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Essays on Fish Populations

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1. Note: The data on which this answer is based comes from the guide to U.N.D.E.R.C. compiled by Dr. Greene as well as my own personal observations.

Generally the large fish populations are found in the high productivity lakes such as Inkpot, Kickapoo, Moccasin, Morris, Plum and Tenderfoot Lakes. All of these lakes have a pH of 8 or above and probably have good amounts of the required nutrients as well. These lakes are also shallower with relatively large surface areas to aid in the mixing of these nutrients in the Summer. The presence of nutrients in appropriate quantities are the basic necessities for life. Fish don't exist until insects, crustaceans and smaller fish exist which feed on zooplankton. The zooplankters need phytoplankton which require nutrients for survival. Thus, ultimately, most fish at U.N.D.E.R.C. need a higher pH water containing nutrients etc. to live. These fish include Smallmouth and Largemouth Bass, Walleye, Northern Pike, Muskellunge and Yellow Perch. They do their best in eutrophic lakes of the type described above. Another reason they would do well in a eutrophic lake as opposed to a bog besides their need for nutrients and smaller life forms is that in the Summer they live and feed in the warm waters of the epilimnion which is particularly shallow in a bog.

In most of the eutrophic, high productivity lakes, there are two species of fish that are usually of different sizes such as Northern Pike and Yellow Perch living together. This facilitates the food-getting of the fish, because the larger pike, being better swimmers with larger, toothed, jaws, will eat the smaller perch which feed on smaller forms such as crustaceans.

If the pike are fished, the populations should remain steady. Such is not the case in Morris which will be discussed later. Basically, only the highly productive, eutrophic lakes can support enough life to reach the end of the food chain, the larger fish.

The only species of fish living in the bogs to my knowledge is the Mudminnow. Low pH, high acidity conditions in a bog, along with lower levels of nutrients and low oxygen levels, makes living difficult for most species of fish. The Mudminnow must utilize something in the bogs that other fish cannot. Also, it probably secretes some sort of mucous quite heavily to withstand the high level of acidity. Further, Mudminnows are a small fish which means they probably can survive on what little there is in a bog.

There are a couple of reasons why we caught smaller fish in Tenderfoot Creek as opposed to Bergner or Morris Lakes. First, and most obvious, is the type of net used in each case. We were after larger fish in the lakes so we used larger mesh gill nets through which smaller fish could pass. The seines we used on Tenderfoot Creek had small mesh and we caught mainly schooling fish that were scared into the nets. This method probably wouldn't work with larger, quicker, more free-living species. A second reason for finding larger fish in the lakes is that generally, the creek is probably used as a waterway to the more lentic bodies of water, the lakes. Larger fish prefer stiller waters where constant movement is not necessary to retain their position. Thus, a more permanent residence for a fish would probably be the lentic waters of the lakes.

2. The problem in Morris is its overpopulation of Northern Pike. Having fished there, it was obvious that they were undernourished. Also they were, as indicated in the question, undersized with large heads and thin bodies.

There are too many pike and not enough food. This may be a partial reason for only finding large perch, because most of them also were aged at four years (Morris was stocked four years ago) and probably the offspring of the original perch were preyed upon by the large population of pike.

Therefore, the perch we saw were probably the originally stocked fish.

Getting back to the basics, Morris is definitely a highly productive, shallow lake with high pH, probably good nutrients, shallow and fairly large surface area. As the U.N.D.E.R.C. guide points out there is a fair variety of phytoplankton and zooplankton, but the zooplankters are fairly small species like Bosmina. Zooplankters are primary consumers, and perhaps due to their small size the secondary consumers aren't getting their food and thus breaking the food chain. Therefore the tertiary consumers, the fish, are also hurting for food. This makes sense for the smaller fish, but the question arises of how are the perch getting so large? Probably the pike are still reproducing, and the perch are eating the young pike. With the large population of pike, they would supply more than enough for the perch. Since, I assume, the perch population is much smaller than the pike population, all of their young are eaten by the pike and thus we get only large perch.