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Cover Art: Steve Hilt, Minocqua, WI
Fish Graphics: Virgil Beck, Stevens Point, WI
INTRODUCTION

Fish populations can fluctuate due to natural forces (weather, predation, competition), management actions (stocking, regulations, habitat improvement), inappropriate development (habitat degradation), and harvest impacts. Wisconsin Department of Natural Resources fisheries crews regularly conduct fishery surveys on area lakes and reservoirs to gather the information needed to monitor changes, identify concerns, evaluate past management actions, and to prescribe good fishery management strategies. Netting and electrofishing surveys are used to gather data on the status of fish populations and communities (species composition, population size, reproductive success, size/age distribution, and growth rates). But the other key component of the fishery that we often need to measure is the harvest.

On many lakes in the Ceded Territory of northern Wisconsin, harvest of fish is divided between sport anglers and the six Chippewa tribes who harvest fish under rights granted by federal treaties. The tribes harvest fish mostly using a highly efficient method, spearing, during a relatively short time period in the spring. Every fish in the spear harvest is counted – a complete “census” of the harvest.

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

A creel survey is an assessment tool used to sample the fishing activities of anglers on a body of water and make projections of harvest and other fishery parameters. Creel survey clerks work on randomly-selected days and shifts, forty hours per week during the open season for gamefish from the first Saturday in May through the first Sunday in March, except during the month of November when fishing effort is low and ice conditions are often unsafe. The survey is run during daylight hours, and shift times change from month to month as day length changes.

Creel survey clerks travel their lakes using a boat or snowmobile to count numbers of anglers on a lake at predetermined times, and to interview anglers who have completed their fishing trip to collect data on what species they fished for, catch, harvest, lengths of fish harvested, marks (finclips 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 make projections of total catch and harvest of each species, catch and harvest rates, and total fishing effort, by month and for the year in total. Keep in mind that these are only projections based on the best information available, and not a complete accounting of effort, catch, and harvest. Accurate projections require that we sample a sufficient and representative portion of the angling activity on a lake. The accuracy of creel survey results, therefore, 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 moment of your time and it gives the Department valuable information needed for management of the fishery.
This report provides projections of:
1. Overall fishing pressure
2. Fishing effort directed at each species
3. Catch and harvest rates
4. Numbers of fish caught and harvested.

Also included are a physical description about Big Arbor Vitae Lake; discussion of results of the survey; and detailed summaries, by species of fishing effort, catch and harvest.

**GENERAL LAKE INFORMATION**

*Location*
Big Arbor Vitae Lake is located in Vilas County just east of the town of Arbor Vitae.

*Physical Characteristics*
Big Arbor Vitae Lake is a 1,090-acre drainage lake of high fertility with a maximum depth of 36 feet. Littoral substrate consists primarily of sand, gravel and muck. Big Arbor Vitae Lake has low to moderate transparency based on algal response to the lakes fertility.

*Seasons Surveyed*
The period referred to in this report as the 2008-fishing season ran from May 3, 2008, through March 1, 2009. The open water creel survey ran from May 3 through October 31, 2008, and the ice fishing creel survey ran from December 1, 2008, through March 1, 2009.

*Weather*
Ice-out on Big Arbor Vitae Lake was around May 2, 2008. Spring, summer and fall weather was dry. Fishable-ice formed on Big Arbor Vitae Lake in late November.

*Sportfishing Regulations*
The following seasons, daily bag limits, and length limits were in place on Big Arbor Vitae Lake during the 2008-09 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>5/03-6/20</td>
<td>Catch &amp; Release</td>
<td></td>
</tr>
<tr>
<td>Smallmouth Bass</td>
<td>6/21-3/01</td>
<td>5</td>
<td>14&quot;</td>
</tr>
<tr>
<td>Musky</td>
<td>5/24-11/30</td>
<td>1</td>
<td>34&quot;</td>
</tr>
<tr>
<td>Northern Pike</td>
<td>5/03-3/01</td>
<td>5</td>
<td>none</td>
</tr>
<tr>
<td>Walleye</td>
<td>5/03-3/01</td>
<td>3*</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 &gt; 14&quot;</td>
<td></td>
</tr>
<tr>
<td>Panfish</td>
<td>year round</td>
<td>25</td>
<td>none</td>
</tr>
<tr>
<td>Rock Bass</td>
<td>year round</td>
<td>none</td>
<td>none</td>
</tr>
</tbody>
</table>

* The statewide bag limit was 5 fish, but due to tribal declarations it was reduced on Big Arbor Vitae Lake.

**SPECIES CATCH AND HARVEST INFORMATION**

Angling information is summarized for each species (Figures 1-10) with effort and/or catch information. Information presented about species whose fishing season extends beyond March 1 should be considered minimum estimates. Each species page has up to five graphs depicting the following:

1. **PROJECTED FISHING EFFORT**
   Total calculated number of hours during each month that anglers spent fishing for a species.
2. PROJECTED SPECIFIC CATCH AND HARVEST RATES
Calculated 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.

3. PROJECTED CATCH AND HARVEST
Calculated number of fish of the indicated species caught or harvested by all anglers, regardless of targeted species.

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
Monthly largest and average length of harvested fish of a species. Only those fish measured by the creel survey clerk are reported.

CREEL SURVEY RESULTS AND DISCUSSION

Survey Logistics
The creel survey went well. We encountered no unusual problems conducting the survey or calculating the projections contained in the report. This was the fifth time the department conducted a creel survey on Big Arbor Vitae Lake. The previous surveys took place in 2005, 1998, 1993 and 1982.

General Angler Information
Anglers spent 57,790 hours or 53.0 hours per acre fishing Big Arbor Vitae Lake during the 2008 season (Table 1). That was 14.7 hours per acre less effort than the 2005-06 survey of 67.7 hours per acre, but 17.8 hours more per acre than the Vilas County average of 35.2. June was the most heavily fished month in 2008 (8.4 hours per acre). Fishing effort was lightest in October (2.3 hours per acre).

SPECIES INFORMATION

Walleye (Table 2, Figure 1)
Walleye received the most fishing pressure in Big Arbor Vitae Lake during the 2008 season. Anglers spent 21,665 hours targeting walleye. Walleye fishing effort was greatest in January (4,993 hours). October had the least amount of walleye fishing effort (402 hours).

Catch was 2,983 walleye with a harvest of 2,002 fish. Highest catch (1,227 fish) and harvest (892 fish) occurred in May. The 2008-09 survey showed an approximate 62% decrease in walleye catch and harvest compared to the 2005-06 census. Anglers fished 7.5 hours to catch and 11.1 hours to harvest a walleye during 2008 compared to 4.1 and 6.0 respectively in the 2005 survey.

The mean length of harvested walleye was 14.1 inches and the largest walleye measured was a 22.6-inch fish harvested in July.

Northern Pike (Table 2, Figure 2)
Fishing effort directed at northern pike was 812 hours during the 2008 season. Big Arbor Vitae Lake has a low density population of northern pike.

Catch was 56 northern pike with a harvest of 22 fish.

The mean length of harvested northern pike
was 24.0 inches and the largest northern pike measured was a 26.3-inch fish.

**Muskellunge** (Table 2, Figure 3)
Anglers spent 17,840 hours targeting muskellunge during the 2008 season. Muskellunge fishing effort was greatest in July (4,608 hours).

Catch was 735 muskellunge and harvest was 11 fish. Highest catch (286 fish) occurred in June. Anglers fished 27.2 hours to catch a muskellunge during 2008.

**Smallmouth Bass** (Table 2, Figure 4)
Fishing effort targeted at smallmouth bass was 849 hours during the 2008 season. Smallmouth bass fishing effort was greatest in June (306 hours).

Catch was 626 smallmouth with a harvest of 12 fish. Highest catch (177 fish) occurred in June. Anglers fished 2.6 hours to catch a smallmouth bass during 2008.

**Largemouth Bass** (Table 2, Figure 5)
Fishing effort directed at largemouth bass was 2,561 hours during the 2008 season. Largemouth bass fishing effort was greatest in August (953 hours).

Catch was 5,136 fish and harvest 16 fish. Highest catch (1,664 fish) occurred in June. Catch has increased almost five fold from the 2005 survey where 1,113 largemouth were caught. Anglers fished 1.4 hours to catch a largemouth bass during 2008 compared to 5.7 hours in 2005.

**Panfish** (Table 2, Figures 6-10)
Panfish effort was 43,675 hours during the 2008 season.

Yellow perch was the most sought after panfish during the survey. Yellow perch comprised 44% of panfish effort, 48% of catch and 57% of panfish harvest. Anglers fished 0.6 hours to catch and 1.2 hour to harvest a yellow perch during 2008. The mean length of harvested yellow perch was 8.4 inches and the largest yellow perch measured was an 11.1-inch fish harvested in February.

Anglers directed 14,949 hours fishing for bluegill. Total catch was 26,995 bluegill with a harvest of 7,855 fish. Mean length of bluegill harvested was 7.1 inches.

Other panfish caught during the 2008 survey include, black crappie (5,400 caught, 2,438 harvested), pumpkinseed and rock bass.

**ACKNOWLEDGMENTS**

Completion of this survey was possible because of the efforts of the technical staff of the Treaty Fisheries Unit and Woodruff Fisheries Management. Treaty staff responsible for ensuring completion of this survey includes Steve Kramer, Joelle Underwood, Marty Kiepke, Tim Tobias, and Jason Halverson. Dean Johnson and Jeff Blonski were the creel clerks on Big Arbor Vitae Lake during the survey period.

The Department thanks Mike and Debbie Downar who generously allowed the department to keep a boat and snowmobile on their property during this survey.

We also 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.

This creel survey report was reviewed by Mike Coshun, Steve Gilbert and Dennis Scholl of the Wisconsin Department of Natural Resources, Woodruff, Wisconsin.
Additional copies of this report and those covering other local lakes can be obtained from the Woodruff DNR. Requests should be directed to:

Mike Coshun  
Treaty Fisheries Biologist  
WI Department of Natural Resources  
8770 Hwy. J  
Woodruff, WI 54568  
E-mail: Michael.Coshun@dnr.state.wi.us
Table 1. Sportfishing effort summary, Big Arbor Vitae Lake, 2008-09 season.

<table>
<thead>
<tr>
<th>Month</th>
<th>Total Angler Hours</th>
<th>Total Angler Hours/Acre</th>
<th>Vilas County Average Hours/Acre</th>
<th>Statewide Average Hours/Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>6110</td>
<td>5.6</td>
<td>5.4</td>
<td>5.8</td>
</tr>
<tr>
<td>June</td>
<td>9203</td>
<td>8.4</td>
<td>7.0</td>
<td>6.1</td>
</tr>
<tr>
<td>July</td>
<td>9068</td>
<td>8.3</td>
<td>7.6</td>
<td>6.4</td>
</tr>
<tr>
<td>August</td>
<td>7890</td>
<td>7.2</td>
<td>6.6</td>
<td>5.4</td>
</tr>
<tr>
<td>September</td>
<td>5908</td>
<td>5.4</td>
<td>4.2</td>
<td>3.8</td>
</tr>
<tr>
<td>October</td>
<td>2455</td>
<td>2.3</td>
<td>2.0</td>
<td>1.6</td>
</tr>
<tr>
<td>December</td>
<td>2597</td>
<td>2.4</td>
<td>0.5</td>
<td>1.7</td>
</tr>
<tr>
<td>January</td>
<td>8083</td>
<td>7.4</td>
<td>0.8</td>
<td>1.5</td>
</tr>
<tr>
<td>February</td>
<td>6293</td>
<td>5.8</td>
<td>0.9</td>
<td>1.3</td>
</tr>
<tr>
<td>March</td>
<td>184</td>
<td>0.2</td>
<td>0.1</td>
<td>**</td>
</tr>
<tr>
<td>Summer Total</td>
<td>40633</td>
<td>37.3</td>
<td>32.8</td>
<td>29.1</td>
</tr>
<tr>
<td>Winter Total</td>
<td>17157</td>
<td>15.7</td>
<td>2.4</td>
<td>4.5</td>
</tr>
<tr>
<td>Grand Total</td>
<td>57790</td>
<td>53.0</td>
<td>35.2</td>
<td>33.6</td>
</tr>
</tbody>
</table>

**"Summer" is May-October; "Winter" is December-March**

**Too few lakes have been surveyed in March to give a meaningful statewide average.**

**Total Angler Hours** is the estimated total number of hours that anglers spent fishing on Big Arbor Vitae 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 if you wish to compare effort on Big Arbor Vitae Lake to other lakes.

**County Average Hours/Acre** is the average angler effort in hours per acre for county lakes that have been surveyed since 1990. This value can be useful in comparisons as well.

**Statewide Average Hours/Acre** is the average angler effort in hours per acre for inland lakes in the state surveyed between 1990 and 1995. This value can be used to compare Big Arbor Vitae Lake to other lakes statewide.
Table 2. Comparison of creel survey synopses, Big Arbor Vitae Lake, 2008-09 and 2005-06 fishing seasons.

<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>21665</td>
<td>24.79%</td>
<td>2983</td>
<td>7.5</td>
<td>2002</td>
<td>11.1</td>
<td>14.1</td>
</tr>
<tr>
<td>Northern Pike</td>
<td>812</td>
<td>0.93%</td>
<td>56</td>
<td>37.2</td>
<td>22</td>
<td>37.2</td>
<td>24.0</td>
</tr>
<tr>
<td>Muskellunge</td>
<td>17840</td>
<td>20.41%</td>
<td>735</td>
<td>27.2</td>
<td>11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smallmouth Bass</td>
<td>849</td>
<td>0.97%</td>
<td>626</td>
<td>2.6</td>
<td>12</td>
<td>149.3</td>
<td>14.9</td>
</tr>
<tr>
<td>Largemouth Bass</td>
<td>2561</td>
<td>2.93%</td>
<td>5136</td>
<td>1.4</td>
<td>16</td>
<td>357.1</td>
<td>14.4</td>
</tr>
<tr>
<td>Yellow Perch</td>
<td>19189</td>
<td>21.95%</td>
<td>34396</td>
<td>0.6</td>
<td>16212</td>
<td>1.2</td>
<td>8.4</td>
</tr>
<tr>
<td>Bluegill</td>
<td>14949</td>
<td>17.10%</td>
<td>26995</td>
<td>0.6</td>
<td>7855</td>
<td>2.0</td>
<td>7.1</td>
</tr>
<tr>
<td>Pumpkinseed</td>
<td>2365</td>
<td>2.71%</td>
<td>4770</td>
<td>0.5</td>
<td>2060</td>
<td>1.2</td>
<td>6.8</td>
</tr>
<tr>
<td>Rock Bass</td>
<td>0</td>
<td>0.00%</td>
<td>873</td>
<td>80</td>
<td>7.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black Crappie</td>
<td>7172</td>
<td>8.21%</td>
<td>5400</td>
<td>1.4</td>
<td>2438</td>
<td>3.0</td>
<td>10.7</td>
</tr>
</tbody>
</table>

* A blank cell in this column indicates that no fish of a given species were caught by anglers who specifically targeted that species.

** A blank cell in this column indicates that no fish of a given species were harvested by anglers who specifically targeted that species.

CREEL YEAR: 2005-06

<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>31686</td>
<td>27.11%</td>
<td>7916</td>
<td>4.1</td>
<td>5358</td>
<td>6.0</td>
<td>13.8</td>
</tr>
<tr>
<td>Northern Pike</td>
<td>1619</td>
<td>1.39%</td>
<td>37</td>
<td>212.0</td>
<td>29</td>
<td>212.0</td>
<td>26.4</td>
</tr>
<tr>
<td>Muskellunge</td>
<td>21427</td>
<td>18.33%</td>
<td>936</td>
<td>28.3</td>
<td>10</td>
<td>2191.0</td>
<td>40.5</td>
</tr>
<tr>
<td>Smallmouth Bass</td>
<td>866</td>
<td>0.74%</td>
<td>1136</td>
<td>4.6</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Largemouth Bass</td>
<td>2276</td>
<td>1.95%</td>
<td>1113</td>
<td>5.7</td>
<td>50</td>
<td>89.3</td>
<td>14.2</td>
</tr>
<tr>
<td>Yellow Perch</td>
<td>27863</td>
<td>23.84%</td>
<td>79629</td>
<td>0.4</td>
<td>29478</td>
<td>1.0</td>
<td>8.1</td>
</tr>
<tr>
<td>Bluegill</td>
<td>17304</td>
<td>14.80%</td>
<td>29736</td>
<td>0.7</td>
<td>8860</td>
<td>2.1</td>
<td>6.9</td>
</tr>
<tr>
<td>Pumpkinseed</td>
<td>2686</td>
<td>2.30%</td>
<td>3514</td>
<td>0.9</td>
<td>1504</td>
<td>1.9</td>
<td>6.7</td>
</tr>
<tr>
<td>Rock Bass</td>
<td>325</td>
<td>0.28%</td>
<td>1662</td>
<td>0.7</td>
<td>306</td>
<td>1.5</td>
<td>6.6</td>
</tr>
<tr>
<td>Black Crappie</td>
<td>10836</td>
<td>9.27%</td>
<td>6228</td>
<td>1.9</td>
<td>3970</td>
<td>2.8</td>
<td>9.8</td>
</tr>
</tbody>
</table>
Figure 1. Walleye sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 2. Northern pike sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 3. Muskellunge sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 4. Smallmouth bass sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 5. Largemouth bass sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 6. Yellow perch sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 7. Bluegill sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 8. Pumpkinseed sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, 2008-09 during.
Figure 9. Rock bass sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.
Figure 10. Black crappie sportfishing effort, catch, harvest, and length distribution, Big Arbor Vitae Lake, during 2008-09.