

# **POMME DE TERRE LAKE**

**2012**

## **ANNUAL REPORT**



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*The information in this report is a summary of fish population sampling, creel surveys, fisheries management activities, and other aquatic related surveys. Any questions, comments or requests to reproduce or use data contained within this report should be directed to Craig Fuller, Fisheries Management Biologist.*

## **Executive Summary**

Pomme de Terre Lake is a 7,820-acre U.S. Army Corps of Engineers (USACOE) impoundment constructed for the purpose of flood control and recreation. The construction of the dam, located in Hickory County, Missouri, near the town of Hermitage was completed in 1961. The lake impounds portions of the Pomme de Terre River and Lindley Creek that are tributaries of the Osage River system. These two watersheds combine for a total lake watershed of 391,040 acres of predominately forested (70%) and pasture and crop lands (30%). The resulting conservation pool elevation is 839 feet above mean sea level (msl) and creates 113 miles of shoreline. The maximum surface acreage is 16,100 acres at the flood pool elevation of 874 feet msl.

### **Zebra Mussels**

Zebra mussel veliger sampling was completed by MDC on June 18, 2009, at three locations: 1) mid-channel on the Pomme de Terre Arm at the 3-mile marker; 2) mid-channel on the Lindley Arm at the 3-mile marker; and 3) approximately 100 yards out in front of the intake tower on the dam. Zebra mussel veligers were detected in samples from all three locations. A coordinated effort between MDC, USACOE and MoDNR State Parks to inform lake users and the general public about the infestation and preventing the spread of zebra mussels began immediately after the discovery. The USACOE conducted zebra mussel veliger sampling in September 2010 at several locations around the lake. All samples taken in 2010 were negative for zebra mussel veligers. Based on contradictory sampling results in 2009 and 2010, MDC and USACE cooperatively conducted independent sampling in June 2011. MDC and USACE samples were sent to separate laboratories for testing. Zebra mussels were not detected in any of the 2011 samples from either agency. Additionally, there were negative results from samples collected by the USACE in September 2012. To date no adult zebra mussels have been observed or reported from Pomme de Terre Lake.

### **Habitat Enhancements**

The **brush pile/fish attractor project** continued in partnership with the USACOE. In 2010, the USACOE conducted a draw down to increase storage capacity so that a major renovation of the stilling basin below the dam could be completed. By October 1, 2010 the lake was drawn down to an elevation of 834 feet msl, five feet below normal pool elevation, the lowest elevation recorded since the lake filled in 1966. By February 25, 2011 the lake was back to the normal pool elevation of 839 feet msl, and by April 5, 2011 the pool elevation had risen to 855 feet msl, 16 feet above normal pool elevation ([Figure 1](#)). MDC took advantage of the low water conditions to improve shallow water habitat along the shoreline by hinge-cutting approximately 35 trees and installing wood pallet structures. Wood pallet structures were installed using two basic designs: “Fish Huts”, which were constructed by attaching two pallets to each other in an “A” frame design; and “Mushrooms”, which were constructed by attaching one pallet to stumps or standing timber. Examples of shallow water habitat can be seen in [Figure 2](#). In total, 253 pallets were placed at 22 sites to construct 164 structures (89 Fish Huts and 75 Mushrooms) ([Figure 3](#)). All pallets were anchored into place. The Fish Huts were anchored using rebar driven into the lake bed and Mushrooms were nailed to stumps or standing timber. All pallets

were placed at an approximate elevation of 833 to 834 feet msl, so that at normal pool they would be located in five to six feet of water. In addition to hinge cutting shoreline trees and placing wood pallet structures, approximately 125 cedar trees were cut and placed as brush piles. Some of the cedar trees were added to existing brush piles and twelve new brush piles were constructed. In February 2012, 21 large cedar tree brush piles were placed in Martin Flats and 30 in the Dam site/Overlook area using the habitat barge. In February 2013, 25 large cedar tree brush piles were placed on the Lindley arm between Nemo Park and Pittsburg Park; and 23 on the Pomme de Terre arm near Bolivar Landing. GPS coordinates were recorded for each location and used to update the interactive fish attractor maps on the MDC public web-site.

### **Angler Surveys**

A roving angler creel survey was conducted in 2010 and 2011, from March through October each year. Preliminary data analysis and summary tables from the 2010 survey have been completed. Analysis of the 2011 data has not yet been completed. A full summary report will be prepared once data analysis for both years has been completed. Preliminary data analysis indicates that anglers took more than 33,000 fishing trips on the lake in 2010. The top five fish species caught (in order of abundance) were; crappie, largemouth bass, bluegill, catfish and walleye.

### **Fishing Regulations**

The following fish species are common to the lake: largemouth and spotted bass, white and black crappie, muskellunge, white bass, walleye, channel and flathead catfishes, gizzard shad, longear and green sunfish, and bluegill.

<b><u>Species</u></b>	<b><u>Regulations</u></b>
Black bass	6 daily, 13" minimum length limit
Crappie	15 daily, 9" minimum length limit
Muskellunge	1 daily, 36" minimum length limit
Channel catfish	10 daily, no length limit
Blue catfish	5 daily, no length limit
Flathead catfish	5 daily, no length limit
White bass	15 daily, no more than 4 greater than 18"
Walleye	4 daily, 15" minimum length limit

### **Fish Population Evaluations**

***Terminology tip: Fisheries Management Professionals use standardized population parameters to evaluate and describe fish populations. To fully understand statistics contained within this report readers need to understand parameters and associated terminology contained therein. See Appendix A, for definitions of these parameters.***

#### **Black bass**

No samples were collected in 2008 or 2011 due to high water conditions. Largemouth bass electrofishing total catch rates were very high in 2012, 2010 and 2009, 275.6, 240.3 and 242.7 fish per hour, respectively. In fact, these catch rates represent two of the three highest recorded values over the past 15 years ([Figure 4](#)). Several continuous years of higher and stable water conditions during the spring spawning season have resulted in multiple strong year classes of

largemouth bass. Size structure of the largemouth bass population has been variable over the past few years with RSD(13) values ranging from 15% to 48% and RSD(15) values ranging from 4% to 28%. The RSD values for 2010 and 2009 were somewhat depressed due to extremely high numbers of fish between 9 and 13 inches. Currently, largemouth bass size structure is very good with RSD(13) and RSD(15) values equal to 48% and 28%, respectively ([Figure 5](#)). In 2009, largemouth reached 12.2 inches at age three, which is within the management objective. No age or growth data was collected for black bass in 2012. In 2012, a total of 26 spotted bass were captured representing only 3.1% of the black bass sample. Due to the relatively few numbers of spotted bass captured in the sample, no analysis was completed for the species.

## **Muskellunge**

A goal of capturing 90 adult male muskie (>20 inches) was set in the 2007 Muskellunge Species Management Plan as a statistically valid sample. A total of ten fyke nets were set the first week in April 2012 and fished for two days, resulting in a total effort of 20 net days. Water temperature had already reached 70°F and was nearly 20 degrees above optimal sampling conditions. Therefore, nets were run only two days compared to the standard four days. Despite less than favorable conditions, 23 muskies were captured for a catch rate of 1.2 fish per net-day, compared to 2.3 and 4.5 per net day in 2011 and 2010, respectively. Of the total 23 muskies captured, 12 were males. Male muskie relative weight (Wr) values have been fairly consistent over the past three years and were equal to 89%, 91% and 94%, in 2012, 2011 and 2010, respectively. About 37% of the fish were greater than the 36 inch minimum length limit, compared to 26% and 53% in 2011 and 2010, respectively. Only 5% were greater than 40 inches, compared to 11% in 2011 and 22% in 2010 ([Figure 6](#)).

A total of 8,019, 12 – 14 inch muskies were stocked into Pomme de Terre Lake in October 2008, which was the first of the prescribed pulse stockings that are scheduled to occur every sixth year as identified in the 2007 Muskie Management Plan. The targeted stocking number for the years 2009 – 2013 is 4,000 each year. In September 2012, a total of 4,635 12 – 14 inch muskies were stocked into Pomme de Terre Lake; approximately 2,355 at Wheatland Park and 2,280 at Nemo Park.

Muskie are not native to Missouri. Being located at more southern latitudes than their native range, muskies in Missouri are subjected to regional environmental stressors. During summer, it is possible that combinations of thermal stratification and high water temperatures constrain or eliminate availability of quality muskie habitat. Previous studies have found that during the summer in lakes at southern latitudes, adult muskies typically seek water temperatures of about 78°F. Adult muskies prefer progressively lower water temperatures as their age and size increase. Thermal stratification occurs in Pomme de Terre Lake throughout the summer; a strong thermocline develops at approximately 12 – 15 feet by June. Water temperatures are at their highest levels during late-June and persist through mid-September, and dissolved oxygen is often insufficient at depths where temperatures are optimal or preferred by muskie. Since the muskie's upper lethal limit is near 86°F, these conditions potentially create a thermally stressful environment for Pomme de Terre Lake muskies. This year, in an effort to collect information on regional environmental stressors that may play a role in limiting factors to muskie management potential in Missouri, we have collected oxygen and temperature data during June, July, August and September from all five lakes managed for muskies. Although data from each lake is slightly different, the concern is where oxygen levels are suitable to sustain life (>4 mg/L) the temperatures are warmer than optimal conditions and in some cases high enough to be stressful (> 80°F). Oxygen/temperature data collected in July from Pomme de Terre Lake can be seen in [Figure 7](#).

## **Crappie**

Crappie are typically sampled with trap nets around the third week of October. Due to the drawdown of the lake and extremely low water conditions throughout the month of October there was no crappie sample completed in 2010.

In 2012, information to assess the crappie population was gathered by setting 20 trap nets for three days for a total effort of 59 trap net days. A total of 1,459 crappie were captured, which equates to a total crappie catch rate of 24.7 fish per net day. During the period 2003 – 2011, total crappie catch rates range from 12.3 – 39.5 fish per net day ([Figure 8](#)).

Black crappie comprised the majority of the crappie sampled from 2003 – 2008, ranging from 68% to 97% of all crappie captured. In 2009, black crappie only accounted for 16% of the annual fall trap net sample. In 2012 black crappie accounted for 45% of the sample. Black crappie total catch rate was 11.1 fish per net day in 2012, compared to 17.5 and 6.1 fish per net day in 2011 and 2009, respectively. Size structure changed dramatically compared to previous years. In 2012, RSD(9) increased to 85% and RSD(12) was 1% ([Figure 9](#)). Age and growth analysis was completed using scales collected during the sample. Black crappie exhibited fairly good growth and reached 8.6 inches at age 3 in 2012.

White crappie dominated the fall 2012 crappie trap net sample by comprising 55% of the sample. White crappie total catch rate was 13.6 fish per net day in 2012, compared to 19.9 and 33.3 fish per net day in 2011 and 2009, respectively. Compared to previous years, white crappie size structure is fairly consistent. In 2012, RSD(9) was 48% compared to 49% and 14% in 2011 and 2009, respectively. The depressed RSD(9) value for 2009 is reflective of the large number of white crappie caught in the 6.5 – 8.5 inch size range ([Figure 10](#)). White crappie exhibited fairly good growth and reached 9.3 inches at age 3 in 2012.

## **Walleye**

The Pomme de Terre Lake walleye population is assessed by sampling in the spring using electrofishing gear within the lake near the dam and in the lake's two main tributaries (Pomme de Terre River and Lindley Creek). In 2012 within the lake, the total walleye catch rate was 68.0 fish per hour, compared to 137.0 and 43.4 fish per hour in 2011 and 2010, respectively. Walleye size structure within the lake is good with RSD(20) values ranging from 42% to 53% over the last three years ([Figure 11](#)).

In 2012 within the tributaries, total walleye catch rate was 45.0 fish per hour, compared to 73.2 and 17.6 fish per hour in 2011 and 2010, respectively. Overall, catch rates in the tributaries seem to be more variable when compared to those of the lake sites, probably due to greater fluctuations of water conditions. Size structure is also more variable than that of the lake sites, with RSD(20) values ranging from 64% to 81% ([Figure 12](#)). In accordance with Missouri's Walleye Management Plan, walleye are stocked into Pomme de Terre Lake if surplus are available (up to 47,000 per year). No surplus walleye were available; therefore, none were stocked into Pomme de Terre Lake in 2012.

## **White Bass**

Currently, there is no standardized sampling regime to collect information or to assess the white bass population in Pomme de Terre Lake. In 2009, there was a documented die-off of white bass during November. Total numbers of dead white bass observed ranged anywhere from half-a-

dozen to a couple hundred, depending on the report. Throughout the event, no other species appeared to be dying. The dead white bass that were observed had no noticeable sores, fungus or bacterial infection. Assuming that white bass were successful at producing above average year classes of young in 2007 and 2008 given the sustained high water levels during spawning, it may be possible that the die-off was simply a natural population adjustment. In summary, the white bass die-off appeared to take place from November 17 through November 27, 2009. It is undetermined to the extent of impact this event had on the white bass population or anglers. However, preliminary data from the 2010 creel survey indicates that a total of 37 anglers expended 51.5 hours of effort specifically fishing for white bass. Unfortunately, 29 of the 37 anglers did not catch any white bass; the other eight anglers collectively only caught nine white bass in total, one of which was harvested.

**Activities planned for 2013 include:**

- 1) Continue habitat improvement projects in cooperation with USACOE and Muskies Inc.
- 2) Collect population data for walleye, muskie, black bass and crappie in a standardized fashion to assess population conditions and trends.
- 3) Complete a summary report of the angler creel survey conducted in 2010 and 2011.
- 4) Stock 4,000 muskies, as prescribed in the Missouri Muskie Plan that was approved December 1, 2007.
- 5) Stock 47,000 surplus fingerling walleye, as prescribed in Table 1 of the “Missouri’s Walleye Management Plan 2010 – 2016”.
- 6) Continue to inform the public about the negative impacts of invasive species, encourage the use of preventative measures, and discourage the introduction of non-native species into Pomme de Terre Lake and its tributaries.
- 7) Continue to promote citizen and citizen group involvement to correct watershed and lake water quality issues.

### USGS 06921325 Pomme de Terre Lake near Hermitage, MO

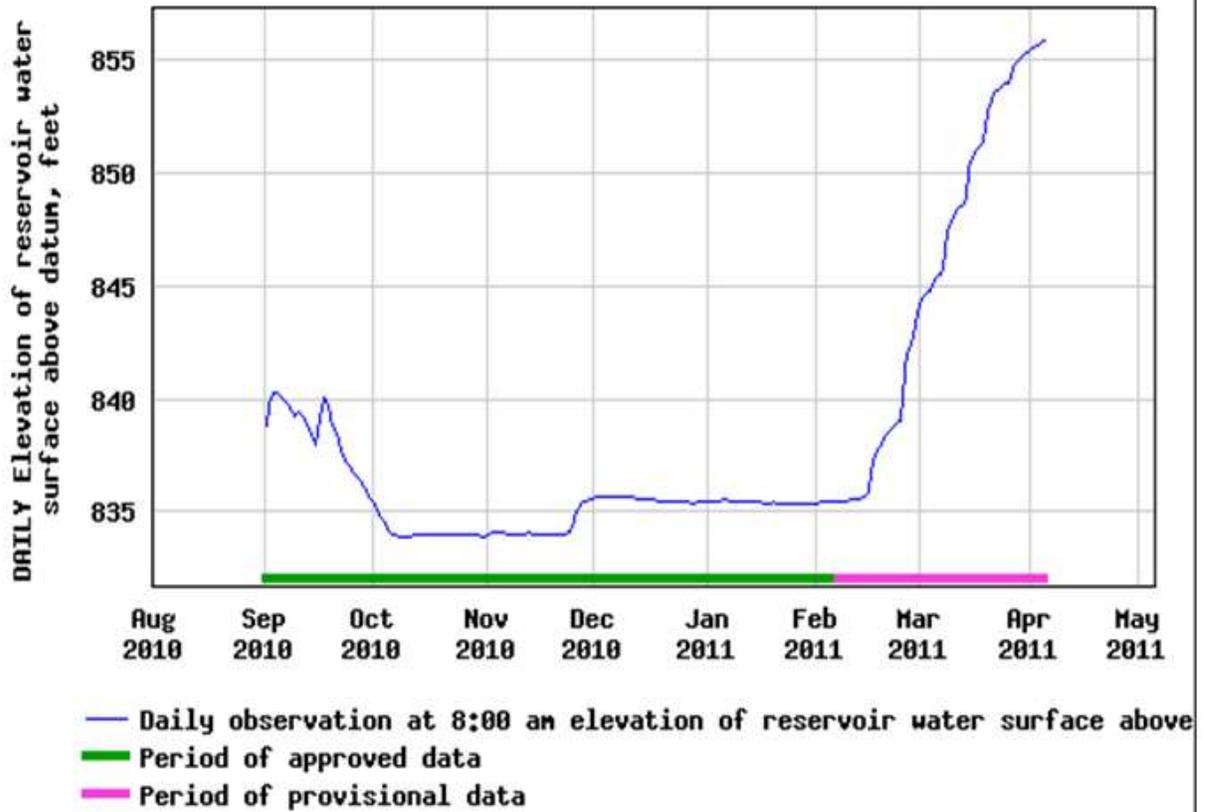


Figure 1. Pomme de Terre lake elevation; September 1, 2010 through April 7, 2011.

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**Hinge-Cut Shoreline Tree**



**Wood Pallet – “Mushroom”**



**Wood Pallet – “Fish Hut”**

**Figure 2. Examples of shallow water habitat.**

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**Figure 3. Shallow water wood pallet habitat sites.**

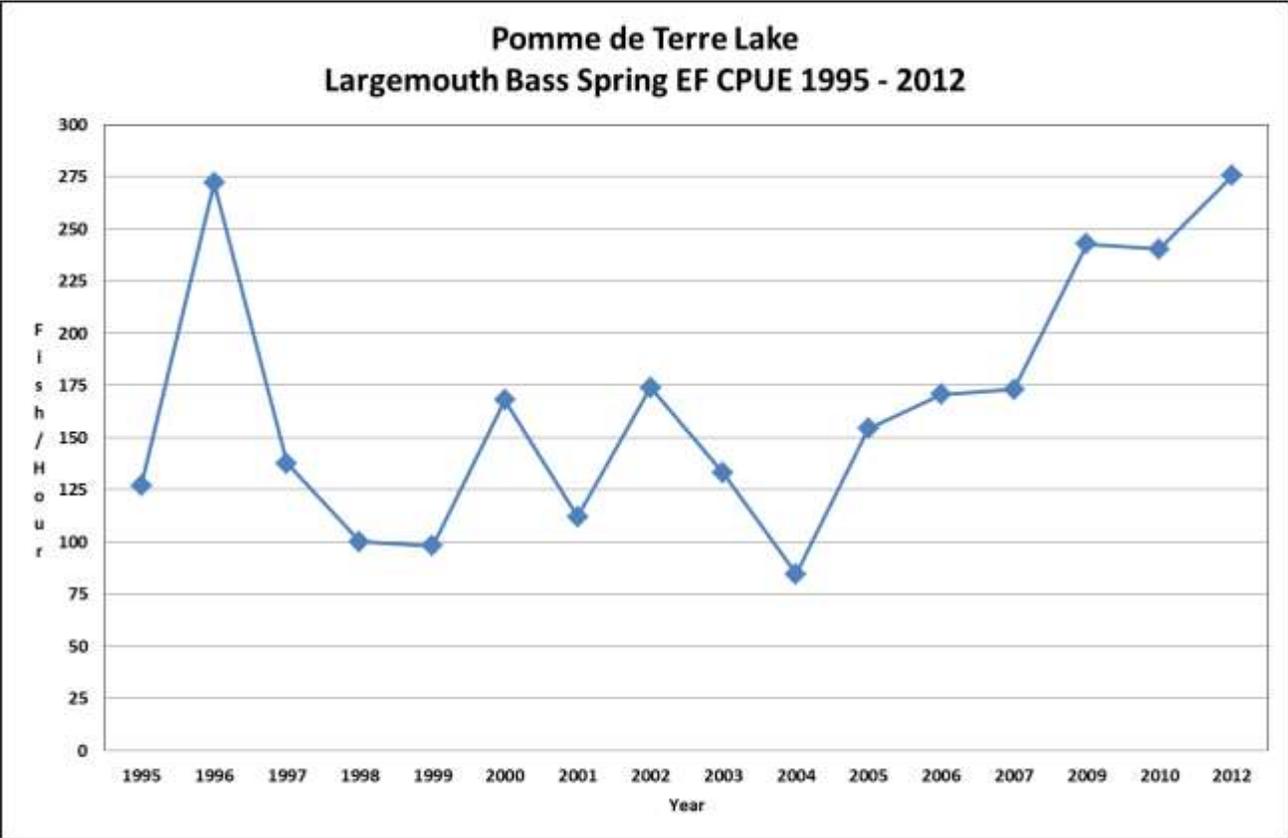
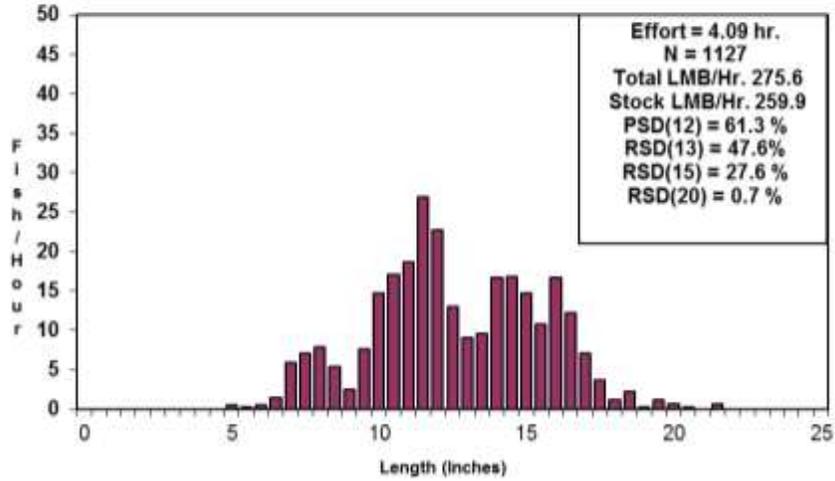


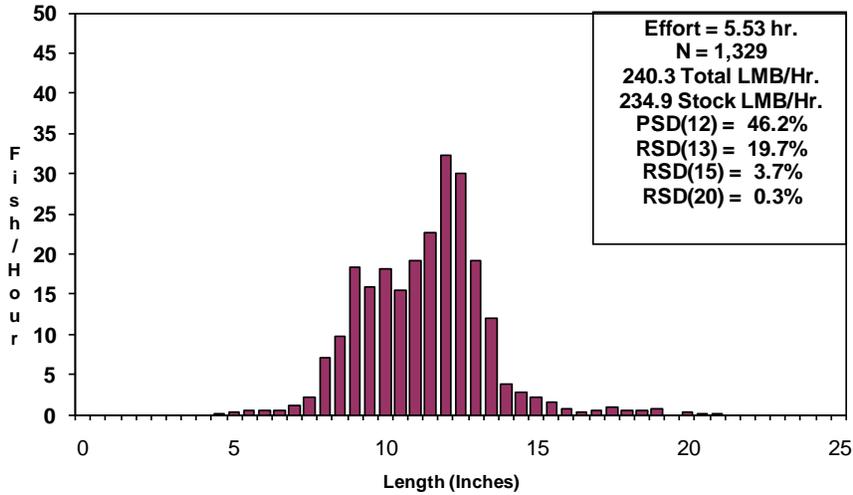
Figure 4. Largemouth bass total catch rate 1995 – 2012.

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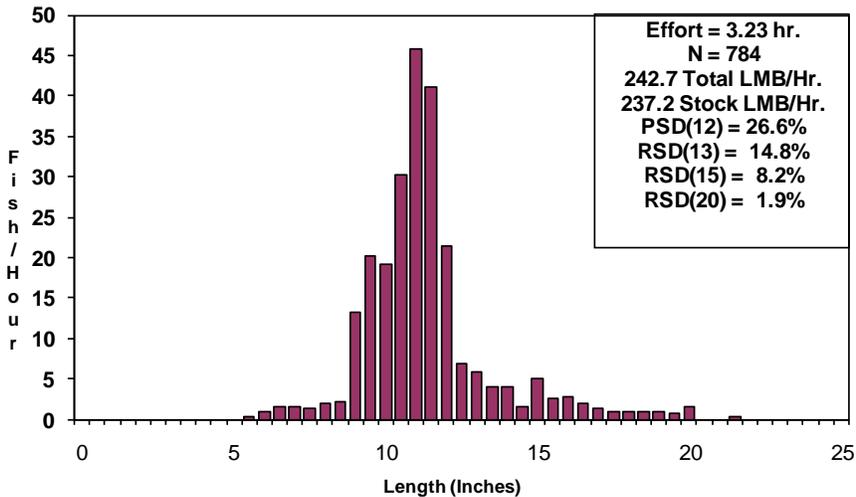
**Pomme de Terre - Electrofishing  
Largemouth bass - Spring 2012**



**Pomme de Terre - Electrofishing  
Largemouth bass - Spring 2010**



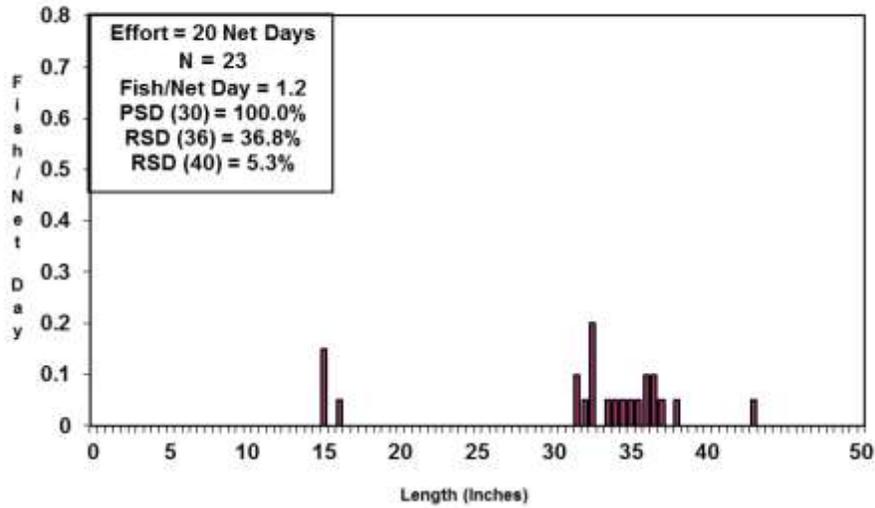
**Pomme de Terre - Electrofishing  
Largemouth bass - Spring 2009**



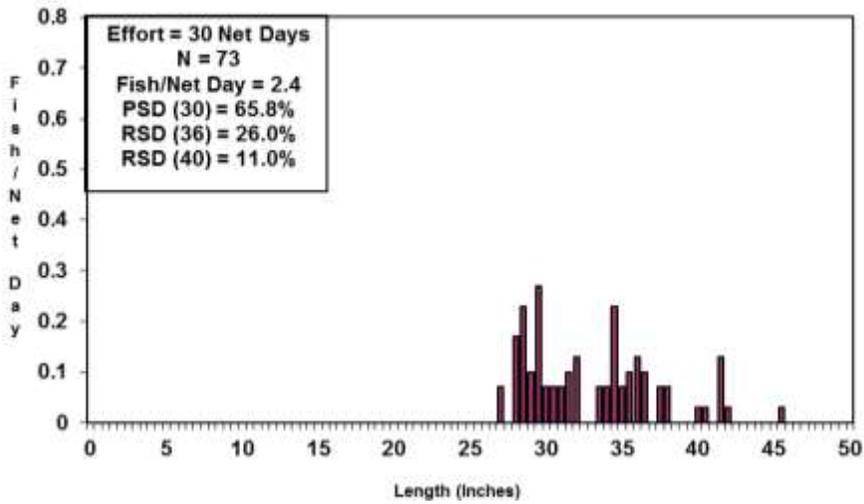
**Figure 5. Pomme de Terre Lake - largemouth bass length frequencies 2009 – 2012.**

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Pomme de Terre - Fyke Net  
Muskie - Spring 2012



Pomme de Terre - Fyke Net  
Muskie - Spring 2011



Pomme de Terre - Fyke Net  
Muskie - Spring 2010

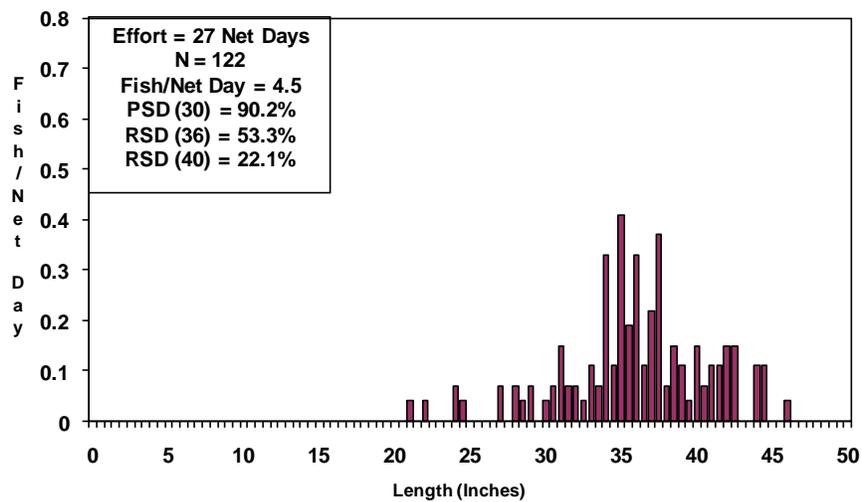
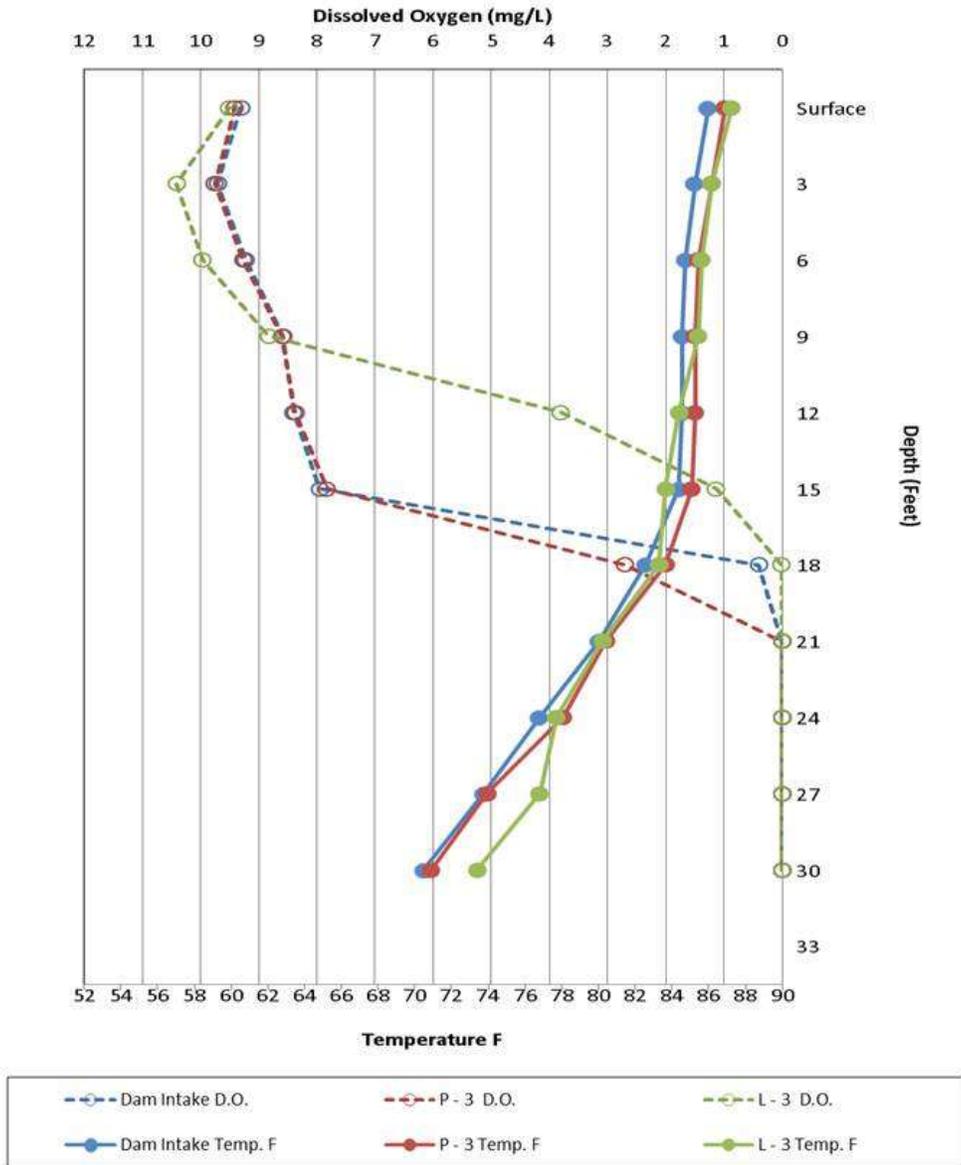


Figure 6. Pomme de Terre Lake – muskie length frequencies 2010 – 2012.

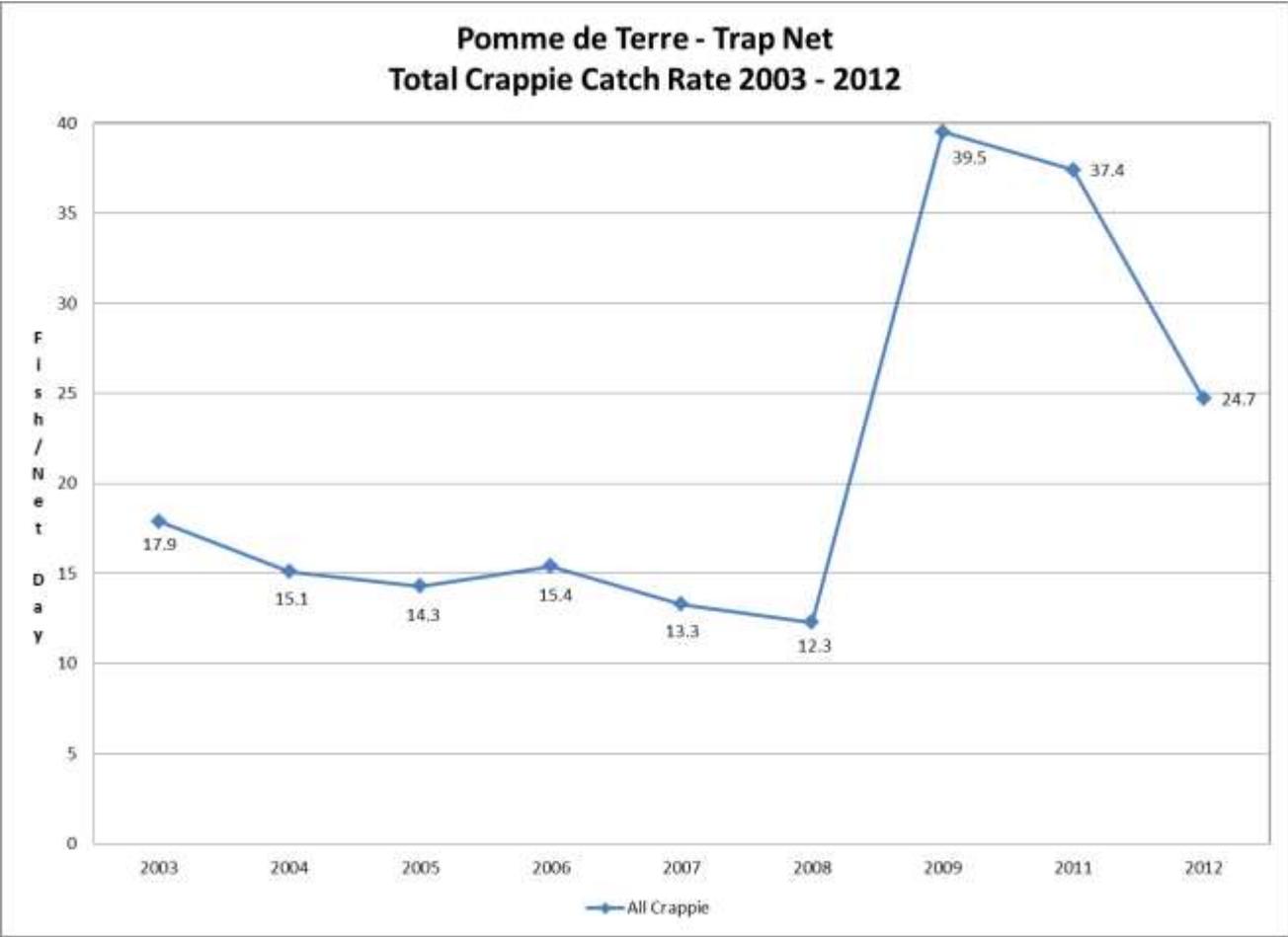
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## Pomme de Terre Lake Oxygen/Temperature Profile (7/11/12)



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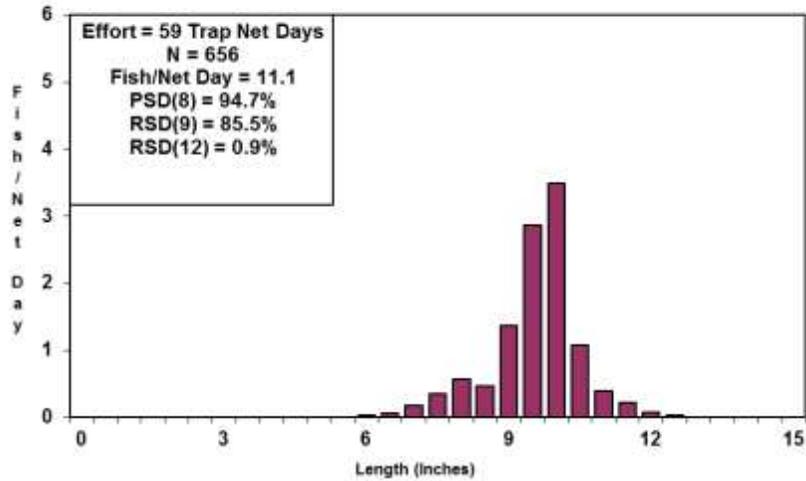
Figure 7. Oxygen/temperature data collected on July 11, 2012.



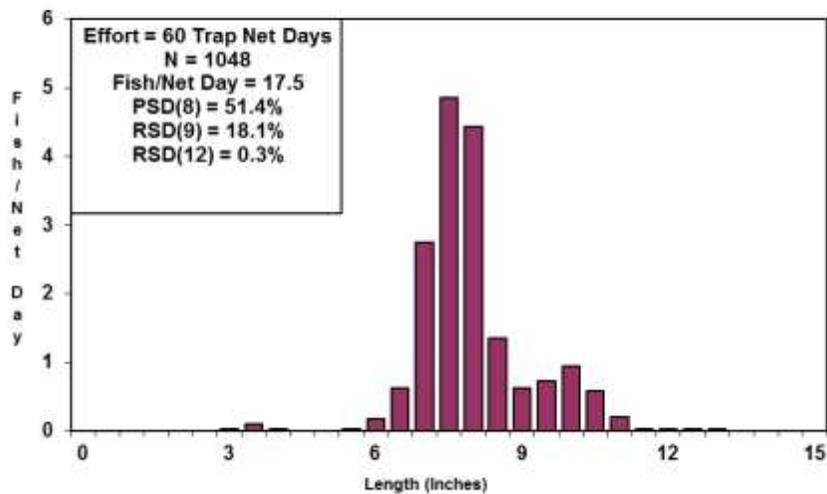
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**Figure 8. Pomme de Terre Lake – total crappie catch rate 2003 – 2012.**

Pomme de Terre - Trap Net  
Black Crappie - Fall 2012



Pomme de Terre - Trap Net  
Black Crappie - Fall 2011



Pomme de Terre - Trap Net  
Black Crappie - Fall 2009

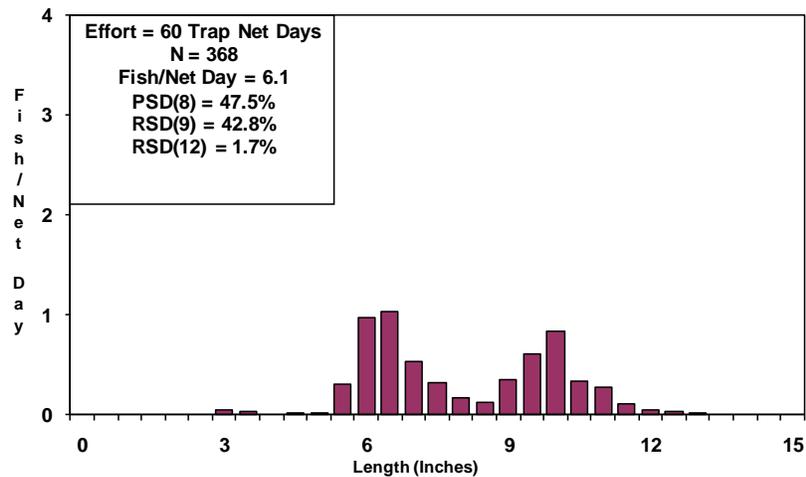
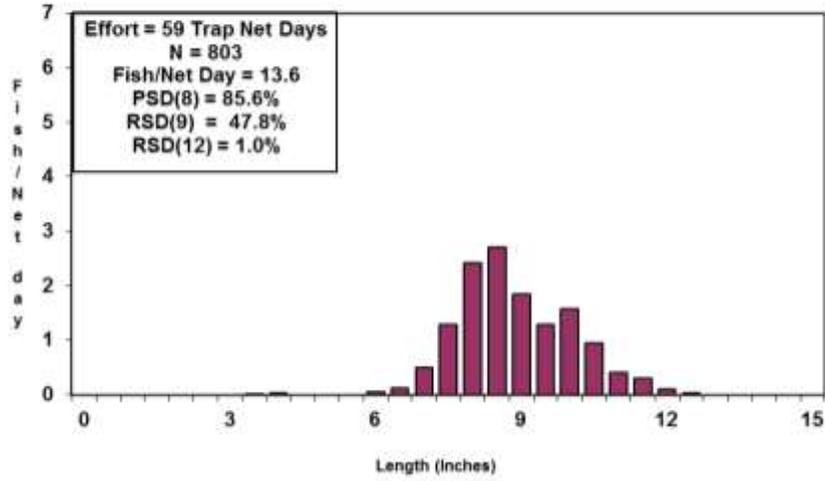


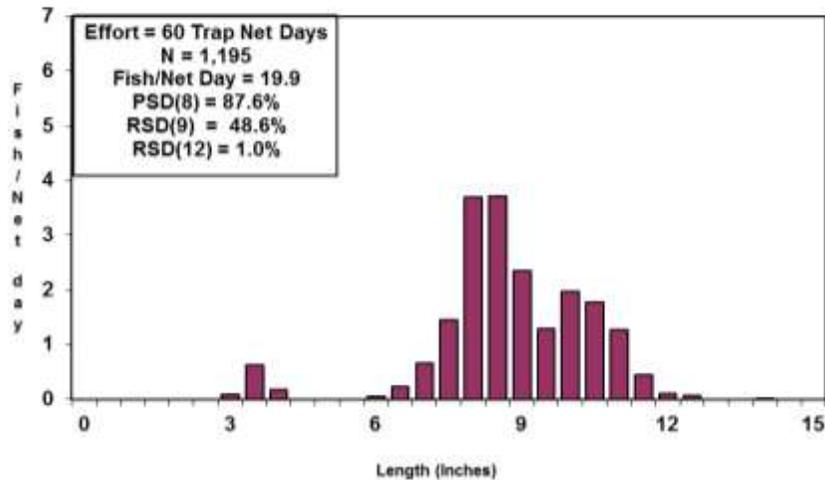
Figure 9. Pomme de Terre Lake - black crappie length frequencies 2009 – 2012.

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Pomme de Terre - Trap Net  
White Crappie - Fall 2012



Pomme de Terre - Trap Net  
White Crappie - Fall 2011



Pomme de Terre - Trap Net  
White Crappie - Fall 2009

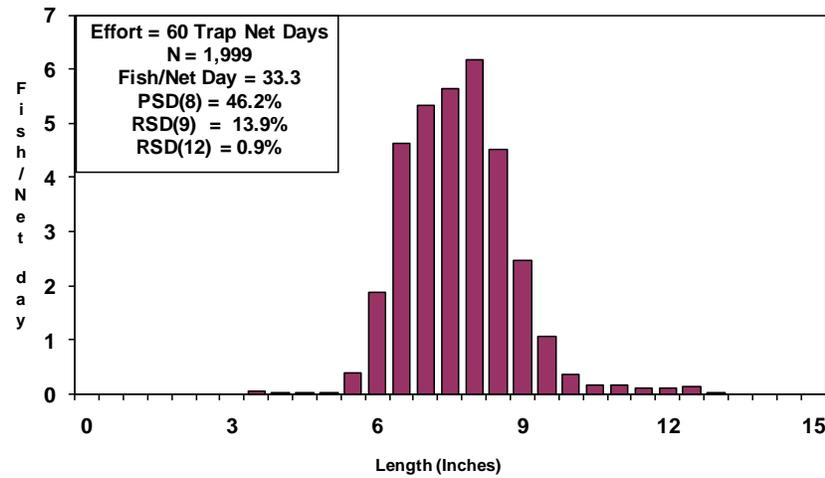
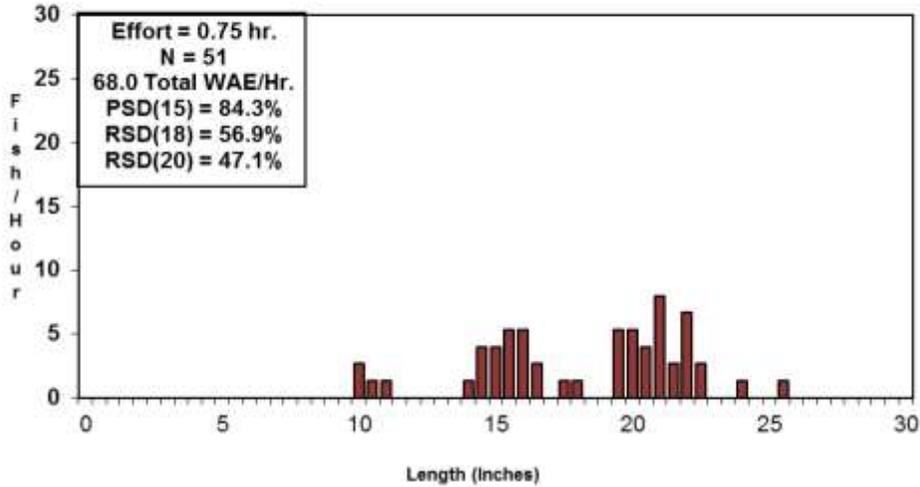


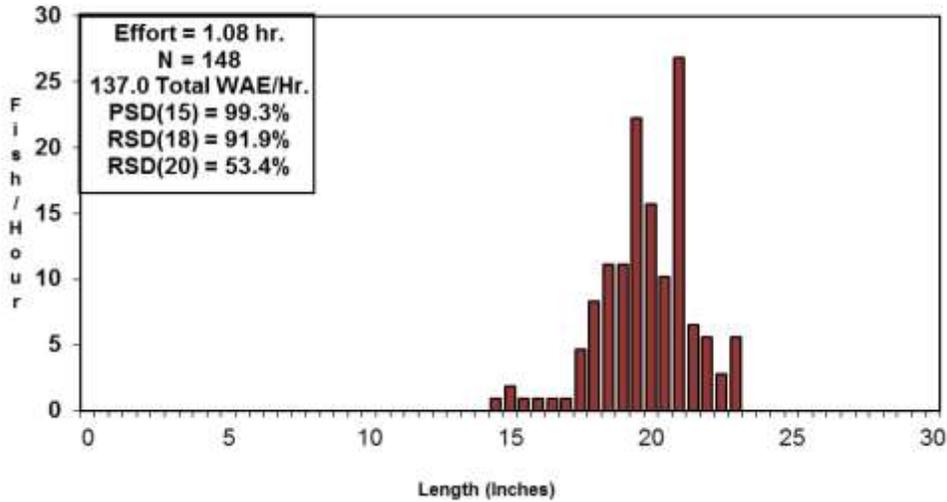
Figure 10. Pomme de Terre Lake - white crappie length frequencies 2009 – 2012.

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Pomme de Terre Lake - Electrofishing  
Walleye - Spring 2012



Pomme de Terre Lake - Electrofishing  
Walleye - Spring 2011



Pomme de Terre Lake - Electrofishing  
Walleye - Spring 2010

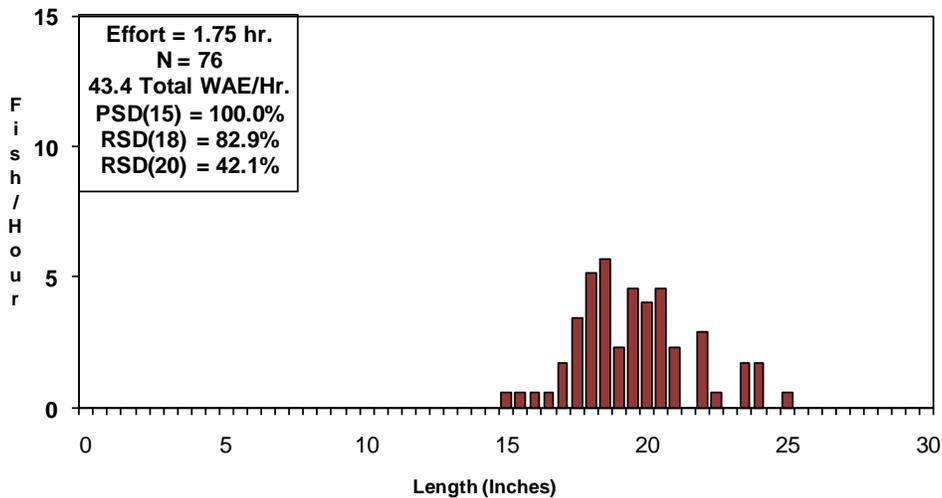
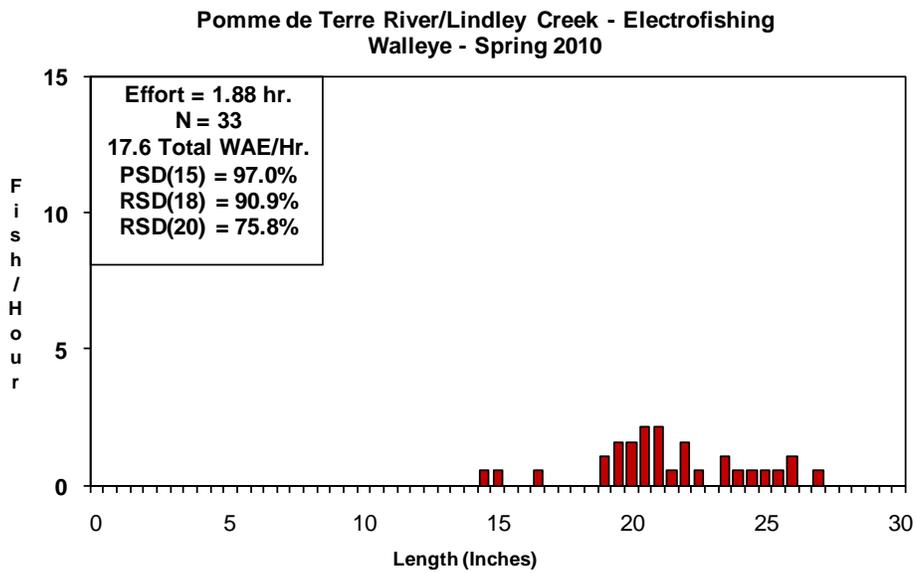
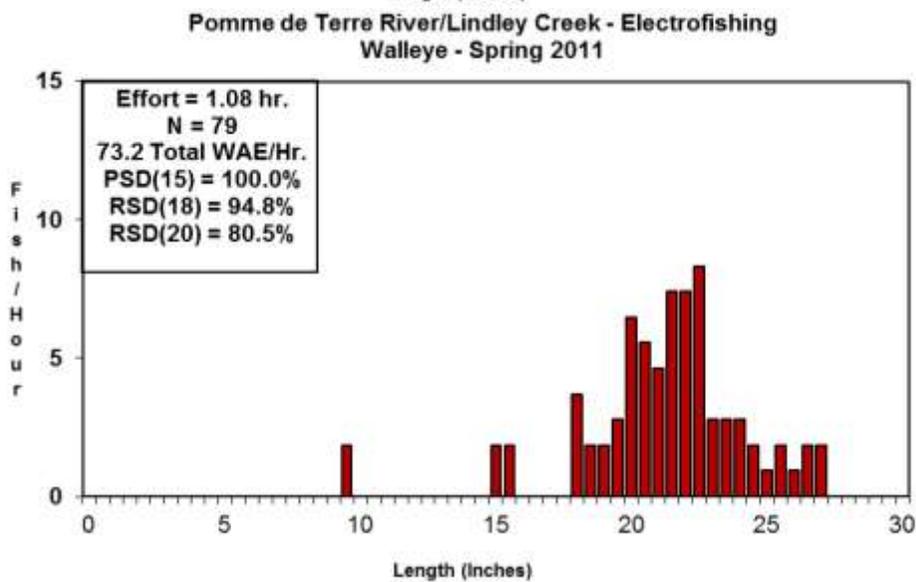
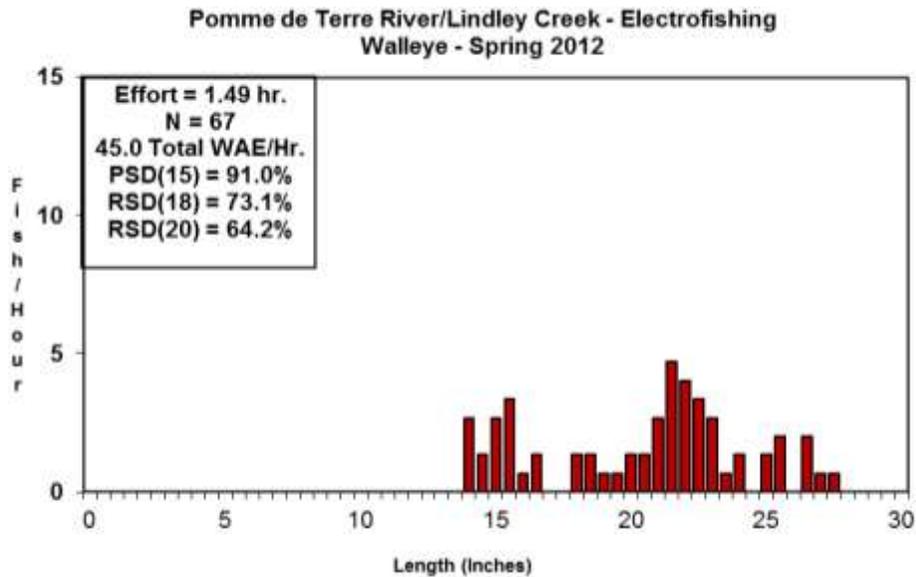


Figure 11. Pomme de Terre Lake - walleye length frequencies 2010 – 2012.

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**Figure 12. Pomme de Terre tributaries – walleye length frequencies 2010 – 2012.**

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## Appendix A:

### FISH POPULATION PARAMETERS

#### Largemouth Bass

PSD(12) – The percentage of largemouth bass  $\geq 8''$  that are  $\geq 12''$ .

The objective range is 40-60%.

RSD(13) – The percentage of largemouth bass  $\geq 8''$  that are  $\geq 13''$ .

The objective range is 20 – 40%.

RSD(15) – The percentage of largemouth bass  $\geq 8''$  that are  $\geq 15''$ .

There is no objective set for this parameter.

RSD(20) – The percentage of largemouth bass  $\geq 8''$  that are  $\geq 20''$ .

There is no objective set for this parameter.

#### Muskellunge

PSD(30) – The percentage of muskellunge  $\geq 20''$  that are  $\geq 30''$ .

The objective range is 60-80%.

RSD(36) – The percentage of muskellunge  $\geq 20''$  that are  $\geq 38''$ .

The objective range is 10 – 20%.

RSD(40) – The percentage of muskellunge  $\geq 20''$  that are  $\geq 40''$ .

There is no objective set for this parameter.

Wr (relative weight) – An index of the weight:length relationship. A Wr value of 100 represents a weight:length relation at the upper 75<sup>th</sup> percentile from all populations of a species sampled.

#### Crappie

PSD(8) – The percentage of crappie  $\geq 5''$  that are  $\geq 8''$ .

The objective range is 50 – 70%.

RSD(9) – The percentage of crappie  $\geq 5''$  that are  $\geq 9''$ .

The objective range is 20 – 40%.

#### Walleye

PSD(1)5 – The percentage of walleye  $\geq 10''$  that are  $\geq 15''$ .

The objective range is 60-80%.

RSD(2)0 – The percentage of walleye  $\geq 10''$  that are  $\geq 20''$ .

The objective range is 10-20%.