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

2010 Fish Survey Report
Sanctuary Pond at Prairie Crossing

Prepared By:
Integrated Lakes Management, Inc.
Christopher J. Ryan
120 Le Baron St.
Waukegan, IL 60085
(847) 244-6662

Introduction

In 1999 Integrated Lakes Management (ILM) introduced four threatened and endangered species into Sanctuary Pond. Since then ILM has performed annual fisheries surveys to monitor the health of the populations and to make recommendations for the sustainability of the E/T species. However, monitoring had been put on hold for two years. This report summarizes the work completed in 2010 since the last fisheries survey conducted in 2007 and determines if changes should be made to the fisheries and/ or habitat to ensure the long term survival of these species.

Methods

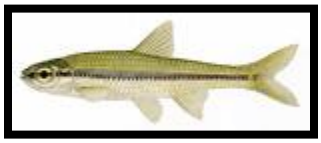
On September 2, 2010 ILM staff members conducted fisheries surveying activities at Sanctuary Pond in Prairie Crossing. Specimens were collected using a methodology established in 2001 that focused on relative populations as opposed to relative/ total populations. Collections were conducted using a 10 ft. X 5ft.X 1/8" mesh, common sense seine. Two hauls were conducted using the 10 ft. seine, covering a 30 ft. stretch of the littoral zone during each haul. ILM collected approximately 1565 individuals and measured 288 specimens during the 2010 fisheries survey. The initial 100 individuals from each species were measured; the remaining individuals were counted. Length frequency data from 2010 accompanies this report, as does the historic species distribution for 2003-2007 and 2010, and the historic numbers of the sampled populations.

Results

The total collection was comprised of Banded Killifish (*Fundulus diaphanus*), Blackchin Shiners (*Notropis heterodon*), and Blacknose Shiners (*Notropis heterolepis*); the Iowa Darter (*Etheostoma exile*) was absent during this survey. The Blackchin Shiner comprised the majority of the sampled population representing 57% of the collection. Banded Killifish were the second most abundant representing 37% of the collection with the Blackchin Shiner representing only 6% of the sampled population.

It is evident that at least three of the four species of state threatened and endangered fish stocked at Sanctuary Pond continue to sustain populations at this site; the Iowa Darter, while absent during the 2010 survey, is still presumed to be present yet unaccounted for at this time. Collection and reporting techniques do have the potential to exert substantial biases to fish population numbers. The quick drop off within Sanctuary Pond makes sampling difficult, and therefore offers potentially skewed results. Water depths at the time of sampling 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. This particular species prefers a sand and/or gravel substrate, whereas Sanctuary Pond is comprised mainly of silt and mud.

Blackchin Shiner



Blackchin Shiners continued to be the dominant species in 2010 as has been the case since 2004. While their percent representation in the sampled population has not rebound from 2006 where they comprised 70% of the collection, their abundance during the 2010 survey still indicates excellent recruitment rates from this species. When historical data is analyzed we observe a steady rise in the representation of the Blackchin Shiners in the sampled population up until 2006. After that we see a gentle decline in their relative abundance. However, given the slight difference in their representation from 2007 (60%) to 2010 (57%) it is hypothesized that this species has reached an equilibrium with its environment. Future surveys will be necessary to determine if this hypothesis is correct.

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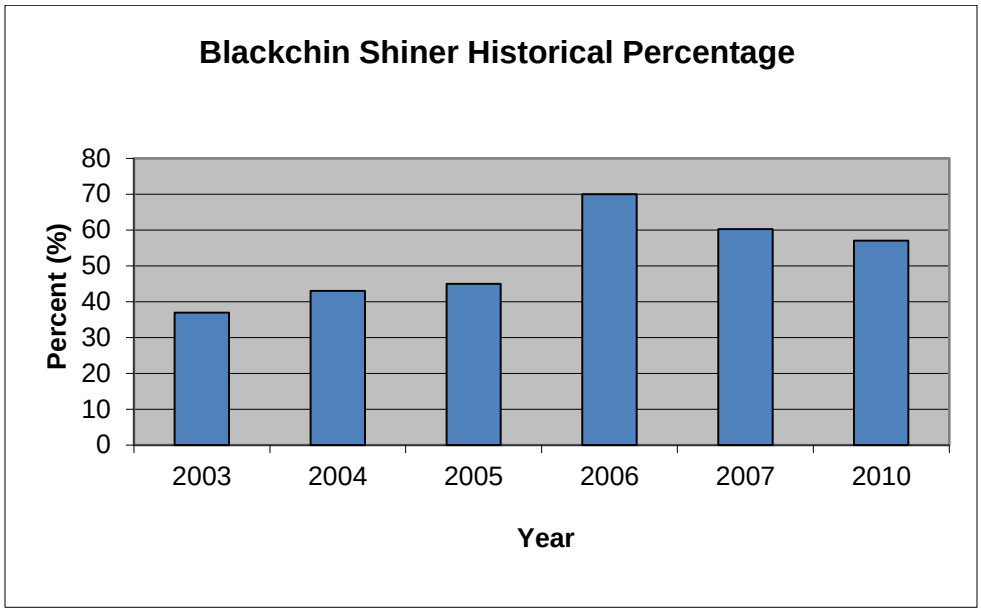
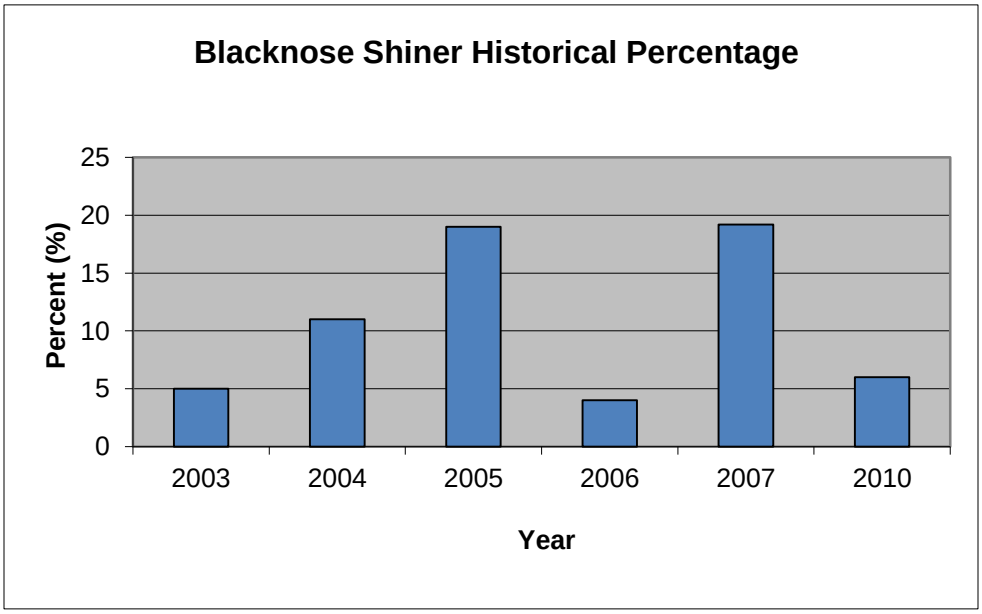


*2008 and 2009 no surveys performed

Date	Percent Of Total Catch
2003	37
2004	43
2005	45
2006	70
2007	60
2010	57

Blacknose Shiner

The 2010 survey has indicated once again that the Blacknose Shiner is still the least abundant species in Sanctuary Pond aside from the Iowa Darter. Their representation dropped substantially in 2010 (6%) in comparison to the 2007 (19%) data. When analyzing the historical data it is noticed that this species has experienced rises and falls in their representation since surveying activities had been initiated back 1999. This boom and bust observation indicates a possible "maximum carrying capacity" of this species at roughly 19%. However, it is important to consider the habitat range of the Blacknose Shiner. This species of shiner has a habitat range of 3 feet deeper than that of the Blackchin Shiner and the Banded Killifish. Therefore, this and previous surveys may be bias in their representation of the Blacknose Shiner as a result of excessive pondweed growth. Future surveys and recommended aquatic herbicides to control aggressive pondweed growth will be the only way to determine if this hypothesis holds true.

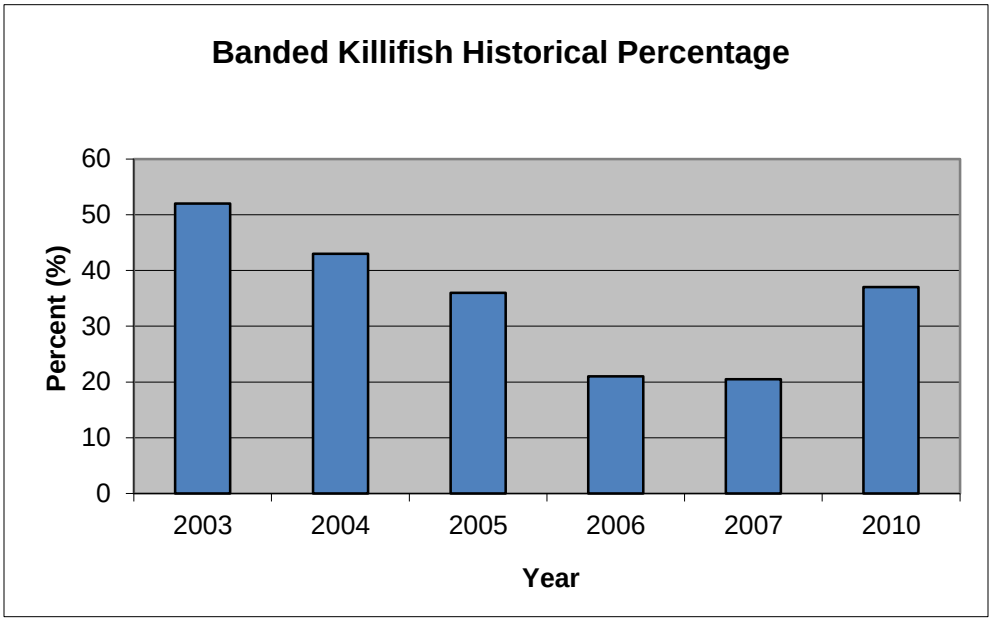


*2008 and 2009 no surveys performed

Date	Percent of Total Catch
2003	5
2004	11
2005	19
2006	4
2007	19
2010	6

Banded Killifish

The Banded Killifish represented 37% of the total catch during the 2010 fisheries survey, and was the second most abundant species in the collection. This is an increase in their percent representation when last sampled in 2007 (20%). Since their initial introduction we observe a steady decline in their overall relative abundance up until 2007. Between 2007 and 2010 this species has rebound and is suspected to have reached equilibrium with its environment. Future surveys will need to be conducted to support this theory.



*2008 and 2009 no surveys performed

Date	Percent of Total Catch
2003	52
2004	43
2005	36
2006	21
2007	20
2010	37

Recommendations

Since the introduction of these four E/T species ILM has been monitored the fisheries at Sanctuary Pond for evidence of population stabilization and sustainability. Data gathered over the past 11 years has proven that these species have the ability to survive and reproduce; now it is important to redirect efforts on monitoring the carrying capacity of this aquatic environment. In order to do this, sampling techniques should be updated and standardized, additional parameters should be monitored, and beneficial alterations to the ecosystem should be made:

- Modify the standardized sampling/ monitoring plan: specifically collection areas, depths, vegetation density (re-implement spot aquatic herbicides), and time of year
- Determine the total carrying capacity of the pond
- Calculate total biomass of fish in pond
- Improve Iowa Darter habitat

It is important to maintain consistency in sampling techniques; location, area sampled, and time of year the survey is conducted should be consistent to ensure viable and relevant data for the purpose of comparisons in data from year to year.

Spot herbicide activities in 2007 made collection efforts easier and much more successful than this year and in years prior to 2007. In order to retain consistency throughout future sampling seasons and ensure a more thorough sampling of the populations present, it is recommended to continue using spot aquatic herbicides.

A ponds carrying capacity, maximum lbs. of fish a pond can support, can vary depending upon the time of year and can be determined through the analysis of several water quality parameters. Samples should be collected during the time of the fisheries survey to determine the ponds current carrying capacity at that point in time.

Batch weights should be collected to extrapolate the total mass of fish in Sanctuary Pond during the time of the survey. Data can then be used to determine what this ponds current fisheries biomass is relevant to its maximum caring capacity. Knowing this information will determine if population control is essential to the overall health and survival of these species.

The removal of sediment accumulation and the addition of sand and gravel in certain shallow areas will create a more preferred habitat for Iowa Darters and increase recruitment rates of this species.

The reduction of cattail stands will increase the success of collection efforts by eliminating an “escape route” when seine nets are pulled to shore.

In previous reports it was recommended that a top predator be introduced into Sanctuary Pond to help maintain a more balanced ecosystem and prevent population crashes of one

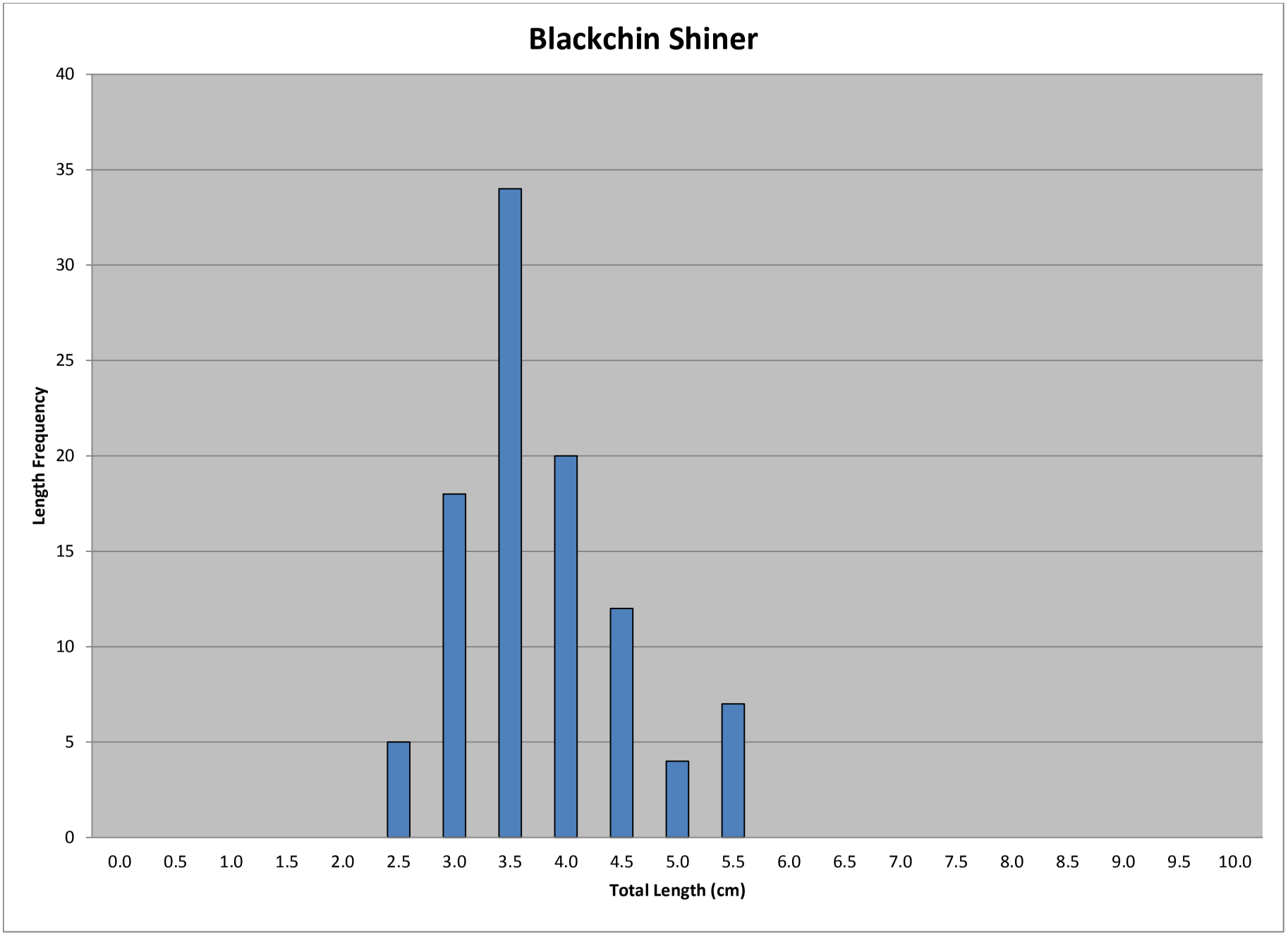
or more of the introduced E/T species. After 11 years of monitoring and evaluating the population dynamics of this refuge pond, data gathered during this last survey supports that three of the four species originally introduced (habitat and vegetation densities may have accounted for the lack of Iowa Darters collected) have representatives from multiple age classes indicating the availability of sufficient forage to sustain a balanced population. However, without total carrying capacity data available it is unknown if a top predator is necessary in Sanctuary Pond to maintain healthy populations resistant to population eradication as a result of disease from overpopulation and competition for forage.

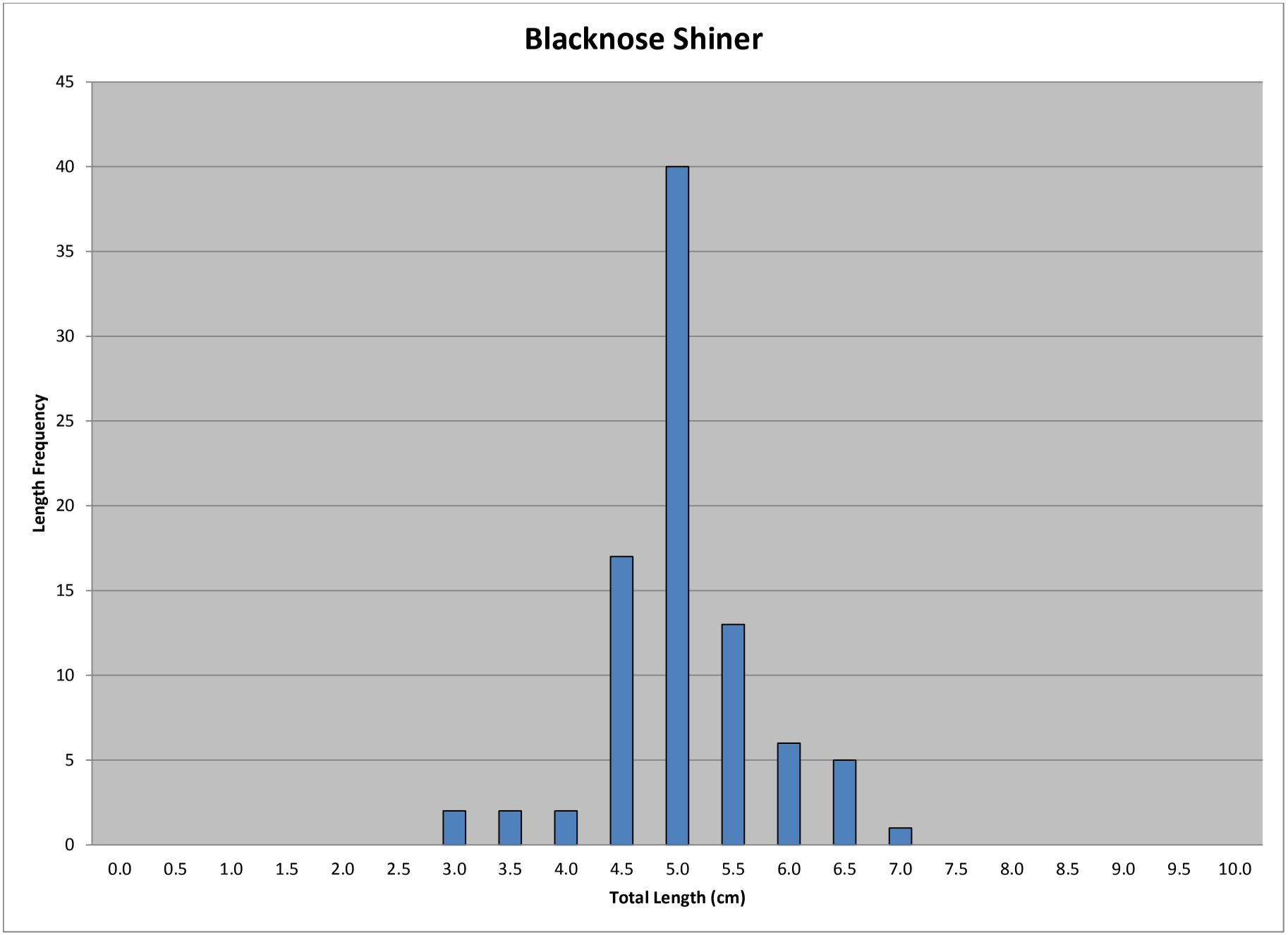
If, through future surveys and data analysis it is determined that a top predator is necessary to maintain the viability of these E/T populations it is recommended that a species incapable of reproducing in this environment be introduced such as Rainbow Trout stocked at a rate of 1-2 per acre. This particular species will keep the target species populations in check and not survive the summer. These two characteristics make this species perfect for population control in this particular situation if warranted.

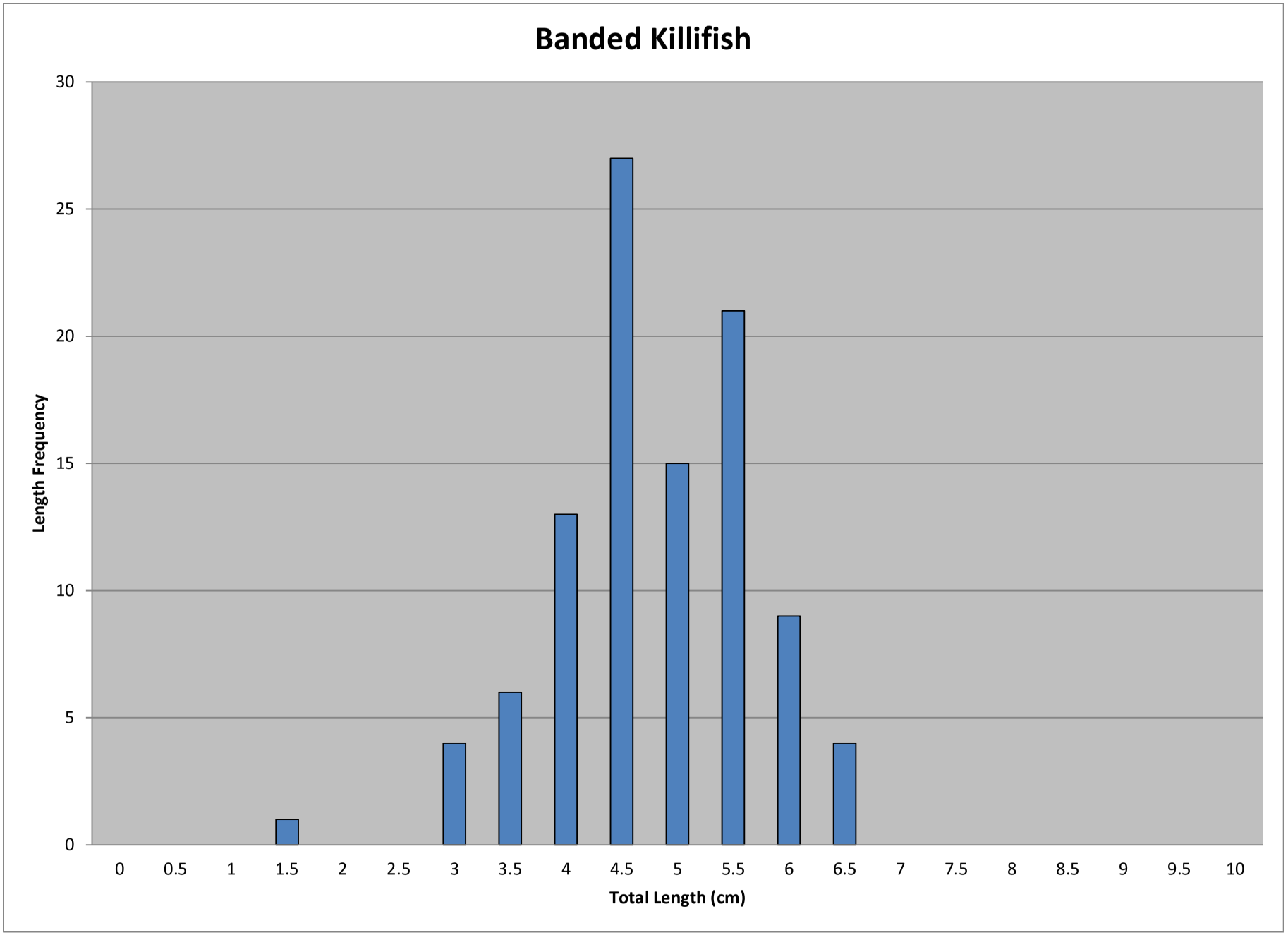
The translocation of large numbers of the E/T species from Sanctuary Pond to Lake Leopold and other lakes should not be overlooked as an effective means of reducing population densities. The overall purpose of this established refuge was to assist in E/T recruitment and re-introduction to extirpated regions of the DesPlanes River basin. Keeping populations contained in Sanctuary Pond defeats the purpose of its establishment. It is recommended that due to the sensitive nature of the shiner populations and their susceptibility to mortality due to handling that that any population transfers conducted be done solely for the purpose of species relocation and that numerating and length frequency data be forgone to ensure the survival of the individuals being relocated.

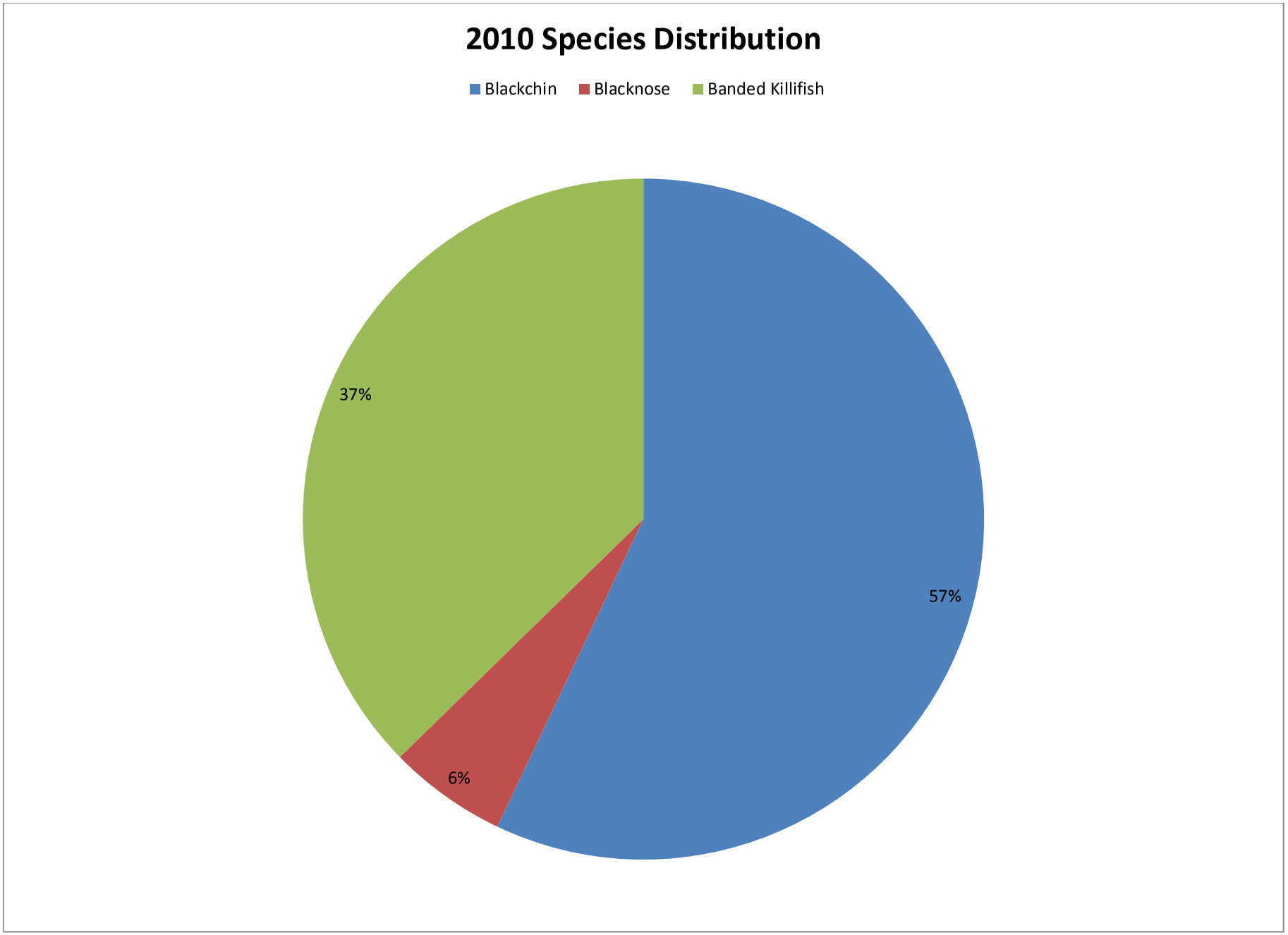
Figure 1: Location of fish collection outlined in red

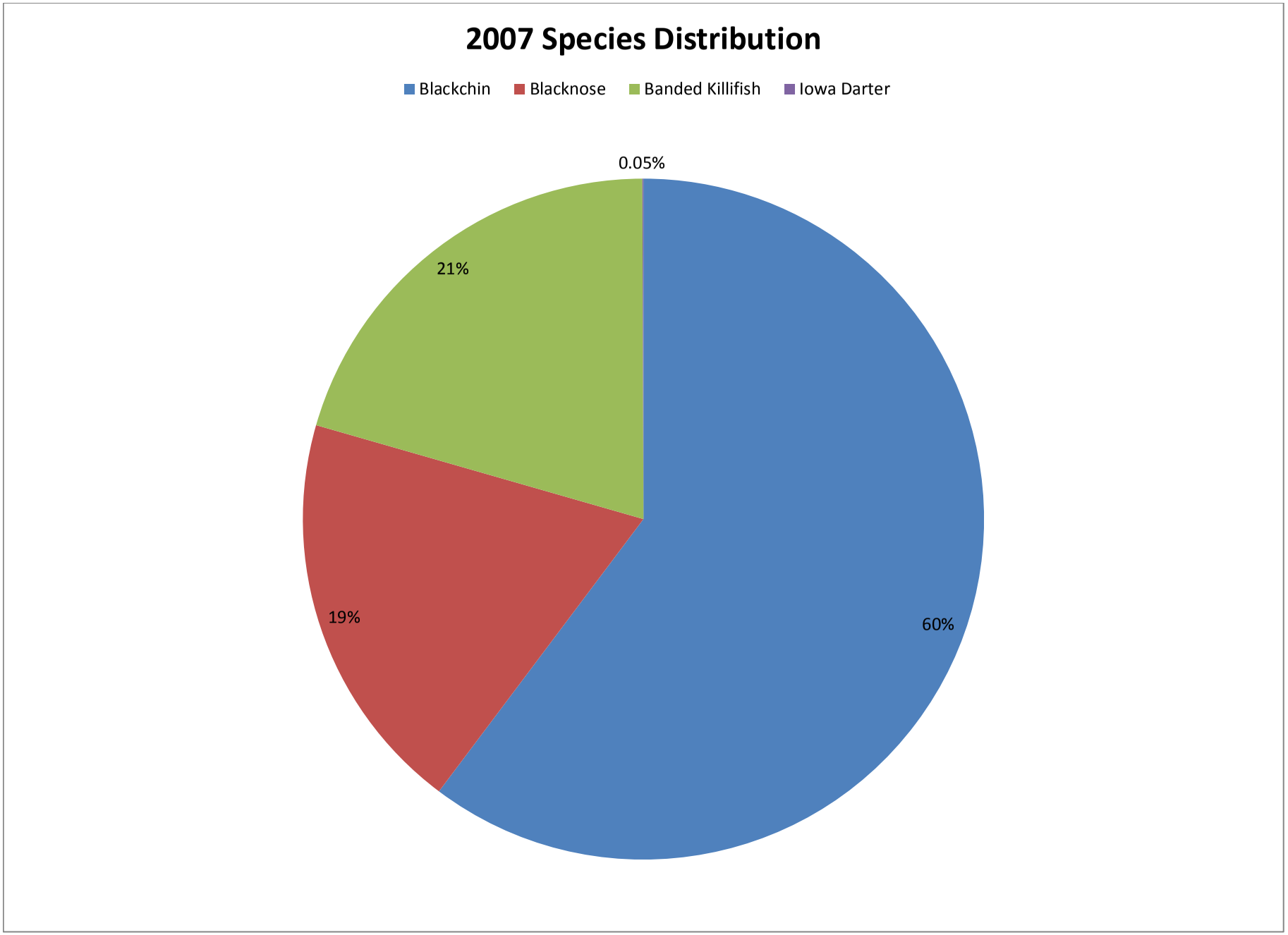
Appendix

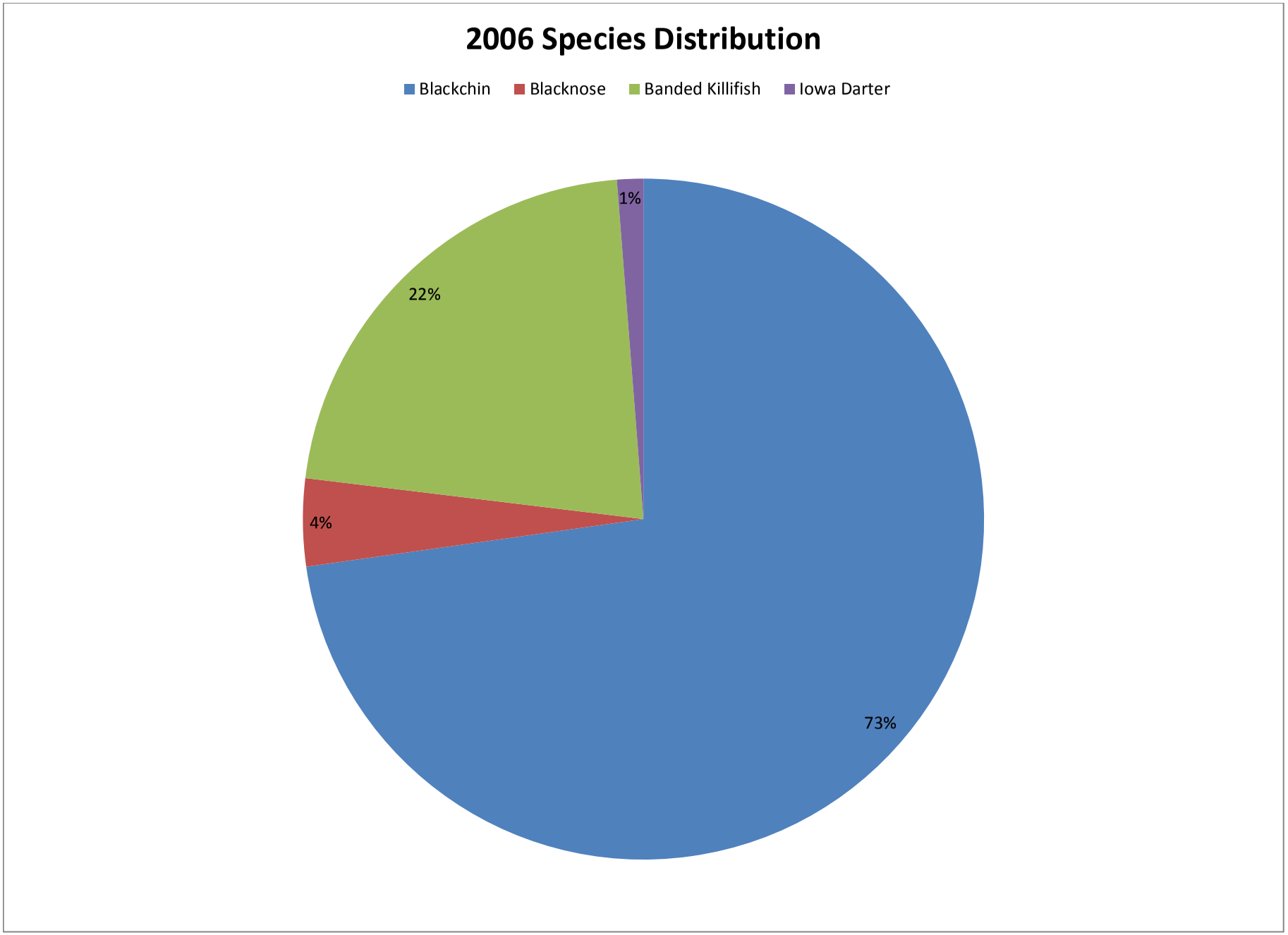

Blackchin Shiner
Length Frequency
0
5
10
15
20
25
30
35
40
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0
Total Length (cm)

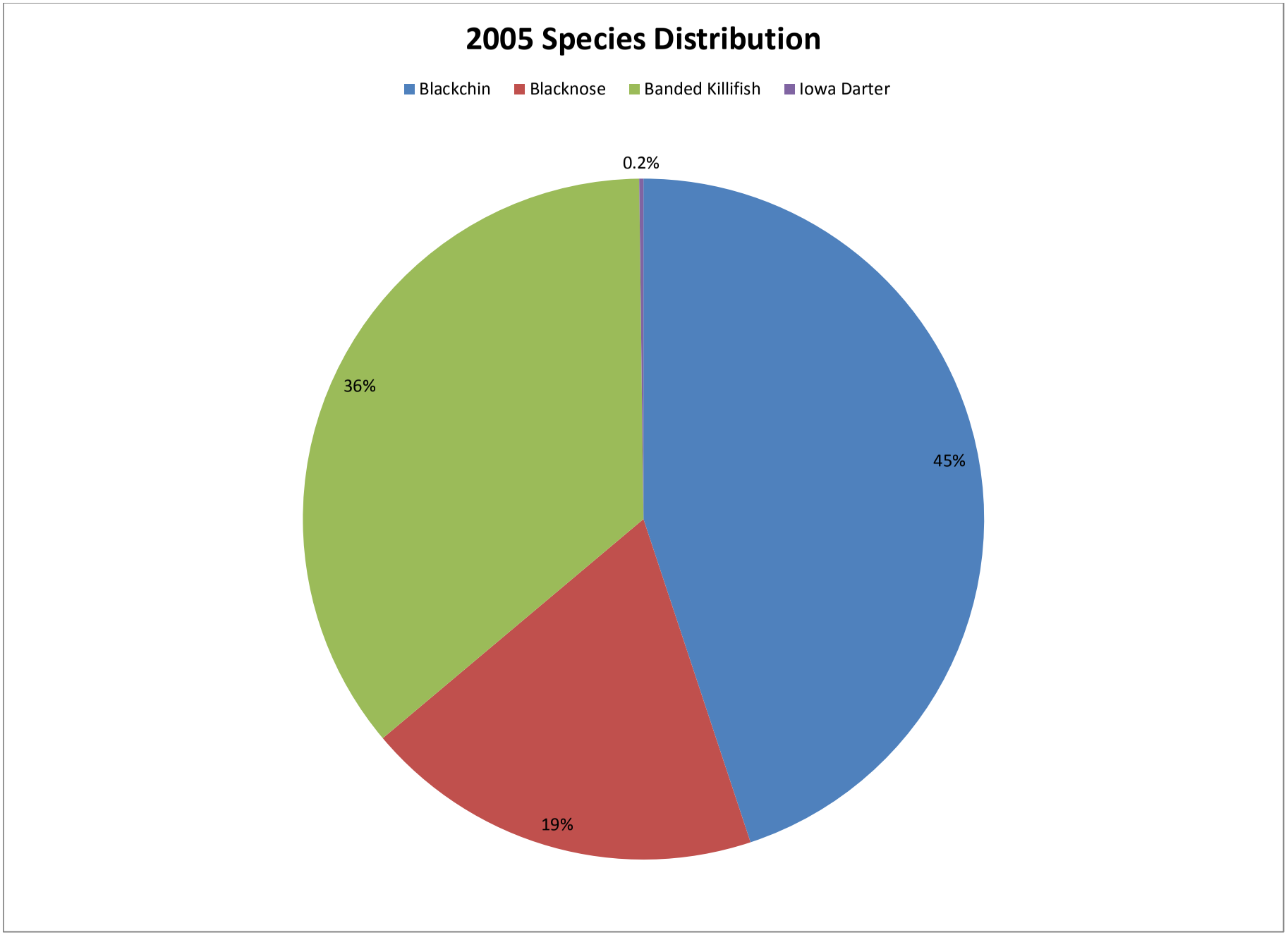

Blacknose Shiner
Length Frequency
45
40
35
30
25
20
15
10
5
0
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0
Total Length (cm)

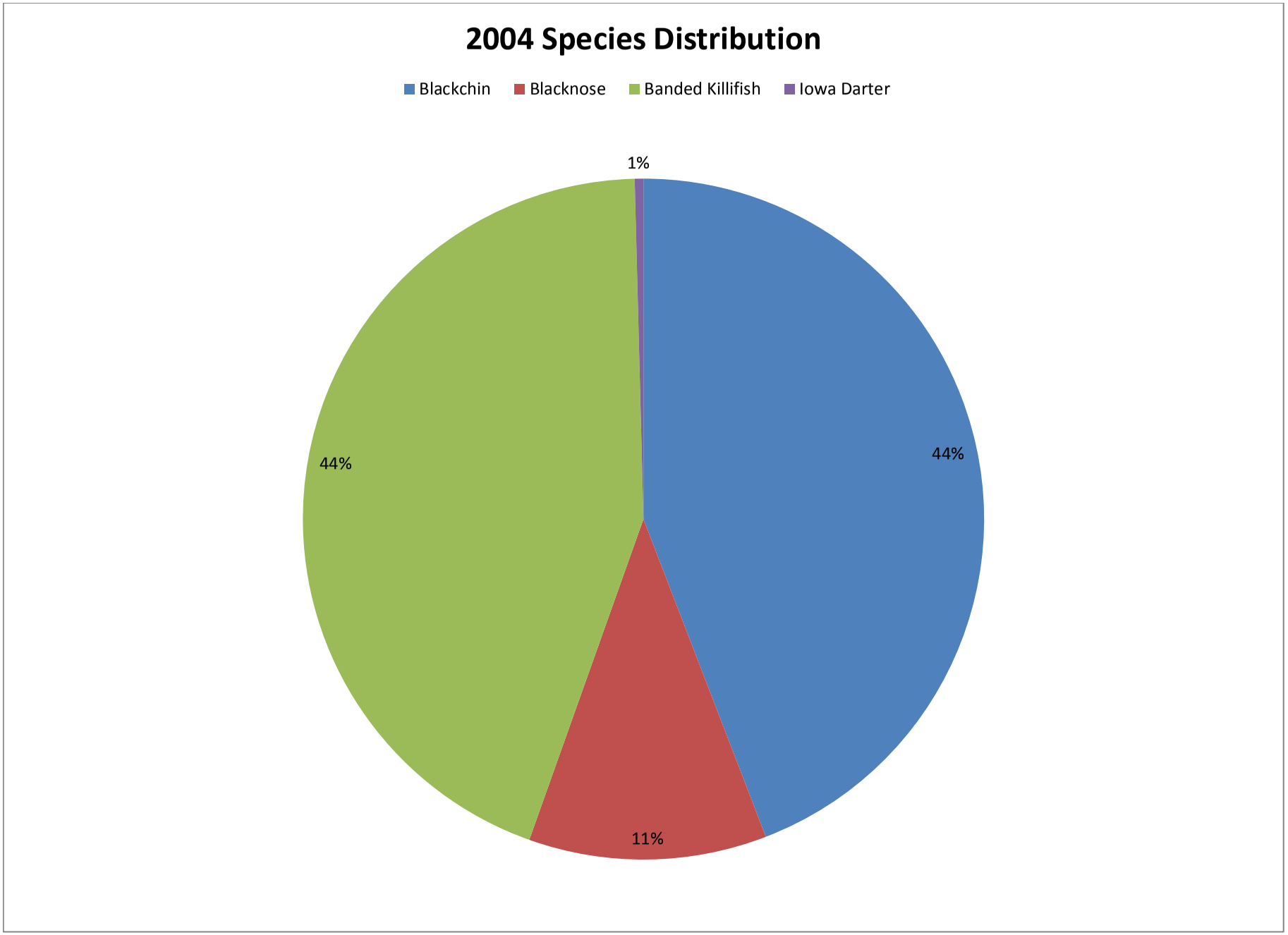

Banded Killifish
Length Frequency
30
25
20
15
10
5
0
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
5
5.5
6
6.5
7
7.5
8
8.5
9
9.5
10
Total Length (cm)

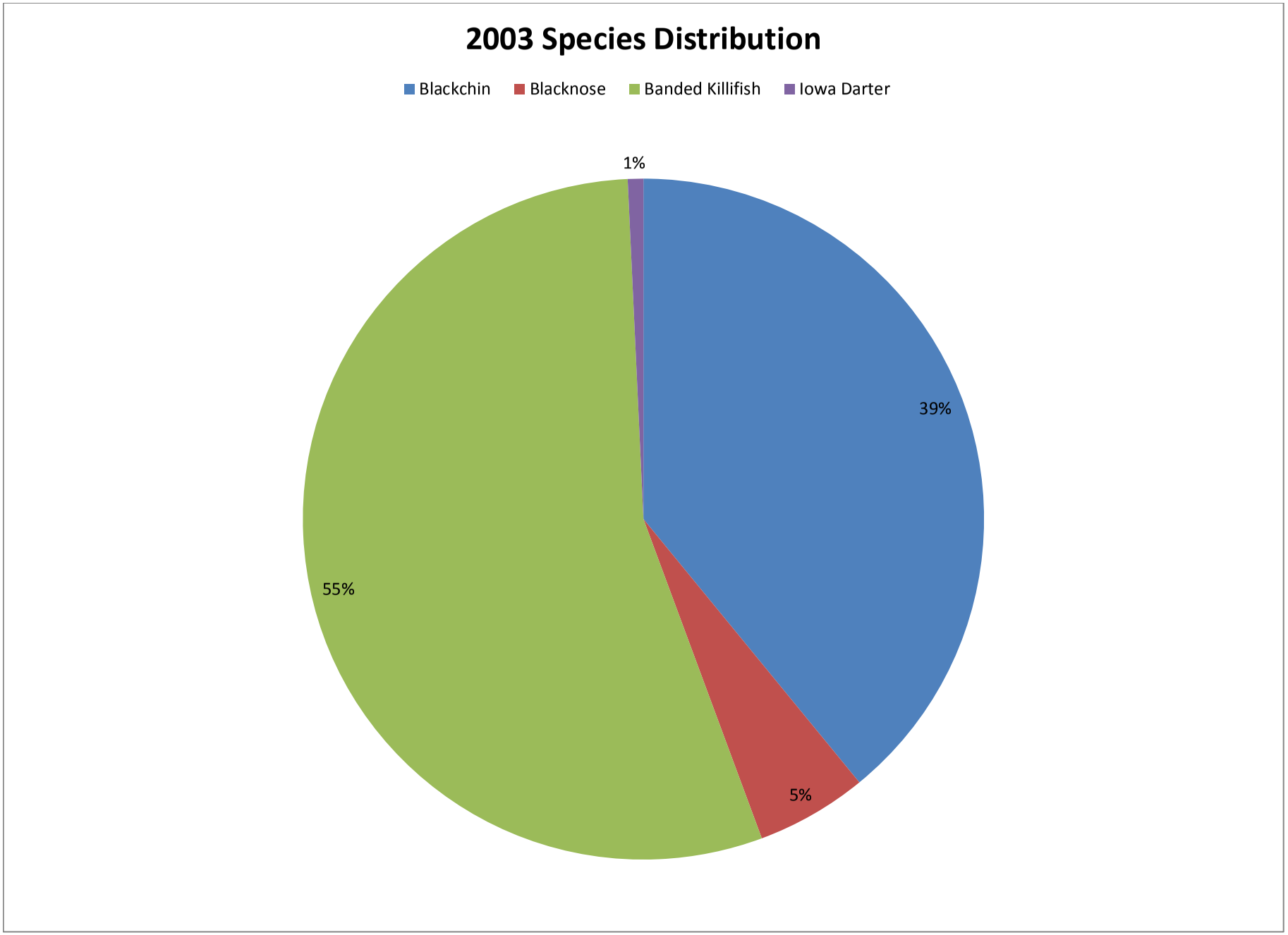

2010 Species Distribution
Blackchin
Blacknose
Banded Killifish
37%
57%
6%

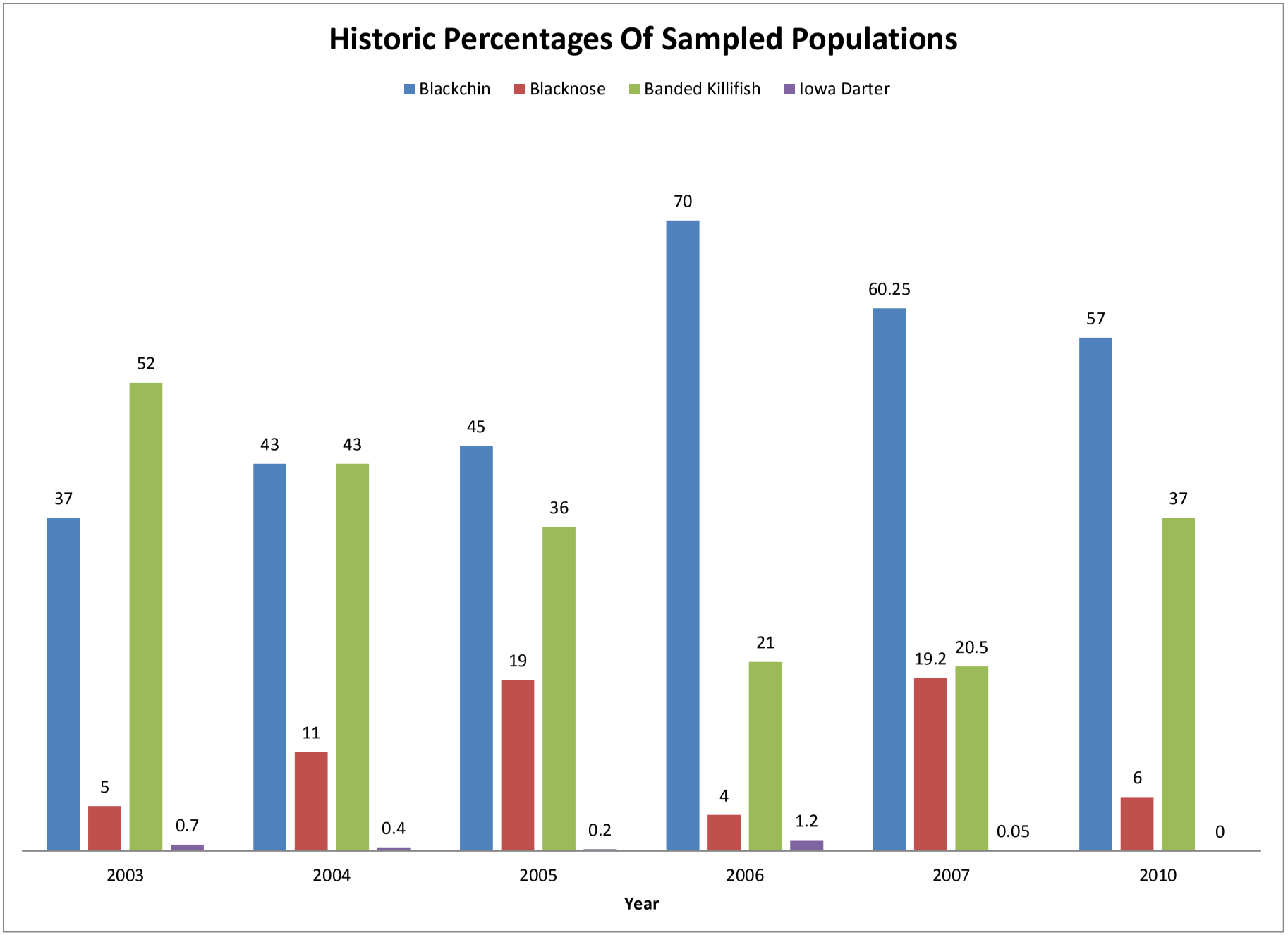

2007 Species Distribution
Blackchin
Blacknose
Banded Killifish
Iowa Darter
0.05%
21%
19%
60%


2006 Species Distribution
Blackchin
Blacknose
Banded Killifish
Iowa Darter
1%
22%
4%
73%


2005 Species Distribution
Blackchin
Blacknose
Banded Killifish
Iowa Darter
0.2%
36%
45%
19%


2004 Species Distribution
Blackchin
Blacknose
Banded Killifish
Iowa Darter
1%
44%
44%
11%


2003 Species Distribution
Blackchin
Blacknose
Banded Killifish
Iowa Darter
1%
39%
55%
5%


Historic Percentages Of Sampled Populations
Blackchin
Blacknose
Banded Killifish
Iowa Darter
37
5
52
0.7
43
11
43
0.4
45
19
36
0.2
70
4
21
1.2
60.25
19.2
20.5
0.05
57
6
37
0
2003
2004
2005
2006
2007
2010
Year