Integrated Lakes Management, Inc.
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# Fish Assessment for Lake Leopold

**June 9, 2005**


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## Introduction

Integrated Lakes Management staff completed a quantitative fisheries survey on June 9th and 10th to assess the relative species abundance of fish assemblages in Lake Leopold. Lake Leopold has been the test lake for a stocking project for several endangered and threatened fish species in that these fish were stocked from Sanctuary Pond, a lake with no predation, to Lake Leopold which approximates the cultural conditions that these species will be exposed to in other area lakes. These conditions include predation, water quality issues, and human and plant management activities. Over the years the fish have been consistently monitored and this study is a continuation of that monitoring program.

## Methodology

Several types of sampling strategies were incorporated in order to increase the likelihood of capturing as complete a fishery assemblage possible in the lake. (All net sets were set for a 24 hour overnight set.)

One large fyke net set at the south east end near the dam
One large hoop net set on the north west end near the curtain
Two small hoop nets set on east and west end of the island

Seven non baited minnow traps were set at intervals around the lake

Ten foot seine hauls were done on both sides of the beach these were done as ten foot pulls for a total of 6 pulls using two different seine pulls (D and C sweep).

Gill nets were to be set overnight but we chose not to do them at this time due to extremely high air temperatures. These may be set for a shorter duration later in the year to minimize fish mortality.

Backpack electroshocking was also employed along the shore but was not incorporated in this report due to poor results. The electroshocker was generating a current but ILM staff could not get appropriate responses from the fish.

The general water quality conditions were assessed on June 6th and are included in the attachments.

A plant assessment will follow within the next two weeks of this assessment in order to draw additional conclusions about lake conditions as pertain to the fishery.

# Results

Total Collection/All Gear Types

| | | |
|---|---|---|
| Blackchin Shiner | Notropis heterodon | 10 |
| Banded Killifish | Fundulus diaphanus | 16 |
| Iowa Darter | Etheostoma exile | 2 |
| Black Crappie | Pomoxis nigromaculatus | 1 |
| Bluegill | Lepomis macrochirus | 248 |
| Green sunfish | Lepomis cyanellus | 2 |
| Largemouth Bass | Micropterus salmoides | 1 |

Lake Leopold's fishery is out of balance. ILM staff used a diversity of sampling methods in order to minimize sample gear bias. However, in every gear we used the results were similar. Bluegill populations dominated the fishery. Almost 99 percent of the fish collected were Bluegill. Only one Largemouth Bass was collected although several moderately sized adults were seen in visual observations. Of the E/T species we were looking for we collected a fair number of Banded Killifish and Blackchin Shiners. No Blacknose Shiners or Pugnose Shiners were collected at this time and only two Iowa Darters were collected. However, Iowa darters are not easily collected and since one of the darters collected was a young of the year fry we believe this population may be faring well since we are seeing recruitment in the lake.

We believe that the reduction of E/T species is due to the predation of these species by Bluegill. Several swimmers commented that they have been nipped by hungry panfish while swimming. This is usually a sign of stunting and overpopulation which is corroborated by the data.

Gill nets and electrofishing will be incorporated into future sampling. Gill nets were not used this time since the mortality from this type of netting would have been detrimental. Gill nets will be appropriate for larger fish such as tiger muskies. This sampling gear is especially effective for open water species and therefore this population was not sampled.

# Recommendations:

- Continue to monitor the distribution of fish populations within the Lake using multiple sampling strategies.

- Consider additional supplemental stocking of E/T species from Sanctuary Pond to help augment populations that are dwindling due to heavy predation from Bluegill and Green sunfish.

- Encourage removal of panfish via fishing

- Stocking of Predatory fish. Several avenues of stocking could be undertaken. Stocking additional top predators such as the Tiger Musky is one option. These won't reproduce in the lake and can be easily controlled. Another route is to look at stocking those fish that were historically found in the lakes of the region such as Gar and Bowfins. These species were common to area lakes but due to active removal via rotenone many of these populations declined along with the E/T minnows populations. In considering stocking quotas in general for every ten pounds of prey species collected one pound of a predatory species is recommended for a balanced fishery (i.e. 10 lbs of Bluegill to 1 lb of Largemouth Bass)

- Plant management options needs to be considered in conjunction with the habitat requirements of the species Liberty Prairie Foundation wishes to promote within the lake.

Lake Leopold
Water Chemistry Data
Deep Hole
6/6/05

Air Temp 85 Degrees

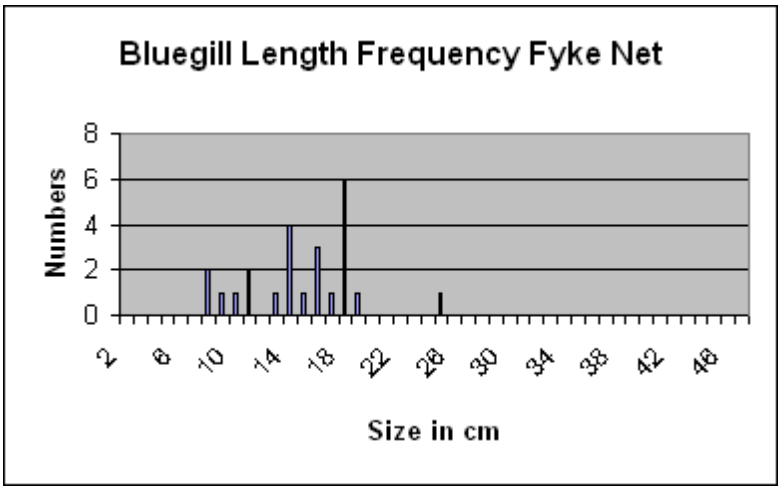
Precipitation (within Previous Week) .4 in in 3 days

| **Total Depth** | **Site 1** | **Site 2** |
|---|---|---|
| Secchi Depth | 12’6” | 11’ |
| pH | 9.4 | 8.5 |
| Alkalinity | 67 | 103 |
| Chloride | 320 | 340 |
| IEPA color chart | 12 | 11 |
| | | |

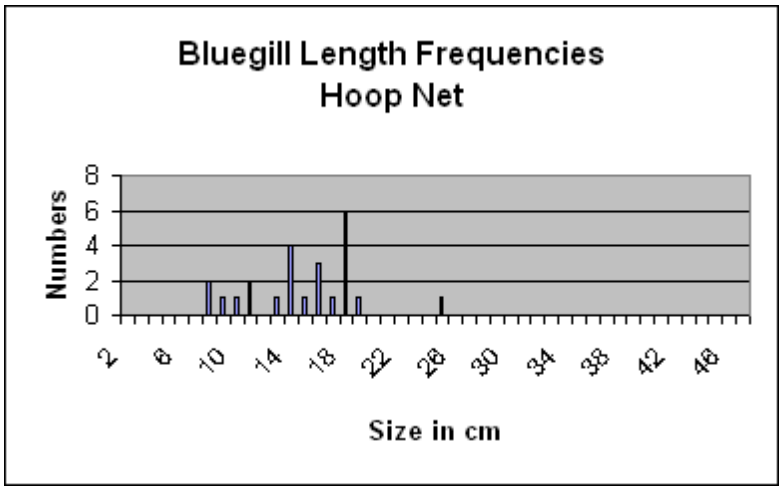
Water Chemistry at Deep hole

| Depth | Temp | Cond | DO | PH |
|---|---|---|---|---|
| surface | 23.7 | 1.275 | 9.2 | 9.2 |
| 1 | 23.7 | 1.275 | 8.9 | 9.2 |
| 2 | 23.7 | 1.275 | 8.9 | 9.2 |
| 3 | 23.6 | 1.275 | 9.0 | 9.2 |
| 4 | 23.5 | 1.274 | 8.8 | 9.2 |
| 5 | 23.3 | 1.276 | 8.6 | 9.2 |
| 6 | 23.1 | 1.275 | 8.5 | 9.2 |
| 7 | 23.0 | 1.276 | 8.4 | 9.2 |
| 8 | 22.7 | 1.277 | 7.5 | 9.1 |
| 9 | 21.9 | 1.274 | 11.7 | 9.2 |
| 10 | 20.3 | 1.270 | 15.4 | 9.2 |
| 11 | 19.6 | 1.264 | 16.9 | 9.2 |
| Bottom | | | | |

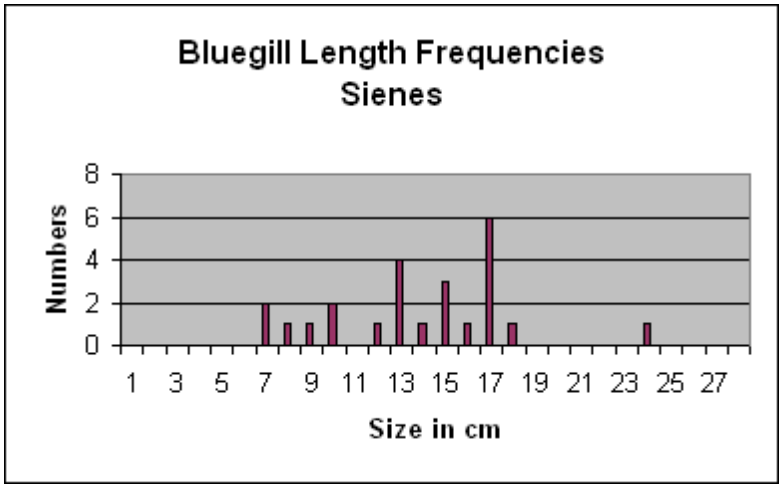
| *cm* | *Frequency* |
|---|---|
| 2 | 0 |
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 0 |
| 7 | 0 |
| 8 | 2 |
| 9 | 1 |
| 10 | 1 |
| 11 | 2 |
| 12 | 0 |
| 13 | 1 |
| 14 | 4 |
| 15 | 1 |
| 16 | 3 |
| 17 | 1 |
| 18 | 6 |
| 19 | 1 |
| 20 | 0 |
| 21 | 0 |
| 22 | 0 |
| 23 | 0 |
| 24 | 0 |
| 25 | 1 |
| 26 | 0 |
| 27 | 0 |
| 28 | 0 |
| 29 | 0 |
| 30 | 0 |
| 31 | 0 |
| 32 | 0 |
| 33 | 0 |
| 34 | 0 |
| 35 | 0 |
| 36 | 0 |
| 37 | 0 |
| 38 | 0 |
| 39 | 0 |
| 40 | 0 |
| 41 | 0 |
| 42 | 0 |
| 43 | 0 |
| 44 | 0 |
| 45 | 0 |
| 46 | 0 |
| More | 0 |



| *cm* | *Frequency* |
|---|---|
| 2 | 0 |
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 0 |
| 7 | 0 |
| 8 | 2 |
| 9 | 1 |
| 10 | 1 |
| 11 | 2 |
| 12 | 0 |
| 13 | 1 |
| 14 | 4 |
| 15 | 1 |
| 16 | 3 |
| 17 | 1 |
| 18 | 6 |
| 19 | 1 |
| 20 | 0 |
| 21 | 0 |
| 22 | 0 |
| 23 | 0 |
| 24 | 0 |
| 25 | 1 |
| 26 | 0 |
| 27 | 0 |
| 28 | 0 |
| 29 | 0 |
| 30 | 0 |
| 31 | 0 |
| 32 | 0 |
| 33 | 0 |
| 34 | 0 |
| 35 | 0 |
| 36 | 0 |
| 37 | 0 |
| 38 | 0 |
| 39 | 0 |
| 40 | 0 |
| 41 | 0 |
| 42 | 0 |
| 43 | 0 |
| 44 | 0 |
| 45 | 0 |
| 46 | 0 |
| More | 0 |



| *cm* | *Frequency* |
|---|---|
| 2 | 0 |
| 3 | 0 |
| 4 | 0 |
| 5 | 0 |
| 6 | 0 |
| 7 | 0 |
| 8 | 2 |
| 9 | 1 |
| 10 | 1 |
| 11 | 2 |
| 12 | 0 |
| 13 | 1 |
| 14 | 4 |
| 15 | 1 |
| 16 | 3 |
| 17 | 1 |
| 18 | 6 |
| 19 | 1 |
| 20 | 0 |
| 21 | 0 |
| 22 | 0 |
| 23 | 0 |
| 24 | 0 |
| 25 | 1 |
| 26 | 0 |
| 27 | 0 |
| 28 | 0 |
| 29 | 0 |



**INTEGRATED LAKES MANAGEMENT**

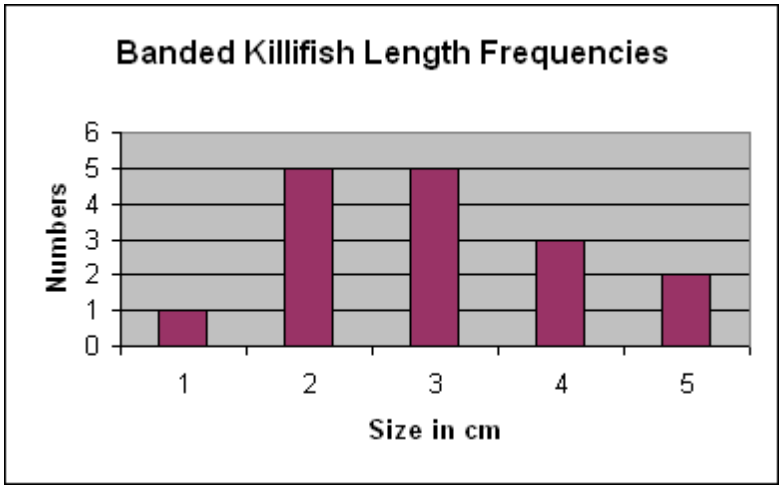
**Banded Killifish Frequency Distribution For June 2005**

**Fish Collection Form**

| | | | | | |
|---|---|---|---|---|---|
| **Dates:** | 9-Jun-05 | **Crew:** | I. West | **Locality:** | Prairie Crossing |
| **Time:** | 24 hour set | | C. Ryan | **Site Name:** | Lake Leopold |
| | | | J. Bland | | |
| | | | P. | | |
| **Gear:** | composite | | Bland | | |

| Banded Killifish | |
|---|---|
| # | cm |
| 1 | 5.9 |
| 2 | 5.7 |
| 3 | 5.3 |
| 4 | 5.3 |
| 5 | 5.3 |
| 6 | 5 |
| 7 | 5 |
| 8 | 4.9 |
| 9 | 4.9 |
| 10 | 4.7 |
| 11 | 4.5 |
| 12 | 4.5 |
| 13 | 4.4 |
| 14 | 4.3 |
| 15 | 4.3 |
| 16 | 4.1 |

| *Bin* | *Frequency* |
|---|---|
| 4.1 | 1 |
| 4.55 | 5 |
| 5 | 5 |
| 5.45 | 3 |
| 5.9 | 2 |




| *Column1* | |
|---|---|
| Mean | 4.88125 |
| Standard Error | 0.13077 |
| Median | 4.9 |
| Mode | 5.3 |
| Standard Deviation | 0.52309 |
| Sample Variance | 0.27363 |
| Kurtosis | -0.6255 |
| Skewness | 0.38964 |
| Range | 1.8 |
| Minimum | 4.1 |
| Maximum | 5.9 |
| Sum | 78.1 |
| Count | 16 |

## INTEGRATED LAKES MANAGEMENT

### Iowa Darter Frequency Distribution For June 2005

**Fish Collection Form**

| | | | | | |
|---|---|---|---|---|---|
| **Dates:** | 9-Jun-05 | **Crew:** | I. West | **Locality:** | Prairie Crossing |
| **Time:** | 24 hour set | | C. Ryan<br>J. Bland | **Site Name:** | Lake Leopold |
| **Gear:** | composite | | P. Bland | | |

Iowa darter

| | | |
|---|---|---|
| 1 | fry | |
| 2 | | 5.4 |

## INTEGRATED LAKES MANAGEMENT

### Blackchin Shiner Frequency Distribution For June 2005

**Fish Collection Form**

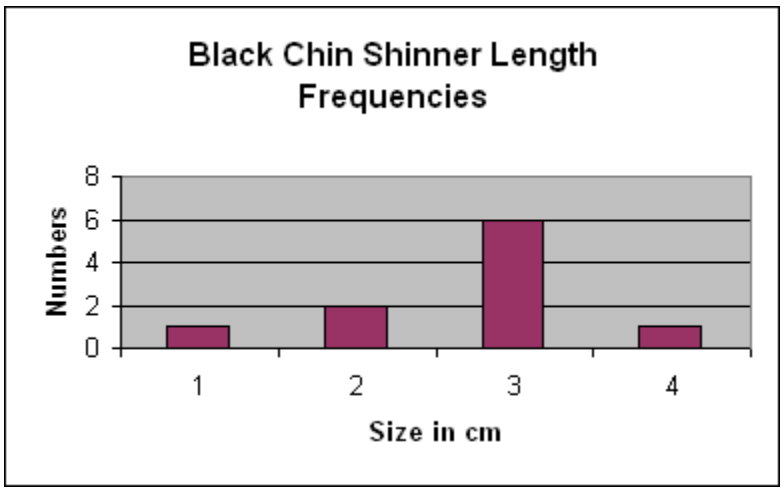
| | | | | | |
|---|---|---|---|---|---|
| **Dates:** | 9-Jun-05 | **Crew:** | I. West | **Locality:** | Prairie Crossing |
| **Time:** | 24 hour set | | C. Ryan | **Site Name:** | Lake Leopold |
| | | | J. Bland | | |
| **Gear:** | composite | | P. Bland | | |

BlackChin Shinner

| | |
|---|---|
| 1 | 4.9 |
| 2 | 4.7 |
| 3 | 4.7 |
| 4 | 4.7 |
| 5 | 4.7 |
| 6 | 4.6 |
| 7 | 4.6 |
| 8 | 4.5 |
| 9 | 4.5 |
| 10 | 4.3 |

| *Bin* | *Frequency* |
|---|---|
| 4.3 | 1 |
| 4.5 | 2 |
| 4.7 | 6 |
| 4.9 | 1 |

| *Column1* | |
|---|---|
| Mean | 4.62 |
| Standard Error | 0.051208 |
| Median | 4.65 |
| Mode | 4.7 |
| Standard Deviation | 0.161933 |
| Sample Variance | 0.026222 |
| Kurtosis | 1.123753 |
| Skewness | -0.40035 |
| Range | 0.6 |
| Minimum | 4.3 |
| Maximum | 4.9 |
| Sum | 46.2 |
| Count | 10 |
| Confidence Level(95.0%) | 0.11584 |



## INTEGRATED LAKES MANAGEMENT

### Bluegill Frequency Distribution For June 2005

**Fish Collection Form**

| | | | | | |
|---|---|---|---|---|---|
| **Dates:** | 9-Jun-05 | **Crew:** | I. West | **Locality:** | Prairie Crossing |
| **Time:** | 24 hour set | | C. Ryan<br>J. Bland | **Site Name:** | Lake Leopold |
| **Gear:** | composite | | P. Bland | | |

Bluegill

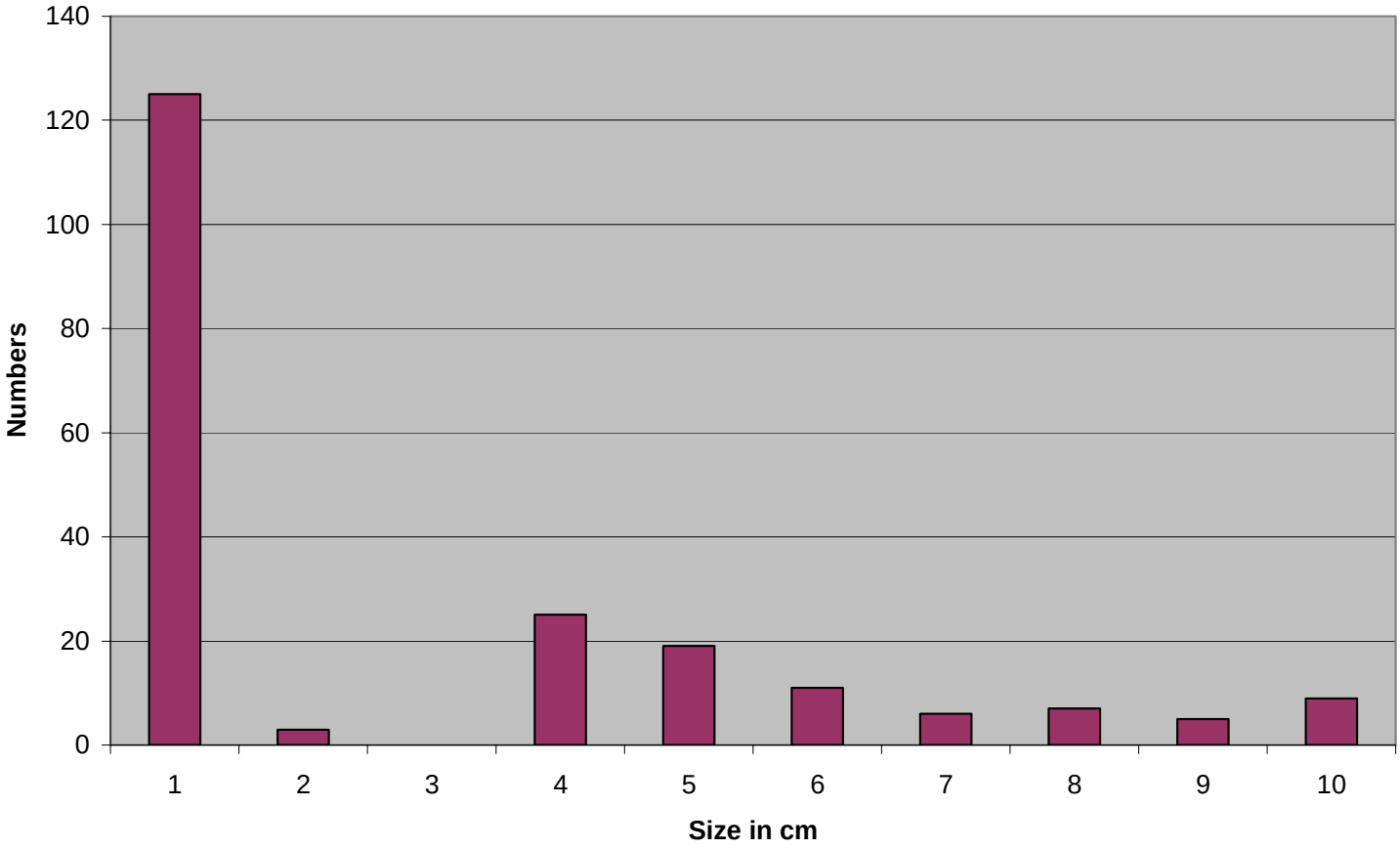
| # | cm | # | cm | # | cm | # | cm |
|---|---|---|---|---|---|---|---|
| 1 | 18.10 | 26 | 11.4 | 51 | 8.00 | 76 | 6.80 |
| 2 | 18.00 | 27 | 11.00 | 52 | 7.90 | 77 | 6.7 |
| 3 | 18.00 | 28 | 11.00 | 53 | 7.80 | 78 | 6.50 |
| 4 | 17.80 | 29 | 11.50 | 54 | 7.80 | 79 | 6.50 |
| 5 | 17.70 | 30 | 10.6 | 55 | 7.80 | 80 | 6.50 |
| 6 | 17.50 | 31 | 10.50 | 56 | 7.7 | 81 | 6.40 |
| 7 | 17.50 | 32 | 10.40 | 57 | 7.60 | 82 | 6.30 |
| 8 | 17.30 | 33 | 10.3 | 58 | 7.50 | 83 | 3.4 |
| 9 | 17.00 | 34 | 9.8 | 59 | 7.50 | 84 | 3.4 |
| 10 | 15.50 | 35 | 9.8 | 60 | 7.50 | 85 | 3.3 |
| 11 | 15.50 | 36 | 9.70 | 61 | 7.50 | 86 | 2.3 |
| 12 | 15.50 | 37 | 9.50 | 62 | 7.50 | | |
| 13 | 15.30 | 38 | 9.5 | 63 | 7.50 | | |
| 14 | 15.00 | 39 | 9.3 | 64 | 7.50 | | |
| 15 | 13.80 | 40 | 9.3 | 65 | 7.50 | | |
| 16 | 13.50 | 41 | 9.00 | 66 | 7.40 | | |
| 17 | 13.50 | 42 | 9.00 | 67 | 7.30 | | |
| 18 | 13.50 | 43 | 8.90 | 68 | 7.30 | | |
| 19 | 13.10 | 44 | 8.8 | 69 | 7.30 | | |
| 20 | 13.10 | 45 | 8.40 | 70 | 7.10 | | |
| 21 | 13.00 | 46 | 8.30 | 71 | 7.00 | | |
| 22 | 12.80 | 47 | 8.20 | 72 | 7.00 | | |
| 23 | 12.50 | 48 | 8.00 | 73 | 7.00 | | |
| 24 | 11.70 | 49 | 8.00 | 74 | 7.00 | | |
| 25 | 11.5 | 50 | 8.00 | 75 | 7.00 | | |

| *Bin* | *Frequency* |
|---|---|
| 3.40 | 125 |
| 4.06 | 3 |
| 5.81 | 0 |
| 7.57 | 25 |
| 9.32 | 19 |
| 11.08 | 11 |
| 12.83 | 6 |
| 14.59 | 7 |
| 16.34 | 5 |
| 18.09 | 9 |

*Column1*

| | |
|---|---|
| Mean | 10 |
| Standard Error | 0.413010038 |
| Median | 8.85 |
| Mode | 7.5 |
| Standard Deviation | 3.830097526 |
| Sample Variance | 14.66964706 |
| Kurtosis | -0.287789086 |
| Skewness | 0.654218936 |
| Range | 15.8 |
| Minimum | 2.3 |
| Maximum | 18.1 |
| Sum | 860 |
| Count | 86 |

## Total Bluegill Length Frequencies All Gear Types



**INTEGRATED LAKES MANAGEMENT**

## Misc. game fish Frequency Distribution For June 2005

**Fish Collection Form**

| | | | | | |
|---|---|---|---|---|---|
| **Dates:** | 9-Jun-05 | **Crew:** | I. West | **Locality:** | Prairie Crossing |
| **Time:** | 24 hour set | | C. Ryan | **Site Name:** | Lake Leopold |
| | | | J. Bland | | |
| **Gear:** | composite | | P. Bland | | |

| | cm |
|---|---|
| Black Crappie | 25.00 |
| Green sunfish | 9.70 |
| Green sunfish | 9.20 |
| Largemouth Bass | 9.1 |