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A Discussion of Questions on the Fish Community at U.N.D.E.R.C.

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The fish community at U.N.D.E.R.C. is mostly a result of stocking and human manipulation of the lakes. Most stocking is done with the requirements of fish in minde, and if it isn't, the fish won't be there more than one generation since they won't reproduce. This stocking has made every lake different from the other in terms of the fish community's balance and the interaction among the different species.

The chemistry of a body of water would largely be responsable for what species of fish would be present. In bogs, the zone where fish can live is very shallow because the dissolved oxygen drops off suddenly and very near the surface. Because of this, one would expect only smaller fish because larger fish would be easier to see from the surface and more suceptible to predation from other animals such as birds. The water color and pH, and the small epilimnion all would limit the productivity of the lake, which would also tend to make larger fish less suitable to that environment since they would have trouble finding food enough to grow to full size. The low productivity also makes strictly carnivorous fish unsuitable. The low pH would also have a drastic effect on which species could survive. Umbra limi, the mudminnow, is very tolerant of low pH, is fairly small, and is the only fish common in bogs.

Contrary to bogs, most eutrophic lakes have a more neutral pH and a more balanced chemistry, that is, balanced with the needs of life, Complex active transport systems don't have to be as efficient, and many more habitats are available due to the greater depth of the livable water. This results in a higher productivity and more niches. This can be seen by the large number of different species of fish present, and the different feeding patterns. Fish which are

only carnivorous can survive in a eutrophic lake, while they couldn't in a bog. Some of the more common fish are the Yellow Perch (Perca flavescens), Sunfish (Lepomis species), Pumpkinseed (Lepomis gibbosus), Bluegill (Lepomus macrochirus), Crappie (Pomoxis sp.), Rockbass (Ambloplites repestris), Smallmouth Bass (Micropterus dolomieu), and Largemouth Bass (Micropterus salmoides). The less common carnivorous fish are Northern Pike (Esox lucius), Muskie (Esox masquinongy), and Walleye (Stizostedion vitreum).

There are several reasons why we caught more small fish in the creek than in the lake, but the most obvious was our collecting method. In the lakes we only used gill nets which could only catch large fish, while we used small meshed seines in the creek, so we don't really have a quantitative sample from which we can determine average sizes. It isn't really possible to do this because of the different natures of the bodies of water, but general observation from the bridge over the creek and the seining showed that there were few large fish in the creek. Larger fish generally prefer deeper water, so since the creek is shallower than a lake, the larger fish are likely to stay in the deeper lakes that are at both ends of the creek. The large fish who stay in the creek were in the deeper areas where we were not able to seine.

Morris lake has a very interesting but abnormal balance of life. The phytoplankton is limited by the nutrients in the water such as phosphate and nitrate, and by the zooplankton which feeds on it. The zooplankton is limited by the phytoplankton it feeds on and by the organisms which feed on it, especially small fish and fry. These small fish and fry limit the number of large carnivorous fish and the two groups

have a balance. In Morris, stocking has severely pulled the balance to the side of the carnivorous fish, increasing their number considerably and lowering the number of small fish and fry since they are being eaten. The imbalance is so severe, however, that the carnivorous fish are not able to eat enough and therefore remain stunted. This has happened to the Northern Pike at Morris.

Since the Pike are stunted, they can no longer eat as large a fish as they could normally. An omnivorous, herbivorous, or small carnivorous fish now has a smaller critical size to which he must grow in order to be too large to be swallowed by the Pike. While this critical size may normally be bigger than the species can grow making an indevidual always possible prey, the new critical size may allow it to grow and live undisterbed for years once it passed the critical size. This is exactly what has happened to the Perch at Morris. The few Perch who reach the critical size can grow and lay very many eggs (since they are so large) which when they hatch and grow a little, become the main food for the Pike. The small fish such as minnows which are common in most lakes, probably do not exist in Morris. They can't reach the critical size, so the Pike are eating the adults. This combined with the extreme pressure of predation against them makes it very likely that none exist. The Perch can exist because the adults are free from predation.

This is good thinking!

Since few if any minnows exist. their niches are left for the fry of the Perch and Pike to fill, and gives these fish less competition. This continues until the Pike begin to feed on larger fish, at which point they become stunted. The decreased competition and extra food continues indefinitely for the Perch, however, and is a big advantage for them.

The Perch and small fish, if there are any, are not only in balance with and limited by the pike, but also by their

food supply, the plankton and plants. If the lake is not further manipulated, the omniverous fish will stay in balance with their food supply so their number will not change much. The Pike shift the balance to allow more fish since the Pike are always reducing the other fishes' number. The balance between the plankton and the fish can be taken back several steps. Since the zooplankton is balanced with the phytoplankton, and the phytoplankton is balanced with the chemical nutrients, the fish are indirectly in a balance with the chemical nutrients.