Integrated Lakes Management, Inc.
Lake and Pond Management
Restoration • Consulting

Fish Survey Summary Report
Sanctuary Pond at Prairie Crossing
September 2006

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Introduction

In 1999 Integrated Lakes Management (ILM) introduced four threatened and endangered species (list) into Sanctuary Pond. Since then ILM has performed annual fisheries surveys. This report summarizes the work completed in 2006 and previous years.

Methods

On September 29, 2006 ILM staff members conducted fisheries surveying activities at Sanctuary Pond in Prairie Crossing. Specimens were collected using a methodology established in 2001 that focused on relative populations as opposed to relative/ total populations. Collections were conducted using a 10 ft. X 6ft.X 1/8" mesh, common sense seine, and a 3.5 ft. X 4 ft. X 1/16" mesh, common sense seine. Active fishing proceeded for 60 min. Seven hauls were conducted using the 10 ft. seine, and three hauls were conducted using the smaller hand held 3.5 ft. seine. ILM collected approximately 272 individuals and measured 149. Length/frequency data accompany this report.

Results

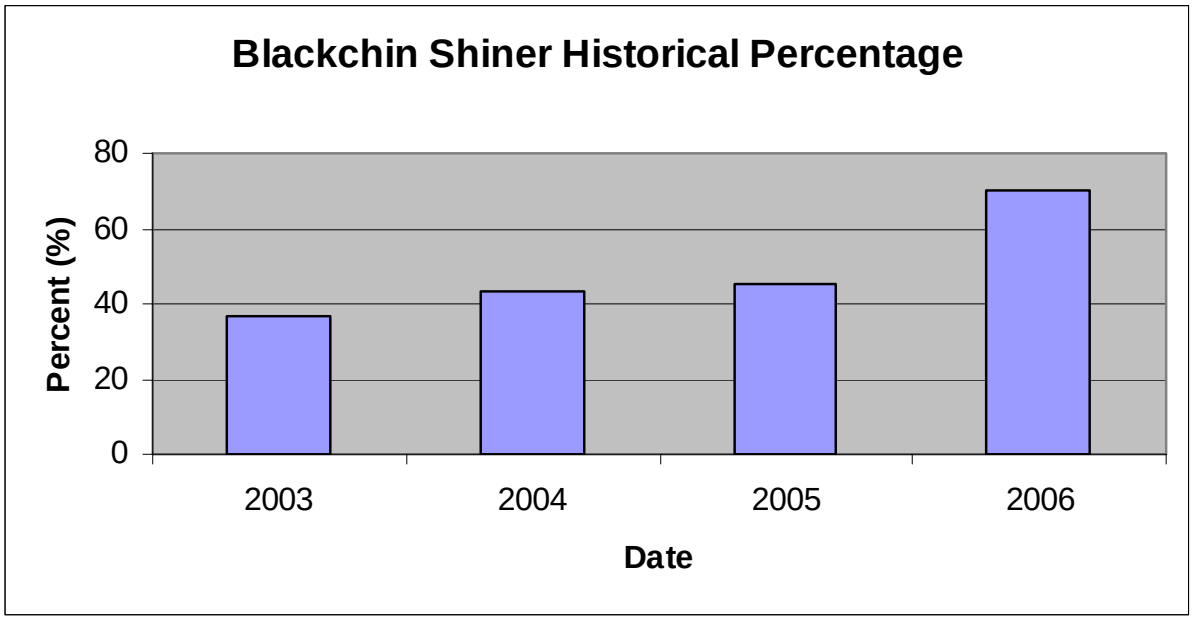
The collection was comprised of Banded Killifish (*Fundulus diaphanus*), Blackchin Shiners (*Notropis heterodon*), Blacknose Shiners (*Notropis heterolepis*), and one Iowa Darter (*Etheostoma exile*). The collection contained predominately Blackchin Shiners and Banded Killifish.

All four species of state threatened and endangered fish continue to sustain populations at this site. However, collection and reporting techniques still have the potential to exert substantial biases to fish population numbers. The dense populations of vegetation and quick drop off within Sanctuary Pond make sampling difficult, and therefore offers skewed results. Efforts were expended to sample the varying habitat types offered in this particular body of water, however ~90 % of all successful seine hauls were conducted through the thick littoral vegetation. Water depths exceed those required to safely and efficiently sample the open water/ weed bed interface using the equipment described, and insufficient habitat exists to efficiently collect an accurate representation of the Iowa Darter population. The only specimen of Iowa Darter collected was gathered using a small one man hand seine, which was quickly pulled through small pockets of exposed sandy substrate.

Common Name	Scientific Name	Totals	Percentage
Blackchin Shiners	*Notropis heterodon*	215	79
Blacknose Shiners	*Notropis heterolepis*	13	5
Banded Killifish	*Fundulus diaphanus*	43	16
Iowa Darter	*Etheostoma exile*	1	<1
All Fish Collected		272	

Blackchin Shiner

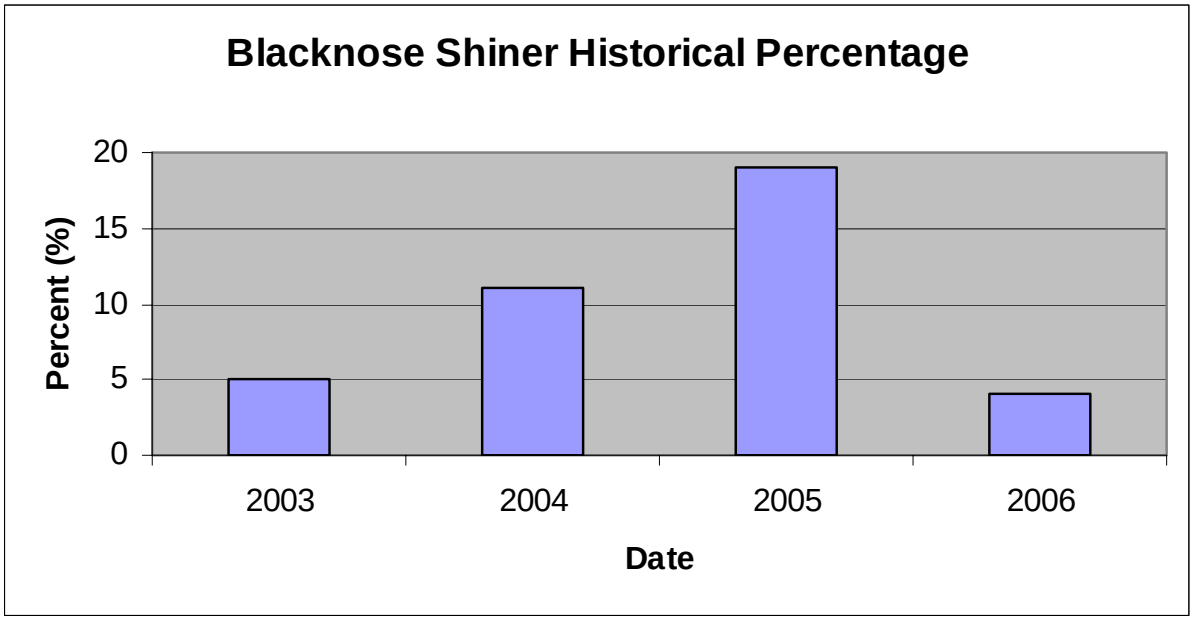
Blackchin Shiners were the dominant species throughout the 2006 fisheries surveying activities at Sanctuary Pond representing 70% of the total collected. This was a drastic increase in comparison to the previous years. Historical data from 2003 to 2006 identifies this species as becoming extremely prolific in comparison to the other species. However, when compared to data collected from Lake Leopold, individuals from this species are smaller in Sanctuary Pond (See Appendix). This can be attributed to the substantial lack of predation, resulting in stunted populations of shiners. While natural predators are present such as heron, frogs, and aquatic invertebrates; this is not sufficient to establish a balanced predator/ prey relationship within Sanctuary Pond.



Date	Percent of Total Catch
2003	37
2004	43
2005	45
2006	70

Blacknose Shiner

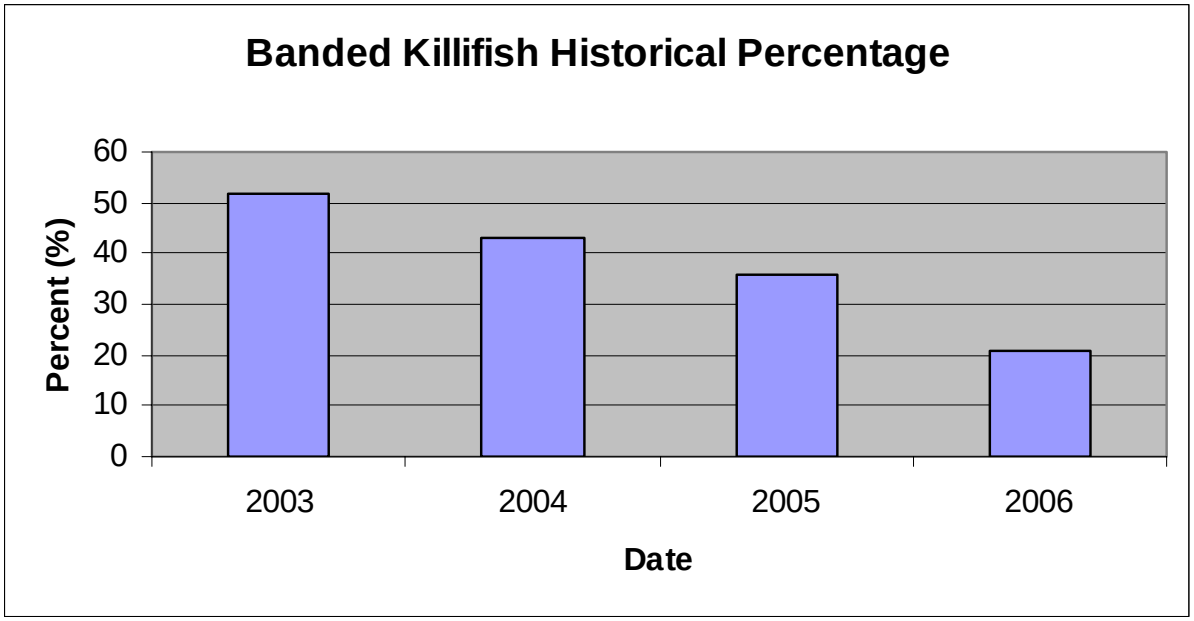
Blacknose Shiner percent representation was down this year in comparison to previous years' sampling activities. In 2006 Blacknose Shiners accounted for only 4% of the total collections, where in 2005 where they represented 19% of the collections. When analyzing historical data collected from 2003 to 2005 there is a significant increase in their representation; however, in 2006 there was a 78% drop in numbers. When compared to the 36% increase in Blackchin Shiner representation, one might suspect that this reduction in population may be caused by interspecies competition for forage. It is important to consider that when comparing the habitat range of both species; Blacknose Shiners tend to have a habitat range of 3 feet deeper than Blackchin Shiners. Coupled with the difficulty of sampling due to excessive pondweed growth, this species may be misrepresented in the collection efforts.



Date	Percent of Total Catch
2003	5
2004	11
2005	19
2006	4

Banded Killifish

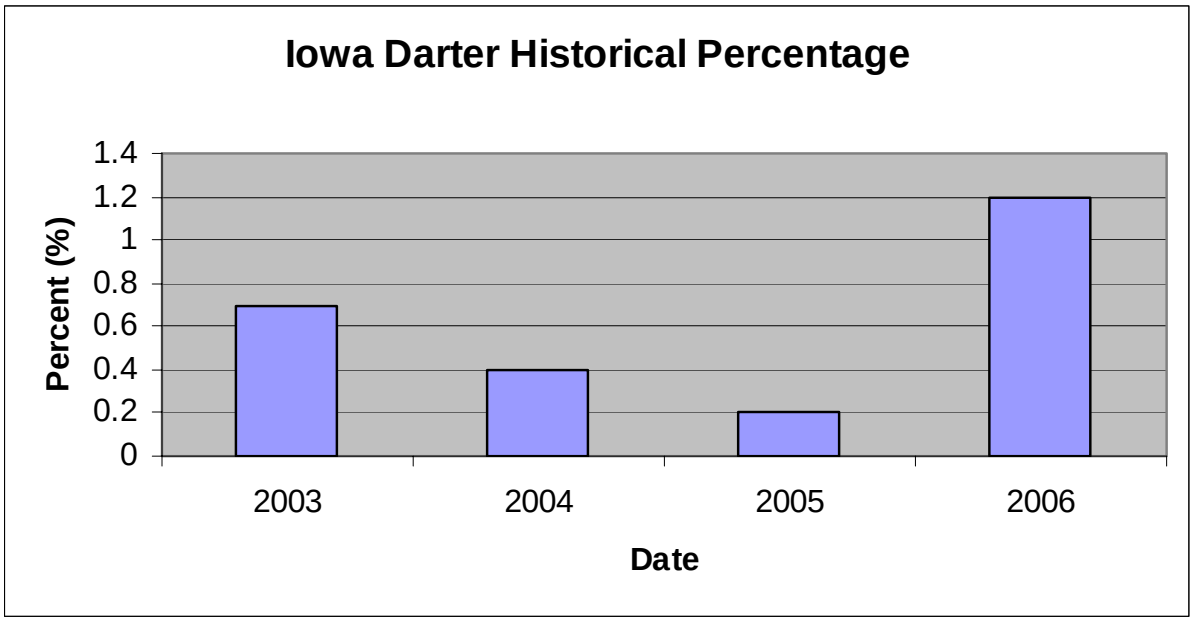
Banded Killifish represented 21% of the total catch during the 2006 fisheries surveying activities. While this species was the second most abundant during the 2006 season, we see a 42% drop in their representation from 2005. Historical data collected from 2003 to 2006 shows a steady drop in their representation within the sample group by 60% over the past four years. Given their habit preference, clear waters at depths of 1-2 feet in open water or areas of sparse vegetation, it is possible that the expanding pondweed growth within Sanctuary Pond is retarding the growth and recruitment of killifish populations.



Date	Percent of Total Catch
2003	52
2004	43
2005	36
2006	21

Iowa Darter

Iowa Darters accounted for 1.2% of the total catches in 2006. While we see a steady decline in their percent representation from 2003 to 2005, there was an increase in their representation from 2005 to 2006. While Iowa Darters prefer a habitat consisted of rooted aquatic and shoreline vegetation during the breeding season, they are regularly observed in areas with sandy bottoms or rugged terrain such as boulders or fallen trees. Given this, it is quite possible that the excessive rooted aquatic vegetation, while providing optimal breeding habitat, is negatively affecting the collection process and thereby resulting in misrepresentative data as to their over all abundance within Sanctuary Pond. It is also important to note that because of the low numbers of Iowa Darters caught; that relative percentages in numbers from year to year will vary widely.



Date	Percent of Total Catch
2003	0.7
2004	0.4
2005	0.2
2006	1.2

Recommendations

First and foremost, for any fisheries survey to be useful, it has to be comparable to previous studies. Historically, the purpose of conducting a fish survey at Sanctuary Pond was to monitor the T/E species that were translocated there. The techniques used for sampling were not designed to track changes in total population.

Now that populations are stable, the next step is to standardize a sampling/ monitoring plan that achieves the following goals:

- Compares total populations of each species year to year
- Evaluates relative ages/ health of individuals within each species year to year
- Allows for the determination of how many individuals can be relocated to other native habitats

Spot herbicide activities must be conducted to offer a break in the littoral composition. By doing so, a more heterogeneous habitat is created within Sanctuary Pond and thereby offers not only greater habitat diversity for the different species present, but allows sampling to become more effective. This is exceedingly important.

The addition of sand in certain shallow areas to create a more formidable habitat for Iowa Darters and Banded Killifish.

The stunted populations found indicate that steps be taken to help reduce competition within the species. It is recommended that specimens from three of the four T/E species present be translocated to Lake Leopold, the exception being the Iowa Darter. This will free up available forage within Sanctuary Pond, and assist recruitment within the main lake. Until it can be determined that the Iowa Darter populations within Sanctuary Pond is such that relocation would not deplete the gene pool significantly, translocation of this species is not recommended. While removal and relocation of the T/E species will help in reducing competition for forage in Sanctuary Pond, some of these species experience multiple breeding seasons within a single year. Therefore, the introduction of a predator species is recommended. A more balanced fishery achieved by including predators will be necessary in order to maintain a more desirable T/E population. The Illinois Department of Natural Resource is in support of this recommendation at Sanctuary Pond. Other regulators and stakeholders must be consulted before doing so.

ILM staff members have years of experience in these lakes, and we look forward to working with Prairie Crossing representatives as the aquatic environment moves from “new” to “established” phase in the eutrophication process.

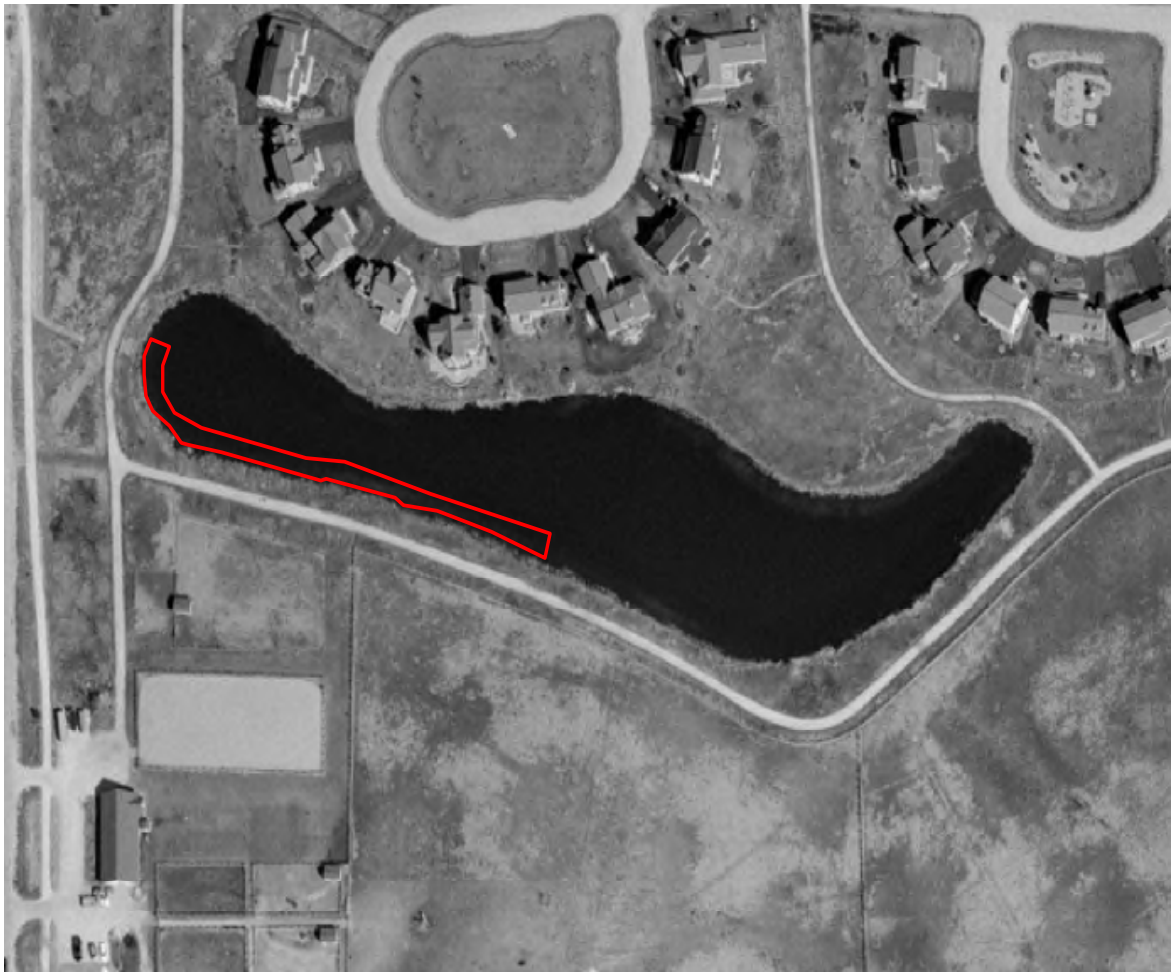


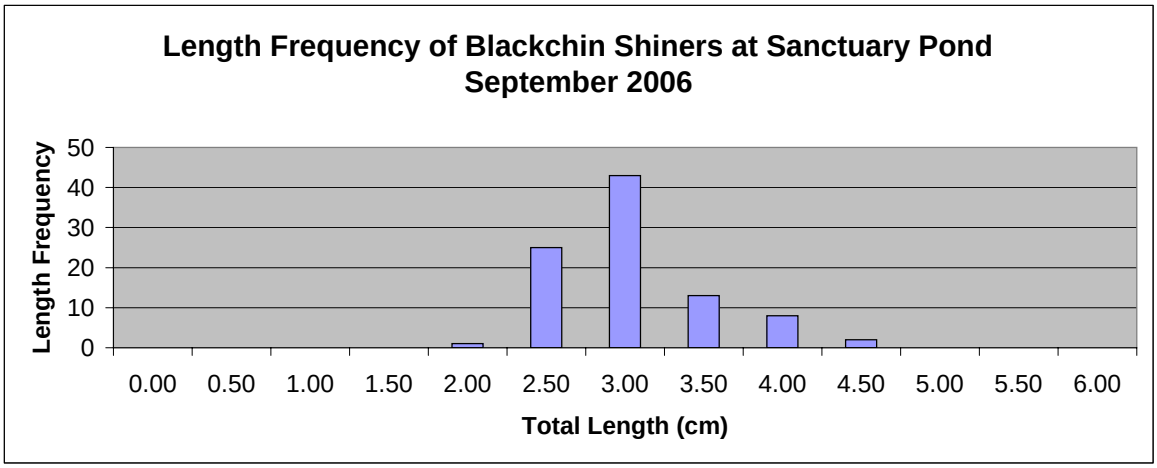
Figure 1: Location of fish collection outlined in red

Appendix

INTEGRATED LAKES MANAGEMENT **Blackchin Shiner Frequency Distribution for September 29, 2006**

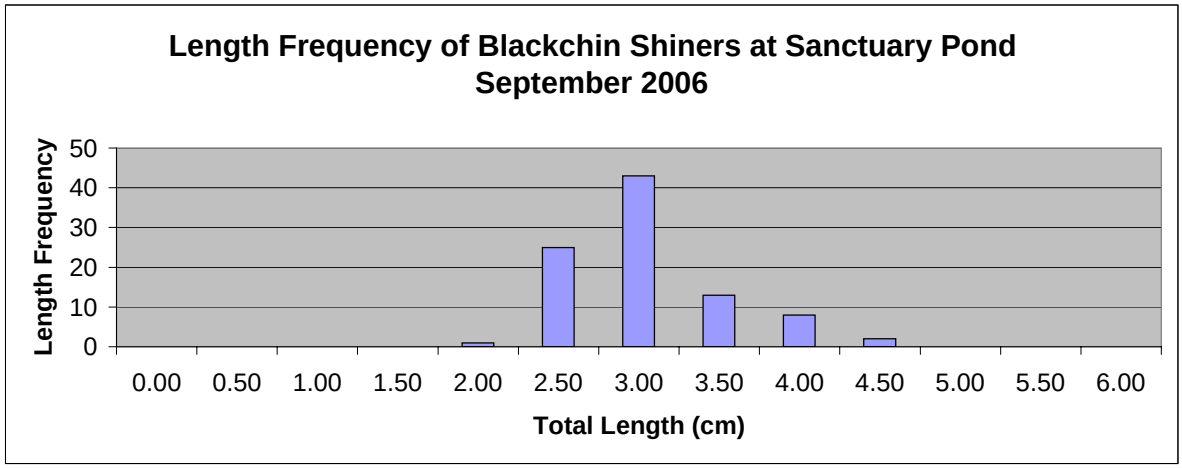
Fish Collection Form

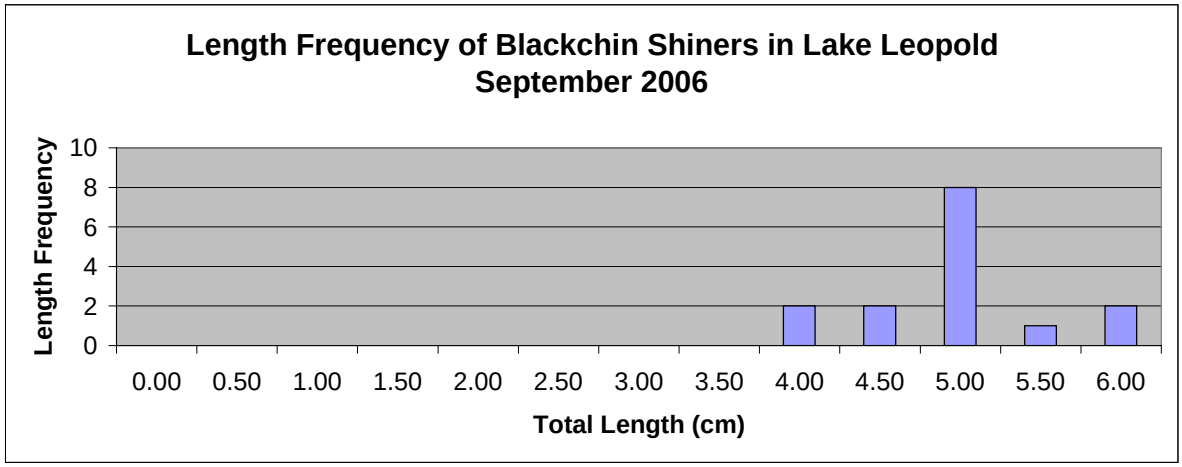
Date: 29-Sep-06	**Crew:** C.Ryan	**Locality:**	Prairie Crossing
Time: 9:30 AM to12:30 PM	C.Rysso	**Site Name:**	Sanctuary pond (Upper Pond)
		Station Name:	S.W. Corner (Station No. 1)
Gear: 10 ft.X 6 ft.X 1/8" Mesh Common Sense Seine			
3.5 ft.X 4 ft.X 1/16" Mesh Common Sense Seine			
Sample Duration: 60 minutes for total collection; all species			
7 passes with 10 ft.; 3 passes with 3.5 ft.		**Station Description;**	
		N42.33364	**W088.01375**



Bin	*Frequency*
0.00	0
0.50	0
1.00	0
1.50	0
2.00	1
2.50	25
3.00	43
3.50	13
4.00	8
4.50	2
5.00	0
5.50	0
6.00	0
More	0

Column1	
Mean	2.869565217
Standard Error	0.048403542
Median	2.8
Mode	3
Standard Deviation	0.464270462
Sample Variance	0.215547062
Kurtosis	0.488657535
Skewness	0.870340179
Range	2.2
Minimum	2
Maximum	4.2
Sum	264
Count	92
Largest(1)	4.2
Smallest(1)	2

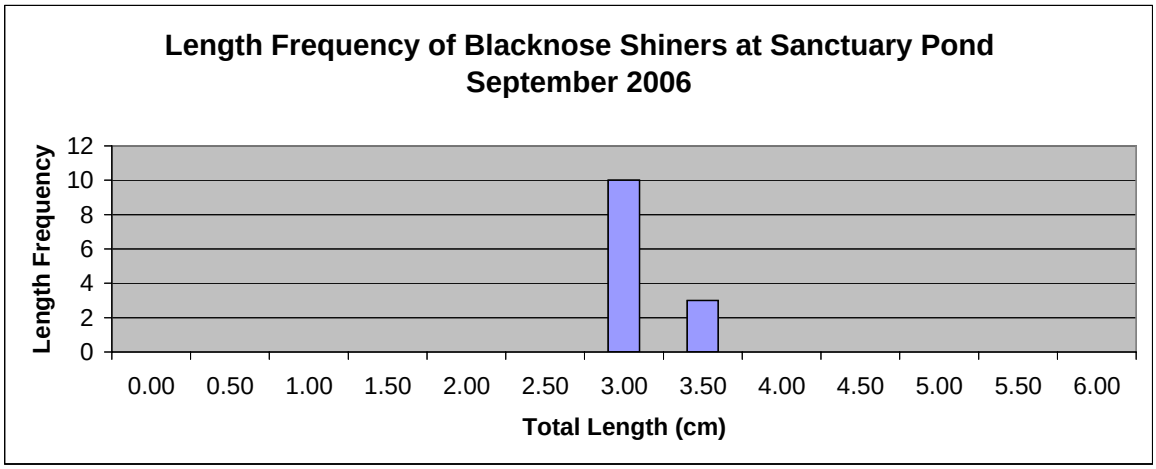

Length Frequency of Blackchin Shiners at Sanctuary Pond
September 2006
Length Frequency
50
40
30
20
10
0
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
Total Length (cm)


Length Frequency of Blackchin Shiners in Lake Leopold
September 2006
Length Frequency
10
8
6
4
2
0
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
Total Length (cm)

INTEGRATED LAKES MANAGEMENT **Blacknose Shiner Frequency Distribution for September 29, 2006**

Fish Collection Form

Date: 29-Sep-06	**Crew:** C.Ryan	**Locality:**	Prairie Crossing
Time: 9:30 AM to12:30 PM	C.Rysso	**Site Name:**	Sanctuary pond (Upper Pond)
		Station Name:	S.W. Corner (Station No. 1)
Gear: 10 ft.X 6 ft.X 1/8" Mesh Common Sense Seine			
3.5 ft.X 4 ft.X 1/16" Mesh Common Sense Seine			
Sample Duration: 60 minutes for total collection; all species			
7 passes with 10 ft.; 3 passes with 3.5 ft.		**Station Description;**	
		N42.33364	**W088.01375**



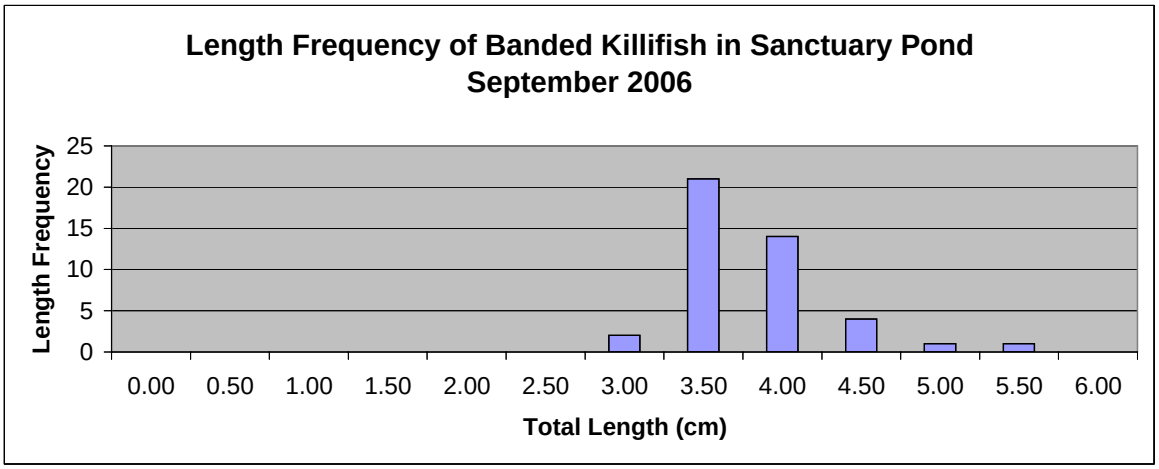
Bin	*Frequency*
0.00	0
0.50	0
1.00	0
1.50	0
2.00	0
2.50	0
3.00	10
3.50	3
4.00	0
4.50	0
5.00	0
5.50	0
6.00	0
More	0

Column1	
Mean	3.015384615
Standard Error	0.066839028
Median	3
Mode	3
Standard Deviation	0.240991542
Sample Variance	0.058076923
Kurtosis	1.179008895
Skewness	1.22287274
Range	0.8
Minimum	2.7
Maximum	3.5
Sum	39.2
Count	13
Largest(1)	3.5
Smallest(1)	2.7

INTEGRATED LAKES MANAGEMENT **Banded Killifish Frequency Distribution for September 29, 2006**

Fish Collection Form

Date: 29-Sep-06	**Crew:** C.Ryan	**Locality:**	Prairie Crossing
Time: 9:30 AM to12:30 PM	C.Rysso	**Site Name:**	Sanctuary pond (Upper Pond)
		Station Name:	S.W. Corner (Station No. 1)
Gear: 10 ft.X 6 ft.X 1/8" Mesh Common Sense Seine			
3.5 ft.X 4 ft.X 1/16" Mesh Common Sense Seine			
Sample Duration: 60 minutes for total collection; all species			
7 passes with 10 ft.; 3 passes with 3.5 ft.		**Station Description;**	
		N42.33364	**W088.01375**



Bin	*Frequency*
0.00	0
0.50	0
1.00	0
1.50	0
2.00	0
2.50	0
3.00	2
3.50	21
4.00	14
4.50	4
5.00	1
5.50	1
6.00	0
More	0

Column1	
Mean	3.630232558
Standard Error	0.074377065
Median	3.5
Mode	3.2
Standard Deviation	0.48772303
Sample Variance	0.237873754
Kurtosis	3.865735706
Skewness	1.615494525
Range	2.5
Minimum	2.9
Maximum	5.4
Sum	156.1
Count	43
Largest(1)	5.4
Smallest(1)	2.9

INTEGRATED LAKES MANAGEMENT **Iowa Darter Data for September 29, 2006**

Fish Collection Form

Date: 29-Sep-06	**Crew:** C.Ryan	**Locality:**	Prairie Crossing
Time: 9:30 AM to12:30 PM	C.Rysso	**Site Name:**	Sanctuary pond (Upper Pond)
		Station Name:	S.W. Corner (Station No. 1)
Gear: 10 ft.X 6 ft.X 1/8" Mesh Common Sense Seine			
3.5 ft.X 4 ft.X 1/16" Mesh Common Sense Seine			
mple Duration: 60 minutes for total collection; all species			
7 passes with 10 ft.; 3 passes with 3.5 ft.		**Station Description;**	
		N42.33364	**W088.01375**

Column1	
Mean	4.8
Standard Error	8.17999E-15
Median	4.8
Mode	#N/A
Standard Deviation	#DIV/0!
Sample Variance	#DIV/0!
Kurtosis	#DIV/0!
Skewness	#DIV/0!
Range	0
Minimum	4.8
Maximum	4.8
Sum	4.8
Count	1
Largest(1)	4.8
Smallest(1)	4.8