HARBOR MAINTENANCE and IMPROVEMENT PLAN

TOWN OF PENSAUKEE
Oconto County, Wisconsin

FEBRUARY 1987

BAY-LAKE Regional Planning Commission

serving communities within the counties of:

FLORENCE ● MARINETTE ● OCONTO ● BROWN ● DOOR ● KEWAUNEE ● MANITOWOC ● SHEBOYGAN

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HARBOR MAINTENANCE

AND

IMPROVEMENT PLAN

TOWN OF PENSAUKEE, OCONTO COUNTY, WISCONSIN

February 1987

Bay-Lake Regional Planning Commission
Suite 450, Wood Hall, U.W.G.B.
Green Bay, Wisconsin

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SECTION 1

INTRODUCTION

HARBOR MAINTENANCE & IMPROVEMENT PLAN

Introduction

An important part of the BLRPC's Coastal Management Work in 1986 is the preparation of Harbor Maintenance and Improvement Plans for two harbors in the Commission's 8 county region. The two harbors to be analyzed as part of this work element are the Town of Suamico and Pensaukee Harbors.

The purpose of this plan is to assist the Town of Pensaukee and its officials in making maintenance dredging decisions that are of benefit to both the community and the environment. Because of the continuing sediment placement that is occurring in and around the Pensaukee Harbor due to the natural flow of the Pensaukee River, and the littoral drift that occurs in Green Bay, the problem of dredging becomes a reoccurring problem. Not only is dredging a costly process but it is also compounded with the issue that if dredging is to occur suitable locations for the disposal of the dredge material must be identified and approved.

To address this issue, the Wisconsin Coastal Management Program (WCMP) requested that the Bay-Lake Regional Planning Commission undertake a study of the Pensaukee Harbor, leading to the preparation of a 10 year unpolluted dredge materials disposal plan which will satisfy the requirements setforth in revised NR 347 and proposed harbor dredging legislation which relate to harbor maintenance dredging. The harbor maintenance legislation promotes a planning process that considers long-term maintenance and improvement needs of Great lakes navigation channels. In particular, this planning process should: identify all reasonable means of using or disposing of unpolluted sediment on land or in water; evaluate available options for reducing the volume of sediment in tributary streams; and identify alternatives which provide for the beneficial use of unpolluted sediment that does not create adverse impacts on the environment and is technically and economically feasible.

This particular planning effort being undertaken includes an inventory and assessment of the natural resource base and sediment quality data from the Pensaukee Harbor area, and results in the development of recommendations for environmentally and economically sound disposal options for materials dredged from the river mouth and harbor channel area.

It must also be noted that sediments are classified as either unpolluted, moderately polluted, or heavily polluted. While the Wisconsin Department of Natural Resources (WDNR) recognizes these guidelines, they are not presently being used for sediment quality analysis of dredge material in Wisconsin. Rather, the WDNR has issued interim guidelines with respect to metals, organic pollutants, and other contaminants in order to

assess the pollutant content of dredge material as it relates to potential disposal options.[1]

[1]Wisconsin is presently in the process of revising NR 347 of the Wisconsin Administrative Code to include WDNR's own standards for evaluating sediments.

SECTION 2

INVENTORY AND ANALYSIS

Physical Setting

Location

Pensaukee is located approximately 22 miles north of the Green Bay harbor on the west shore of Green Bay at the mouth of the Pensaukee River. The City of Oconto, Oconto County's largest community and it's county seat, is located just five miles to the north (see Map 1).

The harbor area is within an hour drive from the Nicolet National Forest, and is also adjacent to the waters of Green Bay.

Political Jurisdiction

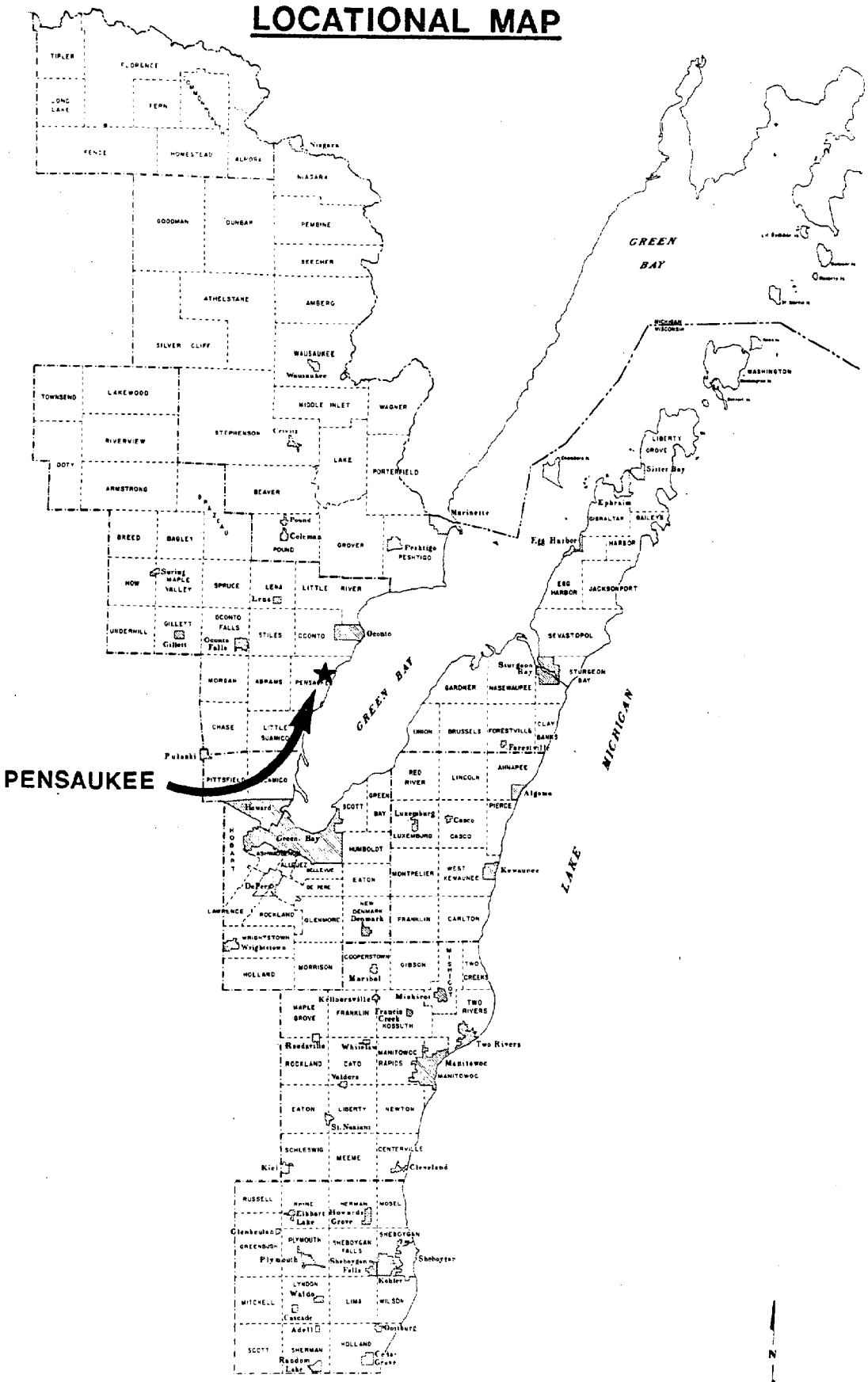
The Town of Pensaukee, a corporate body, exercises its corporate powers through Chapter 60 of the Wisconsin State Statutes. The Town Board consists of a Chairman and two Supervisors. Town officers include a clerk, treasurer, assessor and constable.

Chapter 30 of the Wisconsin State Statutes allows a Town Board to establish a Harbor Commission. Harbor Commissions can be responsible for harbor planning, repairs and maintenance. They have exclusive control of the commercial aspects of day to day operations, setting fees and promoting harbors. The activities of the harbor commission are set by resolution of the Town Board. The Commission's expressed authority is limited to those items specified in the resolution. All planning and fiscal activity are under the control of the harbor commission but any expenditures that are identified are subject to the approval of the Town Board.

As of 1986, the Town of Pensaukee had not yet established a Harbor Commission.

MAP 1

LOCATIONAL MAP



Source: BLRPC.

Topography and Geology

The entire county of Oconto has been modified by the Pleistocene Epoch or "Ice Age". Glacial deposits in the county range up to 300 feet in thickness. The ice sheets changes the drainage patterns by carving valleys and building moraines on top of the bedrock formations of the Precambrian, Cambrian and ordovician periods. As the glaciers melted, water and wind sorted and redeposited much of the material left exposed.

The present surface land features, or topography, are a result of the fourth glacial stage, the Wisconsin Stage, which occurred about 10,000 years ago. This was the final stage of glacial activity which began during the Pleistocene Epoch, about 1,000,000 years ago. All the land features in Oconto County were formed under the direct influence of the Green Bay Lobe of the last Wisconsin glacial ice sheet.

The nature of these glacial features, along with the type of bedrock, place Oconto County in three different physiographic regions of Wisconsin, the Northern Highlands, Central Plain, and Eastern Ridges and Lowlands.

The southern and eastern parts of Oconto County, including the Pensaukee harbor area, are included in the Eastern Ridges and Lowlands. The glacial drift of this area is underlain by two low, parallel ridges with gentle slopes on one side, and steep back slopes of bedrock, referred to as cuestas, on the other side. The western ridge, called the Prairie du Chien cuesta, is formed mainly from Lower Magnesian dolomite (a type of Limestone). The second ridge is composed of Galena-Black River dolomite and is called the Galena-Platterville cuesta. Neither of these ridges are prominent features of Oconto County - in many places they are no more than 50 to 75 feet high. These cuestas lack height because the ice sheets when passing over them tended to wear and smooth them down through and erosion process. Glacial deposits in this region are generally made up of ground moraines on the west and lake sediments to the east along the Green Bay shoreline.

Map 2 details the surficial glacial features found in Oconto County. Pitted outwashes were formed from deposits from glacial melt water and streams. The deposits are stratified and sorted consisting of sand and gravel. The topography of pitted outwash consist of knobs, kettles and minor ridges and in some cases are quite similar to end moraines. Pitted outwash coming from the Cary Stage is also found in the northern portion of the county.

End moraines are glacial landforms composed of unsorted sand, gravel, cobbles, and boulders that were deposited at the terminus of the glacial ice. Acting as an enormous bulldozer, the ice pushed and mounded this material into substantial hills. F.T. Thwaites, in Pleistocene of Part of Northeastern

Wisconsin, Bulletin of Geological Society of America, Volume 54, 1941, pages 86-144, describes terminal moraines in northeastern Wisconsin as consisting of ridges up to several hundred feet high whose topography is for the most part extremely chaotic and irregular. A series of Cary end moraines orientated north to south can be found in the northern portion of the county.

Ground moraines, like end moraines, are composed of unsorted material; however, ground moraines are considerably thinner deposits and have an irregular, gently rolling surface as compared to the more pronounced topography of end moraines. Valders ground moraine most generally occurs in the central and eastern portion of the county.

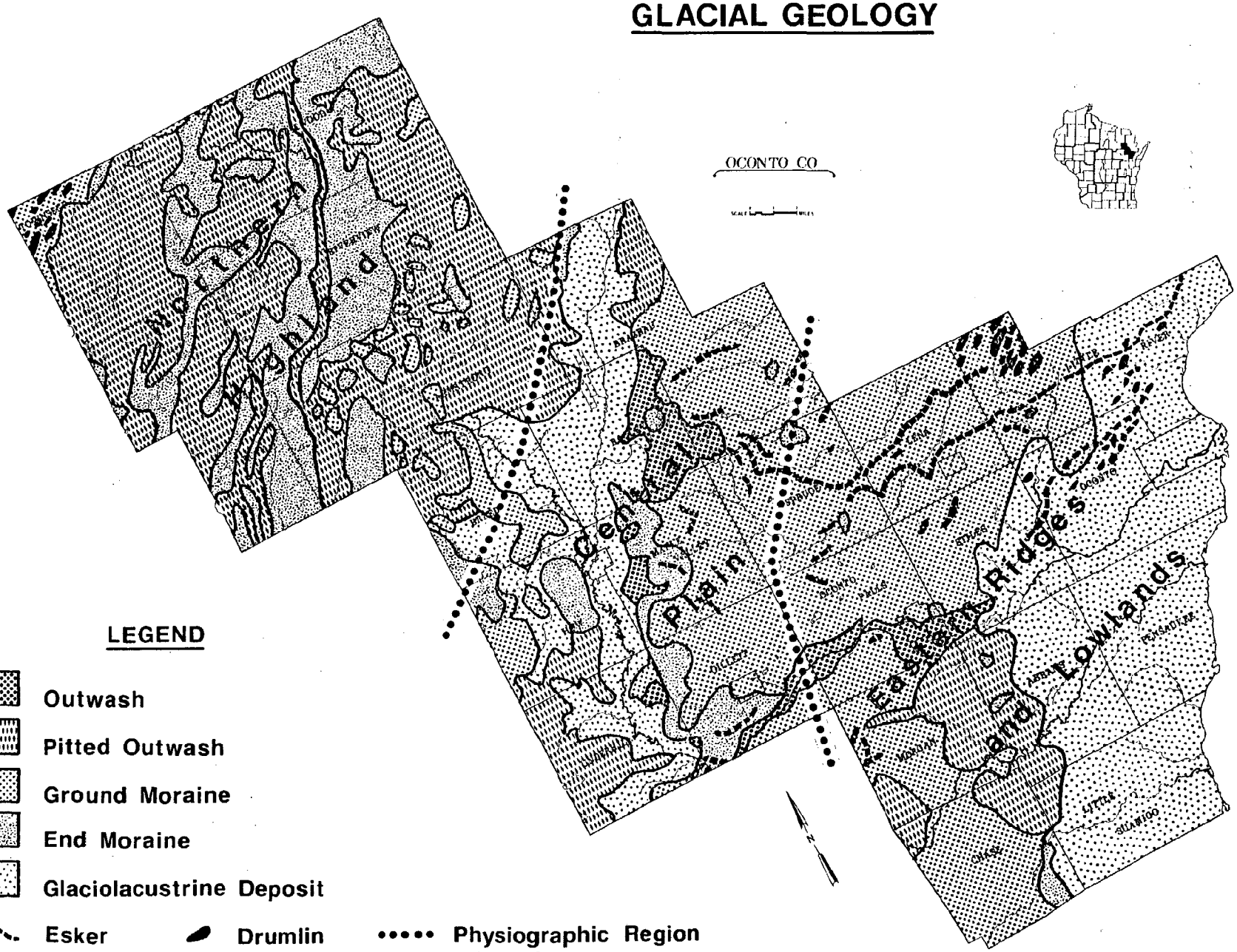
Eskers were formed from the deposits of streams running between ice walls in the glaciers. Eskers are generally in the shape of narrow continuous ridges. Eskers in Oconto County can be found running east to west through the towns of Little River, Lena, and Spruce.

Drumlins are oval hills consisting of unstratified glacial drift, whose longer axis is parallel to the direction of ice movement. Drumlins in Oconto County trend northeast-souteast and can be found in the eastern portion of the county in the northwestern corner of the town of Little River.

Glaciolacustrine deposits are composed of sand, silt, and clay. These sediments were deposited by glacial lakes and can be found in an extensive area adjacent to the Oconto River and the Peshtigo Brook in the western portion of the county and along the Green Bay shoreline in the eastern portion of the county.

Map 2

GLACIAL GEOLOGY



LEGEND

- Outwash
- Pitted Outwash
- Ground Moraine
- End Moraine
- Glaciolacustrine Deposit
- Esker
- Drumlin
- Physiographic Region Boundary

Source: F.T. Thwaites, Pleistocene of Part of Northeastern Wisconsin, Wis. Dept. of Admin., and Wis. Geological and Natural History Survey.

SOILS

Soil Conditions - Oconto County

Map 3 delineates the 8 soil associations of Oconto County and provides a brief description of each soil association. Because of the small scale of the map, only broad areas that have the same pattern of common characteristics are shown. These common characteristics include major soil types, topography and drainage patterns. Within each mapping unit there are two or three major soils, as well as some additional minor soils. This generalized soil map is not suited for specific site analysis, but rather it provides a general picture of the major soil group distributions.

In general, soils in the northern portion of the county lie the Northern Highlands, are comprised of three mapping units, all of which are nearly level to very steep and are well drained. They are Menahga-Rousseau, the Padus-Pena, and Lennan-Keweenaw units. The Padus-Pena unit comprises the majority of soils in the northern highlands.

The Onaway-Solona-Seelyeville soil unit comprises the majority of the soils in the central portion of the county, the central plains. These soils are nearly level to very steep, well drained to somewhat poorly drained and very poorly drained, loamy and mucky soils on uplands. Menahya-Rousseau, Tilleda-Menominee and Seelyeville-Marley Soils are also found in this area, all to the north and west of the Onaway-Solona-Seelyville unit.

In the eastern portion of the county in the Eastern Ridges and Lowlands, the Solona-Onaway-Iosco is the predominant soil unit. The soils are nearly level to gently sloping, well drained to somewhat poorly drained, loamy and sandy soils on uplands.

Soil Conditions - Town of Pensaukee

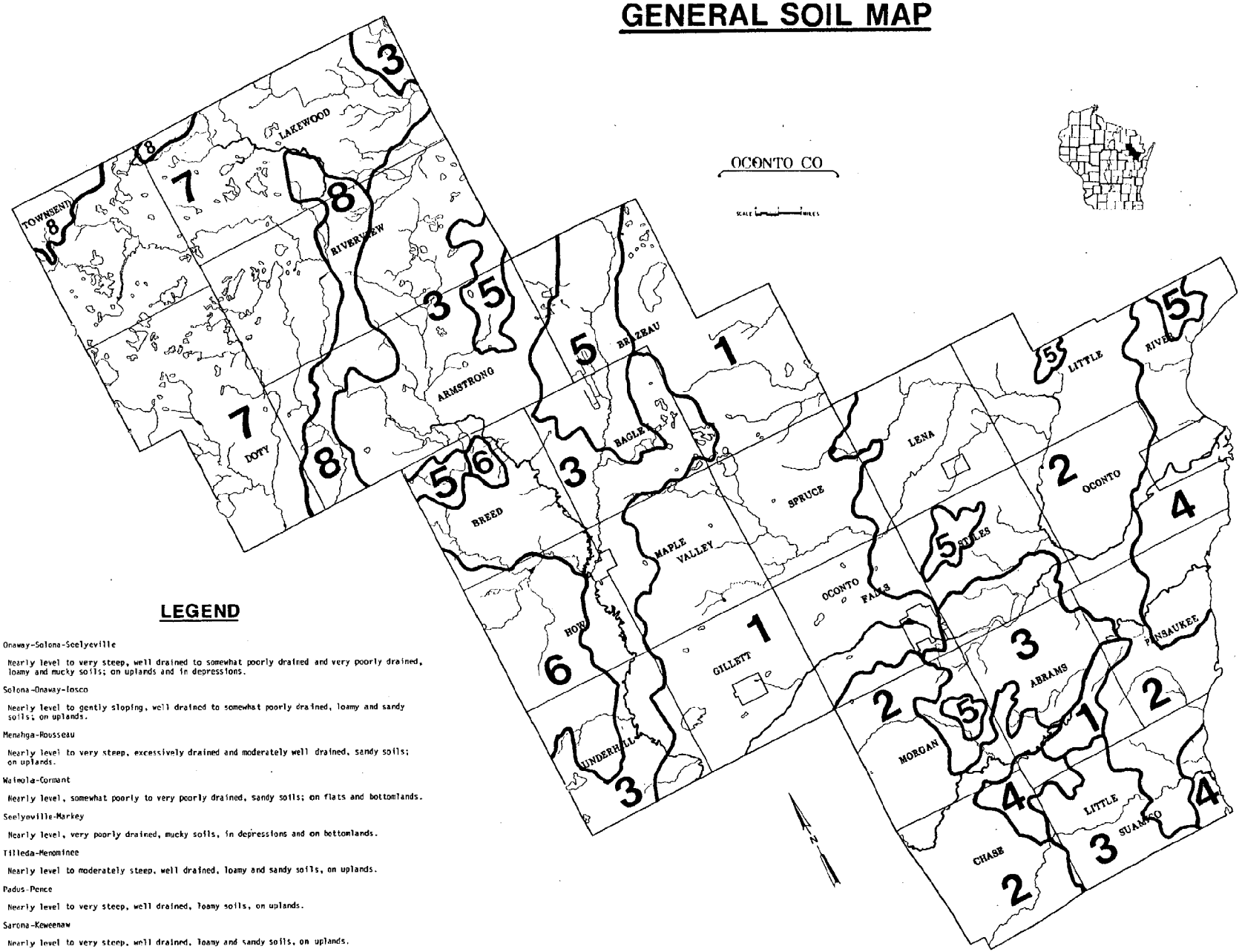
The Town of Pensaukee lies within the eastern portion of the county where the Wainola-Cormant and Solona-Onaway-Iosco soil types are predominant.

Wainola-Cormant soil, which is found in the Pensaukee Harbor area, has several distinct characteristics. They are usually sandy soils, somewhat poorly to very poorly drained. These areas are usually almost level and are found on flats and bottomlands.

The other soil type found in the Town of Pensaukee, the Solona-Onaway-Iosco is found in areas of nearly level to gently sloping terrain. This soil type is well drained to somewhat poorly drained and is of sandy or loamy make-up.

Map 3

GENERAL SOIL MAP



LEGEND

1. Onaway-Solona-Seelyeville

   Nearly level to very steep, well drained to somewhat poorly drained and very poorly drained, loamy and mucky soils; on uplands and in depressions.

2. Solona-Onaway-Iosco

   Nearly level to gently sloping, well drained to somewhat poorly drained, loamy and sandy soils; on uplands.

3. Menahga-Rousseau

   Nearly level to very steep, excessively drained and moderately well drained, sandy soils; on uplands.

4. Waimola-Cormant

   Nearly level, somewhat poorly to very poorly drained, sandy soils; on flats and bottomlands.

5. Seelyeville-Markey

   Nearly level, very poorly drained, mucky soils, in depressions and on bottomlands.

6. Tilleda-Menominee

   Nearly level to moderately steep, well drained, loamy and sandy soils, on uplands.

7. Padus-Pence

   Nearly level to very steep, well drained, loamy soils, on uplands.

8. Sarona-Keweenaw

   Nearly level to very steep, well drained, loamy and sandy soils, on uplands.

Source: Oconto County Soil Conservation Service.

Water Resources
Pensaukee Harbor

The federal project channel at Pensaukee is 3,700 feet long. The sediment in the initial 900 feet of upstream river bed is considered polluted by EPA and the sediments in the remaining 2,800 feet are considered unpolluted. There is an estimated 17,000 to 37,000 cu. yds. of polluted sediment accumulated with an annual deposition of 3,000 cu. yds. The unpolluted area has a backlog of 49,000 to 91,000 cu. yds. and with an annual deposition of 7,000 cu. yds. The U.S. Army Corps of Engineers has indicated that dredging of 40,000 cu. yds. of material will be needed sometime after 1985. The large volume of unpolluted material makes the Pensaukee area a potential area for an innovative disposal demonstration project. Also, if the dredged material could be sold; a site is available for a transfer station if potential users can be located.

The major harbor user, Shilling Fish Company, has undertaken private maintenance dredging activities on an annual basis. The dredged material was placed on adjacent upland site owned by the company.

Water Related Industrial and Commercial Uses

There are approximately 12 commercial fishing boats that utilize the Pensaukee Harbor. All but one of the fishing docks are located on the south bank of the Pensaukee River within 2,200 feet of the mouth. A fish processing plant is also located on the south bank at the river's mouth. There are no other commercial uses of the harbor.

Water Related Recreational Uses

There are two boat launching ramps located across the river from one another approximately 2,000 feet upstream of the river's mouth. The ramp on the north bank is in a state of disrepair and is unusable. There are no other public or private recreational boating facilities in the harbor.

Water Resources, Wildlife and Vegetation

There are four drainage basins within Oconto County, with all of the water draining into Green Bay. The Peshtigo River Drainage Basin drains a very small portion of the county in the Town of Brazeau, Lena, Little River, Lakewood, and Riverview. The Oconto River Drainage Basin drains the majority of the northern and central portion of the county, draining essentially everything north of the Oconto River. The Duck Creek-Suamico-Pensaukee Rivers Drainage Basin drains the southern portion of the county south of the Oconto River. The Wolf River Drainage Basin drains a very small part of the extreme western portion of the county.

Lakes and streams comprise the surface water resources of Oconto County. The Wisconsin Department of Natural Resources prepared a report on the surface waters in Oconto County called Surface Water Resources of Oconto County. The following is from that report.

> The area of surface water in Oconto County is 12,709.5 acres. Of this total, 10,969.5 acres are found in 379 lakes and impoundments and 1,740.0 acres in 191 streams. Stream length in the county is 556.6 miles, of which 316.1 miles are classed as trout stream. Stream frontage (both sides) amounts to 1,113 miles, while lake frontage amounts to 301.5 miles. A comparison between available water area of lakes and streams in relation to frontage finds 3,377 feet of stream frontage and 145 feet of lake frontage per acre of water respectively.
>
> Three hundred sixty-eight natural lakes account for 82 percent and 11 impoundments 18 percent of the total lake surface area. Size classes and acreage of natural lakes and impoundments are noted in Table 3. Lakes under 10 acres represent 63 percent of the total number, but only 7 percent of the acreage. Only 24 lakes (6 percent) are 100 acres of larger, however, they comprise 60 percent of the lake acreage.
>
> In Oconto County, 39 percent of the lakes are under 8 feet in depth, however, they include only 6 percent of the lake acreage. Natural lake depths range from less than one foot in spring ponds to a maximum depth of 65 feet in Little Archibald Lake. White Potato is the largest lake with 978 acres, and the Oconto River the largest stream with 567.8 acres.

Oconto County has 25 miles of shoreline on the west shore of Green Bay. The west shore of Green Bay from the mouth of the Fox River in Brown County to the Wisconsin-Michigan border is an area which possesses an exceedingly rich heritage. Characterized by a low, level terrain, this 53 mile segment of Wisconsin's coastline contains one of the most valuable remaining freshwater ecosystems in the Great Lakes region.

Along Wisconsin's 495 mile Lake Michigan shoreline, there are less than 30 linear miles of remaining coastal wetlands, a large percentage of which occur along the West Shore of Green Bay. Although estimates vary, the West Shore area may contain 80 to 90 percent of the existing wetlands on the entire Lake Michigan shore. This is of special significance because of the somewhat unique character of freshwater coastal wetlands, which contain many of the elements common to inland glacial marshes, yet are subject to the dynamic physical forces of the shoreline regime.

The Pensaukee River has been categorized as a hard water river because of its slightly alkaline compositions. Fish species known to inhabit the river include northern pike, panfish, carp and various types of forage fish (see Map 4). Animals found in the area include deer, rabbit, squirrel and partridge as well as a variety of migrant birds. The specific kinds of birds found in the Pensaukee area include scaup, ring-neck, ruddy, redhead and canvasback ducks.

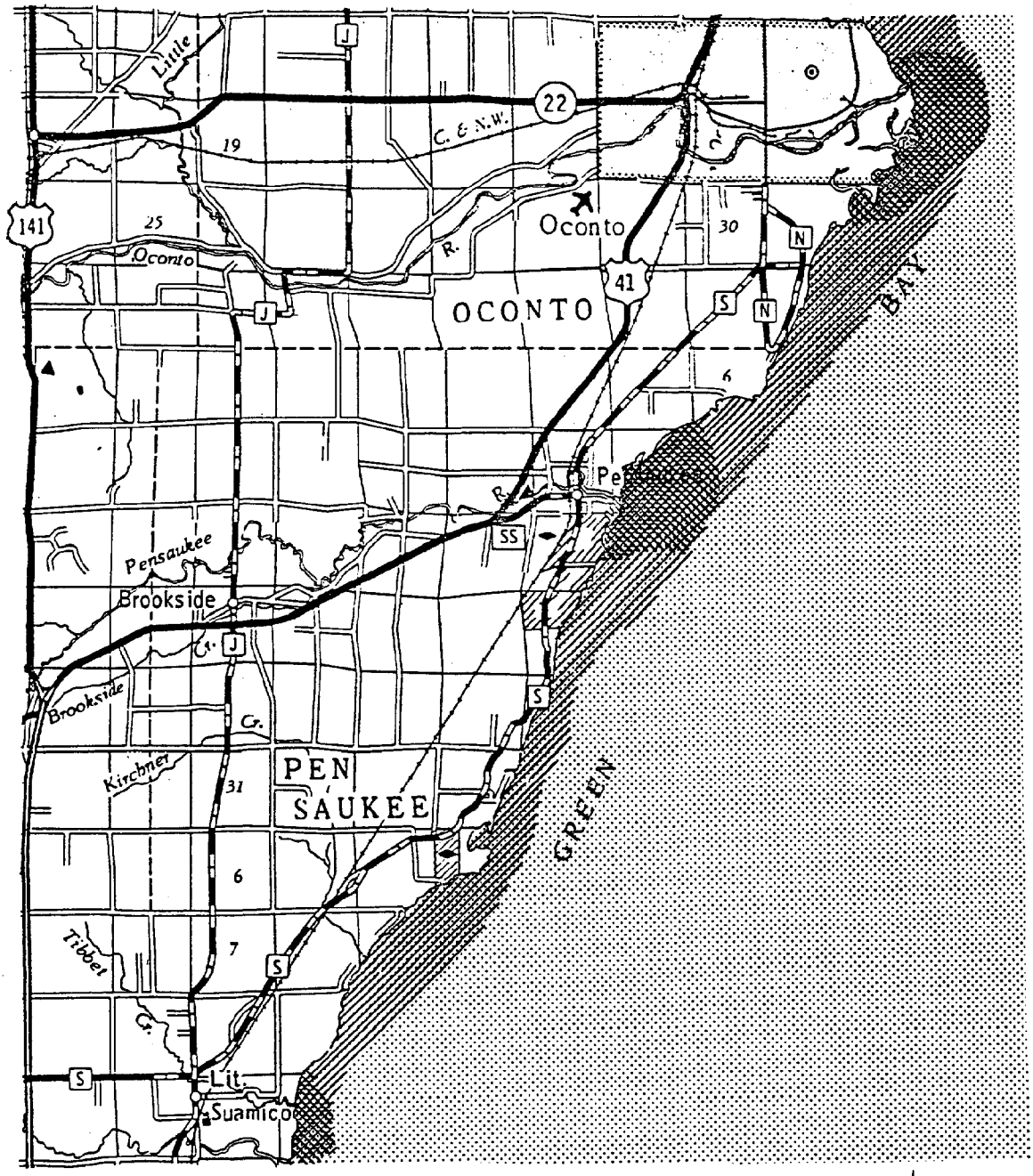
Vegetation that can be found in the watershed of the Pensaukee River is primarily agricultural in nature. Some forest and wetland areas are also found.

Climate

The Town of Pensaukee's climate is typically described as humid continental, which is characterized by extremes in temperatures and moderate amounts of precipitation. Average annual temperatures are in the low 40's with average high temperatures in the high 60's and low 70's and average low temperatures in the teens. Extreme temperatures can range from -30° F. to 100° F. Precipitation is in the form of rain and snow with an average annual amount of 30 to 34 inches. Generally, precipitation amounts and temperature extremes are greater in the northern portion of the county. Conversely, the growing season is longer in the southern portion of the county. This due, in part, to longitudinal differences and the moderating effect of Green Bay and Lake Michigan.

MAP 4

IMPORTANT FISHERY AREAS



Commercial Fishing

Spawning and Nursery

Sport Fishing

-N-

0 1 2

miles

Source: "Green Bay Estuary Study", U.S. Fish and Wildlife Service

Land Use
Generalized Land Use Conditions - Oconto County

According to the 1975 County Land Use Inventory, Oconto County consists of approximately 653,446 acres of 1,021 square miles. Approximately 33,631 acres or 5 percent is considered to be developed (i.e. classified in the residential, commercial, industrial, transportation, institutional/governmental facilities or outdoor recreation categories) while the balance of 619,816 acres or 95 percent is classified as either agriculture/silviculture or natural area (See Tables 1 and 2).

Looking at the land use in the Town of Pensaukee's 22,805 acres, indicates a similar breakdown of land uses as that of the county's (see Map 5). Residential land uses, consisting of single family and multi-family dwellings, farm residences, and mobile homes, account for 314.28 acres or 1.38 percent of the total area of the town.

Commercial land uses include the use of land for retail sales or trade of goods and or services. Only 9.46 acres of 0.04 percent of the town's total area is comprised of this category.

Industrial land use includes the use of land for manufacturing, wholesaling, storage and extractive industries. Approximately 26.79 acres or 0.12 percent of the town's area is in this category.

Transportation land uses are comprised of federal, state, and local roads and highways, airports, rail lines, parking areas and marine related transportation facilities. Approximately 711.69 acres or 3.12 percent of the town's area is in the transportation category.

The communications/utilities land use category is comprised of such uses as electrical power plants, water treatment facilities, sewage treatment facilities, electric power transmission line right-of-ways, natural gas transmission pipeline right-of-ways, and landfills. Approximately 57.97 acres or 0.25 percent of the town's area is within this category.

The institutional/governmental land use category is comprised of land for public and private facilities for education, health or assembly and for government facilities used for administration and safety. Land uses in this category account for 18.97 acres or 0.08 percent of the town's total area.

The outdoor recreation land use category is comprised of land for sport and recreational facilities and for camping and picnicking facilities. Outdoor recreation land uses comprise 34.08 acres or 0.15 percent of the town's total area.

TABLE 1

LAND USE OCONTO COUNTY ACREAGE BY UNIT OF GOVERNMENT

Unit of Government	Total Acreage	Residential	Commercial	Industrial	Transportation	Communications-Utilities	Institutional Government Facilities	Outdoor Recreation	Agriculture-Silviculture	Natural Areas
TOWNS										
Abrams	24,135.87	367.38	9.69	33.65	596.30	59.78	4.40	214.44	8,370.91	14,479.32
Armstrong	46,836.08	610.33	18.66	77.39	1,065.10	177.53	7.35	363.20	2,104.07	42,412.45
Bagley	22,994.48	157.04	1.60	11.76	451.13	45.74	0.58	0.29	2,855.42	19,470.92
Brazeau	46,115.26	761.47	3.35	79.09	1,042.13	188.23	5.87	12.04	13,542.54	30,480.54
Breed	23,000.03	259.05	3.18	4.11	591.48	---	2.82	73.99	5,478.79	16,586.61
Chase	22,881.09	307.11	3.04	114.35	515.91	50.86	8.22	142.31	16,115.08	5,624.21
Doty	34,915.44	376.46	2.06	7.94	697.25	12.13	2.36	320.50	2,052.71	31,444.03
Gillett	22,171.75	315.07	2.92	113.78	622.23	167.84	7.20	1.17	14,530.13	6,411.41
How	22,453.19	170.44	1.18	14.26	456.40	5.10	7.79	0.88	10,282.52	11,514.62
Lakewood	46,434.34	648.79	19.84	35.43	901.79	84.88	10.59	167.39	1,592.82	42,972.81
Lena	21,486.03	224.94	2.35	43.95	524.15	189.24	5.44	17.10	14,632.37	5,846.49
Little River	33,208.74	313.80	4.57	59.53	839.77	180.45	1.84	47.84	16,115.87	15,645.07
Little Suamico	23,900.62	719.09	8.09	111.02	768.43	71.10	20.43	75.44	12,240.87	9,886.15
Maple Valley	22,693.51	248.30	0.29	49.49	520.67	61.10	7.61	36.10	12,336.24	9,433.71
Morgan	22,855.83	207.00	1.32	116.87	525.75	99.22	3.33	9.31	13,634.21	8,258.82
Oconto	23,606.41	264.91	5.94	20.24	814.81	157.17	12.24	84.93	14,392.37	7,853.80
Oconto Falls	21,214.43	276.33	1.18	37.79	544.68	322.50	4.41	---	13,371.89	6,655.65
Pensaukee	22,805.49	314.28	9.46	26.79	711.69	57.97	18.97	34.08	10,989.73	10,642.52
Riverview	46,334.71	695.49	9.72	15.14	937.87	64.96	1.75	11.05	1,781.06	42,817.67
Spruce	22,942.60	300.26	3.39	30.97	526.30	101.92	8.22	19.70	14,002.55	7,949.29
Stiles	22,587.68	366.75	8.36	25.58	627.22	249.34	7.73	152.48	10,176.59	10,973.63
Townsend	27,148.79	844.78	25.40	43.01	1,009.76	3.67	7.34	62.59	3,589.50	21,562.74
Underhill	22,942.17	260.33	1.18	32.45	468.61	8.92	6.61	11.71	10,066.68	12,085.68
VILLAGES										
Lena	484.15	61.19	11.19	13.10	70.88	13.59	7.20	10.89	257.27	38.84
Suring	675.36	84.72	11.48	20.87	74.83	7.75	3.97	77.36	34.47	359.91
CITIES										
Gillette	822.77	170.91	14.41	26.85	101.39	9.52	15.99	25.20	187.21	271.29
Oconto	4,154.68	587.49	51.83	99.79	370.46	41.38	67.40	430.82	589.48	1,916.03
Oconto Falls	1,645.09	334.08	14.85	66.69	170.44	30.86	32.54	97.65	96.39	801.59
COUNTY TOTAL	653,446.59	10,247.79	250.53	1,331.89	16,547.43	2,462.75	290.20	2,500.46	225,419.74	394,395.80

Source: Bay-Lake Regional Planning Commission, 1975 Land Use Inventory

TABLE 2

LAND USE OCONTO COUNTY AS A PERCENT BY UNIT OF GOVERNMENT

Unit of Government	Total Percent	Residential	Commercial	Industrial	Transportation	Communications-Utilities	Institutional Government Facilities	Outdoor Recreation	Agriculture-Silviculture	Natural Areas
TOWNS										
Abrams	100.00	1.52	0.04	0.14	2.47	0.25	0.02	0.89	34.68	59.99
Armstrong	100.00	1.30	0.04	0.17	2.27	0.38	0.02	0.78	4.49	90.55
Bagley	100.00	0.68	0.01	0.05	1.96	0.20	- *	- *	12.42	84.68
Brazeau	100.00	1.65	0.01	0.17	2.26	0.41	0.01	0.03	29.37	66.09
Breed	100.00	1.13	0.01	0.02	2.57	-	0.01	0.32	23.82	72.12
Chase	100.00	1.34	0.01	0.50	2.26	0.22	0.04	0.62	70.43	24.58
Doty	100.00	1.08	0.01	0.02	2.00	0.03	0.01	0.92	5.88	90.05
Gillett	100.00	1.42	0.01	0.51	2.81	0.76	0.03	0.01	65.53	28.92
How	100.00	0.76	0.01	0.06	2.03	0.02	0.04	- *	45.80	51.28
Lakewood	100.00	1.40	0.04	0.08	1.94	0.18	0.02	0.36	3.43	92.55
Lena	100.00	1.05	0.01	0.20	2.44	0.88	0.03	0.08	68.10	27.21
Little River	100.00	0.95	0.01	0.18	2.53	0.54	0.01	0.14	48.53	47.11
Little Suamico	100.00	3.01	0.03	0.46	3.22	0.30	0.09	0.32	51.21	41.36
Maple Valley	100.00	1.10	- *	0.22	2.29	0.27	0.03	0.16	54.36	41.57
Morgan	100.00	0.91	0.01	0.51	2.30	0.43	0.01	0.04	59.65	36.14
Oconto	100.00	1.12	0.03	0.09	3.45	0.66	0.05	0.36	60.97	33.27
Oconto Falls	100.00	1.30	0.01	0.18	2.57	1.52	0.02	-	63.03	31.37
Pensaukee	100.00	1.38	0.04	0.12	3.12	0.25	0.08	0.15	48.19	46.67
Riverview	100.00	1.50	0.02	0.03	2.03	0.14	- *	0.02	3.85	92.41
Spruce	100.00	1.31	0.01	0.14	2.29	0.44	0.04	0.09	61.03	34.65
Stiles	100.00	1.62	0.04	0.11	2.78	1.10	0.03	0.68	45.05	48.59
Townsend	100.00	3.11	0.09	0.16	3.72	0.01	0.03	0.23	13.22	79.43
Underhill	100.00	1.13	0.01	0.14	2.04	0.04	0.03	0.05	43.88	52.68
VILLAGES										
Lena	100.00	12.63	2.31	2.71	14.64	2.81	1.49	2.25	53.14	8.02
Suring	100.00	12.54	1.70	3.09	11.08	1.15	0.59	11.46	5.10	53.29
CITIES										
Gillett	100.00	20.77	1.75	3.26	12.32	1.16	1.94	3.07	22.76	32.97
Oconto	100.00	14.14	1.25	2.40	8.92	0.99	1.62	10.37	14.19	46.12
Oconto Falls	100.00	20.31	0.90	4.05	10.36	1.88	1.98	5.93	5.86	48.73
COUNTY TOTAL	100.00	1.57	0.04	0.20	2.53	0.38	0.04	0.38	34.50	60.36

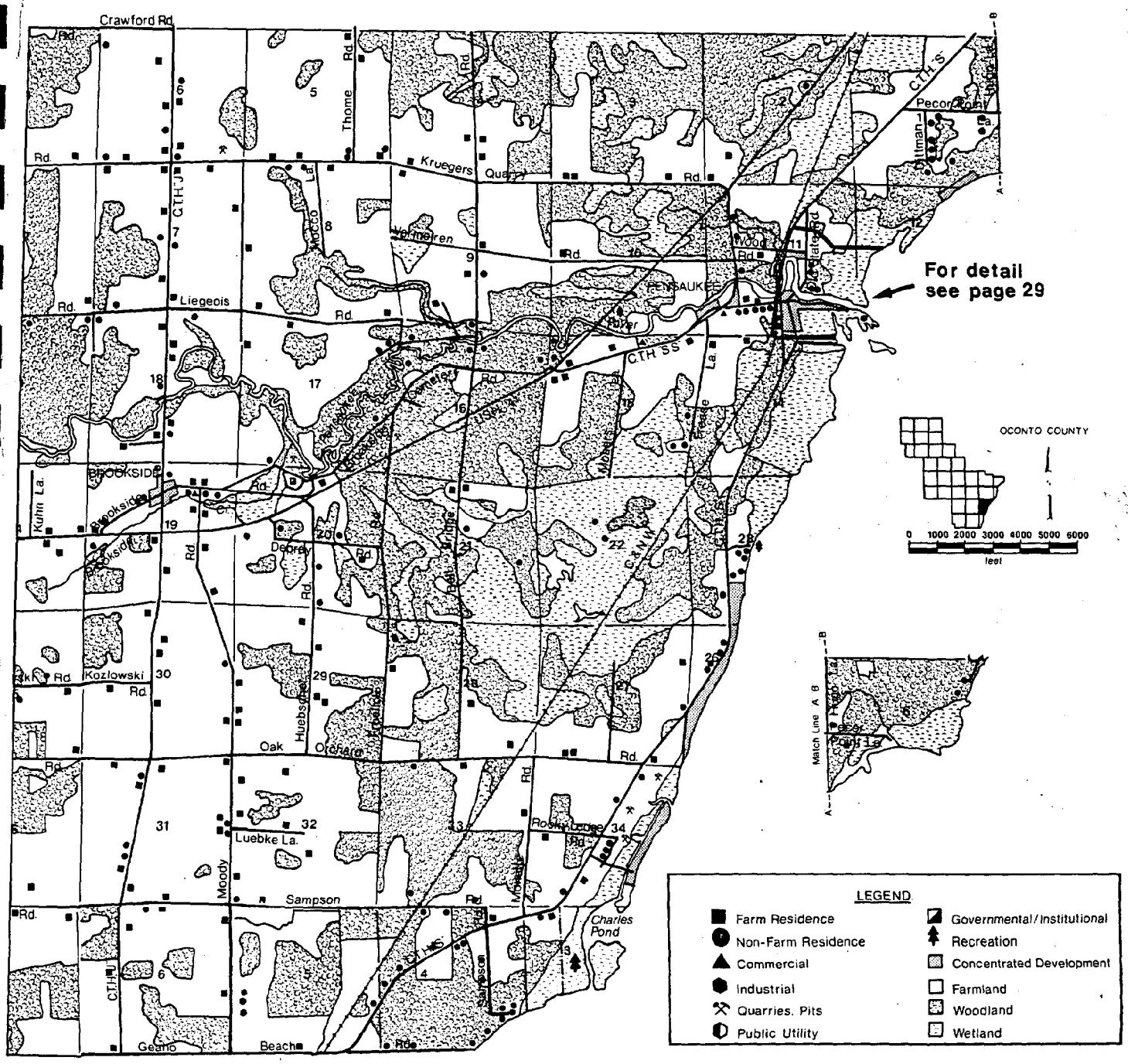
*Less than .01 percent

Source: Bay-Lake Regional Planning Commission, 1975 Land Use Inventory

MAP 5

LAND USE

TOWN OF PENSAUKEE



Source: Bay-Lake Regional Planning Commission.

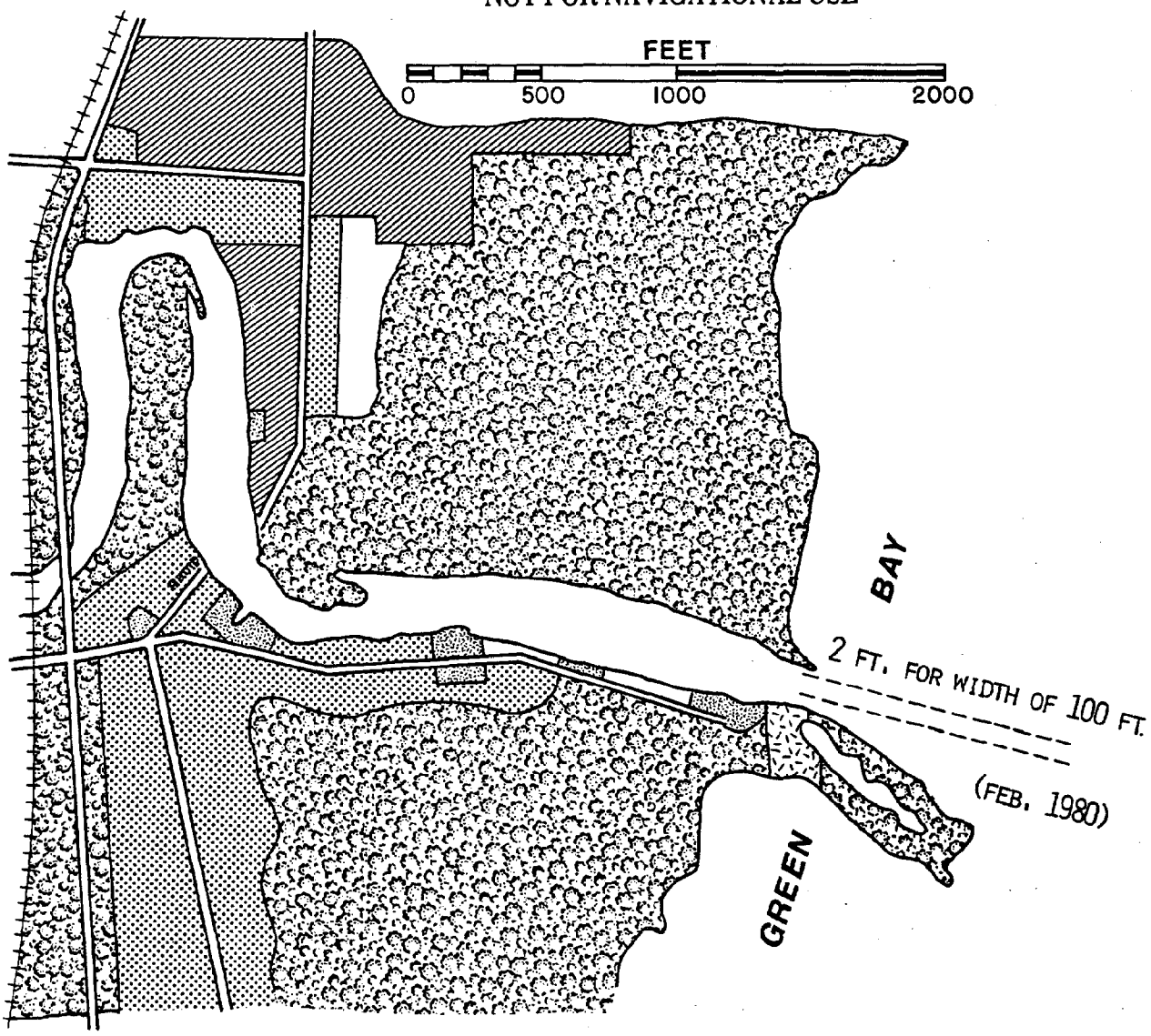
MAP 6

LAND USE

PENSAUKEE HARBOR

Oconto County, Wisconsin

NOT FOR NAVIGATIONAL USE



SOURCE: NOAA NAUTICAL CHARTS AND BAY-LAKE REGIONAL PLANNING COMMISSION

LEGEND

- Residential
- Commercial
- Industrial
- Natural Areas
- Agricultural
- Vacant/Other

The agricultural/silviculture land use category is comprised of croplands, pasturelands, other agricultural areas, and commercial forest. Land uses in this category account for approximately 10,989.73 acres or 48.19 percent of the town's total area.
The natural area category is comprised of lakes, rivers and streams, woodland, wetland, and grasslands. Land uses in this category account for 10,642.52 acres or 46.67 percent of the town's total area.

Generalized Land Use Conditions - Pensaukee Harbor Area

The land uses along the Pensaukee River from the river's mouth to the CTH S Bridge (a distance of approximately one mile), consists of wetlands, single family residential uses and commercial fishing docks (see Map 6).

The Shilling Fish Processing Plan is located at the mouth of the river on the south bank. Land uses include a disposal pond for process waters, outdoor storage, docks and the processing plant. The next 1,000 feet of shoreline are used by commercial fishermen for the mooring of boats and outdoor storage. This is followed by several residential structures, two commercial fishing docks, and a public boat ramp. At this point the river bends, forming a peninsula terminating at the CTH S Bridge. Land uses on the peninsula primarily consist of wetlands, grasslands and woodlands.

There is no development along the first 1,800 feet of the north bank of the river from the river's mouth. Land use in this reach is comprised solely of wetlands and woodlands. This is followed by a single family dwelling, a public boat ramp, and commercial fishing dock, and approximately ten residential dwellings along 2,000 feet of river frontage. The remaining river frontage upstream to the CTH S Bridge parallels CTH S and consists of open space.

Transportation

The Town of Pensaukee is intersected by CTH-GS which runs north and south forming a link between Oconto, five miles to the north, and Little Suamico, which is approximately eight miles to the south. Fish House Road, a town road, extends east along the south bank of the Pensaukee River providing giving access to the harbor area.

Austin Straubel Airport, a large regional airport is located approximately 26 miles to the south and services the region with commercial air service.

One railroad, the Chicago and Northwestern Railroad Company, provides rail transportation to the community of Pensaukee, however, there is no direct rail service to the harbor.

Population

Between 1930 and 1970, the Town of Pensaukee grew by 68 persons or increased by almost 9 percent. Between 1970 and 1980, the Town grew by almost 20 percent and reached a population of 1,000 by 1980. A comparison of the Town's 1930-1980 population figures to the other minor civil divisions in Oconto County is found on Table 3.

Based on the most recent Wisconsin Department of Administration (WDOA) population projections for the Town of Pensaukee indicate a fairly stable rate of population growth through the year 2010. From the Town's 1985 population estimate of 953, the Town's population is projected to grow to 1,308 by 2,010 (see Table 4).

TABLE 3
POPULATION SUMMARY OF MINOR CIVIL DIVISIONS
OCONTO COUNTY, WIS
1930 - 1980

MINOR CIVIL DIVISION	1930	1940	1950	1960	1970	1980
T. ABRAMS	834	805	759	820	884	1,181
T. ARMSTRONG	546	572	490	373	530	735
T. BAGLEY	156	242	211	197	209	272
T. BRAZEAU	1,106	1,135	933	916	924	1,039
T. BREED	462	537	422	391	402	563
T. CHASE	1,081	1,091	952	932	1,026	1,256
T. OOTY	66	125	103	81	93	154
T. GILLETT	1,080	1,029	1,003	957	936	1,059
T. HOW	821	777	746	627	565	592
T. LAKEWOOD	411	360	382	351	469	516
T. LENA	936	970	884	828	877	851
T. LITTLE RIVER	1,076	1,011	1,048	928	859	940
T. LITTLE SUAMICO	1,148	1,098	1,049	989	1,138	1,969
T. MAPLE VALLEY	989	934	880	742	679	715
T. MENOMINEE	269	288	295	261	---	---
T. MORGAN	778	813	688	633	670	726
T. OCONTO	972	1,102	993	974	934	937
T. OCONTO FALLS	855	909	887	843	895	1,033
T. PENSAUKEE	795	822	860	869	863	1,000
T. RIVERVIEW	271	243	252	260	321	417
T. SPRUCE	924	960	927	834	818	805
T. STILES	738	806	816	792	845	1,261
T. TOWNSEND	386	409	380	383	463	735
T. UNDERHILL	825	736	691	600	613	664
V. LENA	413	469	526	506	569	585
V. SURING	421	437	546	513	499	581
C. GILLETT	1,076	1,145	1,410	1,374	1,288	1,356
C. OCONTO	5,030	5,362	5,055	4,805	4,667	4,505
C. OCONTO FALLS	1,921	1,888	2,050	2,331	2,517	2,500
URBAN TOTAL	8,861	9,301	9,587	9,529	9,540	9,527
TOWN TOTAL	17,525	17,774	16,651	15,581	16,013	19,420
TOTAL	26,386	27,075	26,238	25,110	25,553	28,947

TABLE 4
WDOA Population Projections
1990 - 2010
Oconto County

MINOR CIVIL DIVISIONS	1990	1995	2000	2005	2010
T. ABRAMS	1,394	1,484	1,570	1,661	1,757
T. ARMSTRONG	949	1,065	1,172	1,276	1,379
T. BAGLEY	315	338	358	377	396
T. BRAZEAU	1,148	1,181	1,202	1,221	1,238
T. BREED	629	656	690	721	750
T. CHASE	1,363	1,417	1,466	1,521	1,570
T. DOTY	216	237	256	281	306
T. GILLETT	1,143	1,177	1,200	1,216	1,229
T. HOW	585	580	570	553	535
T. LAKEWOOD	580	608	631	651	667
T. LENA	854	835	809	781	751
T. LITTLE RIVER	981	974	957	949	938
T. LITTLE SUAMICO	2,723	3,059	3,361	3,716	4,075
T. MAPLE VALLEY	720	727	728	719	708
T. MORGAN	754	766	773	769	764
T. OCONTO	962	975	980	971	961
T. OCONTO FALLS	1,184	1,254	1,311	1,366	1,416
T. PENSAUKEE	1,105	1,175	1,233	1,272	1,308
T. RIVERVIEW	518	561	598	637	675
T. SPRUCE	799	787	768	742	716
T. STILES	1,407	1,485	1,567	1,642	1,725
T. TOWNSEND	830	887	943	993	1,043
T. UNDERHILL	687	697	700	699	698
V. LENA	612	623	629	629	628
V. SURING	673	688	695	715	733
C. GILLETT	1,391	1,401	1,398	1,381	1,363
C. OCONTO	4,524	4,539	4,512	4,415	4,312
C. OCONTO FALLS	2,545	2,506	2,444	2,382	2,318
COUNTY TOTALS	31,591	32,682	33,521	34,256	34,959

Small Area Projections prepared at Applied Population Laboratory, UW-Madison, 1985, for Demographic Services, Department of Administration, State of Wisconsin.

Archaeological and Historic Sites

Historic and archaeological sites comprise an important portion of the unique cultural heritage of Oconto County. A recognition of historic and archaeological sites is necessary, because once destroyed, these sites and structures cannot be replaced. Table 5 provides a listing of the sites located in the Town of Pensuakee. Many of the sites may be eligible for listing in the National Register of Historic Places in Wisconsin. A few of the sites are listed in the National Register of Historic Places.

According to the State Historical Society of Wisconsin, properties are listed in the National Register of historic Places in accordance with the national Historic Preservation act and with Section 44.22 of the Wisconsin Statutes. Listed properties and those determined eligible for listing received limited protection from encroachment by federally-licensed or assisted projects. Listed and eligible properties also received limited protection in state facilities development and long-range planning under Wisconsin Statutes.

TABLE 5
Specific Historic and Archaeological Sites,
Oconto County, Wisconsin

Town of Pensaukee	Site	Location/Section	
Darr (77)	Indian Site	T27N, R21E	34
DeKeuster (78)	Prehistoric & Historic Campsite	T27N, R21E	3
Ziesmer (79)	Not Classified	T27N, R21E	10
Cemetery/Mounds (80)	Cemetery/Mounds	T27N, R21E	10,11
Pensaukee Mound Group (81)	Mounds/Menominee Village Site	T27N, R21E	11
Pensaukee Harbor Light (82)	Harbor Light	T27N, R21E	12
Zirsmer (83)	Village	T27N, R21E	15
Village (84)	Village	T27N, R21E	17
Brookside Community (85) Center/Town Hall ( )	Community Center	T27N, R21E	19
Snyder I (86)	Indian Habitation Workshop	T27N, R21E	23
Snyder II (87)	Not Classified	T27N, R21E	27
Village (88)	Village	T27N, R21E	34

SOURCE: Bay-Lake Regional Planning Commission

SECTION 3

EXISTING DREDGING INFORMATION

Past Dredging Efforts

The Pensaukee Harbor has been dredged two times in the past 30 years. The frequency of these dredging efforts and the exact amount of material dredged are identified in the following:

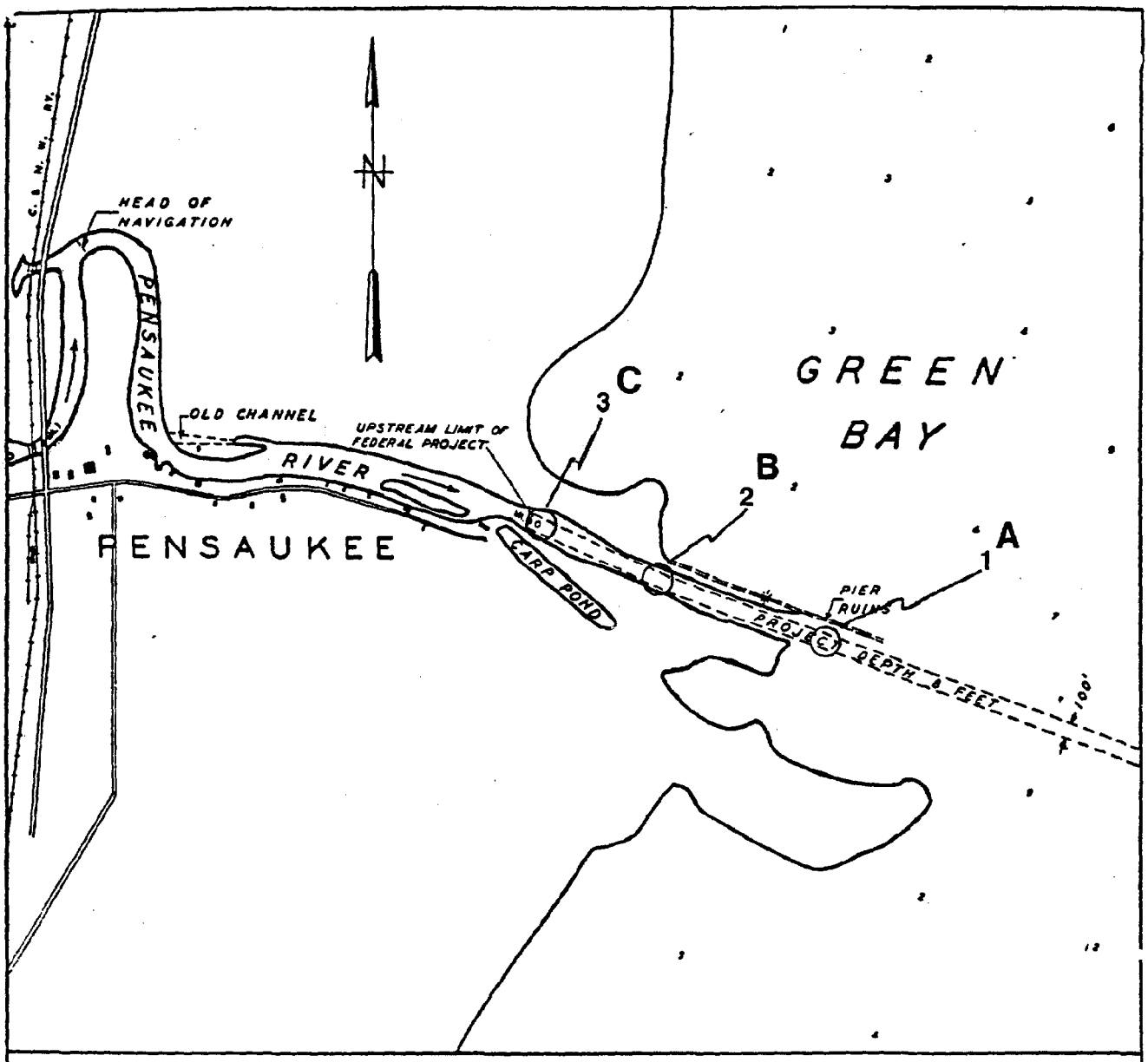
Fiscal Year		Cubic Yards
1961		12,900
1965		8,395
	Total	21,295

The U.S. Army Corps of Engineers has revised the dredging frequency for the Pensaukee Harbor and is now at 20+ year intervals. Based on this revised interval, the harbor area should be dredged sometime after 1985.

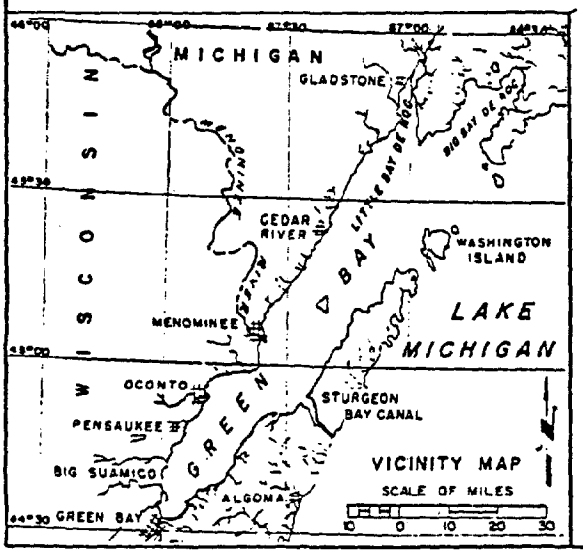
Sediment Data

Map 7 and Tables 6-10 illustrate the most recent test data of sediment conditions that have been compiled by the U.S. Army Corps of Engineers. Retesting of the sediment material is tentatively scheduled for 1992. In addition to the most recent test data, the interim criteria, as developed by WDNR for in-water disposal of specified substances are also listed for comparison purposes (see Table 10).

MAP 7



ACTS	AUTHORIZING DOCUMENTS
August 2, 1882	H. DOC. No. 153, 42d CONG., 3d SESS.
1883	R & H Act Aug 2, 1882



PROJECT DEPTHS AND SOUNDINGS ARE REFERRED TO LOW WATER DATUM 576.8 FEET ABOVE MEAN WATER LEVEL AT FATHER POINT, QUEBEC, I.G.L.D. (1955) (INTERNATIONAL GREAT LAKES DATUM)

PENSAUKEE HARBOR WISCONSIN

IN 1 SHEET — SHEET NO. 1

SCALE OF FEET

500 0 500 1000 1500 2000

U. S. ARMY ENGINEER DISTRICT, DETROIT
30 SEPTEMBER 1982

TABLE 6

DETROIT CORPS OF ENGINEERS

Harbor Pensaukee Sample Type Waters Date Collected 3/3/82

Parameter	Site 2	Site 3				
% Solids	NR	NR				
Total Volatile Solids	NR	NR				
Suspended Solids	<1	<1				
Dissolved Solids	215	367				
TOC	9	21				
BOD	NR	NR				
COD	19	53				
Oil & Grease	8	<4				
Cyanide	0.005	0.005				
Phenols	0.004	0.005				
Total Phosphorous	<0.02	0.02				
Dissolved Phosphorous	NR	NR				
TKN	<1	<1				
Ammonia	<1	<1				
Arsenic	<0.002	<0.002				
Iron	0.070	0.173				
Cadmium	<0.0003	<0.0003				
Copper	<0.001	<0.001				
Chromium	<0.001	<0.001				
Nickel	0.003	0.005				
Manganese	<0.02	<0.02				
Lead	<0.001	<0.001				
Mercury	<0.0002	<0.0002				
Zinc	<0.01	0.030				
Total PCB's	<0.0001	<0.0001				
Chlorinated Pesticides:						
Lindane	<0.0001	<0.0001				
Heptachlor	<0.0001	<0.0001				
Aldrin	<0.0001	<0.0001				
Dieldrin	<0.0001	<0.0001				
Heptachlor epoxide	<0.0001	<0.0001				
Methoxychlor	<0.0001	<0.0001				
DDT	<0.0001	<0.0001				
DDE	<0.0001	<0.0001				
Fecal Coliform	NR	NR				
Density	NR	NR				
Grain Size	NR	NR				
>2 mm						
0.43-2 mm						
0.17-0.43 mm						
0.974-0.17 mm						
<0.074 mm						

Conductivity (μmhos/cm) 348 564

Values are mg/l except as noted.

TABLE 7

Harbor Pensaukee Sample Type Elutriates Date Collected 3/3/82

Parameter	Site 2	Site 3				
% Solids	NR	NR				
Total Volatile Solids	NR	NR				
Suspended Solids	100	76				
Dissolved Solids	245	365				
TOC	47	38				
BOD	NR	NR				
COD	73	69				
Oil & Grease	4	14				
Cyanide	< 0.005	< 0.005				
Phenols	0.003	0.003				
Total Phosphorous	0.29	0.30				
Dissolved Phosphorous	NR	NR				
TKN	12.6	11.8				
Ammonia	16.2	8.7				
Arsenic	0.009	<0.002				
Iron	0.815	4.11				
Cadmium	<0.0003	<0.0003				
Copper	0.002	0.004				
Chromium	0.003	0.003				
Nickel	0.004	<0.002				
Manganese	0.808	0.728				
Lead	<0.001	0.007				
Mercury	<0.0002	<0.0002				
Zinc	0.016	0.056				
Total PCB's	<0.0001	<0.0001				
Chlorinated Pesticides:						
Lindane	<0.0001	<0.0001				
Heptachlor	<0.0001	<0.0001				
Aldrin	<0.0001	<0.0001				
Dieldrin	<0.0001	<0.0001				
Heptachlor epoxide	<0.0001	<0.0001				
Methoxychlor	<0.0001	<0.0001				
DDT	<0.0001	<0.0001				
DDE	<0.0001	<0.0001				
Fecal Coliform	NR	NR				
Density	NR	NR				
Grain Size	NR	NR				
>2 mm						
0.43-2 mm						
0.17-0.43 mm						
0.974-0.17 mm						
<0.074 mm						

Values are mg/l.

TABLE 8

DETROIT COE - TASK 50000
PENSAUKEE HARBOR
BENTHOS ANALYSES

Site	Identification	No. of Organisms
1	Annelida - Naididae	1
	Annelida - Naididae - *Nais* sp	9
	Diptera - Chironomidae - *Cryptochironomus* sp	5
2	Amphipoda - Gammaridae - *Gammarus* sp	1
	Annelida - Naididae	6
	Diptera - Heleidae - *Palpomyia cibialis*	1
	Diptera - Chironomidae - *Caironomus* sp	1
3	Annelida - Naididae	22
	Diptera - Chironomidae - *Procladius* sp	13
	Diptera - Chironomidae - *Chironomus* sp	6

TABLE 9
DETROIT CORPS OF ENGINEERS

Harbor Pensaukee Sample Type Waters Date Collected 3/3/82

Parameter	Site 2	Site 3				
% Solids	NR	NR				
Total Volatile Solids	NR	NR				
Suspended Solids	<1	<1				
Dissolved Solids	215	367				
TOC	9	21				
BOD	NR	NR				
COD	19	53				
Oil & Grease	8	<4				
Cyanide	0.005	0.005				
Phenols	0.004	0.005				
Total Phosphorous	<0.02	0.02				
Dissolved Phosphorous	NR	NR				
TKN	<1	<1				
Ammonia	<1	<1				
Arsenic	<0.002	<0.002				
Iron	0.070	0.173				
Cadmium	<0.0003	<0.0003				
Copper	<0.001	<0.001				
Chromium	<0.001	<0.001				
Nickel	0.003	0.005				
Manganese	<0.02	<0.02				
Lead	<0.001	<0.001				
Mercury	<0.0002	<0.0002				
Zinc	<0.01	0.030				
Total PCB's	<0.0001	<0.0001				
Chlorinated Pesticides:						
Lindane	<0.0001	<0.0001				
Heptachlor	<0.0001	<0.0001				
Aldrin	<0.0001	<0.0001				
Dieldrin	<0.0001	<0.0001				
Heptachlor epoxide	<0.0001	<0.0001				
Methoxychlor	<0.0001	<0.0001				
DDT	<0.0001	<0.0001				
DDE	<0.0001	<0.0001				
Fecal Coliform	NR	NR				
Density	NR	NR				
Grain Size	NR	NR				
>2 mm						
0.43-2 mm						
0.17-0.43 mm						
0.974-0.17 mm						
<0.074 mm						

Conductivity (µmhos/cm) 348 564

Values are mg/l except as noted.

TABLE 10

Harbor Pensaukee Sample Type Sediments Date Collected 3/3/82

Parameter	Site 1	2	3		WDNR Interim Criteria	(*) Exceeds Criteria
% Solids (%)	79	72	70			
Total Volatile Solids (%)	0.39	1.38	1.98			
Suspended Solids	NR	NR	NR			
Dissolved Solids	NR	NR	NR			
TOC	600	3600	6900			
BOD	NR	NR	NR			
COD	3730	15,300	29,200			
Oil & Grease	<250	<280	<290		<1000	
Cyanide	NR	<0.14	<0.14			
Phenols	NR	<0.07	<0.07			
Total Phosphorous	NR	742	747			
Dissolved Phosphorous	NR	NR	NR			
TKN	153	580	910			
Ammonia	NR	81.1	82.1			
Arsenic	NR	<2.0	<2.0		≤10	
Iron	NR	31.4	41.2			
Cadmium	NR	1.7	1.4		≤1.0	*
Copper	NR	5.3	4.2		≤100	
Chromium	NR	<4.0	8.3		≤100	
Nickel	NR	19.1	6.55		≤100	
Manganese	NR	100	80			
Lead	NR	1.42	2.00		≤50	
Mercury	NR	<0.14	<0.14		≤0.1	*
Zinc	NR	13.7	22.5		≤100	
Total PCB's	NR	<0.1	<0.1		<0.05	*
Chlorinated Pesticides:						
Lindane	NR	<0.1	<0.1		<0.05	*
Heptachlor	NR	<0.1	<0.1		<0.05	*
Aldrin	NR	<0.1	<0.1		<0.01	*
Dieldrin	NR	<0.1	<0.1		<0.01	*
Heptachlor epoxide	NR	<0.1	<0.1		<0.05	*
Methoxychlor	NR	<0.1	<0.1			
DDT	NR	<0.1	<0.1		<0.01	*
DDE	NR	<0.1	<0.1			
Fecal Coliform (#/gram wet)	4	<3	4			
Density (g/ml wet)	1.79	1.75	1.55			
Grain Size (%)						
>2 mm	0	0	1.8			
0.60-2 mm	0	0	7.1			
0.17-0.60 mm	50.6	48.0	67.2			
0.074-0.17 mm	47.1	43.4	7.8			
<0.074 mm	2.0	8.4	5.8			

Values are µg/g dry except as noted.

Guidance Criteria for In-Water Disposal

Based upon current knowledge regarding in-water disposal of dredge materials, the WDNR is considering the possibility of allowing in-water disposal of clean dredged material. A WDNR technical subcommittee has developed guidelines for evaluating the in-water disposal option for dredged material. These guidelines are as follows:

- If any pollutant, or group of pollutants, of concern is found in concentrations greater than 125% of the interim criteria for that pollutant, in-water disposal will not be allowed.
- If three or more pollutants are found in concentrations greater than 110% of the interim criteria for those pollutants, in-water disposal will not be allowed.
- If one or two pollutants are found in concentrations within the range of 110-125% of the interim criteria for those same pollutants, in-water disposal will be determined on a case-by-case basis.
- If all pollutants are found at concentrations of 110% or less than the interim criteria for those same pollutants, in-water disposal may be allowed.
- For on the beach disposal, the particle size of the dredged material must meet the following criteria: the average percent of spoil material finer than .074 mm must be within 10-15 percent points of average disposal site material finer than .074 mm. For in-water disposal, particle size matching is not required.
- For near shore disposal, 50 percent or more of sand is required by WDNR (as per proposed revisions to NR 347).

SECTION 4

PROPOSED DREDGE MATERIAL
DISPOSAL SITING

Methodology

In order to develop a map of potentially feasible dredge disposal sites in the Town of Pensaukee, it is necessary to accumulate as much of the appropriate information pertaining to the physical nature of the Town as is possible.

Unless a potential dredge disposal site is physically investigated through the use of detailed soil borings, it is impossible to be assured of its acceptability. For that reason, this plan will identify specific reuse options but only identify potential dredge disposal locations. If this plan would be carried on to the implementation phase, more detailed review and analysis would be required to determine the suitability of specific sites.

It must be noted that in all probability, not all of the potential dredge disposal sites have been identified in a plan of this scope. By the very nature of the data base, portions of the Town identified as having moderate probability for a site might in fact have several most probable locations.

Physical Limitation Affecting Dredge Disposal Siting

For various reasons, there are a number of physical features such as wetlands, floodplains, soils and critical habitat areas that may limit the placement of dredge disposal sites. These factors are especially true when dealing with contaminated dredge material. A summary of these conditions include:

- Within 1,000 feet of any navigable lake, pond or flowage,
- Within 300 feet of any navigable river or steam,
- Within an area that has been identified as floodplain by WDNR and the Federal Emergency Management Agency (FEMA),
- Within wetlands that are delineated on the Official Oconto County Wetland maps,
- Within critical habitat areas that have been delineated,
- Within areas where there is reasonable probability that the disposal of dredge material will have a detrimental effect on surface water and/or groundwater, and
- Within areas where the prominent soil types are not conducive to support a dredge disposal site or solid waste land fill site.

Dredge Disposal Options

Once all of the necessary permits and approvals have been obtained for the dredging of a particular area, disposing of

the dredge material in a safe and efficient way is of primary concern. The following is a general compilation of disposal options:

1. When dredged material is polluted according to EPA criteria, two disposal methods exist:

   - Polluted dredged material that doesn't contain toxic and/or hazardous contaminants can be disposed of in a CDF or other licensed facility.

   - Polluted dredged materials containing high levels of PCB's, heavy metals or other toxic materials may require special care in disposal, such as placing them in a specially-designed and licensed toxic and hazardous waste disposal site.

2. When dredged material is unpolluted by EPA standards, many options exist under existing laws for the disposal of the disposal of the material, including many beneficial uses:

   - Permanent upland disposal site - Filling abandoned gravel pit or creating a diked disposal area are examples of permanent upland disposal. This option requires a solid waste license or waiver under Chapter 180, Wis. Adm. Code. Upland disposal sites might require a pollutant discharge permit under Chapter 200, Wis. Adm. Code, if the site has a discharge to a waterway or to the groundwater.

   - Transfer/reuse site - A permanent site for storage of reusable materials requires a solid waste license (or waiver of license). If the site is located on the bed of a waterway, a structure permit (s. 30.12, Stats.) would be required.

   - Shore protection - Using dredged material in riprap or other shore protection projects does not require a permit if the dredged material is placed above the ordinary high-water mark (OHWM), behind an approved bulkhead line, or is used to replace shoreline material which has eroded in the past year.

   - Fill behind bulkhead lines - Dredged material may be used as fill behind an approved bulkhead line. A pollutant discharge permit or solid waste license may be required.

   - Marsh restoration/creation - Instead of creating dry land, fill may be used to create or restore wetland conditions. Restoration might be possible without permits or authority if the purpose of the filling is to reclaim suddenly lost shoreland. In this case, filling must be done within one year after the

damaging erosion event. Marsh creation might be possible by combining a submerged lands lease and a bulkhead line.

- Littoral drift continuation - Breakwaters and similar structures interrupt the natural long shore transport of sediment by currents (littoral drift) - causing sediments to accumulate and increasing down drift erosion. If the dredged materials are clean, depositing them down drift from the artificial barrier would preserve an important natural process. Littoral drift continuation might be possible by combining a submerged land lease and a bulkhead line.

- Beach nourishment - Clean dredge materials may be used to nourish an existing beach as a shore protection methods. This use requires no permit if the dredged material is placed above the ordinary highwater mark or behind an approved bulkhead line. Beach nourishment is commonly used to offset damage caused by coastal structures that interfere with littoral drift.

3. Other options for the disposal of dredged materials that might be permitted include:

- Construction of breakwaters, jetties, groins, etc.,...

- Construction of marinas and harbor facilities.

- Construction of bridges and/or causeways.

- Construction of bridges and/or causeways.

- Construction of parks, roads, sewage treatment facilities, etc.

- Surface application on agricultural land as a soil conditioner.

- Capping for landfill.

- Economically used for highway ice control.

- In-water, near-shore disposal of clean dredged material may be an option of NR 347 is revised to permit such activity.

Recommended Dredge Disposal Alternatives - Town of Pensaukee

Introduction

Based on the test data that was compiled in 1982, the reuse options identified previously and from discussions with WDNR Personnel, the future disposal of dredge material from the Pensaukee Harbor should be limited to upland disposal sites. Specific reasons for this recommendation include:

1. The current language contained within Chapter 30.12 of the Wisconsin State Statutes states that in water disposal of dredge material is not permitted;

2. WDNR staff have reevaluated the 1982 sampling data prepared by the Corps of Engineers and have determined that the presence of Cadmium, PCB's, Lindane, Mercury, DDT, Aldrin, Dieldrin, Heptachlor and Heptachlor Epoxide (as per WDNR interim criteria) make the dredge materials from the harbor unsuitable for in-water disposal.

Reuse and Disposal Options

A number of specific reuse options and upland disposal sites have been identified for the dredge material from the Pensaukee Harbor.

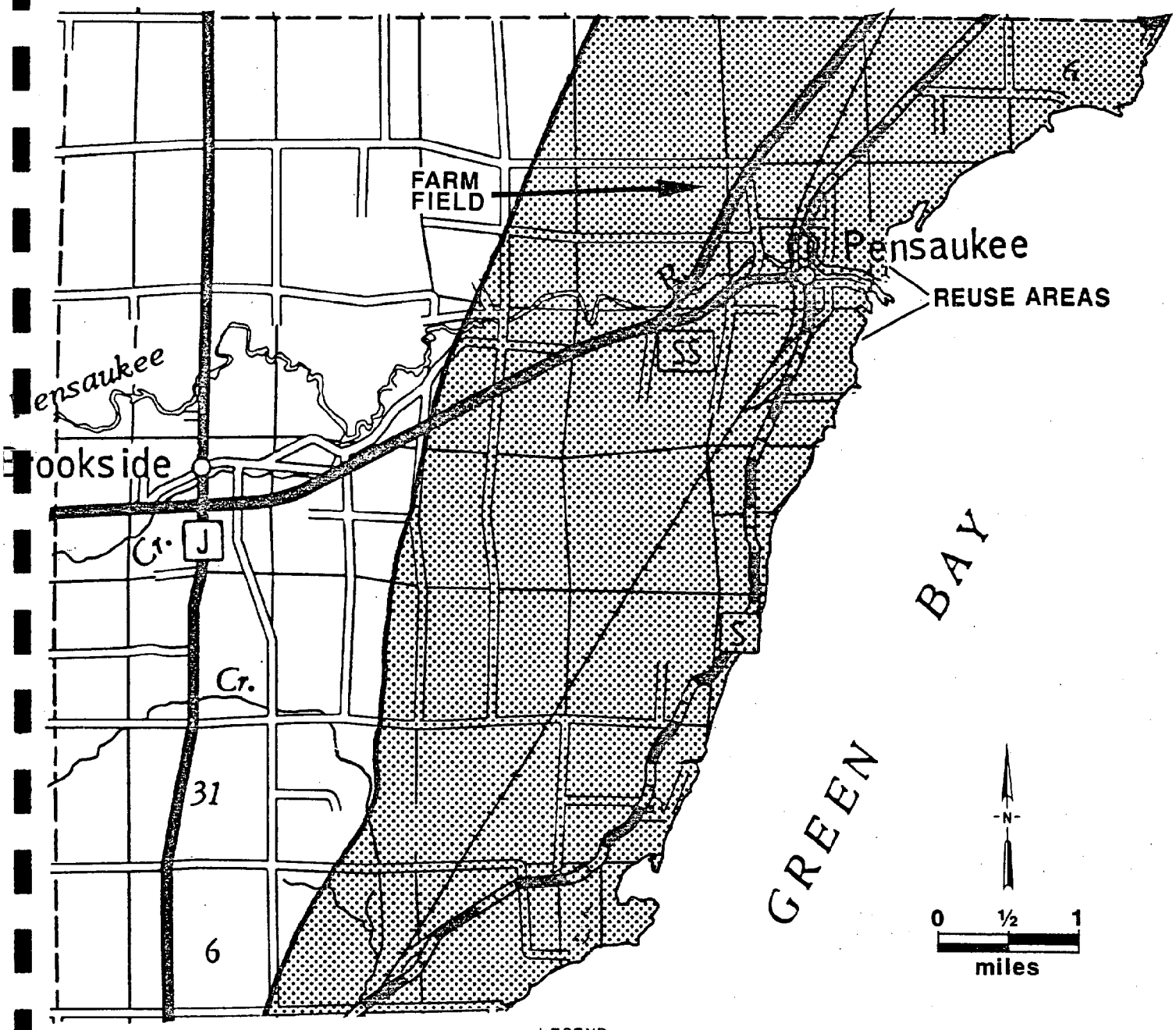
1. Reuse options include: (a) Beach nourishment would be suitable during periods with normal water levels. But at the current time, the high water has consumed many of the original shoreland areas and has resulted in many of the beaches being under several feet of water. Also, the quality of the dredge material for beach nourishment is questioned because of sediment conditions. When water levels subside and the sediment conditions are more accurately known, the potential reuse of clean dredge material for beach nourishment should be reevaluated. (b) Allowing property owners to fill behind bulkhead lines is also possible. The problem with this option is that many of the landowners in the Pensaukee area need little or no fill. (c) Wetland restoration is another possible reuse option. With current water levels, several wetlands in the area could be restored to their once natural state. (d) Island restoration is another option. Much of this effort would involve the placement of clean material on off shore islands to protect them from the negative impacts of record high Bay levels. It must be noted that some type of rock containment would be needed to keep the dredge material in place.

2. Several upland areas exist in the vicinity of the Pensaukee Harbor that appear to have suitable soil conditions to accommodate dredge material disposal (see Map 8). Also, these areas have been evaluated as to their relationship to nearby development and land uses. These

MAP 8

AREAS SUITABLE FOR DREDGE MATERIAL DISPOSAL

Town Of Pensaukee



LEGEND

- Slight Limitations For Dredge Disposal Site
- Moderate Limitations For Dredge Disposal Site
- Severe Limitations For Dredge Disposal Site

Source: Oconto County Comprehensive Solid Waste Management Plan.

upland areas include raising the elevations of developed areas that are along the river and bay shoreline. Some of the developed areas adjacent to the Pensaukee Harbor are very low and are in need of fill. A significant problem does exist in that many of these areas are now under several feet of water and current WDNR regulations do not permit the in-water placement of fill material. When water levels do subside, these areas should be reevaluated as sites for the disposal of clean dredge material.

A second upland disposal site for clean dredge material is a farm field in section 9 of the Town of Pensaukee and is located approximately one mile to the northwest of the harbor. Fill could be used as a soil conditioner for the farm field. Current use of this field is for the growing of corn and hay. In addition to these areas, there are a number of low areas south of the Pensaukee Harbor area that could be filled, but many of these areas are also currently under three to four feet of water. Any placement of fill in these areas should be delayed until the current water levels subside. Also, the use of dredge material for fill purposes should not occur until new test data can determine the overall concentrations of the before-mentioned contaminants in specific dredge material.

Summary - Future Considerations

Based on the data that has been assembled, several factors need further consideration. These include: deficiencies in the sediment testing data, costs, potential funding sources and community involvement activities. Each of these factors are discussed in the following sections.

Deficiencies in Sediment Testing Data

The sediment data listed earlier for the Pensaukee Harbor is deficient in several ways. First, the location of the test sites 1,2 and 3 are where the most contaminated dredge material can be found. The lakebed area away from the river mouth is where much of any future dredging is most needed.

Based on this deficiency, additional sediment test data must be obtained that is east of the harbor to better indicate the actual location and physical makeup of the actual material to be dredged.

Costs

Sediment Testing: Before dredging of material can actually occur in the Pensaukee Harbor, better sediment data must be obtained. It has been estimated by the U.S. Army Corps of Engineers that another round of sediment sampling and test would cost between $6-10,000.

Dredging: Based on the amount of material needed to be dredged from the Pensaukee Harbor being about 21,000 cubic yards and an estimated dredging cost of $5.00/cubic yard, approximately $105,000 would be needed based on current dollar estimates to dredge all of the existing material from the Pensaukee Harbor and move the material to one or more storage or reuse areas. Since the actual amount of material to be dredged is unknown at this time, this estimated cost could be incorrect.

Potential Funding Sources

A number of potential funding sources currently exist that may be applicable for the funding of sediment testing and dredging in the Pensaukee Harbor. These possible funding sources include the U.S. Army Corps of Engineers, Wisconsin Waterways Commission, Harbor Assistance Program and Wisconsin Coastal Management Program. In addition to these outside sources, the Town of Pensaukee could be viewed as potential funding source for future dredging and dredge related activities.

Community Involvement

BLRPC staff prepared this harbor management plan for the Pensaukee Harbor in anticipation to changes to legislation that relates to final placement of clean dredge material. This plan was developed with the technical assistance of Wisconsin Department of Natural Resources and Wisconsin Coastal Management personnel. The direct input of local officials and residents from the Pensaukee Harbor area was not pursued.

The primary reason for not pursuing local involvement centered around the fact that the legislation needed to support in-water disposal of clean dredge material did not legally exist. The Commission and WDNR staff felt that leading communities to believe that in-water disposal was permitted before the laws were actually changed could do more harm than good. A second factor which contributed to this decision included the fact that the sediment data for the Pensaukee Harbor was inadequate to make a determination if the proposed dredge material was actually clean or not. A third factor is that current high water conditions found on the Great Lakes do not make dredging a priority issue especially in small communities such as Pensaukee. Also, there are very limited dollars available to pay for dredging in smaller communities. In many instances, the only dollars now available for dredging are local. With greater competition for state and federal funds that are available to local units of government, greater demands are being placed on local revenues for day-to-day administrative uses.

The specific reuse options and potential disposal sites that have been developed for this plan should be used as a guide for future dredge disposal planning efforts. Once the legislation has been approved by the Wisconsin Legislature which permits as

an option, in-water disposal of clean material, BLRPC and WDNR staff will work with the local unit of government to refine the findings of this document. Only then can specific proposals relating to the siting of dredge material be acted upon.

APPENDICES

APPENDIX A
State Regulations Affecting Dredging

The Wisconsin Department of Natural Resources (herein referred to as WDNR) has the regulatory authority in Wisconsin to oversee all dredging projects that occur in Wisconsin's navigable waterways. A summary of each of these regulations has been developed and is provided in the following:

General Dredging Regulations:
Removal of material from beds of navigable waters, Section 30.20, Wisconsin State Statutes. Removal of any material from any navigable lake or stream bed requires a contract with, or permit from, the DNR. Dredging contacts/permits specify methods of disposal which help minimize or eliminate adverse effects of dredging on water quality, habitat, and recreation.

Regulations of dredging projects on the beds of waterways, NR 347, Wisconsin Administrative Code. This rule provides legal definitions of dredging related terms, lists required projects and environmental information, and specifies the implementation (as it applies to dredging of the wastewater treatment facility plan approval program, the solid and hazardous waste management programs and the Wisconsin Pollution Discharge Elimination System.

Water Quality-Related Laws:
Wastewater treatment facility plan approval, Section 144.04, Wisconsin Statutes. Under this program, all wastewater treatment facilities and sewer extensions constructed for the handling of dredged material disposal must have approved plans prior to beginning construction. Changes to such facilities must also be approved. All treatment facility plans must conform with existing approved areawide waste treatment management plans under the federal Clean Water Act. A dredged material disposal facility may require plan approval since it can involve treatment of waterborne pollutants.

Solid and hazardous waste management programs, Sections 144.43 through 144.784, Wisconsin State Statutes. This group of laws directed the DNR to develop standards for permitting and licensing the construction and operation of solid and hazardous waste disposal facilities. From a preliminary discussion of a proposed dredging project, the DNR determines what technical information is required for permitting. This is based on the amount of dredged material and the potential for contamination of the sediments with PCB's or other hazardous substances. The laws provide for county-level solid waste management planning to be coordinated with recycling and other regional plans. Depending on the nature of the dredged

material and the disposal site, a solid or hazardous waste license may be required.

Wisconsin Pollution Discharge Elimination System, Chapter 147, Wisconsin State Statutes. To eliminate the harmful effects of pollutants on waters and the organisms that depend on them, the legislature directed the DNR to establish limits on effluent discharges. No one may discharge a pollutant to a waterway without a permit. DNR review of the dredging discharge permit application may determine that the project can be authorized by a "general permit" which establishes basic effluent limitation that must be me. For dredging projects not receiving the general permit, a permit is processed and individual effluent limitations are established.

Water quality certification program, NR 299 Wisconsin Administrative Code. The federal Clean Water Act of 1977 requires projects receiving federal approval in state waters to meet state water quality laws. The administrative rule establishes the standards and procedures for determining whether federally issued permits meet the requirements of state laws.

Obstruction-Related Laws:
Establishment of bulkhead lines, Section 30.11, Wisconsin State Statutes. This statute enables a municipality to pass an ordinance subject to DNR approval establishing an artificial line (bulkhead line) delineating the shore of any navigable water within its boundaries. Waterfront property owners may place solid structures or fill up to such lines if they meet standards for the protection of fish, wildlife and water quality. A bulkhead line must meet two legal requirements: its purpose must be in the public interest and it must follow the existing shoreline as nearly as practicable. In the Great Lakes and other waterways where the Corps of Engineers maintains commercial navigation projects, a submerged lands lease may be combined with a bulkhead line to allow structures or fill to be placed farther from the shoreline than by bulkhead line alone.

Structures and deposits in navigable waters, Section 30.12, Wisconsin State Statutes. This statute prohibits the deposit of any material or the placement of any structure on the bed of any navigable water or beyond a lawfully established bulkhead line without a permit. Structures such as groins and jetties, sand blankets, fish cribs or riprap may be placed in navigable waters by permit. Deposits of materials that have no intended use or form are prohibited.

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