WISCONSIN DEPARTMENT OF NATURAL RESOURCES
CREEL SURVEY REPORT

Willow Flowage

Oneida County

2008-09

Treaty Fisheries Publication

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Treaty Fisheries Technician

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SUMMARY TABLES

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INTRODUCTION

Fish populations can fluctuate due to natural forces (weather, predation, competition), management actions (stocking, regulations, habitat improvement), inappropriate development (habitat degradation), and harvest impacts. Wisconsin Department of Natural Resources fisheries crews regularly conduct fishery surveys on area lakes and reservoirs to gather the information needed to monitor changes, identify concerns, evaluate past management actions, and to prescribe good fishery management strategies. Netting and electrofishing surveys are used to gather data on the status of fish populations and communities (species composition, population size, reproductive success, size/age distribution, and growth rates). But the other key component of the fishery that we often need to measure is the harvest.

On many lakes in the Ceded Territory of northern Wisconsin, harvest of fish is divided between sport anglers and the six Chippewa tribes who harvest fish under rights granted by federal treaties. The tribes harvest fish mostly using a highly efficient method, spearing, during a relatively short time period in the spring. Every fish in the spear harvest is counted – a complete "census" of the harvest.

We also measure the sport harvest to assess its impact on the fishery. But because it would be highly impractical and very costly to conduct a complete census of every angler who fishes on a lake, we conduct creel surveys.

A creel survey is an assessment tool used to sample the fishing activities of anglers on a body of water and make projections of harvest and other fishery parameters. Creel survey clerks work on randomly-selected days and shifts, forty hours per week during the open season for gamefish from the first Saturday in May through the first Sunday in March, except during the month of November when fishing effort is low and ice conditions are often unsafe. The survey is run during daylight hours, and shift times change from month to month as day length changes.

Creel survey clerks travel their lakes using a boat or snowmobile to count numbers of anglers on a lake at predetermined times, and to interview anglers who have completed their fishing trip to collect data on what species they fished for, catch, harvest, lengths of fish harvested, marks (finclips or tags), and hours of fishing effort. Collecting completed-trip data provides the most accurate assessment of angling activities, and it avoids the need to disturb anglers while they are fishing.

A computer program is used to make projections of total catch and harvest of each species, catch and harvest rates, and total fishing effort, by month and for the year in total. Keep in mind that these are only projections based on the best information available, and not a complete accounting of effort, catch, and harvest. Accurate projections require that we sample a sufficient and representative portion of the angling activity on a lake. The accuracy of creel survey results, therefore, depends on good cooperation and truthful responses by anglers when a creel clerk interviews them.

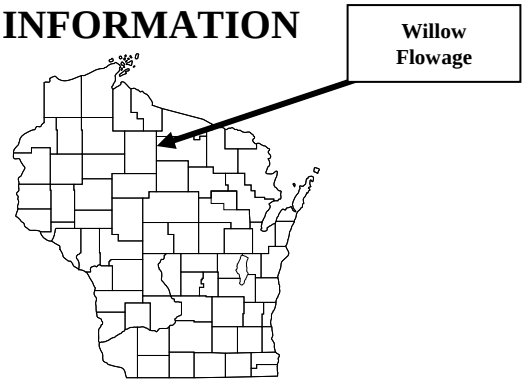
You may have encountered a DNR creel survey clerk on a recent fishing trip. We appreciate your cooperation during an interview. The survey only takes a moment of your time and it gives the Department valuable information needed for management of the fishery.

This report provides projections of:

1. Overall fishing effort (pressure)
2. Fishing effort directed at each species
3. Catch and harvest rates
4. Numbers of fish caught and harvested

Also included are a physical description of the lake; discussion of results of the survey; and detailed summaries, by species, of fishing effort, catch and harvest.

GENERAL LAKE INFORMATION



Location
The Willow Flowage is located in west central Oneida County southwest of the town of Hazelhurst.

Physical Characteristics
The Willow Flowage is a 6,036-acre impoundment of the Tomahawk and Willow Rivers with a maximum depth of 30 feet. Littoral substrate consists primarily of sand, gravel, rubble, boulder and with lesser amounts of muck. The Willow Flowage has soft, slightly acid, light brown water.

Seasons Surveyed
The period referred to in this report as the 2008-09 fishing season ran from May 3, 2008 through March 1, 2009. The open water creel survey ran from May 3 through October 31, 2008 and the ice fishing creel survey ran from December 1, 2008 through March 1, 2009.

Weather
Ice-out on Willow Flowage was around April 24, 2008. Fishable-ice formed on Willow Flowage in December.

Sportfishing Regulations
The following seasons, daily bag limits, and length limits were in place on Willow Flowage during the 2008-09-fishing season:

Species	Season	Bag Limit	Min. Size
Largemouth &	5/03-6/20	Catch&Release	
Smallmouth Bass	6/21-3/01	5	14"
Musky	5/24-11/30	1	34"
Northern Pike	5/03-3/01	5	none
Walleye	5/03-3/01	3	15"
Panfish	all year	25	none
Rock Bass	all year	none	none

SPECIES CATCH AND HARVEST INFORMATION

Angling information is summarized for each species (Figures 1-12) with effort and/or catch information. Information presented about species whose fishing season extends beyond March 1 should be considered minimum estimates. Each species page has up to five graphs depicting the following:

1. **PROJECTED FISHING EFFORT**
   Total calculated number of hours during each month that anglers spent fishing for a species.

2. **PROJECTED SPECIFIC CATCH AND HARVEST RATES**
   Calculated number of hours it takes an angler to catch or harvest a fish of the indicated species. Only information from anglers who were specifically targeting this species is

reported.

3. **PROJECTED CATCH AND HARVEST**
   Calculated number of fish of the indicated species caught or harvested by all anglers, regardless of targeted species.

4. **LENGTH DISTRIBUTION OF HARVESTED FISH**
   All fish of a species that were measured by the clerk during the entire creel survey season.

5. **LARGEST AND AVERAGE LENGTH OF HARVESTED FISH**
   Monthly largest and average length of harvested fish of a species. Only those fish measured by the creel survey clerk are reported.

CREEL SURVEY RESULTS AND DISCUSSION

Survey Logistics
The creel survey went well. We encountered no unusual problems conducting the bus route survey or calculating the projections contained in the report

General Angler Information
Anglers spent 148,657 hours or 28.9 hours per acre fishing the Willow Flowage during the 2008-09 season (Table 1). That was lower than the statewide average of 33.6 hours per acre and the Oneida County average of 37.2 hours per acre. May was the most heavily fished month (6.4 hours per acre).

SPECIES INFORMATION

Walleye (Table 2; Figure 1)
Walleye received the most fishing pressure on the Willow Flowage during the 2008 season. Anglers spent 104,062 hours targeting walleye. Walleye fishing effort was greatest in May (27,078 hours). October (2,637 hours) received the least walleye effort.

Anglers caught 41,129 walleye and harvested 9,582 walleye from the Willow Flowage during the 2008 season. The 2008 projected harvest of walleye was 2.6 times higher than the 1994 harvest of 3,610 fish. Highest catch (14,503 fish) and harvest (4,038 fish) occurred in May. Anglers fished 2.3 hours to catch and 10.2 hours to harvest a walleye during the 2008 open water season. Ice anglers fished 13.9 hours to catch and 30.4 hours to harvest during the winter of 2008.

The mean length of harvested walleye was 16.6 inches and the largest walleye measured was a 24.8-inch fish harvested in June.

Northern Pike (Table 2; Figure 2)
Northern Pike anglers spent 18,080 hours fishing the Willow Flowage during the 2008 season. Northern pike fishing effort was greatest in January (5,629 hours).

Anglers caught 32,134 northern pike and harvested 3,870 fish from the Willow Flowage during the 2008 season. Highest catch (14,186 fish) and harvest (1,405 fish) occurred in May. Anglers fished 2.9 hours to catch and 13.2 hours to harvest a northern pike during the summer of the 2008 season. Winter anglers fished 4.3 hours to catch and 14.0 hours to harvest during the 2008 season.

Muskellunge (Table 2; Figure 3)
Muskellunge anglers spent 1,535 hours fishing the Willow Flowage during the 2008 season. Muskellunge fishing effort was greatest in August (828 hours).

During the 2008 survey anglers caught 118 muskies with no fish harvested. Highest catch (54 fish) occurred in July. Anglers fished 106 hours to catch a muskellunge during 2008.

Smallmouth Bass (Table 2; Figure 4)
Fishing effort targeted at smallmouth bass was 4,420 hours during the 2008 season. Smallmouth bass fishing effort was greatest in July (1,525 hours).

Catch was 10,672 fish and harvest was 387 fish. Highest catch (3,140 fish) occurred in May and harvest (180 fish) occurred in July. Anglers fished 5.7 hours during the summer of 2008 to catch a smallmouth bass.

The largest smallmouth bass measured during the survey was a 20.3-inch fish harvested in August.

Largemouth Bass (Table 2; Figure 5)
Only 2,184 hours of fishing effort were directed at largemouth bass during the 2008 season.

Catch was 970 largemouth bass with a harvest of 205 fish. Highest catch (318 fish) occurred in August.

Panfish (Table 2; Figures 6-10)
Panfish accounted for 45 percent of the total directed effort or 106,129 angling hours during the 2008 season.

Black Crappie (Table 2; Figure 10)
Black crappie was the most sought after panfish species during the 2008 season with 14 percent of the total directed effort.

Anglers fished 33,103 hours for black crappie during the 2008 season. Black crappie fishing effort was greatest in August (7,815 hours).

Catch was 35,597 black crappie with a harvest of 22,463 fish during the 2008 season. Highest catch occurred in August (8,881 fish) and harvest (5,612 fish) occurred in October. Anglers fished 1.1 hours to catch and 1.6 hours to harvest a black crappie during the summer of 2008. Winter anglers fished 3.5 hours to catch and 4.6 hours to harvest a black crappie during 2008.

The mean length of harvested lake black crappie was 10.0 inches and the largest black crappie measured was a 14.6-inch fish harvested in May.

Yellow Perch (Table 2; Figure 6)
Anglers fished 30,819 hours for yellow perch during the 2008 season. 2008 yellow perch fishing effort was greatest in August (7,423 hours).

The 2008 catch of yellow perch was 20,968 fish with a harvest of 10,185 fish. During the summer of 2008 it was estimated to take 2.2 hours to catch and 4.3 hours to harvest a yellow perch.

The mean length of harvested yellow perch was 9.5 inches and the largest yellow perch measured was a 13.3-inch fish harvested in January.

Bluegill (Table 2; Figure 7)
Bluegill was the third most sought after panfish species during the 2008 season with 11.6 percent of the total directed effort. Anglers fished 27,448 hours for Bluegill during the 2008 season. Bluegill fishing effort was greatest in August (7,219 hours).

Anglers caught 29,288 fish and harvest 16,528 fish during the 2008 season. Highest catch (9,401 fish) and harvest (5,140 fish) occurred in August. Anglers fished 72 minutes to catch and 2.0 hours to harvest a bluegill during the summer of 2008.

The mean length of harvested bluegill was 7.8 inches and the largest bluegill measured was a 10.6-inch fish harvested in July.

Other panfish caught during the survey included pumpkinseed (8,892 caught) and rock bass (542 caught).

ACKNOWLEDGMENTS

Completion of this survey was possible because of the efforts of the technical staff of the Treaty Fisheries Unit. Treaty staff responsible for ensuring completion of this survey include Jeff Blonski, Joelle Underwood, Steve Kramer and Tim Tobias. Jason Halverson and John Davis were the creel clerks on the Willow Flowage during the survey period.

We also thank Wisconsin Valley Improvement Company and DNR fish management staff who worked in conjunction with the creel survey performing a netting and shocking survey of the fish community.

We also thank all the anglers who took the time to offer information about their fishing trip to the survey clerk. Without their cooperation, the survey would not have been possible.

This creel survey report was reviewed by Mike Coshun, John Kubisiak and Dennis Scholl of the Wisconsin Department of Natural Resources, Woodruff, Wisconsin.

Additional copies of this report, and those covering other local lakes, can be obtained from the Woodruff DNR. Requests should be directed to:

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Michael.Coshun@wisconsin.gov

Table 1. Sportfishing effort summary, Willow Flowage, 2008-09 season.

Month	Total Angler Hours	Total Angler Hours/Acre	Oneida County Average Hours/Acre	Statewide Average Hours/Acre
May	32633	6.4	5.4	5.8
June	27070	5.3	7.3	6.1
July	29649	5.8	8.3	6.4
August	24173	4.7	6.3	5.4
September	10118	2.0	3.7	3.8
October	7057	1.4	1.7	1.6
December	4947	1.0	1.2	1.7
January	7643	1.5	1.5	1.5
February	5263	1.0	1.5	1.3
March	104	0.0	0.2	**
*Summer Total	130700	25.5	32.8	29.1
*Winter Total	17957	3.5	4.4	4.5
Grand Total	148657	28.9	37.2	33.6

*"Summer" is May-October; "Winter" is December-March
**Too few lakes have been surveyed in March to give a meaningful statewide average.

Total Angler Hours is the estimated total number of hours that anglers spent fishing on Willow Flowage during each month surveyed.

Total Angler Hours/Acre is the total angler hours divided by the area of the lake in acres. This is useful if you wish to compare effort on Willow Flowage to other lakes.

County Average Hours/Acre is the average angler effort in hours per acre for county lakes that have been surveyed since 1990. This value can be useful in comparisons as well.

Statewide Average Hours/Acre is the average angler effort in hours per acre for inland lakes in the state surveyed between 1990 and 1995. This value can be used to compare Willow Flowage to other lakes statewide.

Table 2. Comparison of creel survey synopses, Willow Flowage, 2008-09 and 1994-95 fishing seasons.

CREEL YEAR: 2008-09

SPECIES	DIRECTED EFFORT (Hours)	PERCENT OF TOTAL	TOTAL CATCH	SUMMER SPECIFIC CATCH RATE (Hrs/Fish) *	WINTER SPECIFIC CATCH RATE (Hrs/Fish) *	TOTAL HARVEST	SUMMER SPECIFIC HARVEST RATE (Hrs/Fish) **	WINTER SPECIFIC HARVEST RATE (Hrs/Fish) **
Walleye	104062	44.02%	41129	2.3	13.9	9582	10.2	30.4
Northern Pike	18080	7.65%	32134	2.9	4.3	3870	13.0	14.0
Muskellunge	1535	0.65%	118	106.4		0		
Smallmouth Bass	4420	1.87%	10672	5.7	14.1	387	93.5	
Largemouth Bass	2184	0.92%	970	15.3		205	32.7	
Yellow Perch	30819	13.04%	20968	2.2	4.8	10185	4.3	9.9
Bluegill	27448	11.61%	29288	1.2	1.2	16528	2.0	1.8
Pumpkinseed	14562	6.16%	8892	2.5	12.5	4588	4.7	12.5
Rock Bass	197	0.08%	542	11.2		4		
Black Crappie	33103	14.00%	35597	1.1	3.5	22463	1.6	4.6

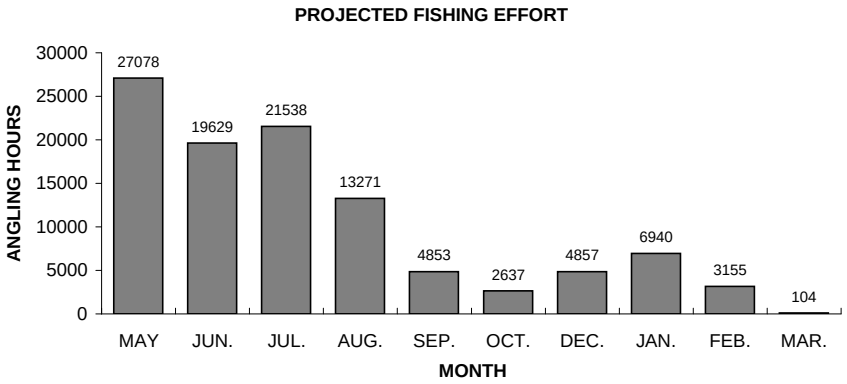
* A blank cell in this column indicates that no fish of a given species were caught by anglers who specifically targeted that species.

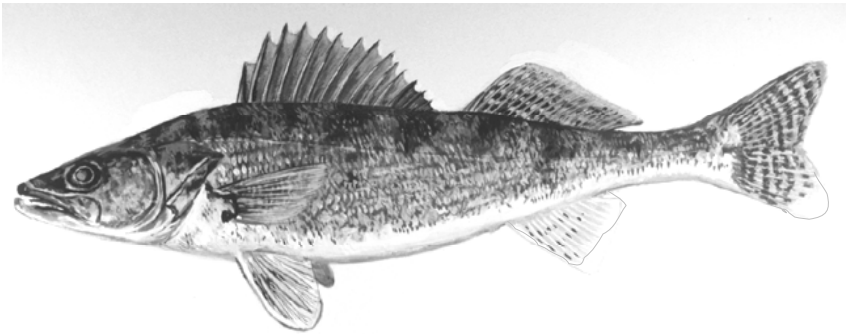
** A blank cell in this column indicates that no fish of a given species were harvested by anglers who specifically targeted that species.

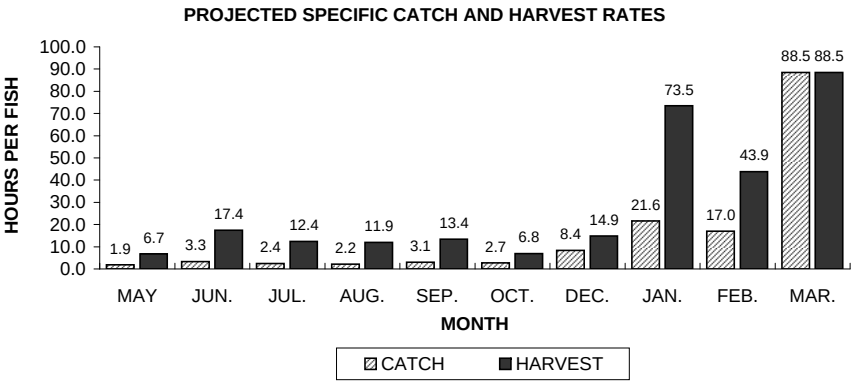
CREEL YEAR: 1994-95

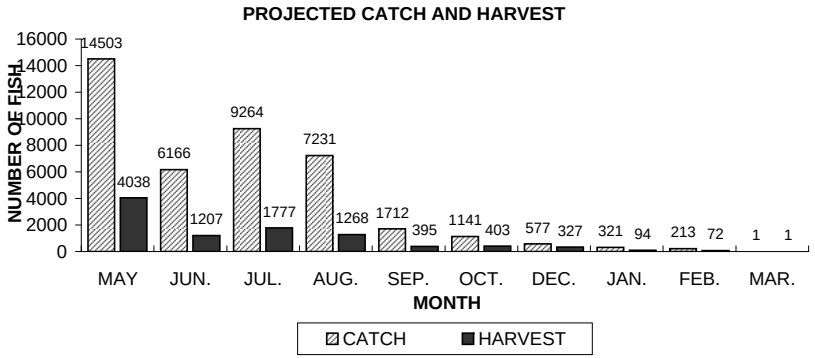
SPECIES	DIRECTED EFFORT (Hours)	PERCENT OF TOTAL	TOTAL CATCH	SUMMER SPECIFIC CATCH RATE (Hrs/Fish) *	WINTER SPECIFIC CATCH RATE (Hrs/Fish) *	TOTAL HARVEST	SUMMER SPECIFIC HARVEST RATE (Hrs/Fish) **	WINTER SPECIFIC HARVEST RATE (Hrs/Fish) **
Walleye	117512	36.16%	20483	5.8	13	3610	33.8	40.7
Northern Pike	21580	6.64%	25533	16.0	6.4	2816	23.9	12.6
Muskellunge	3510	1.08%	177	32.2		12	303.0	
Smallmouth Bass	1087	0.33%	179	95.2		12		
Largemouth Bass	3063	0.94%	702	14.9		92	63.3	
Yellow Perch	44251	13.62%	17821	3.5	3.3	11734	4.9	3.7
Bluegill	55616	17.11%	31717	1.9	24.8	14195	4.1	24.8
Pumpkinseed	15747	4.85%	4681	3.8	7.5	2885	6.4	7.5
Rock Bass	6907	2.13%	889	9.7		468	18.9	
Black Crappie	55693	17.14%	11511	5.8	4.5	8829	7.8	4.6

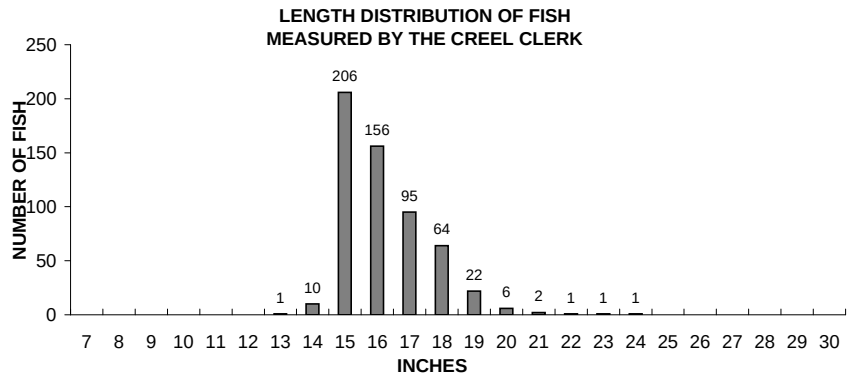
WALLEYE











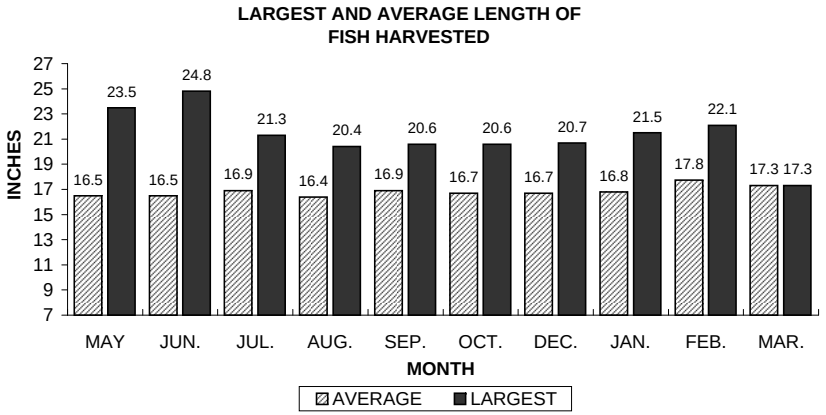
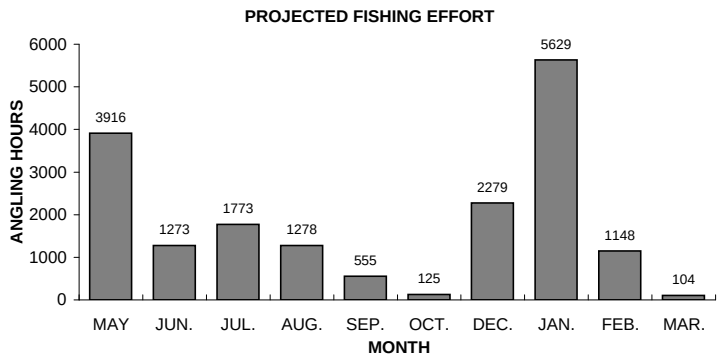
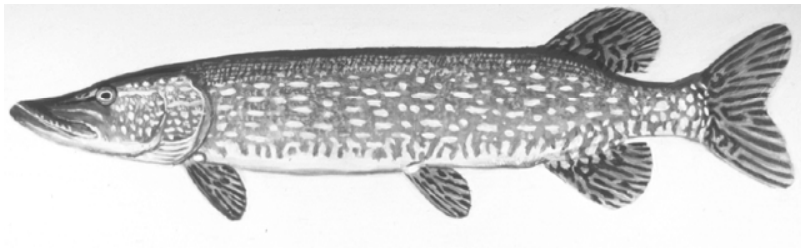
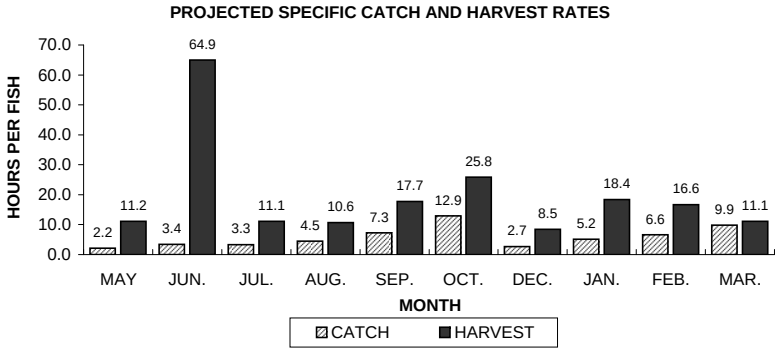


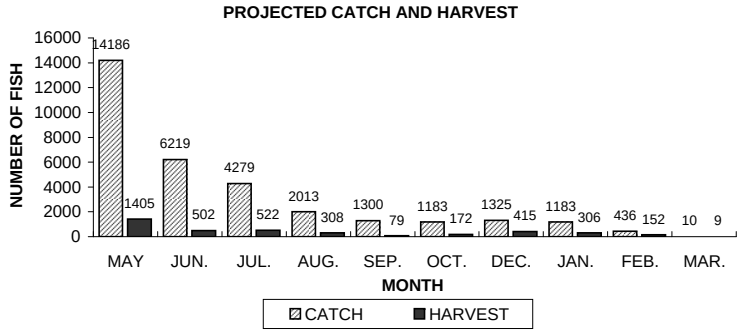
Figure 1. Walleye sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

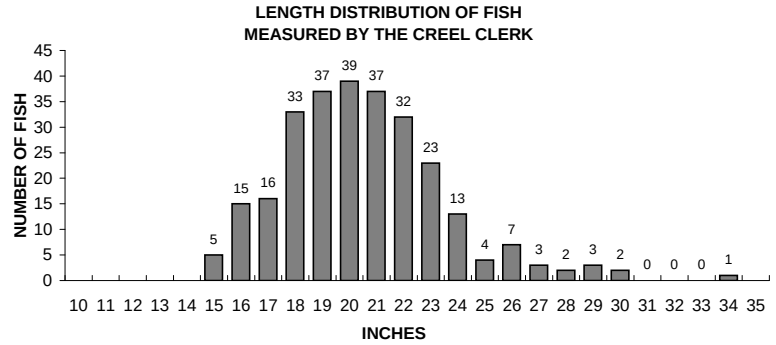


NORTHERN PIKE









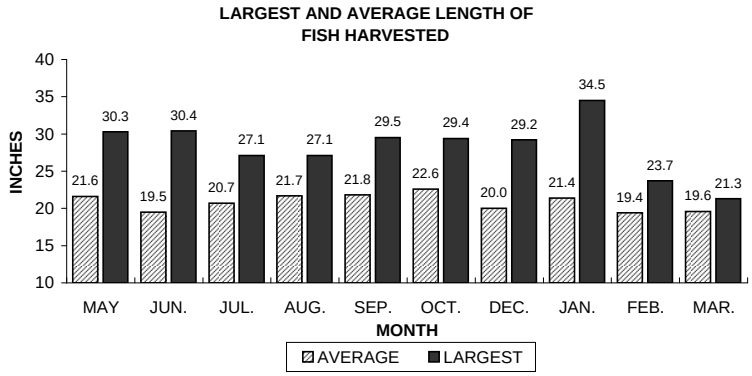
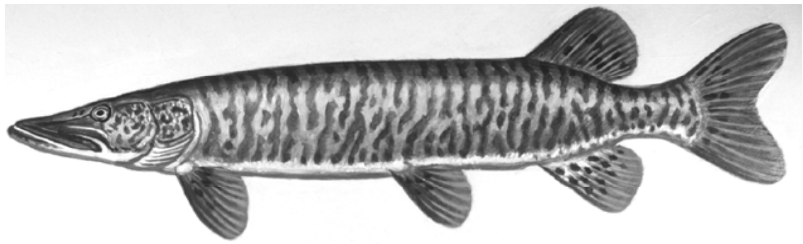
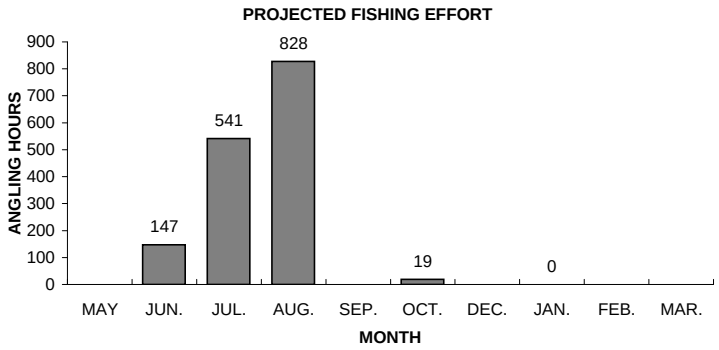
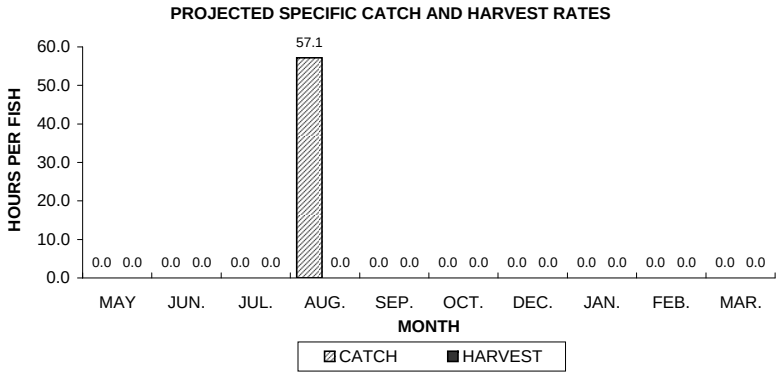


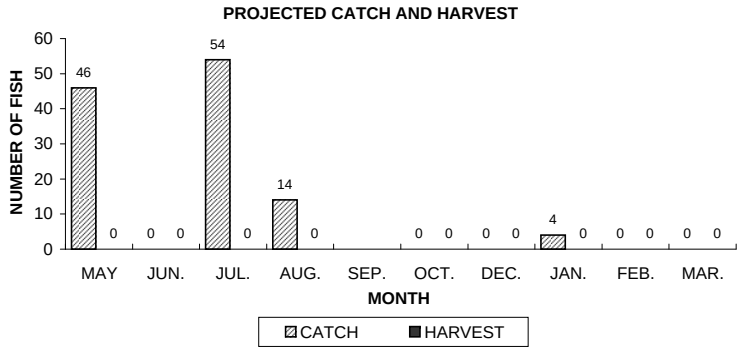
Figure 2. Northern pike sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

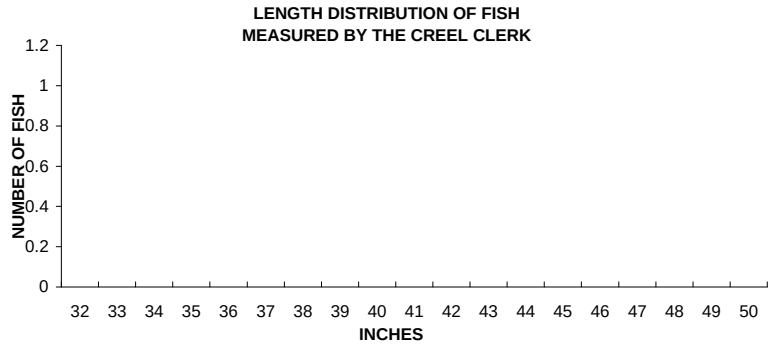
MUSKELLUNGE











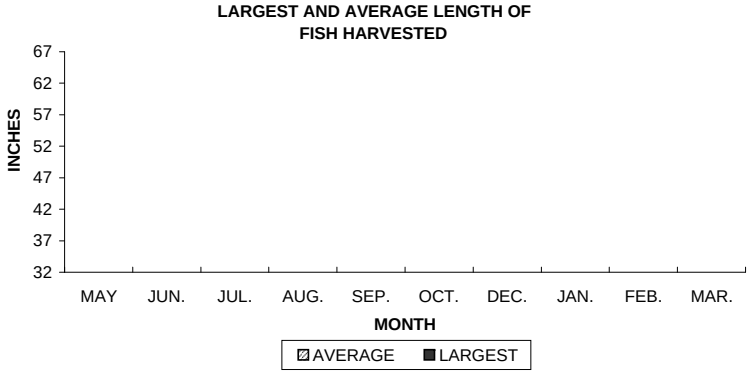
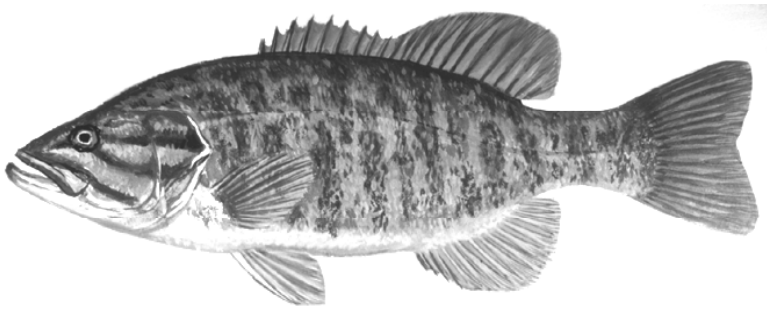
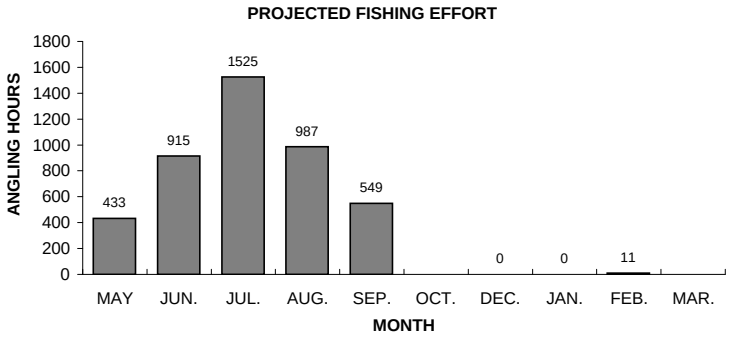
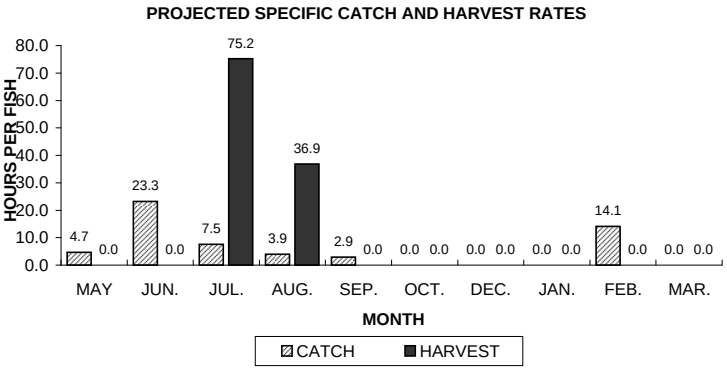


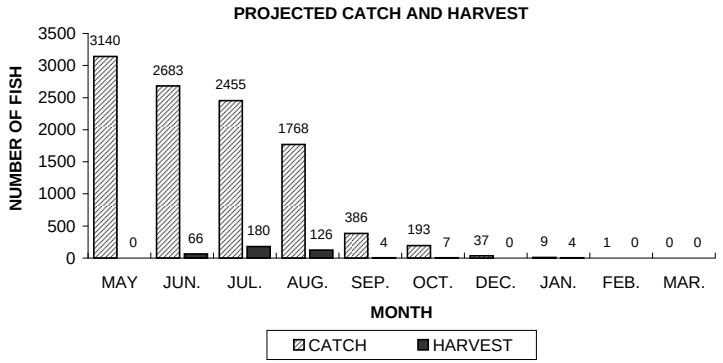
Figure 3. Muskellunge sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

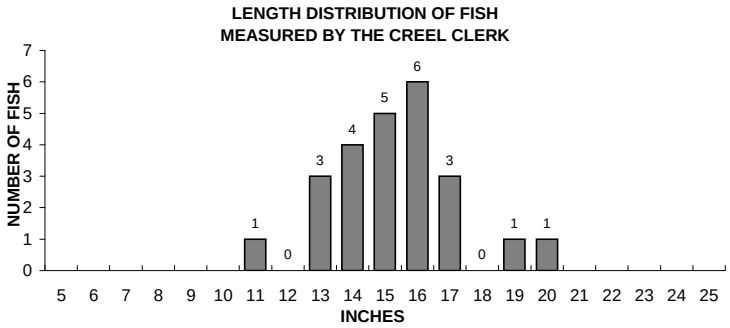
SMALLMOUTH BASS











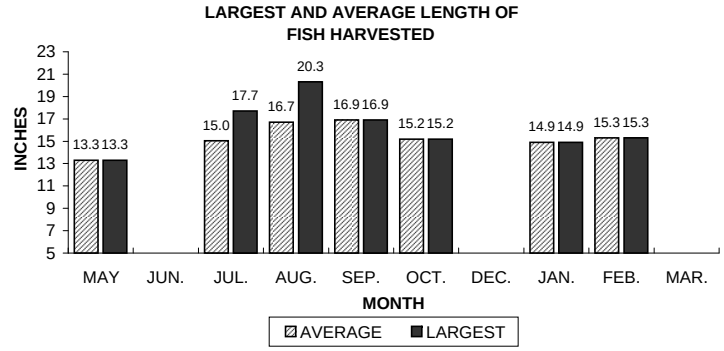
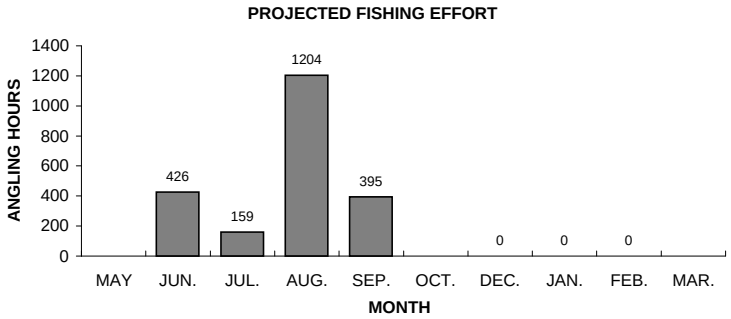
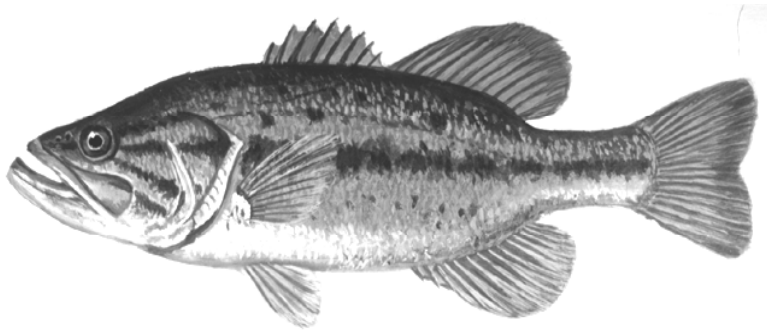
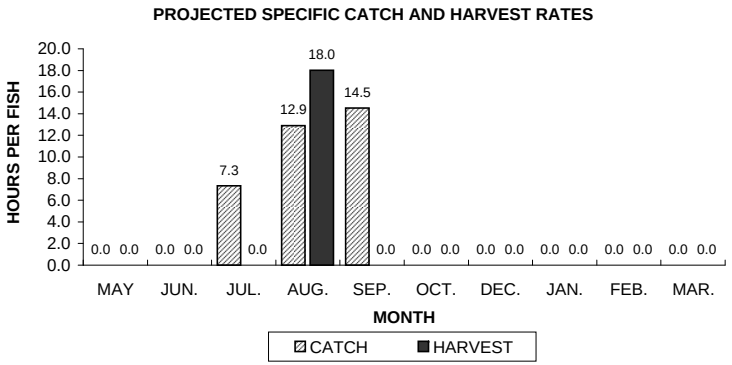


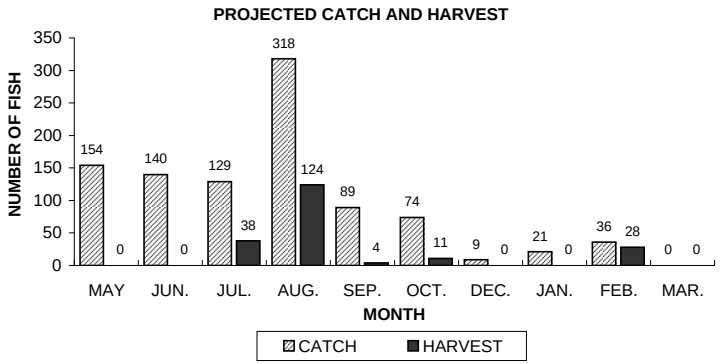
Figure 4. Smallmouth bass sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

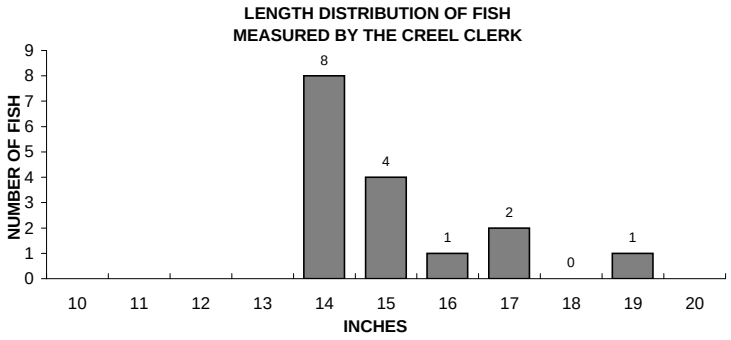
LARGEMOUTH BASS











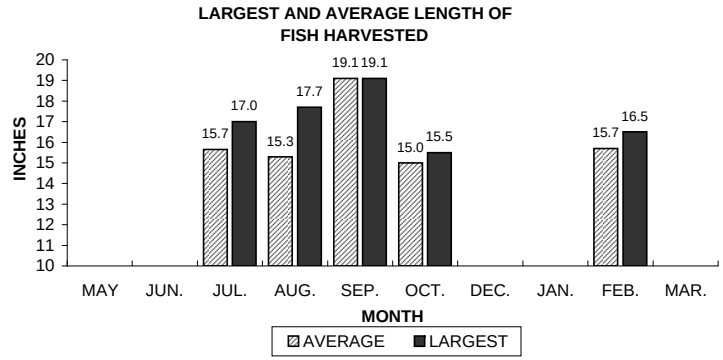
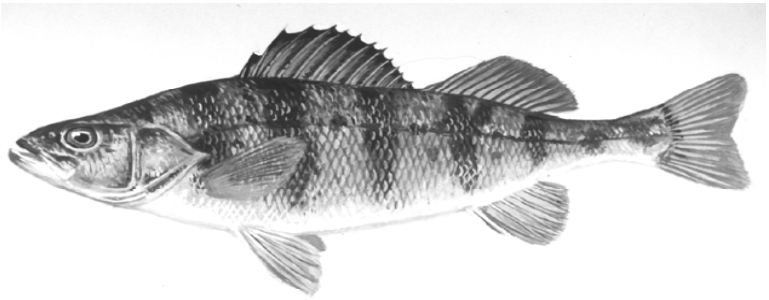
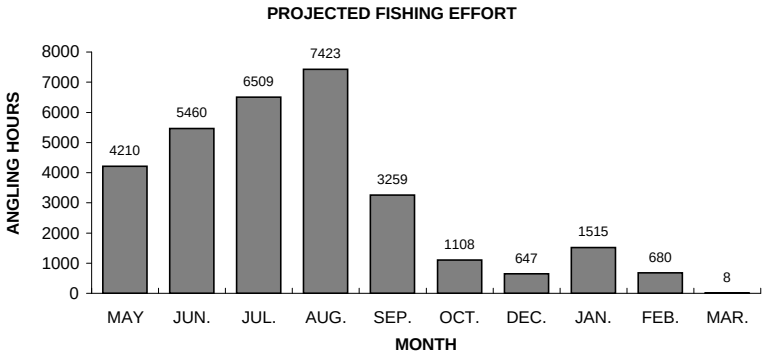
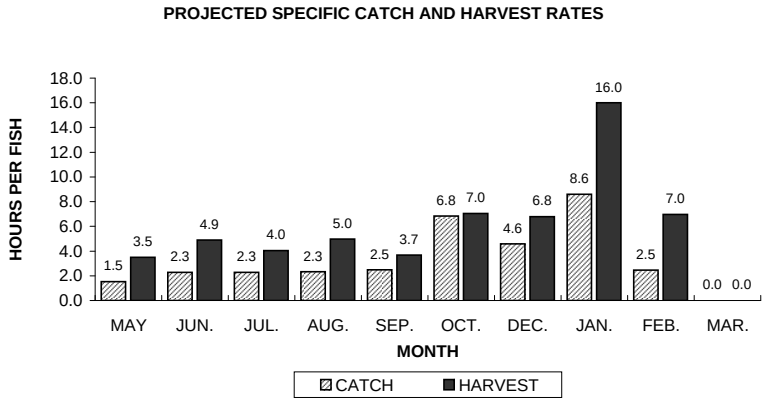


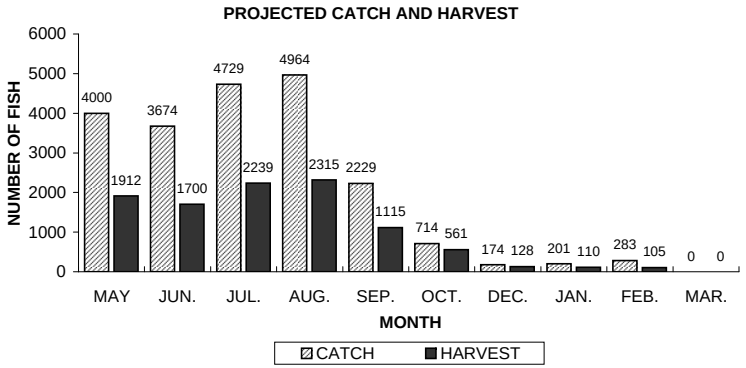
Figure 5. Largemouth bass sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

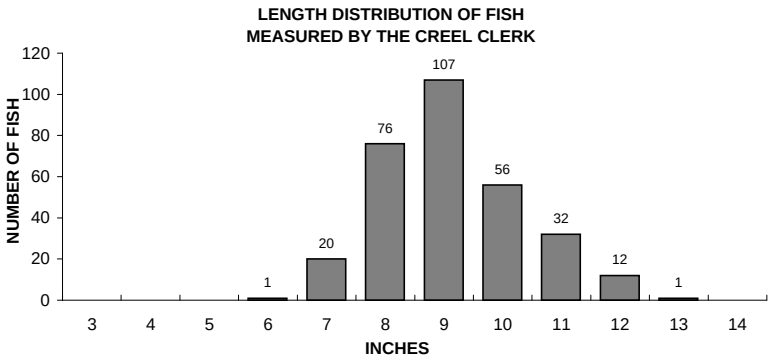
YELLOW PERCH











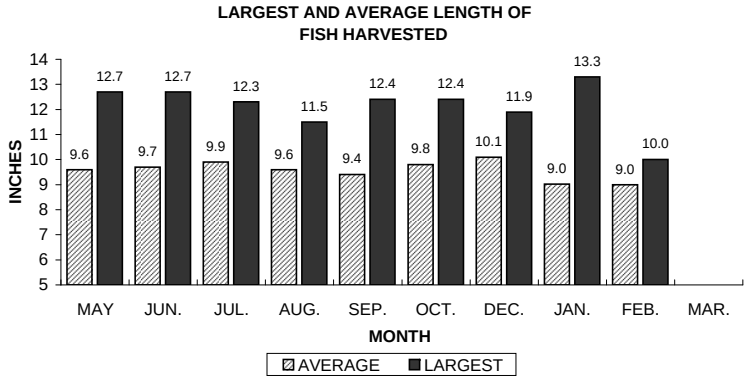
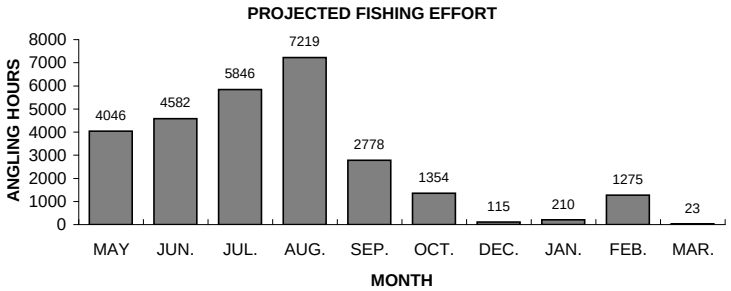
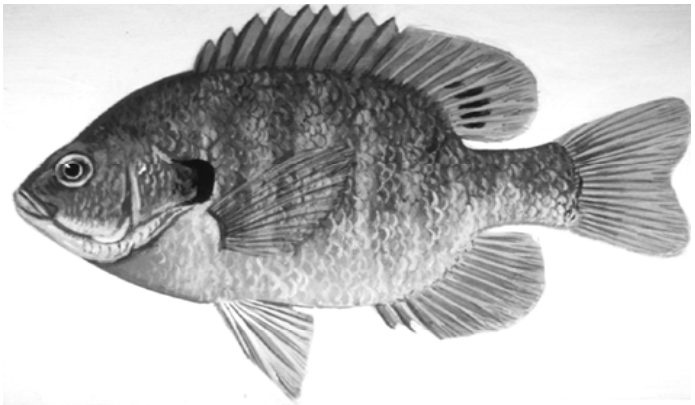
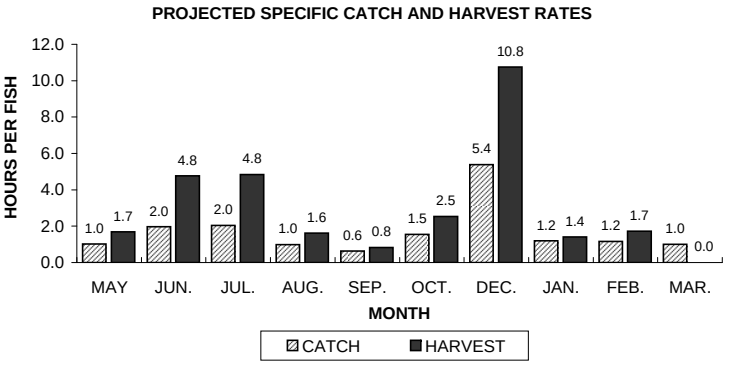


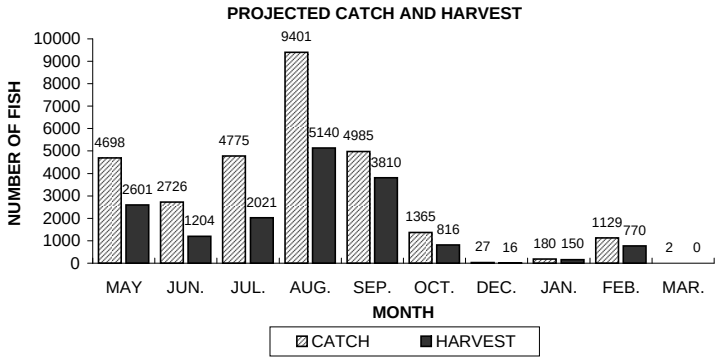
Figure 6. Yellow perch sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

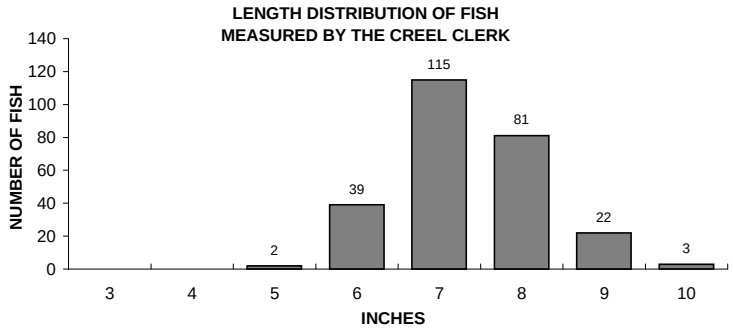
BLUEGILL











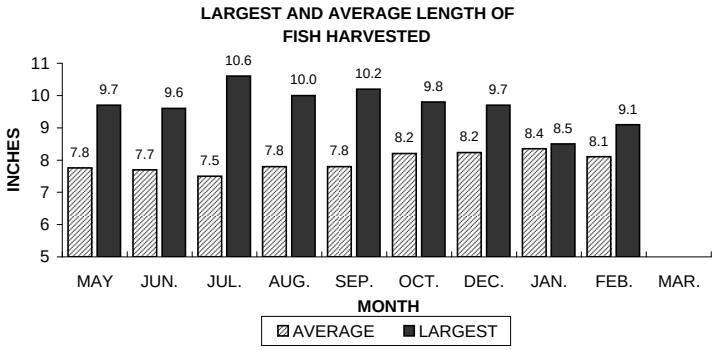
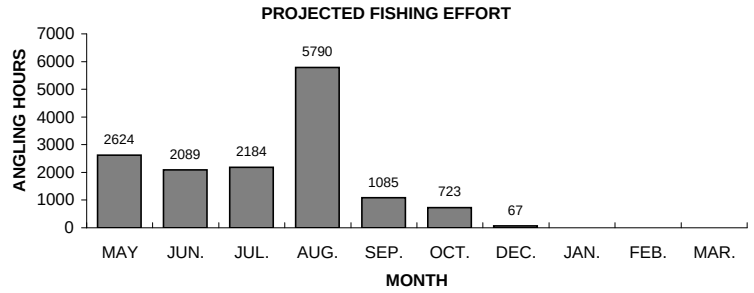
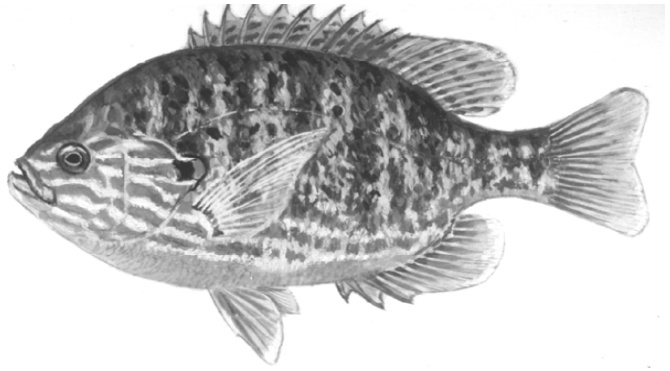
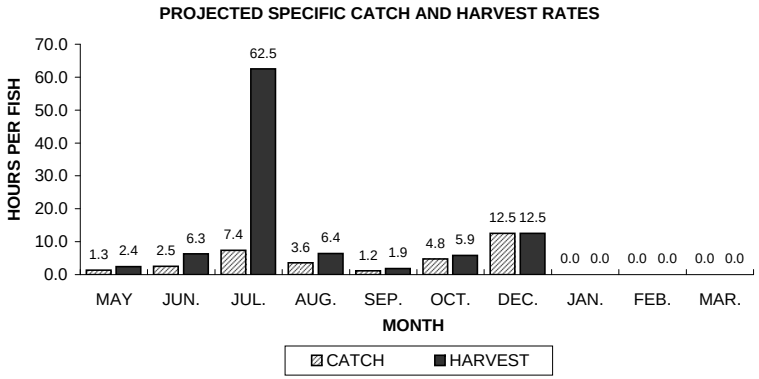


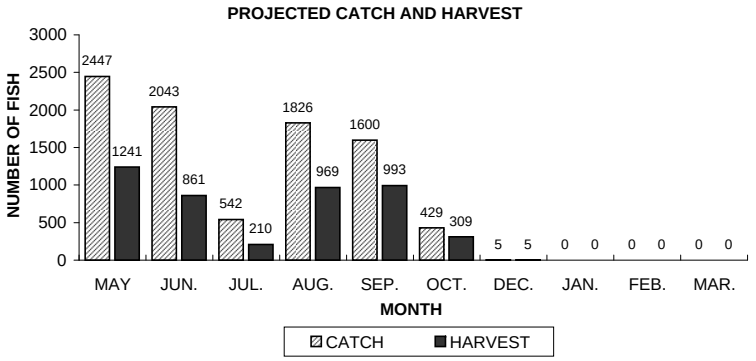
Figure 7. Bluegill sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

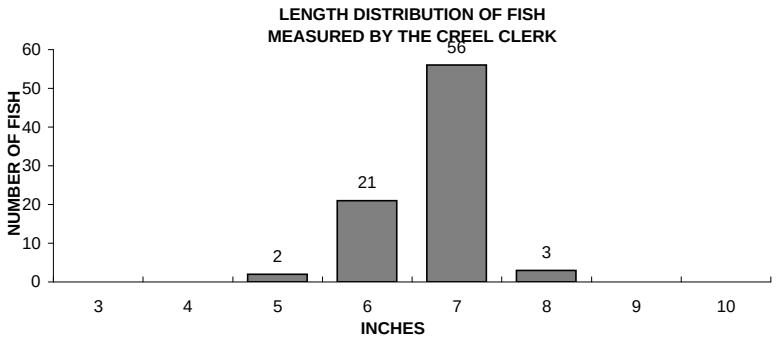
PUMPKINSEED











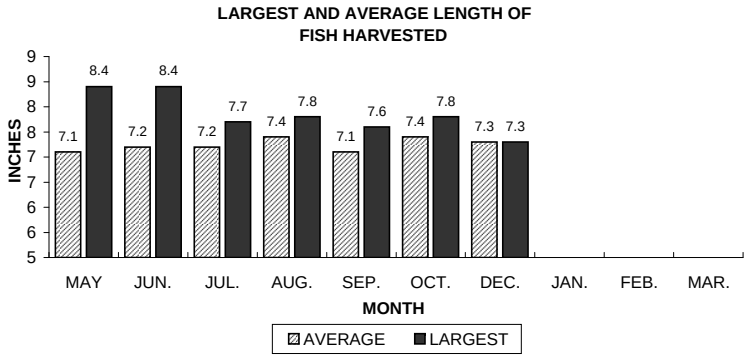
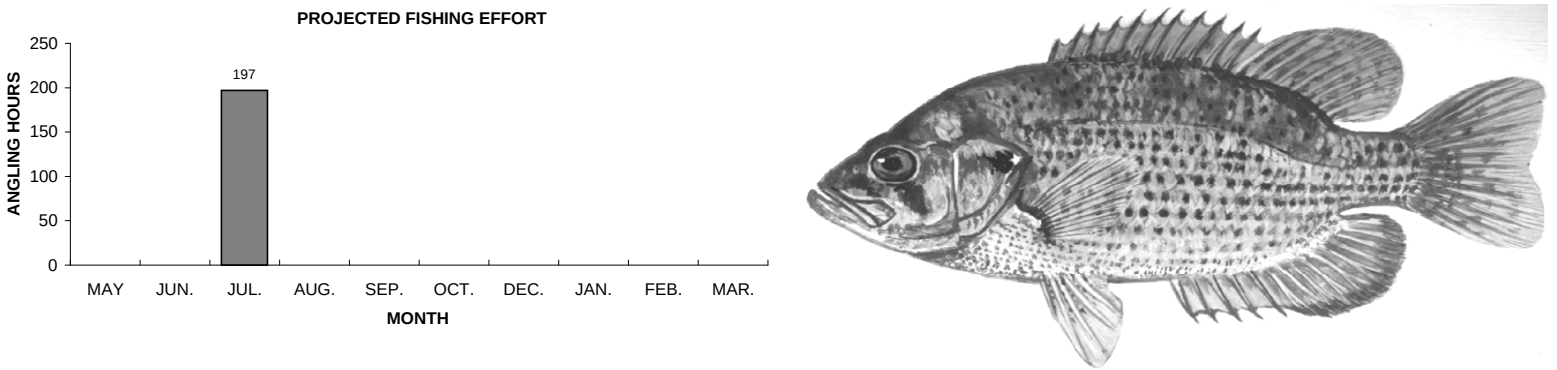
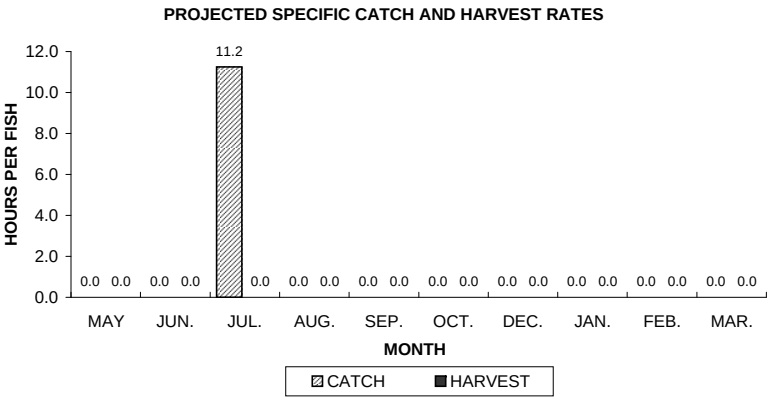
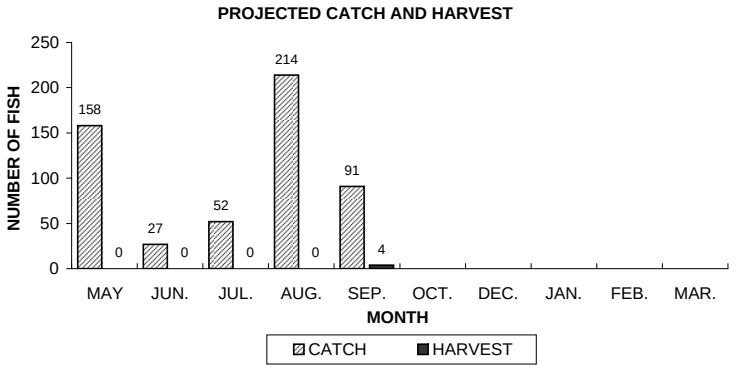


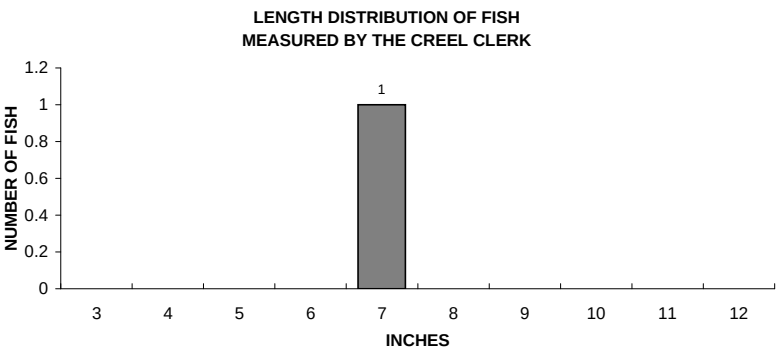
Figure 8. Pumpkinseed sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

ROCK BASS









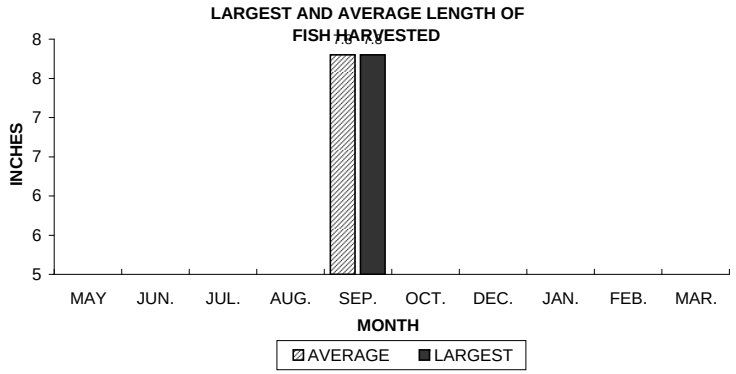
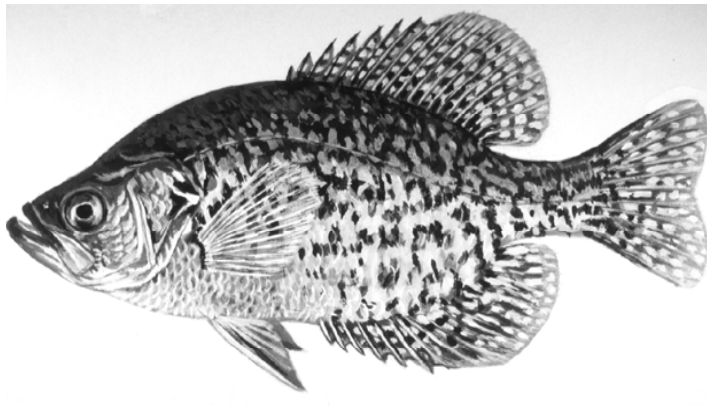
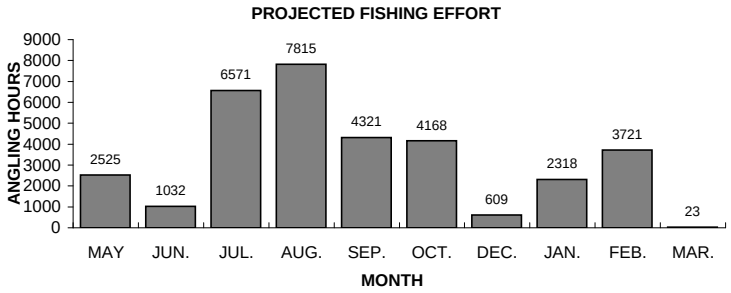
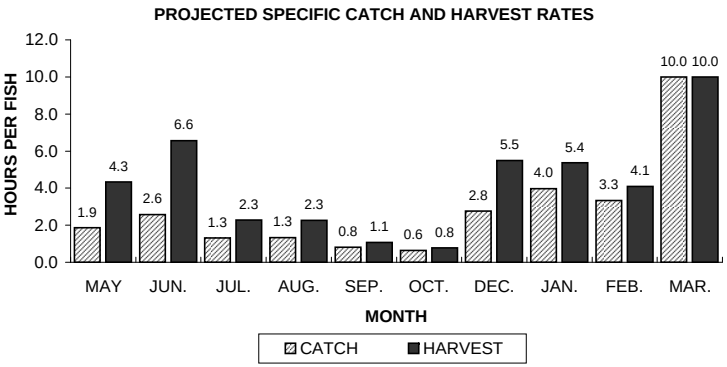


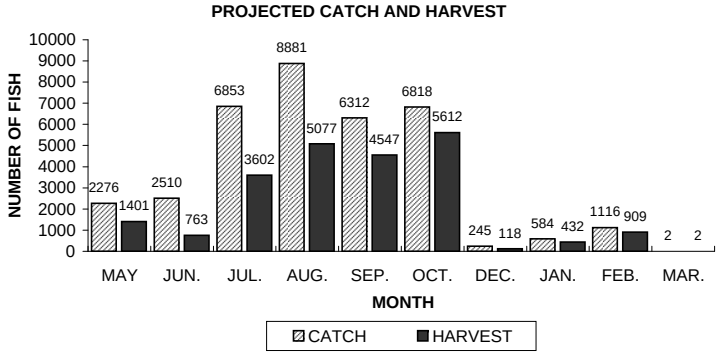
Figure 9. Rock bass sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.

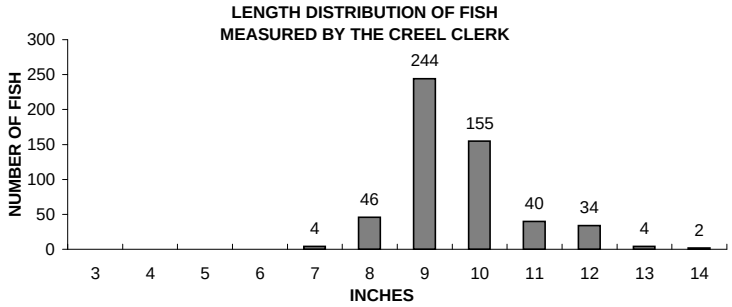
BLACK CRAPPIE











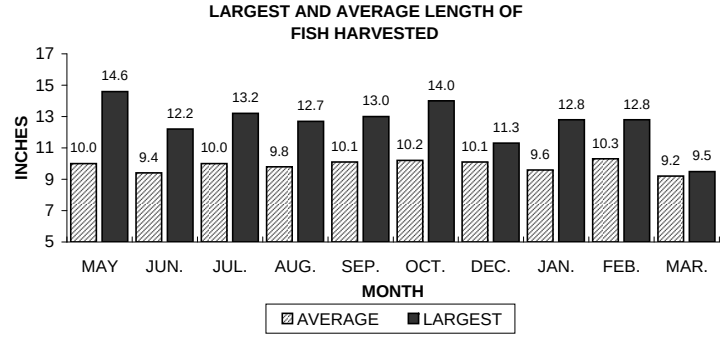


Figure 10. Black crappie sportfishing effort, catch, harvest, and length distribution, Willow Flowage, during 2008-09.