



Summary of Fishery Surveys Cranberry Lake, Price County, 2011-2012

WDNR's Fisheries Management Team from Park Falls completed fyke netting and electrofishing surveys in fall 2011 and spring 2012 to assess the relative abundance and size structure of important fish populations in Cranberry Lake located about 6 miles north of Prentice, WI. We set 3 fyke nets and fished them overnight on October 10 – 12, 2011 for 12 net-nights of effort directed toward black crappie. Fyke netting shortly after the spring thaw at water temperatures 49 – 50°F targeted spawning northern pike, walleye, and yellow perch. Six nets fished overnight on April 2 – 5, 2012 resulted in 18 net-nights of fishing effort. With water temperature at 65°F our nighttime electrofishing survey on May 16, 2012 was well-timed to document the status of largemouth bass and bluegill populations during their spawning activities. We sampled 4.0 shoreline miles in 2.23 hours, including 1.0 mile sub-sampled for panfish in 0.58 hour. 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.

Habitat Characteristics

An earthen dike 7 feet high and 1,000 feet long built near the source of the North Fork Jump River in 1965 flooded expansive wetlands to form 512-acre Cranberry Lake, a shallow impoundment that supplies irrigation to a commercial cranberry grower located immediately downstream. Maximum and average depths are 18 and 6.6 feet, and 34% of the surface area is less than 3 feet deep. Muck and peat are the predominant lakebed materials. Boulders armor the lakeside face of the dike, and gravel and rubble remain sediment-free along the windswept shores of islands and points. Wind action also prevents lasting thermal stratification in summer. On August 11, 1992 water temperature was uniformly 72°F and dissolved oxygen concentration was about 7 milligrams per liter from the surface to 12 feet deep. Phosphorus and chlorophyll concentrations in an August 2002 sample allow us to characterize Cranberry Lake as highly eutrophic, having nutrient levels capable of producing high algal and plant biomass. Dark stained water limits light penetration and the depth to which rooted plants grow (Secchi depth = 3.5 feet; true color = 55 platinum-cobalt units), but by mid-summer dense vegetation makes boating and fishing difficult in the lake's many shallow bays. White water lily and floating-leaf pondweed were rated as “abundant” on a list of 12 aquatic plants found in Cranberry Lake. Decaying plant matter beneath the ice has occasionally caused oxygen depletion and fish mortality—last reported in 1982. For many years the cranberry grower infused air to maintain a small open-water area near the outlet, but the practice did little to reduce the risk of winterkill. Spruce, tamarack, and leather leaf bogs surround 80% of the 10.7-mile perimeter, limiting shoreland development to a few commercial and residential structures near the dike. On the east shore WDNR manages a boat landing and the 225-acre Cranberry Lake Fishery Area.

Summary of Results

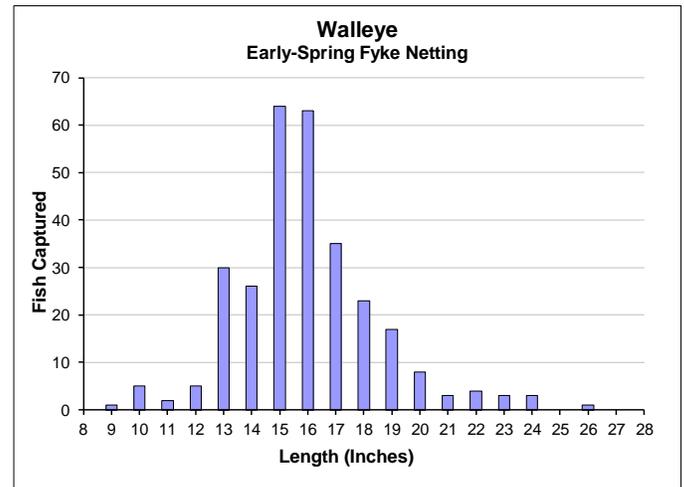
Our fyke netting and electrofishing surveys revealed that Cranberry Lake's fish community, presently comprised of at least 11 species, has changed substantially over two decades. Walleye have replaced largemouth bass as the dominant predator. In 1992 surveys, black bullheads, pumpkinseeds, and yellow perch were abundant and bluegills were scarce. By comparison in 2011 – 2012 we captured no black bullheads, a few brown bullheads rarely encountered in other lake surveys, one pumpkinseed, eight yellow perch 3 – 6 inches long, and many bluegills of sizes that would satisfy most anglers. Muskellunge and smallmouth bass were absent in recent surveys. However, an unverified angler report of a 50-inch musky harvested 5 or 6 years ago and a 36-inch hybrid captured by electrofishing in September 1992 suggest that muskellunge may be present in very low abundance.

Walleye



Early Spring Fyke Nets

Captured 17 per net-night ≥ 10 "	
Quality Size ≥ 15 "	77%
Preferred Size ≥ 20 "	8%
Memorable Size ≥ 25 "	0.3%



First detected in 1992 surveys, walleye were probably unlawfully introduced into Cranberry Lake because we found no record of authorized stocking and because walleye would not be expected to inhabit these 2nd and 3rd order headwater streams prior to impoundment. Capture rate of walleye in early spring 2012 fyke nets indicated moderate population abundance capable of sustaining satisfactory growth rates in walleye and adequate predation on panfish. Goals for Cranberry Lake's fishery have not been formally defined, but proportions of quality- and preferred-size walleye exceeded objectives established for nearby Solberg Lake and the Phillips Chain of Lakes. A high proportion (77%) of walleye ≥ 15 inches in spring fyke nets could at first glance signal low rates of reproductive survival. However, sub-adults in fyke nets and four yearling walleyes captured incidentally in late spring (when young walleye are not necessarily vulnerable to capture by electrofishing) suggest that natural recruitment is occurring in the absence of stocking. Low visibility in dark-stained, turbid water hinders sight predation by largemouth bass and favors survival of walleye through their first summer. Shaded cover from overhanging and floating bogs may offer the optical and thermal conditions that walleye seek when surface water warms in summer. Habitat segregation based on the species' tolerances and preferences for different light intensities, even with some overlap, may further buffer predatory pressure and competition from sight feeding largemouth bass to assure a reliable supply of new recruits to the adult walleye population.

Northern Pike

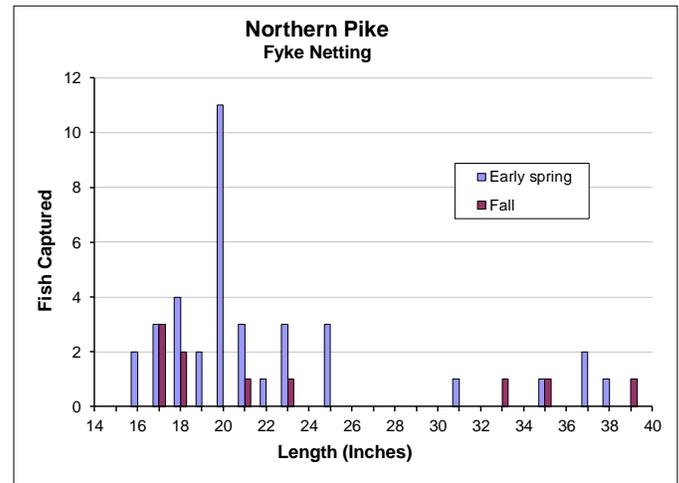


Early Spring Fyke Nets

Captured	2.1 per net-night $\geq 14"$
Quality Size $\geq 21"$	41%
Preferred Size $\geq 28"$	14%
Memorable Size $\geq 34"$	11%

Fall Fyke Nets

Captured	0.8 per net-night $\geq 14"$
Quality Size $\geq 21"$	50%
Preferred Size $\geq 28"$	30%
Memorable Size $\geq 34"$	20%



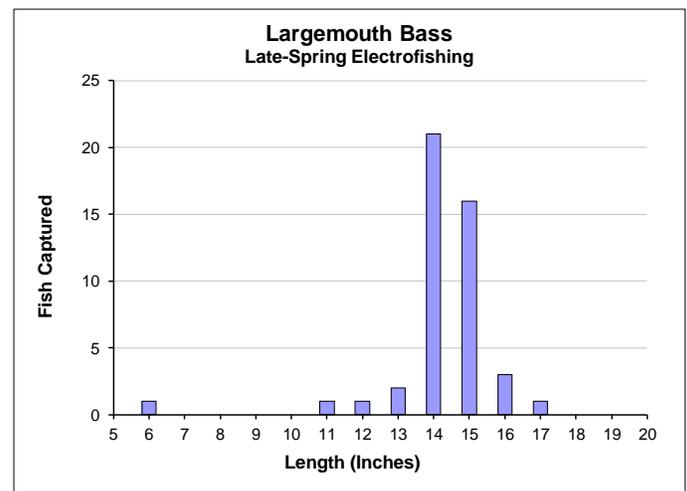
Low capture rates and a desirable size distribution of northern pike in spring and fall fyke nets suggest a low-density population capable of producing memorable-size fish. Wind-driven mixing of Cranberry Lake maintains suitable summer habitat conditions (temperature $< 79^{\circ}\text{F}$; dissolved oxygen $> 3 \text{ mg/l}$) for optimal growth of pike throughout the water column. Groundwater discharge (springs) and shade under floating bogs may offer additional thermal refuge in summer. By contrast, population size structure is often unsatisfactory in thermally-stratified waters where feeding, metabolism, and growth rates decrease as pike are forced to inhabit a narrowing range of depth between oxygen-deficient bottom water and warming surface water. Restricting angler harvest under a 32-inch minimum length could increase the proportion of memorable-size pike and perhaps allow a few to attain trophy size ≥ 44 inches long.

Largemouth Bass



Late Spring Electrofishing

Captured	11 per mile or 20 per hour $\geq 8"$
Quality Size $\geq 12"$	98%
Legal Size $\geq 14"$	91%
Preferred Size $\geq 15"$	44%



Poor visibility in dark-stained water, low conductivity ($50 \mu\text{mhos/cm}$), and difficulty stunning and dipping fish in deep water and beneath bog vegetation undoubtedly decreased our spring 2012 electrofishing capture efficiency, though we observed relatively few fish that eluded capture. A low capture rate of largemouth bass ≥ 8 inches indicates a population at relatively low abundance, comparable to results of spring surveys in 1992, 2001, and 2002 (7 – 18 per hour of all sizes).

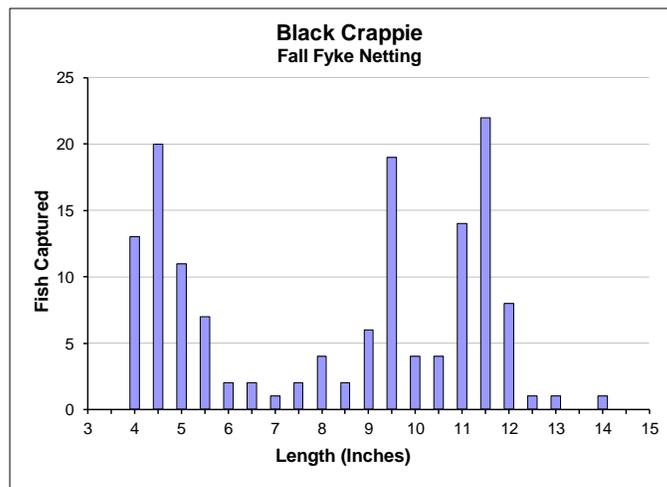
The high proportion of legal-size largemouth bass in spring 2012 suggests a high release rate among successful anglers, and the few sub-legal largemouth bass in our sample could indicate a low rate of juvenile survival, perhaps due to increasing predation by and competition with dominant walleyes. Because walleye are more effective than largemouth bass in controlling panfish abundance, especially in larger waters with low water clarity like Cranberry Lake, walleye will receive management priority over largemouth bass to maintain adequate growth rate and favorable size structure in black crappie and bluegill populations (see below).

Black Crappie



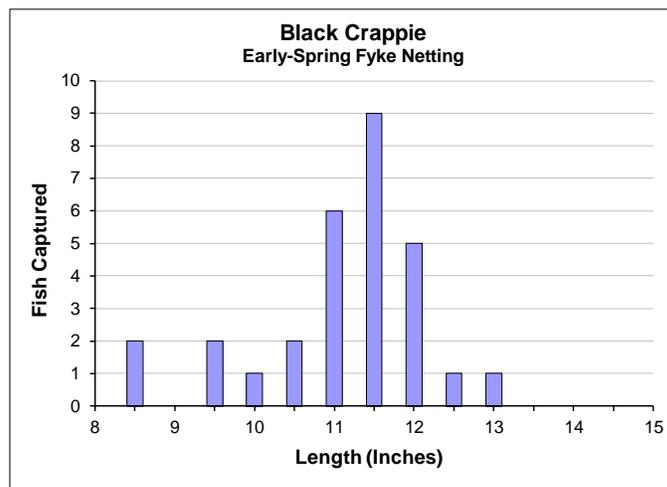
Fall Fyke Nets

Captured 9.3 per net-night ≥ 5 "	
Quality Size ≥ 8 "	77%
Preferred Size ≥ 10 "	50%
Memorable Size ≥ 12 "	10%



Early Spring Fyke Nets

Captured 1.6 per net-night ≥ 5 "	
Quality Size ≥ 8 "	100%
Preferred Size ≥ 10 "	86%
Memorable Size ≥ 12 "	24%



Capture rate and length distribution of black crappie in fall fyke nets indicated moderate population abundance with favorable proportions of preferred- and memorable-size fish. Fall nets captured crappies in all age classes, suggesting reliable but variable recruitment to the population. Weak year classes in 2008 and 2009 (fish that would have been 6 – 9 inches long in our fall 2011 survey) will likely result in a momentary lull in crappie fishing quality in 2014. Early spring netting often fails to capture juvenile crappies and is typically biased toward catching large, mature fish preparing to spawn. Analysis of scales revealed that black crappies nearly attained preferred size in 5 years (average 9.8 inches; range 9.3 – 10.3; n = 11), and they did attain memorable size in 8 years (average 12.0 inches; range = 11.7 – 12.2; n = 5)—0.5 and 0.7 inch longer than regional average lengths at ages 5 and 8, respectively. Crappies 8.0 – 10.8 inches long at capture gained on average 1.4 inches (range 0.4 – 2.7; n = 22) in their most recent growing season. The biggest crappie in our surveys was 14.1 inches long and 11 years old.

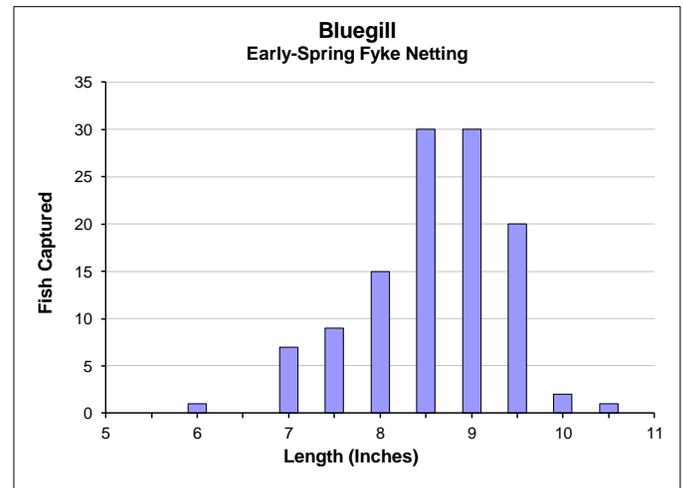
With reports of moderately high fishing pressure, a reduced daily bag limit may help to distribute the harvest of sporadic year classes more evenly among anglers and protect at least a few of Cranberry Lake's fast-growing crappies until they attain trophy size 15 inches and longer.

Bluegill



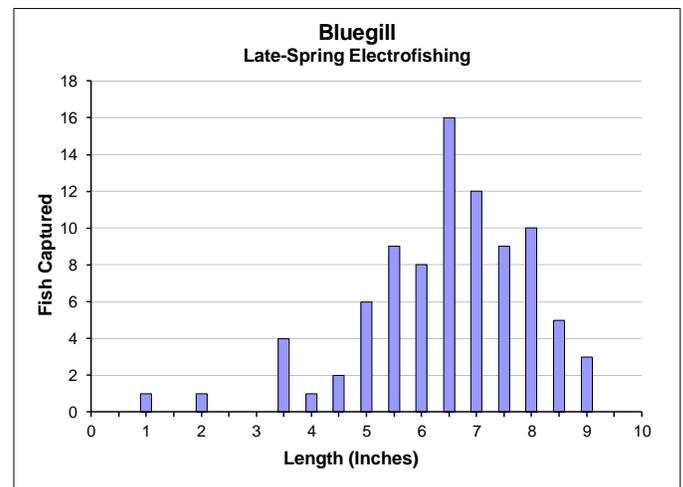
Early Spring Fyke Nets

Captured	6.4 per net-night $\geq 3''$
Quality Size $\geq 6''$	100%
Keeper Size $\geq 7''$	99%
Preferred Size $\geq 8''$	85%



Late Spring Electrofishing

Captured	85 per mile or 147 per hour $\geq 3''$
Quality Size $\geq 6''$	74%
Keeper Size $\geq 7''$	46%
Preferred Size $\geq 8''$	21%



Our relatively low electrofishing capture rate of bluegill suggests that predation by walleye controls the reproductive success of bluegills to maintain moderate abundance, presumably fast growth (not measured), and a remarkably high proportion of preferred-size fish. Measures of population size structure in spring fyke nets were probably inflated by mature bluegills that were staging to spawn in the warmest water, including a few of memorable size 10 inches or longer. High-quality bluegill angling opportunity could be sustained and possibly improved with harvest restrictions aimed toward maintaining walleye at moderate density and protecting large parental male bluegills that comprise the bulk of the population of fish 8 inches and longer.

Rock Bass

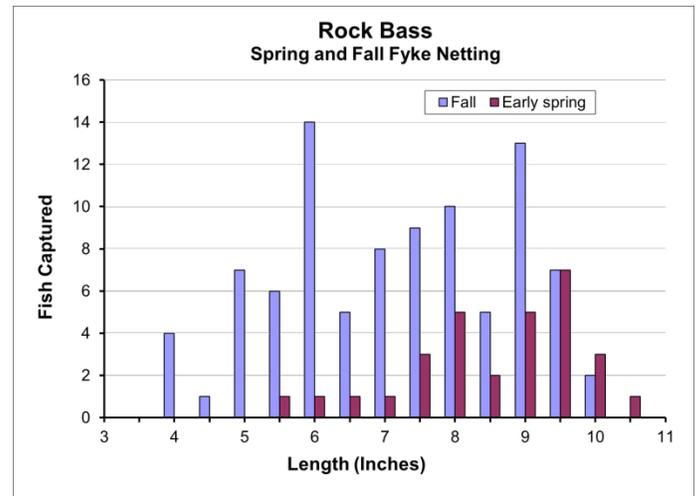


Fall Fyke Nets

Captured 7.6 per net-night $\geq 4"$	
Quality Size $\geq 7"$	59%
Preferred Size $\geq 9"$	24%

Early Spring Fyke Nets

Captured 1.7 per net-night $\geq 4"$	
Quality Size $\geq 7"$	90%
Preferred Size $\geq 9"$	53%



Results of our spring and fall fyke netting surveys reveal an uncommon angling opportunity for rock bass of preferred size. All fyke nets captured rock bass, but those set on rocky lakebed captured the most and largest fish.

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STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

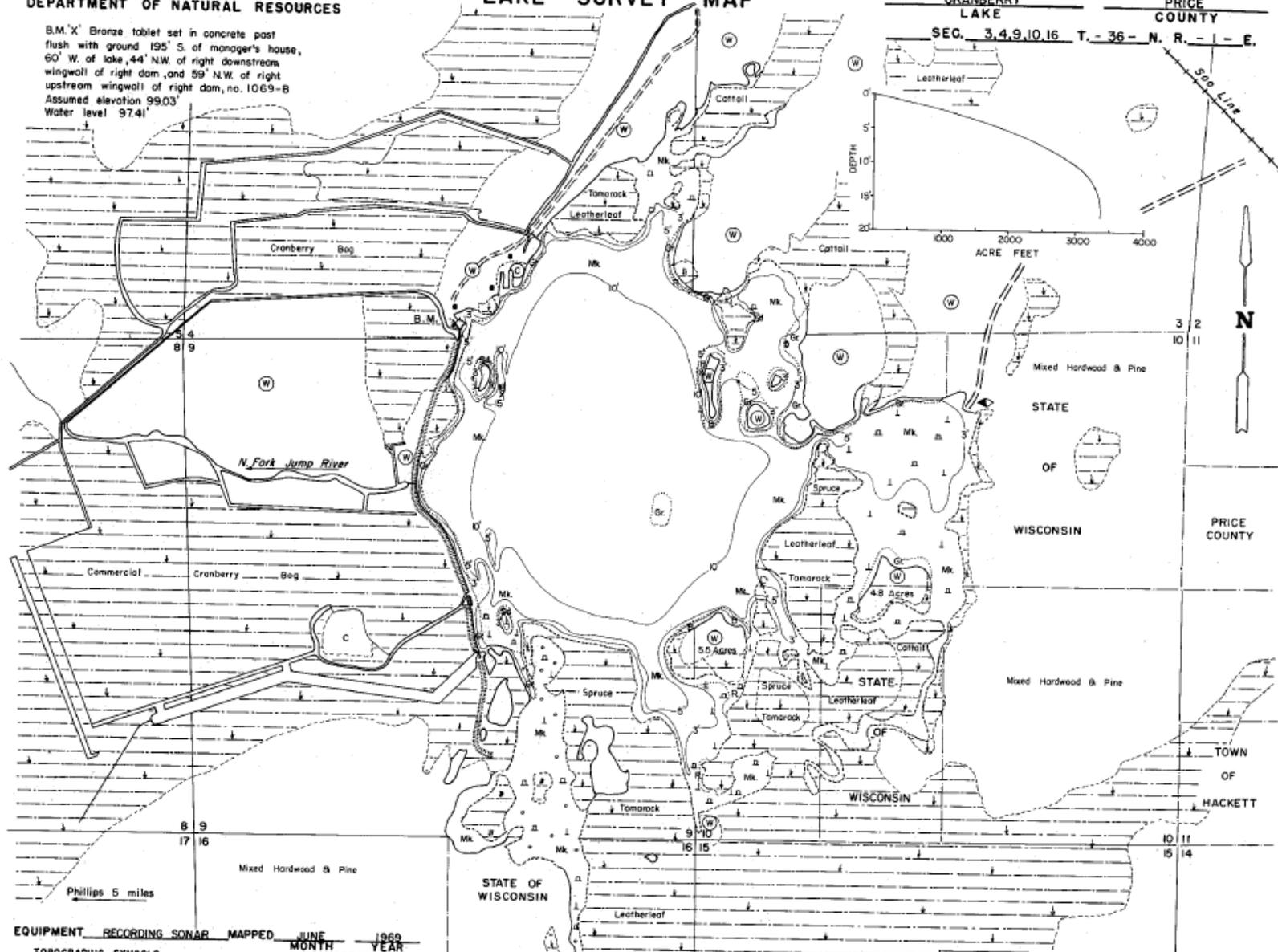
LAKE SURVEY MAP

CRANBERRY
LAKE

PRICE
COUNTY

SEC. 3,4,9,10,16 T. 36 - N. R. - - E.

B.M. 'X' Bronze tablet set in concrete post flush with ground 195' S. of manager's house, 60' W. of lake, 44' N.W. of right downstream wingwall of right dam, and 59' N.W. of right upstream wingwall of right dam, no. 1069-B Assumed elevation 99.03' Water level 97.4'



EQUIPMENT RECORDING SONAR MAPPED		JUNE 1969	
TOPOGRAPHIC SYMBOLS		LAKE BOTTOM SYMBOLS	
⊙ Brush	∩∩∩∩∩ Steep slope	P. Peat	B. Boulders
⊙ Partially wooded	— Indefinite shoreline	Mk. Muck	⊙ Stumps & Snags
⊙ Wooded	⊙ Marsh	C. Clay	⊙ Rock danger to navigation
⊙ Cleared	⊙ Spring	M. Marl	T. Submerged vegetation
⊙ Pastured	⊙ Intermittent stream	Sd. Sand	⊙ Emergent vegetation
⊙ Agricultural	⊙ Permanent inlet	St. Silt	⊙ Floating vegetation
B.M. Bench Mark	⊙ Permanent outlet	Gr. Gravel	⊙ Brush shelters
⊙ Dwelling	⊙ Dam	R. Rubble	
⊙ Resort	⊙ D.N.R. State owned land	Bc. Bedrock	
⊙ Camp			

700' 1400' 2100' 2800'
SCALE
◊ Access ◊ Access with Parking ◊ Boat Livery
Drawn by: C. Holt
Field work by: C. Busch, C. Ritter, S. Johnson

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

WATER AREA 512.4 ACRES
UNDER 3 FT. 34 %
OVER 20 FT. 0 %
MAX. DEPTH 18 FEET.
TOTAL ALK. 12 P.P.M.
VOLUME 3,375.1 ACRE FT.
SHORELINE 10.68 MILES
SHORELINE 12.38 MILES WITH IS.