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THE  
COASTS  
OF  
WISCONSIN

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BY JAMES NAPOLI

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## INTRODUCTION

It's been only 350 million years or so since the first fishlike creatures emerged from the sea onto the land—onto the coast. Over the subsequent eons, gills gave way to lungs and fins became legs, and the first amphibian left its footprint in Devonian sandstone. In the inconceivable expanse of time since then, man has been in existence only a moment. And the fact that his primal roots are deep in the coastal ecosystem may help explain the sense of regeneration people experience at the water's edge. Surely, anyone brought up near a large water body, who then moved inland, knows the gnawing feeling of loss that move entails.

Rachel Carson called the area where sea meets land the "marginal world," an area which held for her the ultimate mystery of life itself. This margin is more than just a symbol of life; it is one of the most biologically productive regions in nature. Coastal estuarine areas, for example, may produce 20 times the basic plant materials as the open sea, a veritable desert. The high concentration of nutrients for plant growth leads to a high concentration of organisms along the coast, including people.

In fact, most of the world's people are still a part of the coastal ecosystem. Whether for reasons of necessity, convenience, preference, or all three, some three-fourths of the world's population lives near the coast.

However defined, the coastal zone is just a tenuous thread of the earth's land mass. In the United States, that thread stretches some 88,633 miles along the Atlantic, Pacific



# THE COASTAL ZONE

and Arctic Oceans, and another 10,980 miles bordering the Great Lakes. Wisconsin's share is about 620 miles along the rims of Lake Superior and Lake Michigan.

This interface of land and water is put to a multitude of uses by man. The most obvious of these is for living space. About half of the nation's population lives in counties bordering the Great Lakes and the oceans. Even in Wisconsin, where most of the state border is noncoastal, about 43 percent of the population is compressed into the 15 coastal counties. By the year 2000, it is expected that 200 million Americans will be living in U.S. coastal counties.

Because the coastal zone lacks the dimension of inland areas, it is especially vulnerable to population pressures. As an illustration, there are only about five inches of shoreline on the earth's surface for each member of the world's population. In Wisconsin, there are only about nine inches of shoreline for each of the state's four and a half million people.

The coastal zone is also used for recreation by millions of Americans. Their demands have created a booming recreational industry along our shores. Some estimate that by 1975, \$5.5 billion will be spent by Americans each year for swimming, surfing, skin diving, pleasure boating and sport fishing.

The greater part of the nation's trade and industry also occurs at the juncture of land and water. And, clearly, the exploitation of offshore oil and gas, as well as underwater minerals, is of looming importance among coastal uses.

Further, coastal waters have traditionally been a convenient, and most economical,



receptacle for both industrial and domestic waste products. And the same waters we use as a sink for our wastes are a bountiful source of high-protein food. In addition to some five billion pounds of fish caught by U.S. fishermen each year, mostly in coastal waters, there is the very real potential of aquaculture—raising food in water as farmers raise it on land.

Coastal areas are also utilized by the government for such things as military and coast guard installations, NASA bases and parks. This accounts for a relatively small portion of our coastline, however, as does the amount of land set aside for nature preserves.

In using the coastal zone for his own purposes, man is no different from any other inhabitant in the ecosystem. But his capacity—indeed, his inclination—for altering the environment is unique.

For example, in the past 20 years, over half a million acres of our country's important fish and wildlife habitats have been destroyed by dredging and filling. One reason for this is the construction of urban airports on large tracts of wetlands, because they are relatively inexpensive and provide an unobstructed, over-water approach for airplanes.

Virtually every human activity in the coastal zone has the potential for environmental disruption. Residential and agricultural uses of the coast tend to increase sedimentation, eutrophication and toxicity in the water. Poorly located, designed and operated sewage treatment facilities can create health hazards, as well as lower water quality and lessen aesthetic values. The construction of power plants can preempt



valuable coastal land, and their operation can contribute to pollution in both water and air. Drilling and transporting oil sometimes result in spills that victimize beaches, marine organisms and birds. "Disposable" plastic containers lace our beaches, the "trash dumps of the world's flotsam."

In short, besides being a center of human population and activity, the coastal zone has become a microcosm of the environmental problems created by man. It was partly a concern for the deteriorating state of our shorelines but, more immediately, a concern over the mounting and conflicting economic needs and congested population that first caught the attention of policymakers in the 1950s. About that time, the National Academy of Sciences and the Navy began to examine the importance of marine and coastal resources to the nation's future

development in a series of reports. During the next decade, a multitude of related reports, studies and statements were produced, some of which were followed by legislation.

For instance, the National Sea Grant College and Program Act, designed to encourage more efficient use of our marine resources, was passed in 1966.

In that same year, Congress established the Commission on Marine Science, Engineering, and Resources, more popularly known as the Stratton Commission. The members, taken from diverse interests and areas of the country, were given the rather nebulous task of examining the nation's stake in the marine environment. In light of national goals, they were also asked to review the adequacy of present programs

and to formulate a comprehensive long-term national program for marine affairs.

One conclusion of their final report, published in 1969, was that the nation's coastal areas needed particular and immediate attention.

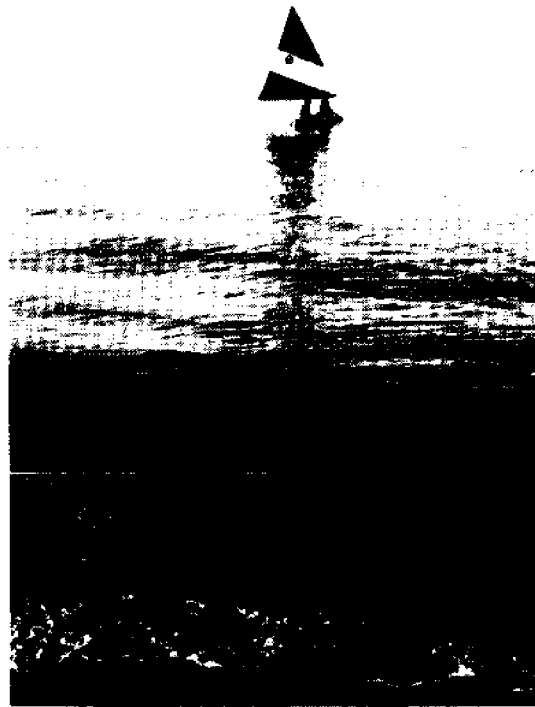
The Stratton Commission recommended that the "primary responsibility for management of the coastal zone continue to be vested in States but that Federal legislation be enacted to encourage and support the creation of State Coastal Zone Authorities to carry out specified national objectives with regard to the zone."

Subsequently, Congress passed and former President Nixon signed the Coastal Zone Management Act in 1972. The act picked up on the recommendations in the 1969 study and created an Office of Coastal Zone Management (OCZM) under the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce.

The law encourages states to develop some comprehensive plan to manage their shoreline and provides them with funds for the preservation of unique coastal areas.

In June 1974, OCZM awarded \$208,000 to the state of Wisconsin to begin developing a coastal management program for its shoreline along Lakes Superior and Michigan. The state contribution to the program amounts to another \$146,000 for the year.

The last section of this booklet examines some of the questions involved in implementing coastal management in Wisconsin. But first, a look at the object of this attention—the Great Lakes coast of Wisconsin.



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## WISCONSIN'S GREAT LAKES COAST

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In the geologic time scale, the five Great Lakes—and, of course, Wisconsin's Great Lakes shoreline—are a recent development. Over a million years ago, no lake even existed. The present Lake Michigan basin was occupied by a great river that flowed to the Gulf of Mexico.

Later, during the Ice Age, the entire Great Lakes region was blanketed by a continental glacier—one or two miles thick. A succession of glaciers ebbed and flowed across the land, the most recent one about 20,000 years ago.

In its last retreat, the Wisconsin glacier gouged out and carried away the softest earth materials, leaving huge basins that later filled with water as the glaciers receded. Harder materials—granites and dolomites—that had withstood the glaciers' onslaught formed many of the lakes' shorelines.

At first, the lakes were quite narrow. But then there was a rainy period and the glacier began to melt more rapidly. The basins filled and overflowed. At one time, the upper Great Lakes spilled over at several spots and they comprised one huge lake—Lake Nipissing. Today, there are only two outlets for the upper lakes: one is through the Port Huron outlet to Lakes Erie and Ontario and then to the St. Lawrence River and the Atlantic Ocean; the other is through the Chicago Sanitary and Ship Canals which goes to the Illinois waterway and to the Mississippi River.

Geologists speculate that during the glacial period, so much of the earth's water was bound up in ice that the levels of the oceans dropped, and a land bridge formed across the Bering Strait. Small, nomadic tribes crossed this bridge from Siberia to the North American continent, and some of these people turned up in the Great Lakes region about 11,000 years ago, after the Wisconsin glacier had disappeared.

Over a thousand-year period, various Indian cultures settled and thrived for a while. But prehistoric civilization gradually disappeared, and the area was uninhabited until recently when other Indians and then white men settled here. That's when man's use of the Great Lakes coastline began in earnest.

## Physical Characteristics of the Coast

The mainland portion of Wisconsin's Lake Superior coast stretches only about 156 miles. The western limit is the Minnesota border at the port of Duluth-Superior, "where the prairie meets the sea." The coastline is severed on the east by Michigan's Upper Peninsula.

The most striking characteristic of the shoreline along Wisconsin's four Lake Superior counties is its evenness and simplicity, interrupted by only two prominent physical features: snub-nosed Bayfield Peninsula and Chequamegon Bay.

The 22 Apostle Islands, the handiwork of the glaciers, are set in the waters around the peninsula.

Because of the relatively young geologic age of the area, the soils are generally of poor quality. They are derived principally from glacial clay, sand and other debris. A flat plain, elevated some 30 to 100 feet above the level of the water, characterizes Douglas County, western Bayfield County and parts of Iron County. The predominantly red clay soils are deeply cut by ravines and by streams and rivers carrying runoff from upland areas to the lake.

Bayfield Peninsula, on the other hand, is typified more by rugged hills and sandstone outcroppings. Another major topographical pattern is that of southwestern Chequamegon Bay and the Kakagon Sloughs. (These are low, flat areas of peat and muck.)

About 50 percent of Wisconsin's Lake Superior shoreline is comprised of high clay



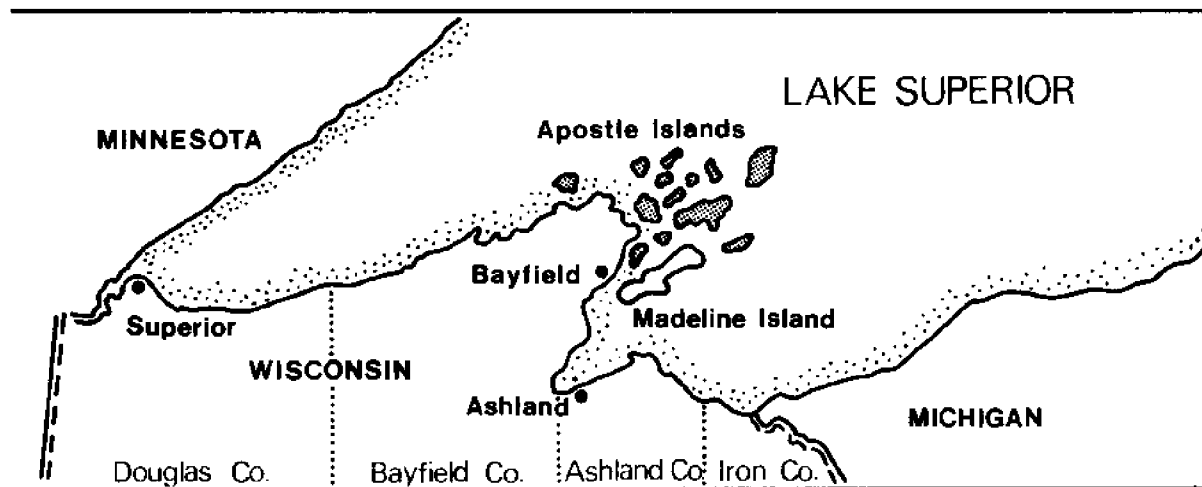
# LAKE SUPERIOR

bluffs, sometimes rising to 100 feet above the level of the lake. These highly erodable bluffs stretch mainly along the linear shores of Douglas and western Bayfield Counties. Farther out on the peninsula, the shore is irregular and many bays of light-colored sandstone beaches stand in striking relief against surrounding red sandstone bluffs. Erosion of the bluffs at the water line has created an array of sandstone caves, accessible only from the water and sometimes large enough to accommodate a small boat.

The coastal sloughs in Ashland County, when viewed from afar, present a two-dimensional picture of vegetation and water. But Ashland County also has a stretch of about eight miles of white sand beach that provides more visual contrast adjacent to the Kakagon Sloughs and along Chequamegon Point, a fingerling peninsula that stretches northwest about one-third the distance across the mouth of the bay.

From the outer edge of Bayfield Peninsula, many of the Apostle Islands are visible. They range in size from the 3 1/3-acre Gull Island to historic 14,904-acre Madeline Island. Together they form an archipelago some 30 miles long and 80 miles wide, and cover some 48,000 acres of land. The lake sides of the islands have had their red brown sandstone shaped by the elemental power of water into fascinating sculpture while the protected shores are bright with beaches. The shorelines of the islands, as of the mainland, are buffered by dense forests of spruce, fir, pine and northern hardwoods.

The islands, together with the marshes and wildlife habitat of the slough area and the beaches of Chequamegon Point, are considered the Apostle Islands Region. The



area has about 25 species of major mammals common to the northern forests, including white-tailed deer and black bear. And bird life is abundant.

Of course, the central and all-pervading reality of the coastal zone is Lake Superior itself. In terms of surface area, it is the world's largest body of fresh water and, in volume, is second only to Lake Baikal in the Soviet Union. Compared to the other four Great Lakes, its surface has a higher elevation above sea level. Its crystalline water is deeper, colder and purer than that of the other lakes, giving its "superior" designation added nuances.

In addition to their Lake Superior shore, the four Wisconsin coastal counties are endowed with innumerable smaller lakes, streams, rivers, flowages and swamp and marsh lands. In all, 184 basins, including the incomparable Brule in the west and the Bad River in the east, drain into Lake Superior from the state.

The climate of the area adjacent to the water is tempered by the lake's presence, making the range in temperatures somewhat less than in areas away from the lake. The winters are long, cold and snowy in the four counties, with a mean January temperature of 13.1° Fahrenheit. The summers are short and cool with a mean July temperature of 66.9° F.

Of course, the lake affects more than the temperature and other climatic conditions of the region. It has also, as we shall see, ordained much of the pattern of human history along its shores.

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### History and Development of the Coast

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In 1490, even before Columbus had set foot on North America, members of the Ojibway (Chippewa) Indian tribe adopted the Chequamegon Bay area of Lake Superior as their home. In their migration from their original home on the Gulf of St. Lawrence,



they had to fight their way through the enemy territory of Fox and Sioux tribes. The Chippewa finally had to cross the mile-and-a-half channel to the "Island of the Golden-Breasted Woodpecker"—Madeline Island—to escape continual harrassment and attacks. Although the island refuge gave them peace for 120 years, it was not an Eden-like existence.

By the seventeenth century, the Indians had overpopulated the island and, during a terrible winter, the tribe's medicine men resorted to cannibalism. That was a mistake, for the outraged tribesmen promptly executed the transgressors. Thereafter, the tribe was haunted by spirits of the medicine men, who walked at night when "balls of fire" rose over the marshes. The village, which once had a population of up to 12,000, was evacuated, and the Chippewa fled back to the mainland and scattered along the Superior coast. It was 200 years before an Indian would again risk staying overnight alone on Madeline Island.

The day of the white man arrived in the region in 1659, when three French traders built the first fur trading post at a site near present-day Ashland. One of the three, Pierre Esprit Radisson, wrote of Chequamegon Bay: "In that bay there is a channell where we take stores of fishes, sturgeons of vast biggness, and Pycks seven feet long."

The first traders were quickly followed by a succession of indefatigable Jesuits bent on converting the heathen Chippewa to Christianity. One missionary, Father Jacques Marquette, drew a map of the lake that was the most accurate one available until very recent times.

But the exploitation of beaver and other fur trades was clearly the major reason for the exploration and settlement of the entire Great Lakes region. The pattern of man's exploitation of the Lake Superior region was thus established from the very beginning.

French fur trading thrived for a while—until 1763, when the British conquered the French and took over their holdings. A British trading post founded in 1793 was in turn taken over in 1816 by John Jacob Astor's American Fur Company and moved to LaPointe on Madeline Island, where it operated until 1845. LaPointe, which had been the hub of economic activity along the lake until the 1840s, diminished in size and importance as land settlement and silk hats took their toll on the fur industry.

Recurrent Indian problems were settled in 1855 when Chippewa chief Na-gon-up signed a treaty with the U.S. Commissioner of Indian Affairs at LaPointe. The vestigial remains of white missionary zeal are evident in the government's demands that the chief give up all but one of his four wives. He kept the best looking one.

The treaty also established two Indian reservations that, today, account for a total of 48 miles—or nearly a third—of the state's Lake Superior coastline. On the extreme northeastern edge of Bayfield Peninsula, 13,652 acres were set aside as the Red Cliff Reservation. Another 194 square miles went to the Bad River Reservation just east of Ashland.



Chippewa Indians spearing fish in winter.

The treaty signing cleared the way for white settlement of the area.

The economic activity of the first settlers was determined by the rich treasure trove of mineral and forest resources.

Pine forests covered the northern two-thirds of the state and contained an estimated 130 billion board feet of high grade lumber. But this seemingly endless stand of trees was virtually cleared in one man's lifetime.

Lumbering provided the initial impetus for the development of Bayfield County, where lumbering reached unprecedented and never-to-be repeated importance. The southern end of the city, established in 1856, was dominated by saw mills in its early days. On a still day, the lake bordering this part of the city was transformed into a giant sawdust field.

Bayfield also became an important commercial fishing port. The abundant whitefish and trout brought the local fishing industry a quarter of a million dollars in 1881. At the same time, local redstone quarries supplied the builders of elegant brownstone houses in Chicago and New York.

The city, whose hills slope gently to the waterfront, thrived. It became a spa for the wealthy of the upper Midwest. Many Queen Ann and Italianate homes with commanding views of the lake still grace Bayfield's hillsides.

The county also attracted settlers from Norway, Sweden, Canada and Finland. In the early part of the century, Croats and Slovaks cleared the land for farming in the central part of Bayfield County.

The latter part of the nineteenth century was, in general, a boom period for the entire Lake Superior coast of Wisconsin.



At the head of the Great Lakes, developers and promoters who had heard of the canal to be built at Sault Ste. Marie between Lake Superior and Lakes Huron and Michigan, laid out ambitious plans for the city of Superior. Superior would be big, they thought, and they set aside an ample 36.6 square miles—nearly the size of Boston—for its growth.

The opening of the first ship lock at Sault Ste. Marie in 1855, did, in fact, facilitate economic delivery of iron ore from Minnesota's giant Mesabi Range to hungry Pittsburgh steel furnaces.

Mining and transporting ore from the Minnesota iron ranges gave Duluth-Superior the economic character it still retains. Hundreds of millions of tons of iron ore have since been moved from Superior's ore docks, the world's largest.

The harbor at Superior has the natural advantage of being behind sand spits, and is larger and better than any harbor in Lake Michigan. Two other good Lake Superior harbors protected by sand spits are at Port Wing and Ashland.

Ashland's early economy was also built on lumbering and ore shipping. Five to six



million tons of ore were shipped annually from Ashland during peak periods. The city even had its own blast furnace around the turn of the century. Ore came to Ashland via railway from the Penokee-Gogebic iron range, the remnant of an ancient mountain range that extends into Wisconsin from Michigan's Upper Peninsula.

Most of the mining in the area was located in Iron County, whose boom period came in the 1880s when the region was first opened up to ore exploitation by mining companies.

But the boom in Iron County, as elsewhere along the coast, was short-lived. The populations of the four coastal counties reached their peak around 1920. Neither the populations, nor the economy, have been the same since then.

In the 1920s, the end of the great lumbering binge was imminent; the last two mines in Iron County closed down after depleting the richest, easiest-to-reach ore; the demands for Bayfield's red sandstone diminished; the commercial fisheries catch began to level off; and even tourism began to drop off.

Farming on cut-over land was still being encouraged in the twenties, even though the poor, thin soil eventually defeated most of the farmers, creating more population loss and unemployment at the worst of possible times—the Depression. Eventually, too, the seemingly unlimited flow of ore from the Mesabi Range dried up, causing chronic economic problems in the Duluth-Superior area.

This economic backdrop provides some understanding of the subsequent condition and current uses and problems of Wisconsin's Lake Superior coastal zone.

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## Current Uses and Problems

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It's become fairly common to compare the area of Wisconsin north of a line between Eau Claire and Green Bay to Appalachia because of its depressed economy. That area, of course, includes the four counties on the state's Lake Superior coast.

And the facts tend to support this comparison, not only for Wisconsin's coast, but for the entire Lake Superior region. It was designated an "economic development region" by the U.S. Secretary of Commerce in 1965.

As a whole, the region is characterized by a rate of unemployment significantly above the national average. The median family income, as well as the available housing, health, and educational facilities, are substantially below that for the rest of the

United States. The rate of outmigration by capital or labor, or both, is substantial, while indices of regional production show a growth rate well below the national average. The area economy, dominated by a few industries in a state of decline, is suffering further adverse effects from changing industrial technology.

Evidence of this can be seen by comparing just the four Lake Superior counties to the rest of Wisconsin.

**Douglas County.** Economically, Douglas County is better off than the other three counties, but still fares poorly when compared to the rest of the state.

The 1970 median family income for the state was \$10,068, while Douglas County had a median family income of \$8,052. The average age of the population is more than two years older than that for the rest of the state, indicating an outmigration of young people. In fact, between 1960 and 1970, population declined by 2,544 people, or 0.8 percent, bucking a state-wide increase during the same period of 11.8 percent.

Superior, though still shipping substantial amounts of grain and taconite pellets, has suffered a decline in the number of available transportation jobs. The shipping situation looked even more dismal in 1974, when all the Great Lakes ports from Duluth-Superior to Rochester were suffering through a depression.

Farming in the region has proved no healthier. In 1969, the county had only 347 farms, compared with 637 a decade before.

**Bayfield County.** During its heyday in 1920, Bayfield County had 17,200 inhabi-

tants. Now, the state's second largest county has a mere 11,700 people, with a median age of around 35, some eight years older than the state average.

Though outmigrations slowed in the 1960s, there has been a severe shrinkage in available jobs, particularly since the closing of the Dupont explosives plant in 1971. Woodworking survives as an industry, but farming and commercial fishing are mere shadows of their former selves.

**Ashland County.** The pattern of a small, declining population with an above-average median age also prevails in Ashland County. In spite of its logging, millworking and shipping operations, the county's economic health in 1974 was poor.

The mayor of Ashland, where more than half of the county's population lives, said recently that the area is in the midst of "an industrial recession" because of the closing of various industrial operations—directly or indirectly causing the loss of 800 already-scarce jobs. The high unemployment rate in the city has been tempered recently only because some short-term public works projects have been initiated.

**Iron County.** The closing of the last two iron mines, and a rapid decline in farming has predictably resulted in population loss for the county and a high median age of those who remain.

Tourism and a number of small plants and woodworking operations haven't been enough to offset the county's economic troubles. Its median family income is the lowest of the four Lake Superior counties and over \$3,000 less than that of the rest of the state.

To add to all of this is the chronically depressed economic state of Indians on the area's two reservations. The two Chippewa bands have even had to fight the state's Department of Natural Resources to maintain their treaty right to freely fish in Lake Superior.

Understandably, then, area residents greet prospects for economic growth with some enthusiasm. One potential spur to the region is the designation of 21 of the 22 Apostle Islands as a National Lakeshore. It will take \$9.2 million to develop the lakeshore, which is expected to generate millions of dollars a year in tourist spending. According to the National Park Service, at least 250,000 tourists were to visit the islands during the summer of 1974. This figure could go as high as 400,000 to 500,000 people, each staying an average of three days.

Without planning, however, what promises to be an economic boon could become a bane, both in an economic and ecological sense.

The northern Bayfield and Ashland County population of about 13,000 people is being asked to provide police protection, roads, medical services, water and sewage facilities, parks, camping areas, parking lots and many other public services on a year-round basis for a resident population that could skyrocket just during summer months.

The counties presently have neither the funds nor the facilities to cope with such demands.

Further, some of the efforts already being made to plan for the lakeshore may just worsen the problems. William Bromberg, former National Park Service Director for



Ashland and the Apostle Islands circa 1867.

the Apostle Islands National Lakeshore, has commented that "the need for trunk highways within a year or two at most is probably our primary need."

The term "freeway effect" is derived from experiences other areas have had with massive highway construction. Increasing accessibility with highways may also increase the demand—sometimes to unacceptable levels. This is a distinct possibility

along the Superior coast of Wisconsin, which is within 250 miles of five million people and within striking distance of many congested and polluted metropolitan areas within the Great Lakes region.

If development at the jumping-off places to the islands is not controlled, it could turn much of the relatively pristine coastal zone into a honky-tonk tourist trap.

One study of Bayfield summarized the potential effects of uncontrolled tourist development as follows:

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*The quiet character of residential streets, the picturesque, one-of-a-kind old buildings, the views over the lake and islands, the surrounding hillsides with their second growth of timber and neat rows of apple trees—these are all a part of Bayfield's "Bayfield-ness." Once this is destroyed or desecrated, it can never be brought back. Unplanned, chaotic, congestion-producing development would destroy or desecrate these very features. It would turn Bayfield into another dull "Anywhere, U.S.A." community.*

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Bayfield's residents are aware of their city's assets and will probably fight to keep them. But it remains to be seen whether zoning ordinances in Ashland and Bayfield Counties are adequate to handle the un-toward growth expected to result from the development of the lakeshore.

Aside from the aesthetic deterioration of shoreline communities, the opening of the Apostle Islands National Lakeshore could create more far-reaching water quality problems.

It is generally conceded that the water of Lake Superior is of high quality at present. According to a recent DNR report, pollution is extremely difficult to demonstrate to any extent in the open water of the lake. It was shown to occur only in the vicinity of waste discharges, particularly around the population centers of Duluth-Superior and Ashland.

But in 1970, the Federal Water Pollution Control Administration counted wastes from 61 industries, 91 municipalities and 124 federal installations being dumped into Superior or its tributaries. This could pose a problem since pollution can be particularly long-lived in Lake Superior, which requires about 500 years to completely flush out its water, compared to 100 years in Lake Michigan and two-and-a-half years in Lake Erie.

According to the DNR report, though water quality in the offshore waters of Lake Superior is generally very high, there are some early signs of deterioration in Chequamegon Bay. In the bay area, concentrations of phosphorus, a fertilizing element, may sometimes reach levels high enough to sustain nuisance algae growth. Such nutrients as phosphorus and nitrogen come from a variety of sources, including sewage, agricultural runoff and sediments from land erosion.

Few of the sources of municipal or industrial effluent along the state's coast meet federal water quality standards for Lake Superior. And poor planning to provide adequate sanitary landfill sites, sewage treatment plants and sewer mains for the national lakeshore could also have an adverse effect on the water quality.

Another potential for economic growth is mining. This too has the potential for causing environmental deterioration.

Although there is no rich iron ore in northern Wisconsin, both Ashland and Iron Counties have thousands of acres of low-grade taconite ore under 99-year leases to various steel companies. The taconite is first crushed so the iron can be separated magnetically from the sand. The iron is then

rolled into pellets to feed into blast furnaces for making steel.

Although taconite development is not seen in the immediate future, it could eventually result in open pit mining that would not only destroy the precious scenic landscape, but could contribute to surface and groundwater pollution. Dumping of the taconite wastes could also create major problems, as it has for nearby Reserve Mining on Minnesota's Lake Superior shore.

Reserve has been dumping its wastes—amounting, now, to about 67,000 tons a day—into the lake for 18 years. These wastes, or tailings, are alleged to accelerate bacterial growth, increase algae growth, decrease the fish population and, recently, to contribute potentially carcinogenic asbestos-like fibers to the air and water. These fibers have even been found in the water supply of Duluth. The tailings also create an aesthetic problem by discoloring the water of Lake Superior.

Future coastal planning for taconite development would have to minimize such effects.

Copper, too, is indigenous to the area—open-pit copper mining goes back at least 4,000 years to the Old Copper People. Copper—in addition to gold, nickel and silver ores—can also be found beneath Lake Superior itself. However, the environmental impact of mining in the Great Lakes needs a long, hard look. Presently, such mining is neither economically nor ecologically feasible.

The lake is already suffering from the natural input of sediments into the water. Rapid red clay erosion, particularly along the western third of the coast, has been a serious problem, not only because it



Reserve Mining Company processing plant in Silver Bay, Minnesota.



Red clay erosion on Lake Superior.

decreases the aesthetic value of the lake, but also because it clogs the gravel beds needed for trout spawning and reduces the amount of oxygen in the water, among other things.

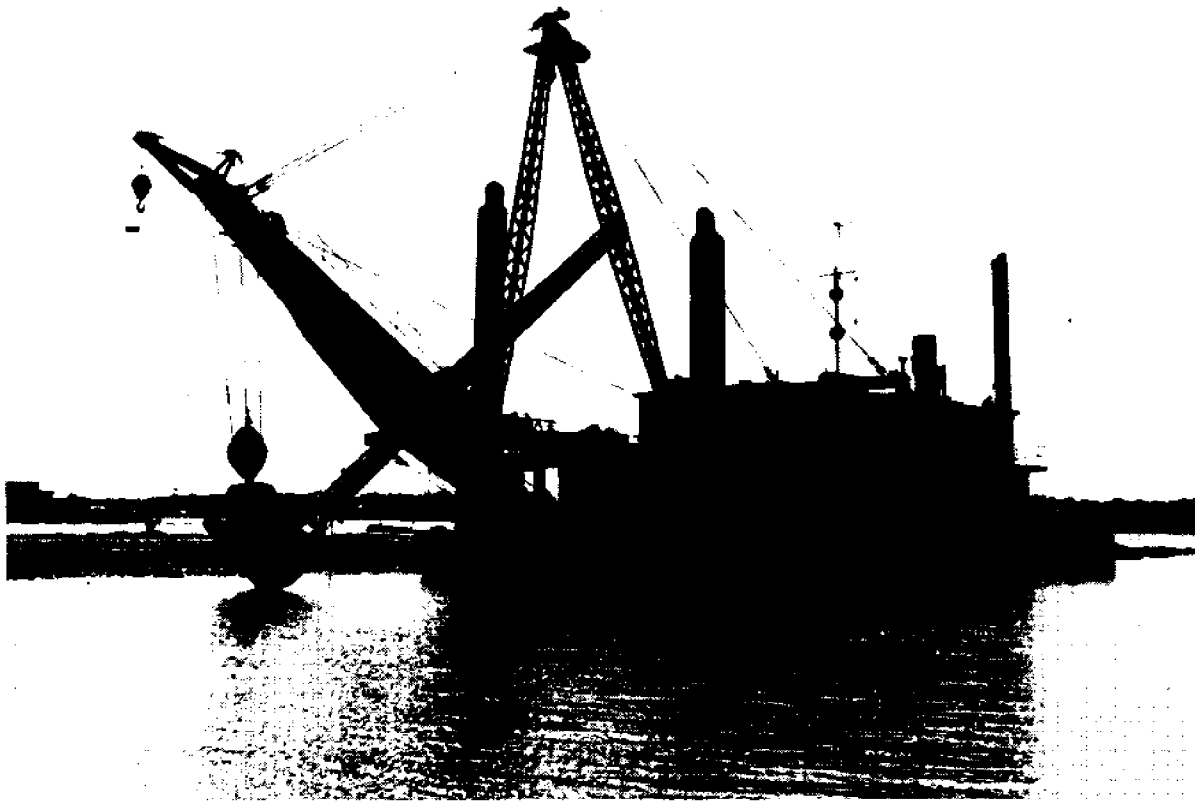
Man has been aggravating the erosion problem by his destructive logging practices. By taking away the trees, he has also taken away the roots that helped hold the red clay in place. By grazing his animals along stream banks and ravines, he laid the soil bare to be carried away by the next cloudburst.

According to a recent report of the state's Red Clay Interagency Committee, controlling the erosion of red clay will involve improved soil and water management and improved highway construction and forestry methods.

But erosion and shoreland damage have been on the increase along Lake Superior, particularly since the International Joint Commission recently started regulating water levels on an experimental basis. The IJC's water level manipulations are designed to hold back water in Lake Superior during periods of high precipitation to reduce the water levels in the other lakes.

Though such manipulation may improve shoreline conditions in Lake Michigan, the erodable shoreline of Superior—the other end of the see-saw—obviously suffers for it. In addition, the 24.6 miles of Lake Superior shoreline subject to flooding are jeopardized by increased water levels.

Ideally, shoreline areas vulnerable to flooding or high erosion should be kept as forest land or natural conservancy areas. This is more easily said than done, however,



since new home building tends to take place along the lakes and streams of the Lake Superior Basin.

Some efforts are being made to protect especially valuable shoreline land. A proposal has been made to the federal Office of Coastal Zone Management to declare the Fish Creek Basin on Bayfield Peninsula and the Bad River Estuarine area in Ashland County as national estuarine sanctuaries.

The Bad River estuary has an extensive wetland area on the Bad River Indian Reservation that is important as a fish spawning area and waterfowl habitat. And, because of the wild rice beds in the wetland that produce a cash crop for the Indians, it would be financially, as well as ecologically, disastrous if the area were developed and destroyed.

Land use pressures along the shore are bound to become more acute with the

growing influx of seasonal residents, speculative land developers and mining activities. In addition, vacationers will want greater access to the shore—only 8.6 miles of the 156-mile mainland coast are currently accessible to the public.

There will be more boating and, particularly, more sport fishing. Control of the lamprey, restocking native fish species and the introduction of salmon have stimulated the sport fishery in recent years. A limited commercial fishery still exists in Lake Superior with some prospects for growth.

Radical shoreline development for port improvements of various kinds also has to take place if the lake's ports are ever to compete successfully with those along the ocean's coasts. To facilitate regional bulk shipping—which may be the real future of Great Lakes ports—Superior is now building a \$100 million terminal for handling coal from the west.

Uses of the water along the shore will continue to be demanded for treating municipal, industrial and agricultural wastes; for irrigation and livestock; for mining; for power plant cooling and for various domestic uses.

And all these varied uses are expected to function without impinging on one another and without lowering the quality of the water or the land.

Even with a sparse population and low level of development, the coastal zone of Lake Superior presents planners with a Gordian knot of managerial problems. No sword presently in existence is capable of cutting through it. And the unraveling has barely begun.



## Physical Characteristics

The Wisconsin coast of Lake Michigan is 407 miles long, a fraction of the entire 1,361-mile length of the lake shoreline. Except for Door Peninsula, which pinches off a portion of the northwest corner of the lake to form Green Bay, Wisconsin's lake shoreline is rather even.

From the southern end of Door Peninsula to the Illinois boundary, there are a few broad capes, but there are no bays or harbors except for the mouths of small rivers. In fact, the ports of Milwaukee, Racine, Kenosha, Sheboygan, Kewaunee, Algoma, Two Rivers and Port Washington are not natural harbors but just river mouths.

The only two large streams along the lake's shores are the Fox and the Menominee Rivers, both of which empty into Green Bay, the largest bay on the lake.

The west coast of the bay is low, the land ascending gradually to the west. The Menominee, Oconto and Peshtigo Rivers form broad, low deltas, and the mouths of these rivers form harbors. On the west side of the bay are the rich wetlands around Suamico, a home for herons, gulls and caspian terns.

Most of this portion of the shoreline is characterized by beaches with a few rare cliffs. Extending into the bay north of the city of Green Bay is Long Tail Point—a national wildlife refuge on one of three sand spits in the lower bay.

The east coast of Green Bay (the west coast of Door Peninsula) is, by contrast, bold and rugged. There are some cliffs cut



# LAKE MICHIGAN

into the shore, notably at Red Banks northeast of Green Bay city, and, farther out, at Peninsula State Park.

The peninsula consists mainly of a sheet of hard, porous Niagara limestone deposited by preglacial waters. This hard limestone split one of the glaciers in its southward trek, causing one part to form the Green Bay-Lake Winnebago-Rock River lowlands while the other part flowed into the Lake Michigan valley.

The peninsula itself has some 250 miles of shoreline. At its tip, at the so-called "top of the thumb," is Porte de Morts Strait or Death's Door—which accounts for the name of the peninsula and the county. This strait separates Washington Island and three other smaller, rugged islands from the land mass. The peninsula is truncated at Sturgeon Bay partly by a man-made canal that cuts through the county about 12 miles from its southern boundary.

The lake side of the peninsula—indeed, the entire west coast of Lake Michigan—is largely characterized by cliffs. But, rather than steep rock cliffs, they are mainly sloping bluffs. Lake action has moved gravel and sand across the mouths of several deep shoreline indentations, converting some bays into coastal lakes. In Door County, Kangaroo Lake, Clark Lake and Europe Lake are all products of the building action of waves and currents.

At the same time, much of the lake shore is still being cut back by waves. Rapid erosion is nothing new or abnormal—it's part of a natural process that has been continuing for centuries; this should be kept in mind when discussing current shoreland

"damage" problems. The beaches at the base of the cliffs remain narrow as the currents carry the eroded materials away.

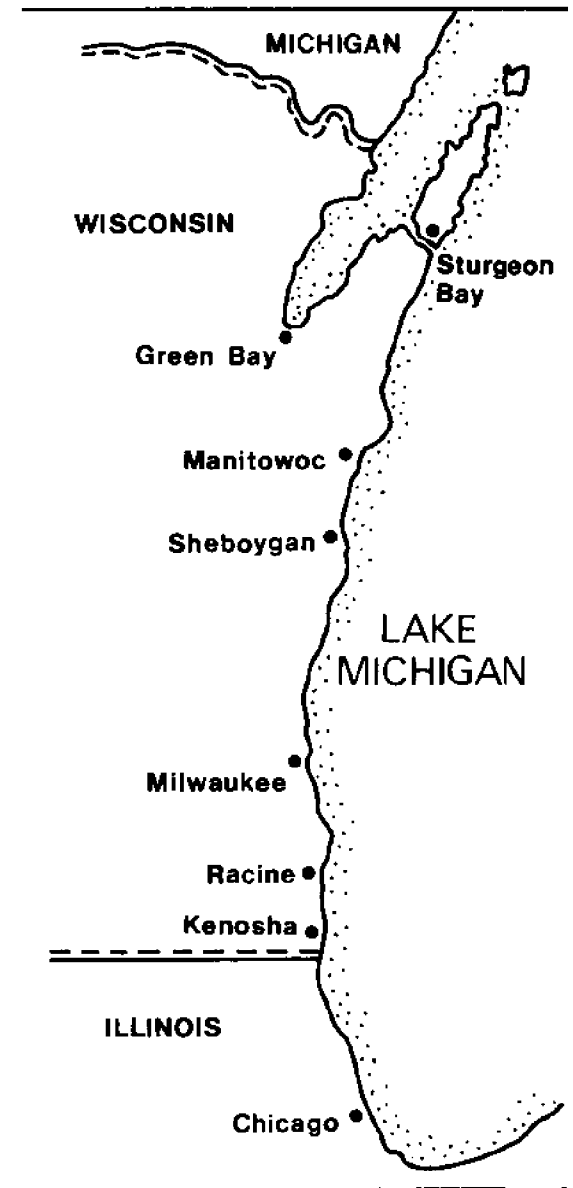
Some parts of the shore, such as in Marinette County, are lined with a variety of tree species reflecting the diversity of soil types. In addition to pine and other softwoods, there are aspen, oak and hard maple. North of Green Bay, towards Michigan, the forests still support some large wildlife. In the southerly areas, there are farm game such as pheasant, cottontail rabbits and gray and fox squirrels.

The climate of the region is greatly influenced by the presence of the lake, particularly by modifying the temperature fluctuations of the nearby land.

Residents of Door County, with its unique location between Green Bay and the lake, boast that their county is "air conditioned by nature." Summer temperatures average three to five degrees cooler than inland areas of the same latitude, while its winter temperatures are three to four degrees warmer. In the fall, the warm air from the lake keeps the leaves from falling for a long period of time; in the spring, cold air from the lake retards vegetative growth till late May.

Lake Michigan itself, though smaller than Superior, is still quite large, having a surface area of 22,400 square miles. In terms of water volume, it is the fourth largest body of fresh water in the world. It is the only one of the Great Lakes that lies totally within the United States—jurisdiction over the other lakes is shared with Canada. Lake Michigan is connected to the rest of the Great Lakes system only by the Straits of Mackinac, and

hangs, somewhat awkwardly, like a massive cul-de-sac, down into the middle of the American upper Midwest.



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## History and Early Development

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Wisconsin, said Theodore Roosevelt, is one of those states "destined to be the greatest, the richest, the most prosperous of all the great, rich, and prosperous commonwealths which go to make up the mightiest republic the world has ever seen." The reason for all this good fortune, in Roosevelt's eyes, was the state's fortuitous location both on the Great Lakes and the Mississippi River.

But the first white man to land on the shores of what is now Wisconsin wasn't quite so pleased with its location.

In 1634, Jean Nicolet was looking for a water passage to the Orient—he found Green Bay. He hoped that a mysterious western people known as the Puants, or People of the Stinking Waters, might be inhabitants of eastern China—they were Winnebago Indians, still very much in North America.

Besides the Winnebago, a Siouan tribe that lived between Green Bay and Lake Winnebago, the region was inhabited by the Dakota in the northwestern part of the state, and the Menominee, an Algonquian tribe, west of Green Bay along the Menominee River.

Nicolet had been sent on his western voyage by Samuel de Champlain, governor of New France, to settle an Indian dispute, which he succeeded in doing.

When he returned to Quebec, he brought word that the continent was larger than anyone had suspected and that the area he had visited was rich in fur and fish.

But it wasn't until 20 years later, after some costly wars in the east, that white men returned to the area.

In 1656, Medart Chouart, Sieur des Groseilliers, and his brother-in-law Pierre d'Esprit, Sieur Radisson, made their first exploratory voyage to "the great lake of the stinkings," Green Bay.

Radisson wrote of Wisconsin: "I can assure you I liked noe country, as I have that wherein we wintered; for whatever a man could desire was to be had in great

plenty: viz. staggs, fishes in abundance, and all sort of meat, corne enough..."

Radisson and Groseilliers eventually found their way to Lake Superior and organized a trading party to Montreal, opening up what was eventually to be a lucrative fur trade in the region.

Close on the heels of the first traders were the early missionaries—most prominently, Father Jacques Marquette and the Jesuit-trained Canadian explorer, Louis Joliet. They are credited with first discovering (or



Commercial fishing camp.



The Fox River industrial waterfront, Green Bay, 1889.

at least, first recording the discovery of) the upper Mississippi.

The settling and exploitation of the Lake Michigan region followed the same pattern as that for the lower lakes. Explorers, missionaries, traders—these were followed by fishermen, then loggers, miners, soldiers, Indian agents, and finally, farmers and homesteaders.

Green Bay was the first white settlement in Wisconsin, and its strategic location on the Green Bay-Fox River waterway, which linked to the Mississippi River, gave it

particular importance to voyageurs and traders. It was also a strategic position in the conflicts between France and England, and later England and the United States. Fortifications around Green Bay were manned by French, English and American soldiers, each in their turn.

Green Bay became the locus of development in the northeastern part of the state, largely because of its port and other transportation facilities.

On the western shore of the bay, early development took the form of lumbering

and farming. In the 1840s, sawmills were established on the Pensaukee, Peshtigo, Oconto and Menominee Rivers. Late in the 19th century, Marinette and its sister city across the Michigan border, Menominee, were among the largest lumber-producing cities in the United States.

Door County, on the opposite shore of the bay, was also subjected to large scale lumbering around 1850, as one of the finest stands of white pine the world has ever seen was logged and shipped out.

The carelessness of the logging operation in the area and a long period of drought were the main reasons for the Peshtigo fire, the worst single disaster in U.S. history from the standpoint of lives lost.

An estimated 1,200 to 1,300 people perished in the uncontrollable blaze which raged on both sides of Green Bay. It took place on October 8, 1871, the same day the more famous Chicago fire was burning 200 miles to the south. Whatever the immediate cause, the conflagration was uncontrollable because of the wasteland of huge stumps and fallen trees left by lumberjacks—the region was a tinderbox in a dry season.

The clearing of the land, however, also cleared the way for agricultural development by immigrant Germans, Norwegians, Belgians, Swedes and Danes. Dairy farming, in particular, became an important source of income in the coastal counties in the northeastern part of the state.

Lumbering also spawned a major shipbuilding industry, which still survives today at Sturgeon Bay. The construction of the Sturgeon Bay and Lake Michigan Canal in the latter part of the 19th century also

facilitated shipping to Green Bay, which was undergoing steady industrial growth.

Another early industry—particularly in Door and Manitowoc Counties—was fishing for lake trout, whitefish, pike and other species that once abounded in Lake Michigan. The fishery has been declining for the past 70 years to the point where the

predominant species is now the alewife, a small bony herring used mainly for animal feed and cat food. Alewives are a food staple for sport fish, however, and are a potential protein source for humans.

Meanwhile, the population continued to spiral upward around Green Bay, just as it did around the other major population center along the state's Lake Michigan shoreline, Milwaukee.

Milwaukee's history goes back to the latter part of the 17th century when French missionaries and the French explorer LaSalle first visited the site. In 1795, French Canadian fur traders who had come to barter with the Indians established a trading post there.

But it wasn't until 1818 that Solomon Juneau, an agent with the American Fur Company, established a permanent settlement. His settlement merged with several nearby villages after 1835 to form Milwaukee, which was incorporated as a city in 1846.

Lake steamers carried settlers by the thousands to the new city. German immigrants, arriving after 1848, further stimulated its political, economic and social development.

The word "Milwaukee" is from an Indian term meaning "gathering place by the



water," an apt term since it's located at the juncture of the Milwaukee, Kinnickinnic and Menominee Rivers.

Milwaukee quickly outstripped Green Bay as a port. Unlike the bay city, whose shipping season is usually limited to eight months a year by winter ice, the port of Milwaukee is substantially ice-free for the greater part of the winter. It was thus open for intralake shipping all-year-round.

The city became a great grain shipping port when wheat production reached its

peak in Wisconsin and nearby states around 1860. It was also in a central location for gathering together raw materials, like iron and hides, as well as for supplying growing markets both to the east and west.

Immigrants also brought their skills to help shape the economic character of the city. Not only were the immigrants expert beer-brewers, but they were skilled metal workers, which helps explain the rapid industrial growth of the entire county. The area became a center for great machinery plants.



Milwaukee Harbor, 1880-1890.

Over the years, the tendrils of urbanization extended south towards Chicago and north towards Green Bay until the greater part of the lake coastline was developed.

Ozaukee, the state's smallest county just north of Milwaukee, was first settled in 1835 after the survey of the Milwaukee-Green Bay road. And it wasn't long before saw and grist mills, using water power from the Milwaukee River and other streams, were in operation. Now the county is an important manufacturing center, with the second fastest growing county population in the state.

To Milwaukee's south, the counties of Kenosha and Racine were quickly settled and industrialized under inexorable pressure from the developing cities of Chicago and Milwaukee with their enormous markets and transportation networks.

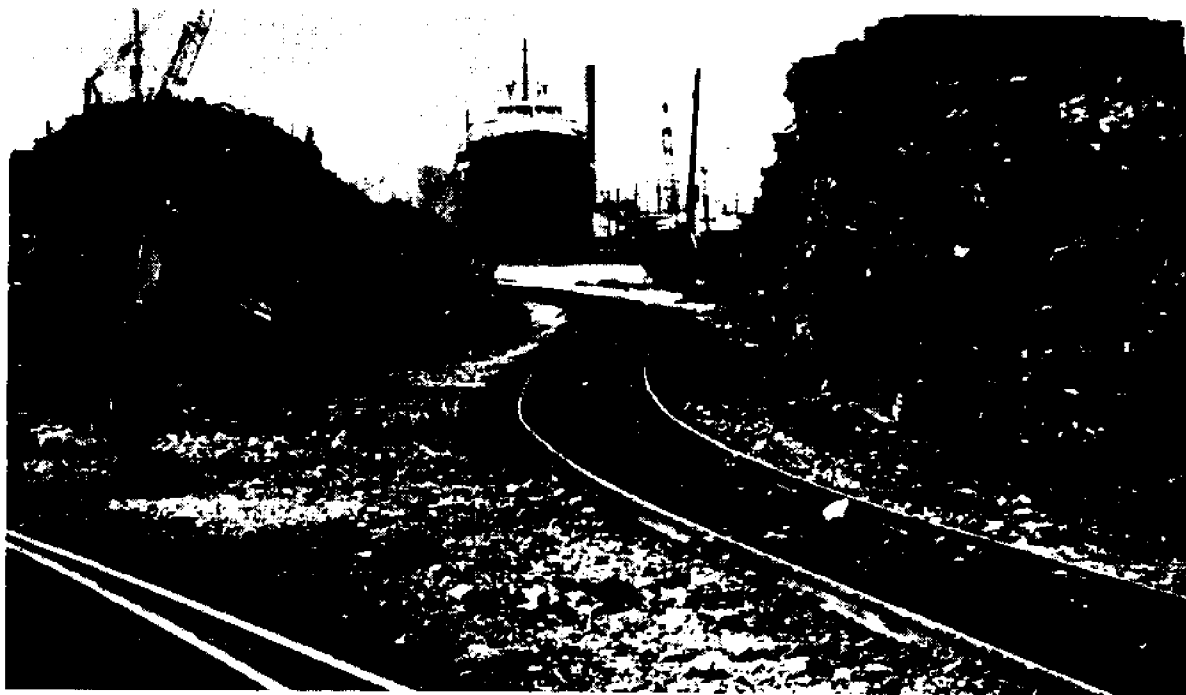
As Wisconsin proceeded to fulfill Roosevelt's prophecy of becoming one of "the greatest, the richest, the most prosperous" states by its urban and industrial expansion along the coast, it was also laying the groundwork for some of the most inextricable coastal problems. Both the benefits and the costs have accrued to this generation.

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### Lake Michigan: Current Uses and Problems

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The Lake Michigan coast of Wisconsin is part of a giant megalopolitan area developing on both the U.S. and Canadian sides of the Great Lakes. Like the Boston-New York-Washington complex in the east, and the sprawling Los Angeles metropolitan area in the west, the Great Lakes megalopolis has



evolved into a new form of human settlement. It is a system characterized by large urban areas tied together by proximity, increasing levels of interaction, reliance on common sources of raw materials, dependence on heavy industry and last, but not least, a common interest in the Great Lakes.

Some planners maintain that it could become the main area of future growth in the U.S. and Canada, but only if its resources are properly maintained and developed. Otherwise, they say, the region, which is already disadvantaged by a harsh climate, could turn into the polluted backwater of the North American continent.

Wisconsin's 11 Lake Michigan coastal counties have about 42 percent of the entire population of the state, which has 72

counties. The most intense development of the shore occurs in the southern portion of the state from the Illinois-Wisconsin line to Port Washington. This development has been primarily for residential, industrial and recreational purposes. North of Port Washington to the Sturgeon Bay canal on Door County, the land is largely agricultural with some undeveloped pieces. The main centers of development along this stretch are at the cities of Sheboygan, Manitowoc, Two Rivers and Algoma. Door County is a very popular summer resort and its shores are lined with numerous summer homes, cabins, resorts, public parks and marinas. The city of Green Bay is, of course, a center of development, but the rest of the coast around the bay is characterized mostly by seasonal and cottage development.

In sum, the uses of the 407-mile mainland coast are as follows: 148.9 miles (37 percent) residential; 12.9 miles (3 percent) industrial and commercial; 103.8 miles (26 percent) agricultural and undeveloped; 54.4 miles (13 percent) parks; 18.2 miles (5 percent) wildlife preserves and game lands; 60 miles (14 percent) forest; 8.8 miles (2 percent) public buildings and adjoining lands. About 75 miles, or 18.5 percent of the entire shoreline, belong to the public; the remaining 81.5 percent is in private hands.

Since one-third of the coast is used for private residential purposes, erosion has become the most visible, though perhaps not the most important, shoreline problem. Included in this residential reach of shore is a 15-mile concentration of expensive homes just north of Milwaukee Harbor.

During 1973, an estimated \$15 million damage was caused by erosion along the state's Lake Michigan coast. A number of homes are already perched precariously on slumping bluffs.

Several landowners' associations have sprung up to devise some short-term measures to slow the expropriation of their land by the lake, as well as push for more long-range programs, including lake level control.

The erosion rate fluctuates with variations in the levels of the lakes, which are caused mainly by the amount of precipitation. In the mid-1960s there was low precipitation and low lake levels, making people forget the recurrent years of high water in the past.

This false sense of security was dissipated in the early 1970s, starting in 1971, when there was extreme precipitation and high levels on all the lakes except Superior. In



Green Bay flood, 1973.

1973, Lake Michigan was 5.6 feet higher than at the most recent low point in 1964.

The outlook for 1975 is for continued high lake levels, and scientists aren't taking any bets for when the high water conditions will abate.

Another consequence of high water levels is flooding. Most of the flood-prone areas of the Lake Michigan coast are centered on the west bank of Green Bay between the cities of Marinette and Green Bay, where about 62 of 76 miles are subject to flooding.

Residents of Oconto and Marinette counties, where there is considerable coastal home development, have been so concerned about flooding that they have attempted to fill in the low shoreland themselves. But many flood-prone areas are benefiting from the Army Corps of Engineers Operation Foresight. According to the Corps, shore protection works have been constructed for a length of about 100 miles, shielding 139 Great Lakes communities from inundation.

However, the Corps makes a distinction between flooding and erosion. If waves reach the shoreline structure, it's flooding; if they only undermine the bluff or dune where the structure is placed, then it's erosion.

The Corps can only offer residents trying to cope with erosion, some advice, construction permits and sympathy—no money.

That's little comfort to shoreline owners, some of whose property values have dropped from 30 to 50 percent in the past few years. It can cost from 30 to 200 dollars a foot for shore protection, an exorbitant sum for most people. And then there is the likelihood that a structure privately built to protect a minute segment of the coast will only worsen conditions on adjoining land.



But funding from local, state or federal governments for broader protection from erosion raises a sticky question of equity. Some have asked: Why should the people as a whole subsidize a select few to live on shoreline property that is known to be susceptible to natural erosional processes?

It must be remembered that erosion has been occurring for eons. One estimate is that the coast from Manitowoc to Chicago has been cut back by waves an average 5.28 feet a year for two or three thousand years.

But then, the equity argument can also be applied to people who build in flood-prone areas and do get government aid.

At least one prospect for general relief to shoreline residents has been offered by the International Joint Commission (IJC), which regulates Great Lakes levels for the United States and Canada.

The IJC has proposed, along with the Corps of Engineers, to reduce the outflow from Lake Superior through the St. Mary's River during high water periods to lower the levels of other lakes—particularly Lakes Michigan and Huron. Such a plan has already been implemented on a temporary basis.

As might be expected, the IJC plan has met stiff resistance from Wisconsin, Minnesota and upper Michigan residents along Lake Superior. They point out that, if the proposal is adopted, no compensation for damage to Lake Superior property from the artificially high lake level would be provided. Again, as might be expected, the response of the beneficiaries of the plan along Lake Michigan is favorable. The IJC was holding hearings in 1974 on several

alternatives for lake level control, and is considering some compensation schemes.

The discussion of erosion and flooding is concerned mainly with the effects the lake has had on shoreline development, but there's also the question of the effects development has had on the lake—and most of them are bad.

Major development along the lakeshore has contributed to deterioration in the lake itself. Residential development contributes sewage, often raw or inadequately treated, which causes heavy concentrations of nutrients in nearshore waters. These nutrients can stimulate dense growths of weeds and algae in the water and deplete the oxygen supply for fish.

Industrial development, such as the paper mills on the Fox River leading into Green Bay, can also decrease the oxygen supply in the water.

Other symptoms of industrial pollution include the increased quantities of chlorides and sulfates, heavy metals, and mercury that wend their way into the air and water.

Agricultural uses spur eutrophication by providing another source of nutrient runoff. Perhaps even more serious, farms contribute a host of dangerous synthetic compounds in pesticides and chemical fertilizers that escape into the lake. And boats and ships are a chronic source of oil and sewage, while power plants inject another possible pollutant, hot water.

All these human sources of pollution have a way of coming home to roost.

For example, in the Green Bay drainage basin, 11 municipal sewage plants, 17 pulp and paper mills and hundreds of farms

contribute their wastes to the bay. In the extreme lower bay, organic wastes have created an insufferable eutrophication problem that is as bad as anything in notorious Lake Erie.

It has reached the point where recreational uses of the lower bay have practically stopped; public beaches in the area have been closed. Boaters have complained that the pea-soup consistency of the water clogs boat filters, causing equipment failures. Many Green Bay residents now seek their recreation on the inland lakes of the northern counties.

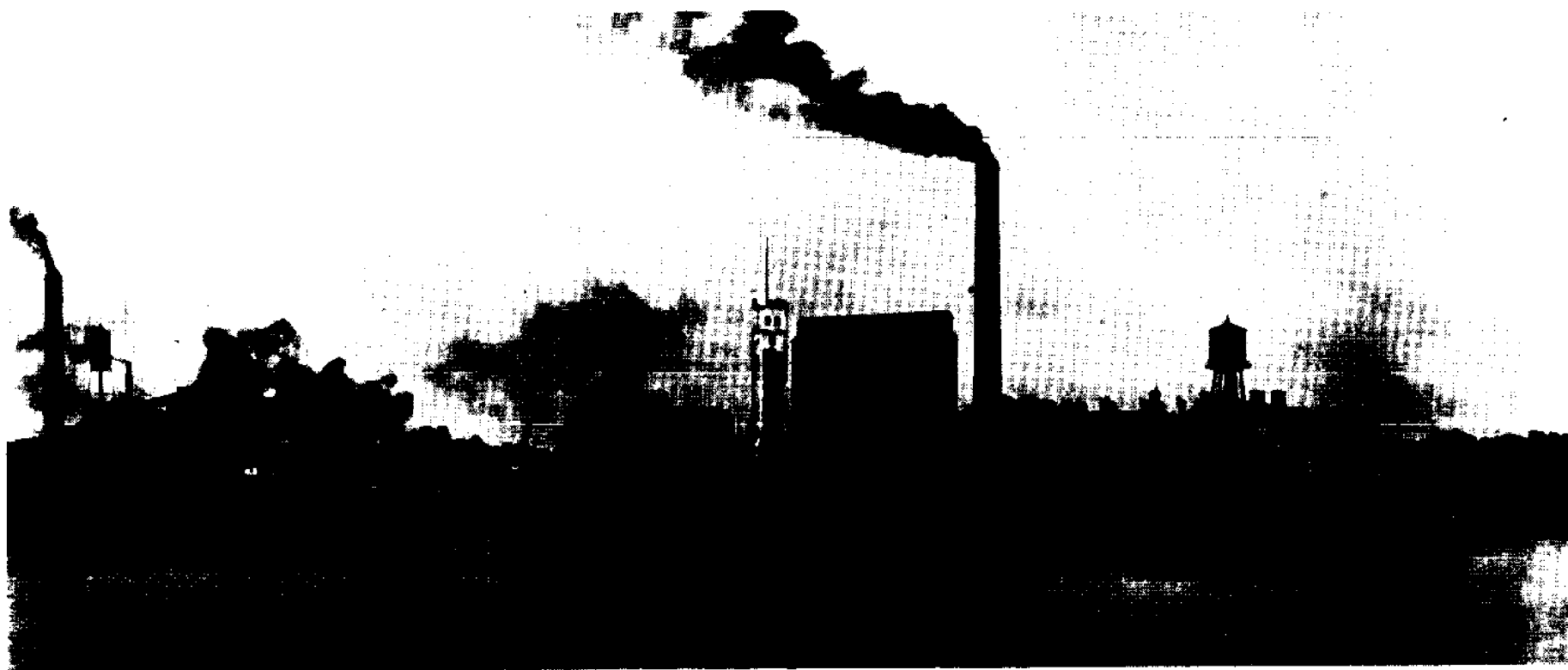
Furthermore, the quality of the bay water has made it necessary for the city of Green Bay to pipe its municipal water supply all the way from Lake Michigan proper. The deterioration also poses a threat to tourism in Door County, which is already suffering groundwater contamination from inadequate septic systems.

And, although the commercial fishery is hanging on in the bay, the fishery ecosystem has been thrown out of balance by eutrophication, as well as by overfishing and the invasion of exotic species like alewives and the parasitic lamprey.

The harvest of valuable fish like the chubs has gone down, while the less desirable, but ubiquitous, alewife has become the major catch in the lower bay. A similar condition characterizes the commercial fishery in the lake as a whole.

The peculiar physical configuration of Green Bay intensifies the effects of pollution there, but symptoms of pollution are apparent along the entire Lake Michigan coast.

The Milwaukee River, for instance, has the reputation of being a running sewer. The



Northern paper mills along the Fox River, 1910.

river has shown continuous evidence of bacterial pollution, and beaches near the city have been closed intermittently because of high coliform counts.

And, while the central, deep waters of the lake remain relatively pure, evidence of eutrophication in the southerly basin is increasing. Since 1971, Lake Michigan fish have carried levels of DDT and polychlorinated-biphenyls sufficiently high to warrant their ban from interstate commerce—one more blow to the faltering commercial fishery. The levels of these two

compounds were reported down somewhat in 1974.

The environmental effects of development on the coast are not restricted to the water. Recent evidence has shown that pollutants from lakeside freeways, airports and coal-fired power plants can be turned into petrochemical smog during the summer when stabilized lake air penetrates inland.

And that's what happened in the summer of 1974, when ozone levels in Racine and Milwaukee reached levels comparable to common levels in smog-ridden Los Angeles.

Heavy shoreline development has also meant a loss of valuable ecological areas, like wetlands, and of areas with historical value or recreational potential.

Because coastal land is expensive, communities have tended to buy inland areas for recreational purposes. Of the 75 miles of public land on Lake Michigan, the majority is located outside the urban areas. This can be a significant deprivation for the urban poor and elderly unable to travel at will. In some ways, the shoreline is a preserve for the affluent.

Some exceptions to this situation are in Milwaukee, where the Park Commission operates a system of 10 parks and beaches covering a total of nine shoreland miles, and in Sheboygan, with its system of contiguous city parks. Milwaukee is also using harbor dredgings to build a 53-acre park behind a diked compound in the outer harbor, which will be used for fairs and its annual Summerfest celebration.

Those city dwellers who do have the means to travel—and there may be more of them, with more money and leisure time in the future—are going to increase the pressure on existing lakeshore recreational facilities.

In Door County, the most popular summer resort area in the state, the public has access to the water at only 21 points, all but six of them on the Green Bay side of the peninsula. Although there are plans for the construction of more public access points, the proliferation of cottages along most of the county's shoreline is already eliminating some of the best areas for future park and recreation development. And Door County property owners generally oppose purchase and construction of more public facilities or parks.

Shoreline residential growth may also impede the construction of marinas and harbors for the booming boating industry in Wisconsin. Wisconsin facilities are already inadequate to meet the boating demand; the state has only 24 federal deep draft or small craft harbors, many of them too small to handle today's recreational boating demand. In Green Bay, for example, there were only 197 slips available for docking for about 1,500 registered boats in the 16 to 25-foot class.

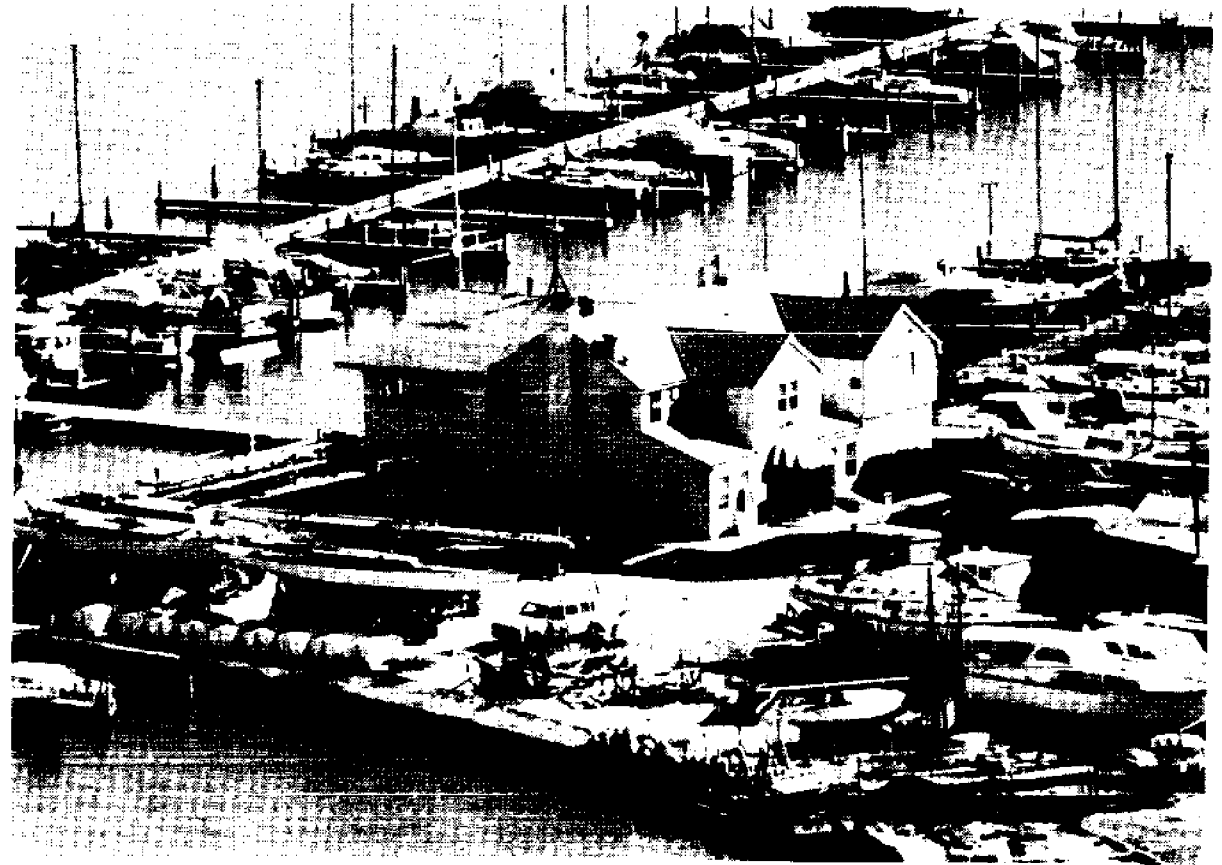
In addition, the smaller size of today's boats requires more harbors of refuge set closer together, not only to disperse the crowd, but also to insure their safety during sudden storms.

Lake Michigan ports also have to be revamped for commercial shipping activities. As it stands now, Wisconsin's major Lake Michigan ports—Green Bay and Milwaukee—are both in a state of decline.

Once important stops on the 2300-mile St. Lawrence Seaway route, Wisconsin's ports

are now sharing in the general state of depression afflicting all inland ports. In 1974, international cargo shipping in the Great Lakes was down two-thirds from the record 8.9 million tons moved in 1971.

Part of the problem may be temporary, due to chronic labor problems on the docks. But, more importantly, the Great Lakes ports suffer some endemic problems. These stem from the fact that the seaway locks are too small to accommodate most ocean-going vessels being built today, and from obsolete dock facilities, ice that paralyzes winter



shipping and heavy competition from the railroads.

The picture is not entirely bleak, however. The ports may still sustain their economic

viability by increased handling of bulk commodities, like iron ore, coal and grain. In addition, there is a good potential for some lake shipping activities like passenger cruise

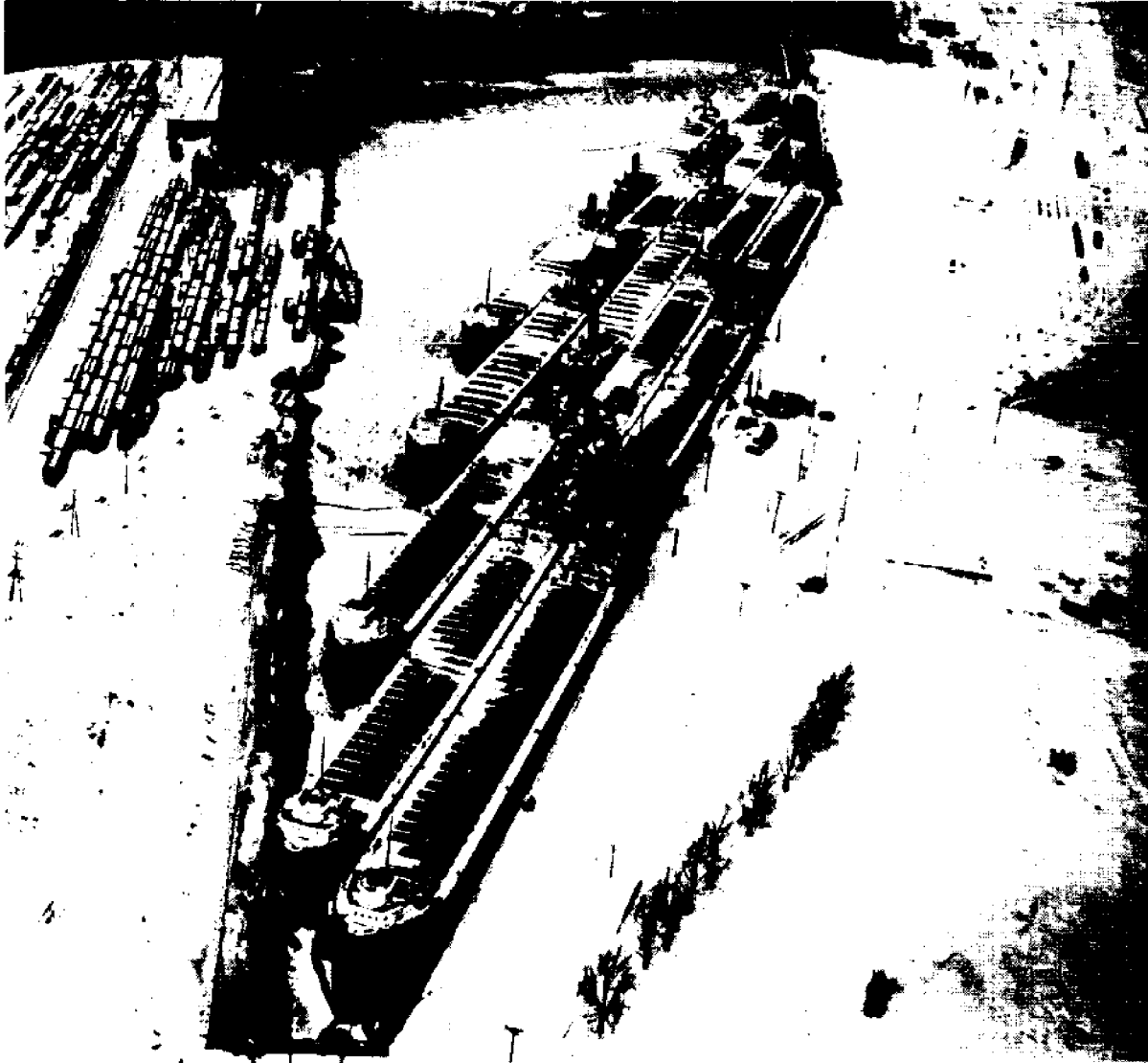
lines or multiple-purpose boats, capable of carrying automobiles and railroad cars.

Evidence of the potential opportunities of lake shipping is found in the recent decision of the American Steamship Company of Chicago—a city also suffering from the seaway slump—to order two 70,000 ton “superlakers” to carry cargo on the Great Lakes. Present cargo carriers average between 25 and 30,000 tons.

The ships are being built in Wisconsin at Sturgeon Bay, where a massive dry dock is now being built to handle construction of these 1,000-foot ships. The first supership is scheduled for launching in 1977.

Although it has been necessary, to some degree, to talk about coastal uses as though they were separate entities, the fact is that many uses, and their attendant problems, are linked to other uses and problems. One example of this is the effect that water pollution from commercial, industrial, residential and shipping development on the coast has on other coastal uses, such as recreation, fisheries and water supply. There are many other instances of real or apparent conflicts between those who use coastal resources: the conflicts between sport and commercial fishermen or between preservationists and developers, to name a few.

The challenge of coastal management, then, is not just to resolve problems of particular uses, but also to sort out use conflicts. Then comes the hard part of providing solutions or the allocation of uses that—to plagiarize the 19th century philosopher Jeremy Bentham—will give the greatest amount of happiness to the greatest number of people.



Ships tied up for winter in Milwaukee Harbor.

The primary, if not the solitary, factor underlying the development of the Great Lakes shoreline to date has been economics. There has been no comprehensive shoreline management as such; management has been mainly for the optimal economic benefit of specific sectors, such as shipping, electric power production and industrial interests. With some exceptions, particularly in the areas of water supply and pollution control, federal agencies and federal legislation have almost always been concerned with the promotion of private development for a specific resource use. For the most part then, the coastal zone has either been managed by the private market system, or it has gone unmanaged.

A number of criticisms of this laissez-faire approach to the coastal zone have been raised by political scientists, planners and others. The first of these criticisms is the same one that is echoed at almost every level of resource use—the familiar “tragedy of the commons.” Traditionally, resources are free for anyone to use, but no one has responsibility for them. In effect, they are used for narrow economic interests that provide no incentive for broader public concerns such as the preservation of wildlife, water quality and scenery. Furthermore, assets like aesthetics cannot be priced and marketed to those who can afford to pay for them in the usual free enterprise sense. Nor is it morally acceptable to do so.

In addition, the market system can result in private resource uses that create situa-



## MANAGING WISCONSIN'S COASTS



tions—such as pollution or the expropriation of valuable historical or recreational land—that impinge on other valid uses. These criticisms argue for some imposition of public, comprehensive management of the coastal zone—although the nature and extent of such management is not immediately evident.

Three very general management strategies to deal with the highly distinctive situations and problems of different coastal areas have evolved over the years.

The first of these is the traditional *multiple use strategy* such as has long been employed in the management of the nation's forests. Many widely diverse uses of the

coastal zone can be compatible with one another. For example, Milwaukee has heavy concentrations of industrial, sewage and shipping facilities coexisting with public parks, marinas and residential development. Under ideal conditions, all these uses can coexist peacefully. The conflicts arise when one or more uses develop in such a way or increase to the extent that they interfere with other uses, as already pointed out. Good comprehensive multiple use management can settle the conflicts between usually compatible uses.

A second strategy is for *exclusive uses* of the coastal zone. These uses are few but they are becoming increasingly crucial as heavy

shoreline development proceeds. Wildlife preserves, for example, cannot tolerate any other uses in the same area of the coast—a fact recognized by the Coastal Zone Management Act's provision for estuarine sanctuaries. Another consideration is the literal need for human beings to have access to areas where they can enjoy relative isolation with nature and beauty untarnished by outfalls and smokestacks.

Third, there is the *displaceable use strategy*. With increasing pressure on uses of the coastal zone, it is becoming increasingly necessary to be selective about which activities should be allowed there. Some examples of the tendency toward displacing current

coastal uses to other areas are the development of offshore ports and inland marinas connected to the shore by canals.

Electric power plants may also be a displaceable use of the coast. Right now, 67 percent of Wisconsin's generating capacity is located along the coast; ten power plants, including two nuclear ones, are on the Lake Michigan shore. But recent developments have taken away much of the economic advantage of a coastal location. And other factors, not the least of which is safety, have made electric power companies seek inland sites for their new nuclear plants.

But, before any management strategies are ever employed in Wisconsin, there are a host of legal and institutional considerations that have to be met. In Wisconsin, as much as in any other of the 30 states along the ocean or Great Lakes coasts, the idea of imposing coastal management by federal or state fiat is delusory.

Under terms of the Coastal Zone Management Act of 1972, the federal Office of Coastal Zone Management granted \$208,000—and the state contributed \$146,000—for Wisconsin to begin developing its coastal zone management development program. The state Department of Administration is the lead agency in the program, launched in June of 1974.

But coastal planning cannot operate in a vacuum. It must take into consideration the high degree of political participation in decision making at the local and regional levels and the state's century-long tradition of progressive natural resource legislation.

Besides providing for interstate and national interests in its program, each state

must supply the federal government with evidence of cooperation and coordination with every level of government to qualify for future federal funding.

In its first year, Wisconsin, like most other coastal states, is conducting resource inventories and user studies to identify major coastal zone issues. These baseline data constitute the sine qua non for rational decision making.

Five major issues have already been identified for preliminary study during the year: erosion, public access to use of the lakes, recreational pressures on the coastline, port development and power plant siting.

But, at this embryonic stage, it's the institutional arrangements that are most crucial.

In November 1974, letters left Governor Patrick J. Lucey's office appointing 26 people to a State Coastal Zone Coordinating and Advisory Council. The council will include representatives of county, city and village governments, regional planning commissions, the University of Wisconsin System, as well as state agencies.

Its duties are to set program direction and advise the governor on matters of coastal policy.

The council co-chairmen (one representing state interests and the other, regional concerns) will appoint another 26-member committee. This will be a citizens committee, consisting of representatives of identifiable interest groups in the coastal zone, ranging from development to environmental groups.

In addition to providing an apparatus for the various interest groups to have their say

in coastal policy, the citizens committee is expected to provide a linkage to the general public. And, to head off the universal tendency of such citizens advisory groups to become mere rubber stamps for the real policy makers, the committee is being given its own staff.

Reaching the public to gain its understanding, its input, and hopefully, its support, is the major undertaking of this initial year. Fully one-third of the program's funding for the year is tied up in public participation and information.

Informational workshops and discussion sessions to answer questions and gather ideas from citizens regarding coastal resources are part of the program design.

The peculiar history and polity of Wisconsin has in large measure determined the direction that the coastal management program has taken in the state.

It will take enthusiasm and persistence to successfully deal with the difficulties that remain: to harmonize the activities of the multitudinous institutions, agencies and interest groups; to coordinate with related programs and laws; to ease citizen and local government apprehensions about state planning; and to deal with an uncertain political climate any proposed new water and land use controls may encounter.

In addition to a rather limited amount of federal money, coastal zone management offers what may be most important—an opportunity to engage public attention, acquire better factual information and make broad-based decisions on how we wish to deal with the future of Wisconsin's coastal resources.



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## POSTSCRIPT

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Seamen look landward, not at the coast, but past the coast to some more verdant relief from the sea. People on shore stare out to the dark and heaving sea to reflect their own pensive moods. Or perhaps for more primal reasons.

But people have been looking past the coast for too long. Some things fare better under a policy of benign neglect, but the coast isn't one of them. Unless some concern is shown for the coast itself, it will deteriorate quickly and, in some instances,

like the loss of wetlands, irrevocably. It's a truism that all of the nation's coasts are in various stages of decline. The decline in the quality of Wisconsin's coast may not be as far advanced as in other areas, but its direction is clear.

A reversal of direction requires an amendment to the ethic governing man's use of natural resources. It requires a change from the view of nature as man's lowly servant to a view of man as part—maybe not the most important part—of nature. It would require man to utilize coastal resources not only with rationality, but with awe. Such an ethical change would sweep like Robinson Jeffers' "November Surf."

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*The earth, in her childlike prophetic sleep,  
Keeps dreaming of the bath of a storm that  
prepares up the long coast  
Of the future to scour more than her sea-  
line:  
The cities gone down, the people fewer and  
the hawks more numerous,  
The rivers mouth to source pure; when the  
two-footed  
Mammal, being someways one of the nobler  
animals, regains  
The dignity of room, the value of rareness.*

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