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Study of a
Fish Population

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To determine the nature of a fish population involves studying the kinds and numbers of the fish, their physical and chemical environment, their food sources and their sizes and distribution. A quantitative and qualitative investigation deals with the health and size of the population as well. Techniques should be used to enable the investigator to study the types, numbers and sizes of the various fish without damaging the population itself.

Before any collecting is done, the lake itself must be studied. Is it in a temperate zone? What is its origin? Is it the result of an ancient glacier, mass shifting of the earth's crust or man-made? The morphometric features such as area, depth, volume, bottom character etc. should be determined. This also enables the researcher to discover where the deeper and shallower areas are (different fish live in different depths) so he may set the proper nets in the proper places *or different substrates.*

The borders and neighboring land areas should be surveyed to see how they affect the lake's waters. Is there bog mat to increase acidity? Is there flat, open space around the lake or dense forest that might curb the wind? Is the lake situated in hilly country or flat plains? These

factors affect both water chemistry and physical parameters.

A temperature-oxygen curve should be taken hopefully over a period of several days. This would verify the lake's seasonal stage. If it is in summer stagnation, the researcher will learn the thermal stratification and oxygen levels.

A water chemistry analysis should be taken. If there is stratification, water should be sampled above, below and possibly within the thermocline. This analysis should include pH, alkalinity, acidity, hardness, color, Secchi disc readings, nitrates, phosphates, carbon dioxide and iron. This data would indicate what the conditions are within the water giving insight as to what kinds of fish to expect and where to find them.

A macrophyte survey (food source for the fish) should be taken as well as a general animal survey to see which animals if any act as predators. These surveys should help determine what productivity level the lake is at; oligotrophy, eutrophy or dystrophy. Once the researcher realizes what kind of a lake he is working with, he may approach the fish sampling procedure on a more orderly basis. Also, all necessary permits and authorizations should be obtained.

A proper quantitative study of the fish population involves counting as many of the fish in the lake (assuming the number is constant at that point in time) as possible. Ideally, each fish would be counted. If each fish that were

impractical!

specific water source.

Good point!

counted were killed, a depletion of the population would result. Therefore, those methods of capture should be used that will enable the fish to remain alive while measurements are being taken.

Gill nets are most effective in capturing fish over a wide area. In the deeper waters, these nets should be set drifting, at the surface and at mid-depth. For a wide survey, the nets should be of various mesh, set perpendicular to shore with the smaller mesh in shore. These nets should be run twice a day for approximately 1-2 weeks. Those fish found alive should be marked, measured and returned to the water. The others should be measured and discarded. Though this method does kill the fish, using the gill nets for 1-2 weeks prevents any chance of depletion and gives the investigator an initial idea of what types of fish to expect.

Near shore Fyke nets with wings should be used. These nets should be staked near the macrophyte area with the wings perpendicular and opening parallel to shore. These nets are effective at catching fish who tend to stay near walls. Also in this category are the pound nets. These are also a maze net that does not kill the fish when it is caught. The pound nets can be placed anywhere, especially in deep water. They should be set at the bottom of some of the deeper areas of the lake.

impractical in smaller lakes.

Seining is a useful way of collecting fish but it

-but it's fun!

requires hard work and time. A haul seine or beach seine could be used to collect the fish while keeping them alive. Travelling in a wide circle around the lake slowly closing in would be an effective technique. Hand seining near the shore or near any inlets or outlets of the lake would help catch smaller fish that dwell in those environments.

-impossible!

One of the more useful types of collection would be electrofishing. By applying direct current to the water, the investigator attracts the fish until they receive such a shock as to be stunned. They'll come to the surface and can be easily collected. This would provide an easy access to the fish to be handled and measured and safely returned to the water.

The capturing procedure should be continued relative to the size of the lake or estimated size of the population. As the collections continue, more and more marked fish should appear. It is important however to maintain a wide variety of catching methods. Surface, mid-depth, shoreline, and deep waters should all be thoroughly covered as well as any inlets or outlets.

different substrates.

Once the fish are caught, several measurements should be made. Weight, length (from nose to notch on caudal fin) and scale aging should be determined. A length-frequency curve should be assimilated. This information uses the frequency of sizes of the fish to determine the number of

why fork length?

generations and thus ages of the fish. Using a reference text (such as Carlander's guide) that relates fish size to age recorded from data collected throughout the nation, one can determine if the fish in the lake are healthy and the proper size, at least by general standards. As a result, with respect to all the data acquired of the fish's environment and physical condition, a conclusion may be drawn both on the size and quality of the fish population.

Some species may be healthier than others due to one factor or another and thus outcompete the other fish. Or, it is possible that several species live together in harmony. Either way, size and conditions may be evaluated and discovered to be profitable or disadvantageous for a certain species of fish. A population may be studied quantitatively and qualitatively for its diversity and health.

Need more thought on the overall meaning of all this. Done