

Robinson Lake

Fish and Wildlife Research and Management Notes

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Title: Maintenance of a Quality Largemouth Bass Population at Robinson Lake

ABSTRACT

Robinson Lake is a 59-acre natural lake in northwest Whitley and eastern Kosciusko Counties, Indiana. Crossland Scout Reservation (Boy Scouts of America) encompassed almost three-fourths of the shoreline and except for a small swimming beach, maintained the shoreline in its natural state. Private landowners on the south and east shores also maintained the natural shoreline except for a small boat ramp and two piers. The only access for the public was through a long, unimproved lane to the private fee ramp on the south shore. The Department of Natural Resources (DNR) purchased the Crossland property in 1992. It was renamed Deniston Resource Area and officially opened to the public in 1994. A gravel launch site and parking lot were constructed at the former beach area in 1994.

A fisheries survey was conducted in 1993 which included a largemouth bass population estimate. The estimate of 30.4 bass per acre was one of the highest in Indiana natural lakes. Over 8 percent of the bass population was 18 inches. New largemouth bass regulations became effective in August 1996 by emergency rule. The bag limit was reduced from six to two bass per day and the size limit increased from 12 to 18 inches. Work Plan #95492 was approved in 1995 to measure the impact of the regulation changes on the fishery. An angler creel survey was conducted 4 April-23 September 1999 to measure fishing pressure, harvest and preferences. Largemouth bass sampling for a population estimate was conducted 26 April-19 May 1999 to obtain an estimate of bass abundance. A general fisheries survey was conducted 14-16 June 1999 to obtain general population information and length-weight data for creel survey yield estimates

Estimated fishing pressure for the six month survey period was 135.85 hours per acre with 36 percent occurring in May and 20 percent in June. Of the 757 people interviewed, 39 percent were Whitley County residents and 21 percent were Kosciusko County residents. Anglers fished Robinson Lake an average of 12 times per year. Thirty-one percent of anglers said the quality of fishing at Robinson Lake was staying the same, another 18 percent said it was improving. When asked to rate their support for the bass regulations, 91 percent supported it. Bass anglers were most supportive while bluegill anglers were most opposed.

Total estimated harvest was 3,810 fish of eight species. Bluegill accounted for 66.3 percent of the harvest with 39 percent of the bluegill harvest occurring in May and 32 percent in June.

An estimated 22 largemouth bass were harvested from Robinson Lake. Length range of harvested bass was 18.0-21.0 inches. An estimated 2,504 bass were released.

Estimated crappie harvest was 778 while estimated release was 378. Over 90 percent of the crappie harvest occurred in May. Ninety-two percent of harvested crappies were >8.0 inches.

Other fish harvested included redear sunfish, brown and yellow bullheads, warmouth and yellow perch. The Schnabel estimate for bass 8 inches was 41 per acre, higher than the 1993 and 1996 estimates. RSD-18 declined to 4.25 percent. CPUE of bass 18 inches increased to 5.9 per hour but was still less than the 10 per hour goal of the project.

Management recommendations are made.

INTRODUCTION

Robinson Lake is a 59-acre natural lake in northwest Whitley and eastern Kosciusko Counties, Indiana. This is one of the last natural lakes in Indiana with almost no development on the shoreline. Crossland Scout Reservation (Boy Scouts of America) encompassed almost three-fourths of the shoreline and except for a small swimming beach, maintained the shoreline in its natural state. Private landowners on the south and east shores also maintained the natural shoreline except for a small boat ramp and two piers. The only access for the public was through a long, unimproved lane to the private fee ramp on the south shore. Fishing pressure therefore remained very light through the years. The Department of Natural Resources (DNR) purchased the Crossland property in 1992. It was renamed Deniston Resource Area and officially opened to the public in 1994. A gravel ramp and parking lot were constructed at the former beach area in 1994.

A fisheries survey was conducted in 1993 which included a largemouth bass population estimate (Braun 1994). The estimate of 30.4 bass per acre was one of the highest in Indiana natural lakes (Pearson 1995). Over 8 percent of the bass population was 18 inches. To prevent over-exploitation of this fishery with the expected increase in fishing pressure when the property was opened to the public, changes in the largemouth bass size and bag limit were proposed for Robinson Lake. The new regulations became effective in August 1996 by emergency rule. The bag limit was reduced from six to two bass per day and the size limit increased from 12 to 18 inches. Work Plan #95492 was approved in 1995 to measure the impact of the regulation changes on the fishery. An angler creel survey was conducted 4 April-23 September 1999 to measure fishing pressure, harvest and preferences after implementation of the regulation changes. Largemouth bass sampling for a population estimate was conducted 26 April-19 May 1999 to obtain an estimate of bass abundance. A general fisheries survey was conducted 14-16 June 1999 to obtain general population information and length-weight data for creel survey yield estimates.

METHODS

The standard small lake creel survey methods were used (Hudson and Shipman 1980). The fishing day was defined as lasting 16 hours from 6 a.m. until 10 p.m. The creel survey analyst worked either "A period" (6:30 a.m.-2:00 p.m.) or "B period" (2:00 p.m.-9:30 p.m.) on three weekend days and seven weekdays each two-week interval. The number of people fishing each hour was recorded. The creel analyst attempted to interview anglers as they left the lake to obtain complete fishing trip information.

Each fishing party was interviewed to determine the length of fishing trip, species fishing for, species, size, and number of fish harvested, species and number of fish released, number of people in the party, county of residence, how many times they fished Robinson Lake this year, and whether they were satisfied with the fishing trip that day. Anglers were asked to answer the question: “Do you think the quality of fishing at this lake is improving, declining, or staying the same?” Anglers were also asked to rate their support for the change in largemouth bass regulations on a scale of one to five with one for strongly support to five for strongly oppose. Data were kept separate for weekend, weekday, boat and shore anglers by month. Weight of fish harvested was calculated using length-weight data collected during the general fisheries survey. The Schnabel mark-recapture method was used to estimate size of the largemouth bass population. Largemouth bass were collected one night each week for five weeks using dc electrofishing gear. Largemouth bass were collected on one lap around the lake in 15 minute segments. All bass were fin-clipped, measured to the nearest 0.1 inch and recaptures recorded then released near the middle of each sampling station.

RESULTS AND DISCUSSION

Creel Survey

During the six months of this creel survey the creel analyst interviewed 757 anglers on Robinson Lake ([Table 1](#)). Boat anglers accounted for 88.9 percent of all interviews with weekend boat anglers accounting for 50.7 percent of the interviews. Shore fishing opportunities are limited by heavy vegetative cover of trees and shrubs along the shoreline and heavy emergent and submergent vegetation in shallow water. Interviewed anglers fished a total of 2638.83 hours for an average of 3.35 hours per fishing trip. Weekend boat anglers accounted for 54.7 percent of all interview hours and averaged 3.71 hours per trip. Weekday boat anglers accounted for 40.3 percent of all interview hours and averaged 3.48 hours per trip. May weekday boat anglers averaged the longest fishing trips at 4.42 hours. Weekend boat anglers in May averaged 4.18 hours per trip and weekend boat anglers in July averaged 4.32 hours per trip. Shore anglers averaged 1.62 hours per trip for the six months. July weekend shore anglers averaged 3.25 hours per trip and May weekday shore anglers averaged 2.19 hours per trip.

Total estimated (expanded) fishing pressure for the six months of this creel survey was 8,015.10 hours or 135.85 hours per acre ([Table 2](#)). May was the busiest month when 35.9 percent of fishing pressure occurred. April was the slowest month with 4.9 percent of the fishing pressure. Boat anglers accounted for 93.2 percent of all fishing pressure with weekend boat anglers accounting for 55.5 percent. Shore anglers accounted for 6.8 percent of all fishing pressure.

Anglers came from 23 counties in Indiana and one other state ([Table 3](#)). Of the 757 people interviewed, two people did not give a response to the county of residence question. Whitley County accounted for the most anglers with 39 percent followed by Kosciusko County with 21.4 percent. Allen County residents represented 14.5 percent of anglers fishing Robinson Lake.

Responses to the question of how many times they fished Robinson Lake per year varied from 1 to 126. Average number of times anglers fished the lake was 12.1 times ([Table 4](#)). Monthly averages varied from 7.5 in September to 19 in May. Thirty-one percent of the anglers

interviewedsaid the quality of fishing at Robinson Lake was staying the same ([Table 5](#)). Another 17.7 percent said it was improving. Over 41 percent of the interviewed anglers gave no response or said they “didn’t know.”

Table 1. Number of People Interviewed and Hours Fished on Robinson Lake, 1999.

Month	Day	B/S	# Anglers Interviewed	Int. Hrs.
April	WD	B	0	0.00
April	WD	S	2	1.00
April	WE	B	9	26.67
April	WE	S	0	0.00
May	WD	B	71	308.08
May	WD	S	21	21.67
May	WE	B	94	347.67
May	WE	S	7	10.92
June	WD	B	82	367.58
June	WD	S	9	9.08
June	WE	B	98	385.50
June	WE	S	17	34.42
July	WD	B	61	217.50
July	WD	S	5	4.58
July	WE	B	67	280.00
July	WE	S	3	9.75
Aug.	WD	B	40	118.58
Aug.	WD	S	5	7.00
Aug.	WE	B	52	230.75
Aug.	WE	S	7	15.08
Sept.	WD	B	35	88.42
Sept.	WD	S	2	1.33
Sept.	WE	B	64	172.17
Sept.	WE	S	15	18.25
Total			757	2676.00

Among preference groups with more than 20 respondents, largemouth bass anglers were the most likely to say the quality of fishing was increasing at 25 percent of interviewed bass anglers ([Table 6](#)). Bass anglers were also the most likely to say the quality was declining at 11.1 percent of interviewed bass anglers. Crappie anglers were the most likely to say the quality of fishing was remaining the same at 43.5 percent. The quality of the surroundings appeared to be more important than the quality of the fishing.

Table 2. Estimated Fishing Pressure on Robinson Lake by Month, 1999.

Month	Day	Boat Hrs	Shore Hrs	Total Hrs	Percent	Month Total Hrs	Percent by Month
April	Week End	292.50	15.00	307.50	3.84	390.00	4.87
April	Week Day	0	82.50	82.50	1.03		
May	Week End	1728.38	70.13	1798.50	22.44	2873.50	35.85
May	Week Day	1006.25	68.75	1075.00	13.41		
June	Week End	662.14	79.29	741.43	9.25	1568.86	19.57
June	Week Day	798.31	29.12	827.43	10.32		
July	Week End	723.75	41.25	765.00	9.54	1352.81	16.88
July	Week Day	576.56	11.25	587.81	7.33		
August	Week End	430.31	47.81	478.13	5.97	834.64	10.41
August	Week Day	332.95	23.57	356.52	4.45		
September	Week End	609.38	78.13	687.50	0.97	995.29	12.42
September	Week Day	307.79	0	307.79	3.84		
Total		7468.31	546.79	8015.10			

Table 3. County of Residence of Robinson Lake Anglers, 1999.

County	No. of Anglers	Percent
Allen	110	14.53
Blackford	2	0.26
Dekalb	2	0.26
Delaware	14	1.85
Elkhart	5	0.66
Grant	15	1.98
Howard	8	1.06
Huntington	21	2.77
Kosciusko	162	21.40
Lake	20	2.64
Madison	4	0.53
Marshall	2	0.26
Miami	2	0.26
Newton	4	0.53
Noble	19	2.51
Randolph	2	0.26
St. Joseph	9	1.19
Steuben	2	0.26
Tippecanoe	3	0.40
Tipton	2	0.26
Wabash	16	2.11
Wells	19	2.51
Whitley	295	38.97
Non-resident	17	2.25
NR	2	0.26
Total	757	

Table 4. Average Angler Response to the Question "How many time do you typically fish this lake each year?" by Month, 1999.

Month	Ave. Times/Year
April	8.2
May	19.0
June	10.6
July	10.9
August	10.1
September	7.5
Average (all months)	12.1

Table 5. Angler Response to the Quality of Fishing Question, Robinson Lake, 1999.

Response	# of Anglers	percent
No response	314	41.48
Improving	134	17.70
Staying the same	238	31.44
Declining	71	9.38

Table 6. Angler Response to the Quality of Fishing Question by Preference Group, Robinson Lake, 1999.

Fishing For	Quality	# of Anglers	Percent of Pref. Group
NR	I	2	28.6
	S	2	28.6
	D	3	42.9
	NR	80	45.7
Anything	I	26	14.4
	S	54	30.9
	D	15	8.6
	NR	91	53.2
BLG	I	21	12.3
	S	41	24.0
	D	18	10.5
	NR	8	34.8
CPR	I	4	17.4
	S	10	43.5
	D	1	4.3
	NR	80	32.8
LMB	I	61	25.0
	S	76	31.1
	D	27	11.1
	NR	38	50.0
BLG + LMB	I	8	10.5
	S	26	34.2
	D	4	5.3
	NR	10	43.5
BLG + CRP	I	4	17.4
	S	5	21.7
	D	4	17.4
	NR	3	50.0
CRP + LMB	I	3	50.0
	NR	3	50.0
BLG + CRP + LMB	I	11	84.6
	S	2	15.4
RES	S	3	100.0
BLG + RES	NR	2	33.3
	I	4	66.7

Table 7. Angler Response to the Question “Are you satisfied with your fishing trip today?”, Robinson Lake, 1999.

Satisfied?	# of Anglers	Percent
Yes	682	90.09
No	69	9.11
NR	6	0.79

Table 8. Angler Support for the Quality Largemouth Bass Regulations on Robinson Lake, 1999.

Support for LMB rules	# of Anglers	percent
Strongly support	512	67.64
Support	101	13.34
Neutral	64	8.45
Oppose	35	4.62
Strongly oppose	15	1.98
No response	30	3.96

When asked if they were satisfied with their fishing trip that day, 90 percent of the interviewed anglers responded "yes" ([Table 7](#)). Only 9 percent answered "no", generally anglers who had caught nothing that day.

When asked to rate their support for the 18 inch size limit and reduced bag limit for largemouth bass on Robinson Lake, 81 percent were in favor ([Table 8](#)). Only 6.6 percent were opposed or strongly opposed.

B	boat angler
BLG	bluegill
BLH	bullhead
BOW	bowfin
BRB	brown bullhead
CAP	carp
CPUE	catch per unit effort
CRP	crappie
GAR	spotted gar
DNR	Department of Natural Resources

INT. HR.	interview hours
LES	longear sunfish
LMB	largemouth bass
N	no
NO./AC.	number per acre
NR	no response
OTH	other fish
ppb	parts per billion
ppm	parts per million
RES	redeer sunfish
ROB	rock bass
S	shore angler
WD	week day excluding holidays
WE	weekend day including holidays
Y	yes
YEB	yellow bullhead
YEP	yellow perch
WAM	warmouth
WHS	white sucker

Largemouth bass anglers were most supportive with over 91 percent either supportive or highly supportive of the regulation ([Table 9](#)). People fishing for crappie were also highly supportive. People fishing for the combination of bluegill and bass or anything were most likely to be opposed.

The estimated total number of fish harvested from Robinson Lake during this survey was 3,810 ([Table 10](#)). Eight species were included in this estimate. The creel clerk recorded eight hybrid sunfish and two longear sunfish harvested in May which were not expanded and not included in the total. Area residents also reported that they bowfished or speared on Robinson Lake at night, having taken several carp and gar. These activities occurred outside the creel clerk work hours so no interviews were obtained and no data recorded for these users. Catch and release statistics were calculated for three species, largemouth bass, bluegill and crappie. An additional ten species were reported as released ([Table 11](#)). Numbers were not expanded for these ten species.

Table 9. Angler Support for the Largemouth Bass Regulations by Preference Group, Robinson Lake, 1999.

Fishing for	Support rating	# of anglers	percent of pref. group
Anything	1	107	61.14
	2	25	14.29
	3	21	12.00
	4	14	8.00

	5	2	1.14
	NR	6	3.43
	Total	175	
BLG	1	98	57.31
	2	28	16.37
	3	26	15.20
	5	3	1.75
	NR	16	9.36
	Total	171	
LMB	1	194	79.51
	2	29	11.89
	3	5	2.05
	4	6	2.46
	5	5	2.05
	NR	5	2.05
Total	244		
CRP	1	18	78.26
	2	2	8.70
	3	2	8.70
	NR	1	4.35
Total	23		
RES	1	3	100.00
BLG + LMB	1	46	60.53
	2	14	18.42
	3	5	6.58
	4	11	14.47
Total	76		
BLG + CRP	1	22	66.67
	2	3	9.09
	3	5	15.15
	4	1	3.03
NR	2	6.06	
Total	33		
BLG + RES	1	6	100.00
CRP + LMB	1	3	50.00
	4	3	50.00
Total	6		
BLG + CRP +LMB	1	13	100.00

	1	2	28.57
NR	5	5	71.43
	Total	7	
Total		757	

Bluegills accounted for 66.3 percent of all fish harvested from Robinson Lake during the six months of this survey ([Table 10](#)). May and June were the best months. People fishing for bluegill harvested bluegills at the rate of 1.28 per hour and had a harvest rate of 1.43 fish per hour for all species ([Table 12](#)). Anglers fishing for bluegills or bluegills in combination with another species accounted for 39.5 percent of all anglers and 35.8 percent of all interview hours. In addition to the harvest, anglers reported releasing 5,614 bluegills. Bluegill anglers released bluegills at the rate of 1.76 per hour ([Table 13](#)). Total catch rate (harvest plus catch & release) by bluegill anglers was 3.28 fish per hour. Length range of harvested bluegills was 5.0-9.5 inches with 47.9 percent 7-inches and 5.4 percent 8 inches.

Total expanded harvest of crappies was 778 with another 378 released. Over 90 percent of the crappie harvest occurred in May. Length range of harvested crappies was 6.0-14.0 inches with 44.2 percent 10.0 inches. People fishing for crappies and crappies in combination with another species accounted for 9.9 percent of all anglers interviewed and 10.1 percent of interview hours. Anglers fishing for crappies alone had the highest harvest rate of any preference group at 1.47 crappies per hour and total harvest of all species of 1.57 fish per hour. Crappie anglers released fish at a lower rate than most other preference groups at 0.69 fish per hour. Total catch rate (harvest plus catch and release) was still 2.26 fish per hour for this group.

Table 10. Estimated Number of Fish Harvested and Released at Robinson Lake by Month, 1999.

MONTH	B/S	EXPANDED HARVEST (NUMBER)								RELEASED (NUMBER)		
		BLG	LMB	CRP	RES	WAM	BRB	YEB	YEP	BLG	LMB	CRP
April	B	0	11	0	0	0	0	0	0	0	11	0
April	S	0	0	0	0	0	0	0	0	0	0	0
May	B	971	0	704	225	0	0	0	7	1547	851	203
May	S	16	0	3	131	6	0	0	0	64	48	0
June	B	718	4	48	63	5	0	0	0	1176	581	128
June	S	103	0	0	5	2	2	0	0	193	21	0
July	B	227	0	5	5	0	0	3	3	883	423	5
July	S	7	0	0	0	0	0	0	0	102	13	4
Aug.	B	249	4	21	13	0	0	0	0	413	245	17
Aug.	S	0	0	0	0	0	0	0	0	42	0	0
Sept.	B	0	3	0	3	0	7	0	0	1044	298	21
Sept.	S	236	0	0	0	0	0	0	0	150	13	0
Total		2527	22	778	445	13	9	3	10	5614	2504	378
No./Ac.		42.8	0.4	13.2	7.5	0.2	0.2	>0.1	0.2	95.2	42.4	6.4

Table 11. Recorded Number of Other Fish Released at Robinson Lake, 1999.

Species	RES	BOW	BLH	YEP	WHS	ROB	LES	WAM	GAR	CAP
No. Released	81	13	11	9	6	5	5	4	2	2

Table 12. Harvest Rate by Preference Group for Robinson Lake, 1999.

Harvest rate (#/hr.) by preference group by species harvested

Fishing for	# of anglers	percent of anglers	Int. Hrs.	percent of Hrs.	BLG	CRP	LMB	RES	Total all species
LMB	244	32.2	977.75	36.5	0	.02	<.01	0	.02
ANY	175	23.1	598.33	22.4	.216	.02	<.01	0.09	.33
BLG	171	22.6	536.50	20.1	1.282	.01	0	0.13	1.43
BLG + LMB	76	10.0	251.08	9.4	.179	0	0	0.02	.2
BLG + CRP	33	4.4	124.25	4.6	.491	.60	0	0.02	1.11
CRP	23	3.0	79.17	3.0	.101	1.47	0	0	1.57
BLG + CRP + LMB	13	1.7	35.92	1.3	.278	0	.03	0.03	.33
NR	7	0.9	27.08	1.0	0	0	0	0	0
BLG + RES	6	0.8	11.17	0.4	0	0	0	0	.72
CRP + LMB	6	0.8	31.00	1.2	.065	.58	0	0.03	.65
RES	3	0.4	3.75	0.1	0	0	0	0	0
Total	757		2676.00		.352	.09	<.01	0.05	.50

Table 13. Catch and Release Rate of Largemouth Bass, Bluegill and Crappie and Total Catch Rate by Preference Group for Robinson Lake Anglers, 1999.

Fishing for	# of anglers	percent of anglers	Int. Hrs.	percent of Hrs.	Release rate (#/hr.) by preference group by species released				Catch rate (Harvest + C & R)
					LMB	BLG	CRP	Total C&R	
LMB	244	32.2	977.75	36.5	0.61	0.02	0.01	0.64	0.66
ANY	175	23.1	598.33	22.4	0.20	0.74	0.08	1.02	1.35
BLG	171	22.6	536.50	20.1	0.07	1.76	0.02	1.85	3.28
BLG + LMB	76	10.0	251.08	9.4	0.21	1.59	0.01	1.80	2.00
BLG + CRP	33	4.4	124.25	4.6	0.10	1.14	0.16	1.40	2.51
CRP	23	3.0	79.17	3.0	0.33	0.09	0.28	0.69	2.26
BLG + CRP + LMB	13	1.7	35.92	1.3	0.28	1.28	0	1.56	1.89
NR	7	0.9	27.08	1.0	0.44	0	0.59	1.03	1.03
BLG + RES	6	0.8	11.17	0.4	0.36	0.99	0	1.34	2.06
CRP + LMB	6	0.8	31.00	1.2	0.71	0	0	0.71	1.36
RES	3	0.4	3.75	0.1	0	0	0	0	0
Total	757		2676.00		0.33	0.75	0.05	1.13	1.63

Estimated harvest of largemouth bass was 22 for the six months. Length range was 18.0- 21.0 inches. Fifty percent of the harvest occurred in April. An estimated 2,504 bass were released with 36 percent of the catch and release occurring in May. People fishing for largemouth bass alone accounted for 32.2 percent of all anglers interviewed and 36.5 percent of all interview hours, more than any other preference group. Anglers fishing for bass in combination with another species added 12.5 percent of anglers and 11.9 percent of interview hours. Because of the size limit and a catch and release ethic among bass anglers, this group had a very low harvest rate for bass and all fish in general. Release rate of bass by bass anglers was 0.61 per hour with an overall catch rate of 0.66 per hour or about one fish caught every 90 minutes. The creel clerk reported several anglers bringing bass to the ramp to be measured before releasing them. A few of which were over 22 inches.

Redear sunfish harvest was estimated at 445 for the six months. Eighty percent of the harvest occurred in May mainly by bluegill anglers. Interestingly, people who said they were fishing for redear harvested none. Harvest rate of redear by all preference groups and the overall average was very low at 0.05 per hour.

Other species included in the harvest were warmouth, brown bullhead, yellow bullhead and yellow perch. Although the bullheads can reach sizes greater than 12 inches, they are not highly regarded by Hoosier anglers and seldom targeted. Warmouth seldom reach a size large enough to interest anglers and are usually taken incidentally by bluegill anglers. The yellow perch in Robinson Lake seldom get large enough to interest anglers.

Robinson Lake contains some large bowfin and bass anglers reported releasing 13 of them, primarily during June and July. Gar will also hit artificial lures and bass anglers reported releasing two.

Bass Population Estimate

Largemouth bass were sampled once per week starting 26 April and ending 19 May. A total of 894 bass was collected during the four nights of sampling with 128 recaptures. Length range was 2.8-22.2 inches. Average catch per unit effort for all sizes was 177 per hour. The Schnabel estimate for bass 8 inches was 2,421 or 41.0 per acre. The 95 percent confidence interval was 2,046-2,913. The standard error was 9.0 percent of the estimate. PSD for the spring samples combined was 54.75 percent and RSD-18 was 4.25 percent. A total of 297 of these bass were aged (Appendix B). Growth was slightly slower for age 1+ through 3+ compared to previous years.

Table 14. Length-Frequency of Fish Harvested from Robinson Lake, 1999.

Length (in.)	Observed Harvest (Number)									
	BLG	percent	CPR	percent	LMB	percent	RES	percent	YEP	percent
5.0	43	4.60					1	0.72		
5.5	64	6.85					3	2.17		
6.0	157	16.81	2	0.93			12	8.70		
6.5	223	23.88	2	0.93			31	22.46		
7.0	267	28.59	7	3.26			41	29.71		
7.5	130	13.92	5	2.33			31	22.46		
8.0	43	4.60	9	4.19			17	12.32	1	20.00
8.5	3	0.32	23	10.70			1	0.72	4	80.00
9.0	3	0.32	48	22.33			1	0.72		
9.5	1	0.11	24	11.16						
10.0			36	16.74						
10.5			31	14.42						
11.0			19	8.84						
11.5			4	1.86						
12.0			2	0.93						
12.5										
13.0			2	0.93						
13.5										
14.0			1	0.47						
18.0					1	20.00				
18.5					1	20.00				
19.0										
19.5										
20.0					1	20.00				
20.5					1	20.00				
21.0					1	20.00				
Total	934		215		5		138		5	

General Fish Population Survey

The general fish population survey was conducted 14-16 June 1999. Water level was low due to drought conditions. Dissolved oxygen ran out below 15 feet (Appendix A). The water was fairly clear with a secchi disc reading of over six feet.

Total catch was 1,865 fish weighing 500.49 pounds (Table 15). Twenty-three species and one hybrid were collected. Over 81 percent of the number and 36 percent of the weight were species usually sought by anglers.

Bluegill was the most abundant species accounting for 62.7 percent of the sample by number and 13.3 percent by weight. Length range was 1.7-7.9 inches (Appendix B). Age groups 1+ through 6+ were represented. Growth was slightly slower than the 1996 survey. Only 2.3 percent of the 1,170 bluegills collected were 7-inches. PSD was 12.5 percent.

Table 15. Species and Relative Abundance of Fishes Collected by Number and Weight, Robinson Lake General Survey, 14-16 June 1999.

Common Name of Fish*	Number	Percent	Length Range (Inches)	Weight (Pounds)	Percent
Bluegill	1170	62.7	1.7-7.9	66.61	13.3
Redear	179	9.6	2.1-7.8	8.62	1.7
Largemouth bass	140	7.5	3.4-16.8	96.53	19.3
Gizzard shad	140	7.5	7.3-13.7	59.22	11.8
Spotted gar	56	3.0	11.2-36.1	101.90	20.4
Warmouth	40	2.1	2.1-7.9	4.41	0.9
White sucker	25	1.3	8.5-18.6	20.21	4.0
Black crappie	21	1.1	3.4-11.0	4.41	0.9
Bowfin	17	0.9	16.8-29.4	82.80	16.5
Golden shiner	17	0.9	3.9-8.2	1.59	0.3
Brown bullhead	14	0.8	11.6-16.2	15.71	3.1
Lake chubsucker	12	0.6	4.5-10.7	3.46	0.7
Black bullhead	10	0.5	7.8-12.9	8.62	1.7
Yellow perch	9	0.5	5.6-9.1	1.67	0.3
Yellow bullhead	4	0.2	10.1-11.9	3.32	0.7
Spotted sucker	3	0.2	14.1-15.9	2.95	0.6
Carp	1	0.1	27.9	10.67	2.1
Brook silverside	1	0.1	3.4	0.01	0.0
Channel catfish	1	0.1	19.4	2.67	0.5
Hybrid sunfish	1	0.1	7.4	0.33	0.1
Grass pickerel	1	0.1	10.7	0.27	0.1
Spotted sunfish	1	0.1	4.5	0.05	0.0
White bass	1	0.1	15.8	1.76	0.4
Quillback	1	0.1	17.9	2.70	0.5
TOTAL	1865	100	83.8	500.49	100

*Common names of fishes recognized by the American Fisheries Society

Redear sunfish ranked second in the survey with 179 collected. Length range was 2.1-7.8 inches. Age groups 1+ through 5+ were present and growth was unchanged. Fifty-seven percent were age 1+. Less than 20 percent were 6-inches and 3.4 percent were 7-inches. One-hundred-forty largemouth bass were collected during the June survey. Length range was 3.4-16.8 inches. Age groups 1+ through 7+ were represented. PSD of the June sample was 40 percent but no legal size bass were collected.

Gizzard shad accounted for 7.5 percent of the sample by number and 11.8 percent by weight. Length range of the 140 shad was 7.3-13.- inches. No YOY shad were found at the time of the survey.

Spotted gar represented three percent of the sample by number but 20.4 percent by weight. Length range of the 56 gar collected was 11.2-36.1 inches with 37.5 percent 24-inches

Forty warmouth were collected. Length range was 2.1-7.9 inches with 25 percent 7 inches

Length range of the 21 black crappies collected was 3.4-11.0 inches. Five were 8 inches. Age groups 1+ through 5+ were represented. Growth was better than the 1996 survey. No white crappies were collected during this survey.

Robinson Lake supports a sizable bowfin population. Length range of the 17 collected was 16.8-29.4 inches. Although they represented less than one percent of the sample by number, bowfin accounted for 16.5 percent of the weight

Several catfish species were collected including brown bullhead, black bullhead, yellow bullhead and channel catfish. The one channel catfish was 19.4-inches in length. Length range of the bullhead species was 7.8-16.2-inches

Nine yellow perch were collected. Length range was 5.6-9.1-inches. Age groups 2+ through 6+ were represented. Growth was average

One carp was collected this year. Length was 27.9-inches and it weighed over ten pounds.

One 4.5 inch spotted sunfish, one 15.8 inch white bass and one 17.9-inch quillback were collected. This is the first time these species have been found at Robinson Lake.

A new aspect of standard lake surveys starting in 1999 was aquatic vegetation mapping. Robinson Lake supports a diverse and dense aquatic vegetation assemblage, both submergent and emergent, due to the undeveloped shoreline. Vegetation was identified from shore to the deepest occurrence along four transects on 14 June. Submergent vegetation was present to a maximum depth of 12 feet (Appendix C). Eurasian watermilfoil and coontail were the dominant submergent species. Pickerelweed, arrow arum and waterlillies were the dominant emergents. Pithophora, a tough filamentous algae, was abundant on all the submergent and emergent plants.

Discussion

During a creel survey conducted on Robinson Lake May through October 1996, 256 anglers were interviewed. Fishing pressure was estimated at 60 hours per acre. That was the first year the public access site was open and the more restrictive largemouth bass limits took effect in August of that year. Three years later, fishing pressure has more than doubled and the number of anglers interviewed has almost tripled as more people have become aware of the state property and Robinson Lake. This is also reflected in the geographic distribution of anglers. In 1996 anglers came from 13 counties while in 1999 they came from 23 counties. Non-residents (out-of-state) accounted for over two percent of anglers in 1999 but less than one percent in 1996. Local residents from Whitley and Kosciusko Counties still dominate.

In the 1996 survey, 57 percent of the anglers interviewed said the quality of fishing was staying the same and 25 percent said it was improving. That declined to 31 percent who said it was staying the same and 18 percent who said it was improving in 1999. The 41 percent of anglers who gave no response or said they didn't know reflects a large number of first time visitors to Robinson Lake.

Support for the largemouth bass regulations has increased over the past three years, from 62.5 percent to 91 percent. Bluegill anglers were again the least likely to support the restrictive bass regulations while bass anglers were most likely to support them. This change reflects a change in the users. In 1996, over 39 percent of the anglers were after bluegills while less than 25 percent were bass anglers. By 1999, bass anglers accounted for over 32 percent of the users while bluegill anglers declined to about 23 percent of users. The majority of the increase in users and fishing pressure was due to bass anglers, reflecting the reputation of Robinson Lake as having a quality bass population.

Although fishing pressure more than doubled since 1996, the total estimated number of fish harvested increased by only 21 percent ([Table 16](#)). The estimated number of bluegills harvested declined by almost 8 percent and the bass harvest declined by 89 percent due to the change in size limit. The estimated number of crappies harvested increased by 301 percent and the redear harvest increased by 3,945 percent.

Table 16. Comparison of the Estimated Number of Fish Harvested from Robinson Lake, 1996 and 1999.

Species	1996	1999	Percent change
BLG	2739	2527	-8
LMB	206	22	-89
CRP	194	778	+301
RES	11	445	+3945
Total	3155	3810	+21

The timing of the harvest was very different between these two years as well. In 1996 over 60 percent of the bluegills were harvested in September and none were taken in May. In 1999, May and June were the best with little harvest of bluegills in September. The majority of the crappie harvest also occurred in May in 1999 while most of the 1996 crappie harvest occurred in September. Fifty percent of the bass harvest in 1999 occurred in April while in 1996 over 50 percent occurred in July

The size of the bluegills harvested in 1999 was slightly smaller than in 1996. Sixty-six percent of the bluegills harvested in 1996 were 7 inches and 22 percent were 8 inches. In 1999 that declined to 48 percent 7 inches and 5 percent 8 inches. In 1996, 1.4 percent of the bluegills harvested were less than 5 inches. Bluegills harvested in 1999 were all 5 inches. The rate at which bluegills were harvested dropped from 0.95 per hour in 1996 to 0.35 per hour in 1999 for all anglers combined. Harvest rate of bluegills by bluegill anglers dropped from 1.98 per hour to 1.28 per hour. The number of bluegills released however more than doubled from 2,728 to 5,614. Bluegills were released at the rate of 1.76 per hour by bluegill anglers and 0.75 per hour for all anglers combined in 1999, about the same as in 1996.

Length range of the crappies harvested in 1996 was 7.0-11.0 inches and 71 percent were less than 9 inches, while 12 percent were 10 inches. In 1999 the length range was 6.0-14.0 inches but 44 percent were 10 inches. Harvest rate of crappies by crappie anglers was three times greater in 1999 than in 1996. Although the total number of crappies released declined slightly from 393 to 378, the rate at which crappies were released by crappie anglers doubled from 0.13 per hour in 1996 to 0.28 per hour in 1999

Bass fishing has changed at Robinson Lake under the 18 inch size limit and a continued trend toward catch and release. Under the 12 inch size limit in 1996, bass anglers harvested bass at the rate of 0.11 per hour resulting in 3.5 bass per acre being removed from the lake. Less than 17 percent of those bass would have been legal size under the 18 inch rule. Despite a large increase in the number of bass anglers and fishing pressure directed towards bass, the 1999 harvest was only 0.4 per acre. Harvest rate was less than 0.01 bass per hour in 1999 for all preference groups except those fishing for the combination of bass, bluegill and crappie. The estimated number of bass released on the other hand almost tripled from 871 to 2,504. Bass anglers released bass at the rate of 0.61 per hour in 1999 compared to 0.40 per hour in 1996, an increase of 52 percent

There were probably two factors influencing the redear harvest in 1999. First was a large group of redear reaching harvestable size. About 75 percent of the harvested redear were 6.5-7.5 inches and age 4+ and 5+. The second was the ability of the creel clerk to identify redear sunfish from bluegill. The creel clerk in 1996 was a high school student with no formal training in fish identification. The creel clerk in 1999 was a aquatic biology major who had completed her junior year. It is very possible that a small portion of the bluegill harvest recorded in 1996 was redear misidentified as bluegill.

The largemouth bass population estimate in 1999 was higher than 1996 or 1993 ([Table 17](#)). The increase appears to be in bass 12 inches but less than 18 inches as PSD increased but RSD-18 decreased. This means the proportion of the bass population that was 18 inches was less than previous years. The CPUE of bass 18 however indicates that the number of these large bass was

greater in 1999 than in 1996 but still less than the 10 per hour goal of the project. Fifteen percent of the bass collected during spring sampling were 14-16 inches. These fish were five to six years old. It takes bass in Robinson Lake seven to eight years to reach 18 inches. If growth of the older year classes does not slow, these fish should reach 18 inches by 2002 when the next population estimate and creel survey are scheduled. RSD-18 and CPUE of 18 inch bass should increase by that year.

Table 17. A Comparison of the Largemouth Bass Population Estimates at Robinson Lake, 1993, 1996 and 1999.

Year	1993	1996	1999
Population estimate	1791	1176	2421
No./Ac.	30.4	20.3	41.0
PSD	51.5	40.5	54.8
RSD-18	8.1	7.4	4.3
CPUE (all sizes)	150.4	83.6	177.0
CPUE (18 inches)	10.4	4.1	5.9

The June general survey in 1999 was substantially different than 1993 and 1996, primarily due to the preponderance of bluegill. Trap-net CPUE in 1999 was almost ten times greater than previous surveys. Electrofishing CPUE was also greater. Length-frequency distribution and age distribution were similar all three years.

This difference is probably due to weather. Surface water temperatures in 1993 and 1996 were 65 degrees F and 68 degrees F respectively during early June because of cool, wet spring weather. Bass were in the shallows but bluegill and other panfish had not moved into shallow water to begin spawning yet. The cool water also delayed vegetation growth, making electrofishing easier those years. In 1999, spring weather was dry and warm. Surface water temperature was 78 degrees F during the June survey. Bluegill and redear were in shallow water spawning, making them more vulnerable to trap-nets. Bass on the other hand had completed spawning and the adults had moved to deeper water

Redear sunfish exhibited a similar pattern. The trap-net CPUE in 1999 was five times greater than the 1993 and 1996 surveys. This was due to a very strong 1998 year class. Fifty-seven percent of the redear in the 1999 survey were 1-year-old.

Largemouth bass remained third in relative abundance in the June survey. Electrofishing CPUE and PSD were similar all three years. RSD-18 was 6.6 in 1993 and 7.5 in 1996, but was zero in 1999. The larger adult bass had moved to deeper water by June of 1999 and were not vulnerable to electrofishing

In the previous two surveys, gizzard shad ranked second in relative abundance. In this survey, they ranked fourth. Electrofishing CPUE declined from 280 per hour 1993 to 140 per hour in 1996 to 36 per hour in 1999. The decline in 1999 may be due in part to the heavy vegetative

cover making shad more difficult to see and net while electrofishing. It does appear that shad abundance has declined since 1993, perhaps due to more predation by an increasing number of largemouth bass. The shad population continued to be dominated by 10-12 inch fish

Spotted gar and bowfin were more abundant in the 1999 survey than previously, again possibly due to warmer water making them more active and vulnerable. Robinson Lake has rather large populations of these predators.

Black crappie were less abundant in 1999 than previous surveys, especially 1996 when 100 were collected. Crappie harvest on the other hand was three times greater in 1999. The harvest in 1999 occurred in May, prior to the general survey, while in 1996 it occurred in September, after the survey. On the surface, it would appear that exploitation of the crappie population may have been very high in 1999. The estimated number of crappie released however was nearly the same both years, with about one-third of the release in 1999 occurring in June, during and after the general survey. As with largemouth bass, this apparent decline may be due to the adult crappie moving to deeper water prior to the survey, making them less vulnerable to the sampling gear.

A few white crappies were collected during the 1993 and 1996 surveys but not in 1999. This species is not common in the natural lakes and they are probably still present in low numbers

Two channel catfish were collected in 1993 and one in 1999. None were found in 1996. Channel catfish appear to be maintaining a small population with very limited fishing opportunity. No channel catfish have been recorded harvested in two creel surveys.

Shore angling opportunities remain severely limited by aquatic vegetation. Eurasian watermilfoil is the main problem species. Vegetation control efforts and shore fishing access will have to be coordinated with the Division of Nature Preserves.

B	boat angler
BLG	bluegill
BLH	bullhead
BOW	bowfin
BRB	brown bullhead
CAP	carp
CPUE	catch per unit effort
CRP	crappie
GAR	spotted gar
DNR	Department of Natural Resources
INT. HR.	interview hours
LES	longear sunfish
LMB	largemouth bass
N	no
NO./AC.	number per acre

NR	no response
OTH	other fish
ppb	parts per billion
ppm	parts per million
RES	redeer sunfish
ROB	rock bass
S	shore angler
WD	week day excluding holidays
WE	weekend day including holidays
Y	yes
YEB	yellow bullhead
YEP	yellow perch
WAM	warmouth
WHS	white sucker

Recommendations

1. The project should be continued as outlined in the work plan.
2. A handicap only parking spot should be established at the bottom of the hill adjacent to the launch area.

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