Summary of Fishery Surveys
Diamond Lake, Taylor County, 2009

WDNR's Fisheries Management Team from Park Falls completed fyke netting and electrofishing surveys in 2009 to assess the status of important fish populations in Diamond Lake. Fyke nets set shortly after the spring thaw targeted walleye, northern pike, and yellow perch. A late-spring electrofishing survey documented the abundance and size structure of largemouth bass and bluegill populations. Quality, preferred, and memorable sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is based on known angler behavior.

Survey Effort

On April 30 we set three fyke nets at locations chosen to intercept early spring spawners and fished them overnight for one night when water temperature was 51°F. Comparing measured water temperature with the optimal spawning temperature range of the target species, our spring fyke netting probably occurred shortly after the peak spawning activity of pike, perch, and walleye. With water temperatures at 63-68°F, our May 19 electrofishing survey was well-timed to represent the relative abundance and size structure of largemouth bass and bluegill populations that were either spawning (bass) or preparing to spawn (bluegill). We sampled the entire shoreline (1.42 miles) in 0.77 hour, including 0.51 mile sub-sampled for panfish in 0.25 hour.

Habitat Characteristics

Diamond Lake is a 49-acre drainage lake located about 20 miles west of Medford, WI. The average depth is 14 feet, and maximum depth is 30 feet. Water color has a moderate brown stain (Secchi disk visibility = 5 feet). The lakebed is comprised of 5% sand, 20% gravel, 20% rock, and 55% muck substrates that support a moderate density of submersed and emergent vegetation. Approximately 50 percent of the surrounding shoreline is overgrown pasture, and the remainder is upland hardwood and marsh. Diamond Lake is eutrophic because 27% of the 3.1-square-mile watershed is in agricultural production. There are high nutrient levels and frequent algae blooms. Visitors have access to the lake through the county park boat landing on the west shore, which is maintained by the Taylor County Parks and Forestry Department. There is no residential development on the lake. Diamond Lake and surrounding lands were designated as a State Natural Area in 2002.

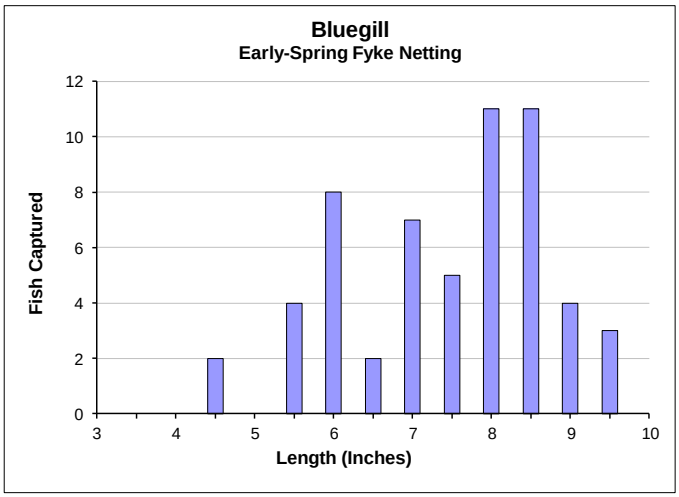
Summary of Results

We captured nine fish species in our netting and electrofishing surveys. Largemouth bass and walleye were the principle predators with bluegill and black crappie as their principle prey. White suckers also complemented the forage base. Our samples included yellow perch in low abundance (all < 8 inches long) and two northern pike (23.5 and 28.0 inches long). Common carp were absent from this survey, but reported in a survey from 2003.

Bluegill

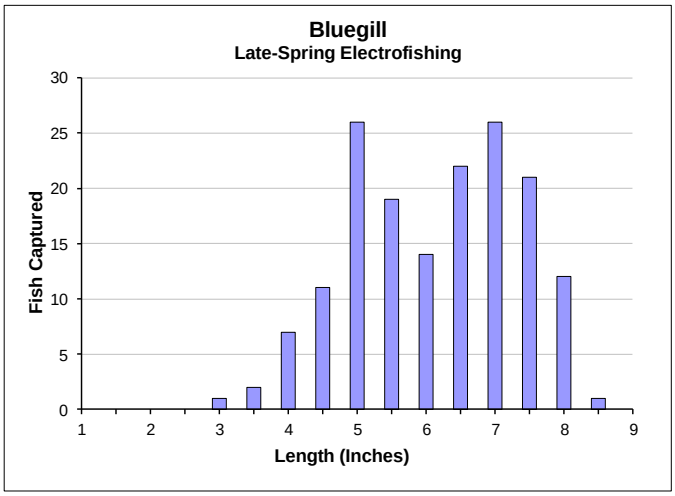
Early Spring Fyke Nets

Captured 19 per net-night ≥ 3"	
Quality Size ≥ 6"	72%
Keeper Size ≥ 7"	51%
Preferred Size ≥ 8"	12%



Late Spring Electrofishing

Captured 318 per mile or 648 per hour ≥ 3"	
Quality Size ≥ 6"	59%
Keeper Size ≥ 7"	37%
Preferred Size ≥ 8"	8%

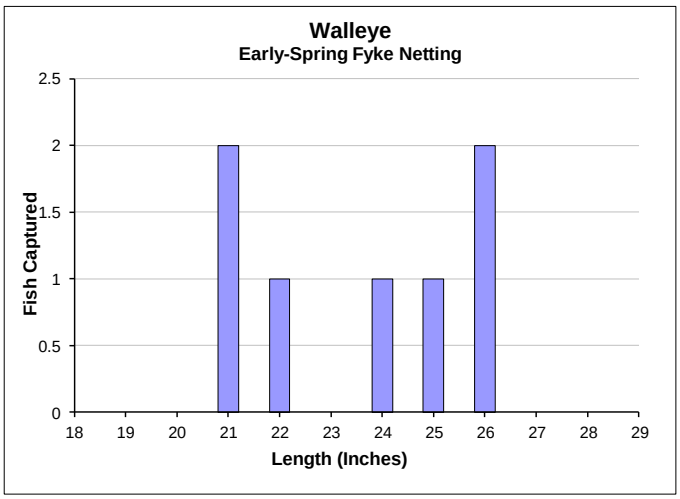


Both spring 2009 samples included high proportions of "keeper" sized bluegill, despite the very high population abundance indicated by our electrofishing capture rate. Measures of population size structure in spring fyke nets were probably inflated by mature bluegills that were staging to spawn in the warmest water. The population-controlling effect of abundant predators (primarily largemouth bass) and the availability of abundant food in this nutrient-rich lake may contribute to the production of preferred-size bluegill. Analysis of growth rings on scales revealed that sampled bluegills reached 7.0 inches in four years (range 6.7 – 7.5; n = 8)—1.4 inches above the regional average length at age four.

Walleye

Early Spring Fyke Nets

Captured 2.3 per net-night ≥ 10"	
Quality Size ≥ 15"	100%
Preferred Size ≥ 20"	100%
Memorable Size ≥ 25"	43%



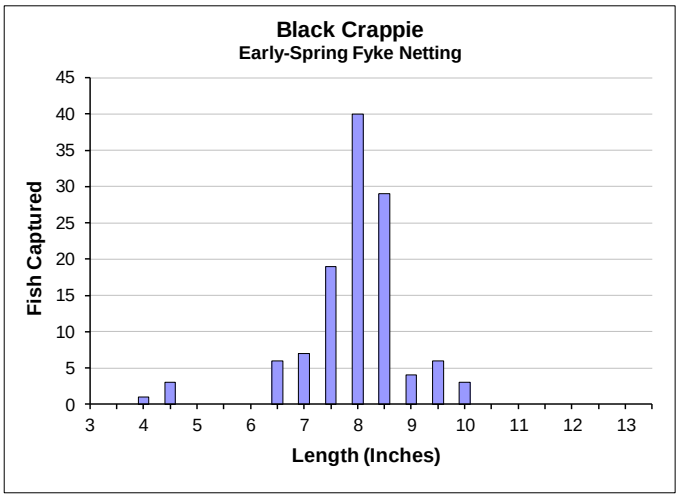
Our low fyke-net capture rate of walleyes – all over 20 inches long – reflects very low adult density and virtually no survival of young fish in recent years. Walleye captured during this survey were most likely remnants from the stocking of 1,000 large fingerlings (6-7 inches) in 1999. Poor reproductive success in the walleye population is not due to a lack of spawning habitat; suitable substrate covers half the lakebed. Instead, we suspect that predation and competition from abundant largemouth bass are limiting the survival of young walleyes. Currently, walleyes less than 14 inches long may be kept, while those 14-18 inches long are in a protected slot. Anglers may also keep one walleye daily 18 inches or longer. But with little or no production of new recruits, any harvest of young walleyes (< 14 inches) seems inconsistent with establishing a balanced population. Therefore, a proposal to restore the statewide 15-inch minimum length limit is in review.

Since the conclusion of this survey, walleye stocking has resumed. In 2010, 2012, and 2013 local groups reared or purchased 735 large walleye fingerlings that were stocked at 6-8 inches in the fall and 410 yearling walleyes that were stocked at similar sizes in the spring – all with WDNR approval. We believe that survivors of these stockings, if protected from harvest, will be helpful in maintaining predatory control over abundant bluegill and crappie, allowing these panfish to grow fast and reach angler-preferred sizes. Anglers are encouraged to voluntarily release walleyes less than 15 inches long until the statewide minimum length limit can be reinstated.

Black Crappie

Early Spring Fyke Nets

Captured 38 per net-night ≥ 5"	
Quality Size ≥ 8"	72%
Preferred Size ≥ 10"	3%
Memorable Size ≥ 12"	0%

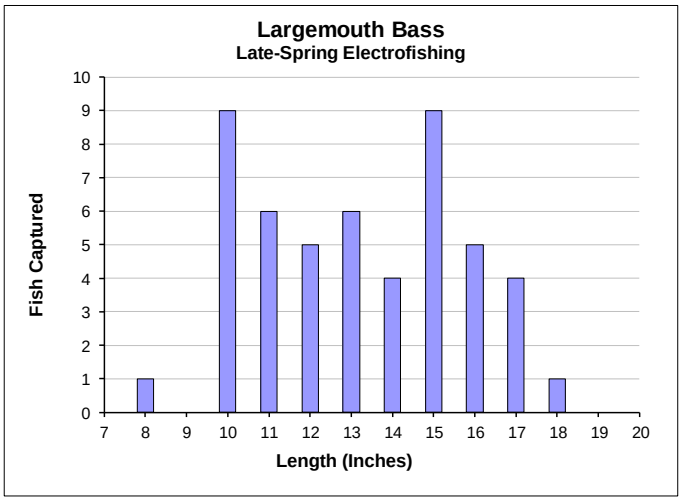


We captured black crappie at a high rate in early-spring fyke nets. Such samples can disproportionately represent larger, mature crappies that are staging to spawn. We cannot determine if the low proportion of preferred-size crappies in our sample stems from high rates of angling and natural mortality, or from an earlier weak year class. But analysis of growth rings on scales revealed that crappies reached 8.0 inches in five years (range 7.5 – 8.5; n = 8), which is 1.3 inches below the regional average length at age 5. Slow growth among crappies may be a result of overabundance and competition in a lake that has too few walleyes to control the number of young crappies that enter the population.

Largemouth Bass

Late Spring Electrofishing

Captured 35 per mile or 65 per hour ≥ 8"	
Quality Size ≥ 12"	68%
Preferred Size ≥ 15"	38%
Memorable Size ≥ 20"	0%



Largemouth bass were captured at a relatively high rate, and a large proportion of fish (38%) were of preferred size (15 inches and longer). Such a population should provide outstanding bass fishing. Young panfish in relatively high abundance are providing ample forage and encouraging satisfactory growth rates of largemouth bass. Analysis of growth rings on scales revealed that largemouth bass reached 14.4 inches in six years (range 13.3-15.2; n = 10). This represents average growth rate for the region. Though largemouth bass may prevent survival of young walleyes, they exist in sufficient numbers and sizes to control mid-size bluegills, allowing surviving fish to grow fast and reach preferred size in this nutrient-rich lake.

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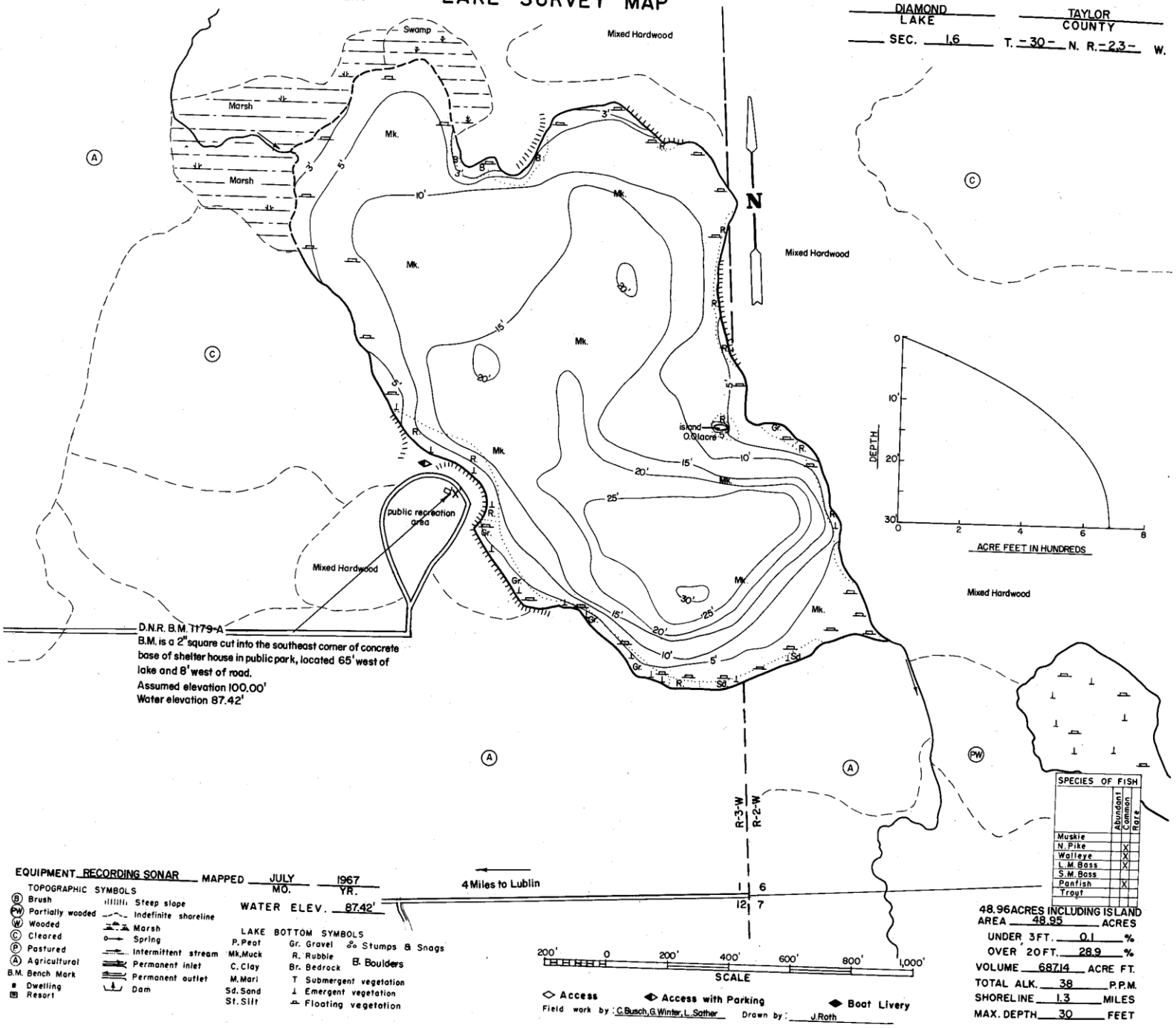
WISCONSIN CONSERVATION DEPARTMENT

LAKE SURVEY MAP

DIAMOND LAKE — TAYLOR COUNTY

SEC. 16 T. 30 N. R. 23 W.



SPECIES OF FISH	Abundant	Common	Rare
Muskie			
N. Pike		X	
Walleye		X	
L.M. Bass		X	
S.M. Bass			
Panfish		X	
Trout			

EQUIPMENT RECORDING SONAR MAPPED JULY 1967 (MO. YR.)

WATER ELEV. 87.42'

TOPOGRAPHIC SYMBOLS

- (B) Brush
- (PW) Partially wooded
- (W) Wooded
- (C) Cleared
- (P) Pastured
- (A) Agricultural
- B.M. Bench Mark
- Dwelling
- Resort
- Steep slope
- Indefinite shoreline
- Marsh
- Spring
- Intermittent stream
- Permanent inlet
- Permanent outlet
- Dam

LAKE BOTTOM SYMBOLS

- P. Peat
- Mk. Muck
- C. Clay
- M. Marl
- Sd. Sand
- St. Silt
- Gr. Gravel
- R. Rubble
- Br. Bedrock
- Stumps & Snags
- Boulders
- T Submergent vegetation
- Emergent vegetation
- Floating vegetation

◇ Access ◆ Access with Parking ◆ Boat Livery

Field work by: C. Busch, G. Winter, L. Sather Drawn by: J. Roth

48.96 ACRES INCLUDING ISLAND

AREA 48.95 ACRES

UNDER 3 FT. 0.1 %

OVER 20 FT. 28.9 %

VOLUME 687.14 ACRE FT.

TOTAL ALK. 38 P.P.M.

SHORELINE 1.3 MILES

MAX. DEPTH 30 FEET