Michelle Friedl

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Determining the Fish Population in Tenderfoot Lake

In order to quantitatively and qualitatively determine the fish population in Tenderfoot Kake, certain background information would be required. The surface area, the location and measurement of the deep and shallow areas of the lake should be determined.

Water chemistry tessts should also be performed. It is important to know the acidity, pH, turbidity, hardness, productivity, etc. of Tenderfoot. Some examples of how the fish are affected by these parameters are as follows: Avery low pH makes life impossible for fish. Large-mouth bass prefer lakes with high hardness and high phosphate levels, and the white suckers' growth rate is correlated with the mineral and H^+ ion concentration of the lake. A polluted lake containing an extensive algal bloom would smother fish. And some fish, such as the northern creek chub, are pollution tolerant. Some fish prefer clear waters, while some fish inhabit muddy waters.

Oxygen readings are also important since they show where and in what amounts oxygen is present in the lakes. If there would be a lack of oxygen in any part of the lake, then fish would not be expected to be found there.

Temperature readings should be taken. Different species of fish prefer different temperatures.

After the background information is collected, the nets could be set up for sampling. They should be set up in different areas of Tenderfoot, the shallow parts, the deeper basins, etc. In this way, the different populations in different areas could be determined. By placing a net along the ridge between two basins, one can sample the fish that pass between the two areas.

A gill net with netting of various sizes should be used. This kind of net will catch different sized fish. These nets are set up across the lake. A weight is tied on to the lead line on each side of the net to anchor it. A float is tied on to each of the two lighter lines on top of the net. This net can be placed at the bottom or in the upper depths.

Fyke nets are placed near the shore with the closed end facing the shore. Two stakes are needed to anchor the two extending flaps on the open end so that they open up in a v. A third stake is used to anchor the closed end. The stakes are thus placed in a triangle.

The fish should be collected for several days in the morning and the early evening. The fish collected in the morning represent the population that is active during the night, while the fish collected in the evening represent the fish that are active during the day. The fish are then weighed and measured. There are two length measurements - total length, the length of the entire fish, and fork length, the measurement to the fork in the tail. These fish are also identified to species, and the numbers of each species are counted.

Since the fish were caught in different regions of Tenderfoot, they should be compared with each other. The nets that were placed on the bottom would mainly catch the bottom feeders, such as suckers, carp, and catfish. The fyke nets would probably catch fish that come near shore to feed. Fish populations found in different basins might also be different from each other, since the depth, water chemistry, and temperature might differ.

A sample of fish from each species should be gutted. The contents are then examened underneath a dissecting scope for anything the fish has swallowed. This procedure determines the fish's diet.

The approximate ages of fish from each species can be determined by counting the number of annuli on the scales. About four or five scales from each fish are mounted on a slide and projected onto a screen. The mumber of rings is then counted. One ring corresponds fo one year. Care should be taken to avoid counting replacement scales.

Two graphs can be made from the compiled data-a length-frequency graph and a size vs. # of annuli graph. The first graph compares the fish length to the number of fish found at that length. The condition factors for each species should be calculated using the formula, $K=\frac{(\text{weight in grams})\ (10^5)}{(L)^3\ (\text{length in mm})}$.

They can be compared to the average K values for the lakes in the Michigan-Wisconsin area. Alow K value indicates a fish that is underweight for its length. This may occur in an overpopulated lake where there is stiff competition for food.

With all the aquired information, data, and graphs much can be said about the fish population- what kinds and numbers of fish are where in Tenderfoot, which fish predominate , the ages and growth of fish, what they eat, and why they are where they are(how the conditions are favorable).

It is possible to explain what is happening in the lake with the fish population. For example; Let's say that more shiners were caught than bass (as was the case in Bergner Lake). Both the bass and shiners had lower than average K values. More than 25% of the shiners lay their eggs in bass nests.

The young bass have a difficult time competeing with the more numerous shiners, since they both eat about the same thing. Not as many young bass as shiners are able to survive. Because of their numbers, the shiners are smaller. Because of the competition from the shiners, the bass are also smaller than they should be.

Let's again say that the lenghh-frequency graph has a higher frequency of bass at the greater lengths than it does at the smaller lengths. This graph might then be showing the decrease in the bass population over the years.

One thing is certain. A fish population is in a delicate balance and it depends on so many interweaving parameters.