Treaty Fisheries Publication

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INTRODUCTION

Fish populations can fluctuate due to a variety of factors including natural forces like climate, reproductive success, predation and competition. Human activities such as fish harvest, stocking, habitat change and invasive species introduction can also have significant impacts. The Wisconsin Department of Natural Resources (DNR) fisheries crews regularly conduct fishery surveys on lakes and reservoirs to gather the information needed to monitor changes, identify concerns, evaluate past management actions and to prescribe fishery management strategies. Netting and electrofishing surveys are used to gather data on the status of fish populations and communities, measuring such parameters as species composition, population size, reproductive success, size and age distribution and growth rates. Harvest is another key component of fisheries that we need to measure.

On many lakes in the Ceded Territory of northern Wisconsin, harvest of fish is divided between sport anglers and the six Ojibwe bands who harvest fish under rights reserved by federal treaties. The tribes harvest fish primarily using spearing, a highly efficient method, during a relatively short time in the spring. Every fish in the spear harvest is counted and reported, creating a complete census of the harvest.

We also measure the sport angler harvest to assess its impact on the fishery. It would be highly impractical and very costly to conduct a complete census of every angler who fishes on a lake, so we conduct creel surveys instead.

A creel survey is an assessment tool used to sample the fishing activities of anglers on a body of water to make estimates of harvest and other fishery parameters. Creel survey clerks work on randomly-selected days and shifts, forty hours per week. The survey is conducted during daylight hours throughout the open season for gamefish from the first Saturday in May through the first Sunday in March. Creel surveys are not conducted in November when fishing effort is low and ice conditions are often unsafe.

Creel survey clerks travel their lakes using a boat or snowmobile to count the number of anglers at predetermined times and to interview anglers who have completed their fishing trip. Data are collected on what species they fished for, catch, harvest, lengths of fish harvested, marks (fin clips or tags) and hours of fishing effort. Collecting completed-trip data provides the most accurate assessment of angling activities and it avoids the need to disturb anglers while they are fishing.

A computer program is used to estimate catch and harvest of each species, catch and harvest rates and fishing effort by month, as well as for the year in total. Keep in mind that these are estimates based on the best information available and not a complete accounting of effort, catch and harvest. Accurate estimates require that we sample a sufficient and representative portion of the angling activity on a lake. The accuracy of creel survey results depends on good cooperation and truthful responses by anglers when a creel clerk interviews them.

You may have encountered a DNR creel survey clerk on a recent fishing trip. We appreciate your cooperation during an interview. The survey only takes a few minutes of your time and it gives the DNR valuable information needed for management of the fishery.

This report provides estimates of:
1. Overall fishing effort (pressure)
2. Fishing effort directed at each species
3. Numbers of fish caught and harvested
4. Catch and harvest rates

Also included are a physical description of Big Lake, discussion of results of the survey and detailed summaries by species of fishing effort, catch and harvest.
GENERAL LAKE INFORMATION

LOCATION
Big Lake is located in Vilas County near the town of Boulder Junction.

PHYSICAL CHARACTERISTICS
Big Lake is a 835-acre drainage lake with a maximum depth of 61 feet. Littoral substrate consists primarily of sand, gravel and lesser amounts of muck. Big Lake contains medium-hard, neutral, clear water of high transparency.

SEASONS SURVEYED
The period referred to in this report as the 2021-22 fishing season ran from May 1, 2021 through March 6, 2022. The open-water creel survey ran from May 1 through Oct. 31, 2021 and the ice fishing creel survey ran from Dec. 1, 2021 through March 6, 2022.

WEATHER
Ice-out on Big Lake was around mid-April 2021. Fishable ice formed on Big Lake in early December 2021.

FISHING REGULATIONS
The following seasons, daily bag limits and length limits were in place on Big Lake during the 2021-22 fishing season:

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>SEASON</th>
<th>BAG LIMIT</th>
<th>MIN. SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largemouth Bass</td>
<td>5/01-3/06</td>
<td>Catch &amp; Release</td>
<td></td>
</tr>
<tr>
<td>Smallmouth Bass</td>
<td>5/01-3/06</td>
<td>Catch &amp; Release</td>
<td></td>
</tr>
<tr>
<td>Musky</td>
<td>5/29-12/31</td>
<td>1</td>
<td>40&quot;</td>
</tr>
<tr>
<td>Northern Pike</td>
<td>5/01-3/06</td>
<td>5</td>
<td>None</td>
</tr>
<tr>
<td>Walleye</td>
<td>5/01-3/06</td>
<td>3</td>
<td>None</td>
</tr>
<tr>
<td>Panfish</td>
<td>Open all year</td>
<td>25</td>
<td>None</td>
</tr>
<tr>
<td>Rock Bass</td>
<td>Open all year</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

1. DIRECTED FISHING EFFORT
The estimated number of hours during each month that anglers spent fishing for a species.

2. TOTAL CATCH AND HARVEST
The estimated number of fish of the indicated species caught or harvested by all anglers, regardless of targeted species.

3. SPECIFIC CATCH AND HARVEST RATES
The estimated number of hours it takes an angler to catch or harvest a fish of the indicated species. Only information from anglers who were specifically targeting that species is reported.

4. LENGTH DISTRIBUTION OF HARVESTED FISH
All fish of a species that were measured by the clerk during the entire creel survey season.

5. LARGEST AND AVERAGE LENGTH OF HARVESTED FISH
The largest and average (mean) length of a species of fish harvested. Only fish measured by the creel survey clerk are reported.

CREEL SURVEY RESULTS AND DISCUSSION

SURVEY LOGISTICS
We encountered no unusual problems conducting the survey or calculating the projections contained in the report. This was the second time the DNR conducted a creel
survey on Big Lake. The last creel survey took place in 1995-96.

**GENERAL ANGLER INFORMATION**

Anglers spent 17,136 hours, or 20.5 hours per acre, fishing Big Lake during the 2021-22 season (Table 1). That was less than the Vilas County average of 33.8 hours per acre and less than the fishing effort documented during the 1995-96 creel survey (29.8 hours per acre). June was the most heavily fished month (4,011 hours), and fishing effort was lightest in February (63 hours). The creel clerks were able to conduct 658 interviews throughout the survey.

**RESULTS BY SPECIES**

**WALLEYE** (Table 2, Figure 1)

Walleye received the most fishing effort of any gamefish species during the season. Anglers spent 5,591 hours targeting Walleye. The greatest fishing effort for Walleye was in July (932 hours). February had the least amount of Walleye fishing effort (63 hours). The total catch of Walleye was 1,938 fish, with a harvest of 900. Both the highest catch (782 fish) and the highest harvest (269 fish) occurred in October. Anglers fished an estimated 3.0 hours to catch and 6.4 hours to harvest a Walleye during the survey. The mean length of harvested Walleye was 14.4 inches and the largest measured was a 22.8-inch fish.

**NORTHERN PIKE** (Table 2, Figure 2)

Fishing effort directed at Northern Pike was 411 hours during the season. Northern Pike fishing effort was greatest in September (76 hours). The total catch of Northern Pike was 79 fish, with a harvest of 15. Anglers fished an estimated 67.6 hours to catch a Northern Pike during the survey. The mean length of harvested Northern Pike was 24.9 inches and the largest measured was a 27.2-inch fish.

**MUSKELLUNGE** (Table 2, Figure 3)

Anglers spent 4,874 hours targeting Muskellunge during the season. Muskellunge fishing effort was greatest in July (1,243 hours). The total catch of Muskellunge was 221 fish and the highest catch (60 fish) occurred in July. Anglers fished an estimated 31.4 hours to catch a Muskellunge and there was no documented harvest during the survey.

**SMALLMOUTH BASS** (Table 2, Figure 4)

Fishing effort targeted at Smallmouth Bass was 5,493 hours during the season. Smallmouth Bass fishing effort was greatest in June (1,760 hours). The total catch of Smallmouth Bass was 5,502 fish, with no fish harvested. The highest catch (2,102 fish) occurred in June. Anglers fished an estimated 1.2 hours to catch a Smallmouth Bass during the survey.

**LARGEMOUTH BASS** (Table 2, Figure 5)

Fishing effort directed at Largemouth Bass was 1,936 hours during the season. Largemouth Bass fishing effort was greatest in June (718 hours). Total catch of Largemouth Bass was 1,311 fish, with a harvest of 0 fish. The highest catch (420 fish) occurred in June. Anglers fished an estimated 2.9 hours to catch a Largemouth Bass during the survey.

**PANFISH** (Table 2, Figures 6-10)

**YELLOW PERCH** received 585 hours of directed fishing effort. The total catch of Yellow Perch was 1,980 fish, with 105 harvested. The mean length of Yellow Perch harvested was 7.5 inches.

**BLUEGILL** received 1,487 hours of directed fishing effort. The total catch of Bluegill was 3,788 fish, with 651 harvested. The mean length of Bluegill harvested was 7.1 inches.

**BLACK CRAPPIE** was the most sought after panfish species during the survey. Black Crappie received 1,769 hours of directed fishing effort. Anglers caught 2,138 Black Crappie and harvested 1,331. The mean length of Black Crappie harvested was 10.7 inches.

**PUMPKINSEED** received 59 hours of directed fishing effort. Anglers caught 236 Pumpkinseed and harvested 30. The mean length of Pumpkinseed harvested was 6.5 inches.

**ROCK BASS** received 0 hours of fishing effort. However, anglers incidentally caught 622 Rock
Bass and harvested 96. The mean length of Rock Bass harvested was 6.6 inches.

ACKNOWLEDGMENTS

The DNR would like to thank all the anglers who took the time to offer information about their fishing trip to the survey clerk. Without their cooperation, the survey would not have been possible.

We also thank the Northern Highland American Legion State Forest who generously allowed the DNR to keep a boat and snowmobile on their property during this survey.

Completion of this survey was possible because of the efforts of the following fisheries management and treaty fisheries staff: John Kubisiak, Lawrence Eslinger, Joelle Underwood, Jason Halverson, Eric Brown, Bob Consolo and Evan Priebe. Creel clerks on Big Lake during the survey period were Matt Lorenzoni and Mike Rynski.

This creel report was reviewed by John Kubisiak, Lawrence Eslinger and Eric Weglietner of the DNR.

Additional copies of this report and those covering other local lakes can be obtained from the DNR Woodruff Service Center or online at: http://dnr.wisconsin.gov/topic/Fishing/north/trtycrlsrvys.html
Table 1. Sportfishing effort summary, Big Lake, 2021-22 season; compared to 1995-96 creel results, Vilas County averages, and Ceded Territory averages.

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Angler Party Interviews</th>
<th>Total Angler Hours</th>
<th>Total Angler Hours/Acre</th>
<th>1995-96 Total Angler Hours/Acre</th>
<th>Vilas County Average Hours/Acre</th>
<th>Ceded Territory Average Hours/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>96</td>
<td>2,475</td>
<td>3.0</td>
<td>4.5</td>
<td>5.2</td>
<td>4.8</td>
</tr>
<tr>
<td>June</td>
<td>129</td>
<td>4,011</td>
<td>4.8</td>
<td>6.4</td>
<td>6.7</td>
<td>6.2</td>
</tr>
<tr>
<td>July</td>
<td>118</td>
<td>3,643</td>
<td>4.4</td>
<td>6.8</td>
<td>7.1</td>
<td>6.6</td>
</tr>
<tr>
<td>August</td>
<td>91</td>
<td>2,476</td>
<td>3.0</td>
<td>4.8</td>
<td>6.2</td>
<td>5.2</td>
</tr>
<tr>
<td>September</td>
<td>120</td>
<td>2,327</td>
<td>2.8</td>
<td>3.4</td>
<td>4.1</td>
<td>3.2</td>
</tr>
<tr>
<td>October</td>
<td>90</td>
<td>1,770</td>
<td>2.1</td>
<td>3.4</td>
<td>1.9</td>
<td>1.4</td>
</tr>
<tr>
<td>December</td>
<td>5</td>
<td>191</td>
<td>0.2</td>
<td>0.2</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>January</td>
<td>6</td>
<td>181</td>
<td>0.2</td>
<td>0.1</td>
<td>0.9</td>
<td>1.7</td>
</tr>
<tr>
<td>February</td>
<td>3</td>
<td>63</td>
<td>0.1</td>
<td>0.2</td>
<td>1.0</td>
<td>1.6</td>
</tr>
<tr>
<td>March</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Summer Total</td>
<td>644</td>
<td>16,702</td>
<td>20.0</td>
<td>29.4</td>
<td>31.3</td>
<td>27.3</td>
</tr>
<tr>
<td>Winter Total</td>
<td>14</td>
<td>434</td>
<td>0.5</td>
<td>0.5</td>
<td>2.7</td>
<td>4.6</td>
</tr>
<tr>
<td>Grand Total</td>
<td>658</td>
<td>17,136</td>
<td>20.5</td>
<td>29.8</td>
<td>33.8</td>
<td>31.5</td>
</tr>
</tbody>
</table>

Note: Summer is May-October; Winter is December-March

**Number of Angler Party Interviews** is the number of groups of anglers interviewed by the creel clerk. A party is considered the members of a group who fish together in the same boat, ice shanty or from shore. The clerk fills out one interview form for each group of anglers. The number of individual anglers actually contacted by the clerk is usually much greater than the number of groups listed in this table since most groups consist of more than one angler.

**Total Angler Hours** is the estimated total number of hours that anglers spent fishing on Big Lake during each month surveyed.

**Total Angler Hours/Acre** is the total angler hours divided by the area of the lake in acres. This is useful in order to compare effort on Big Lake to other lakes.

**1995-96 Total Angler Hours/Acre** is the total angler hours divided by the area of the lake in acres. This is from the previous creel survey that took place on Big Lake.

**County Average Hours/Acre** is the average angler effort in hours per acre for county lakes that have been surveyed since 1990. This value is useful for fishing pressure comparisons with other waters.

**Ceded Territory Average Hours/Acre** is the average angler effort in hours per acre for inland lakes in the Ceded Territory that have been surveyed since 1990. This value can be used to compare Big Lake to other lakes in northern Wisconsin.
Table 2. Comparison of creel survey synopses, Big Lake, 2021-22 and 1995-96 fishing seasons.

**CREEL YEAR: 2021-22**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>DIRECTED EFFORT (Hours)</th>
<th>PERCENT OF TOTAL</th>
<th>TOTAL CATCH</th>
<th>SPECIFIC CATCH RATE (Hrs/Fish)</th>
<th>TOTAL HARVEST</th>
<th>SPECIFIC HARVEST RATE (Hrs/Fish)</th>
<th>MEAN LENGTH OF HARVESTED FISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walleye</td>
<td>5,591</td>
<td>25.2%</td>
<td>1,938</td>
<td>3.0</td>
<td>900</td>
<td>6.4</td>
<td>14.4</td>
</tr>
<tr>
<td>Northern Pike</td>
<td>411</td>
<td>1.9%</td>
<td>79</td>
<td>67.6</td>
<td>15</td>
<td>67.6</td>
<td>24.9</td>
</tr>
<tr>
<td>Muskellunge</td>
<td>4,874</td>
<td>22.0%</td>
<td>221</td>
<td>1.2</td>
<td>0</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>Smallmouth Bass</td>
<td>5,493</td>
<td>24.7%</td>
<td>1,311</td>
<td>2.9</td>
<td>0</td>
<td>*</td>
<td>**</td>
</tr>
<tr>
<td>Largemouth Bass</td>
<td>1,936</td>
<td>8.7%</td>
<td>1,980</td>
<td>1.5</td>
<td>105</td>
<td>*</td>
<td>7.5</td>
</tr>
<tr>
<td>Yellow Perch</td>
<td>585</td>
<td>2.6%</td>
<td>1,980</td>
<td>0.6</td>
<td>651</td>
<td>3.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Bluegill</td>
<td>1,487</td>
<td>6.7%</td>
<td>3,788</td>
<td>0.6</td>
<td>651</td>
<td>3.3</td>
<td>7.1</td>
</tr>
<tr>
<td>Black Crappie</td>
<td>1,769</td>
<td>8.0%</td>
<td>2,138</td>
<td>0.9</td>
<td>1,331</td>
<td>1.4</td>
<td>10.7</td>
</tr>
<tr>
<td>Pumpkinseed</td>
<td>59</td>
<td>0.3%</td>
<td>236</td>
<td>1.4</td>
<td>30</td>
<td>4.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Rock Bass</td>
<td>0</td>
<td>0.0%</td>
<td>622</td>
<td>*</td>
<td>96</td>
<td>*</td>
<td>6.6</td>
</tr>
</tbody>
</table>

**CREEL YEAR: 1995-96**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>DIRECTED EFFORT (Hours)</th>
<th>PERCENT OF TOTAL</th>
<th>TOTAL CATCH</th>
<th>SPECIFIC CATCH RATE (Hrs/Fish)</th>
<th>TOTAL HARVEST</th>
<th>SPECIFIC HARVEST RATE (Hrs/Fish)</th>
<th>MEAN LENGTH OF HARVESTED FISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walleye</td>
<td>8,931</td>
<td>28.1%</td>
<td>3,041</td>
<td>3.0</td>
<td>498</td>
<td>18.1</td>
<td>16.4</td>
</tr>
<tr>
<td>Northern Pike</td>
<td>395</td>
<td>1.2%</td>
<td>155</td>
<td>76.9</td>
<td>51</td>
<td>*</td>
<td>24.0</td>
</tr>
<tr>
<td>Muskellunge</td>
<td>13,463</td>
<td>42.3%</td>
<td>494</td>
<td>29.8</td>
<td>11</td>
<td>1,250.0</td>
<td>37.5</td>
</tr>
<tr>
<td>Smallmouth Bass</td>
<td>1,321</td>
<td>4.2%</td>
<td>229</td>
<td>9.5</td>
<td>34</td>
<td>65.8</td>
<td>14.7</td>
</tr>
<tr>
<td>Largemouth Bass</td>
<td>863</td>
<td>2.7%</td>
<td>80</td>
<td>16.6</td>
<td>20</td>
<td>79.4</td>
<td>14.5</td>
</tr>
<tr>
<td>Yellow Perch</td>
<td>2,815</td>
<td>8.9%</td>
<td>6,015</td>
<td>0.9</td>
<td>1,030</td>
<td>4.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Bluegill</td>
<td>2,017</td>
<td>6.3%</td>
<td>3,496</td>
<td>0.7</td>
<td>1,276</td>
<td>2.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Black Crappie</td>
<td>1,627</td>
<td>5.1%</td>
<td>307</td>
<td>5.8</td>
<td>232</td>
<td>7.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Pumpkinseed</td>
<td>103</td>
<td>0.3%</td>
<td>264</td>
<td>0.5</td>
<td>33</td>
<td>5.0</td>
<td>5.8</td>
</tr>
<tr>
<td>Rock Bass</td>
<td>262</td>
<td>0.8%</td>
<td>357</td>
<td>1.9</td>
<td>86</td>
<td>10.9</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Note: If a species is not shown in a table, no data was collected by the creel clerks for that species.

* Indicates that no fish of this species were caught or harvested (depending on the column) by anglers who specifically targeted this species.

** Indicates that no fish were measured by the creel clerks for this species.
Figure 1. Walleye fishing effort, catch, harvest, and length distribution, Big Lake, during 2021-22.
Figure 2. Northern Pike fishing effort, catch, harvest, and length distribution, Big Lake, during 2021-22.
Figure 3. Muskellunge fishing effort, catch and harvest, Big Lake, during 2021-22.
Figure 4. Smallmouth Bass fishing effort, catch and harvest, Big Lake, during 2021-22.
Figure 5. Largemouth Bass fishing effort, catch and harvest, Big Lake, during 2021-22.
Figure 6. Yellow Perch fishing effort, catch, harvest, and length distribution, Big Lake, during 2021-22.
Figure 7. Bluegill fishing effort, catch, harvest, and length distribution, Big Lake, during 2021-22.
Figure 8. Black Crappie fishing effort, catch, harvest and length distribution, Big Lake, during 2021-22.
Figure 9. Pumpkinseed fishing effort, catch, harvest, and length distribution, Big Lake, during 2021-22.
Figure 10. Rock Bass fishing catch, harvest and length distribution, Big Lake, during 2021-22.