

POMME DE TERRE LAKE

2015

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

On December 10, 2014 during routine dock permit inspections the USACE project staff noticed a new dock located at Bisbee Acres on the Lindley Arm of the lake. The dock owner had purchased a used dock from Lake of the Ozarks and it was put into Pomme de Terre Lake the day prior to the permit inspection. The USACE ordered the dock owner to pull the dock out of the lake immediately. After removal, USACE project staff inspected the dock and found hundreds of live zebra mussels attached to the dock. An eradication plan was developed to treat the potential infestation site and treatments were completed in March, 2015. The treatment zone was one surface acre (3 acre/feet) in size that targeted the Bisbee Acres boat ramp and dock mooring site. Two separate treatments were completed within 14 days of each other using copper sulfate (6.0 ppm) and potassium chloride (7.5 ppm). The treatment site and several sites immediately downstream will be monitored over the next couple of years in an effort to detect any adult zebra mussels.

Habitat Enhancements

The brush pile/fish attractor project continues in partnership with the USACOE. In March 2015, 15 large cedar tree brush piles were placed on the Pomme Arm between Martin Flats and Wheatland Flats; and 17 on the Lindley Arm in the Nemo area using the habitat barge. 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. A full summary report will be completed in 2016, including a historical perspective that will include creel data dating back to 1983. Preliminary data analysis indicates that anglers took more than 17,000 and 7,000 fishing trips on the lake in 2010 and 2011, respectively. The estimated catch rate for bass was 1.3 and 1.2 bass per hour of fishing in 2010 and 2011, respectively. For crappie, the estimated catch rate was 2.8 and 3.1 fish per hour of fishing in 2010 and 2011, respectively. Also interesting to note was that the percent of legal size bass released was 88% and 73% in 2010 and 2011, respectively. Whereas, the percent of legal size crappie released was only 2% during both years. Also for both years, the average size crappie harvested was 10.1 inches.

Fishing Regulations

The following fish species are common to the lake: Largemouth and Spotted Bass, White and Black Crappie, Muskie, White Bass, Walleye, Channel and Flathead Catfishes, Gizzard Shad, Longear, Green Sunfish, and Bluegill.

| <u>Species</u> | <u>Regulations</u> |
|------------------|---|
| 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, 2011 or 2013 due to high water conditions. Largemouth Bass electrofishing catch rates continue to remain very high; in 2015, 2014 and 2012 total catch rate was 219, 208 and 276 fish per hour, respectively. This has led to five continuous samples where total catch rate has been greater than 200 fish per hour ([Figure 1](#)). 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 20% to 48% and RSD(15) values ranging from 4% to 28%. The RSD values for 2010 were somewhat depressed due to extremely high numbers of fish between 11 and 13 inches. In 2015, Largemouth Bass size structure was good with RSD (13) and RSD (15) values equal to 40% and 17%, respectively ([Figure 2](#)). No age or growth data was collected for black bass in 2015. In 2009, Largemouth Bass reached 12.2 inches at age three, which is within the management objective. In 2015, a total of 41 Spotted Bass were captured representing only 4.2% 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 Muskie Species Management Plan as a statistically valid sample. A total of ten fyke nets were set the second week in April 2015 and fished for two days, resulting in a total effort of 20 net days. Water temperature was 53°F and lake elevation was 841 msl, making for optimal sampling conditions. A total of 203 Muskies were captured for a catch rate of 10.2 fish per net day, compared to 5.4 and 7.0 per net day in 2014 and 2013, respectively. Of the total 203 Muskies captured, 128 were males. Body condition for male Muskies was good, average relative weight (Wr) value was 93%. About 36% of the fish were greater than the 36- inch minimum length limit, compared to 31% and 25% in 2014 and 2013, respectively. There were 14% greater than 40 inches, compared to 5% in 2014 and 3% in 2013 ([Figure 3](#)).

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 scheduled to occur every sixth year as identified in the 2007 Muskie Management Plan. The targeted stocking number for the years 2009 – 2013 was 4,000 each year. Since 2008, Missouri has received Muskie fingerlings from Spirit Lake Fish Hatchery in Iowa. Those fingerlings typically

arrive in MDC's hatchery system in early summer and are grown out to 12-14 inches before being stocked into program lakes each fall. Unfortunately, Iowa was not able to provide any Muskie fingerlings to Missouri in 2013 due to poor hatchery survival. While MDC staff tried to acquire Muskie fingerlings from neighboring state agencies, many of those states also experienced poor Muskie production in 2013. Fortunately, we received a limited number of Muskie fingerlings from Indiana. The Muskie fingerlings averaged 10.3 inches in length at stocking. In November 2013, a total of 1,468 Muskies were stocked into Pomme de Terre Lake; approximately 734 at Wheatland Park and 734 at Nemo Park. The second prescribed pulse stocking occurred in 2014. A total of 8,000, 12-14 inch Muskies were stocked between Wheatland Park, Pittsburg Area and Nemo Park in October 2014. In 2015 a total of 4,702, 12-14 inch Muskies were stocked at Wheatland Park and 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. 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 since 2012. 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 August of 2014 and 2015 from Pomme de Terre Lake can be seen in [Figure 4](#). Data collected from August of 2015 appears to be substantially different than data from August of 2014. The difference is likely due to sustained high lake levels throughout the months of July and August of 2015 ([Figure 4a](#)) coupled with the high inflow of nutrients from excessive rainfall in early July. This situation resulted in extremely low dissolved oxygen levels in the upper parts of the lake, particularly on the Pomme de Terre Arm. In August of 2015, dissolved oxygen levels were less than 3 mg/L at the surface and declined with depth.

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, no crappie sample was completed in 2010.

In 2015, information to assess the crappie population was gathered by setting 20 trap nets for three days resulting in a total effort of 59 trap net days. A total of 1,555 crappie were captured, which equates to a total crappie catch rate of 26.4 fish per net day. During the period 2003-2014, total crappie catch rates range from 12.3-39.5 fish per net day ([Figure 5](#)).

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 2015 Black Crappie accounted for 36.5% of the sample. Black Crappie total catch rate was 9.6 fish per net day in 2015, compared to 5.1 and 8.3 fish per net day in 2014 and 2013, respectively. Size structure remains good with RSD(9) equal to 67% and RSD(12) equal to 7.8% in 2015 ([Figure 6](#)). An amazing number of young of the year (3-4 inches) were captured this year at a rate of 5.9 fish per net day. In 2012, 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.

White Crappie dominated the fall 2015 crappie trap net sample comprising 63.5% of the total crappie catch. White Crappie total catch rate was 16.7 fish per net day in 2015, compared to 9.5 and 29.8 fish per net day in 2014 and 2013, respectively. Size structure remains good with RSD(9) equal to 53.7% and RSD(12) equal to 3.7% in 2015 ([Figure 7](#)). Although not as numerous as Black Crappie, a relatively high number of White Crappie young of the year were captured (1.3 fish per net day). 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). Due to high water conditions, Walleye sampling was not completed in 2013. In 2014, the lake site was not sampled due to unusually cool water temperatures and poor weather conditions during the optimal sampling time frame. In 2015 within the lake, the total Walleye catch rate was 66.7 fish per hour, compared to 68.0 and 137.0 fish per hour in 2012 and 2011, respectively. Walleye size structure within the lake is good with RSD(20) values ranging from 22.6% to 53.4% during 2011 through 2015 ([Figure 8](#)).

In 2015 within the tributaries, total Walleye catch rate was 30.4 fish per hour, compared to 38.2 and 44.9 fish per hour in 2014 and 2012, 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 48% to 64% during the period 2012 through 2015 ([Figure 9](#)). 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). Fortunately, surplus Walleye have been available five out of the last six years (2010 – 2015). In 2012, no surplus was available; therefore, no Walleye were stocked.

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. Data from the 2010 and 2011 creel survey suggests that the die-off had a significant impact on the White Bass population and anglers. Very few White Bass were reportedly caught throughout the two year creel survey. Fortunately, White Bass seem to be making a recovery. By the end of 2013, anglers started reporting catching greater numbers of White Bass. Additionally, several anglers were observed catching their limit of White Bass on the Pomme Arm near the lake boundary during the Walleye sample in March 2014. In 2015, numerous White Bass were captured as incidental catch during the fall crappie trap netting survey.

Activities planned for 2016 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 Muskie at a rate of 5,000 annually.

- 5) Stock 47,000 surplus fingerling Walleye, as prescribed in Table 1 of the “Missouri’s Walleye Management Plan 2010-2016”.
- 6) Conduct adult Zebra Mussel sampling, with concentrated effort around the Bisbee Acres area on the Lindley Arm.
- 7) 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.

Pomme de Terre Lake Largemouth Bass Spring EF CPUE 1995 - 2015

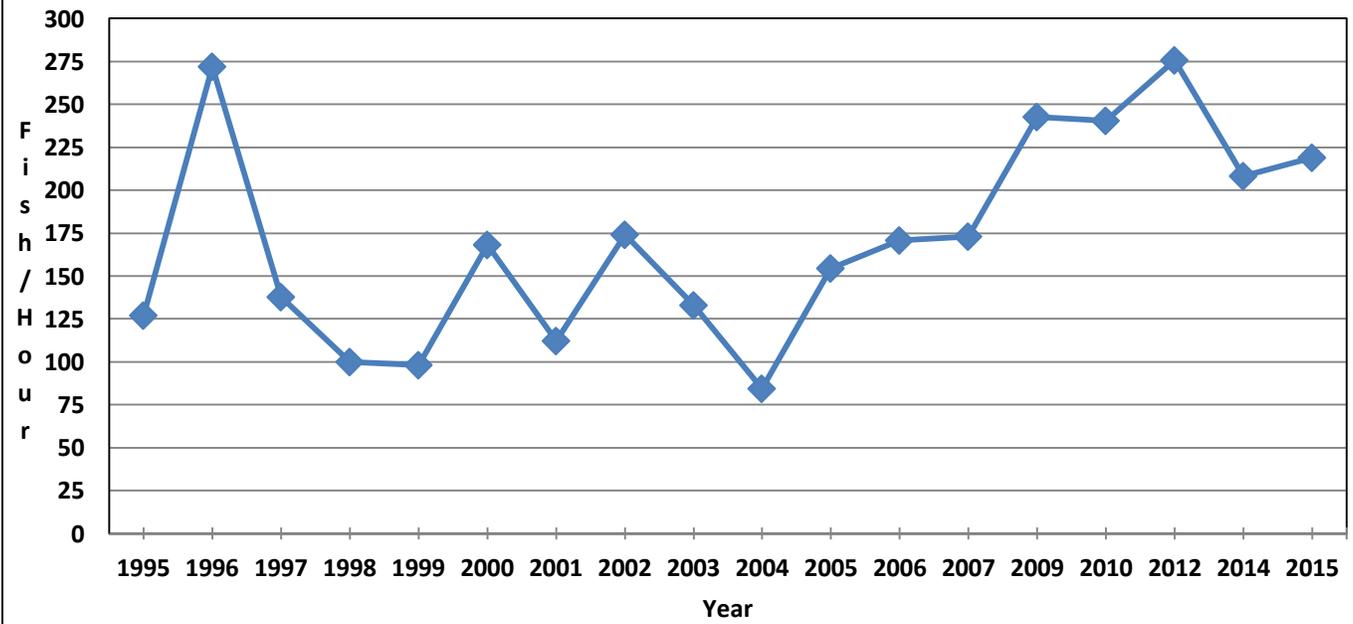
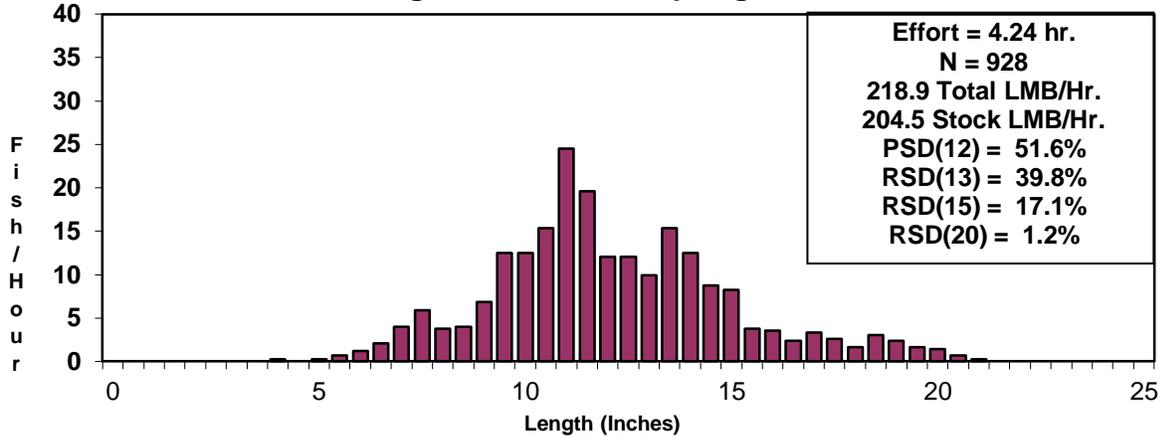


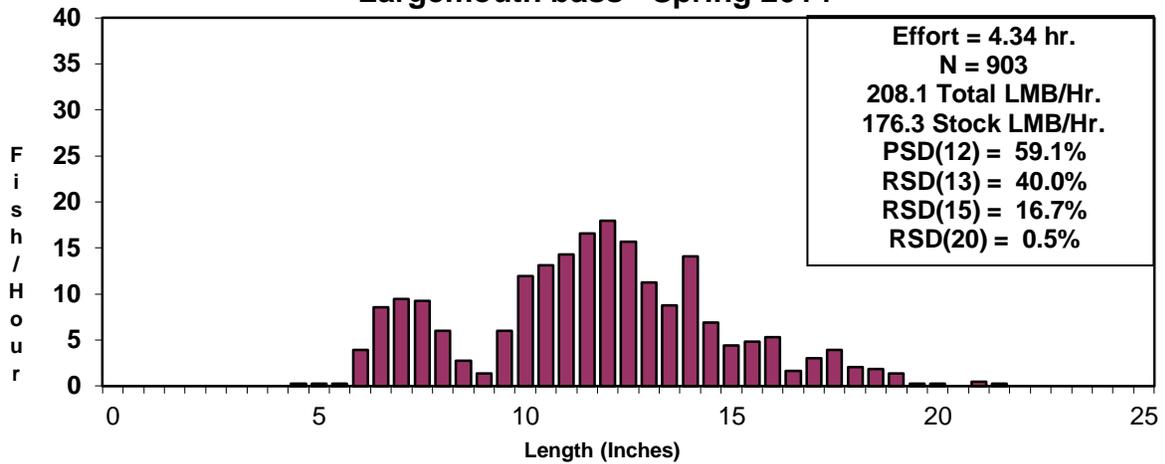
Figure 1. Largemouth Bass total catch rate 1995 – 2015.

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**Pomme de Terre - Electrofishing
Largemouth bass - Spring 2015**



**Pomme de Terre - Electrofishing
Largemouth bass - Spring 2014**



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

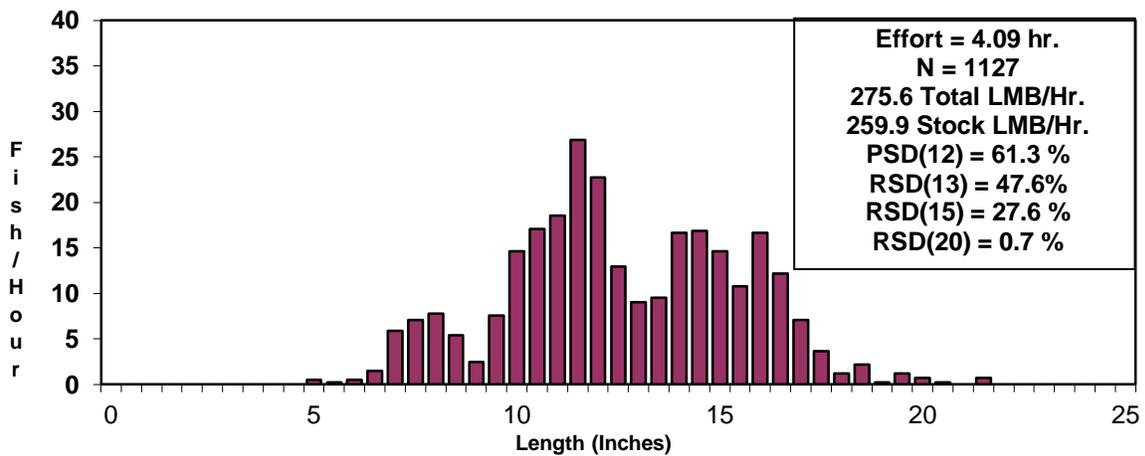
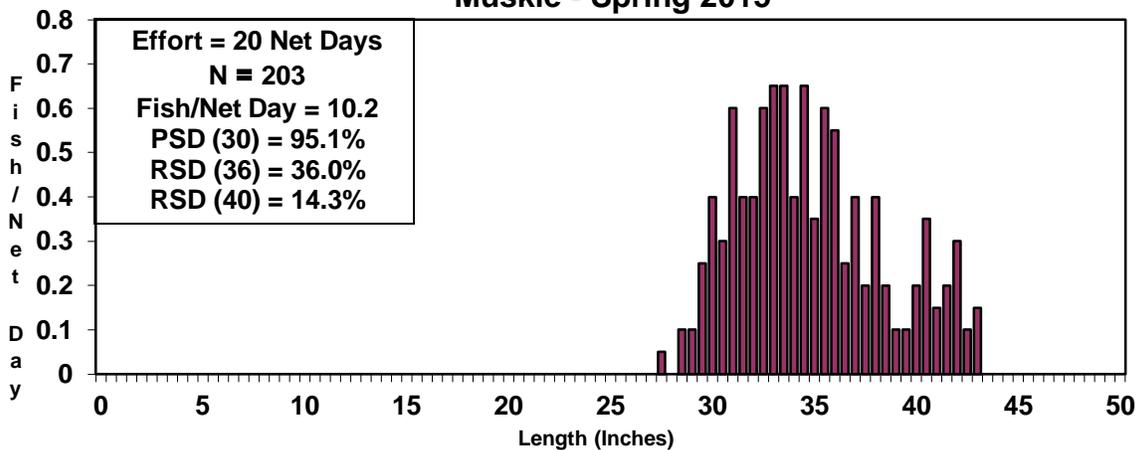


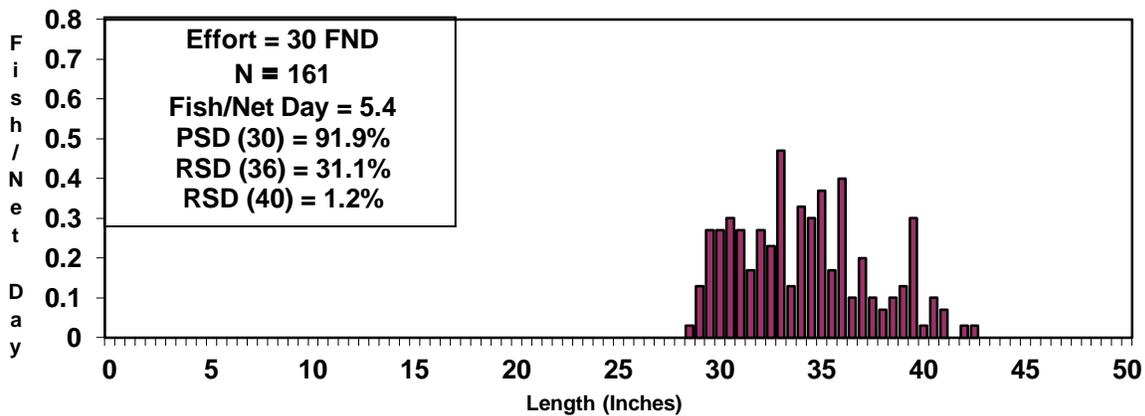
Figure 2. Pomme de Terre Lake - Largemouth Bass length frequencies 2012 – 2015.

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**Pomme de Terre - Fyke Net
Muskie - Spring 2015**



**Pomme de Terre - Fyke Net
Muskie - Spring 2014**



**Pomme de Terre - Fyke Net
Muskie - Spring 2013**

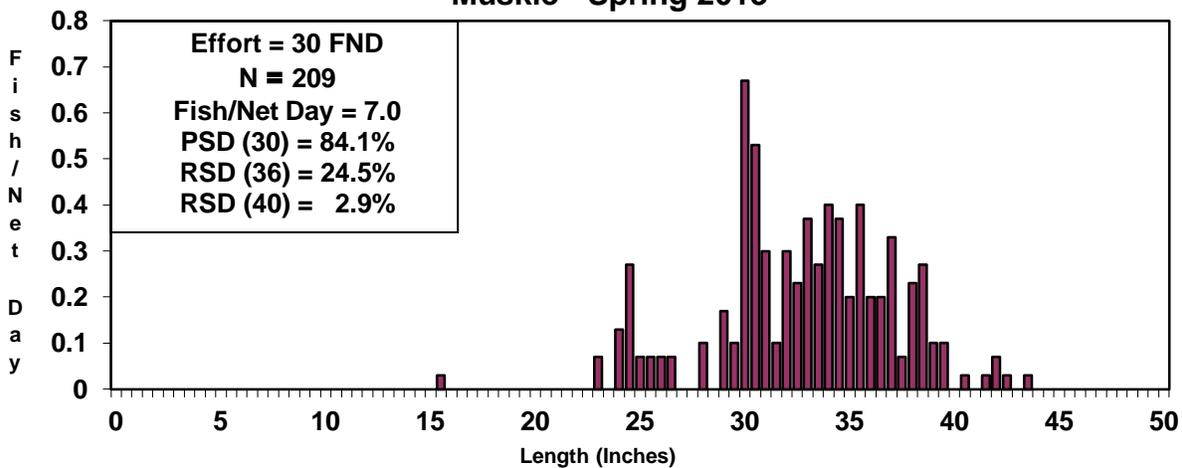
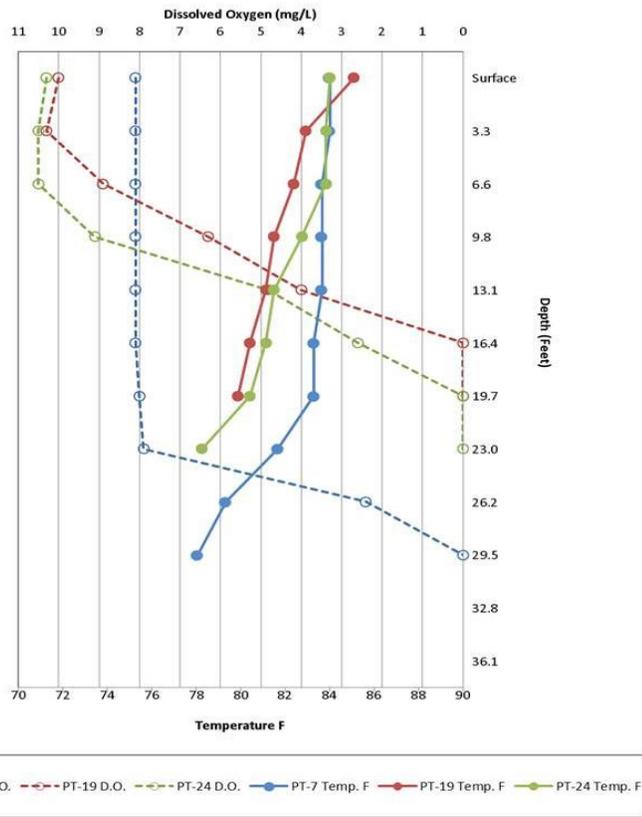


Figure 3. Pomme de Terre Lake – Muskie length frequencies 2013 – 2015.

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**Pomme de Terre Lake
Oxygen/Temperature Profile (8/20/2014)**



**Pomme de Terre Lake
Oxygen/Temperature Profile (8/20/2015)**

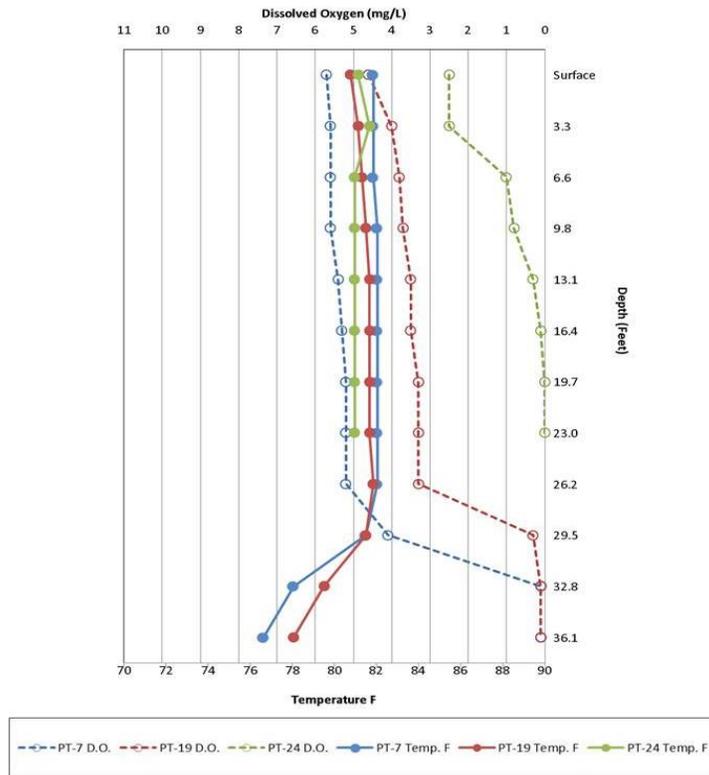


Figure 4. Oxygen/temperature data collected in August 2014 and 2015.

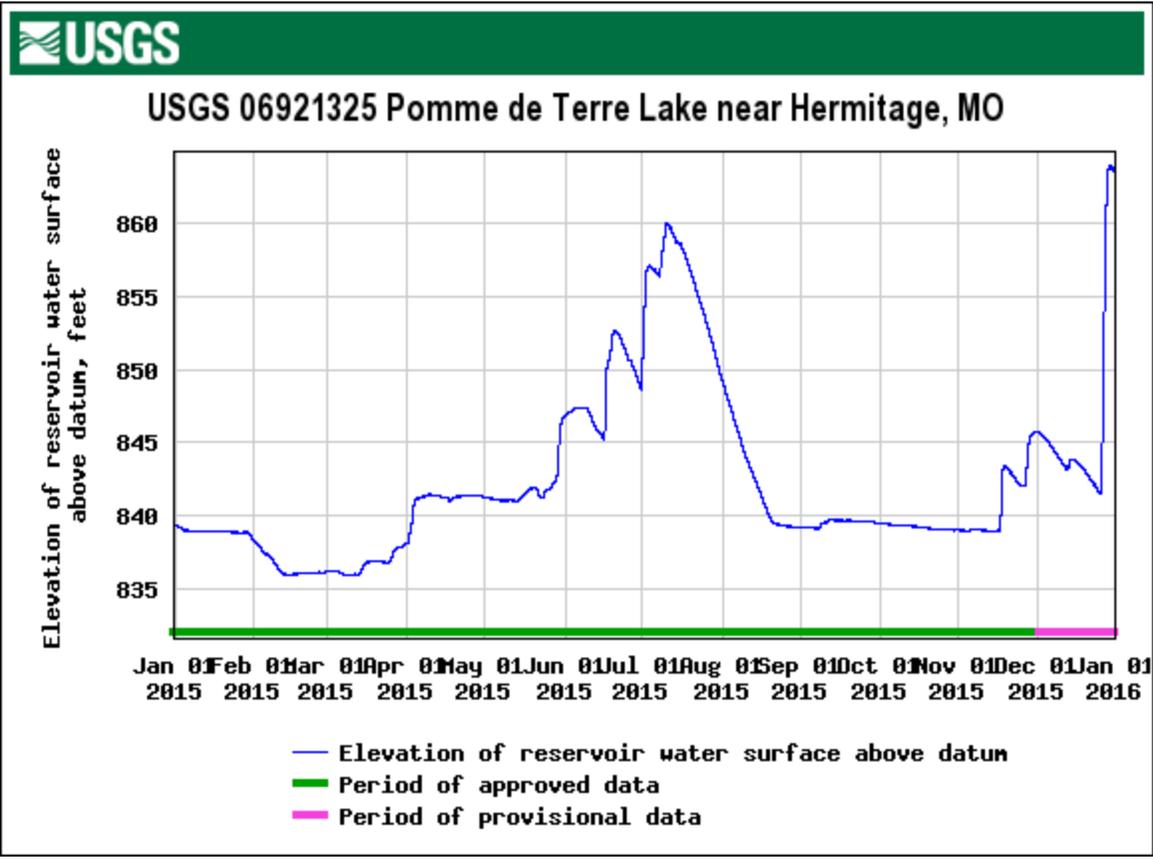
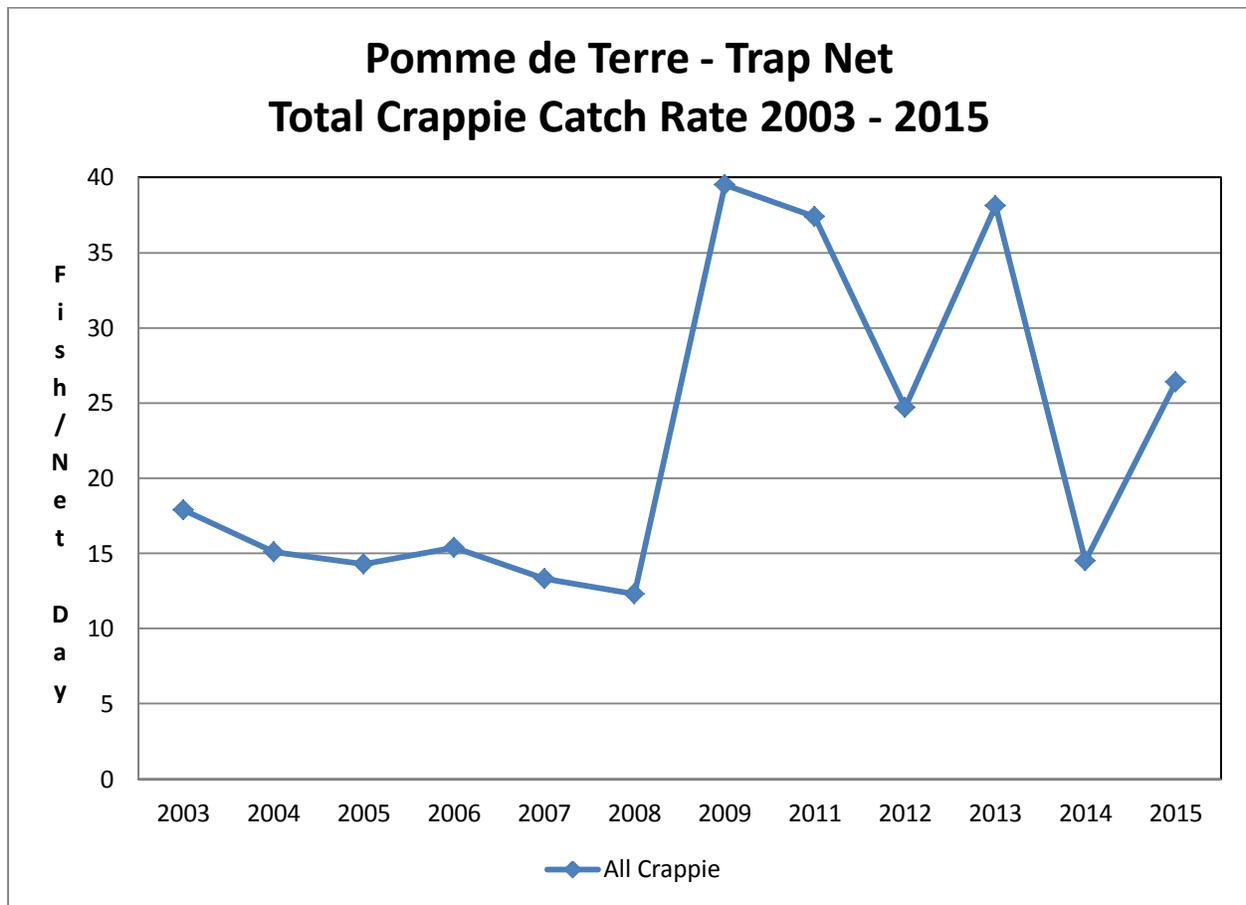


Figure 4a. Pomme de Terre Lake level - 2015

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Figure 5. Pomme de Terre Lake – total crappie catch rate 2003 – 2015.

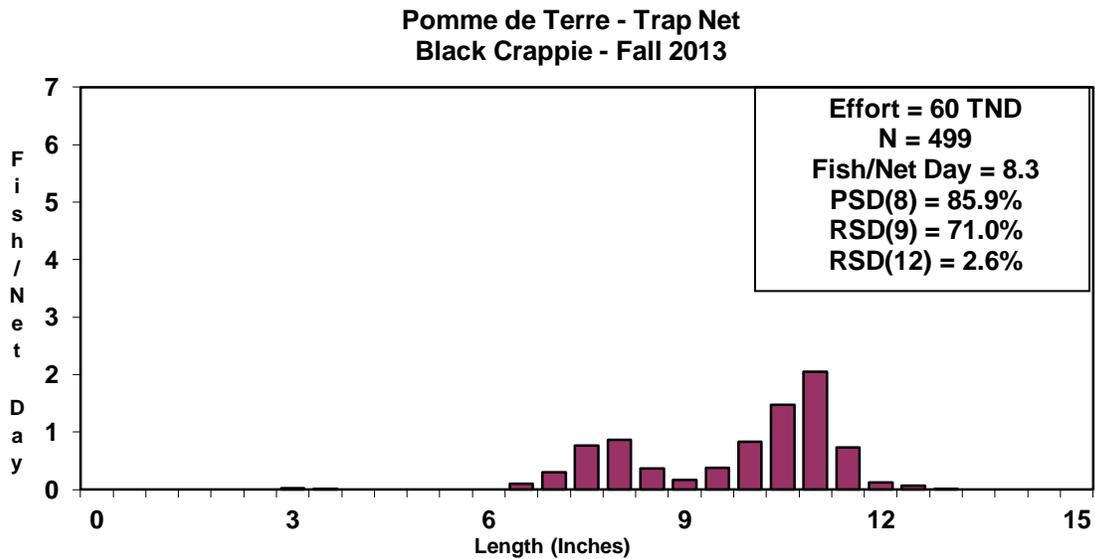
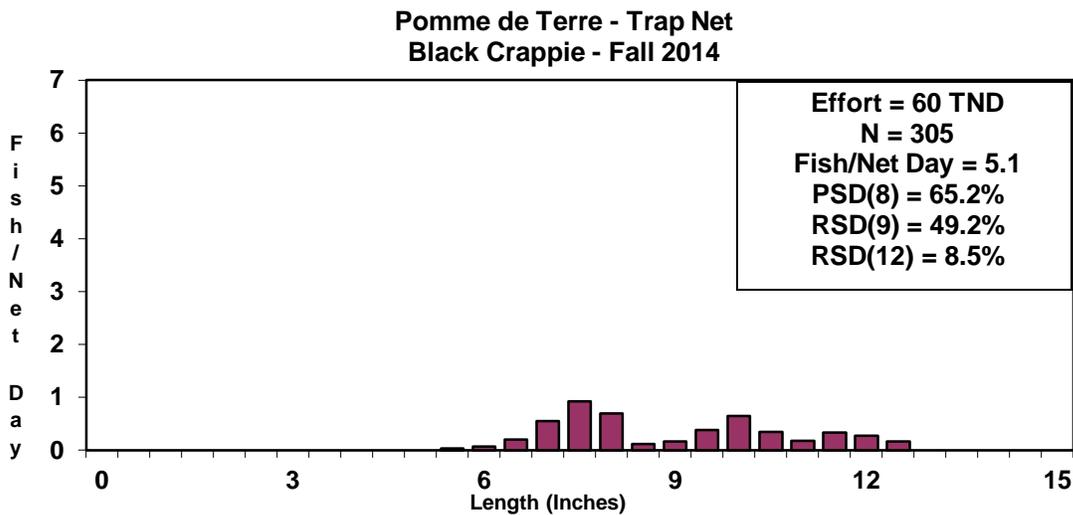
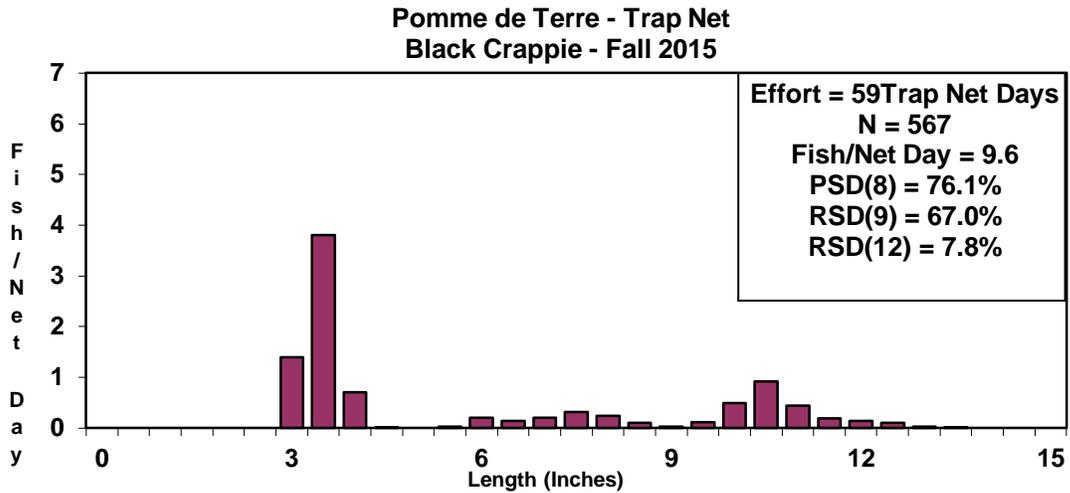
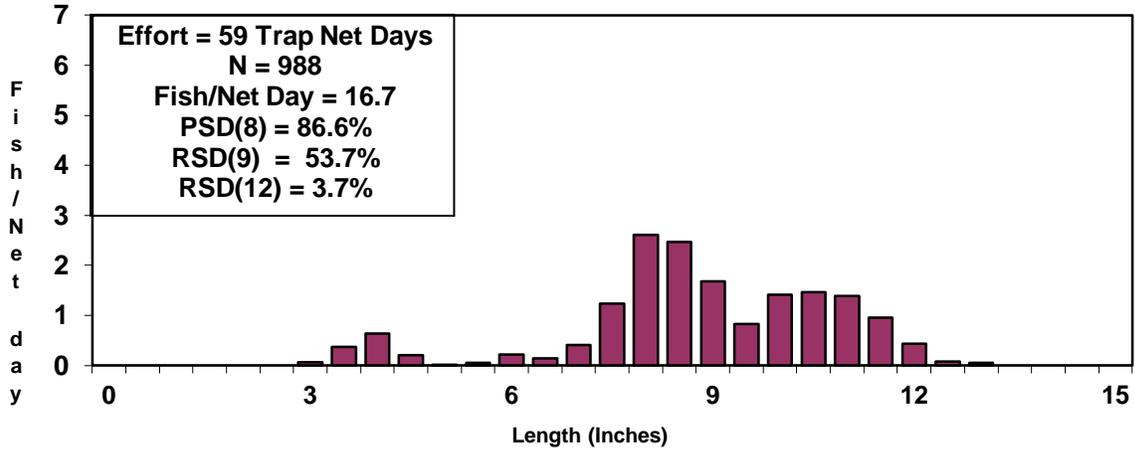


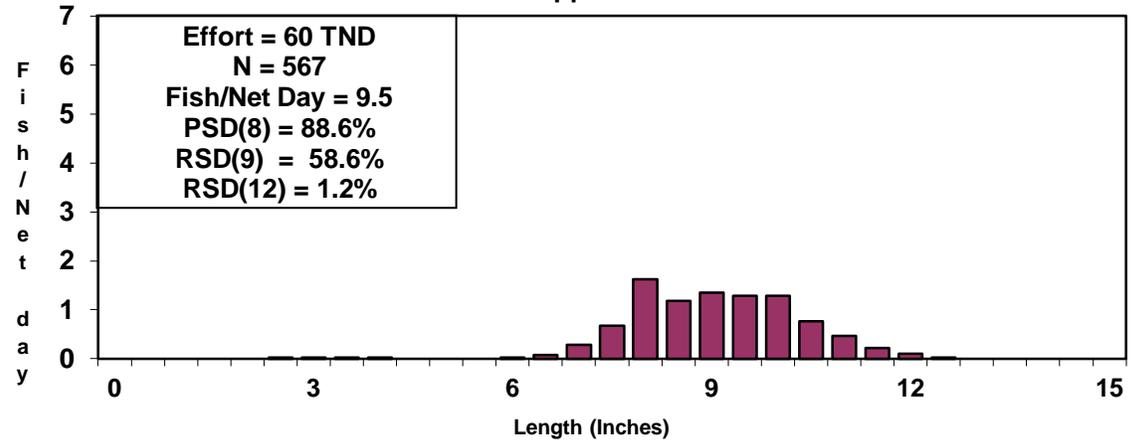
Figure 6. Pomme de Terre Lake - Black Crappie length frequencies 2013 – 2015.

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Pomme de Terre - Trap Net
White Crappie - Fall 2015



Pomme de Terre - Trap Net
White Crappie - Fall 2014



Pomme de Terre - Trap Net
White Crappie - Fall 2013

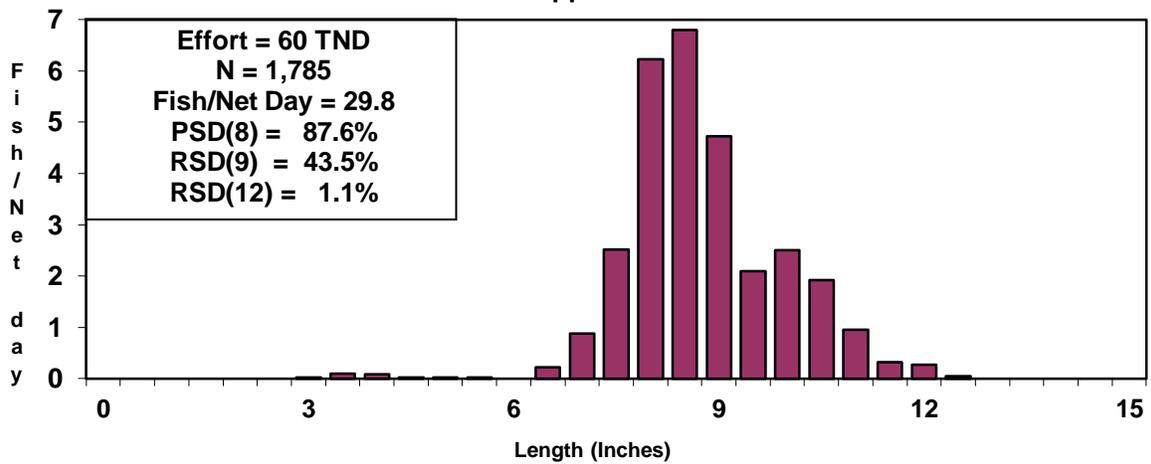
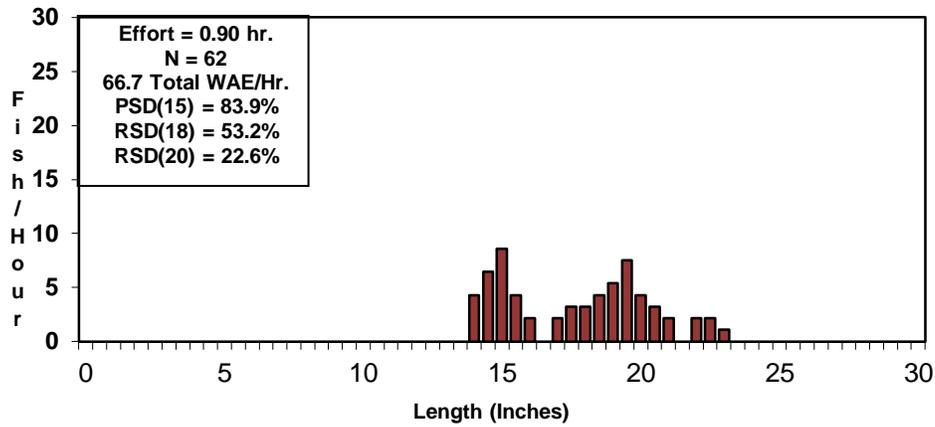


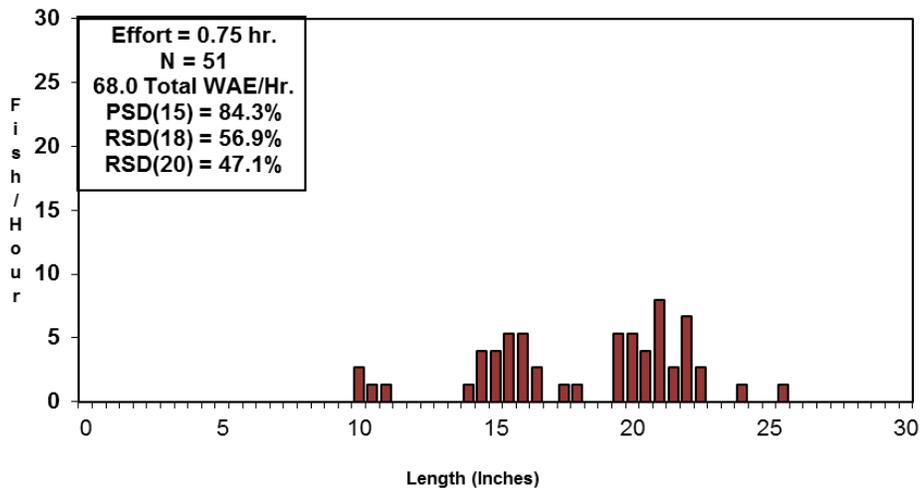
Figure 7. Pomme de Terre Lake - White Crappie length frequencies 2013 – 2015.

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**Pomme de Terre Lake - Electrofishing
Walleye - Spring 2015**



**Pomme de Terre Lake - Electrofishing
Walleye - Spring 2012**



**Pomme de Terre Lake - Electrofishing
Walleye - Spring 2011**

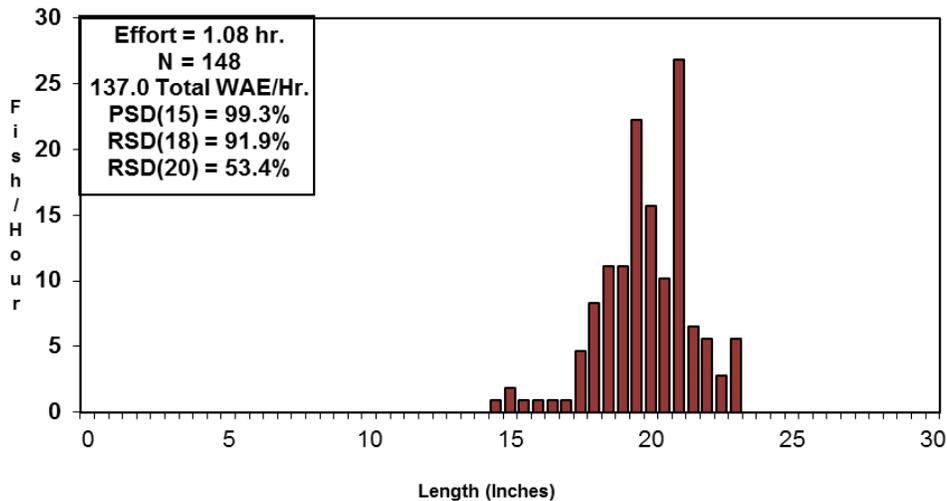


Figure 8. Pomme de Terre Lake - Walleye length frequencies 2011 – 2015.

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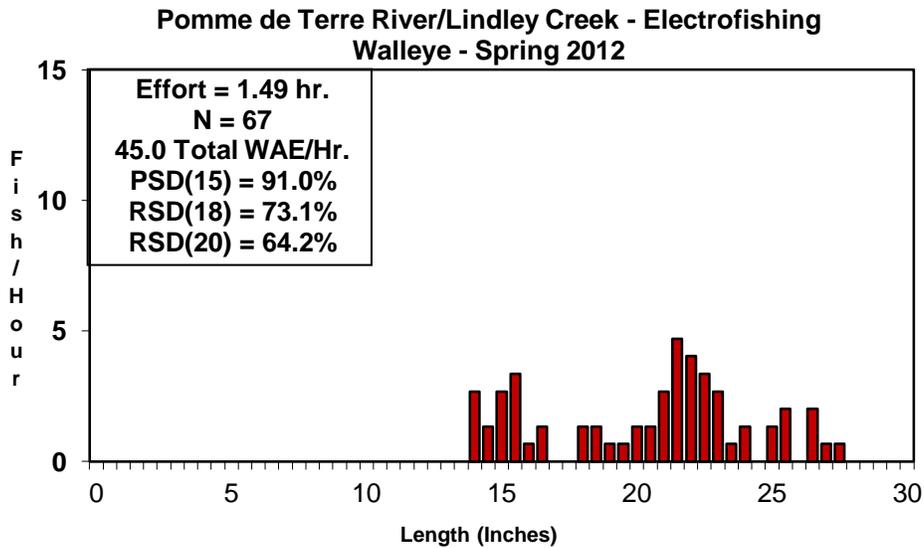
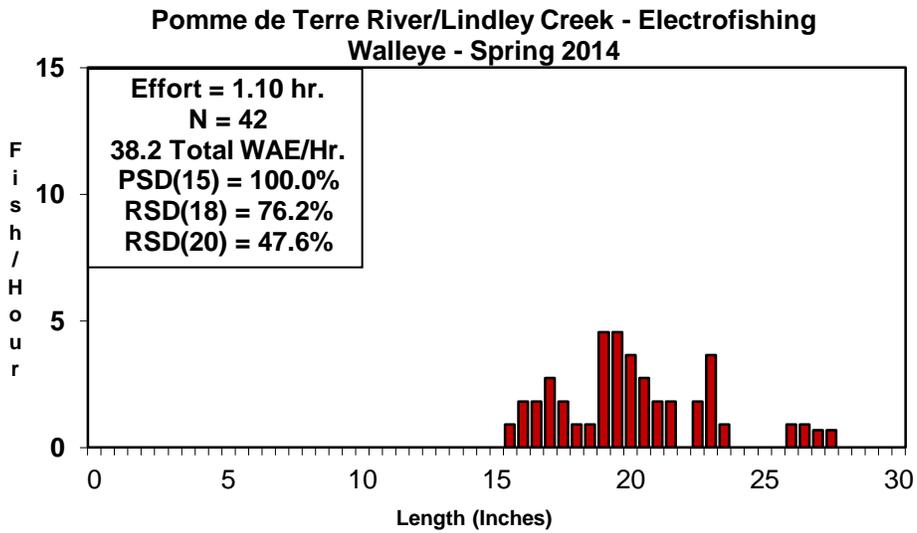
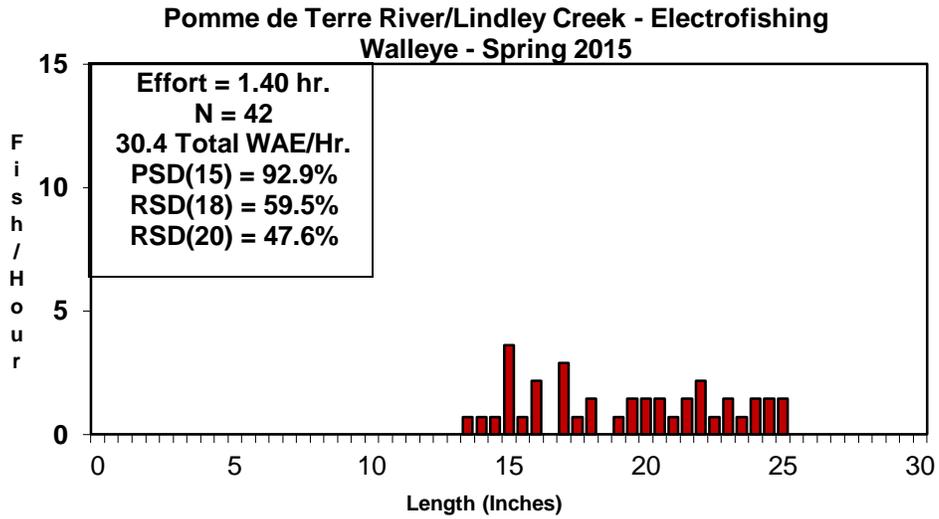


Figure 9. Pomme de Terre tributaries – Walleye length frequencies 2012 – 2015.

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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 $\geq 36''$.

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 75th 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(15) – The percentage of Walleye $\geq 10''$ that are $\geq 15''$.

The objective range is 60-80%.

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

The objective range is 10-20%.