An Ecological Study of The Pine Point Shoreline

Project Report For Week VII

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A 24-hour seining exercise was carried out at Pine Point on July 11 and July 12. Samples were taken by Joel Hienen and myself using a 20 foot straight seine. The samples were taken at the following times: 8pm, 11pm, 2am, 5am, 8am, 12 noon and 4pm. This schedule allowed the maximum number of night samples during the relatively short dark periods. This would give us a good basis for speculation if any diurnal activities were observed. Once a sample was collected, the species were identified and released. Of each sample, only 10 fish were preserved for stomach analysis. The entire samples were not preserved due to the possible effects on the spawning grounds of the bay. If a species concentrated its reproductive efforts in the area, the samples could seriously reduce the population size. Stomach analysis were carried out in the lab in the days following. Samples from stomachs were analyzed by approximating the contents by percent of total volume. Other than the differences already mentioned, this study was carried out in the same manner as the class exercise on S. Fishtail Bay in the following week.

Looking at the data collected, several interesting observations can be made. The times of Notropis stramineus feeding can be seen in Figure 1. This species was used for this illustration because it was found at all times of sampling and was large enough to accurately examine

This figure shows a peak in feeding activity in the early morning and once again in the afternoon. This seemingly strange pattern may be better explained by looking at Figure 3. This shows the majority of the stomach was composed of flies during these times. It seems that flies composed much less of the stomach contents at other time periods. This leads one to believe that the fish are feeding most heavily at hours when these flies are hatching. The results seem to justify this theory by the corresponding peaks of feeding activity and stomachs containing flies.

The greatest number of fishes collected were not sand shiners but were Notropis hudsonius larvae. It has been hypothisized that adults and larval fishes can be considered totally different systems and no actual competition exists. Figure 2 seems to support this hypothesis. Even in the hours of peak sand shiner feeding, the spottail shiner occured in large proportions of the total sample. It seems that the spottail shiners' presence did not affect sand shiner feeding in any way.

Looking at stomach contents is indicative of invertabrate species present in the area and the habitat type in general. The examination of yellow perch stomachs found in this

study greatly contrast those found in the class exercise. Figures 4a & 4d compare stomach contents at the same approximate time period for yellow perch caught on Pine Point and those caught by the class. A noticeable absence of crayfish exists in the Pine pt. fish stomachs. Also, many of the Southern Fishtail Bay fish contained large volumes of amphipods while the Pine pt. fish did not. These differences suggest striking habitat differences. We know this to be true by our own observations in and out of class. Pine point is located on the main body of the sand shoal that dominates this bay. The water does not get more than 2 ft. deep even 75 yards from shore. This lack of topographical diversity is compounded by the lack of vegetative matter or rocks. Very few weeds or sedges exist in the area and none were found in the immediate sampling vicinity. The bottom is uniformly covered with sand and very few pebbles, cobbles or rocks can be found. This habitat type sharply contrasts the conditions near the Station's shore on the southern end of the same bay. Sand extends out several yards from shore without interruption. About 7 yards out one can find an occasional cobble or stone. The striking difference is one of vertical diversity. On the south end of the bay water depth drops off very quickly. This drop-off creates a shelf covered by various vegetation. The degree of difference is illustrated by species overlap.

Tables 1 and 2 show species composition of the two areas in question. A rather low overlap exists between the two sites. It is interesting to note the Pine pt. species are all present at the south end of the bay, but not visa versa. One can again explain this in terms of habitat types. Pine point is uniformly sand with a shallow bottom and no vegetation. This type of habitat exists at the south end of the bay in a narrow band that extends along the shoreline. Just before the drop off, the south portion of the bay is all sand and very similar to Pine pt. The sandy shallow regions of the south end of the bay have the same habitat features and hence the same fish species. The drop off area represents great vertical and horizontal diversity and a corresponding increase in fish species diversity.

A FUNCTION OF TIME

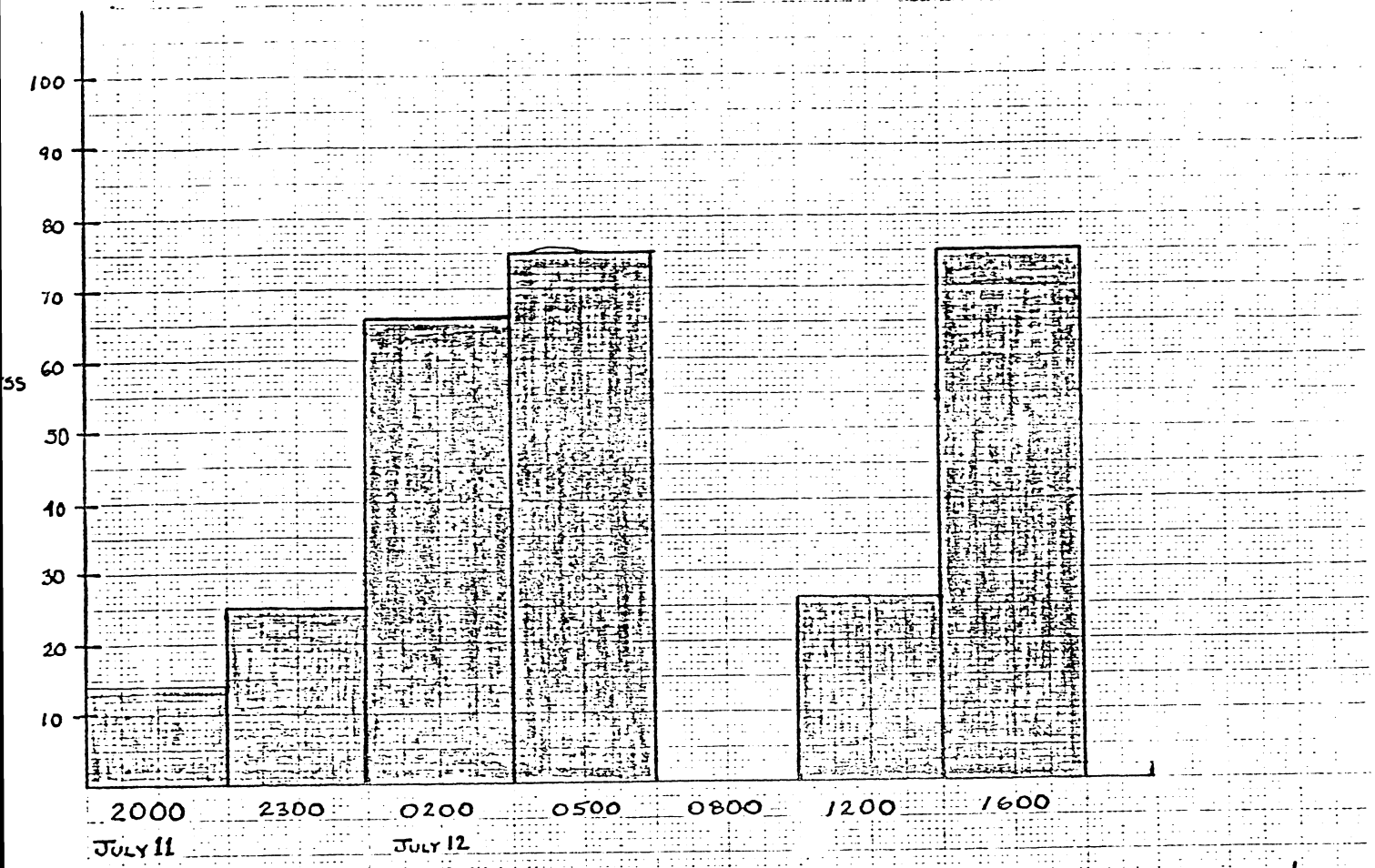
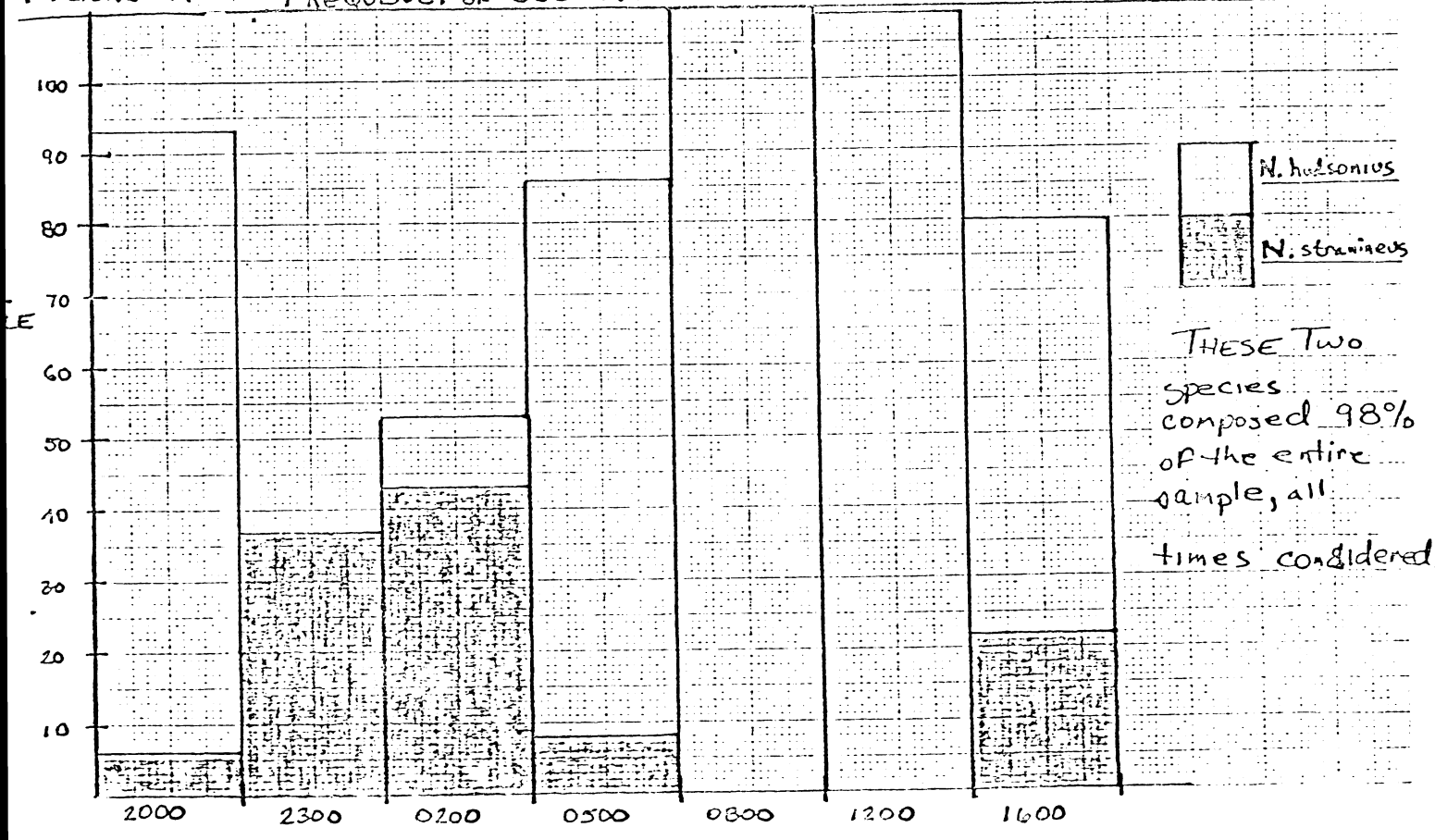


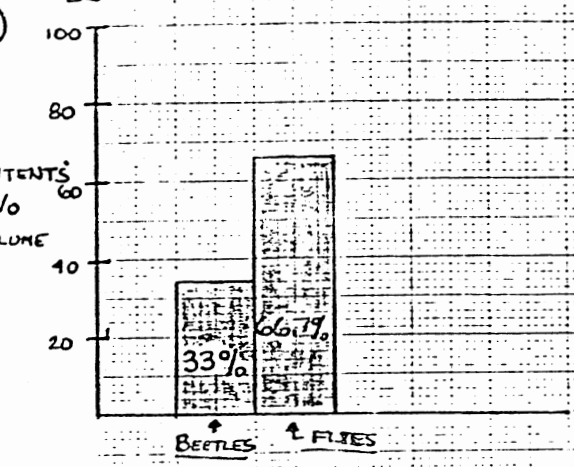
FIGURE 2. FREQUENCY OF OCCURANCE FOR ADULT *Navicula* *N. hudsonius* LARVAE



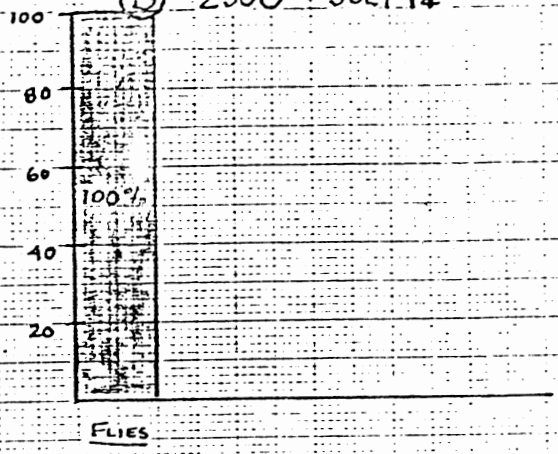
THESE TWO species composed 98% of the entire sample, all times considered.

AT EACH SAMPLE TIME

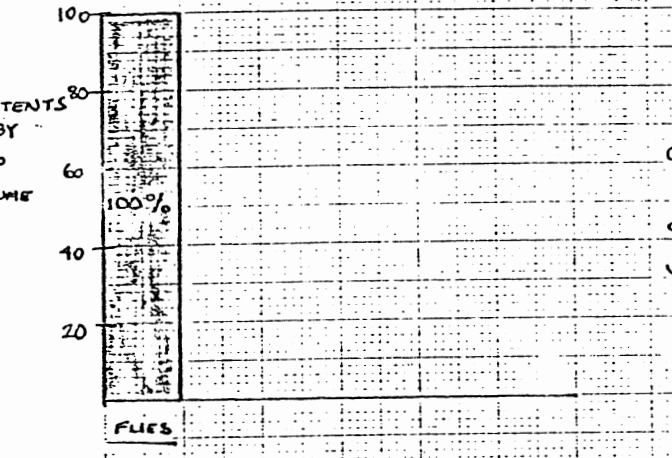
(A) 2000 JULY 11



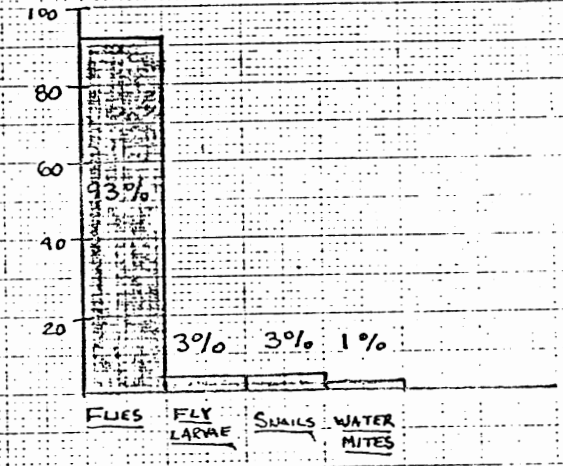
(B) 2300 JULY 12



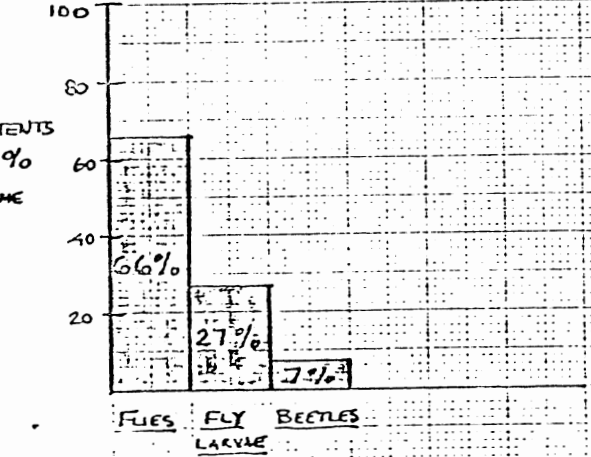
(C) 0200 JULY 12



(D) 0500 JULY 12



(E) 1200 JULY 12



(F) 1600 JULY 12

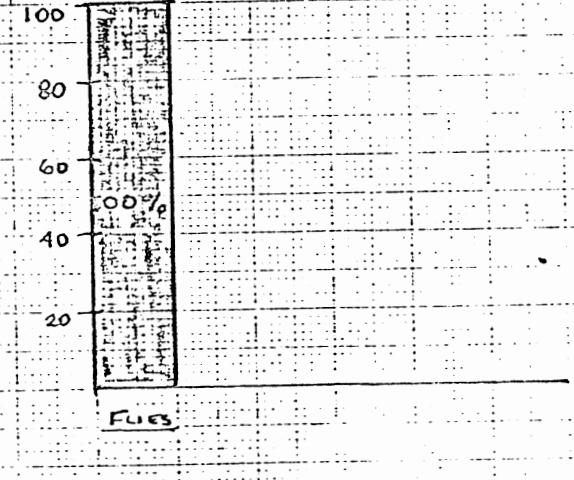
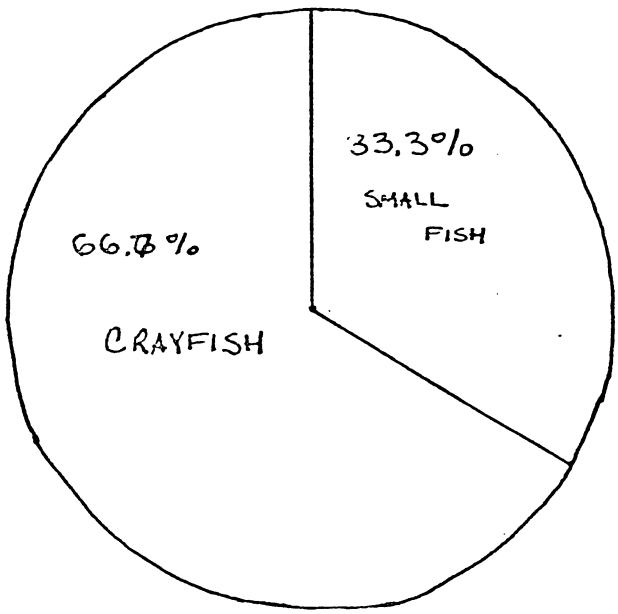


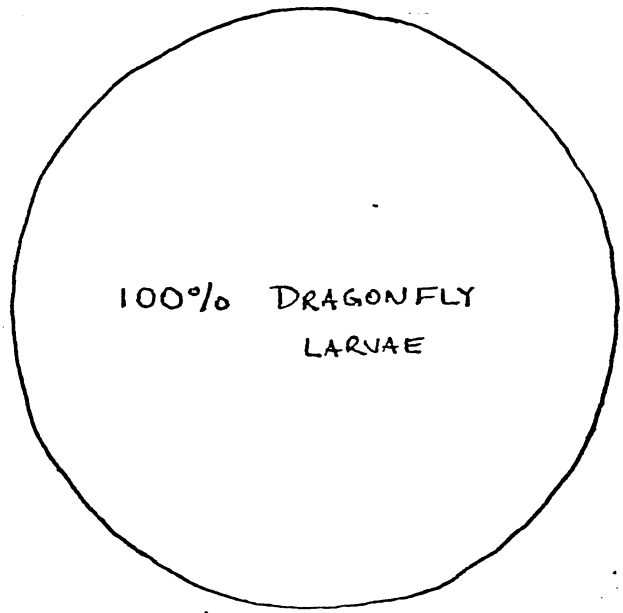
FIGURE 4 : A COMARISON OF AVERAGE STOMACH CONTENTS FOR PERCA FLAVESCENS

(FIGURES ARE % OF TOTAL VOLUME)

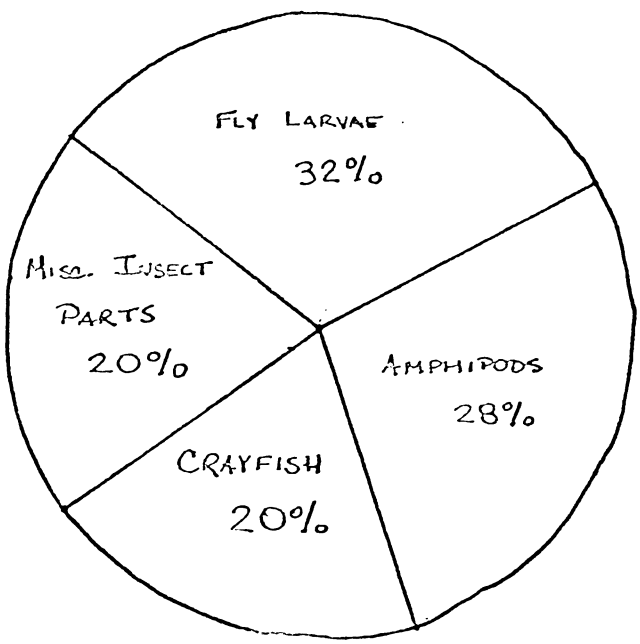
(A) JULY 14
0300 - SOUTH FISHTAIL BAY



(B) JULY 12
0200- PINE POINT



(C) JULY 14
1100- S. FISHTAIL BAY



(D) JULY 12
1200 - PINE POINT

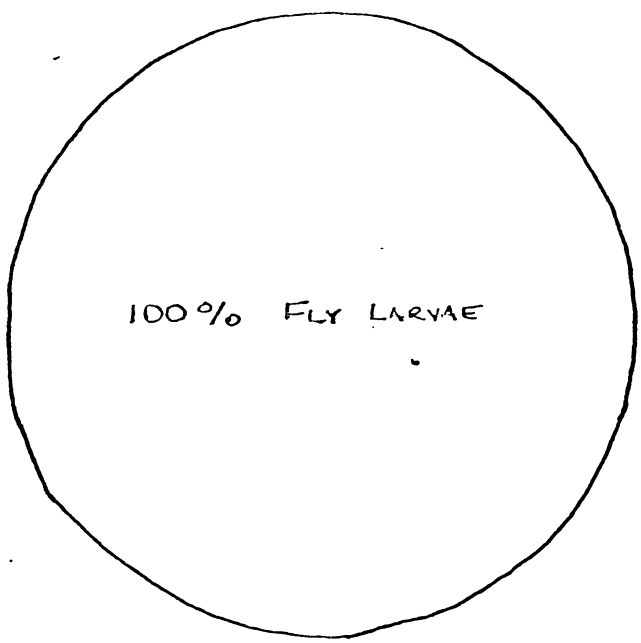


TABLE 1. SPECIES COMPOSITION FOR SOUTH END OF FISHING BAY

SPECIES	NUMBER COLLECTED	% OF SAMPLE
Perca flavescens	443	58.9
Ambloplites rupestris	89	11.8
Lepomis gibbosus	23	3.1
Pimephales notatus	6	0.8
Notropis hudsonius	74	9.8
N. stramineus	1	0.1
N. cornutus	4	0.5
Etheostoma exile	14	1.9
E. nigrum	58	7.7
Percopsis omiscomaycus	11	1.5
Percina caprodes	13	1.7
Catostomus commersonni	3	0.4
Actalurus nebulosus	13	1.7
TOTAL	752	100

TABLE 2. SPECIES COMPOSITION OF PINE POINT SITE

SPECIES	NUMBER COLLECTED	% OF SAMPLE
Perca flavescens	5	0.8
Notropis hudsonius	533	88.2
N. stramineus	57	9.4
N. cornutus	1	0.2
Percina caprodes	5	0.8
Catostoma commersonni	3	0.6
TOTAL	604	100

OVERLAP BETWEEN THE TWO SITES:

$$\alpha = \left[1 - \tfrac{1}{2}\left|P_{i,x} - P_{i,y}\right|\right] \cdot 100$$

$$\alpha = 12.2$$