

WISCU-WA-71-002 e. 2

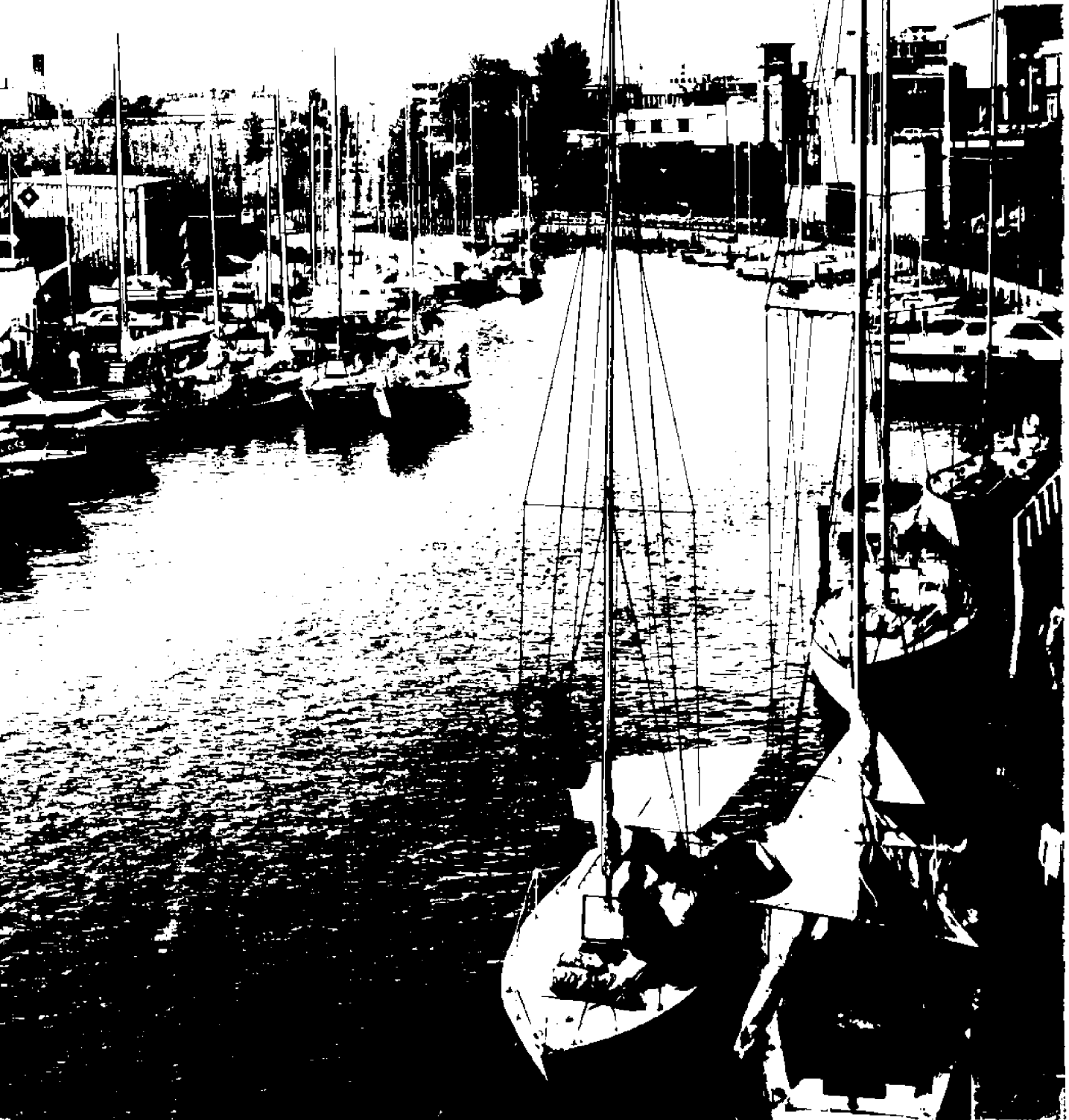
# The Future of Boating on Lake Michigan

LOAN COPY ONLY

CIRCULATING COPY

Highlights of a conference sponsored  
by the University of Wisconsin Sea  
Grant Program, Madison, Wisconsin,  
October 15-16, 1970.

## Sea Grant Depository



**THE FUTURE OF BOATING  
ON LAKE MICHIGAN**

LOAN COPY ONLY

Highlights of a session of the  
University of Wisconsin Sea Grant Conference  
"The Great Lakes—Sink? or Swim?"

October 15-16, 1970  
Madison, Wisconsin

**CIRCULATING COPY**  
**Sea Grant Depository**

The University of Wisconsin Sea Grant Program  
Public Information Report No. 6  
WIS-SG-71-106  
August 1971

Additional copies are available from  
The University of Wisconsin Sea Grant Office  
1225 West Dayton Street  
Madison, Wisconsin 53706

# HIGHLIGHTS OF THE FUTURE OF BOATING ON LAKE MICHIGAN SESSION

The University of Wisconsin Sea Grant Conference  
"The Great Lakes – Sink? or Swim?"

Robert B. Ditton, Session Chairman  
The University of Wisconsin-Green Bay

## TABLE OF CONTENTS

Introduction . . . . .	5
<b>Panel Discussion:</b>	
<b>Access and Boating Facility Development on Lake Michigan</b>	
The Boating Market and Future Boating Facility Needs on Lake Michigan, Matt Kaufman . . . . .	7
The DNR, ORAP and Future Funding Arrangements Needed to Promote Marina Development, Donald Beghin . . . . .	9
Funding Arrangements of the U.S. Army Corps of Engineers for Harbor/Marina Developments, Ronald Buddecke . . . . .	11
Local Marina Development Problems, Fred Garner . . . . .	13
<b>Recreational Boating on Lake Michigan, a Map . . . . .</b>	<b>16</b>
<b>Other Discussion Topics . . . . .</b>	<b>17</b>
<b>Ongoing Recreation Research, UW Sea Grant Program . . . . .</b>	<b>18</b>
<b>Research Needs as Expressed by the Conference Audience . . . . .</b>	<b>19</b>
<b>List of Participants in the Recreation Session . . . . .</b>	<b>21</b>

**Cover:** Pleasure boats line the Palmer Johnson Boat Harbor, Racine, Wisconsin.  
(From a photo courtesy of Palmer Johnson Boats, Inc.)

## FOREWORD



This session on "The Future of Boating on the Great Lakes" was planned and conducted by Professor Robert B. Ditton, University of Wisconsin—Green Bay. It was a part of the annual University of Wisconsin Sea Grant Conference in October, 1970, entitled "The Great Lakes — Sink? Or Swim?" What is recorded here is a brief summary of the papers and information developed during the meeting.

Recreation boating as a major and growing use of Great Lakes Waters has attracted much interest from regional planning agencies, local communities, and the tourist and manufacturing industries. As a resource with social benefit and economic input to a region, it is one that requires study as the pressure for increased use rate has implications which are both positive and negative in terms of the affected communities.

The University of Wisconsin Sea Grant Program has recognized and studied the important relationships between recreation use and real and perceived water quality.

There are many other needed inputs, however, and for these we wish to acknowledge with appreciation the contributions by the speakers in this session.

The University of Wisconsin's Sea Grant Program is a part of the National Sea Grant Program, which is maintained by the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce. Support has been provided by the State of Wisconsin and the National Science Foundation.

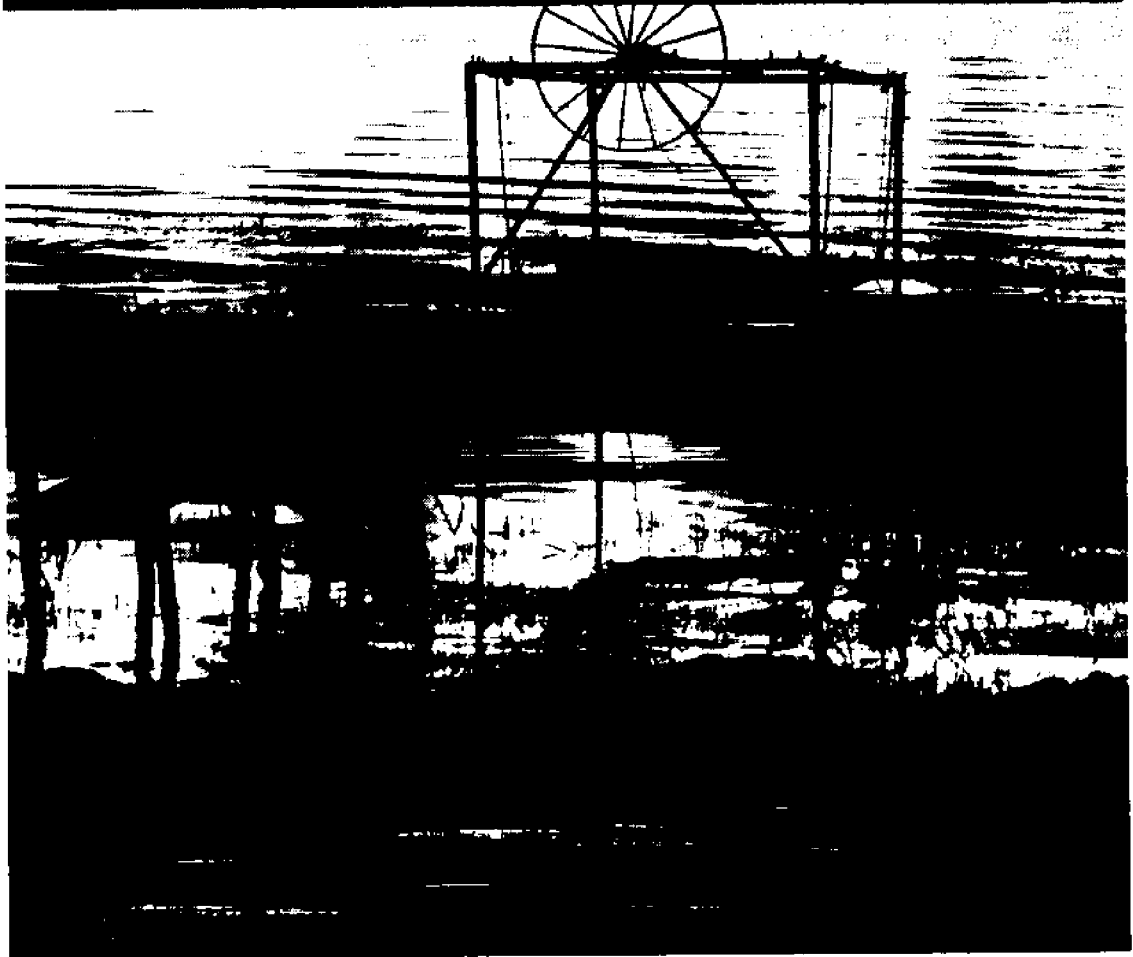
**GREGORY D. HEDDEN**

*General Chairman of the Conference*

*Director of University Extension*

*Sea Grant Program*

(From a photo courtesy of Green Bay Press Gazette.)



## INTRODUCTION



**Robert B. Ditton**

*University of Wisconsin—Green Bay*

Studies conducted by the U.S. Outdoor Recreation Resources Review Commission in 1960 revealed that 44 percent of outdoor recreation participants favored water-based recreation activities over any others, and that an additional substantial percentage favored water-related recreation activities. Subsequent studies conducted by the Bureau of Outdoor Recreation have revealed that water-based recreation activities are increasing sharply, as evidenced by a 12 percent increase in fishing, an 18 percent increase in boating, and a 15 percent increase in swimming, during the half-decade from 1960-1965, while the population increase was estimated at only 8 percent during that period. In fact, it is generally recognized that recreation use is the most rapidly growing demand on water.

Boating is projected to undergo the greatest popularity growth. The Bureau of Outdoor Recreation estimates that between 1965 and 1980 boating will increase 76 percent while the population increases 29 percent and that between 1965 and the year 2000 boating will increase 215 percent while the population increases 76 percent. In light of past conservative projections and 1970 census data, it is highly likely that these projections are underestimations themselves.

It is perhaps paradoxical that as a nation we are witnessing a population explosion; people today have more leisure (shortened work weeks, unemployment, earlier retirement, 3 and 4 day work weeks, longer and more frequent vacations, etc.); more money and greater mobility. At the same time, our effective supply of water resources needed to support leisure activity is diminishing in both quantity and quality. This collision course will continue until more attention is paid to the constraints on future recreational use of water—namely: 1) water pollution, 2) lack of access and facility development and 3) conflicting water uses.

The purpose of this conference is to evaluate these constraints and seek

ways to overcome them so as to optimize the recreational boating potentials of Lake Michigan.

Through ecologically-sensitive technology and user resource planning, it is possible to meet human recreative needs without any further sacrifice of the Lakes' environmental quality. In areas of degraded water quality, water recreation can be further eliminated by other conflicting water uses, or indeed recreation development can become a substantial pressure for alleviating degraded conditions. Lake Michigan with its unique weather conditions is seen as an ideal safety valve for many of our small aquatic bodies that have reached the saturation point in recreational development and are diminishing in quality.

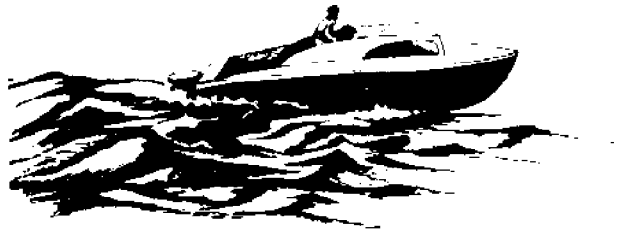
(From a photo courtesy of the Wisconsin Conservation Department.)



# ACCESS AND BOATING FACILITY DEVELOPMENT ON LAKE MICHIGAN

## A Panel Discussion

### The Boating Market and Future Boating Facility Needs on Lake Michigan



**Matt Kaufman**  
*Executive Director*  
*Boating Industry Association*  
*Chicago, Illinois*

It is no secret that pleasure boating has grown tremendously since World War II. In 1947 there were 2,440,000 boats of all types in use on all the waters of the U.S. In 1969 there were 8,469,000 pleasure boats in use on U.S. waters.

In terms of dollar volume, it is estimated that in 1947 \$905 million was spent in the retail sector on boating equipment, servicing and maintenance. In 1969 this figure jumped to \$3.2 billion.

In 1970 there was a slight increase over 1969 in overall expenditures at the retail level. The industry as a whole will probably be down about 12% in the sale of *new* equipment. However, there has been a lot of sales activity in regard to used equipment and replacement of accessories because of the slowdown in the economy. Boating has fared better than other durable goods, which are reporting decreases of 20% to 25% in sales. The boating industry has reached a new plateau of about 560,000 new boat sales each year. In addition, there are approximately a half-million new outboard motor sales per year.

Wisconsin has been one of the "Top Ten" states in the boating industry since World War II. Our statisticians came up with a figure of \$150,000,000 in sales of boating equipment of all types in Wisconsin in 1969. Approximately 25,000 outboard motors were sold in Wisconsin last year and about the same number of boats.

As far as the over-all picture is concerned there are about 280,138 registered motorboats and sailboats over 12 feet long in Wisconsin. We estimate there are also about 298,000 outboard motors in use here. Adding to that another 150,000 unpowered boats we arrive at a total boat population for the State of Wisconsin of about 430,000.

In addition, we have estimated the number of boats using the Lake Michigan shoreline in Wisconsin. About 60,000 boats use the Lake at least once a year; at least half of these are less than 16 feet in length. We also estimate that



some 25,000 out-of-state boats operated off Wisconsin's Lake Michigan shoreline last year. This would yield a total boating usage of 85,000 boats over the course of a summer.

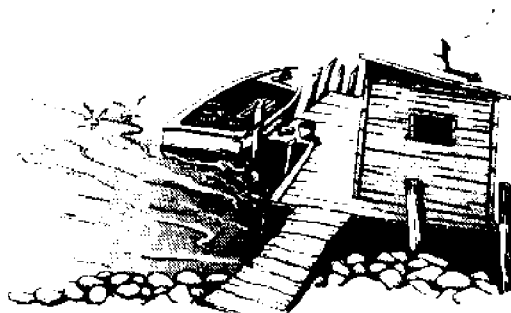
Wisconsin has always been a very good market for marine products in comparison with other states. While Wisconsin has about 2.1 percent of the nation's population, it has 5.8 percent of all the boats registered in the U.S. The 5.8 percent figure is somewhat misleading because many states don't register sailboats as Wisconsin does. On the other hand, Wisconsin represents 5 percent of the national market for outboard motors, and Wisconsinites purchase 4.7 of the small boats under 26 ft. and a like amount of boat trailers. So you might say that boat sales in Wisconsin are twice as high as you might expect strictly on the basis of population.

What about the future? In 1965, the U.S. Bureau of Outdoor Recreation predicted some dramatic increases in boating activity nationally. In 1985 they estimate boating activity will increase 75 percent and that by the year 2000 boating activity will increase by 215 percent. These projections are in terms of "occasions of participation" or one man going out in a boat for any part of a day. In terms of actual activity, there were nearly 220 million boating occasions in 1965. Projections call for 387 million boating occasions in 1985 and 694 million by the year 2000.

To meet these projected increases in boating activity, a number of matching fund assistance programs have been set up by the federal government. Several Great Lakes States draw upon the revenues derived from marine fuel taxes for marina-boating facility development. Illinois earmarks \$2 million out of its fuel taxes for boating facility development. Michigan invests \$3 million and Minnesota spends about \$500,000. Wisconsin has no boating facility funding program tied to marine fuel taxes.

In conclusion, it should be clear that any increase in boating activity on Lake Michigan depends heavily upon the establishment of a statewide boating facility development program in Wisconsin.

# THE DNR, ORAP AND FUTURE FUNDING ARRANGEMENTS NEEDED TO PROMOTE MARINA DEVELOPMENT



**Donald Beghin**  
*Supervisor, Boating Activities*  
*Wisconsin Department of Natural Resources*  
*Madison, Wisconsin*

Monies for aid to local units of government for the construction of boat access facilities are available from the following sources: ORAP, LAWCON, HUD (Housing and Urban Development, Open Space Grants), the County Conservation Fund whereby payments are made in lieu of bounty payments, and the U.S. Army Corps of Engineers. Funds from all of these programs are administered by the Wisconsin Department of Natural Resources (DNR) with the exception of the U.S. Army Corps of Engineers.

Normally, access sites developed under this program are in conjunction with some type of a park facility, which also provides for picnic sites, swimming beaches, nature study areas, parking lots, shelters, sanitary facilities, electric utilities, grills and other recreation facilities. It is possible to benefit from a 75 percent cost share on the land portion, and in a 50 percent cost share on the actual facility development costs.

Harbor construction, including break waters, channel and basin dredging, is beyond the primary scope of our present DNR programs even though recreation is the main harbor purpose. The U.S. Army Corps of Engineers provides 50 percent cost sharing specifically for this purpose. Should a harbor project also include the development of supporting recreation areas and facilities, these items would be eligible for cost sharing under the state's program.

Since the state aid law was passed in 1959 Wisconsin has cost shared in the construction of 162 public access and boat launching sites. The average cost for the states share of an access site was \$2,240.92 and the total amount paid by the state was \$363,029.32.

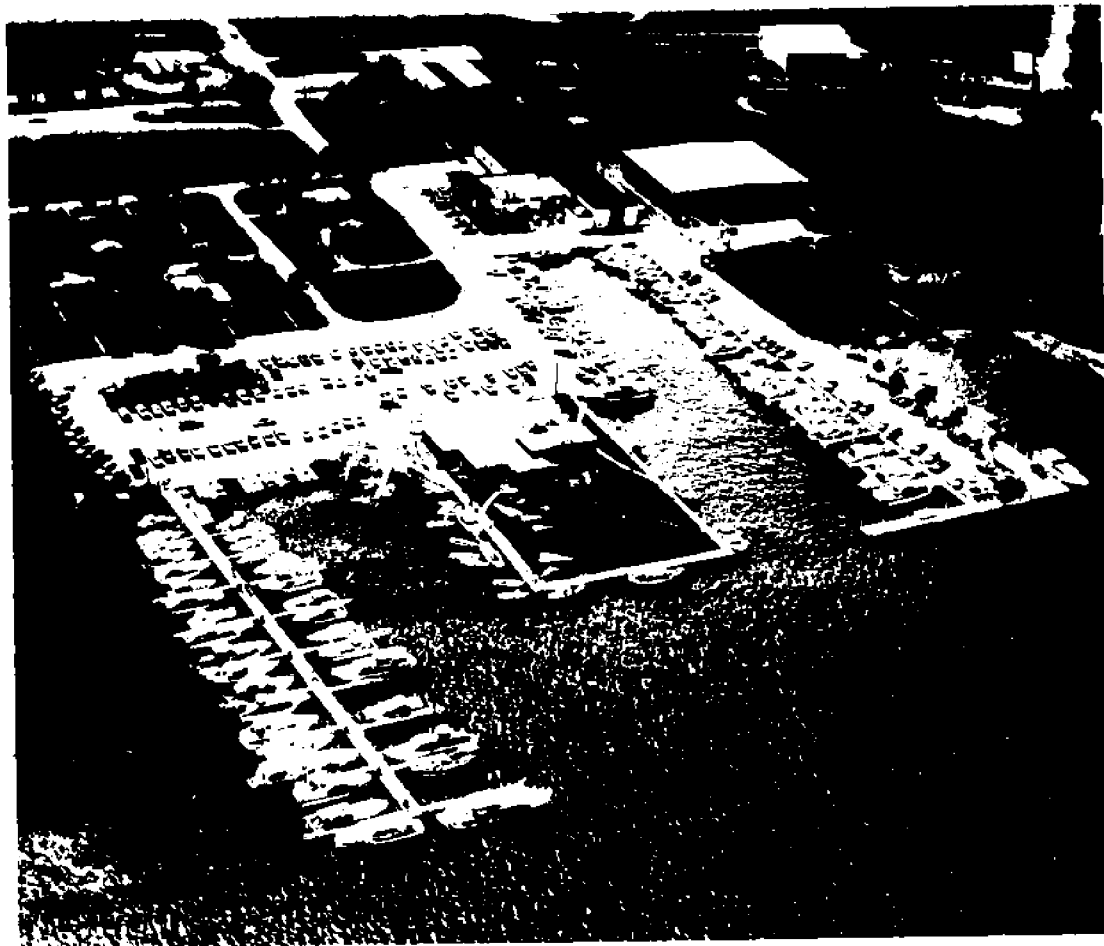
The Department of Natural Resources is presently drafting proposed legislation whereby marine fuel taxes would be appropriated to the Department to be used as follows:

1. 15 percent of the fund would be used for an increased program of water safety and enforcement;
2. 35 percent of the fund would be used for an increased program of lake and stream improvement for navigation, recreation and water quality enhancement;
3. 50 percent of the fund would be used for the acquisition and improvement of lands for public access and to erect protection, launching and dock facilities and toilets at such access locations.

Dr. Ron Aitkin of the University of Wisconsin, Oshkosh Campus, conducted a survey which shows that there is approximately 2.3 million dollars per year collected on the sale of marine fuel which is reverted to the highway fund. It is our position that the taxes collected on marine fuel should be utilized for the construction of marine facilities, the improvement of our waterways and for an increased water safety and enforcement program.

If marine fuel taxes were turned over to the Department of Natural Resources under the terms of the proposed legislation there would be over one million dollars available on an annual basis for marina development programs.

(From a photo courtesy of Baudhuin Yacht Harbor.)



## FUNDING ARRANGEMENTS OF THE U.S. ARMY CORPS OF ENGINEERS FOR HARBOR/ MARINA DEVELOPMENT



**Ronald Buddecke**

*Civil Engineer, North Central Division  
U.S. Army Corps of Engineers  
Chicago, Illinois*

The scope of the Corps of Engineers water resources projects have developed through a long series of River and Harbor and Flood Control Acts. However, one of the most important acts for consideration of recreation at Corps of Engineers projects was the "Fletcher Act." This act enlarged the scope of the federal interest in navigation to include in the term "commerce" the use of waterways by "seasonal passenger craft, yachts, houseboats, fishing boats, motorboats, and other seasonal water craft, whether or not operated for hire." Survey scope studies are authorized by Congress, while section 107 of the River and Harbor Act of 14 July 1960 as amended, provides authority for the Chief of Engineers to develop, construct and maintain small navigation projects not specifically authorized by Congress.

Wisconsin Great Lakes shorelines are located on Lake Superior and Lake Michigan. The shoreline on Lake Superior extends 156 miles from Superior Entry to the Wisconsin-Michigan line in Iron, Ashland, Bayfield and Douglas Counties. In 1960 these counties had a total population of 82,123. These counties' populations are projected to increase to 89,000 in the year 2020.

The Wisconsin portion of Lake Michigan Shoreline includes 403 miles from the Menominee River south to the Wisconsin-Illinois State Line. Shoreline counties are Marinette, Oconto, Brown, Door, Kewaunee, Manitowoc, Sheboygan, Ozaukee, Milwaukee, Racine and Kenosha. The counties had a total population of 2.4 million in 1960. The population of these counties is expected to increase to 3.2 million in 1980, 4.1 million in 2000 and 5.5 million in 2020.

Wisconsin today has an extensive system of harbors on its shoreline. Twenty-four federal deep draft or small craft harbors have been constructed to meet the needs of navigation. In addition local public and private interest have developed a number of natural or non-federal harbors to serve the Great Lakes small boat fleet. Local interests report however that, in many areas, the

recreational boating activities are rapidly increasing and more facilities are urgently needed.

The Corps of Engineers has today an impressive list of study authorities for small craft harbors in Wisconsin. These authorities, comprehensive in scope, cover the entire Lake Michigan shoreline in Wisconsin and Douglas County on Lake Superior. The problems restricting Great Lakes Navigation are two-fold: (1) as previously mentioned the lack of facilities and (2) the harbor spacing.

Our approach to the first problem, the lack of facilities, is in part to study ways to gain more efficient use of the existing deep draft harbors for small craft. This approach suggests structural modifications to the harbors to provide areas of safe moorage for the small boat fleet and construction of launching facilities to provide access for the trailer borne boats.

Our approach to the second problem, harbor spacing, is now being considered in the Great Lakes Basin Commission Framework Study. Remember the original criteria in establishing the spacing for harbors of refuge program was 30-40 miles. This was for the large cruising craft using the Great Lakes in the thirties and forties. Today our need is to provide facilities for the great number of smaller recreational boats. Additional harbors of refuge are needed at a spacing of 10-15 miles in areas where there are a lack of mooring facilities and where a continuing growth in recreational navigation is recorded.

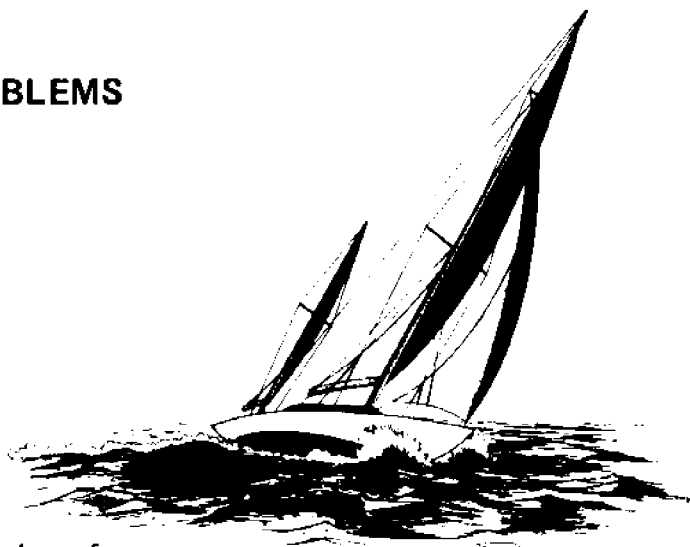
The federal interest in development of water and related land resources can be directly related to the state and local interest. Harbors and shore facilities are the manifestations of this interest for recreational navigation on the Great Lakes. Six of the eight Great Lakes States recognizing the importance of boating have developed positive programs for recreational navigation including authorities for construction and cost sharing of facility development.

Wisconsin is blessed with an invaluable resource—559 miles of Great Lakes shoreline with virtually unlimited boating potential. Today this resource provides only a small part of the effective boating water supply of the State of Wisconsin.

Public desire, public involvement and public planning are the means available for moving toward a comprehensive program for recreational navigation. Small boat harbor and facility development on Wisconsin's Great Lakes shoreline can be a major element of such a program.

If it is the goal of Wisconsin to utilize the resources of the Great Lakes to meet the projected growth in boat ownership and use, a major capital investment program is required. The great need will be for additional harbors, docking, launching, service facilities, and parking. A comprehensive program of boating facilities development on the Great Lakes in Wisconsin for the foreseeable future could require an order of magnitude nonfederal first cost of up to 20 million dollars.

## **LOCAL MARINA DEVELOPMENT PROBLEMS**



**Fred Garner**  
*Chairman, Green Bay Chamber of  
Commerce Harbor & Ports Committee  
Green Bay, Wisconsin*

The need for a marina facility in Green Bay, Wisconsin, has been clear for some time. There are 8,000 boats in Brown County which includes the City of Green Bay and only 197 slips for docking purposes. Of these 8,000 boats, 95 percent of them are outboards, but there are 212 inboards and 175 sailboats. There are 1,500 boats in the 16 to 25 foot class and many of these require slips.

Beyond a shortage of dockage facilities in the lower bay area, there are also safety factors involved. Harbors of refuge are in short supply as evidenced in the 40 mile separation between Green Bay and Sturgeon Bay facilities.

Using the proposed Green Bay boating facility development as a case study, the following planning considerations were discussed:

1. boating facility location;
2. regional needs and decision making;
3. communication with the public;
4. competition for local recreation facility development funds;
5. interaction with federal and state agencies involved in boating facility development.

### **Project Development & Requirements of Local Cooperation**

(As provided by Ronald Buddecke, U.S. Army Corps of Engineers.)

Adoption of a federal project generally requires findings of economic feasibility in survey reports made in response to specific congressional authorization. Studies are thoroughly coordinated with local interests and other federal agencies, and are reviewed by the Bureau of the Budget. Following Congressional consideration and authorization of recommended projects, usually in Omnibus River and Harbor Acts, funds for federal design, construction, operation and maintenance, consistent with the authorized conditions of local

cooperation, are subsequently appropriated by Congress after consideration of the President's budget.

The local interests must agree to meet the following requirements of local cooperation:

#### **Lands, Easements, and Rights-of-Way**

Provide without cost to the United States all lands, easements, and rights-of-way required for construction and maintenance of the recommended improvement, and for construction and maintenance of navigation aids, upon the request of the Chief of Engineers.

#### **Hold and Save**

Hold and save the United States free from damages due to construction and subsequent maintenance of the improvement.

#### **Depths in Berthing Areas**

Provide and maintain without cost to the United States depths in the berthing areas which would use the recommended improvement commensurate with the depths provided in the project channels.

#### **Public Dock**

Provide without cost to the United States an adequate public landing or wharf with provision for the sale of motor fuel, lubricants, and potable water available to all on equal terms (in accordance with plans approved by the Chief of Engineers when deemed necessary).

#### **Alterations and Relocations**

Provide without cost to the United States all alterations and relocations to existing improvements including highways, buildings, utilities, sewers, and other facilities which may be required because of the project. (Also applicable to commercial, but is often excluded for modifications of existing projects).

#### **Public Body**

Establish a competent and properly constituted public body empowered to provide, maintain, and operate local harbor facilities, with the understanding that said facilities will be open to all on equal terms. (Always applicable unless the public body furnishing assurances already exists).

#### **Spoil Areas**

Provide without cost to the United States all lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers, to be required in the general public interest for initial and subsequent disposal of spoil, and also

necessary retaining dikes, bulkheads, and embankments therefore or the costs of such retaining works.

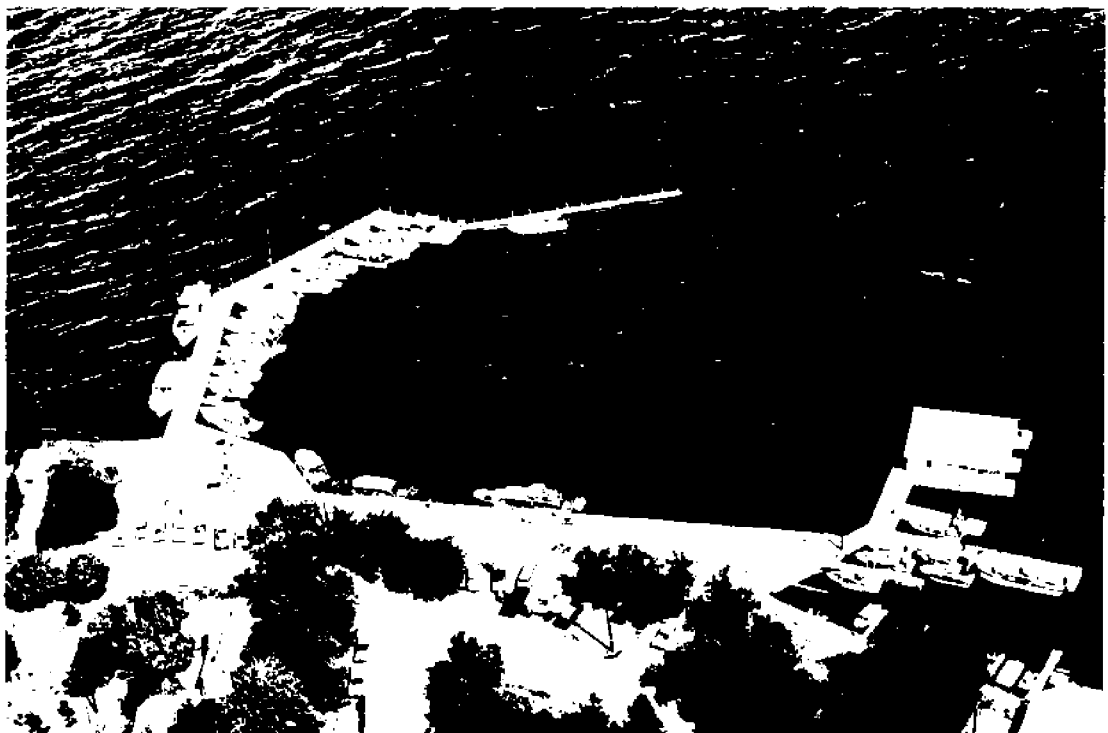
### **Pollution**

Establish regulations concerning discharge of pollutants in the waters of the harbor (anchorage) by users thereof, which regulations shall be in accordance with applicable laws or regulations of federal, state, and local authorities responsible for pollution prevention and control (Board of Engineers for Rivers and Harbors decided that this should be a standard requirement in response to Federal Water Pollution Control Administration Comments on Navigation Reports).

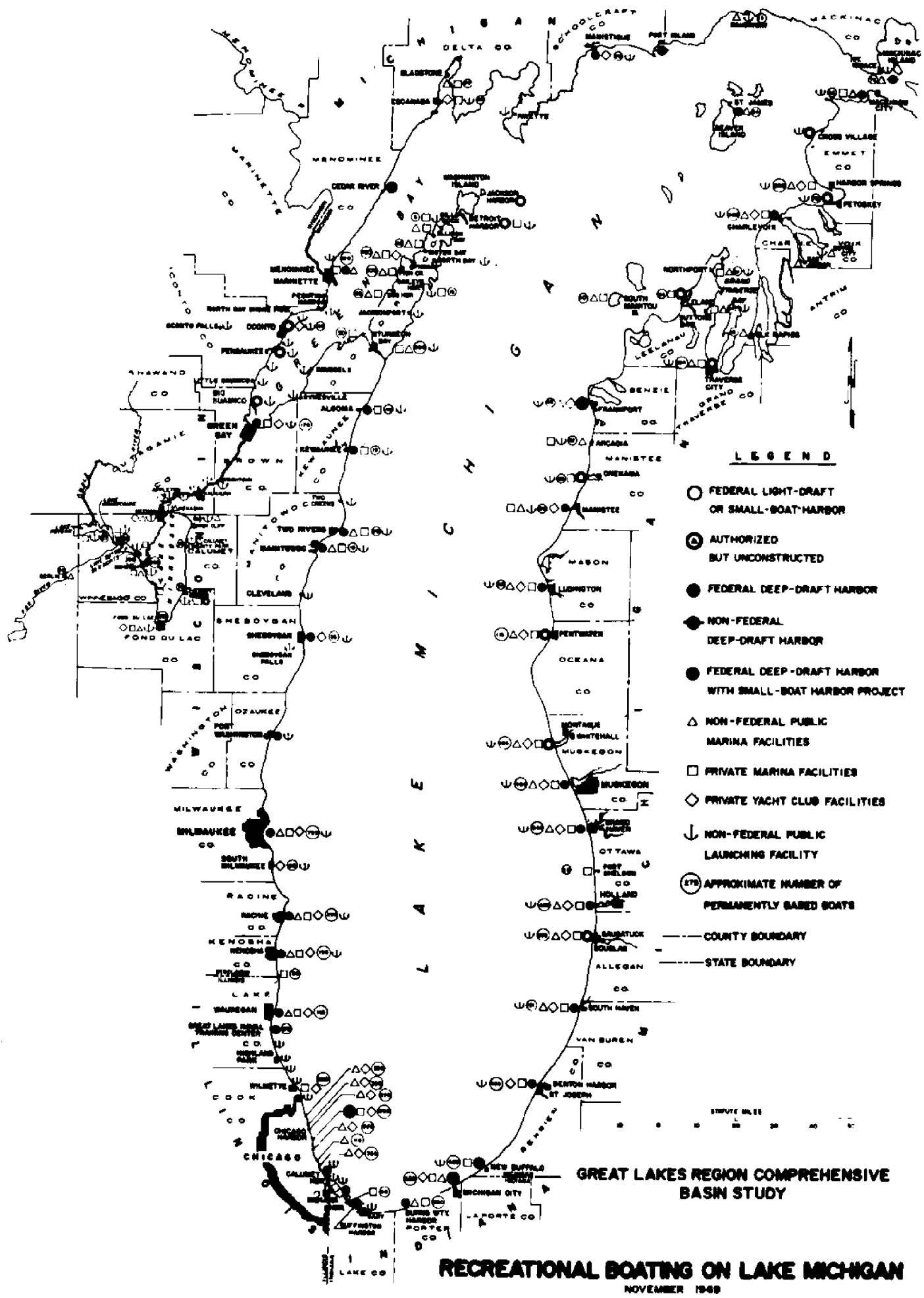
### **Cash**

Contribute in cash 50 percent of that portion of the first cost of federal construction allocated to recreational navigation to be paid either in a lump sum prior to initiation of construction, or in installments prior to start of pertinent work items in accordance with construction schedules as required by the Chief of Engineers, the final apportionment of cost to be made after actual costs have been determined. The federal government assumes pre-authorization survey costs, and the total costs of navigation aids and of maintenance for the general navigation facilities. The general navigation facilities are defined as including a safe entrance channel, protected by breakwaters or jetties if needed, protected anchorage basins, and major interior access channels and turning basins.

(From a photo courtesy of Baudhuin Yacht Harbor.)







## OTHER DISCUSSION TOPICS



Establishment of relevant water quality criteria for boating

Boater responses to water pollution conditions and implications for development

Marina and harbor development activities in the State of Michigan

The boating potential of Lake Superior

Boating use patterns and facility needs in urban areas

Structural modifications required to make deep vessel harbors usable for recreation vessels

Institutional changes being made by federal and state agencies to meet the increasing demand for recreational boating

The National Oceanic and Atmospheric Administration (NOAA) and recreational boating problems

User fees and recreation development

Provisions dealing with federal maintenance of recreational harbors

The economics of boating facility allocation

Zoning and other regulations that can be used to reduce recreation user-group conflicts

**ONGOING RECREATION RESEARCH  
UNIVERSITY OF WISCONSIN  
SEA GRANT PROGRAM**



**“Public Perception of and Reaction to Water Quality”**

**Elizabeth L. David  
Department of Agricultural Economics  
University of Wisconsin—Madison**

**“RECWAT: A Computerized Bibliographic Retrieval System for Water-Based Recreation Research Literature”**

**Robert B. Ditton  
Leisure Sciences Collateral  
University of Wisconsin—Green Bay**

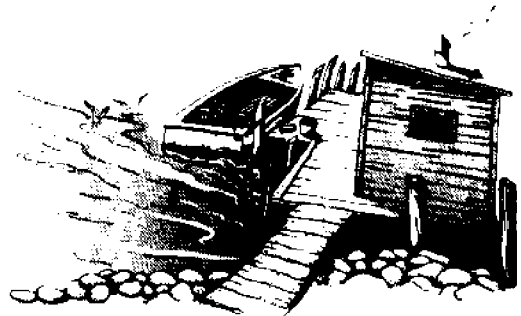
**“The Marine Recreational Uses of Green Bay: A Survey of Behavior and Attitude Patterns”**

**Robert B. Ditton and Thomas L. Goodale  
Leisure Sciences Collateral  
University of Wisconsin—Green Bay**

**“The Application of a Conceptual Systems Model to Determine the Economic Impact of Lake Michigan on the Recreation Industry in Door County, Wisconsin”**

**William Strang  
Graduate School of Business  
University of Wisconsin—Madison**

## RESEARCH NEEDS AS EXPRESSED BY CONFERENCE AUDIENCE



In Michigan, research has indicated that boaters are travelling three to four hundred miles to participate in boating. Since such data is critical to planning decisions affecting the boating utilization of the Great Lakes, user origin and destination studies need to be undertaken in Wisconsin to determine 1) rates and types of participation of both residents and non-residents, 2) the extent of boating use transfer from areas outside Wisconsin and 3) the economic impact of such transfers.

Weather conditions are a vital consideration in assessing the boating potential of the Great Lakes. Portable communication systems that would provide boaters with continuous weather warnings could conceivably extend the area as well as the season boating use in addition to reducing the number of harbors of refuge necessary for safety. Such systems are in operation on the East Coast and are seen as a method of neutralizing the Great Lakes' weather conditions.

Research and development studies need to be conducted to determine the feasibility of producing a continuous weather warning system to be utilized by boaters with low-priced portable radio receivers.

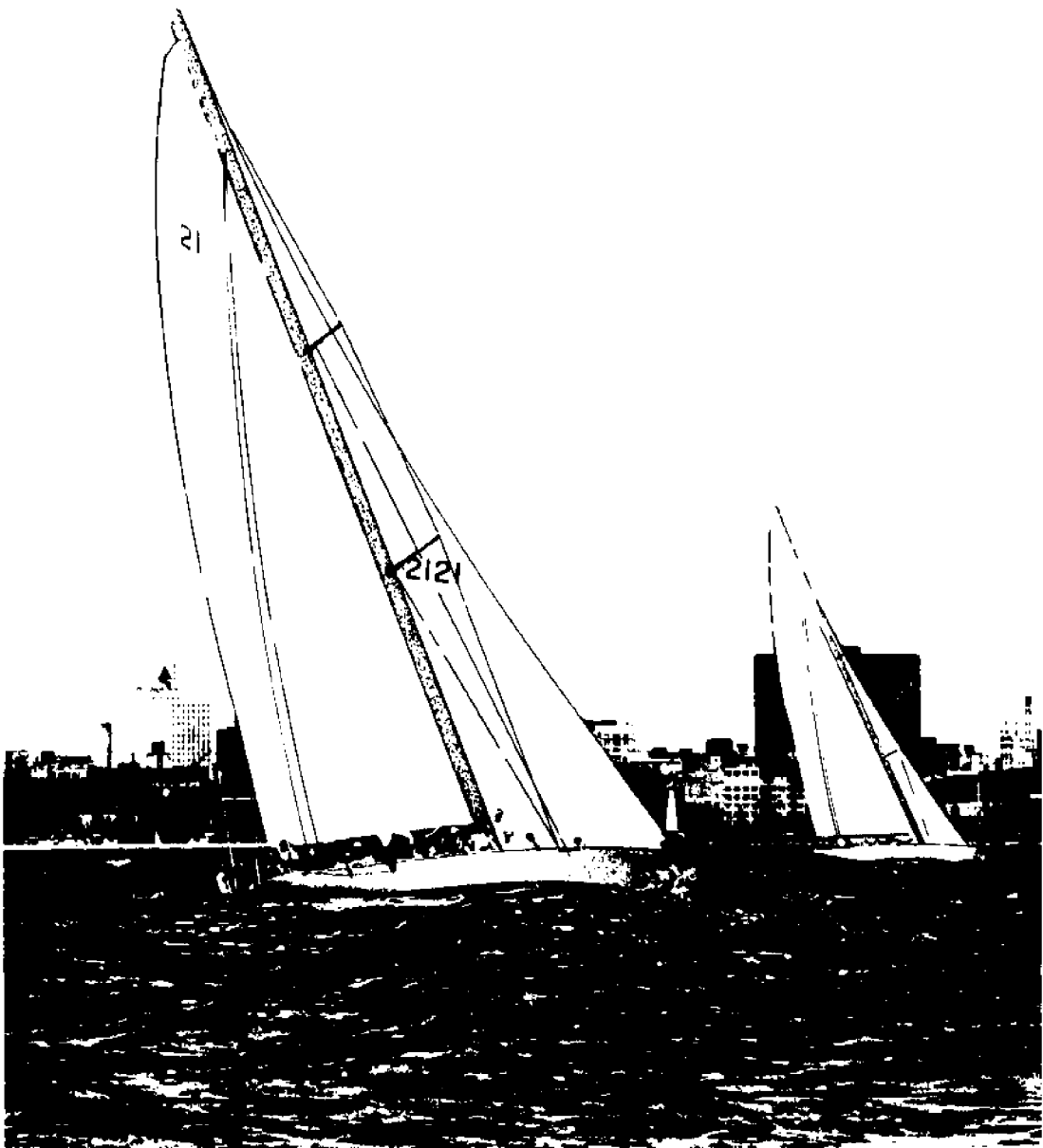
With present laws on both state and federal levels dealing with boater sanitary wastes and their on-shore disposal, it would be useful to determine the relative importance of boater wastes in relation to the total volume of wastes entering Lake Michigan and the other Great Lakes.

All agreed that the present methods of launching boats on the Great Lakes as well as elsewhere is archaic. Ramps are seen as inconvenient as well as extremely dangerous in bad weather. Since other systems are too cumbersome or require too much labor to be useful, new prototypes for boat launching facilities in Lake Michigan waters need to be developed and evaluated.

In congested urban areas, we are seeing the virtual demise of the single

dwelling unit. This is closely related to the boating industry as summer and winter storage space for boats is now at a premium in these areas. There is a need to devise prototype high-rise storage facilities which can be implemented by the boating industry. Without such storage facilities, the carrying capacity of existing and proposed marina and harbor facilities is seen as being greatly reduced.

(From a photo courtesy of Milwaukee Convention & Visitors Bureau, Inc.)



## **PARTICIPANTS IN RECREATION SESSION**

**Sea Grant Conference  
October 15, 16, 1970**



**BARCLAY, ROBERT W.**  
Director, Port of Green Bay  
Court House Annex  
Green Bay, Wisconsin 54301

**BEGHIN, DONALD**  
Supervisor, Boating Activities  
Bureau of Law Enforcement  
Wisconsin Department of Natural Resources  
Post Office Box 450  
Madison, Wisconsin 53701

**BERMAN, STEPHAN**  
Research Assistant  
Department of Meteorology  
University of Wisconsin-Madison  
Madison, Wisconsin 53706

**BERGMAN, RALPH**  
Director, Brown County Regional Planning  
Commission  
Green Bay, Wisconsin 54301

**BLUM, JOHN**  
Professor, Department of Botany  
The University of Wisconsin-Milwaukee  
Milwaukee, Wisconsin 53201

**BUDDECKE, RONALD P.E.**  
Civil Engineer, Department of the Army  
North Central Division, Corps of Engineers  
536 South Clark Street  
Chicago, Illinois 60605

**BYFIELD, ABBOT**  
Coordinating Council for Higher Education  
732 North Midvale Boulevard  
Madison, Wisconsin 53705

**CHAPPELLE, DANIEL E.**  
Associate Professor  
Department of Recreation Resources  
Michigan State University  
323 Natural Resources  
East Lansing, Michigan 48823

**COOPER, ROLLIN**  
Assistant Professor  
Center for Recreation Research Development  
University Extension  
Madison, Wisconsin 53706

**DAVID, ELIZABETH**  
Assistant Professor, Water Resources Center  
The University of Wisconsin-Madison  
Madison, Wisconsin 53706

**DAVIS, JAMES M.**  
President, Northwestern Michigan College  
Great Lakes Maritime Academy  
Traverse City, Michigan 49684

**DAVY, WILLIAM**  
Student, Department of Leisure Sciences  
The University of Wisconsin-Green Bay  
Route 2  
Kewaunee, Wisconsin 54216

**DERUSHA, ROGER H.**  
President, Marinette Marine Corporation  
Ely Street  
Marinette, Wisconsin 54143

**DITTON, ROBERT B.**  
Assistant Professor  
Department of Leisure Sciences  
The University of Wisconsin-Green Bay  
Post Office Box 834  
Green Bay, Wisconsin 54301

**DOWELL, GERALD T.**  
Lt. J.G., U.S. Coast Guard Boating  
Safety Team 9  
Commander, Ninth Coast Guard District  
1240 East 9th Street  
Cleveland, Ohio 44199

**EMMENEGGER, ROBERT E.**  
Chief, Hydraulics Branch  
Engineering Division, U.S. Army  
North Central District, Corps of Engineers  
536 South Clark Street  
Chicago, Illinois 60605

**GARNER, FRED**  
Chairman, Green Bay Chamber of Commerce  
Harbor and Ports Committee  
532 Arrowhead Drive  
Green Bay, Wisconsin 54301

**GILLIGAN, JAMES P.**  
Director, Center for Recreational Resource  
Development  
University Extension  
432 North Lake Street  
Madison, Wisconsin 53706

**GOODALE, THOMAS**  
Assistant Professor  
Department of Leisure Sciences  
The University of Wisconsin-Green Bay  
Post Office Box 834  
Green Bay, Wisconsin 54301

**HAEGLE, GERALD**  
Algoma Marine, Inc.  
Algoma, Wisconsin 54201

**HARRIS, ROBERT E.**  
Coordinator, Sea Grant Advisory Services  
Division of Marine Resources  
University of Washington  
3716 Brooklyn, Northeast  
Seattle, Washington 98105

**HICKS, STEACY D.**  
Chief, Research Group  
U.S. Environmental Science Services  
Administration  
Coast and Geodetic Survey  
C31, Room 622, Building 1  
6001 Executive Boulevard  
Rockville, Maryland 20852

**HILDEBRAND, NORBERT**  
Assistant Director  
University-Industry Research  
The University of Wisconsin-Madison  
Madison, Wisconsin 53706

**HUTCHINS, H. CLIFTON**  
Specialist, Computer Center  
The University of Wisconsin-Madison  
Madison, Wisconsin 53706

**JACOBSON, STEPHEN**  
Project Assistant  
Center for Recreational Resource Development  
University Extension  
432 North Lake Street  
Madison, Wisconsin 53706

**JONES, JAMES P.**  
Project Engineer  
U.S. Army Corps of Engineers  
Kewaunee Project Office  
Kewaunee, Wisconsin 54216

**KAUFMAN, MATT**  
Executive Director  
Boating Industries Association  
333 North Michigan Avenue  
Chicago, Illinois 60601

**KERANEN, PAUL F.**  
Engineer, Planning Branch  
U.S. Army Engineer District  
U.S. Corps of Engineers  
1210 U.S. Post Office and Custom House  
St. Paul, Minnesota 55101

LINCOLN, RICHARD H.  
Manager, Environmental Engineering  
Outboard Marine Corporation  
4143 North 27th Street  
Milwaukee, Wisconsin 53216

LOONEY, GARLING A.  
Navigation Section, Planning Division  
U.S. Army Corps of Engineers  
219 South Dearborn  
Chicago, Illinois 60604

MALONEY, MICHAEL  
Assistant to the President  
Bjorksten Research Laboratories, Inc.  
Post Office Box 265  
Madison, Wisconsin 53701

MATHIAK, HAROLD A.  
Horicon, Wisconsin 53032

McGOWAN, JAMES W.  
Port Coordinator, Bay County Board of  
Commissioners  
Port and Industrial Development Committee  
702 County Building  
Bay City, Michigan 48706

McKINNIS, GARY  
Environmental Resources Section  
U.S. Army Engineer District  
Corps of Engineers  
1210 U.S. Post Office and Custom House  
St. Paul, Minnesota 55101

MIDDEN, RICHARD E.  
Assistant Director  
Ohio Department of Natural Resources  
907 Ohio Departments Building  
65 Front Street  
Columbus, Ohio 43215

MILLER, E. RONALD  
Wisconsin Department of Natural Resources  
Post Office Box 450  
Madison, Wisconsin 53701

MOHR, JAMES W.  
Research Director  
Outboard Marine Corporation  
4109 North 27th Street  
Milwaukee, Wisconsin 53216

MONKMEYER, PETER  
Professor, Department of Civil Engineering  
The University of Wisconsin-Madison  
Madison, Wisconsin 53706

MORGAN, JAMES W.  
Federal-State Relations Analyst  
Wisconsin Department of Administration  
State Office Building  
Madison, Wisconsin 53701

MURPHY, STANLEY R.  
Director, Division of Marine Resources  
University of Washington  
3716 Brooklyn Avenue, Northeast  
Seattle, Washington 98105

NAKATANI, ROY  
Program Director  
Living Resources Department  
University of Washington  
3716 Brooklyn Avenue, Northeast  
Seattle, Washington 98105

NELSON, WILLIAM R.  
Director, Corporation Development  
Green Bay Packaging  
Post Office Box 1107  
Green Bay, Wisconsin 54305

POSEY, ROLLIN B.  
Dean, School of Professional Studies  
The University of Wisconsin-Green Bay  
Post Office Box 834  
Green Bay, Wisconsin 54301

RIEDEL, WILSON A.  
Research Associate  
Bureau of Commercial Recreation  
Wisconsin Department of Natural Resources  
Post Office Box 450  
Madison, Wisconsin 53701

ROSE, P.  
Wisconsin Boating Association and Green  
Bay Outboard Club  
Green Bay, Wisconsin 54301



ROTH, HAROLD  
Chief, Recreation and Research  
Planning Division  
U.S. Army Corps of Engineers  
219 South Dearborn  
Chicago, Illinois 60604

SCHINK, DONALD  
Assistant Director  
Center for Recreation and Resources  
Development  
University Extension  
Madison, Wisconsin 53706

SMITH, BERT  
General Manager  
Smith Brothers of Milwaukee, Inc.  
2370 North Third Street  
Milwaukee, Wisconsin 53212

SLOAN, RUELL  
Federal-State Relations  
Department of Administration  
State of Wisconsin  
Madison, Wisconsin 53701

STRANG, WILLIAM  
Assistant Professor  
Graduate School of Business  
The University of Wisconsin-Madison  
Madison, Wisconsin 53706

STRIEGEL, ALBERT R.  
Civil Engineer  
108 West Wells Street, Room 352  
Milwaukee, Wisconsin 53203

SUMMERFIELD, GENE  
Green Bay Chamber of Commerce  
Green Bay, Wisconsin 54301

THOMPSON, THOMAS W.  
Professor  
The University of Wisconsin-Green Bay  
Green Bay, Wisconsin 54301

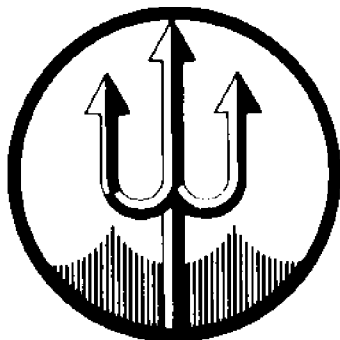
WICK, WILLIAM  
Head, Marine Advisory Program  
Oregon State University  
Marine Science Center  
Newport, Oregon 97365

WOPAT, PRISCILLA F.  
Project Assistant  
Center for Recreation Resources Development  
University Extension  
432 North Lake Street  
Madison, Wisconsin 53706

**RECEIVED**

OCT 14 1971

**SEA GRANT  
DEPOSITORY**



The University of Wisconsin  
Sea Grant Program  
Public Information Report No. 6  
WIS-SG-71-106  
August 1971

PELL MARINE SCIENCE LIBRARY  
UNIV. OF R. I., NARRAGANSETT BAY CAMPUS  
NARRAGANSETT, R. I. 02882