The functional regression of Sunfish Lake yellow perch length-weight data is presented in figure 13. The r value of 0.99 indicates good linear relationship. The 95% confidence limits calculated for the slope includes the value 3.0. This indicates that fish growth was isometric, implying that the relationship between increase in length and increase in weight was constant throughout the life of the fish (Ricker 1975).

DISCUSSION

For a juvenile yellow perch, survival is largely dependent upon predator avoidance. As a result, this age class is frequently observed to inhabit shallow weedy areas which offer abundant refuge sites from predators. These sites are often not the sites of greatest food abundance. Therefore, habitat use by small fish represents a compromise of foraging efficiency for a reduced risk of predation (Mittelbach 1981a). Larger adult perch are not faced with these same predator pressures. For example, the dominant predator in Sunfish Lake, the largemouth bass (*Micropterus salmoides*), would not present a threat to a large yellow perch (>200 mm). Therefore, based upon optimal foraging theory (MacArthur and Pianka 1966), one would expect these adult fish to feed upon the food resource yielding the highest net energetic gain (Werner and Mittelbach 1981).

Upon initial inspection, one might consider the zooplankton diet of Sunfish Lake yellow perch to be sub-optimal. Closer inspection, however, reveals that an abnormal diet for the species may not be a sub-optimal diet

for the population of Sunfish Lake. A comparison of Daphnia in Sunfish Lake with those of other lakes containing yellow perch suggests that Daphnia acheive greater densities at this study site (figure 14). As a result, yellow perch search costs may have been reduced to the point where the consumption of zooplankton yeilded a higher net energetic gain than did either the benthic or piscivorous modes of feeding. However, one must be cautious when comparing zooplankton densities based on samples taken from only two or three sites in a lake. My data show that variation between sites can be very high, even in a small lake such as Sunfish. When these data are compared to equally variable data from other lakes, potential errors are increased even further. Therefore, these results can be considered suggestive at best, and additional evidence should be sought.

Indirect evidence can be found in the growth performance of the yellow perch. Optimal foraging assumes the selection of food items which represent the highest net energetic gain per unit effort. This gain would be reflected in increased growth and reproductive output. Therefore, the above average growth indicated by figure 15 suggests that their diet of zooplankton represents a high net energetic gain.

Figure 14. Comparison of Sunfish Lake Daphnia spp. population abundance to data collected from other regional lakes

Sunfish Lake
Little Round Lake (Glen 1971)
Sydenham Lake (Fullerton 1977)
Lake Opinicon (Brown 1977)
Gould Lake (Fullerton 1977)

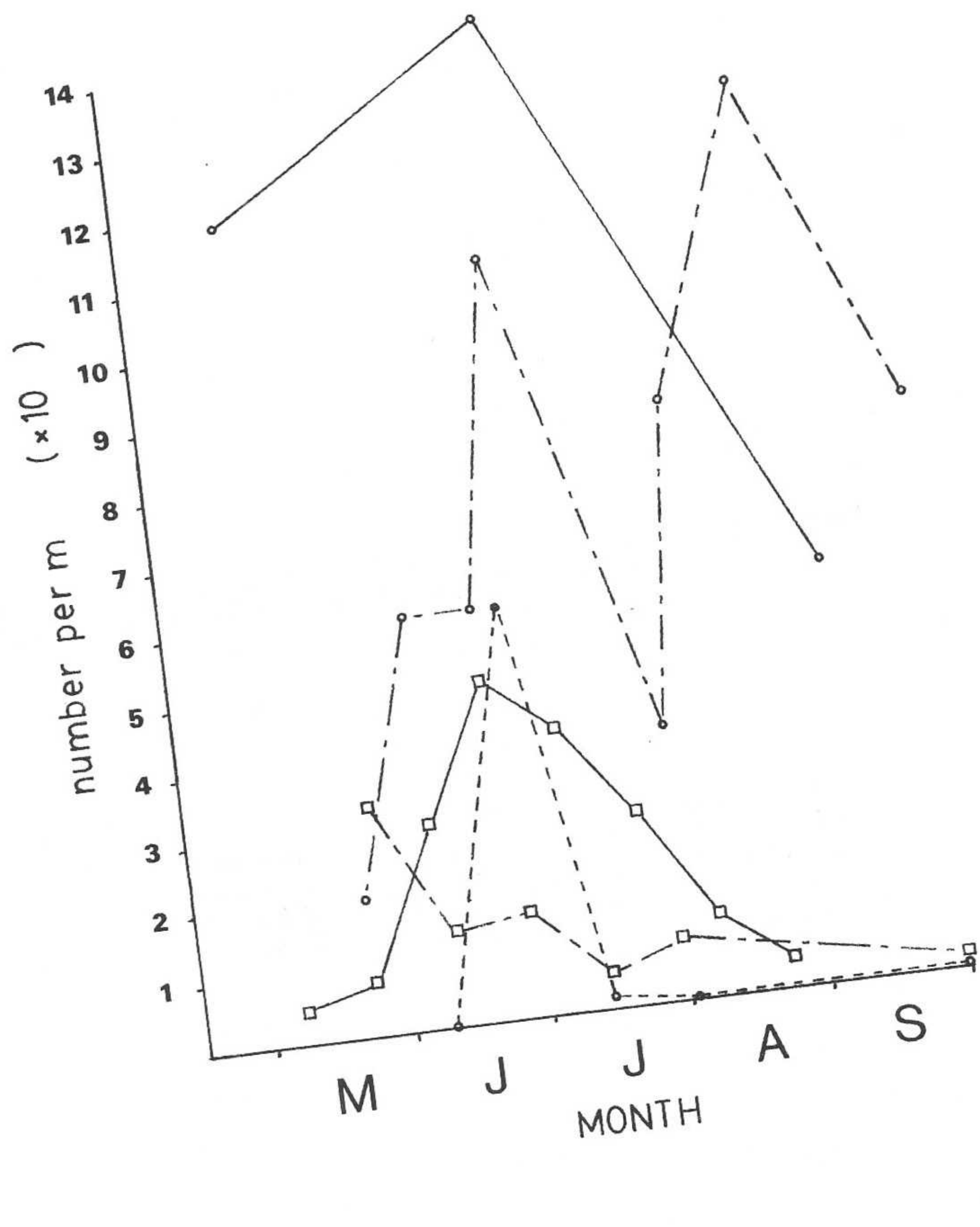
14
13
12
11
10
9
8
7
6
5
4
3
2
1
number per m (×10)
M
J
J
A
S
MONTH

Figure 15. Comparison of Sunfish Lake length-age plot to data collected from other regional lakes

Sunfish Lake	o——o
Lake Mephremagog (Nakashima & Leggett 1975)	□—- -—□
Lake Erie (Jobes 1952)	□- - - -□
Gould Lake (Brown 1977)	o- - - -o
Lake Opinicon (Keast 1977)	□——□
Massachusetts Ponds (Stroud, 1955)	o—- -—o