CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: January 4, 2012 FILE REF: 3600

TO: Armour Lake File

FROM: Stephen Gilbert, Fisheries Biologist

SUBJECT: Armour Lake, Vilas County Fall 2011 Electrofishing Survey

In an effort to collect baseline fisheries data on Armour Lake, Vilas County an electrofishing survey was conducted on the night of October 25, 2011. Sampling conditions were excellent. The survey consisted of a single lap of the entire shoreline including all but one small island using an AC electrofishing boat. Crew members collected all game fish regardless of length throughout the entire survey. All fish species were collected within two half mile index stations.

This survey should not be viewed as a comprehensive picture of this fishery. Additional spring fyke netting and electrofishing surveys are required to get a complete inventory of all the species and age classes present. It does provide an accurate indication of game fish recruitment and a general overview of the species present in a waterbody.

The results from this survey indicate that Armour Lake has a healthy walleye based fishery. The fishery is very diverse with 15 different species captured. Two of these species, cisco and mottled sculpin, are indicators of good water quality. There appears to be good walleye spawning habitat and abundant woody cover for other species present. Recruitment for all game fish species is adequate and no stocking is recommended at this time.

Walleye

As noted above Armour Lake has a healthy walleye fishery. The fall electrofishing survey found that a good natural year class was produced this year with 14.0 young of year per mile. The long term average catch rate of young of year (YOY) walleye captured in our fall electrofishing surveys on our natural walleye waters (not stocked) in northern Wisconsin is 34 YOY/mile. The average YOY for the stocked waters in northern Wisconsin is only 9 YOY per mile. If we see around 15 YOY per mile we consider that to be a significant year class. We also captured significant numbers of walleye from the 2010 year class (6.7/mile).

Given that Armour Lake produces good natural year classes on a regular basis it falls under our no stocking guidance. The bottom line is that the lake is doing a reasonable job of recruiting walleye on its own and is producing a fishable population given its small size and moderate fertility. Stocking of walleye will not add significantly to this population and may harm the health of the entire fishery.

Scale samples were collected to determine the age of the smaller walleyes captured and determine the length distributions of the YOY and yearling year classes. Scales have growth rings on them similar to rings on a tree that allow us to determine their age. We also collected scales from a few larger walleye. The results from this sample indicate that walleye in Armour Lake are growing at about the same rate as other walleye populations in our area. Our sample size of larger fish was small and a more extensive sample from a spring survey would be needed to make any meaningful conclusions.

Given the level of natural recruitment the only management change we would suggest for the walleye fishery would be to consider a size limit change. A no minimum length limit and only one fish over 14 or a 14 to 18 inch protected slot would be a more appropriate regulation on Armour Lake.

Largemouth and Smallmouth Bass

Armour Lake appears to have a good smallmouth bass fishery. Largemouth bass are present, but in lower numbers. Given the fish community and habitat present this is to be expected. We only captured 1 YOY bass and this is very typical when using this type of survey gear. In the fall YOY bass are only 2 to 3 inches long and are hiding in rocks and logs making it difficult to see and catch them. There were fair numbers of bass representing several year classes present between 9.0 and 14.0 inches in length. We only captured 3 fish greater than 14 inches and did not observe many larger fish. Again stocking of bass is not currently needed based on the numbers of small fish present. We did not collect scale samples from bass.

Based on abundance of larger fish and the fish community present a regulation change to an 18 inch minimum size limit and a one fish bag limit on bass in Armour Lake could be considered. This would restrict harvest, increase numbers, and improve bass size structure.

Northern Pike

Northern pike are present in low numbers based on our survey (1.2/mile). We captured seven fish that ranged from 16.8 to 26.3 inches in length. Low northern pike numbers favor muskellunge populations. Liberal northern pike regulations should remain on Armour Lake and anglers should be encouraged to harvest them if a quality muskellunge fishery is desired.

Muskellunge

We captured only two (23.0, 24.4) muskellunge during this survey. This is typical of electrofishing surveys that are not very efficient at capturing larger fish like muskellunge. Spring netting surveys are the best method to evaluate muskellunge populations. This does indicate that natural recruitment may be occurring for this species in Armour Lake. Another possibility is that there is movement of young muskellunge from the Crab system upstream into Armour Lake. Crab Lake is stocked by the state with 475 large muskellunge fingerlings in even numbered years. The movement of young muskellunge down stream from stocked waters is common and has been documented in other waters.

Panfish

Yellow perch were common and the most abundant panfish species observed during our survey. We did capture a few rockbass and observed several bluegills. Again given the habitat present, lake type, and water quality this is what we would expect to find. The crew did not see many quality size panfish, but this is not the best time of year to survey panfish. We did not see any black crappie during this survey. This is good since abundant numbers of crappies result in poor walleye fisheries.

This is not a lake were we would expect to be able to produce a quality panfish fishery. The moderate fertility and short growing season in this region do not favor quality panfish populations. Vilas County for all its water has very few decent panfish lakes. Those that are present are typically large, shallow, weedy, and fertile.

Summary

Overall the fishery of Armour Lake is in good shape. Given the habitat and water quality present the fish community and their abundance is what we would expect. At this time I see no reason for state or private stocking of any species in Armour Lake. If there is local support a change in the bass and walleye

regulations as noted above could be considered in the future. Additional information would need to be collected on the bass and walleye populations before any regulation could be submitted to the state for consideration.

SUMMARY FISHING RECORD
Form 3600-63

Department of Natural Resources

County	Waters	
Vilas	Armour Lake	MWBC: 2953200

Sampling Objective	Number and Locations of Stations (Habitat)	
Walleye Recruitment Survey		Source
	Miles Actually Shocked =6.0	GPS
Period Fished (Dates)	Acres = 320	LM
10/25/2011	Total Miles of Shoreline =6.0	LM
	Total Miles of Shockable Shoreline =6.0	GPS

GEAR

Boomshocker (Hours)	Time
3 hours 31 minutes	√ Night Day

Visual Hours	Time of Day	Haul Seine (Length)	Mesh Size	Area Covered
Angling (Hours)	Time of Day	Trap Net (No. of Net Lifts)	Mesh Size	Depth
Minnow Seine (No. of Hauls)	Area Covered	Gill Net (No. of Feet x No. of Lifts)	Mesh Size	Depth

Other (Hours or Lifts)		Characteristics	
Boomshocker(s): 1	Mini-boomshocker(s):	Walleye Recruitment Code:	NR
Dip Netter(s): 2	Dip Netter(s):		

FISHING RESULTS

Species	No.	Modal Size(s)	Size Range	Catch/Unit	
Walleye (Age 0+)	84	5.7"	3.8 - 7.2"	24.0 / hour	14.0 / mile
Walleye (Age 1+)	40	9.2"	7.6 - 9.7"	11.4 / hour	6.7 / mile
Walleye (Other)	67		10.0 - 22.4"	19.1 / hour	11.2 / mile
Smallmouth Bass	9		9.1 - 16.9"	2.6 / hour	1.5 / mile
Largemouth Bass	2		4.2 - 16.8"	0.6 / hour	0.3 / mile
Muskellunge	2		23.0 - 24.4"	0.6 / hour	0.3 / mile
Northern Pike	7		16.8 - 26.3"	2.0 / hour	1.2 / mile

OBSERVATIONS

Other Species	Abundance	Size Range	Other Species	Abundance	Size Range
Yellow Perch	Common	2.3 - 5.5"	Common Shiner	Present	-
Rockbass	Common	1.9 - 6.4"	Mimic Shiner	Present	2.3 - 2.6"
White sucker	Common	-	Mottled Sculpin	Present	2.4 - 2.7"
Cisco	Present	9.7"	Log Perch	Present	-
Bluegill	Present	-	Burbot	Present	-

1) Tank Mortality: None

2) Weather: Clear, Cool, Calm

3) Reliabilty: High

4) Stocking: None

5) Comments: All game fish were targeted during the entire survey. All fish were collected in two 0.5 mile index stations (see map).

Rev. 11-99

Signed (Compiler) Stephen Gilbert

Date 01/05/12

Department of Natural Resources

LAKE ELECTROFISHING DATA COLLECTION SHEET (FALL)

Form 3600A-191 8-95

Lake: Armour Lake MWB Code: 2953200 Date: 10/25/2011 County: Vilas Collector(s): S. Gilbert, M. Kiepke, J. Halverson

Target Fish: Juvenile Walleye Survey Type: CPE Mark Given: None H20 Temperature: 50°F Station: Entire Shoreline

Adverse Conditions: None Gear Type: Boomshocker Distance Shocked: 6 miles

Volts: 160 Amps: 1.6 Current Type: [X]AC [ ]DC [ ]Pulsed DC Pulse Rate: None Duty Cycle: None

Shocking Start Time: 19:10 Shocking End Time: 21:52 Generator Start Hour: Generator End Hour:

Number of Dippers: [ ]1 [X]2 Entire Shoreline Shocked: [X]Y [ ]N [ ]I Dipnet Mesh Size: 3/8 inch bar H20 Clarity: 7.0 feet

inches	Unclipped	Clipped	inches	Unclipped	Clipped	inches	Unclipped	Clipped
<3.0			7.2	1		11.5		
3.0			7.3			11.6	2	
3.1			7.4			11.7	1	
3.2			7.5			11.8	3	
3.3			7.6	1		11.9	2	
3.4			7.7	2		12.0-12.4	5	
3.5			7.8			12.5-12.9	4	
3.6			7.9			13.0-13.4	5	
3.7			8.0			13.5-13.9	5	
3.8	1		8.1	2		14.0-14.4	2	
3.9			8.2	3		14.5-14.9	3	
4.0	2		8.3	1		15.0-15.4	2	
4.1			8.4	2		15.5-15.9	1	
4.2	1		8.5	3		16.0-16.4	1	
4.3	1		8.6	3		16.5-16.9	1	
4.4			8.7	2		17.0-17.4	1	
4.5			8.8			17.5-17.9	1	
4.6	3		8.9	2		18.0-18.4		
4.7	2		9.0	2		18.5-18.9		
4.8	4		9.1	4		19.0-19.4	1	
4.9	6		9.2	7		19.5-19.9		
5.0	3		9.3	2		20.0-20.4		
5.1	2		9.4			20.5-20.9		
5.2	2		9.5	2		21.0-21.4		
5.3	6		9.6			21.5-21.9		
5.4	2		9.7	2		22.0-22.4	1	
5.5	5		9.8			22.5-22.9		
5.6	5		9.9			23.0-23.4		
5.7	10		10.0	2		23.5-23.9		
5.8	5		10.1			24.0-24.4		
5.9	2		10.2	2		24.5-24.9		
6.0	1		10.3	1		25.0-25.4		
6.1	4		10.4	1		25.5-25.9		
6.2	3		10.5	1		26.0-26.4		
6.3	5		10.6			26.5-26.9		
6.4	1		10.7	2		27.0-27.4		
6.5	2		10.8	2		27.5-27.9		
6.6	1		10.9	3		28.0-28.4		
6.7			11.0	6		28.5-28.9		
6.8	2		11.1	1		29.0-29.4		
6.9	2		11.2	1		29.5-29.9		
7.0			11.3	3		30.0 +		
7.1			11.4	1		Totals:	191	0

WALLEYE

Department of Natural Resources

GAMEFISH ELECTROFISHING DATA COLLECTION SHEET (FALL)

Form 3600F-186 8-95

Lake: Armour Lake MWB Code: 2953200 Date: 10/25/2011 County: Vilas Collector(s): S. Gilbert, M. Kiepke, J. Halverson

Target Fish: Juvenile Walleye Survey Type: CPE Mark Given: None H20 Temperature: 50°F Station: Entire Shoreline

Adverse Conditions: None Gear Type: Boomshocker Distance Shocked: 6 miles

Volts: 160 Amps: 1.6 Current Type: [X]AC [ ]DC [ ]Pulsed DC Pulse Rate: None Duty Cycle: None

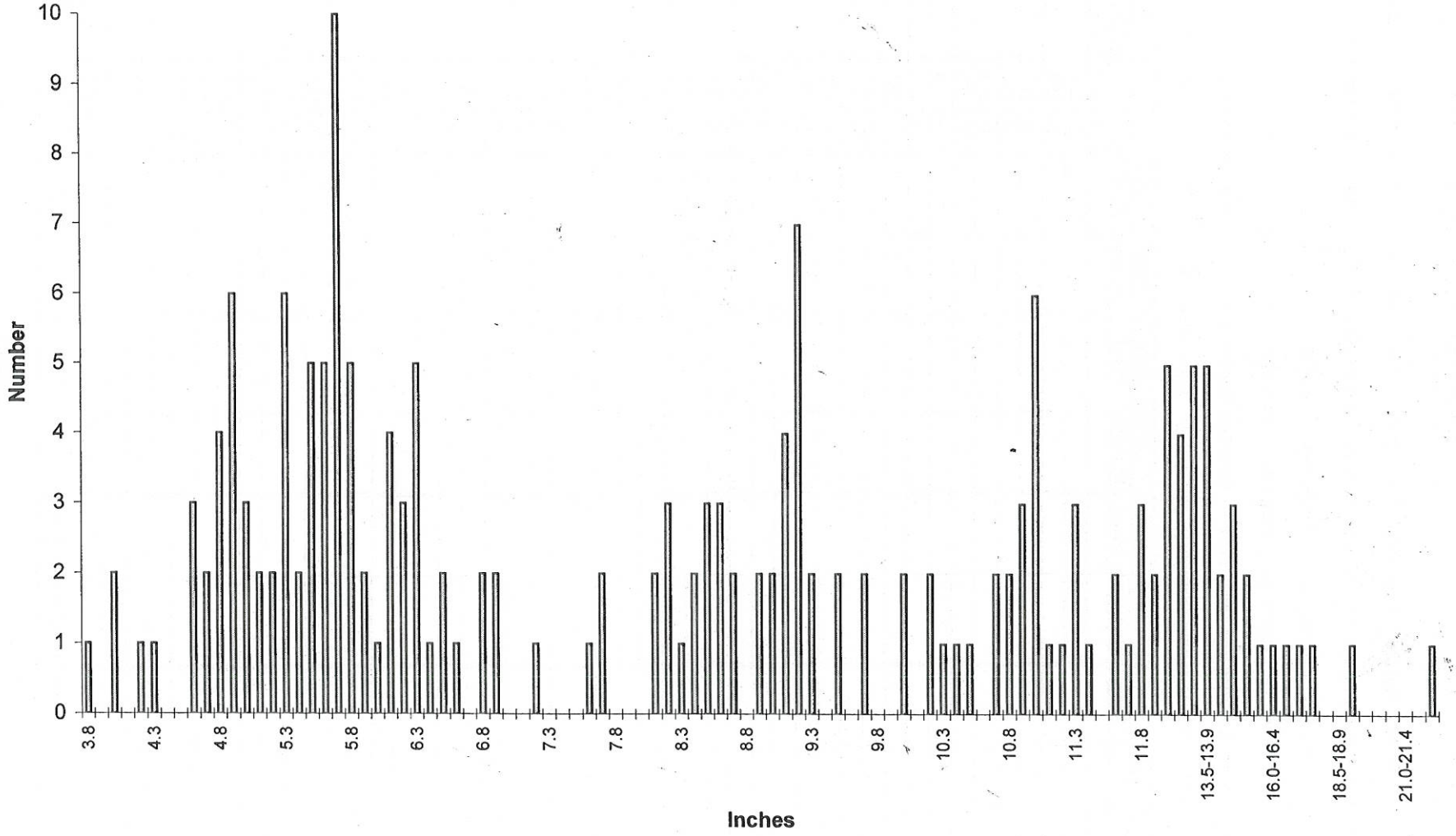
Shocking Start Time: 19:10 Shocking End Time: 21:52 Generator Start Hour: 0 Generator End Hour: 0

Number of Dippers: [ ]1 [X]2 Entire Shoreline Shocked: [X]Y [ ]N [ ]I Dipnet Mesh Size: 3/8 inch bar H20 Clarity: 7.0 feet

	Northern Pike		Muskellunge		Largemouth Bass		Smallmouth Bass			Northern Pike		Muskellunge	
inches	Unclipped	Clipped	Unclipped	Clipped	Unclipped	Clipped	Unclipped	Clipped	inches	Unclipped	Clipped	Unclipped	Clipped
<1.5									24.5-24.9				
1.5-1.9									25.0-25.4				
2.0-2.4									25.5-25.9				
2.5-2.9									26.0-26.4	1			
3.0-3.4									26.5-26.9				
3.5-3.9									27.0-27.4				
4.0-4.4					1				27.5-27.9				
4.5-4.9									28.0-28.4				
5.0-5.4									28.5-28.9				
5.5-5.9									29.0-29.4				
6.0-6.4									29.5-29.9				
6.5-6.9									30.0-30.4				
7.0-7.4									30.5-30.9				
7.5-7.9									31.0-31.4				
8.0-8.4									31.5-31.9				
8.5-8.9									32.0-32.4				
9.0-9.4							1		32.5-32.9				
9.5-9.9									33.0-33.4				
10.0-10.4							1		33.5-33.9				
10.5-10.9									34.0-34.4				
11.0-11.4							1		34.5-34.9				
11.5-11.9							2		35.0-35.4				
12.0-12.4							2		35.5-35.9				
12.5-12.9									36.0-36.4				
13.0-13.4									36.5-36.9				
13.5-13.9									37.0-37.4				
14.0-14.4									37.5-37.9				
14.5-14.9									38.0-38.4				
15.0-15.4									38.5-38.9				
15.5-15.9									39.0-39.4				
16.0-16.4							1		39.5-39.9				
16.5-16.9	1				1		1		40.0-40.4				
17.0-17.4									40.5-40.9				
17.5-17.9									41.0-41.4				
18.0-18.4									41.5-41.9				
18.5-18.9	1								42.0-42.4				
19.0-19.4	1								42.5-42.9				
19.5-19.9									43.0-43.4				
20.0-20.4									43.5-43.9				
20.5-20.9									44.0-44.4				
21.0-21.4	1								44.5-44.9				
21.5-21.9	1								45.0-45.4				
22.0-22.4									45.5-45.9				
22.5-22.9									46.0-46.9				
23.0-23.4			1						47.0-47.9				
23.5-23.9	1								48.0-48.9				
24.0-24.4			1						49.0-49.9				
Totals:	7	0	2	0	2	0	9	0	50.0+				

GAMEFISH

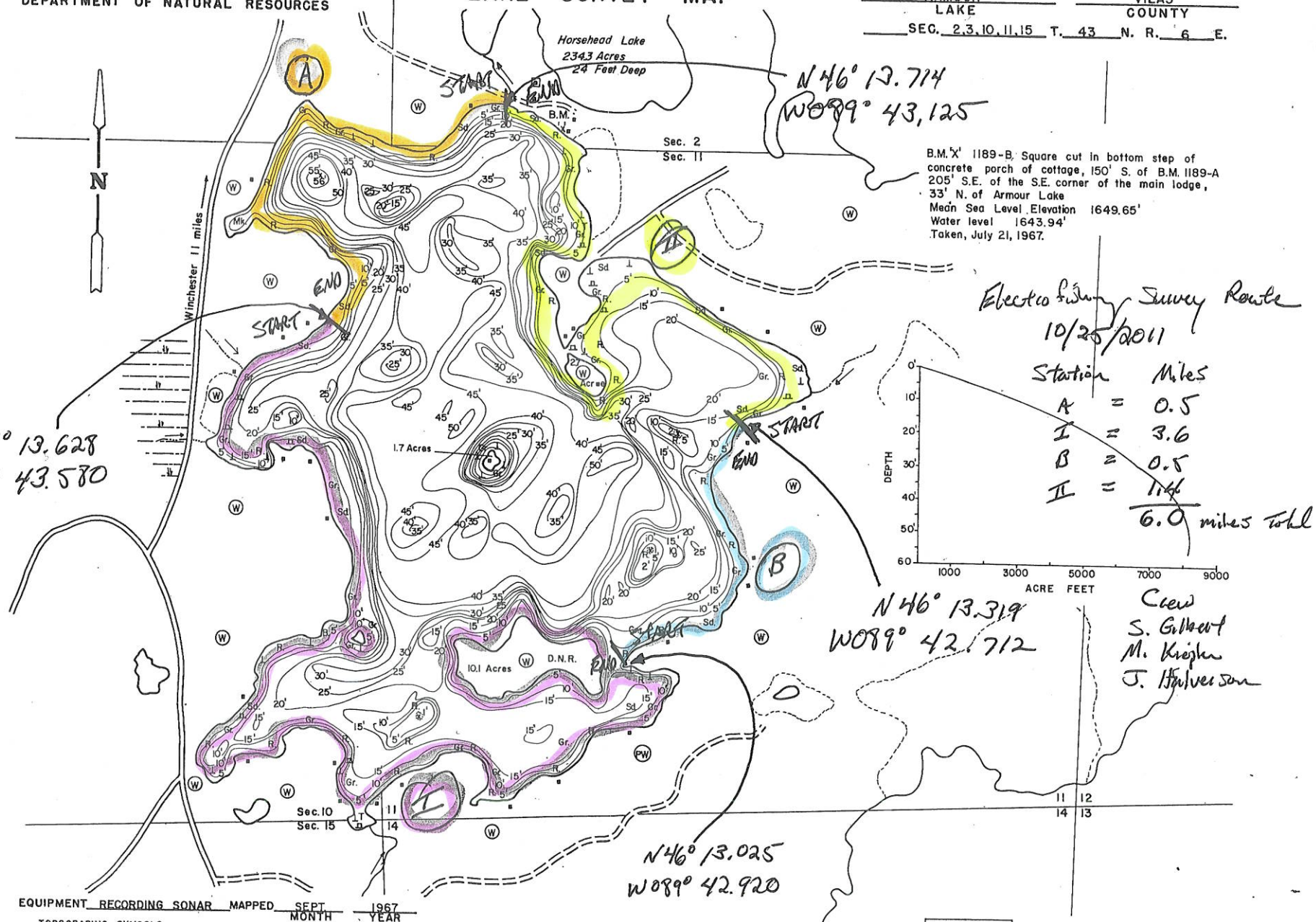
Walleye Length Distribution
2011 Armour Lake, Vilas County



STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

LAKE SURVEY MAP

ARMOUR LAKE — VILAS COUNTY
SEC. 2,3,10,11,15 T. 43 N. R. 6 E.



B.M. 'X' 1189-B. Square cut in bottom step of concrete porch of cottage, 150' S. of B.M. 1189-A 205' S.E. of the S.E. corner of the main lodge, 33' N. of Armour Lake
Mean Sea Level Elevation 1649.65'
Water level 1643.94'
Taken, July 21, 1967.

Electro fishing Survey Route
10/25/2011

Station	Miles
A =	0.5
I =	3.6
B =	0.5
II =	1.4
	6.0 miles total

Crew
S. Gilbert
M. Krejcha
J. Halverson

EQUIPMENT RECORDING SONAR MAPPED SEPT 1967
MONTH YEAR

TOPOGRAPHIC SYMBOLS

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

LAKE BOTTOM SYMBOLS

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

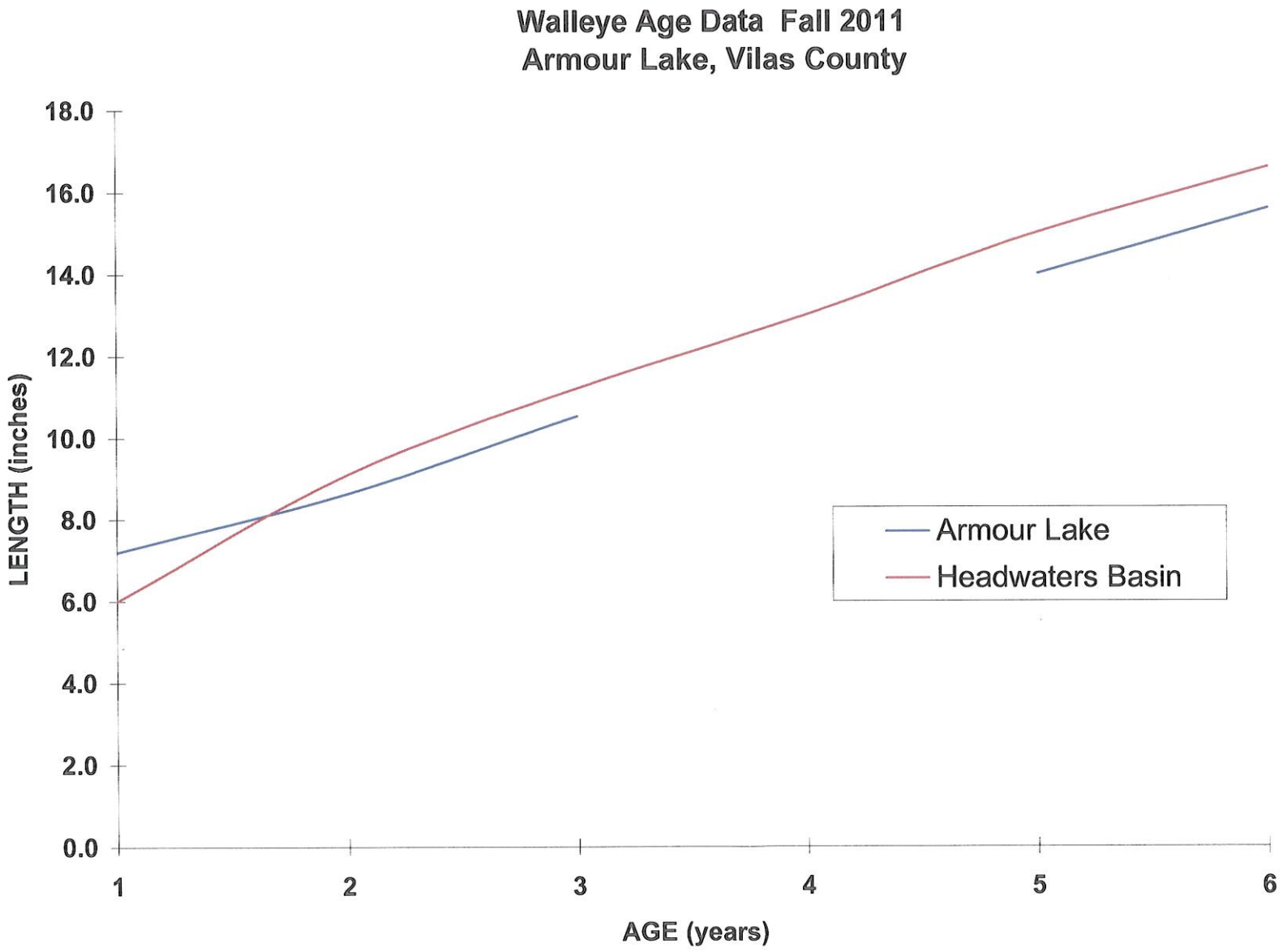
500' 0' 500' 1000' 1500' 2000'
SCALE

◇ Access ◇ Access with Parking ◇ Boat Livery

Drawn by: C. Holt
Field work by: P. Michelson, J. Smith

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

WATER AREA 319.5 ACRES
UNDER 3 FT. 7.0 %
OVER 20 FT. 58.4 %
MAX. DEPTH 56 FEET.
TOTAL ALK. 22 P.P.M.
VOLUME 8158.7 ACRE FT.
SHORELINE 4.8 MILES
SHORELINE 5.7 MILES WITH IS.


Walleye Age Data Fall 2011
Armour Lake, Vilas County
LENGTH (inches)
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
1
2
3
4
5
6
AGE (years)
Armour Lake
Headwaters Basin