DISSOLVED OXYGEN STUDY

OF

LAKE WISCONSIN

Environmental Laboratory

Badger Army Ammunition Plant

OCTOBER 1994

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TABLE OF CONTENTS

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INTRODUCTION

A study conducted by Mead & Hunt, Inc. in 1992 and published in April of 1994, titled "Prairie du Sac Hydroelectric Project", indicated that at several locations the Dissolved Oxygen levels in Lake Wisconsin have degraded to lower than 5mg/L.

Badger Army Ammunition Plant is preparing to apply for a revised WPDES permit which would discharge to Lake Wisconsin. Based on the Mead and Hunt study, the Wisconsin Department of Natural Resources has delayed any decision on a permit until additional data is provided to them.

Badger AAP has conducted this study to provide additional information on D.O. levels in Lake Wisconsin. To have a more complete understanding of the lake, readings were taken from under the ice (see Appendix C) in March 1994 at 1°C, and in August at water temperatures ranging from 18 to 23°C. The D.O. readings were in the 10-11 mg/L range in cold water except for a reading taken at 1 or 2 inches from the bottom sludge.

A more extensive investigation of 20 different sites was conducted in August of 1994 when water temperature was presumed to be at its highest temperature. The water temperature readings ranged between 18 and 23°C. The D.O. readings were above 5mg/L except when the readings were taken at the bottom of the lake which is covered with a layer of sludge. pH readings were also recorded and ranged between 7.8 and 8.7. The tables, pages 2-10, show dissolved oxygen readings above the 5mg/L except in rare cases when readings were taken close to the bottom sludge. The study also shows the depths at which the tests were taken.

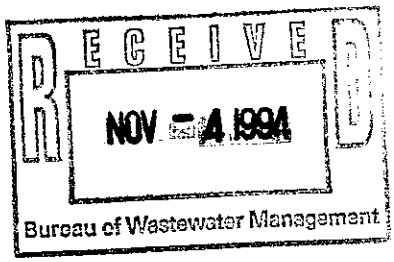
Excluding the low readings at the extreme lake bottom, the average D.O. level for the lake was found to be 6.35mg/L. This would indicate assimilative capacity is being retained by the lake.

DEPARTMENT OF THE ARMY
BADGER ARMY AMMUNITION PLANT
BARABOO, WISCONSIN 53913

November 1, 1994

REPLY TO
ATTENTION OF

Commander's Representative



Mr. Tom Bauman
Bureau of Wastewater Management
Wisconsin Dept. of Natural Resources
101 S. Webster St.
P.O. Box 7921
Madison, WI 53707-7921

Dear Mr. Bauman:

As discussed in our recent meeting held on September 27, please find two copies of the Lake Wisconsin dissolved oxygen study, conducted by Olin Corporation on August 31, 1994. As you will see from the report, the accumulated dissolved oxygen data indicates that a substantial amount of assimilative capacity for BOD may exist within Lake Wisconsin, even during the summer months.

If there are any questions, please contact Mr. John Hansen, Olin Corporation or me at (608)356-5525.

Sincerely,

David C. Fordham
Commander's Representative

Enclosure

Copy Furnished:
Olin Corp., BAAP

DATE: February 21, 1995 FILE REF: 8250

TO: Bernie Robertson WR/2

FROM: Steve Jaeger WR/2

SUBJECT: Comments on a possible discharge from Badger Ammunition to the Wisconsin River upstream of the Prairie du Sac dam.

Here's my response to your request for information on the assimilative capacity of the Wisconsin River, just upstream of the Prairie du Sac dam, for a possible discharge from Badger Ammunition.

Wisconsin Power and Light conducted continuous dissolved oxygen monitoring at the Prairie du Sac dam during 1992 as part of their FERC relicensing. The continuous monitoring showed the dissolved oxygen at the dam was below 5 mg/l more than half of July, a good portion of August, and a few days in September, 1992. The worst two days period was July 27th and 28th during which time the maximum D.O. was 3.6 mg/l the minimum was 1.7 mg/l.

Based on this data, there is no assimilative capacity for BOD at this location.

cc: Tom Bainbridge SD
Mike Witt WW/2

DESCRIPTION OF PROJECT

Badger Army Ammunition Plant is submitting a WPDES wastewater permit for discharging all plant wastewaters into Lake Wisconsin. Regulations do not allow discharges to reduce receiving water levels below 5 mg/L. A recent Wisconsin Power and Light (WP&L) study, the Prairie du Sac Hydroelectric Project F.E.R.C. No. 11162-000, has reported Lake Wisconsin Dissolved Oxygen (D.O.) levels below 5.0 mg/L. The purpose of this study is to measure the D.O. levels in the same locations sited in the WP&L Report and at additional channel locations during late August when the D.O. levels should be at their lowest. An earlier study was done by Badger on 7 March 94 thru the ice (see Appendix C).

The current study of dissolved oxygen, pH and temperature was performed on 31 August 1994. The measurements were taken at 20 sites (see maps) from a boat equipped with a bottom-locating sonar and electric trolling motor. The area in which the measurements were to be taken was surveyed using the sonar in order to locate the deepest spot in a given area and to provide an indication of the bottom contour. This information was used to select the particular location for the measurements. The electric trolling motor was used to keep the boat in the proper location while taking measurements. It was important to make sure the cord to the D.O. probe remained vertical. During measurements taken in the deep channel locations, the boat was allowed to drift downstream at the speed of the current in order to keep the probe cord vertical. This resulted in the readings being taken over a 100 foot stretch of river.

The boat was launched at Moon Valley Public Boat Launch and traveled upstream to begin the study. When a location was selected, the surface pH was first measured. The D.O. probe was then lowered into the water in 0.5 meter increments.

The data is reported in tables by site number as found on the accompanying maps. The map titled "Local Features" shows the entire Lake Wisconsin area and shows the overall location of each of the sites. The following enlarged area maps illustrate the exact location of the measurements at each of the north river area, central area, south area and dam areas of the lake. A map of Lake Wisconsin titled "Fishing Hot Spots" is included on Page 16 to show the relative depths and bottom contour of the lake.

An Omega Model PHH-63 portable pH meter (see Appendix A) was used to directly measure the pH of the surface of the water. The meter was calibrated in the lab prior to leaving at pH 7 + 10. The meter was recalibrated in the field after every 5 sites.

A YSI Model 51B Dissolved Oxygen Meter with a 50 foot cable attachment to the measurement probe was used to measure dissolved oxygen and temperature at the various depths (see Appendix B). The meter was calibrated for dissolved oxygen in the lab the morning of sampling.

DATA TABLES FOR

DISSOLVED OXYGEN STUDY OF LAKE WISCONSIN

SITE 1
8-31-94 Interstate 94 10:00 a.m.

Depth (meter)	pH	D. O. (mg/L)	Temperature °C
Surface	7.8	7.5	20° C.
0.4		7.7	20
1.0		7.5	20
1.4		7.8	20
2.0		7.7	20
2.4		7.7	20
3.0 (bottom)		7.7	20

Observations at the time of sampling: Light rain and windy, temperature was approximately 60°F. The depth varied from 4-5 feet with the sampling location just below a center pylon being about 10 feet deep.

SITE 2
8-31-94 Tipperary Point 10:22 a.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	7.8	7.8	20
0.5		7.6	20
1.0		7.5	20
1.5		7.6	20
2.0		7.6	20
2.5		7.6	20
3.0		7.5	20
3.5		7.5	20
4.0		7.4	20
4.5 (bottom)		5.8	20

Observations: Strong north wind and rain. Measurements were taken in center of the mouth of the river between Tipperary Point and the area directly opposite Tipperary Point forming the mouth of the river. The sampling point was the approximate center of the channel near a channel marker. The average depth of the channel coming from the river and the sampling area was approximately 12-14 feet.

SITE 3
8-31-94 Stoner Bay 10:40 a.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.2	9.0	20
0.5		8.7	21
1.0		6.4	19
1.3 (bottom)		3.2	19

Observations: Strong winds prevailed but area was sheltered and the surface was very calm. The depths indicated in the WP&L Report were not found in the area. The lake area along the north shore forming the cove area was 5 feet deep. Upon entering Stoner Bay, the bay itself was full of lily pads in the back half. The opening of Stoner's Bay was clear of vegetation and actually deeper than the adjacent cove which shallows to 2-3 feet. The readings were taken between the two small points defining Stoner's Bay at approximately 4 feet.

SITE 4
8-31-94 Whalen's Bay 11:01 a.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.2	8.3	20
0.5		8.0	21
1.0		7.5	20
1.5		5.8	20
2.0		2.2	18
2.5		1.8	18
2.8 (bottom)		1.7	18

Observations: Strong northerly winds and rain. The road bridge over the access to the back of Whalen's Bay and Rowan Creek did not have enough clearance to pass under. The lake side of Whalen's Bay was shallow and averaged 3 feet deep with a creek channel coming from the road bridge which was about 9 feet near the bridge and gets shallower towards the lake. The sample point was the area immediately west of the road bridge in the creek channel.

SITE 5
8-31-94 Sticky Bay 11:23 a.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.7	8.3	21
0.5		8.2	21
1.0		8.2	21
1.5		7.5	21
2.0 (bottom)		6.5	21

Observations: A very strong wind was blowing from the north into Sticky Bay caused waves 2-2½ feet. The water was very dark and muddy. Upon leaving the channel and entering the bay, the water immediately shallowed to 7 feet. At the halfway point into the bay, the water was at a constant 6 feet.

SITE 6
8-31-94 Pine Bluff 11:36 a.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.2	6.4	22
0.5		6.4	22
1.0		6.3	22
1.5		6.3	22
2.0		6.2	22
2.5		6.2	22
3.0 (bottom)		3.0	22

Observations: A strong wind was blowing into Pine Bluff causing 2 foot waves. The river channel flows along the face of Pine Bluff so readings represent the channel as well as Pine Bluff. The area of the sampling, about 50 yards from Pine Bluff near the west end, averaged 12 feet deep on the sonar. The 0.5 meter increments are probably slightly longer than 0.5 meters.

SITE 7
8-31-94 Okee Bay 11:53 a.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.4	7.9	20
0.5		7.7	21
1.0		7.8	21
1.5		7.9	21
2.0		7.5	21
2.5		7.4	20
3.0		7.3	20
3.5		7.3	20
4.0 (bottom)		6.8	20

Observations: A strong wind was blowing into the bay. The sample readings were taken in the channel about 100 feet from the road bridge on the Okee side. The rest of Okee Bay was about 4-6 feet deep. The bay itself was calm.

SITE 8
8-31-94 Merrimac Ferry 1:05 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.1	6.3	22
0.5		6.3	22
1.0		6.3	22
1.5		6.2	22

2.0		6.2	22
2.5		6.0	22
3.0		6.0	22
3.5		6.0	22
4.0		6.0	22
4.5		6.0	22
5.0 (bottom)		5.0	22

Observations: Windy and 1-1½ foot waves. The sample readings were taken in the center of the lake approximately 300 feet from the bridge at the deepest location found.

SITE 9
8-31-94 Sunset Bay 1:17 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.7	8.2	21
0.5		8.0	22
1.0		7.8	22
1.5 (one foot above bottom)		6.6	22

Observations: The wind was blowing into the bay. The measurements were taken at the center of the back of the bay.

SITE 10
8-31-94 Channel Across From Sunset Bay 2:08 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.3	6.5	22
0.5		6.5	22
1.0		6.4	22
1.5		6.4	22
2.0		6.4	22
2.5		6.3	22
3.0		6.4	22
3.5		6.4	22
4.0		6.4	22
4.5		6.3	22
5.0		6.1	22
5.5 (bottom)		5.0	22

Observations: The measurements were taken from the channel out from the center of Sunset Bay one third of the way across the lake from Sunset Bay.

SITE 11
8-31-94 Moon Valley Bay 1:30 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.4	7.5	22
0.5		7.3	22
1.0		7.3	22
1.5		7.2	22
2.0		7.1	22
2.5		7.1	22
3.0 (bottom)		6.0	22

Observations: The bay was sheltered from the wind and was calm. The measurements were taken just south of the mouth of the back of the bay where the water was deeper. A "flat" is located in the mouth of the back of the bay which is only about 5-6 feet deep.

SITE 12
8-31-94 Weigand's Bay 1:41 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.6	7.6	22
0.5		7.2	22
1.0		7.0	22
1.5		7.1	22
2.0		7.1	22
2.5		7.0	22
3.0		6.8	22
3.5		6.2	22
4.0 (near bottom)		2.0	21

Observations: The bay was sheltered from the wind. The measurements were taken approximately 200 feet off the river pumping station towards the body of the lake.

SITE 13
8-31-94 Channel Across From Weigand's Bay 1:54 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.2	5.6	22
0.5		5.6	22
1.0		5.5	22
1.5		5.4	22
2.0		5.4	22
2.5		5.4	22
3.0		5.4	22
3.5		5.4	22
4.0		5.3	22
4.5		5.3	22
5.0		5.2	22
5.5		5.2	22
6.0		5.1	22
6.5		4.7	22
7.0 (1 foot from bottom)		2.8	22
7.25 (bottom)		1.5	22

Observations: The wind was not as strong as mid morning and the lake flows more north to south so the wind is more down the lake. The measurements were taken at mid lake just below the south shore point.

SITE 14
8-31-94 100 Feet Above IRM Discharge Site Near Shore 2:32 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.5	6.0	23
0.5		5.8	23
1.0		5.9	23
1.5		5.9	23
2.0		5.7	23
2.5		5.6	23
3.0		5.6	23
3.5		5.4	23
4.0		5.5	23
4.5		5.5	23
5.0		5.1	23
5.5		5.0	23
6.0		4.8	23
6.5		4.6	23
7.0		4.0	23
7.5 (1 foot from bottom)		1.7	23

Observations: The measurements were taken approximately 100 feet above the discharge area at the end of the overhanging trees. The area is sheltered from the wind.

SITE 15
8-31-94 IRM Discharge Site, 1/4 Out from Shore 2:45 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.5	6.5	23
0.5		6.4	23
1.0		6.3	23
1.5		6.3	23
2.0		6.1	23
2.5		6.0	23
3.0		6.0	23
3.5		5.8	23
4.0		5.8	23
4.5		5.6	23
5.0		5.5	23
5.5		5.2	23
6.0		5.2	23
6.5		5.0	23
7.0		5.0	23
7.5		5.1	23
8.0		5.0	23
8.5 (near bottom)		0.3	22
9.0 (bottom)		0.1	22

Observations: The measurements were taken approximately 1/4 of the way across the lake. A light north wind was blowing across and down the lake.

SITE 16
8-31-94 IRM Discharge Site 1/2 Out From Shore 2:58 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.5	6.8	23
0.5		6.7	23
1.0		6.7	23
1.5		6.5	23
2.0		6.5	23
2.5		6.3	23
3.0		5.9	23
3.5		6.0	23
4.0		5.8	23
4.5		5.8	23
5.0		5.8	23
5.5		5.7	23
6.0		5.2	23
6.5		5.3	23
7.0		5.3	23
7.5		5.3	23
8.0		4.2	22
8.5		3.4	22
8.75 (bottom)		2.0	22

Observations: The wind was blowing down the lake and into the shore. The surface had 6 inch waves.

SITE 17
8-31-94 Channel Across From Gruber's Grove 3:20 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.6	6.7	23
0.5		6.7	23
1.0		6.7	23
1.5		6.3	23
2.0		6.2	23
2.5		6.2	23
3.0		6.2	23
3.5		6.2	23
4.0		6.2	23
4.5		6.2	23
5.0		5.3	23
5.5		5.3	23
6.0		5.2	23
6.5		5.2	23
7.0		5.2	22
7.25 (bottom)		3.1	22

Observations: Measurements were taken from center of channel out from center of Gruber's Grove.

SITE 18
8-31-94 100 Yards North of WP & L Powerhouse 3:36 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.6	7.2	23
0.5		7.2	23
1.0		7.2	23
1.5		7.1	23
2.0		6.8	23
2.5		6.7	23
3.0		6.4	23
3.5		6.4	23
4.0		6.3	23
4.5		6.3	23
5.0		6.2	23
5.5		6.2	23
6.0		6.1	23
6.5		6.1	23
7.0		6.1	23
7.5		6.1	23
8.0		6.0	23
8.5		6.0	23
9.0		5.7	23
9.5		5.2	23
10.0 (bottom)		4.5	22

Observations: The wind was blowing into the dam and the lake had 1-1½ foot waves.

SITE 19
8-31-94 Middle of Channel About 100 Yards Above Dam 3:49 p.m.

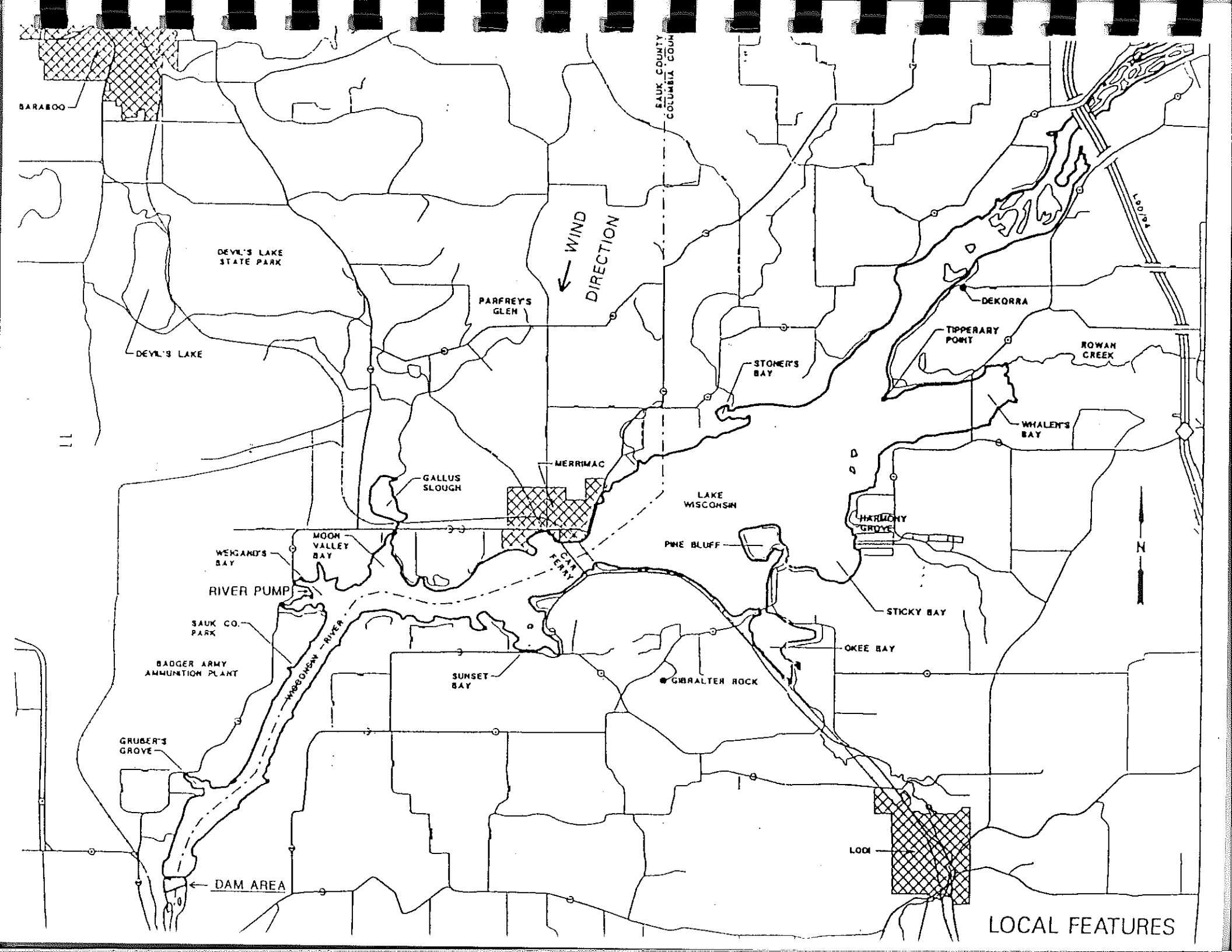
Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.5	6.5	23
0.5		6.4	23
1.0		6.4	23
1.5		6.2	23
2.0		6.2	23
2.5		6.1	23
3.0		6.0	23
3.5		6.0	23
4.0		6.0	23
4.5		6.0	23
5.0		5.8	23
5.5		5.9	23
6.0		5.9	23
6.5		6.0	23
7.0		6.0	23
7.5 (bottom)		3.5	22

Observations: The measurements were taken above power pole tower. The surface was choppy.

SITE 20
8-31-94 100 Yards Above East End of Dam 3:55 p.m.

Depth(meter)	pH	D. O. (mg/L)	Temperature °C
Surface	8.5	6.4	23
0.5		6.2	23
1.0		6.2	23
1.5		6.1	23
2.0		6.1	23
2.5		6.1	23
3.0		6.1	23
3.5		6.1	23
4.0		6.1	23
4.5		6.1	23
5.0 (bottom)		3.5	23

Observations: East end of the dam is not as deep as above the powerhouse. The water surface was choppy. The measurements were taken 100 feet above the south most marker buoy.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SAUK COUNTY
COLUMBIA COUN
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ROWAN CREEK
STONER'S BAY
WHALEN'S BAY
MERRIMAC
GALLUS SLOUGH
LAKE WISCONSIN
HARMONY GROVE
PINE BLUFF
MOON VALLEY BAY
WEIGAND'S BAY
CAR FERRY
RIVER PUMP
STICKY BAY
SAUK CO. PARK
BADGER ARMY AMMUNITION PLANT
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GIBRALTER ROCK
OKEE BAY
GRUBER'S GROVE
LOCK
DAM AREA
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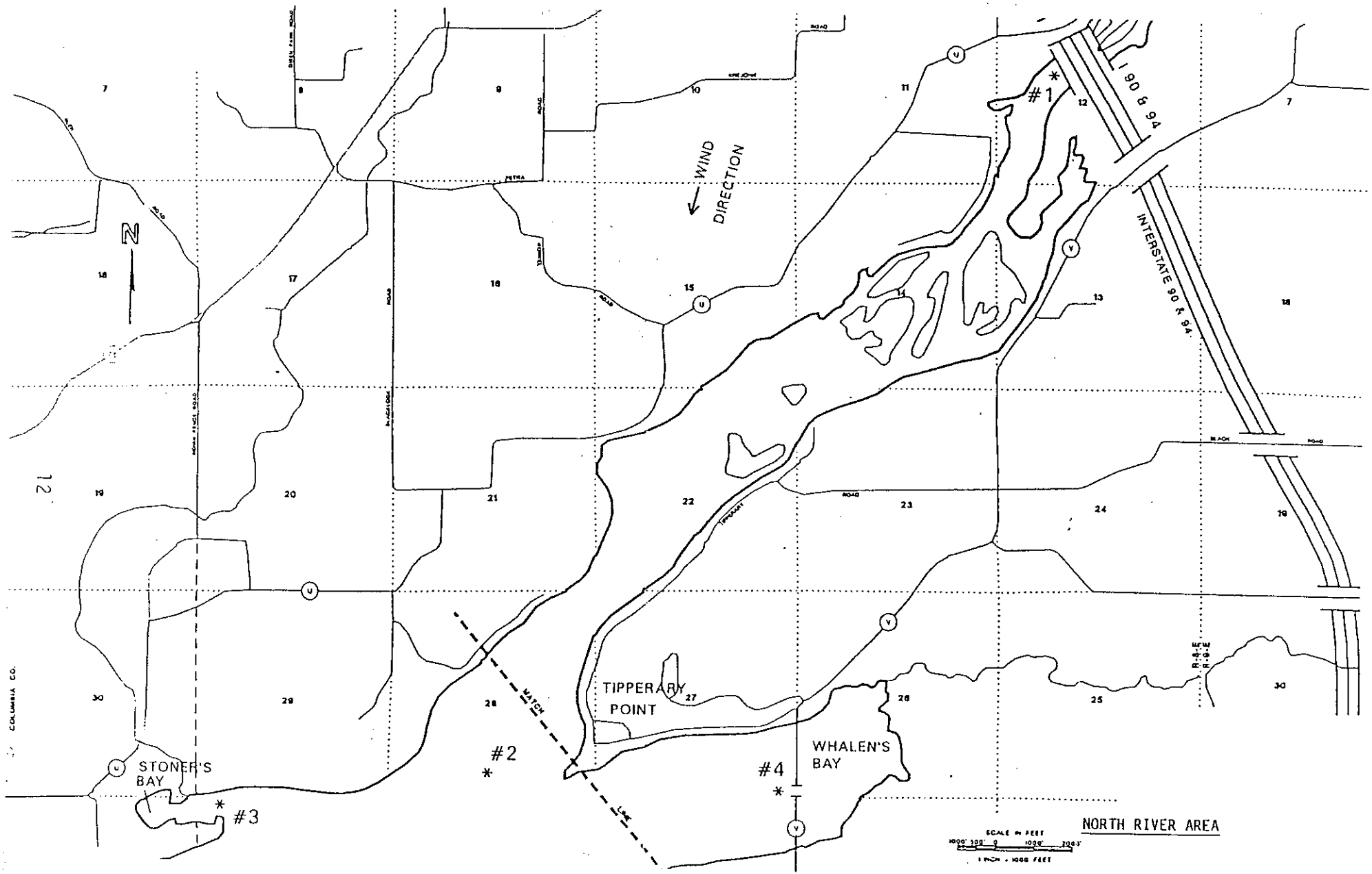
LOCAL FEATURES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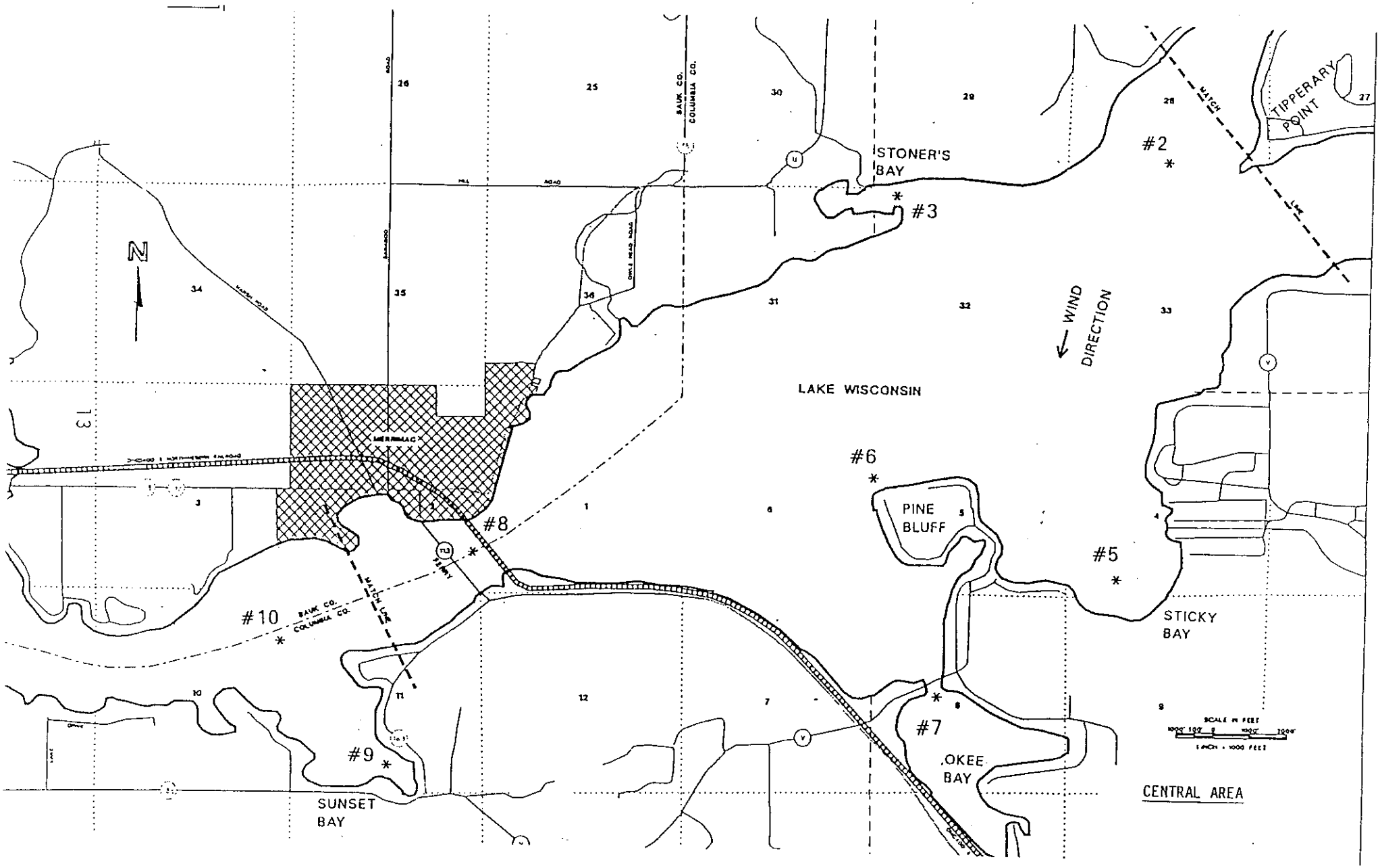
MATCH LINE
N
NORTH RIVER AREA
SCALE IN FEET
1 INCH = 1000 FEET
COLUMBIA CO.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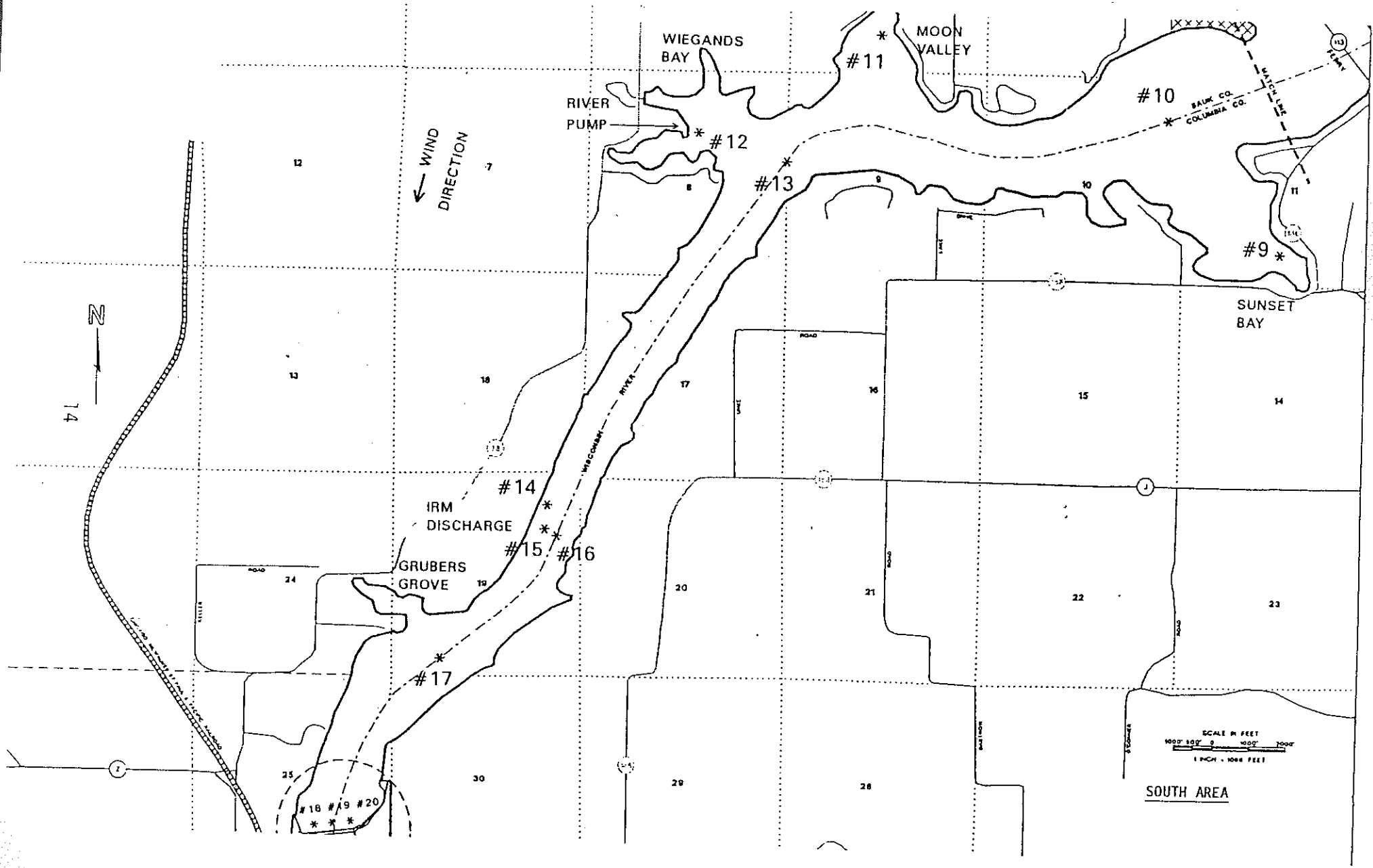
BAUK CO.
COLUMBIA CO.
MERRIMAC
CENTRAL AREA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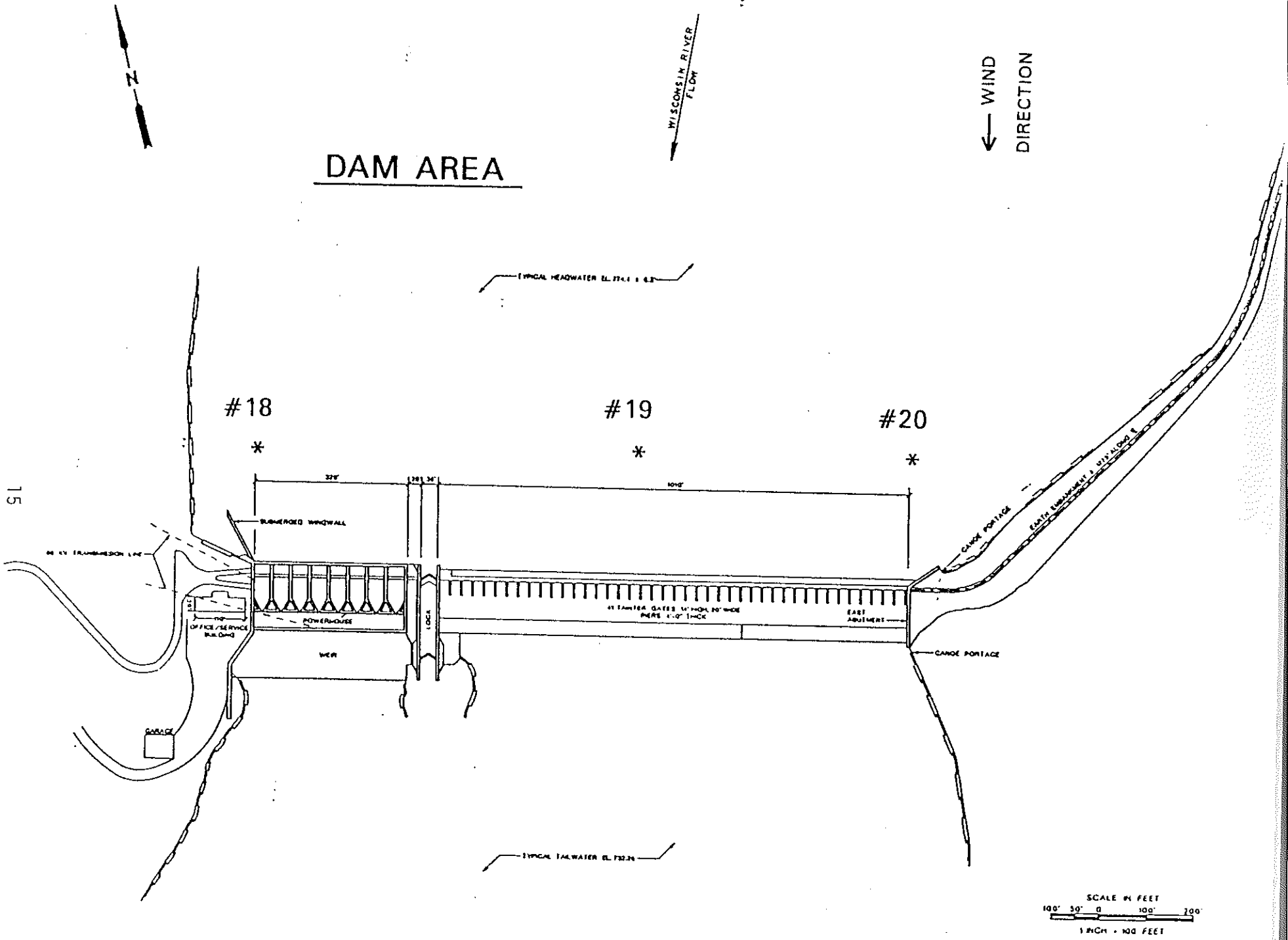
SOUTH AREA

DAM AREA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POWERHOUSE
LOCK
WEIR
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CANOE PORTAGE
CANOE PORTAGE
GARAGE
SCALE IN FEET
100' 50' 0 100' 200'
1 INCH = 100 FEET

APPENDIX A

OMEGA
ENGINEERING, INC.
An OMEGA Technologies Company

MODEL PHH-63
pH METER

Operator's Manual

4.2 CHARGING THE BATTERIES

The internal rechargeable batteries of the PHH-63 can be charged with a 115V or 230V adapter/charger. Check the label on the AC adapter/charger supplied with the instrument to make sure that the AC line voltage is correct. If the wrong AC adapter is supplied, notify OMEGA Customer Service Department at (203) 359-1660.

The instrument must be recharged once the LO BAT annunciator starts to flash. It can continue to operate when the batteries are being charged. If AC power is not available to charge the instrument, stop operation immediately to avoid measurement errors. Make sure that the LED lamp on the adapter/charger is on, indicating that the instrument is being charged.

When charging the instrument, pressing the CLEAR key will reset the microprocessor. This feature is used to bring the microprocessor up and running.

When the instrument is not in use, press the ON/OFF key to turn off the instrument. Unplugging the AC adapter/charger from the instrument or from the AC line does not turn off the instrument. The instrument will continue to operate on the internal batteries.

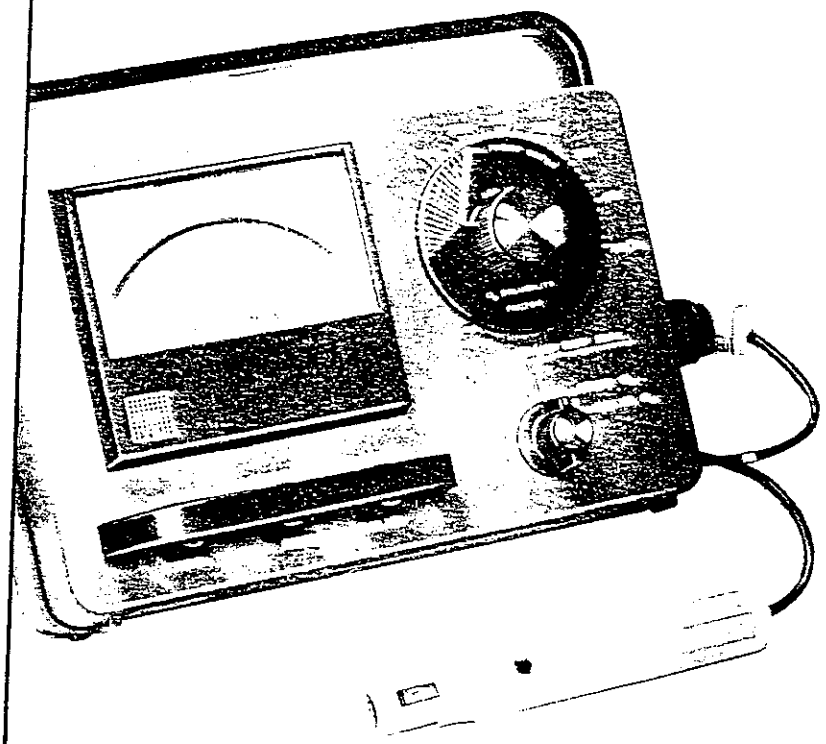
SECTION 5 SPECIFICATIONS

RANGE:	pH −2.00 to 16.00, mV ±999, temperature 0 to 99.9°C
RESOLUTION:	pH 0.01, mV 1, temperature 0.1°C
ACCURACY:	pH ±0.1%, mV ±0.1%, temperature ± 0.5°C
INPUT IMPEDANCE:	$> 10^{12}$ ohms
TEMPERATURE COMPENSATION:	Manual or automatic 0 to 99.9°C
CONNECTION:	"3 in 1" triaxial electrode connector (may be used BNC if provided adapter is used)
POWER:	Rechargeable batteries
DIMENSIONS:	6.7" x 3" x 1.2"
WEIGHT:	0.64 lb

APPENDIX B

YSI MODEL 51B

Dissolved Oxygen Meter Instructions



YSI Incorporated
Yellow Springs, Ohio 45387 USA

APPENDIX C

DESCRIPTION

The YSI Model 51B Dissolved Oxygen Meter is intended for dissolved oxygen and temperature measurement in water and wastewater applications, but is also suitable for use in certain other liquids. Dissolved Oxygen is indicated in mg/L (milligrams per liter) on a 0-15 mg/L scale. Temperature is indicated in °C on a -5° to +45°C scale. The dissolved oxygen range is automatically temperature compensated for permeability of the probe membrane, and manually by direct dial for changes in water temperature.

The probes use Clark-type membrane covered polarographic sensors with built-in thermistors for temperature measurement and compensation. A thin, permeable membrane stretched over the sensor isolates the sensor elements from the environment, but allows oxygen and certain other gases to enter. When a polarizing voltage is applied across the sensor, oxygen that has passed through the membrane reacts at the cathode, causing a current to flow.

The membrane passes oxygen at a rate proportional to the pressure difference across it. Since oxygen is rapidly consumed at the cathode, it can be assumed that the oxygen pressure inside the membrane is zero. Hence, the force causing the oxygen to diffuse through the membrane is proportional to the absolute pressure of oxygen outside the membrane. If the oxygen pressure increases, more oxygen diffuses through the membrane and more current flows through the sensor. A lower pressure results in less current.

SPECIFICATIONS

Oxygen Measurement

Range: 0-15 mg/L

Accuracy: Better than ±0.2 mg/L when calibrated within ±5°C of actual sample temperature.

Readability: Better than 0.1 mg/L

Temperature Measurement

Range: -5°C to +45°C

Accuracy: ±0.7°C, including probe

Readability: 0.25°C

Compensation

Temperature compensation for oxygen probe membrane coefficient is automatic.

Temperature compensation for oxygen solubility is manual by direct dial from 0°C to 45°C for fresh water and -5°C to +37°C for sea water.

Altitude compensation is manual by direct dial from 0 to 11,000 feet.

Salinity compensation is manual by direct dial from fresh water to sea water of 20,000 mg/L chloride concentration.

System Response Time

Typical response for temperature and DO readings is 90% in 10 seconds at constant temperature of 30°C.

DO response at low temperature and low DO is typically 90% in 30 seconds.

If response time under any operating conditions exceeds two minutes, probe service is needed.

Ambient Range

Satisfactory operation from -5°C to +45°C.

Power Supply

Power is supplied by four C size batteries, providing approximately 1000 hours of operation.

Calibration Tables

Table I shows the amount of oxygen in mg/L that is dissolved in air saturated fresh water at sea level (760 mmHg atmospheric pressure) as temperature varies from 0° to 45°C.

Table I - Solubility of Oxygen in Fresh Water

Temp °C	Solubility mg/L	Temp °C	Solubility mg/L	Temp °C	Solubility mg/L
0	14.62	17	9.67	34	7.07
1	14.22	18	9.47	35	6.95
2	13.83	19	9.28	36	6.84
3	13.46	20	9.09	37	6.73
4	13.11	21	8.92	38	6.62
5	12.77	22	8.74	39	6.52
6	12.45	23	8.58	40	6.41
7	12.14	24	8.42	41	8.31
8	11.84	25	8.26	42	6.21
9	11.56	26	8.11	43	6.12
10	11.29	27	7.97	44	6.02
11	11.03	28	7.83	45	5.93
12	10.78	29	7.69	46	5.84
13	10.54	30	7.56	47	5.74
14	10.31	31	7.43	48	5.65
15	10.08	32	7.31	49	5.56
16	9.87	33	7.18	50	5.47

Derived from 17th Edition, *Standard Methods for the Examination of Water and Wastewater.*

Table II shows the correction factor that should be used to compensate for the effects of variation in atmospheric pressure or altitude. Find true atmospheric pressure in the left hand column and read across to the right hand column to determine the correction factor. (Note that "true" atmospheric pressure is as read on a barometer. Weather Bureau reporting of atmospheric pressure is corrected to sea level.) If atmospheric pressure is unknown, the local altitude may be substituted. Select the altitude in the center column and read across to the right hand column for the correction factor.

Table II - Altitude Correction Factors

Pressure in inches Hg	mm Hg	kPa	Altitude in Feet	Meters	Correction Factor (%)
30.23	768	102.3	-276	-84	101
29.92	760	101.3	0	0	100
29.33	745	99.3	558	170	98
28.74	730	97.3	1126	343	96
28.11	714	95.2	1703	519	94
27.52	699	93.2	2290	698	92
26.93	684	91.2	2887	880	90
26.34	669	89.2	3496	1066	88
25.75	654	87.1	4115	1254	86
25.12	638	85.1	4747	1447	84
24.53	623	83.1	5391	1643	82
23.94	608	81.1	6047	1843	80
23.35	593	79.0	6717	2047	78
22.76	578	77.0	7401	2256	76
22.13	562	75.0	8100	2469	74
21.54	547	73.0	8815	2687	72
20.94	532	70.9	9545	2909	70
20.35	517	68.9	10293	3137	68
19.76	502	66.9	11058	3371	66

The temperature/solubility relationship of oxygen in sea water is not the same as that in fresh water. Oxygen solubility in sea water is shown in Table III.

Table III - Solubility of Oxygen in Sea Water

(Chloride concentration 20,000 mg/L)

Temp. °C	Solubility mg/L	Temp. °C	Solubility mg/L	Temp. °C	Solubility mg/L
0	11.41	11	8.77	21	7.20
1	11.11	12	8.58	22	7.07
2	10.83	13	8.41	23	6.95
3	10.56	14	8.24	24	6.83
4	10.30	15	8.07	25	6.71
5	10.05	16	7.91	26	6.60
6	9.82	17	7.78	27	6.49
7	9.59	18	7.61	28	6.38
8	9.37	19	7.47	29	6.28
9	9.16	20	7.33	30	6.18
10	8.96				

Derived from 15th Edition, *Standard Methods for the Examination of Water and Wastewater*

PACKING LIST

YSI MODEL 5739

DISSOLVED OXYGEN PROBE

ITEM NUMBER	QUANTITY	ITEM DESCRIPTION
057087	1	5739 DISSOLVED OXYGEN PROBE
098094	1	5775 MEMBRANE KCl KIT
077000	1	AIR SAMPLER (BOTTLE)
004506	1	CAUTION LABEL
004483	1	5700 INSTRUCTION SHEET
062091	1	CLEANING CERTIFICATE
005130	1	WARRANTY CARD
065699	1	O-RING/DIAPHRAGM PACK
057085	1	PROBE GUARD
065524	1	PACKING LIST
070056	1	DARK ANODE SHEET

Yellow Springs Instrument Co., Inc.
Yellow Springs, Ohio 45387 USA • Phone 513 767-7241 • 800 343-HELP • Fax 513 767-9353 • Telex 205437

FORM OM-10000 REV. 961 APPENDIX C

INTER OFFICE MEMO Olin

TO L. M. UNVERZAGT AT

FROM G. K. SHALABI AT

DATE 16 MARCH 1994

COPY TO J. P. HANSEN
J. R. MATTEI
D. C. FORDHAM

SUBJECT DISSOLVED OXYGEN (D.O.) READINGS AT LAKE WISCONSIN

On the 7th of March 1994, dissolved oxygen (D.O.) readings were taken through the ice at three different locations on Lake Wisconsin, marked as locations # 1, # 2, and # 3 on the attached map. Six readings were taken at location # 1 and two readings each at locations # 2 and # 3. The temperature was also taken in all cases and in all cases was 1° Centigrade. The depth of water readings were started at the bottom of the ice layer and were recorded along with each dissolved oxygen reading as shown in the attached table.

Location # 1

Six holes starting at 30 and then 60, 90, 120, 150 and 270 feet from the bank were bored through the ice. The bores were parallel to the dam at approximately 300 yards away. The depth of the water ranged from 1 to 12 feet and D.O. readings taken ranged from 6.5 to 11.0 mg/L.

The lower D.O level of 6.5 mg/L was taken where the water was 1 foot deep at bore #1 and could be attributed to the biological activity in the sludge. See the table for the remaining results which are all above 10.4 mg/L.

Location # 2

The second location on the map was at Gruber's Grove Bay. The ice did not seem to be as solid as it was above the dam because of Badger's run off during the warm spell which was obvious during sample time. Two holes were bored as shown on the map, one at 30 feet and one at 60 feet from shore in the center directly south of Badger's effluent (See table for results).

Location # 3

The third location on the map was at Summer Oaks boat landing. Again two holes were bored. One at 30 feet from shore and the second at 60 feet (as shown on the map). The 60 foot bore was clearly in the river current (See table for results).

The D.O. level of an additional water sample taken from Summer Oaks boat landing and read at the laboratory on a different meter was 10.6 mg/L. The sample was taken 60 feet from the bank. A water sample taken from Summer Oaks boat landing on 12 January 1994 was 30 feet from the bank had a reading of 10.5 mg/L on the same laboratory meter.

Higher dissolved oxygen readings are normally experienced in the winter months when the water temperature has a higher capacity for dissolved oxygen. Additional readings will be taken during summer months when the water temperature is at its highest and has a lower capacity for dissolved oxygen.

G. K. SHALABI
Chief Engineer
Labs & Special Projects

GKS/asr
Attachments: as stated

16 March 1994

TABLE OF DISSOLVED

OXYGEN READINGS AND LOCATIONS

LOCATION # 1 – 300 YARDS NORTH OF PRAIRIE DU SAC DAM

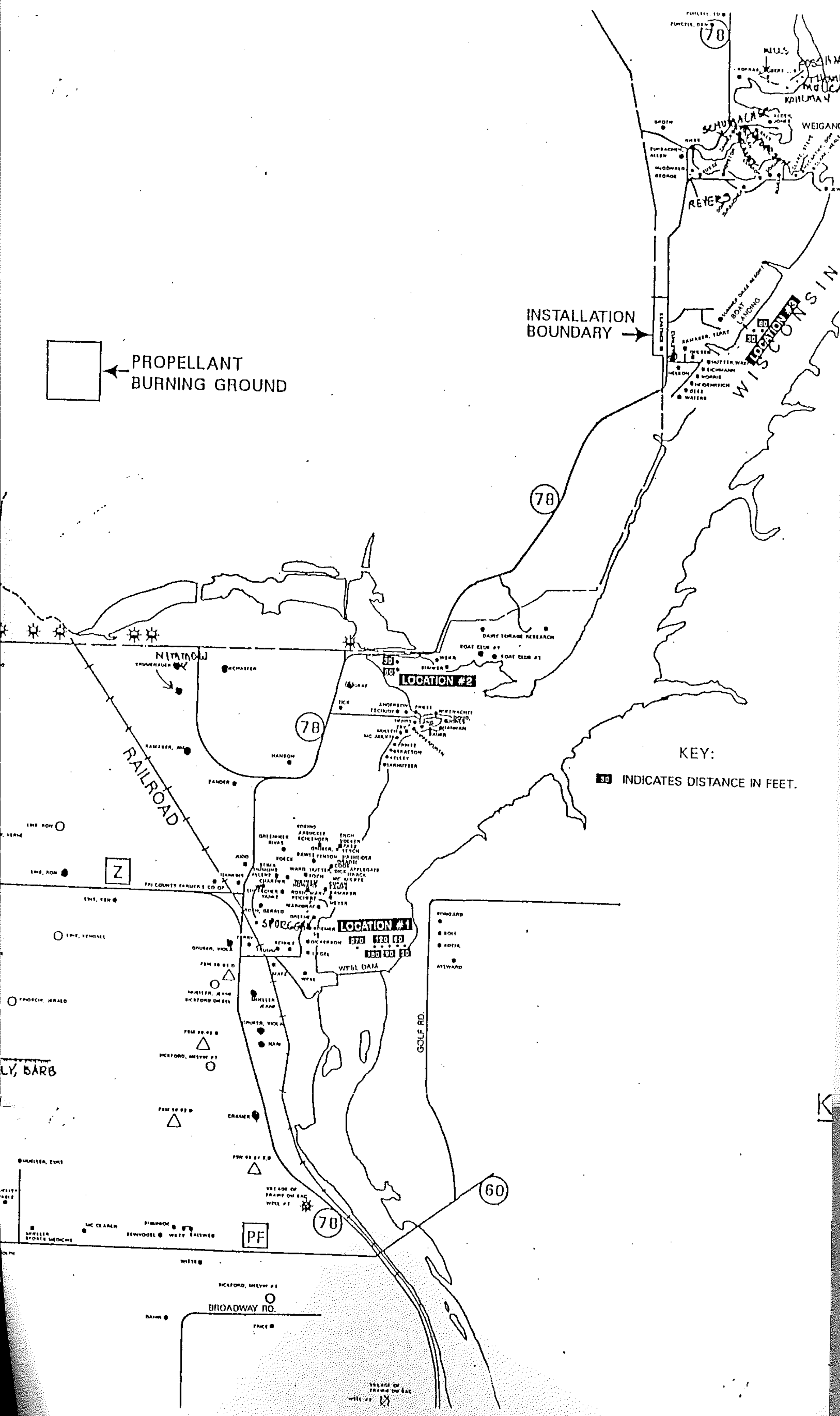
BORE #	DISTANCE FROM BANK Ft.	DEPTH OF READING Ft.	D.O. READING mg/L
1	30	Bottom of ice	6.5
	"	+ 1 ft. 2" off bottom	6.5
2	60	Bottom of ice	10.4
	"	+ 1 ft.	10.8
	"	+ 2 ft.	10.8
	"	Lake bottom	No Reading
3	90	Bottom of ice	10.9
	"	+ 1 ft.	10.9
	"	+ 2 ft.	10.9
	"	+ 3 ft. (2" off bottom)	10.9
4	120	Bottom if ice	10.9
	"	+ 1 ft.	10.9
	"	+ 2 ft.	10.9
	"	+ 3 ft.	10.9
	"	+ 4 ft. (2 " off bottom)	10.0
5	150	Bottom of ice	11.0
	"	+ 1 ft.	10.9
	"	+ 2 ft.	10.9
	"	+ 3 ft.	10.8
	"	+ 4 ft.	10.8
	"	+ 4.5 ft. (2 " off bottom)	10.4
6	270	Bottom of ice	11.0
	"	+ 1 ft.	10.8
	"	+ 2 ft.	10.8
	"	+ 3 ft.	10.8
	"	+ 4 ft.	10.8
	"	+ 5 ft.	10.8
	"	+ 6 ft.	10.8
	"	+ 7 ft.	10.7
	"	+ 8 ft.	10.7
	"	+ 9 ft.	10.7
	"	+ 10 ft.	10.8
	"	+ 11 ft.	10.7
	"	+ 12 ft. (2" off bottom)	10.7

LOCATION # 2 – GRUBER'S GROVE BAY DIRECTLY SOUTH OF BAAP EFFLUENT

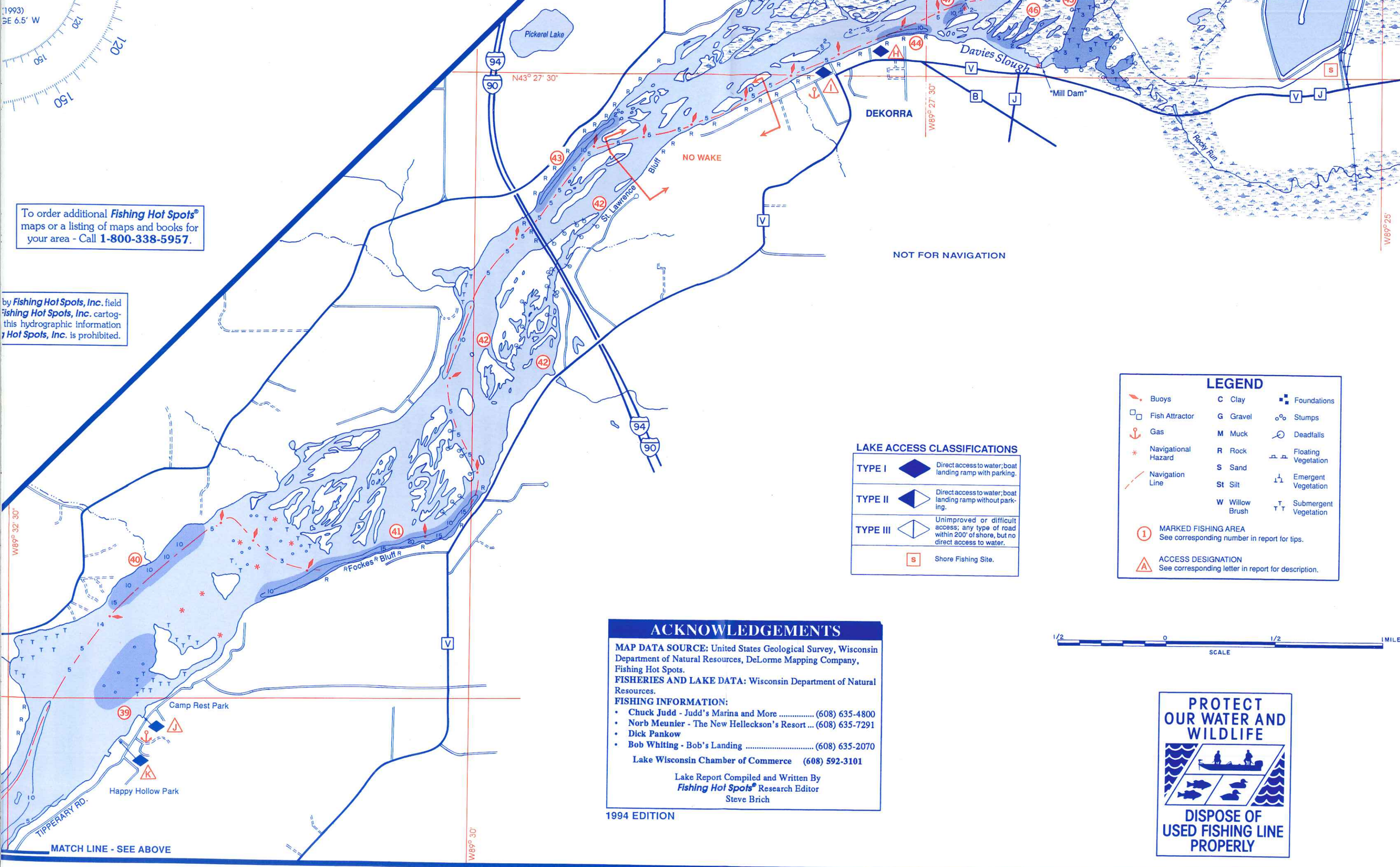
BORE #	DISTANCE FROM BANK Ft.	DEPTH OF READING Ft.	D.O. READING mg/L
1	30	Bottom of ice	11.0
	"	+ 1 ft. (2" off bottom)	10.0
2	60	Bottom of ice	11.0
	"	+ 1 ft. (2" off bottom)	10.2

LOCATION # 3 – SUMMER OAKS BOAT LANDING

BORE #	DISTANCE FROM BANK Ft.	DEPTH OF READING Ft.	D.O. READING mg/L
1	30	Bottom of ice	10.8
	"	+ 1 ft.	10.7
	"	+ 2 ft.	10.7
	"	+ 3 ft.	10.7
	"	+ 4 ft.	10.7
	"	+ 5 ft.	10.8
	"	+ 5.5 ft.	Bottom – No Reading
2	60 River Current	Bottom of ice	10.9
	"	+ 1 ft.	10.8
	"	+ 2 ft.	10.8
	"	+ 3 ft.	10.8
	"	+ 4 ft.	10.8
	"	+ 5 ft.	10.8
	"	+ 6 ft.	10.8
	"	+ 7 ft.	10.7
	"	+ 8 ft.	10.7
	"	+ 9 ft.	10.7
	"	+ 10 ft.	10.8
	"	+ 11 ft.	10.7
	"	+ 12 ft.	10.7
	"	+ 12.5 ft.	Bottom – No Reading



PROPELLANT BURNING GROUND
INSTALLATION BOUNDARY
RAILROAD
LOCATION #1
LOCATION #2
LOCATION #3
WISCONSIN
BOAT LANDING
GOLF RD.
BROADWAY RD.
WPEL DAM
DAIRY FORAGE RESEARCH
78
60
Z
PF
KEY:
30 INDICATES DISTANCE IN FEET.



To order additional ***Fishing Hot Spots®*** maps or a listing of maps and books for your area - Call **1-800-338-5957**.

LAKE ACCESS CLASSIFICATIONS

TYPE I	Direct access to water; boat landing ramp with parking.
TYPE II	Direct access to water; boat landing ramp without parking.
TYPE III	Unimproved or difficult access; any type of road within 200' of shore, but no direct access to water.
S	Shore Fishing Site.

LEGEND

- Buoys
- Fish Attractor
- Gas
- Navigational Hazard
- Navigation Line
- C Clay
- G Gravel
- M Muck
- R Rock
- S Sand
- St Silt
- W Willow Brush
- Foundations
- Stumps
- Deadfalls
- Floating Vegetation
- Emergent Vegetation
- Submergent Vegetation
- (1) MARKED FISHING AREA — See corresponding number in report for tips.
- (A) ACCESS DESIGNATION — See corresponding letter in report for description.

ACKNOWLEDGEMENTS

MAP DATA SOURCE: United States Geological Survey, Wisconsin Department of Natural Resources, DeLorme Mapping Company, Fishing Hot Spots.
FISHERIES AND LAKE DATA: Wisconsin Department of Natural Resources.
FISHING INFORMATION:

- **Chuck Judd** - Judd's Marina and More ..... (608) 635-4800
- **Norb Meunier** - The New Helleckson's Resort ... (608) 635-7291
- **Dick Pankow**
- **Bob Whiting** - Bob's Landing ..... (608) 635-2070

Lake Wisconsin Chamber of Commerce (608) 592-3101

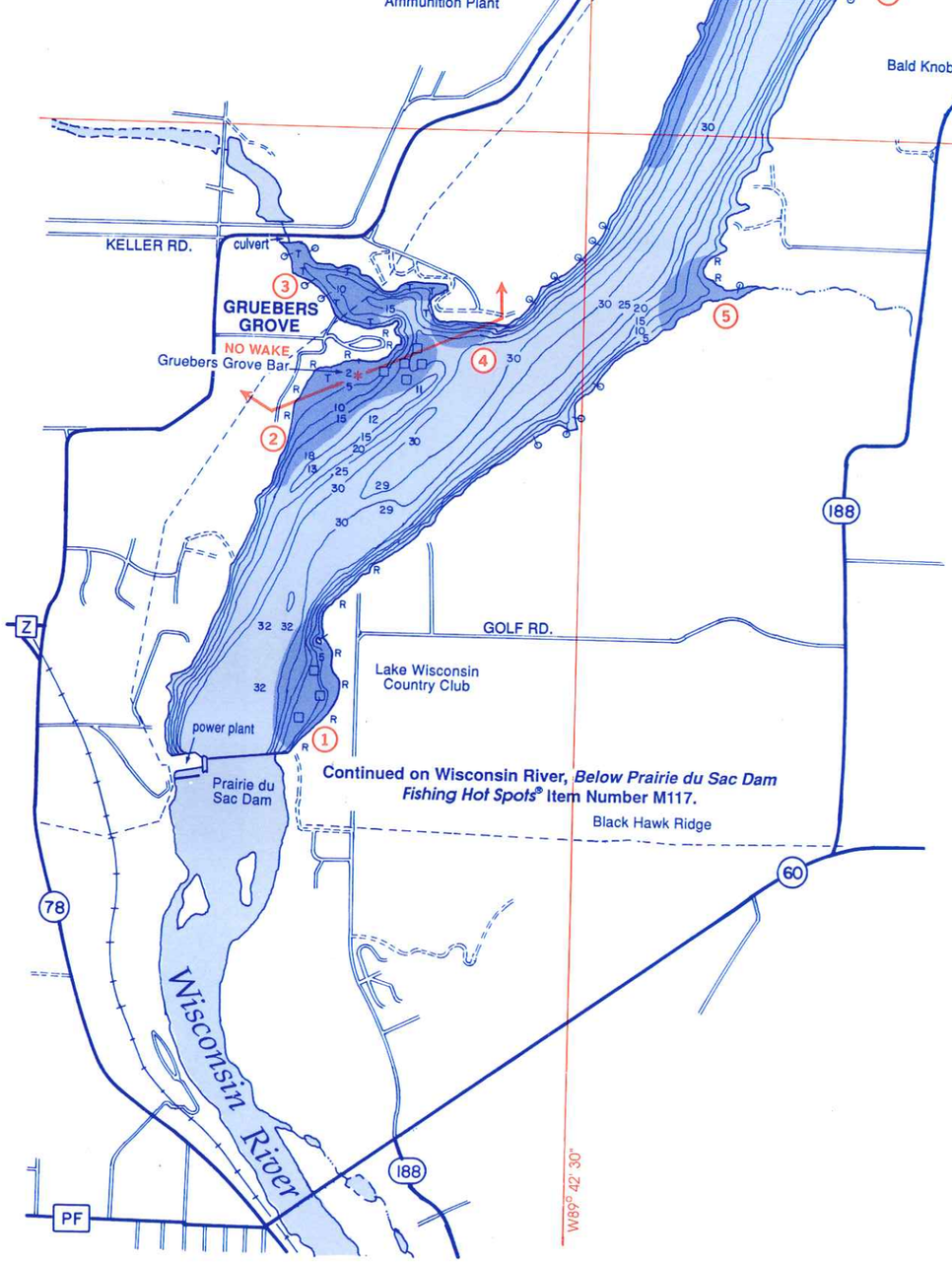
Lake Report Compiled and Written By
Fishing Hot Spots® Research Editor
Steve Brich

1994 EDITION

SCALE 1/2 0 1/2 1 MILE

PROTECT OUR WATER AND WILDLIFE

DISPOSE OF USED FISHING LINE PROPERLY



PRAIRIE du SAC

NOT FOR NAVIGATION

LAKE SURVEY MAP

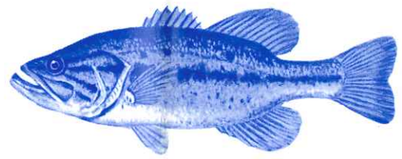
Fishing Areas Shaded

Area (1) In late fall, slowly backtroll live bait rigs along the steep drop-off just west of the Lake Wisconsin Country Club for walleye and sauger. Redtail chubs or large fathead minnows should be worked tight to bottom. Crappie and an occasional school of white bass use the old cribs and submerged timber on the adjacent flat.

Area (2) This large flat just south of Gruebers Grove is a well-known walleye producer throughout the season. In spring (May and June) use jigs tipped with live bait to check the 10-foot depths. The 10- to 20-foot break can hold good numbers of walleye during summer and fall. Use a depthfinder to locate the remains of the old fish cribs for summer crappie.

Area (3) Cast 1/4- or 3/8-ounce white spinnerbaits close to the docks, submerged timber and weed growth at the west end of Gruebers Grove for largemouth bass. Quickly check this area in early spring for spawning crappie and bluegill.

Largemouth Bass



The largemouth is found throughout the United States and other countries. It prefers heavy cover, including stumps, logs, brush and weeds. Largemouth eat almost anything - frogs, minnows, crayfish, worms, insects, panfish, salamanders, snakes, mice and even small birds. Largemouth readily strike artificial lures. Plastic worms and spinnerbaits are consistent producers.

Area (4) A small, 12-foot deep bar just south of the Southern Lake Wisconsin Boat Club holds walleye in May and June. Live bait rigs are suggested to work this small structure.

Area (5) Largemouth bass and bluegill utilize the shallow cover in this bay for spawning. The drop-off at the bay's mouth is a good bet for late fall walleye.

Area (6) White bass and walleye frequent the small gravel/rock bar at the entrance to this cove. The best action is usually found along the 15- to 25-foot drop-off. Fish cribs located at the cove's mouth (about 100 feet off the north shore) hold white bass, crappie and walleye.

Area (7) Troll bottom bouncers tipped with live bait along the shoreline drop-off between Gruebers Grove and the Sauk County Park Boat Landing for summer and fall walleye and sauger.

Area (8) This shallow rock bar at the entrance to Weigands Bay is a popular spot to take walleye and sauger throughout the year. During low-light periods, try slip bobber rigs and leeches along the 5- to 10-foot drop-off. The steep drop-off along the east side of the bar produces best during late summer and fall.

Area (9) A number of old fish cribs about 125 feet east of the pumping station can still hold numbers of bluegill and crappie. Use a depthfinder to scan the 12- to 15-foot depths to locate the old cribs and concentrations of fish.

Area (10) The weedy west end of Weigands Bay holds largemouth bass and bluegill. Docks and submerged timber on the weed flat often concentrate fish.

Area (11) A combination of fish cribs, weeds and rock piles makes the north end of Moon Valley a good bet for a number of species. In spring and fall, trophy walleye are attracted to the moving water at the Highway 78 bridge. A number of fish cribs are scattered in the seven-foot depths and provide year-round opportunities for panfish. Largemouth bass relate to the available weed cover from early spring through fall.

Area (12) Walleye are attracted to the shallow stump bar at the entrance to Moon Valley from May through August. The best action occurs on the steep, 10- to 20-foot break along the edge of the old river channel. Crappie and bluegill can also be found throughout spring and summer.

Area (13) Troll deep-diving crankbaits along the rocky shoreline drop-off for summer walleye. Planer boards are often used to prevent spooking fish.

Area (14) Slowly backtroll live bait rigs along the 12-foot break on this irregularly shaped rock bar for walleye. Occasionally, some trophy walleye are taken during July and August.

CONTINUED ON OTHER SIDE

MATCH LINE - SEE BELOW

Prentice Creek

Tipperary Bluff

Stoners Bay

Stoners Point

Tipperary Point

TIPPERARY RD.

Rowan Creek

Grade

Whalens Bay

Whalens

WILLOW AVE.

CORNING ST.

CS

N43° 22' 30"

HARMONY GROVE

Pine Bluff

Sticky Bay

The Fingers

W89° 32' 30"

NO WAKE BY BRIDGE

Okee Bridge

OKEE

Okee Bay

Long Lake

Baraboo River

Wisconsin River

Duck Creek

power plant

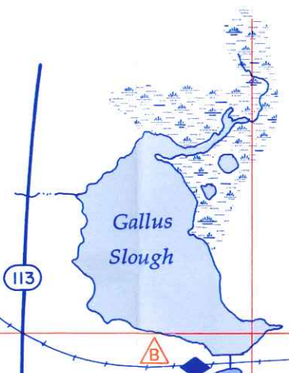
DUPLESS RD.

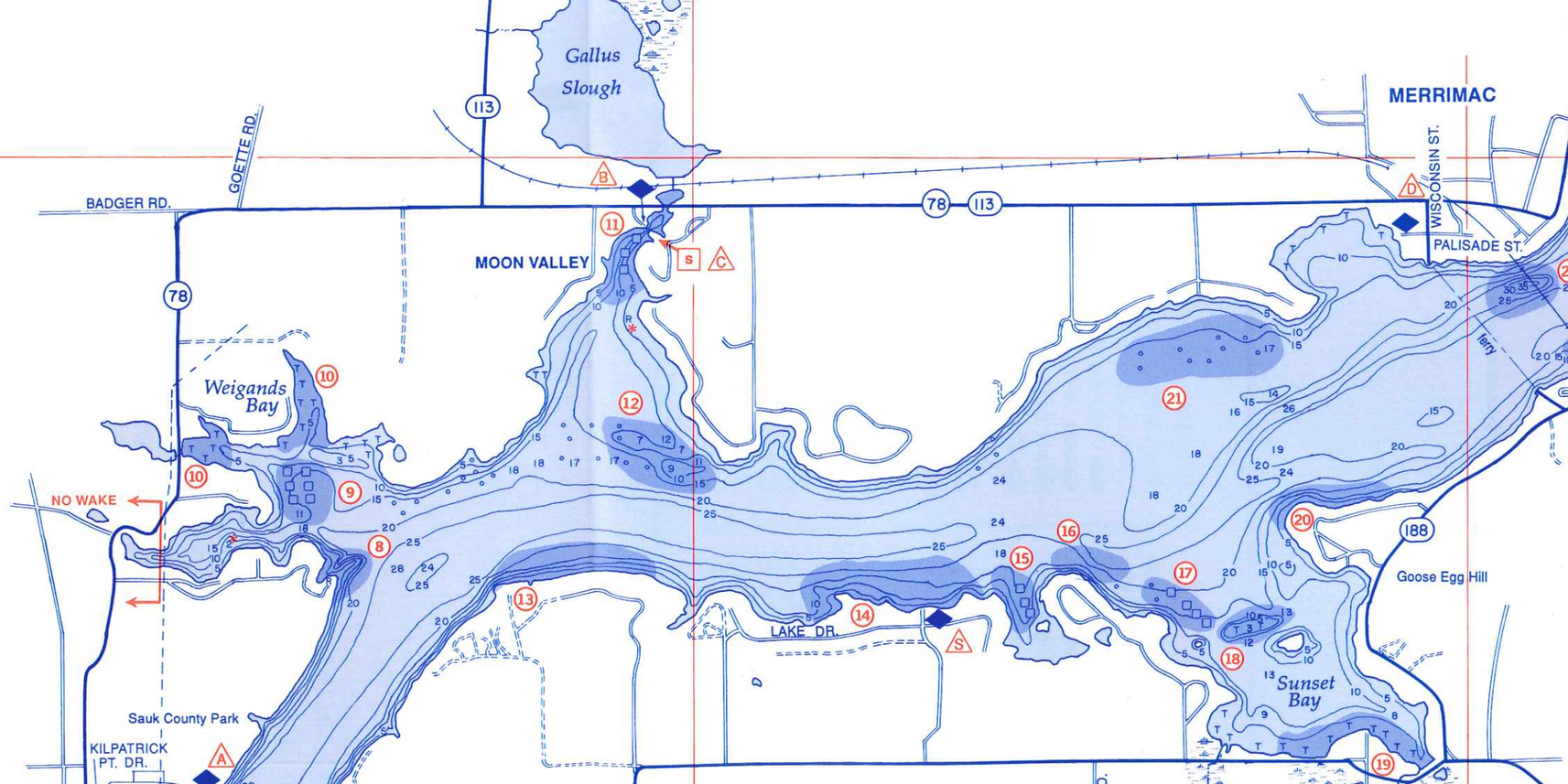
THUNDERBIRD DR.

Lake Columbia

Fishing Hot Spots®

Lake Wisconsin





LOCATION

In south central Wisconsin, about 25 miles north of Madison and adjacent to Interstate 90/94.

ACCESS

A **Type I (Sauk County Park):** On the west side of Lake Wisconsin, just south of Weigands Bay; from Highway 78, take Kilpatrick Point Drive east a short distance to the county park. A two-lane concrete ramp, loading pier, restrooms and large blacktop parking area for 200 rigs are provided. This site closes at 10:00 p.m.

B **Type I (Moon Valley):** On the north side of the lake, at the west side of Gallus Slough bridge; from Highway 78, take the unmarked gravel road south a short distance to the landing. There is a gravel ramp, loading pier, restrooms and parking for about 10 rigs.

C **Shore Fishing Site:** On the east side of Moon Valley; from Highway 78, enter the wayside park on the south side of the road.

D **Type II (Merrimac Landing):** On the north side of the lake, in the town of Merrimac; from Highway 78, take Wisconsin Street south for 0.1 mile to Palisade Street. Turn right and proceed to the gravel ramp at the end of the road. Parking is not permitted along Palisade Street.

E **Type I:** On the north side of the lake, about one mile east of Merrimac, adjacent to Highway 78. This site offers a blacktop ramp, loading pier, beach and picnic area. Parking and telephone are available on the north side of Highway 78. A fee is charged and this facility closes at 10:00 p.m.

F **Type I:** On the west side of the Wisconsin River, north of the I-90/94 bridge; from Highway 78, take Highway U west for about eight miles to Reumann Road. Proceed north on Reumann Road for about 1½ miles to Thunderbird Drive. Turn right on Thunderbird Drive and continue about ¾ mile to the river. A shallow sand ramp and parking are provided. This unimproved access is suitable for small boats and canoes.

G **Type I:** On the west side of the Wisconsin River, north of the I-90/94 bridge; from Highway 78, take Highway U west for about eight miles to Reumann Road. Drive north on Reumann Road for about 1½ miles to Thunderbird Drive, then turn right on Thunderbird and go about 1¼ miles to the end of the road. There is a sand ramp and parking. A shallow sandbar at the end of ramp can make launching difficult.

H **Type I:** On the south side of the Wisconsin River, in the town of Dekorra; from Highway 51, take Highway V west for about 2½ miles to the town park. A concrete ramp and large blacktop parking area are provided. Picnic area, playground and restrooms are located nearby.

I **Type I:** On the south side of the Wisconsin River, in the town of Dekorra; from Highway 51, take Highway V west for about 2¾ miles to the access road just west of the town park. This site includes a concrete ramp and roadside parking. Launching can be difficult during high-water periods.

J **Type I (Camp Rest Park):** On the south side of the Wisconsin River, north of Tipperary Point; from I-90/94, take Highway CS west for 2.8 miles to Highway V. Proceed north on Highway V for 0.8 mile to Tipperary Road, then turn west on Tipperary Road for 2.5 miles to the landing. A rough concrete ramp, picnic area, playground, restrooms and parking for five rigs are provided. This site is closed from 10:00 p.m. to 6:00 a.m.

K **Type:** On the south side of the Wisconsin River, just north of Happy Hollow Park; from I-90/94, take Highway CS west for 2.8 miles to Highway V. Turn north on Highway V for 0.8 mile to Tipperary Road, then west on Tipperary Road for 2.2 miles to the landing. A concrete ramp and parking for about eight rigs are provided.

L **Type I:** On the east side of the Wisconsin River, just north of Tipperary Point; from I-90/94, take Highway CS west for 2.8 miles to Highway V. Proceed north on Highway V for 0.8 mile to Tipperary Road. Turn west on Tipperary Road and drive 1.1 miles to the landing. This facility includes a concrete ramp and parking for six rigs. Additional parking is found just west of this site in the town park.

M **Shore Fishing Site:** On the east side on Lake Wisconsin, along Whalens Grade; from I-90/94, take Highway CS west for 2.8 miles to Highway V. Proceed north on Highway V a short distance to the Grade.

N **Type I (Lake Wisconsin Public Access):** On the east side of Lake Wisconsin, at the south end of Whalens Grade; from the Highway V and CS intersection, take Highway V north a short distance to the landing. A two-lane concrete ramp, loading pier, restrooms and large paved parking lot are present.

O **Type I:** On the east side of Lake Wisconsin; from the Highway V and CS intersection, take Highway V west for 1.1 miles to Willow Avenue. Turn right and proceed a short distance to the small town park. A gravel ramp, picnic area and restrooms are provided.

P **Type I (The New Hellecksons Resort):** On the east side of Lake Wisconsin; from the intersection of highways V and CS , take Highway V west for 1.2 miles to Corning Street. Turn right and continue to the end of the road. This access offers a concrete ramp, loading pier and parking.

Q **Shore Fishing Site:** On the south side of Lake Wisconsin, at the Okee Bridge; from Highway 113, take Highway V east a short distance to the bridge. Anglers fish along the road right-of-way and from the small picnic area on the east side of the bridge.

R **Type I:** On the south side of Lake Wisconsin, on the west side of the Okee Bridge; from Highway 113, take Highway V east a short distance to the landing. This facility provides a concrete ramp, loading pier and parking.

S **Type I:** On the south side of Lake Wisconsin, just west of Sunset Bay; from Highway 188, take Lake Drive north for 0.4 mile to the landing. A concrete ramp and parking for five rigs are found.

RELATED SERVICES

BOAT/MOTOR RENTALS - Yes, at the marinas

VEGETATION - Generally scarce, but considerable growths occur in protected bays and backwater areas

SPECIAL FEATURES

Lake Wisconsin and the Wisconsin River are extremely popular with both recreational boaters and fishermen. Resorts, campgrounds and tourist attractions are present throughout the area.

A car ferry across Lake Wisconsin operates at the town of Merrimac from mid-April through ice-up. This popular tourist attraction is provided free of charge.

Because Lake Wisconsin and the Wisconsin River receive heavy boating pressure, certain areas are posted with speed restrictions. A series of black/white buoys have been placed from the Merrimac railroad bridge upstream to the town of Dekorra to mark a safe navigation route.

Camping and picnicking on the many sandbars is very popular on the Wisconsin River above the I-90/94 bridge.

LAKE CHARACTERISTICS

SIZE AND DEPTH - 9,000 acres with a maximum depth of 47 feet located just above the Prairie du Sac Dam. The Wisconsin River upstream from Lake Wisconsin is generally shallow with many sandbars.

WATER SOURCE - Drainage lake: An impoundment of the Wisconsin River which enters on the northeast end and outlets in the southwest corner through the Prairie du Sac Dam. Minor inlets include Rowan Creek, Prentice Creek and Gallus Slough.

SHORELINE - Mainly upland and wooded, with heavy commercial and residential development around much of the lake. Several large wetland areas are present at the east end.

BOTTOM - Primarily sand and muck. Gravel and rock are found along many shoreline areas, especially in the Wisconsin River and lower Lake Wisconsin. Stumps and submerged timber are scattered throughout the lake, with the heaviest concentrations from the railroad bridge upstream to Tipperary Point.

WATER - Fertile and light brown in color. A blue-green algae bloom usually occurs by early summer. Because of the influence of the Wisconsin River, a summer thermocline does not develop, and dissolved oxygen levels are adequate throughout the water column. Biologists have estimated that a complete exchange of water occurs every four days.

Primary - Walleye, Sauger, White Bass, Black Crappie, Channel Catfish, Bullhead.

Secondary - Northern Pike, Largemouth Bass, Perch, Bluegill, Pumpkinseed.

Limited - Hybrid Muskie, Smallmouth Bass, Lake Sturgeon, White Crappie, Rock Bass.

COMMENT - Excellent natural reproduction and above-average growth rates have resulted in a stable walleye population. Many fish are in the 14- to 16-inch range, and a few 10-pound trophies are present. Anglers should practice catch-and release on the larger fish to protect this resource.

A good population of sauger is present, especially in the Wisconsin River. Because of abundant spawning habitat and improving water quality, the sauger fishery continues to increase in abundance and average size. Fish in the 16-inch range are considered common.

Black crappie are abundant with many fish from seven to 10 inches. Due to sporadic reproductive success typical of crappie populations, abundance can vary dramatically from year to year.

Channel catfish are common and underutilized by most anglers. There are some catfish in the eight-pound range, but most run between one and three pounds.

Largemouth bass reproduction and recruitment tends to fluctuate due to the limited weed cover. Presently, largemouth in the 10- to 14-inch range are the most common.

Bluegill are abundant, including many fish in the six-inch range. The majority of the bluegill concentrate in the shallow bays that contain weed growth.

SEASONAL MIGRATIONS - From late winter through early spring, walleye move up the Wisconsin River towards the Wisconsin Dells Dam. Spawning usually occurs during the first week of April. A similar movement also occurs in late fall.

In spring, when water temperatures reach about 55 degrees (usually mid-May), white bass run up the Wisconsin River to spawn. In late summer (late August to early September) white bass congregate around the warm-water discharge from Lake Columbia.

FORAGE - Emerald shiner, golden shiner, bluntnose minnow and juvenile panfish are common. Gizzard shad are common around the warm-water discharge from Lake Columbia.

LAKE MANAGEMENT

LAKE INVESTIGATION DATA - The Wisconsin DNR conducted an electrofishing survey to evaluate the fishery. Samples gathered during the survey were used to calculate the age/length relationships presented in the following chart.

The survey results confirmed the stability of the walleye and sauger fisheries. Biologists noted that numerous young-of-the-year and yearling fish were captured, demonstrating good natural reproduction. A reduction in the number of larger fish has been noted, indicating possible angler overharvest.

Crappie and bluegill growth rates were slightly below the area average. Many of the bluegill sampled were between three and seven inches, while the majority of crappie were six to eight inches.

LAKE WISCONSIN AGE/LENGTH RELATIONSHIPS

	LENGTH (In Inches) AGE								AVERAGE SIZE
SPECIES	I	II	III	IV	V	VI	VII	VIII	
Sauger	7.9	11.7	15.0	17.1	19.0	—	—	—	15.6"
Walleye	8.0	14.0	18.4	21.4	24.2	26.2	28.9	—	15.3"
N Pike	11.0	17.0	23.0	27.5	32.1	33.8	36.9	—	NA
LM Bass	—	7.8	11.9	13.7	15.0	15.8	17.1	18.0	NA
B Crappie	—	5.9	8.1	9.7	11.4	13.3	13.7	—	NA
White Bass	6.1	8.8	10.9	12.9	14.0	—	—	—	NA
Bluegill	—	4.0	6.1	7.4	8.2	8.7	9.1	—	NA

STOCKING - Muskie and hybrid muskie have been stocked periodically in Lake Wisconsin from 1955 through 1990. Due to limited availability of muskie fingerling and lack of angler interest, the muskie stocking program has been discontinued.

LAKE WISCONSIN STOCKING SUMMARY

YEAR	SPECIES	NUMBER	SIZE
1987	Hybrid Muskie	2,500	Fingerling
1988	Hybrid Muskie	2,500	Fingerling
1989	Hybrid Muskie	2,500	Fingerling
1990	Hybrid Muskie	2,500	Fingerling

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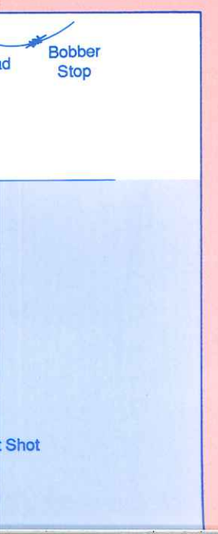


productive. From mid-summer through fall move deeper and fish tight to the stumps. White bass are often found on the downstream side of the bridge pilings.

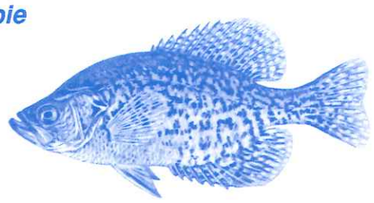
Area (24) Troll the edge of this stump field with a No. 7 Countdown Rapala for spring and summer walleye. Crappie and white bass often suspend in the submerged trees adjacent to the old river channel.

Area (25) Follow the 15- to 20-foot drop-off adjacent to the old river channel, for a mixed bag of sauger and walleye. Trolling deep-diving crankbaits just above bottom is an effective technique for locating active fish.

Area (26) This large stump field is home to a large number of walleye and sauger during summer. Use a depthfinder to locate concentrations of stumps, then vertical jig the area with jigging spoons or jigs tipped with live bait.

Area (27) Fish cribs and scattered stumps in this area provide needed cover for bluegill, crappie and some walleye during summer and early fall.

Crappie



Crappie are considered excellent fighters when taken on light tackle. They often suspend along drop-offs during the day and bite best in early morning or toward evening. Fallen trees, brush and emergent vegetation also attract crappie. Small minnows are the preferred prey.

Area (28) Walleye hold along this steep rock shoreline in early spring and fall. Cast or pitch a 1/16- or 1/8-ounce jig tipped with a minnow or a piece of nightcrawler tight to the shoreline rocks.

Area (29) The area around the Okee Bridge is popular with both boat and shore anglers. In early spring and late fall, walleye are taken on bottom rigs tipped with fathead minnows. White bass, crappie and bluegill usually suspend near the fish cribs throughout summer.

Area (30) Buzzbaits and spinnerbaits should be worked over the weed growth in Okee Bay for summer largemouth bass. If the action is slow on the flats, try pitching Texas-rigged plastic worms under the docks.

Area (31) The rocky shoreline of Pine Bluff is an important walleye and sauger spawning area. Cast small jigs (1/16- or 1/8-ounce) tipped with live bait into the five- to 10-foot depths. During fall, walleye can be found scattered along the five- to 15-foot drop-off. The cribs in the area can also hold good numbers of crappie and white bass.

Area (32) Stumps and fish cribs south of Stoners Point provide outstanding action for a variety of species. Crappie anglers will find the best action in spring and early summer around the fish cribs. Walleye and sauger buffs should slowly troll the edge of the 10-foot break with a silver/blue Countdown Rapala for summer action. Drifting live bait rigs tight to bottom is also popular with many fishermen.

Area (33) Cast spinnerbaits into the submerged timber and scattered weed growth of Stoners Bay for largemouth bass. During summer, concentrate on the deeper wood for best results.

Area (34) Boating channels on the east side of Sticky Bay are locally referred to as the "Fingers." Bluegill, crappie, largemouth bass and northern pike are available in early spring. Work tight to the developing weed growth and docks for the best action.

Area (35) Good numbers of walleye are taken from the stump fields on the west side of the islands. From late

Area (37) The west side of Whalens Grade is a popular shore fishing area for walleye, crappie and bluegill. During April and May, good numbers of walleye and crappie are caught from the base of the riprap on slip bobbers rigs and live bait. Look for the best fishing to occur during low-light periods and at night.

Area (38) Walleye and sauger are taken from the steep, rocky drop-off east of Tipperary Bluff throughout the season. Early in spring, check the drop-off in the eight- to 10-foot depths for walleye. During the fall lake sturgeon season, anglers anchor and soak nightcrawlers on bottom in the 20-foot depths.

Area (39) This shallow flat west of Camp Rest Park can hold a mixed bag of walleye, northern pike and bluegill. When water levels are slightly above normal, the stumps and weed growth provide the most consistent action.

Area (40) Walleye and sauger cruise the edges of this 10-foot hole. Slowly drift down river working live bait rigs along the drop-off. White bass and some crappie are also available.

Area (41) The deep water at the base of Fockes Bluff yields good numbers of walleye and sauger. Many local anglers prefer to drift the 10- to 20-foot depths with a Lindy Rig and live bait. White bass can also be present from early spring through summer. Look for signs of surface feeding activity before fishing.

Area (42) Largemouth bass are present in the backwater areas downstream of St. Lawrence Bluff. Cast spinnerbaits and jig n' pig combos into the submerged shoreline timber. This area tends to produce best during normal to high-water periods.

Area (43) This deep-water slot just upstream from the I-90/94 bridge is a well-known area for walleye, sauger and smallmouth bass. Anglers key on the shoreline rock and riprap to take both pre-spawn and post-spawn fish. During summer, walleye and sauger are scattered along the current break. Drift or slowly slip with the current and work a jig tipped with a minnow or a piece of nightcrawler tight to bottom.

Area (44) Work the 10-foot hole just upstream from Dekorra for walleye and sauger. In spring, white bass can also be present in good numbers.

Area (45) Early season largemouth bass and northern pike action is available from the east end of Davies Slough. Abundant weeds and submerged timber provide the primary cover. A mill dam at the entrance is a navigation hazard during normal and low-water periods.

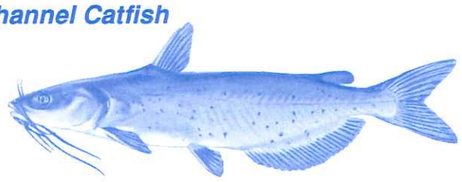
Area (46) Largemouth, northern, bluegill and crappie are found in these shallow bays at the entrance to Davies Slough. After ice-out, cast spinnerbaits into shallow shoreline cover for bass and northern. Bluegill and crappie are usually present during spring spawning.

During the ice fishing season, locals walk in from Highway V to fish these backwater areas for northern and bluegill.

Area (47) Small jigs tipped twister tails or grubs take white bass from the edges of this 10-foot deep hole.

Area (48) The submerged timber along this section of the Wisconsin River yields good numbers of channel catfish during summer. Nightcrawlers and cut bait are usually fished tight to bottom.

Channel Catfish



The channel catfish is highly prized by anglers who specialize in this tasty and hard-fighting species.The deeply forked tail and coloration, which varies from silver to blue-gray and green-gray with

are present along the bridge. During spring -foot depths are most

Whalens Bay. The best action is usually found in early spring before weed growth becomes heavy. Slop baits, such as the Moss Boss, Grass Rat and Timber Doodle, take bass and pike from the thick cover during summer. Ice anglers fish this area for bluegill, crappie and northern pike.

congregate around the warm-water discharge to feed on gizzard shad.

Area (50) Early season walleye and sauger relate to the sand/gravel bar at the entrance to the Baraboo River. Surface feeding activity reveals schools of feeding white bass that frequent the area in August and September.

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Muck areas in the main lake basin produce a population of mayfly larvae that walleye feed on during early summer. When walleye are feeding on mayfly larvae, slowly drift or backtroll the mud flats with a light jig tipped with a leech.

Many of the areas that anglers key on for spring walleye also produce in fall. Generally look for a rock/gravel bottom on a steep drop-off adjacent to current. Tipperary Bluff, Fockes Bluff, Grubers Grove and the railroad bridge are important fall areas. Jig and minnow combos or crankbaits can be effective at this time.

Largemouth bass concentrate in shallow weedy bays, such as Grubers Grove, Weigands Bay, Moon Valley, Okee Bay and Whalens Bay. During spring, cast 1/4- or 3/8-ounce spinnerbaits near emerging vegetation, stumps and submerged shoreline timber. Areas that develop heavy weed growth can hold bass throughout summer. Weedless spoons, such as the Moss Boss, Timber Doodle and Jaw-Breaker, can be worked through the heavy cover.

Steep drop-offs that contain docks and submerged timber are prime locations for largemouth bass from late spring through summer. Pitch Texas-rigged plastic worms and jig n' pig combos tight to the cover. Most strikes occur as the lure is falling.

Crappie fishing is generally best from late March through April during the spawning period. Work shallow bays, such as Weigands Bay, Okee Bay and the boating channels in Sticky Bay. Slip bobber rigs and small minnows are recommended at this time.

After spawning, crappie leave the shallows and suspend around the fish cribs and standing timber. Use a depthfinder to locate suspended fish before fishing an area. Slowly drift and work small tube jigs vertically just above the suspended fish.