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Zooplankton Production in Lake Ontario as Influenced by Environmental Perturbations

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ZOOPLANKTON PRODUCTION IN LAKE ONTARIO AS INFLUENCED BY ENVIRONMENTAL PERTURBATIONS

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ABSTRACT

The Crustacean zooplankton are excellent indicators of environmental perturbation, especially if enough of their biology is known to explain why certain species increase with nutrient enrichment of lakes. The distribution of zooplankton in Lake Ontario suggested that eutrophic indicators were found in the vicinity of major urban centers. The ratio of the number of Bosmina longirostris, the most successful eutrophic species, to Diaptomus sicilis, the most oligotrophic form, supported this conclusion. Furthermore, mathematical indices, including diversity, the community competition coefficient, and carrying capacity, separated urban inshore from rural inshore waters, further evidence of perturbation. Biomass estimates made with new acoustical techniques indicated that most of the zooplankton biomass was in deep waters, thus the eutrophication of Ontario's waters, both nearshore and in the vicinity of cities, is still localized in nature. Mathematical techniques have been developed to model such perturbations.

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SECTION I

CONCLUSIONS AND RECOMMENDATIONS

The horizontal distribution of the crustacean zooplankton of Lake Ontario suggested that eutrophic indicator species were generally found in the vicinity of Metropolitan Toronto, the Oswego River, Mexico Bay, and Popham and Weller's Bays. The shallow bays of Lake Ontario likely represent areas of natural eutrophication, whereas conditions off Toronto and Oswego deserve special attention, as these areas of the lake are likely in a stage of accelerated cultural eutrophication (Section IV). Action in the near future is important to reverse eutrophication in these perturbed regions.

The impact of urban areas upon the crustacean zooplankton was also visible when using community matrix techniques to characterize watermasses. Zooplankton communities, considered together, showed greatest perturbation when in shallow waters near urban areas; correspondingly, least perturbation was associated with communities of deep waters (Section V). Thus the deepwater communities still contain important oligotrophic species vital to a stable community structure.

Biomass estimates made with new acoustical techniques indicated that previous estimates of zooplankton biomass were low (10 - 100 times), and that much of the biomass was associated with deep waters ($>$100 m). These conclusions will be important in modelling the Lake Ontario ecosystem (Section VI). They are both new and surprising, and require further confirmation.

The small cladoceran, Bosmina longirostris, has been described as a eutrophic indicator, likely because it utilizes a variety of algal foods, including larger phytoplankton and avoids fish predation (Section VIII). The ratio of B. longirostris to Diaptomus sicilis may be a useful indicator of perturbed communities (Section IV). This index is simple to determine, as the two species are easily recognized. Hopefully it will have future application in detailing areas of the Laurentian Great Lakes suffering from pollution.

New techniques developed for calibrating plankton nets indicated that samples collected with a 64μ mesh net over depth interval of 0 - 5 m may underestimate zooplankton abundance by a factor of 2x, while tows made over a path of 0 - 50 m may underestimate by a factor of 3x. These new results are vital to using historical data in calibrating and validating ecosystem models (Section III).

Mathematical techniques have been developed to model zooplankton communities, using new application of the community matrix. Eventual uses will include the development of simple mathematical indices for perturbed communities.

SECTION II

INTRODUCTION

The production of zooplankton in Lake Onatrio is closely related to environmental perturbations, including the input of plant nutrients and the introduction of exotic fishes. The principal purpose of this study, during The International Field Year on the Great Lakes, was to examine the abundance of zooplankton with regard to likely sources of nutrients and other perturbing factors, and then to evaluate the quality of this environment using the tools of modern ecology. These included both mathematical tools, such as expressions for community stability, as well as electronic devices such as our zooplankton-sensitive echo-sounder. With the results of this program now analyzed, we have a much better picture of specific regions along the shorelines of Lake Ontario where eutrophication is proceeding at an increased rate; in addition, it has been observed that even the deep-water communities sometimes exhibit signs of environmental instability.

In Section III we have listed the methods used, including traditional collection techniques with fine-meshed (64μ) plankton nets, as well as acoustical methods for determining the total biomass of zooplankton in the water column. In addition, a detailed discussion of the collecting efficiency of nets has been included, with the result that we have suddenly realized that previous estimates of zooplankton biomass have been consistently low, by at least a factor of 2 and possibly by as much as one magnitude.

The seasonal distribution of the zooplankton crustaceans is important to modelling grazing and fish production. Detailed summaries for all ten cruises on Lake Ontario have been included in Section IV. In addition, horizontal distributions of all dominant species have been interpolated using the 60 station IFYGL grid. Analysis of these distributions, coupled with a subjective division of the crustacean zooplankton into oligotrophic and eutrophic indicators, has provided us with a detailed picture of the polluted regions of Lake Ontario, so that sources of plant nutrients may be identified and logical steps taken to reduce the rate of degradation of this vital ecosystem. One important function of this distribution analysis of the zooplankton is to identify <u>in-basin</u> sources of pollution, as opposed to perturbations resulting from the inflow of nutrients from Lake Erie.

Certainly urban concentrations of people, as well as industry and agriculture, are likely sources of nutrients and other perturbations. In the Lake Ontario basin most urban centers are also associated with rivers, whose mouths serve as natural harbors. In Section V we have examined the effects of urban centers and associated agricultural drainage upon inshore communities of zooplankton. Certainly the effects are most striking.

In modelling the trophic dynamics of a large ecosystem, not only are the fluxes of materials and energy difficult to quantify, but the standing crops of organisms are both difficult and time-consuming to estimate if traditional techniques of plankton sampling are employed. In Section VI we have presented our new acoustical method for the estimation of zooplankton biomass over the entire water column at each sampling station. The results suggest that others may have previously underestimated the abundance of zooplankton in Lake Ontario. These results will enable more realistic ecosystem models to be constructed, with a better understanding of the magnitude of zooplankton grazing.

Our estimates of the impact of urban areas upon water quality (Section V) utilize one form of the competition matrix to interpret community structure on a comparative basis. In Section VII Dr. Steven Levine has investigated community structure with a new modification of this matrix. This approach enables us to estimate community stability, or the relative lack thereof, again from information on species abundance.

The changes in the composition of the crustacean zooplankton in Lake Ontario, both on a geographical basis and with historical time, are certainly related to their trophic relationships, especially selective feeding upon certain algal forms. In Section VIII we have suggested a new hypothesis to explain these dramatic community changes occurring as Lake Ontario becomes more perturbed.

The appendix includes summaries of the zooplankton composition on each IFYGL cruise, as well as a selected sample of results (4 cruises), from using our acoustical device in estimating zooplankton biomass.

SECTION III

METHODS

GENERAL FIELD TECHNIQUES

Zooplankton net samples

Vertical plankton hauls were taken from the NOAA R/V Researcher at the 60 IFYGL sampling stations on the 10 IFYGL cruises. Fortunately these 60 stations selected by the IFYGL Management were comparable within the framework of our lakewide division, described in Sections V and VI. The urban inshore stations had a mean depth of 14.0 m, whereas those stations designated rural inshore had a mean depth of 18.5 m. Samples were collected from 5 m depth to the surface, 0 - 25, 0 - 50, 0 - 100, 0 - 150 and 0 - 200 m using a plankton net 0.8 m in diameter, with mesh apertures of 154 μ for cruises 1 - 3 and of 64 μ thereafter. The zooplankton in these samples were relaxed with CO_2, preserved in buffered formalin (pH 7.0), and counted in the laboratory. Approximately 3% of the most abundant forms in each sample were counted, whereas all of the rare species were tallied.* Thus we were able to discover 6 specimens of *Diaptomus ashlandi* obscurred among the first 300,000 animals identified to species!

Acoustical profiles

At each station four acoustical profiles were recorded, both on paper tape and on an X-Y plotter for immediate inspection. These profiles were made at frequencies of 80, 120, 200 and 500 kHz. The theory behind acoustical sampling, the program developed for data reduction, and actual examples of such data will be presented in Section VI and in the Appendix.

---

*Note: plankton densities used in analyses found in Sections IV and V are observed densities. That is, the number per unit volume (m^3) was determined from a consideration of the amount of water in a hypothetical column of a given depth and from a consideration of the number of animals captured in those waters. If corrected densities are required for modelling, multiply observed densities by 2.01 for samples from the 0 - 5 m strata. Likewise the data on density in the Appendix have not been adjusted. In calculating lakewide biomass (Section VI) the net efficiency was considered. Thus the densities of zooplankton and biomass estimates in Section VI are corrected for the inefficiency of net sampling. These data do not need to be adjusted.

PERFORMANCE OF ZOOPLANKTON NETS

Introduction

Our purpose was to design a meter to measure the efficiency of a plankton net in a continuous fashion. Vertical net-hauls remain a principal tool of many limnological investigators. In making such hauls the nets encounter successive water layers containing varying densities of organisms. With such encounters, a net becomes progressively more clogged. Thus a simple measure of total flow tells little, for the net could have an efficiency of 15 to 70% when a distinct layer is encountered. But a continuous measure will enable an investigator to tell precisely the efficiency at any point in the water column.

These measures of efficiency which we have made will be of considerable use. They suggest that standing crops of zooplankton in Lake Ontario are 2 - 5 times larger than previously anticipated.

Construction and Operation

Two plastic rotor assemblies (Fig. 1), consists of a propeller 10cm in length mounted upon a shaft, with a magnet mounted off-axis at the opposite end. Each time the shaft rotates, a magnetic switch is closed, thereby applying a signal to a magnetic tape recorder.

One rotor assembly was mounted 7.5 cm below the rim of a 3/4 m dia. net and 17 cm from the rim. The other rotor was mounted 15 cm outside the rim. The electronics were mounted in a sealed pipe 12 cm in diameter, which served also as a weight. It was easily sealed to withstand pressures to 150 m.

The electronics consisted of two free-running multi-vibrators operating at widely different frequencies. The magnetic switch, closing at a rate of once per revolution, is registered on a magnetic tape. The information was stored on the magnetic tape. It was made by transcribing the tape slowly (1/15 original) into a recording potentiometer. One may visibly separate the two frequencies and thus count the number of times the magnetic switches closed.

Results of field-trial

A 3/4 m dia. net with mesh aperture of 64μ was calibrated on Lake Ontario. The net was lowered to 25, 50 and 100 m and raised to the normal speed (slow) of a B.T. winch.

The results (Fig. 2) show a curvilinear decrease in filtering efficiency. Whether the net was lowered to 25 or 100 m depth, initially the efficiency was 65 - 70%. In each case the efficiency had dropped to 15 - 30 % by the time it reached the surface. Nets fished only in the trophogenic zone showed a steeper rate of decrease

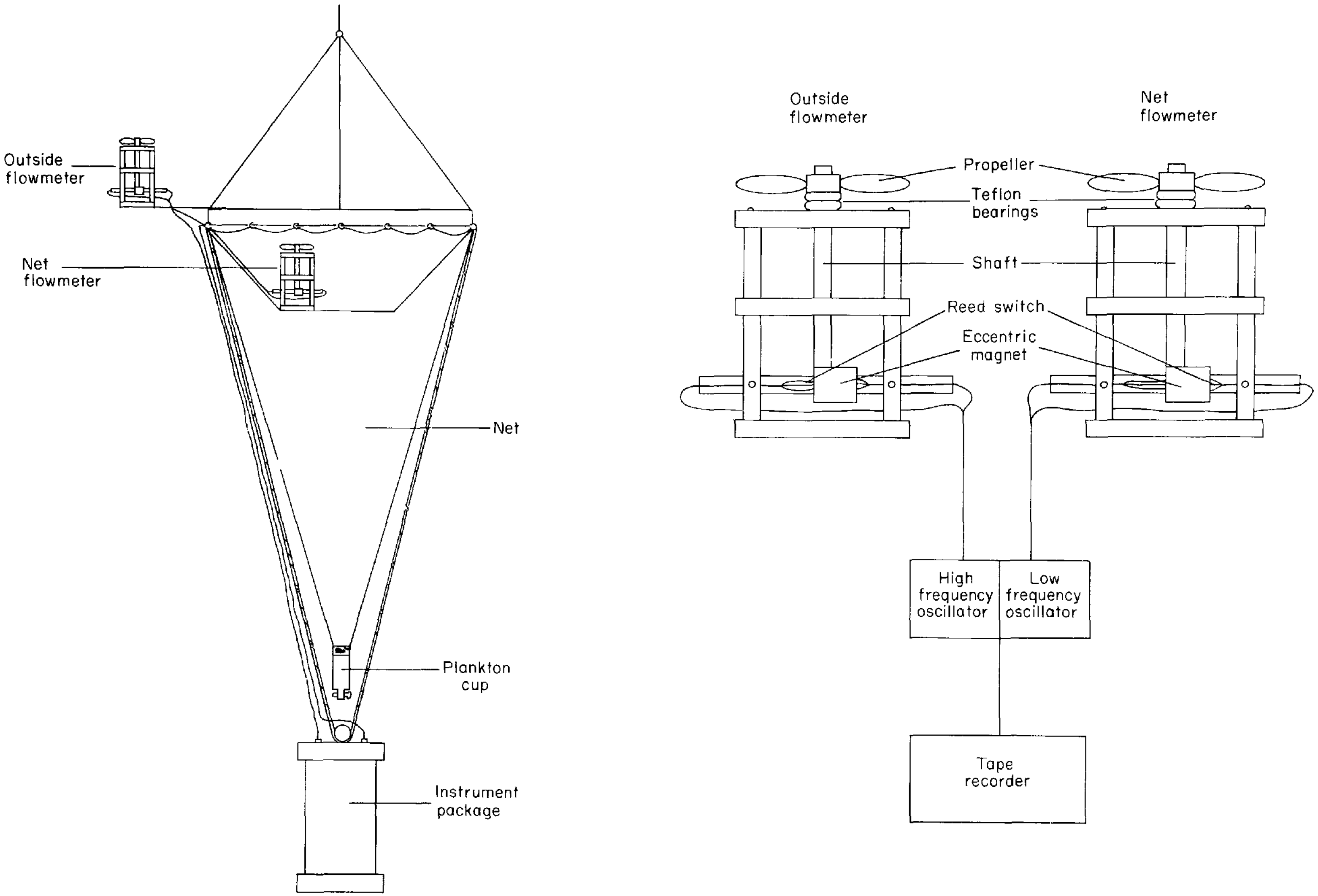

Figure 1. Design of a continuous-efficiency net calibrator

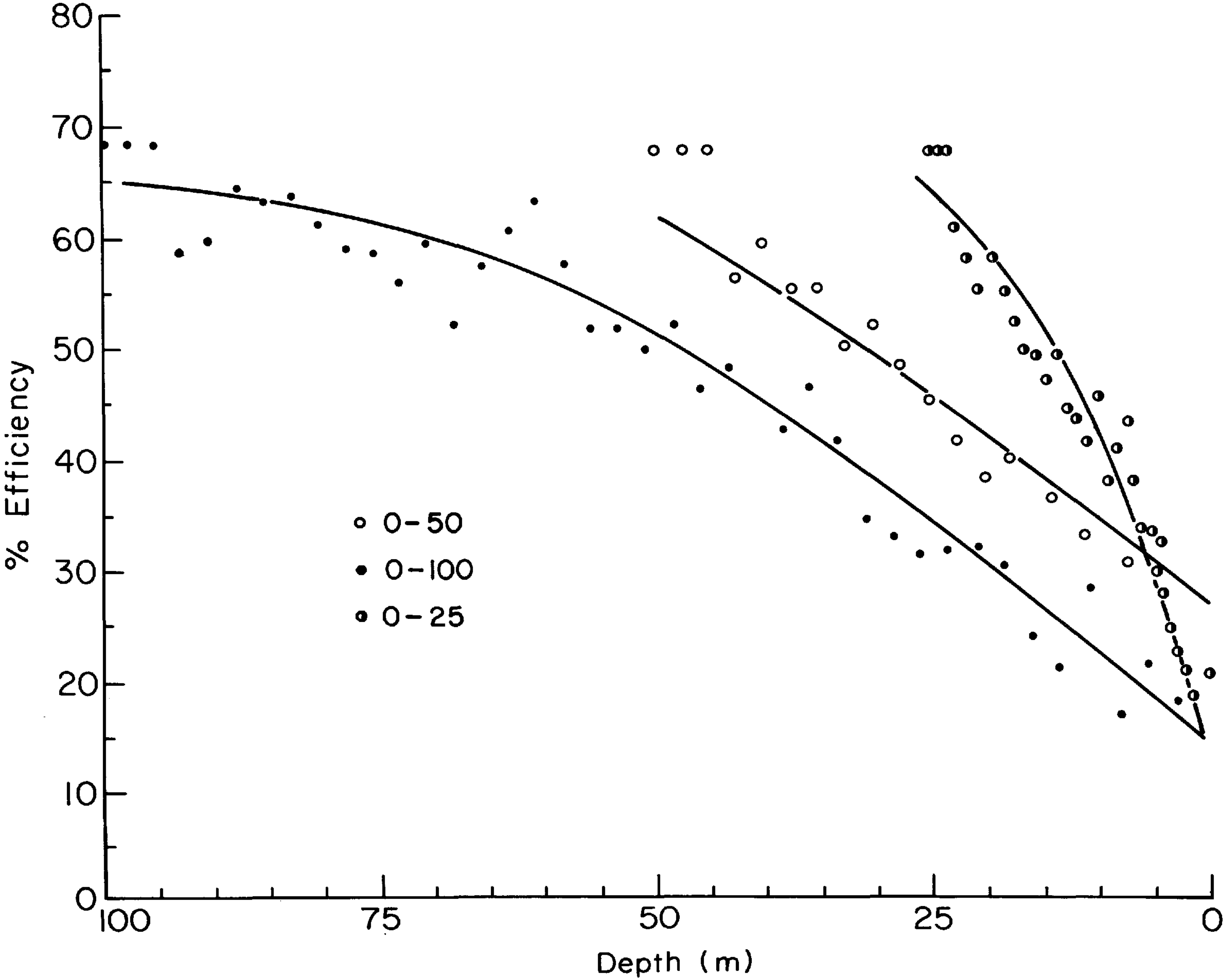

Figure 2. Filtering efficiency with depth for 3 vertical tows (100 m - 0 m, 50 m - 0 m, and 25 m - 0 m) made in Lake Ontario

(0 - 25 m tow) than nets fished in deeper, less productive waters (0 - 100 m). In any case, without such a device, it obviously is impossible to predict the efficiency of a net at the moment it encounters a layer of plankton.

Recommendations

Devices are currently available, such as high-frequency sonar, which graphically delimit layers of zooplankton (see Part VI). Combined with such graphic devices, a net equipped with the device described herein is a logical companion, permitting precise estimates of net efficiency at any level during a vertical tow.

SECTION IV

ANALYSIS OF ZOOPLANKTON POPULATIONS

Both seasonal patterns in species abundance and estimates of secondary productivity are important in understanding the dynamics of competing species, let alone relating their dynamics to that of the primary producers. We have produced detailed information on the abundance of all species of Cladocera and Copepoda (Crustacea) at the 60 stations of the IFYGL Lake Ontario grid. Estimates of standing crop are vital in estimating zooplankton grazing. Horizontal distribution is important to understanding the development of populations, with regard to the non-homogeneous or clumped distribution of their food resources.

SEASONAL DISTRIBUTION OF THE CRUSTACEA

Bosmina longirostris, the most abundant cladoceran of Lake Ontario, began to increase in abundance in April and May in *inshore* waters, although rapid population growth does not result in large standing crops until June (Table 1). Maximum densities were reached in August inshore. In deeper, offshore waters, the initial standing crops were lower in May and June, but July and August densities were as high as 63,691/m^3 (Table 2). Following a population crash in November, *Bosmina* over-wintered as parthenogenetic females, at densities of only 0.3-10.2/m^3.

Bosmina coregoni, a larger Bosminid considered characteristic of oligotrophic waters (see Section VIII), is also found in Lake Ontario. It likewise overwinters at densities of 4 - 65/m^3, but is currently much less successful in Lake Ontario, reaching a maximum density of 2,050/m^3 offshore in October (Table 2).

Among the daphnids, *Daphnia retrocurva* is currently most successful in epilimnetic waters, again with an August maximum (11,965/m^3) offshore (Table 2). The smaller *Ceriodaphnia lacustris* is chiefly a summer form, as is *Holopedium gibberum*. *Diaphanosoma* sp. is a winter form, in relatively low numbers (4 - 9/m^3) from November through March (Table 2).

Polyphemus pediculus, a non-bivalve cladoceran often considered predatory, is found only during August in offshore waters (Table 2).

Cyclops bicuspidatus was the most common cyclopoid of the offshore waters, whereas *Tropocyclops prasinus* was more common inshore (Table 2). *C. bicuspidatus* was most abundant during July and August (12,478/m^3), and overwintered at high densities (121-452/m^3) in offshore waters (Table 2). *C. vernalis* likewise reached its maximum abundance in

August, but never exceeded densities of $650/m^3$. Tropocyclops is an autumnal species, which reached densities of $14,185/m^3$ offshore at the same time. Thus not only do C. bicuspidatus and T. prasinus show different seasonal patterns, but their gross horizontal distribution, to be examined further, is complimentary.

The calanoid copepods, often abundant in oligotrophic waters, are a diverse assemblage in Lake Ontario, but are never especially abundant. Unidentified copepodites were most abundant inshore during October-November. The classical oligotrophic indicator, Diaptomus sicilis, was most abundant offshore in June ($184/m^3$) and July ($119/m^3$). Eurytemora affinis, the recent invader from the sea, never exceeded $2350/m^3$ (August) in inshore waters (Table 1).

These data on relative density clearly indicate that Lake Ontario is characterized by a single seasonal peak in zooplankton production which occurs during August. Most species overwinter in the lake as adults, the exceptions being the rare cladocerans, Holopedium, Polyphemus and Diaphanosoma.

Table 1. INSHORE ZOOPLANKTON POPULATION DENSITIES. Values (number/m^3) represent animals collected with net (64 u aperture) at stations in waters less than 30 m in depth, over vertical range of 0 - 5 m.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 Mar	24-28 April	12-16 June
Cladocera										
Bosmina coregoni	13.4	62.2	2040.	547.	3628.	1246.	64.5	62.7	20.5	152.
Bosmina longirostris	41.4	887.	9844.	97,741.	2073.	126.4	8.8	3.5	10.2	2723.
Daphnia galeata	0.5	23.8	78.6	299.	24.8	56.8	13.1	1.9	6.1	12.3
Daphnia retrocurva	0.	22.8	86.0	8676.	2331.	689.	8.7	2.4	8.5	39.5
Daphnia longiremis	0.	0.3	0.3	0.	30.3	0.	0.	0.	5.2	6.0
Ceriodaphnia lacustris	0.	0.5	101.	3989.	138.	4.9	0.	0.	13.6	27.1
Chydorus sphaericus	0.1	19.7	94.4	358.	70.	610.	0.	1.5	12.0	26.3
Holopedium gibberum	0.	0.7	0.	30.	4.5	0.	0.	0.	0.	0.
Polyphemus pediculus	0.	0.	0.	4.	0.	0.	0.	0.	0.	0.
Diaphanosoma	0.	0.	0.	20.	3.8	14.0	0.	9.0	0.	0.
Cyclopoida										
Cyclopoid copepodites	132.0	418.	1193.	21,552.	11,003.	7532.	1893.	1145.	1341.	17482.
Cyclops bicuspidatus	170.1	534.	5818.	4274.	932.	723.	145.	184.	1363.	639.
Cyclops vernalis	0.7	25.7	146.	881.	262.	129.	8.3	11.6	11.0	203.

Table 1 (continued). INSHORE ZOOPLANKTON POPULATION DENSITIES. Values (number/m^3) represent animals collected with net (64 u aperture) at stations in waters less than 30 m in depth, over vertical range of 0 - 5 m.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 Mar	24-28 April	12-16 June
Cyclopoida (cont)										
Tropocyclops prasinus	0.5	25.6	247.	2000.	14,185.	1278.	189.5	53.5	65.1	140.
Mesocyclops	-	-	+	++	+	-	-	-	-	+
Calanoida										
Calanoid copepodites	0.8	68.8	209.	148.	494.	218.	45.4	63.4	122.7	266.
Diaptomus ashlandi	28.4	-	-	0.	-	11.3	0.	15.9	-	-
Diaptomus siciloides	0.	0.	0.	0.2	21.9	13.0	7.0	2.1	1.5	6.0
Diaptomus minutus	0.	50.3	84.4	49.		43.3	33.7	45.5	37.8	228.
Diaptomus oregonensis	0.7	25.4	105.	17.5	60.9	90.3	71.5	13.4	43.8	6.8
Diaptomus sicilis	12.7	39.8	117.	8.8	63.3	54.4	41.0	39.3	39.0	14.9
Limnocalanus macrurus	59.6	309.	88.7	8.0	33.7	38.9	40.2	52.2	124.7	38.0
Eurytemora affinis	0.	16.8	0.	2350.	161.3	28.2	3.0	0.	22.6	16.1

Table 2. OFFSHORE ZOOPLANKTON POPULATION DENSITIES. Values (number/m^3) represent animals collected with net (64 u aperture) at stations in waters greater than 30 m in depth, over vertical range of 0 - 5 m.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 Mar	24-28 April	12-16 June
<u>Cladocera</u>										
Bosmina coregoni	0.5	31.3	389.	1453.	2050.	751.	11.0	4.4	5.8	66.1
Bosmina longirostris	28.	288.	13206.	63,691.	1784.	75.4	0.3	1.2	2.1	972.2
Daphnia galeata	0.4	22.2	3027.	99.	13.6	8.5	0.	0.2	0.	0.9
Daphnia retrocurva	0.	15.9	149.	11,965.	1733.9	66.7	0.	0.	0.1	25.7
Daphnia longiremis	0.	0.	294.	0.	0.7	0.2	0.	0.	0.	0.2
Ceriodaphnia lacustris	0.	0.7	103.	4202.	149.8	59.6	0.	0.	0.5	6.7
Chydorus sphaericus	0.	16.0	641.	100.	33.5	0.7	0.	0.	0.	5.9
Holopedium gibberum	0.	0.	53.9	7.	1.5	0.	0.	0.	0.	0.
Polyphemus pediculus	0.	0.	0.	3.	0.	0.	0.	0.	0.	0.
Diaphanosoma	0.	0.	0.	2.5	0.3	0.	0.	0.	0.	0.
<u>Cyclopoida</u>										
Cyclopoid copepodites	86.7	322.	2201.	29,143.	10,803.	6820.	2260.	1600.	664.	9674.
Cyclops bicuspidatus	344.	1424.	12,478.	12,113.	1182.	345.9	121.0	268.	452.	538.5
Cyclops vernalis	0.7	28.1	190.	643.	132.	131.	13.2	4.9	0.9	34.9

Table 2 (continued). OFFSHORE ZOOPLANKTON POPULATION DENSITIES. Values (number/m^3) represent animals collected with net (64 u aperture) at stations in waters greater than 30 m in depth, over vertical range of 0 - 5 m.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 Mar	24-28 April	12-16 June
Cyclopoida (cont)										
Tropocyclops prasinus	0.	10.8	65.6	1676.	3510.	886.7	159.8	159.	257.5	287.9
Mesocyclops	-	+	+	++	+	+	-	-	-	-
Calanoida										
Calanoid copepodites	19.9	60.4	123.9	116.	331.	128.3	36.6	72.4	94.5	155.6
Diaptomus ashlandi	0.	0.	0.	0.	0.	0.	0.8	0.	0.	0.
Diaptomus siciloides	0.	0.	0.	0.	2.5	5.2	0.3	0.	0.	0.6
Diaptomus minutus	56.7	225.	90.9	73.7	27.8	28.6	42.8	54.4	50.6	47.3
Diaptomus oregonensis	0.8	70.7	76.1	107.5	35.8	34.5	9.3	6.2	10.7	1.9
Diaptomus sicilis	22.4	184.	119.4	17.	26.1	28.3	27.4	24.5	44.8	2.5
Limnocalanus macrurus	68.2	183.	139.	6.	23.8	22.9	20.4	50.8	127.0	1.4
Eurytemora affinis	0.	0.	0.	117.6	110.1	22.6	0.3	0.	9.5	1.4

HORIZONTAL DISTRIBUTION OF CRUSTACEAN ZOOPLANKTON AT SPECIES POPULATION MAXIMA

Water quality is reflected in the horizontal distribution of the crustacean zooplankton of Lake Ontario. From our sampling during the 1972-73 IFYGL survey, the distributions of each species are available from a variety of water strata. In this section we will discuss the horizontal surface (0 - 5 m) distribution of dominant forms at the time of their seasonal population maxima.

Biologically it is important to interpret horizontal distributions. Inputs of plant nutrients from rivers tributary to Lake Ontario likely influence secondary production. Thus areas of unusually high standing crops of zooplankton are likely indicators of stimulation by pollutants of the nutrient-poor Ontario ecosystem. Likewise, physical factors like upwelling, with associated increases in available plant nutrients, may influence observed horizontal distributions of zooplankton. In the final interpretation of Lake Ontario results, such information must be considered.

Lastly, the Ontario ecosystem is extremely dynamic. Large populations of warm-water cladocerans, initially developing inshore, may be carried offshore, with little final correspondence between the location of a clump in time and the environmental factors which led to its development.

The Cladocera

The horizontal distributions of the cladoceran and copepod crustaceans will be discussed as a sequence of possible eutrophic indicators from *Bosmina longirostris*, the most useful key to extreme eutrophy, to *Diaptomus sicilis*, the most primitive oligotrophic form.

The smallest major cladoceran, *Bosmina longirostris*, is likely a eutrophic indicator because of its diet, which permits grazing on large forms of algae. It is predominantly an inshore form (Section V), presently close to urban centers. *Bosmina longirostris* was found in Ontario over 12 months, but reached maximum density during August 1972. Clearly the horizontal distribution of *B. longirostris* is (a) characterized by greater densities inshore, and (b) associated with urban shoreline development and river inflow. At maximum development from 21 - 25 August 1972, it reached densities of greater than 200,000/m^3 off Toronto, Ontario, and 300,000 off Oswego, New York (Figure 3). Likely the Oswego case was influenced as much by the agricultural nutrient load of the Oswego River as by the city itself, whereas the effect from Toronto is likely more directly associated with nutrients originating from the city. In both cases, of course, such nutrient stimulation is thought to have its primary impact upon the phytoplankton, with the response which we have observed so clearly in the zooplankton

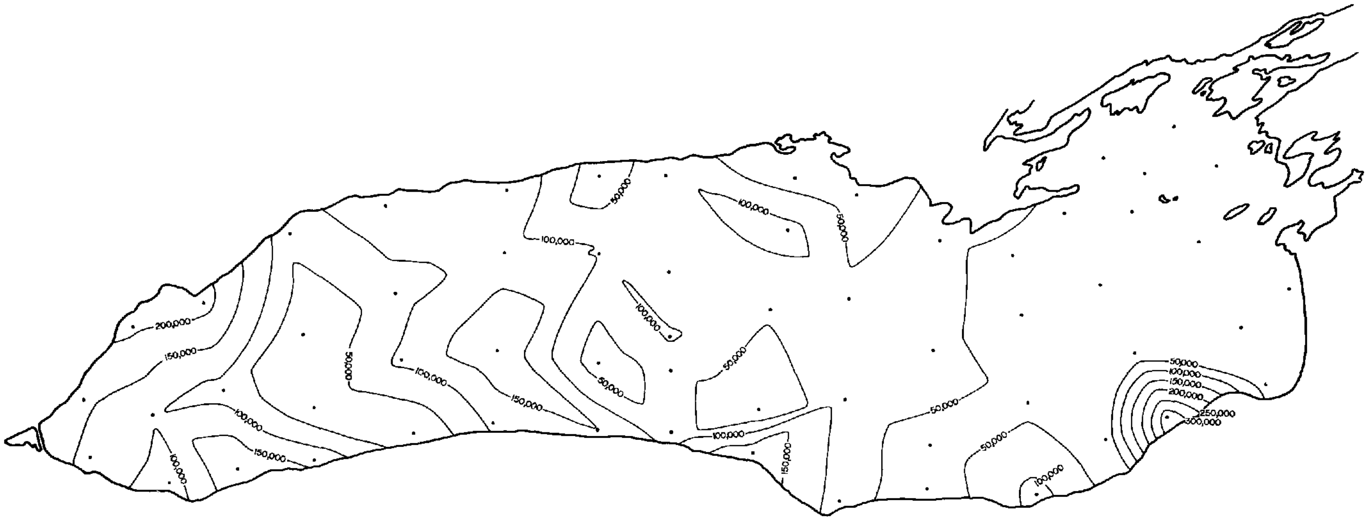

Figure 3. Density (no./m^3) of eutrophic Cladoceran <u>Bosmina</u> <u>longirostris</u> on 21 - 25 August 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

a secondary one. But the usefulness of Bosmina longirostris as an indicator of stress is obvious.

Bosmina coregoni, almost twice as large as B. longirostris at maturity, has been considered an oligotrophic form. In contrast to the inshore preferences of B. longirostris, B. coregoni exhibited offshore blooms of up to 30,000/m^3, also during 21 - 25 August 1972. These intense concentrations were largely confined to the eastern end of Lake Ontario (Figure 4), with large aggregations of 20,000/m^3 and 1,500/m^3 offshore of Rochester, New York, and a cell of lesser density at the outflow of the lake.

The third common cladoceran, Daphnia retrocurva, while not classically used as an indicator of eutrophication, is a small species which withstands fish predation well, and thus is very successful. Large inshore concentrations were found again at Oswego (35,000/m^3) and just eastward from Oswego at Nine Mile Point (10,000/m^3), the site of a nuclear power plant complex from 21 - 25 August 1972. A third cell of maximum densities of 20,000/m^3 was located west of Rochester (Figure 5).

The Copepods

Diaptomus sicilis, in sharp contrast to the cladoceran Bosmina longirostris, is the most oligotrophic form in the Great Lakes, and remains the dominant species in oligotrophic Lake Superior. As expected of an oligotrophic indicator, it develops its maximum population earlier (July) than Bosmina longirostris (August), and this development occurs in deeper, cooler midlake watermasses. Currently not nearly as abundant as Bosmina, D. sicilis densities during 1972 did not exceed 375/m^3. Two large cells were found in eastern Lake Ontario (Figure 6), one occupying most of the deepwater basin north of Rochester and Oswego, and the other between this larger cell and the outlet during the period 10 - 14 July 1972. Less intense inshore development was observed in shallow Mexico Bay in the extreme southeast corner of the lake and in the western portion just east of the Niagara River inflow.

Diaptomus minutus, a more mesotrophic species with the predatory avoidance characteristics associated with small size at maturity, also exhibited an offshore distribution at maximum development. Large clumps with relatively low densities of 300 - 1000/m^3 were found in both the western and eastern parts of Lake Ontario from 12 - 16 June 1973. In contrast to the cladocerans, these cells were always centered well offshore (Figure 7).

The cyclopoid copepods have not been used as indicators of pollution in the traditional sense. They are likely predators which obtain a living by piercing and sucking body fluids from rotifers and small crustaceans. Three species are dominant in Lake Ontario. In order of abundance, these are Cyclops bicuspidatus, C. vernalis and Tropocyclops prasinus. Cyclops bicuspidatus reached its population maximum in July, C. vernalis in August, and Tropocyclops in October 1972.

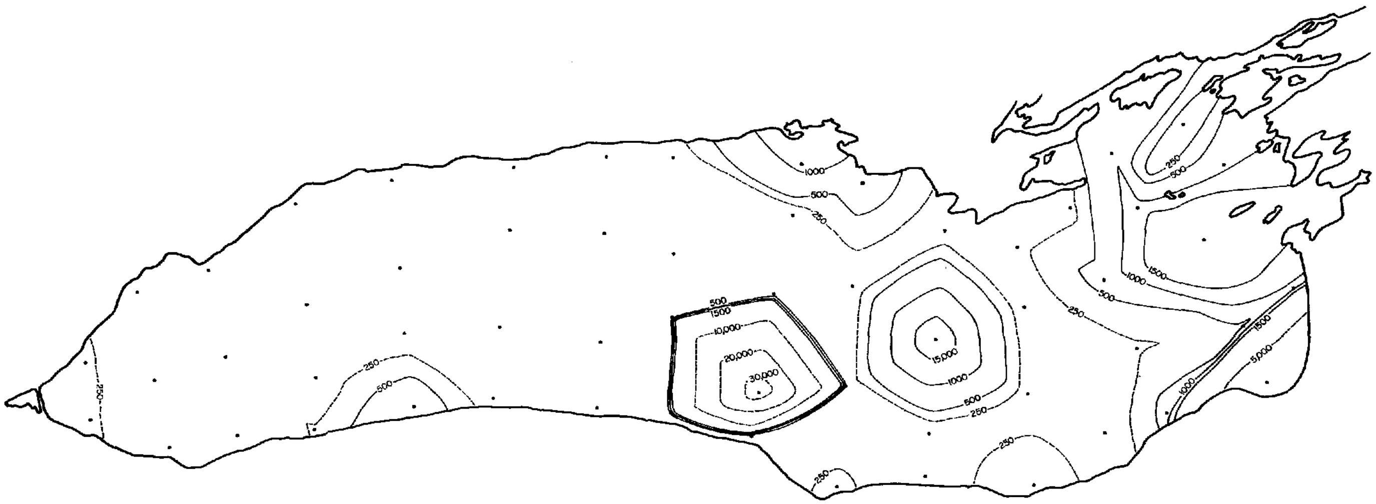

Figure 4. Density (no./m^3) of oligotrophic Bosmina coregoni on 21 - 25 August 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

Figure 5. Density (no./m^3) of eutrophic *Daphnia retrocurva* on 21 - 25 August 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

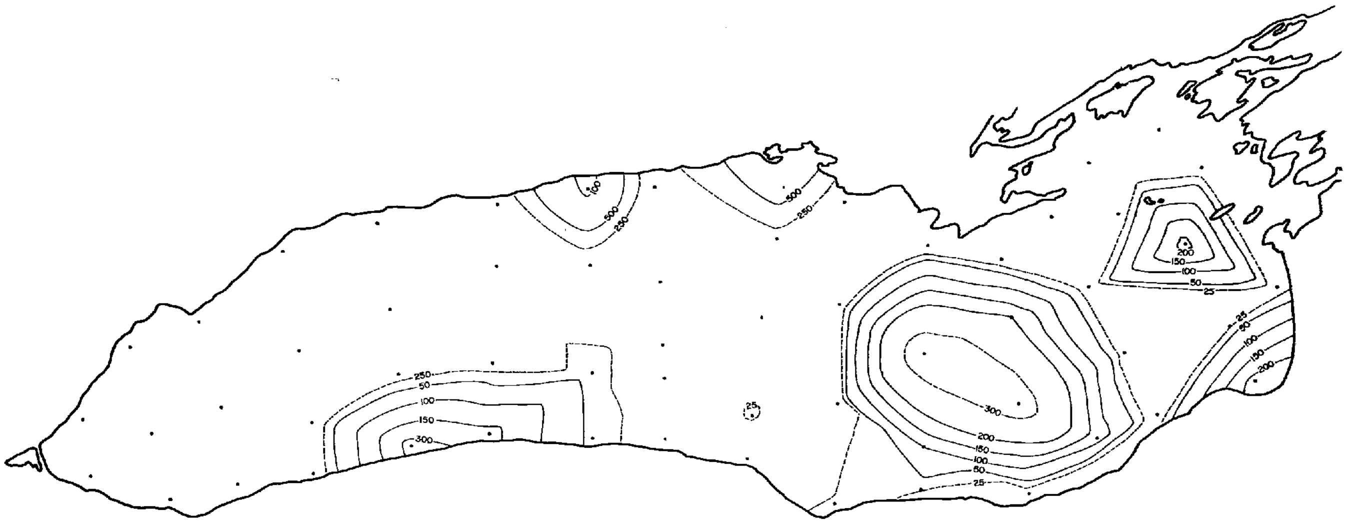

Figure 6. Density (no./m^3) of ultra-oligotrophic Diaptomus sicilis on 10 - 14 July 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

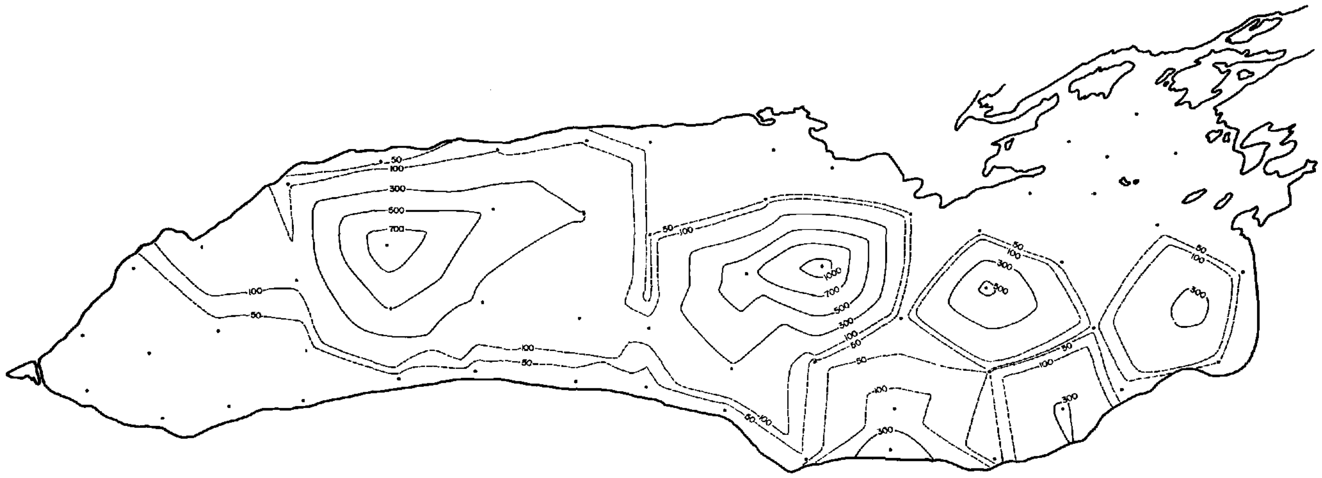

Figure 7. Density (no./m^3) of mesotrophic Diaptomus minutus on 12 - 16 June 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

Cyclopoid copepodites, or immatures of the above three species, were abundant from 21 - 25 August 1972, both inshore and offshore (Figure 8). A large cell with maximum densities of 50,000/m^3 was present in shallow eutrophic Mexico Bay in southeast Lake Ontario, but the greatest concentrations were in the central basin of the lake (100,000/m^3) and inshore just southwest of Toronto (90,000/m^3). Cyclopoids develop rather slowly, and it is likely that large aggregations may drift about the lake for long periods of time with little relationship to the origin of the underlying environmental factors responsible for their initial population explosion.

Cyclops bicuspidatus, the most abundant of the cyclopoid copepods, is a spring species reaching a maximum abundance by early (10 - 14) July. In eastern Lake Ontario it was most abundant over deepwater at Station 75 (20,000/m^3). In the western waters a large cell was located in midlake (70,000/m^3) and another inshore at Toronto (50,000/m^3). The density of *Cyclops* in the inflowing waters from Lake Erie was apparently rather low (10,000/m^3), as illustrated in Figure 9. Since *Cyclops* is a seizer and serum sucker probably feeding upon rotifers and small crustaceans, its distribution may reflect the abundance of such foods, but is likely less closely tied to algal and nutrient distributions and thus is not useful as an indicator of environmental stress.

Cyclops vernalis was much less abundant than *C. bicuspidatus*. Two small concentrations were observed in western Lake Ontario during August (Figure 10), one off of Toronto (1500/m^3), from 21 - 25 August 1972. Elsewhere densities ranged between 250 and 1500/m^3. Together with the data on *C. bicuspidatus*, these densities of *C. vernalis* may enable modellers to estimate the incidence of zooplankton (non-fish) predators.

Tropocyclops prasinus is an autumnal form which reached densities of 335,000/m^3 during October 1972 (Figure 11). It was found in a very large inshore bloom (200,000/m^3) west of the Murray Canal, which connects the Bay of Quinte to Lake Ontario, from 30 October through 3 November 1972. The relationship of such blooms in Popham's Bay to nutrient inputs from the Bay of Quinte should be answered.

Generalities Regarding the Horizontal Distribution of the Crustacean Zooplankton

Certainly the cladocerans are most abundant close to shore, while the copepods prefer deeper waters. These data illustrate differences within these two orders, indicating clearly that some cladocerans prefer more eutrophic conditions than others, while some copepods are more oligotrophic than others. *Bosmina longirostris*, clearly the most eutrophic form, exhibits a tendency to explode in areas of known perturbation, especially off the Oswego River and the City of Toronto. *Bosmina coregoni*, a more oligotrophic indicator on a relative scale, is found in large offshore clumps, well away from major sources of inorganic and organic plant nutrients. *Daphnia retrocurva* is

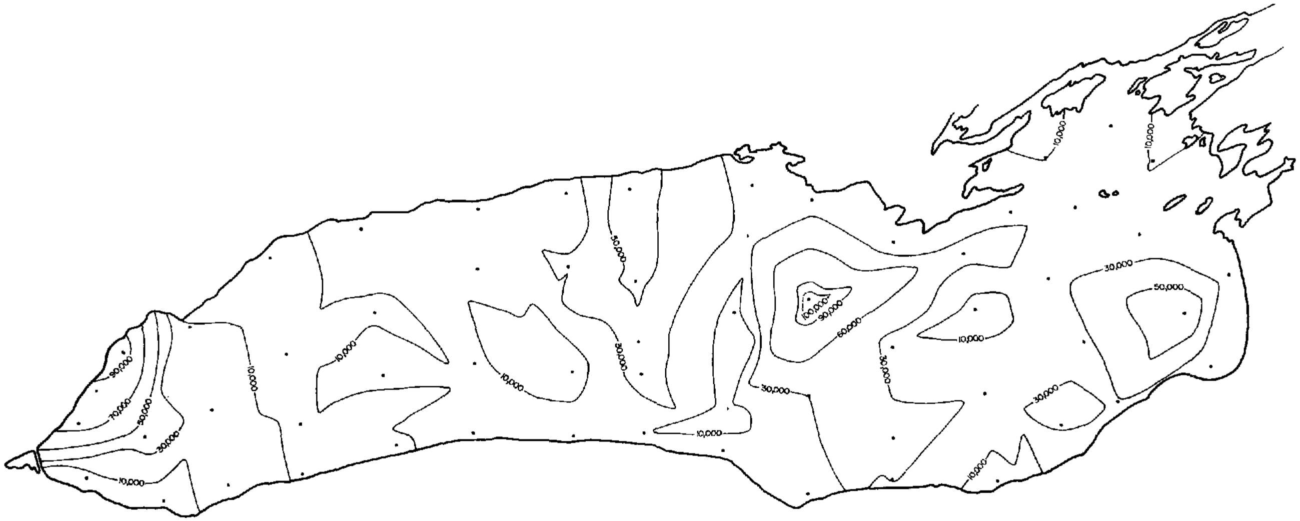

Figure 8. Density (no./m^3) of Cyclopoid copepodites on 21 - 25 August 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

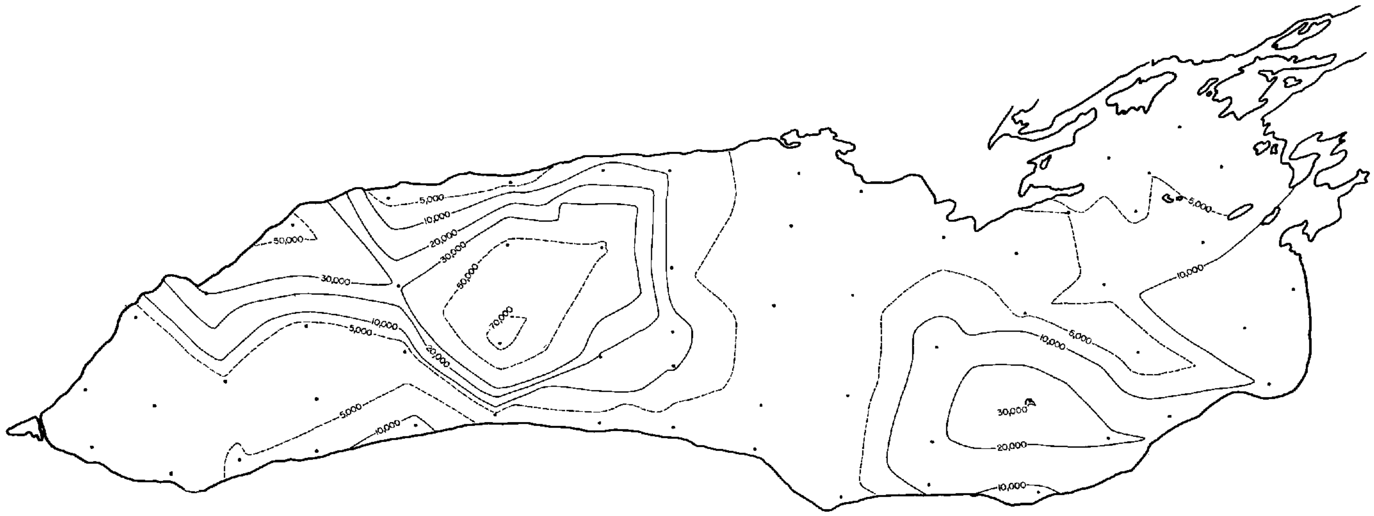

Figure 9. Density (no./m^3) of Cyclops bicuspidatus on 10 - 14 July 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

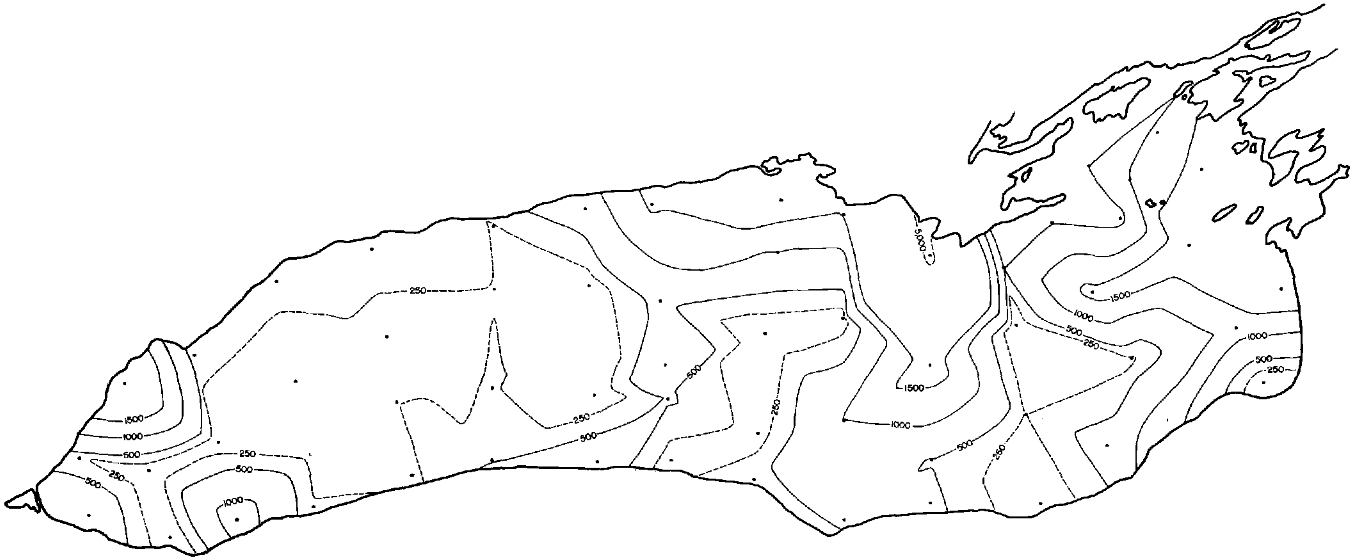

Figure 10. Density (no./m^3) of Cyclops vernalis on 21 - 25 August 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

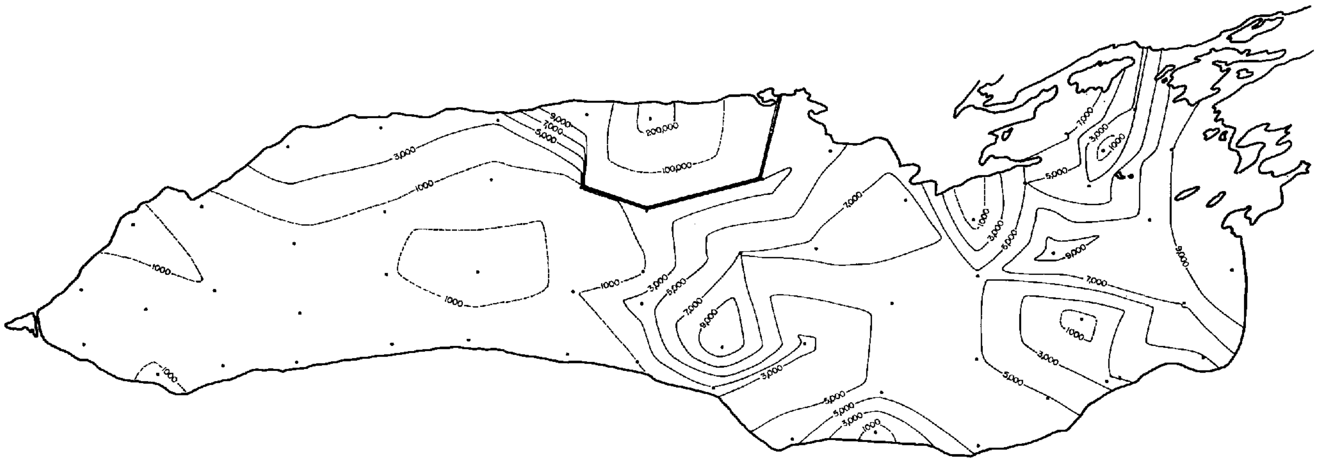

Figure 11. Density (no./m^3) of Tropocyclops prasinus on 30 October - 3 November 1972 in surface waters (0 - 5 m) of Lake Ontario at 60 stations of IFYGL Biology Program

intermediate between the Bosminas in its response, probably closer to B. longirostris.

Clearly Diaptomus sicilis, often called the most oligotrophic crustacean, exhibits an offshore distribution, as does Diaptomus minutus. From our observation, strongly influenced by information in the literature, we have erected a continuum of species, indicative of early oligotrophy to eutrophy. For these found in Lake Ontario, the extremes might include:

Early oligotrophy:	Diaptomus sicilis
Oligotrophy:	Bosmina coregoni
Mesotrophy:	Diaptomus minutus
Eutrophy:	Daphnia retrocurva
Late Eutrophy:	Bosmina longirostris

Communities of Lake Ontario Under Stress

Four restricted areas of this tremendously large system are currently under stress, as indicated by their zooplankton communities. These include the waters adjacent to Metropolitan Toronto, those off the Oswego River, and three shallow and productive Bays, Mexico Bay in southeast Lake Ontario and Popham's and Weller's Bays adjacent to the Murray Canal which connects Lake Ontario to the Bay of Quinte on the northeastern Canadian shore.

We have concluded that these areas are under stress, based on a consideration of the relative numbers of cladocerans and calanoid copepods found at maximum density, usually during July and August. In the four areas under stress, the mean density of Bosmina longirostris at population maximum was $150{,}000/m^3$, while that for Diaptomus sicilis and minutus was $312/m^3$, for a Bosmina:Diaptomus ratio of 480:1 (Table 3). In more oligotrophic waters at stations 17, 77 and 83, the mean density of Bosmina was $1000/m^3$ and that of Diaptomus was $255/m^3$, for a Bosmina:Diaptomus ratio of 3.9:1. Thus Diaptomus, the oligotrophic form, is relatively more abundant in oligotrophic waters as indicated. Bosmina, on the other hand, was 150 times more abundant in eutrophic than oligotrophic waters in this example.

Clearly, the Environmental Protection Agency should consider solutions to problems of accelerated eutrophication in U.S. territorial waters near Oswego and especially in Mexico Bay, and the Canadian government should be concerned with the same problem in the area of Toronto and in shallow Popham's and Weller's Bays on the northern coast of Lake Ontario. It may be possible to separate cultural causes from simple morphometric (depth) relationships in these cases. That is, the problems associated with the input of nutrients from the Oswego River and Toronto may have engineering or other technical solutions. The problems of high productivity in the shallow bays may be primarily associated with their morphometry. These bays may be important feeding grounds for young fishes and a slowing of their eutrophication may be neither feasible nor desirable.

Table 3. COMPARISON OF AREAS UNDER STRESS WITH OLIGOTROPHIC AREAS ON BASIS OF RELATIVE DENSITIES OF *DIAPTOMUS SICILIS* + *MINUTUS* AND *BOSMINA LONGIROSTRIS* (no./m^3).

	Density of Organisms at Maximum	
	Diaptomus sicilis + *minutus*	*Bosmina longirostris*
Areas under stress:		
Metropolitan Toronto	100	200,000
Oswego Area	150	300,000
Mexico Bay	500	50,000
Popham's and Weller's Bays	500	50,000
	312.5	150,000
MEAN *Bosmina*:*Diaptomus* ratio	480:1	
Oligotrophic Areas		
Station 17 (mid-western)	11	0
Station 77 (mid-eastern)	740	0
Station 83 (mid-eastern)	14	3,000
	255	1,000
MEAN *Bosmina*:*Diaptomus* ratio	3.9:1	

SECTION V

EFFECTS OF URBAN CENTERS ON ZOOPLANKTON POPULATIONS

INTRODUCTION

The zooplankton faunas of the Laurentian Great Lakes reflect water quality, with seasonal population equilibria apparently achieved in a short time between the quantity and quality of algal foods and the density of grazers. Thus, to some degree, the variety and abundance of the zooplankton is a reflection of the secondary influences of nutrient loading. In a similar fashion the population size structure, and ultimately the species composition of the zooplankton, is influenced by their fish predators (Wells, 1970).

As a working hypothesis, we suggest that urban development along the shores of Lake Ontario influences the community structure of inshore zooplankton populations during a growing season. A proposed mechanism might involve the input of nutrients, in turn stimulating the production of bluegreen algae, or the discharge of substances inhibitory or lethal to zooplankton growth. However, we will not attempt to further define this mechanism now. The purpose of this particular analysis of data was to test this hypothesis. Basically three questions are important. First, do differences in community structure occur lakewide on a defined horizontal scale within a growing season? If so, are such differences in community structure related to long-term changes demonstrated for Lake Ontario? And most importantly, what do such differences infer regarding the eutrophication of Lake Ontario's ecosystem?

Definition of the time-scale of changes during community succession is important to understanding eutrophication. This succession has been partially answered. Over time, the zooplankton of the Great Lakes probably have adapted to both changing foods and predators. During a recent period of accelerated cultural eutrophication commencing about 1900 (Beeton, 1969), major changes in zooplankton community structure probably were initiated. Diaptomus sicilis, the dominant form in Lake Superior, seems the most oligotrophic form in the Great Lakes (Patalas, 1972). Toward the eutrophic end of the spectrum, the summer zooplankton community of Lake Ontario has shifted since 1939 from dominance by Diaptomus to an abundance of Bosmina longirostris (McNaught and Buzzard, 1973). Thus long-term shifts have been documented for Lake Ontario and probably have occurred in all of the lower Great Lakes.

Lake Ontario is the seventeenth largest body of freshwater in the world (Hutchinson, 1957), an international resource of tremendous value to both the United States and Canada. Lake Erie, upstream to Lake Ontario, is certainly responsible for important organic and inorganic inputs. Thus it is also the purpose of this analysis of the Ontario ecosystem to detect the ecological impact of in basin inputs of nutrients and other substances. This will be attempted by dividing Lake Ontario into three segments, with special attention given to proximity to human influence. These designated areas thus include (1) inshore waters adjacent to urban centers and less than 30 m in depth, (2) inshore waters not offshore from but adjacent to rural areas, and (3) offshore waters greater than 30 m in depth.

Vertical plankton hauls were taken from the NOAA R/V Researcher at the 60 IFYGL sampling stations (Figure 12) on the cruises of 12 - 16 June, 10 - 14 July and 21 - 25 August 1972. Fortunately these 60 stations selected by the IFYGL management were comparable within the framework of our lakewide division. The urban inshore stations had a mean depth of 14.0 m, whereas those stations designated rural inshore had a mean depth of 18.5 m.

COMPARISON OF ZOOPLANKTON COMMUNITIES

Basically three types of comparisons will be made between populations inhabiting urban inshore, rural inshore, and offshore waters. First the relative densities of each species will be contrasted. Secondly, traditional measures of Shannon-Weaver diversity, richness and evenness will be utilized. Lastly, community indices, including the theoretical community competition coefficient (α) and community carrying-capacity (K) (Levins, 1968) will be used. Discussion and application to Great Lakes problems of these indices by Vandermeer (1972), Lane and McNaught (1970), and McNaught and Buzzard (1973) may be consulted for information on formulations and application.

Density Differences

In comparing densities (Table 4), relatively higher numbers, but fewer species of many cladocerans were found in urban inshore waters. *Daphnia longiremis* was limited to offshore waters, while *Bosmina longirostris*, *Ceriodaphnia*, *Chydorus*, *Polyphemus* and *Diaphanosoma* were usually more abundant offshore. However, on a unit volume basis (no./m^3) the cladocerans, usually considered warm water organisms, were more abundant inshore than offshore during June-August (mean of 64,325/m^3 versus 33,737/m^3). Roth and Stewart (1973) found a similar situation in Lake Michigan. In contrast to the cladocerans, the cyclopoid copepods did not exhibit such an obvious trend. Among the calanoid copepods, both *Diaptomus minutus* and *D. oregonensis* were more abundant offshore, as was *Limnocalanus*, a cold water form. A two-way analysis of variance demonstrated that zooplankton densities varied significantly ($p < .01$) with time (Table 7), but not with location. Clearly there are seasonal pulses in zooplankton densities, as we have long realized, but the differences between urban inshore, rural inshore and offshore waters are not effectively described in terms of total crustacean zooplankton densities.

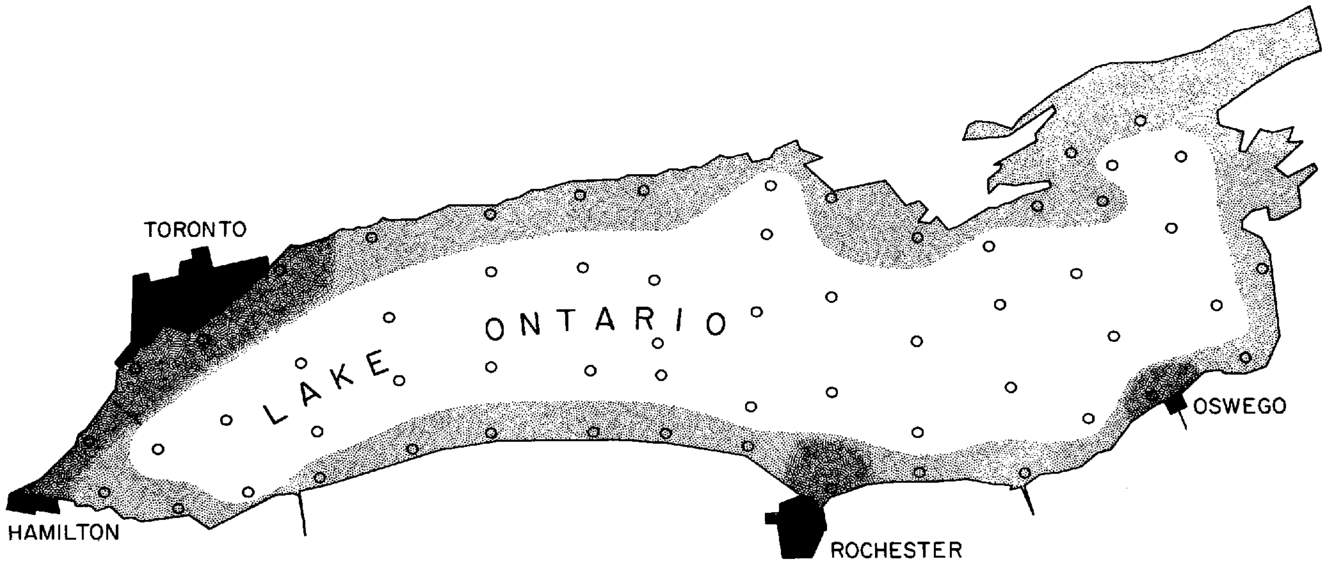

Figure 12. Lake Ontario, divided into three areas of differing trophy and community structure --- including offshore (unstippled), rural inshore (lightly stippled), and urban inshore waters (heavily stippled) --- as well as associated cities of Toronto, Hamilton, Rochester and Oswego, plus IFYGL sampling stations (O)

Table 4. COMPARATIVE MEAN DENSITIES (#/m^3) OF CRUSTACEAN ZOOPLANKTON FROM 0 - 5 m DEPTH, CONTRASTING URBAN INSHORE VERSUS OFFSHORE COMMUNITY COMPOSITION.

Species	June 1972 Big Cities	June 1972 Offshore	July 1972 Big Cities	July 1972 Offshore	August 1972 Big Cities	August 1972 Offshore
Cladocerans						
Leptodora kindtii	+	+	+	+	+	+
Bosmina coregoni	12	31	82	389	402	1,453
Bosmina longirostris	179	288	7,060	13,206	174,580	63,691
Daphnia galeata	-	22	108	3,027	1,873	99
Daphnia retrocurva	5	16	164	149	6,028	11,965
Daphnia longiremis	-	-	-	294	-	-
Ceriodaphnia lacustris	-	7	-	103	2,399	4,203
Chydorus sphaericus	-	16	-	640	30	100
Holopedium gibberum	-	-	-	54	43	7
Polyphemus pediculus	-	0	-	+	11	7
Diaphanosoma	-	-	-	-	-	3
Cyclopoida						
Copepodites	1,160	323	816	2,201	27,586	29,143
Cyclops bicuspidatus	650	1,424	17,555	12,478	4,158	12,113
Cyclops vernalis	76	28	43	190	1,011	643
Tropocyclops prasinus	25	11	11	66	1,874	1,676
Mesocyclops spp.	-	+	-	+	+	+
Calanoida						
Copepodites	35	60	97	124	203	116
Diaptomus minutus	67	225	23	91	39	74
Diaptomus oregonensis	10	71	-	76	94	108
Diaptomus sicilis	18	184	17	119	58	17
Limnocalanus macrurus	68	183	47	139	24	6
Eurytemora affinis	28	+	-	11	60	117

Diversity Differences

Comparison of the three lake regions, using Shannon-Weaver diversity, as well as the richness and evenness components, illustrated some significant differences between watermasses (Tables 5 - 6). In all three summer months, the urban inshore areas exhibited the lowest diversity (1.13 - 1.66 bits), with rural inshore areas intermediate (2.43 - 2.93) and offshore waters most diverse (2.94 - 3.31). Note that these ranges in diversity do not overlap. During the months June and July fewer species (12 - 14) were found in urban inshore areas, and the richness component was lower (2.49 - 3.85) than in offshore waters (3.76 - 4.32). In August the evenness component accounted for reduced diversity in urban inshore waters. The location and time effects on diversity were both highly significant ($p < .01$), as shown in Table 7.

Differences in Community Indices

Biotic communities should evolve toward a moderately low level of interspecific competition, otherwise species extinction will force such evolution. In apparently stable planktonic communities, as in oligotrophic lakes, the mean community competition coefficient might be on the order of 0.3. For a larger number of samples collected from Lake Michigan the mean community alpha was 0.31 (Lane and McNaught, 1970). Thus a third comparison, between location and alpha, was attempted (Table 7). During the months of June, July and August, 1972, the mean community alpha was highest for the communities of urban inshore waters. In two of three cases, alpha was lowest for communities of offshore waters. These indices suggest that offshore communities, with reduced levels of potential interspecific competition, are the most stable ecologically. In contrast, the urban inshore communities were again judged least stable, and by using an index independent of the previous Shannon-Weaver diversity computation. The effect of location upon alpha was highly significant ($p < .01$), while there was also a significant effect ($p < .05$) of time of year (Table 7). Thus two ecological indices have suggested greater instability in urban inshore regions.

Similarly, a second community index, carrying capacity (K), was higher for urban inshore waters, as compared to rural inshore areas (Tables 5 - 6). Since this theoretical estimate of carrying capacity is calculated using alpha (Levins, 1968), this conclusion is not unexpected. However, the ratio (N/K) of observed density (N) to theoretical carrying capacity (K) is probably a better index of eutrophication. During these same three months the N/K ratio suggested that urban areas were closer to carrying capacity than rural inshore waters. Moreover, since we are dealing with r-selection organisms, which fill only a small fraction of their carrying capacity, it was logical that these ratios would remain below 15%. It should also be noted that the offshore communities of zooplankton are closest to theoretical capacity (11 - 12%). A two-way ANOVA suggested that the effect of location on the ratio of N/K

Table 5a. BIG CITIES (INSHORE) COMMUNITY STRUCTURE. Abbreviations in text.

Date	Density	Community Competition Coefficient		Relationships with Theor. Carrying-Capacity			Number Species		Diversity		
	N/m3	α	var α	K	N/K	K/ (β/β)	S	est. S	H	Rich	Even
1972											
15-19 May											
12-16 June	2,400	.53	.12	31,207	.08	.75	14	4	1.13	3.85	.98
10-14 July	26,020	.40	.12	192,088	.14	.61	12	5	1.41	2.49	1.31
21-25 August	220,486	.56	.11	3,580,032	.06	.81	20	5	1.66	3.56	1.28
20 Oct.-3 Nov.	19,547	.58	.11	319,395	.06	.90	21	5	1.57	4.66	1.79
27 Nov.-3 Dec.	9,476	.70	.11	118,479	.08	.95	18	5	1.73	4.27	1.38
1973											
5-9 Feb.	2,462	.68	.12	33,551	.07	.88	14	5	1.33	3.83	1.16
19-22 Mar.	1,325	.61	.11	10,571	.13	.86	10	4	1.28	2.88	1.28
24-28 April	1,608	.61	.11	11,451	.14	.81	9	4	.94	2.49	.92
12-16 June	7,474	.38	.10	52,521	.14	.71	11	5	1.25	2.58	1.2
MEAN (June 72-June 73)	32,310	.56		483,255	.07	.81	14.3		1.37	3.40	1.26

Table 5b. INSHORE (LESS BIG CITIES) COMMUNITY STRUCTURE.

Date	Density N/m3	Community Competition Coefficient α	var α	Theor. Carrying-Capacity K	N/K	K/(β/β)	Species S	est. S	Diversity H	Rich	Even
1972											
15-19 May	495	.461	.12	5,239	.09		14	5	1.47	4.83	1.28
12-16 June	2,288	.33	.12	40,863	.06		19	7	2.43	5.36	1.90
10-14 July	20,299	.31	.09	213,957	.09		18	8	2.73	3.95	2.18
21-25 August	251,259	.39	.10	1,303,347	.19	.74	21	9	2.92	3.70	2.21
30 Oct.-3 Nov.	40,061	.54	.13	583,453	.12	.48	20	15	2.40	4.13	1.85
27 Nov.-3 Dec.	13,833	.46	.15	179,968	.08	1.00	21	9	2.94	4.83	2.23
1973											
5-9 Feb.	2,602	.60	.12	35,364	.07	.94	15	15	2.33	4.09	0.86
19-22 Mar.	1,830	.52	.13	28,179	.07	.88	18	8	2.17	5.83	1.73
24-28 April	4,124	.36	.13	44,203	.09	.46	19	12	2.43	4.97	1.9
12-16 June	26,132	.35	.10	405,847	.06	.73	19	8	2.575	4.08	2.0
MEAN (June 72-June 73)	40,270	.43		315,042	.13				2.55	4.55	1.87

Table 6. OFFSHORE COMMUNITY STRUCTURE.

Date	Density	Community Competition Coefficient		Relationships with Theor. Carrying-Capacity			Number Species		Diversity		
	N/m^3	α	var α	K	N/K	K/ (β/β)	S	est. S	H	Rich	Even
1972											
15-19 May	670	.48	.13	5,613	.12	1.21	12	4	1.95	3.89	1.81
12-16 June	2,991	.29	.08	24,784	.12	.69	16	9	2.99	4.89	2.48
10-14 July	33,217	.27	.10	383,233	.09	.80	18	10	2.95	3.76	2.35
21-25 August	129,994	.41	.10	1,196,729	.11	.95	19	9	3.31	3.52	2.59
30 Oct.-3 Nov.	22,365	.49	.15	328,726	.07	.95	21	16	3.23	5.60	2.45
27 Nov.-3 Dec.	9,816	.54	.18	134,737	.07	1.07	19	16	3.30	4.51	2.58
1973											
5-9 Feb.	2,763	.47	.13	40,969	.07	.64	17		2.55	4.04	1.23
19-22 Mar.	2,291	.58	.11	20,424	.11	.94	12	15	2.76	3.27	2.55
24-28 April	1,891	.39	.18	18,540	.10	.89	15	18	2.96	4.27	1.0
12-16 June	12,158	.28	.11	186,072	.07	.91	19	7	2.69	4.41	2.10
MEAN (June 72-June 73)	24,165	.41		259,357	.09	1.01			3.19	4.25	2.15

Table 7. ANALYSIS OF VARIANCE (2-WAY ANOVA) FOR EFFECT OF LOCATION AND TIME UPON DENSITY, COMMUNITY COMPETITION COEFFICIENT, THE RATIO DENSITY TO CARRYING CAPACITY (N/K), NUMBER OF SPECIES (S), AND DIVERSITY (H). -- = $p < .01$, - = $p < .05$.

A. Effect upon density:

	Sum of Sq.	d.f.	Mean Sq.	
Total	10.6×10^{10}	26		
Location	11.7×10^{8}	2	5.8×10^{8}	NS
Time	9.8×10^{10}	8	12.3×10^{9}	--
Residual	7.3×10	16	4.5×10^{8}	

B. Effect upon competition coefficient:

	Sum of Sq.	d.f.	Mean Sq.	
Total	.411	26	.005	--
Location	.118	2	.003	--
Time	.249	8	.0003	
Residual	.004	16		

C. Effect upon N/K:

	Sum of Sq.	d.f.	Mean Sq.	
Total	.002	26		
Location	.00005	2	.00002	NS
Time	.0006	8	.00008	NS
Residual	.002	16	.0001	

D. Effect upon number species:

	Sum of Sq.	d.f.	Mean Sq.	
Total	335.4	26		
Location	96.5	2	48.2	--
Time	158.7	8	19.8	--
Residual	80.1	16	5.0	

E. Effect upon diversity:

	Sum of Sq.	d.f.	Mean Sq.	
Total	14.1	26		
Location	12.4	2	6.22	--
Time	1.2	8	.158	--
Residual	.41	16	2.59	

was not significant ($p > .05$) (Table 7). Thus the ratio of observed to theoretical carrying capacity (N/K) does not confirm the other evidence suggesting that dramatic changes are occurring within watermasses off larger cities along Lake Ontario's shores.

SIGNIFICANCE

Fewer species of crustacean zooplankters were found in urban inshore areas of Lake Ontario than in adjacent inshore or offshore regions. While the cladocerans *Daphnia*, *Ceriodaphnia* and *Chydorus* are important in rural inshore areas, they have given way to *Bosmina longirostris* and *Cyclops* in urban inshore waters.

Ecologically it was significant that seasonal and geographical differences in zooplankton distribution wherein the urban inshore waters were presumed more eutrophic than offshore waters, paralleled changes that have occurred in the zooplankton communities of the Great Lakes over much longer periods of time. These findings thus suggest that in waters offshore of urban centers we find drifting, planktonic communities which are highly modified, even though drifting along shore rapidly at velocities of 10 km/day (Scott, 1973). The causal effects of changes in zooplankton community composition off large cities quite plausibly are included in the concepts of algal resource availability, zooplankton selective feeding, and zooplankton predator abundance. These mechanisms are currently being investigated in our laboratory.

From a management viewpoint, the indices of diversity and theoretical community competition may be used to identify similar urban-influenced watermasses. More importantly, such indices should be useful in the conduct of surveys, especially as nutrient inputs to the Great Lakes are reduced.

SECTION VI

ACOUSTICAL ESTIMATES OF ZOOPLANKTON BIOMASS

THE ACOUSTICAL METHOD FOR DETERMINATION OF ZOOPLANKTON BIOMASS

The echo-integrating sonar, especially designed to be sensitive to particles of the size and density of zooplankton, has been described previously (McNaught, 1973). The approach was to transmit an exact waveshape (sound-wave) and detect the return, using a 100 channel signal averager. Each channel thus corresponded to 1% of depth (or time). The returning signal was simultaneously fed into an synchronous demodulator, then to a storage oscilloscope, providing a picture of zooplankton abundance with depth over time. The data from the signal averages, the heart of the system, were also displayed on an X-Y plotter, and later processed from paper tape using a program described below.

The 5-frequency sonar (53 or 80 kHz, 120, 200 and 500 kHz) operates on the principal that the maximum reflectivity from small targets (zooplankton) nearly the same density as water itself is obtained when the wavelength of sound is equivalent to the diameter of the (sphaerical) target (McNaught, 1968, 1969). Thus, as successively higher frequencies are employed, smaller and smaller organisms can be detected. For example, sound at a frequency of 200 kHz is maximally reflected by particles 2 mm in diameter, with reasonable sensitivity to particles down to 1 mm in diameter. Sound at a frequency of 500 kHz is maximally reflected by particles 0.8 mm in diameter, and to some extent by particles as small as 0.4 mm (Figure 13). Thus these two frequencies combined can be employed to give an estimate of the biomass of zooplankton between 0.8 and 2 mm in diameter. In the same way, signals from the 200 kHz and 120 kHz projectors provide an estimate of the biomass of zooplankton between 2 mm and 3 mm in diameter, and the 120 kHz and 80 kHz projectors provide an estimate of the biomass between 3 mm and 5 mm, which is chiefly fish larvae and fishes. These low-frequency projectors are thus used to eliminate echoes from fishes from the zooplankton biomass estimate (or alternatively, to estimate the biomass of fishes in Lake Ontario).

Corrections for properties of Sound and Transducers

In determining the zooplankton biomass with depth using acoustical techniques, only physical correction factors have been employed. The necessary factors are (a) the relative strength of the acoustical output (frequency normalization) for each frequency transducer, (b) the relative attenuation of sound at 80, 120, 200 and 500 kHz, and (c) the beam angle of the transducer (Table 8). These correction factors have been employed in writing a program to correct raw field data.

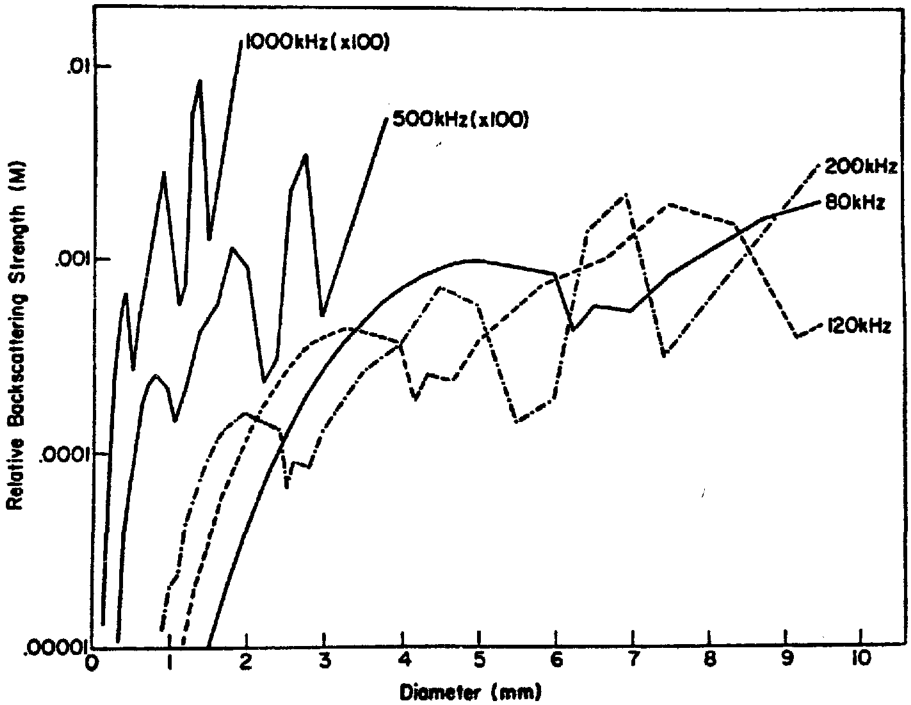

Figure 13. Relationship between backscattering strength (Appendix B), used to calculate biomass of zooplankton, and size of spherical particles for five frequencies (80, 120, 200, 500 and 1000 kHz). (From McNaught, 1969)

Table 8. CORRECTION FACTORS FOR ACOUSTICAL RETURNS NECESSARY TO EQUATE RETURNS TO BIOMASS OF ZOOPLANKTON

Formula: $\frac{\text{intensity x normalization x attenuation}}{\text{beam correction}}$ = Correction Factor

Corrections	(Step 1) Frequency Normalization: Bottom Corr. factor (x)	(Step 2) Attenuation factor (x): Channel	Equiv. Depth	(M)	(Step 3) Beam Correction factor (5° angle) (÷)	
80 kHz	1.056	4	1.4	1.08	1 m	1.00
		5	1.7	1.12	2 m	1.16
					3 m	1.33
120 kHz	1.161	6	2.0	1.17	4 m	1.51
		7	2.4	1.24	5 m	1.71
		8	2.7	1.29	6 m	1.92
					7 m	2.13
200 kHz	1.735	9	3.1	1.37	8 m	2.37
		10	3.4	1.42	9 m	2.61
		11	3.7	1.48	10 m	2.86
500 kHz	3.282	12	4.1	1.55		

Data Correction

In Table 9a we see an example of raw field data (first four sets at 80, 120, 200 and 500 kHz). These acoustical reflectivities have been multiplied by the suggested correction factors (Table 8) to yield four sets of "corrected profiles" (Table 9b). Then these corrected profiles are subtracted (120 - 80 kHz, 200 - 120 kHz and 500 - 200 kHz) to yield biomass estimates for particles of the three size ranges previously indicated (Table 9c). Since the data are not useful in 1% increments of the gated interval or scan depth, they are then converted to acoustical reflectivity per 5 m interval, again for three size ranges (last block) (Table 9d).

Calibration of Acoustical Technique

An empirically based calibration was made by comparing the sum of differences in acoustical reflectivity, specifically between the 200 kHz and 120 kHz channels and the 500 kHz and 200 kHz channels, with the product of numerical density of zooplankton and their mean weight. This calibration utilized the data of the cruises of 21 - 25 August 1972 when animals were abundant and 30 October - 3 November 1972 when animals were relatively scarce. Because the 64μ aperture net used to collect animals was most efficient over a 5 m tow, and because the sonar likewise was most sensitive from 0 - 5 m, all calibration points were based upon 0 - 5 m data. A linear regression was obtained for the relationship between acoustical reflectivity (D.C. volts) and zooplankton biomass (g/m^3 dry-wt), such that biomass (g/m^3) is related to corrected acoustical reflectivity (D.C. volts) as follows:

$$\text{Biomass } (g/m^3) = 0.681 + 13.53 \begin{pmatrix}\text{Corrected} \\ \text{Acoust. Ref}\end{pmatrix}$$

Thus we observe (Figure 14) that the acoustical technique is insensitive to biomass levels of less than 0.68 g dry-wt/m^3. At very low acoustical reflectivity, it appears that biomass is overestimated.

Table 9 (a). EXAMPLE OF UNCORRECTED ACOUSTICAL REFLECTIVITY AT FOUR FREQUENCIES (80, 120, 200 AND 500 kHz) OVER 100 CHANNELS OR 1% DEPTH INCREMENTS

80 KC

01	.2428	02	.1931	03	.1957	04	.1943	05	.1944	06	.1914	07	.1934
08	.1797	09	.1879	10	.1898	11	.1952	12	.1953	13	.1898	14	.1889
15	.1856	16	.1869	17	.1852	18	.1912	19	.1911	20	.1882	21	.1883
22	.1970	23	.1889	24	.1895	25	.1894	26	.1888	27	.1922	28	.1974
29	.1918	30	.1888	31	.1871	32	.1822	33	.1927	34	.1898	35	.1897
36	.1857	37	.1867	38	.1886	39	.1868	40	.1867	41	.1890	42	.1906
43	.1856	44	.1882	45	.1885	46	.1863	47	.1964	48	.1924	49	.1890
50	.1974	51	.1927	52	.1854	53	.1921	54	.1891	55	.1906	56	.1846
57	.1867	58	.1870	59	.1902	60	.1896	61	.1893	62	.1923	63	.1988
64	.1867	65	.1917	66	.1874	67	.1909	68	.1861	69	.1896	70	.1918
71	.1871	72	.1928	73	.1919	74	.1824	75	.1854	76	.1894	77	.1859
78	.1879	79	.1883	80	.1935	81	.1964	82	.1848	83	.1836	84	.1868
85	.1876	86	.1898	87	.1860	88	.1924	89	.1938	90	.4963	91	.3940
92	.3581	93	1.1704	94	.4711	95	.2054	96	.1733	97	.1820	98	.1892
99	.1896	**	.1118										

120 KC

01	1.2135	02	.3059	03	.1918	04	.1757	05	.1744	06	.1722	07	.1716
08	.1740	09	.1750	10	.1704	11	.1720	12	.1710	13	.1655	14	.1676
15	.1690	16	.1656	17	.1653	18	.1634	19	.1644	20	.1655	21	.1680
22	.1673	23	.1668	24	.1676	25	.1651	26	.1686	27	.1663	28	.1677
29	.1669	30	.1664	31	.1651	32	.1658	33	.1673	34	.1653	35	.1688
36	.1688	37	.1695	38	.1658	39	.1639	40	.1639	41	.1630	42	.1853
43	.1699	44	.1656	45	.1651	46	.1684	47	.1656	48	.1671	49	.1651
50	.1659	51	.1672	52	.1690	53	.1636	54	.1654	55	.1697	56	.1673
57	.1653	58	.1660	59	.1637	60	.1661	61	.1675	62	.1684	63	.1667
64	.1614	65	.1639	66	.1655	67	.1656	68	.1706	69	.1678	70	.1673
71	.1712	72	.1659	73	.1628	74	.1658	75	.1680	76	.1641	77	.1671
78	.1687	79	.1664	80	.1667	81	.1656	82	.1660	83	.1666	84	.1680
85	.1679	86	.1643	87	.1658	88	.1654	89	.1666	90	.5752	91	1.7955
92	1.1083	93	.3154	94	.1754	95	.1714	96	.1730	97	.1759	98	.1748
99	.1769	**	.1135										

200 KC

01	.8153	02	.3323	03	.2640	04	.2547	05	.2465	06	.2360	07	.2287
08	.2222	09	.2175	10	.2167	11	.2128	12	.2117	13	.2104	14	.2098
15	.2158	16	.2255	17	.2320	18	.2362	19	.2390	20	.2407	21	.2417
22	.2423	23	.2441	24	.2436	25	.2423	26	.2429	27	.2440	28	.2437
29	.2418	30	.2418	31	.2416	32	.2413	33	.2428	34	.2417	35	.2403
36	.2418	37	.2428	38	.2401	39	.2393	40	.2424	41	.2430	42	.2440
43	.2418	44	.2409	45	.2417	46	.2394	47	.2399	48	.2423	49	.2427
50	.2425	51	.2419	52	.2409	53	.2394	54	.2418	55	.2405	56	.2416
57	.2410	58	.2412	59	.2391	60	.2397	61	.2410	62	.2423	63	.2418
64	.2424	65	.2404	66	.2403	67	.2396	68	.2405	69	.2424	70	.2418
71	.2408	72	.2426	73	.2416	74	.2413	75	.2406	76	.2404	77	.2408
78	.2405	79	.2417	80	.2417	81	.2415	82	.2405	83	.2403	84	.2400
85	.2400	86	.2403	87	.2403	88	.2401	89	.2411	90	.2556	91	.2393
92	.2584	93	.2529	94	.2503	95	.2486	96	.2488	97	.2464	98	.2455
99	.2435	**	.1145										

500 KC

01	.2486	02	.2141	03	.2078	04	.2047	05	.2036	06	.2021	07	.2016
08	.2012	09	.1998	10	.1994	11	.1994	12	.1987	13	.1986	14	.1982
15	.1981	16	.1978	17	.1971	18	.1969	19	.1978	20	.1971	21	.1966
22	.1968	23	.1970	24	.1970	25	.1968	26	.1954	27	.1958	28	.1963
29	.1957	30	.1961	31	.1960	32	.1958	33	.1958	34	.1954	35	.1949
36	.1959	37	.1958	38	.1953	39	.1954	40	.1951	41	.1952	42	.1948
43	.1941	44	.1952	45	.1953	46	.1944	47	.1950	48	.1950	49	.1950
50	.1951	51	.1947	52	.1946	53	.1949	54	.1945	55	.1944	56	.1943
57	.1945	58	.1945	59	.1935	60	.1938	61	.1951	62	.1951	63	.1942
64	.1943	65	.1946	66	.1938	67	.1943	68	.1941	69	.1946	70	.1948
71	.1944	72	.1938	73	.1939	74	.1942	75	.1946	76	.1939	77	.1940
78	.1948	79	.1944	80	.1943	81	.1942	82	.1941	83	.1942	84	.1942
85	.1941	86	.1937	87	.1941	88	.1937	89	.1940	90	.1941	91	.1947
92	.1946	93	.1940	94	.1939	95	.1941	96	.1936	97	.1938	98	.1937
99	.1933	**	.1155										

Table 9 (b). CORRECTED ACOUSTICAL PROFILES

CORRECTED PROFILES FOR:

AUG STA 17 FA 10**4 AVG 5 DEPTH 430 SCAN 170

80 KC

01	.2210	02	.1758	03	.1761	04	.1769	05	.1770	06	.1742	07	.1761
08	.1636	09	.1710	10	.1728	11	.1777	12	.1776	13	.1728	14	.1720
15	.1690	16	.1701	17	.1686	18	.1741	19	.1740	20	.1713	21	.1714
22	.1793	23	.1720	24	.1725	25	.1724	26	.1719	27	.1750	28	.1797
29	.1746	30	.1719	31	.1703	32	.1659	33	.1754	34	.1726	35	.1727
36	.1690	37	.1700	38	.1717	39	.1700	40	.1700	41	.1720	42	.1735
43	.1690	44	.1713	45	.1716	46	.1696	47	.1788	48	.1751	49	.1720
50	.1797	51	.1754	52	.1688	53	.1749	54	.1721	55	.1735	56	.1680
57	.1700	58	.1702	59	.1731	60	.1726	61	.1723	62	.1751	63	.1810
64	.1700	65	.1745	66	.1706	67	.1738	68	.1694	69	.1726	70	.1746
71	.1703	72	.1755	73	.1747	74	.1660	75	.1688	76	.1724	77	.1692
78	.1710	79	.1714	80	.1761	81	.1788	82	.1682	83	.1671	84	.1700
85	.1708	86	.1728	87	.1693	88	.1751	89	.1764	90	.4518	91	.3587
92	.3260	93	1.0654	94	.4288	95	.1870	96	.1578	97	.1657	98	.1722
99	.1726	**	.1018										

120 KC

01	1.2145	02	.3062	03	.1920	04	.1758	05	.1745	06	.1723	07	.1717
08	.1741	09	.1751	10	.1705	11	.1721	12	.1711	13	.1656	14	.1677
15	.1691	16	.1657	17	.1654	18	.1635	19	.1645	20	.1656	21	.1681
22	.1674	23	.1669	24	.1677	25	.1652	26	.1687	27	.1664	28	.1678
29	.1670	30	.1665	31	.1652	32	.1659	33	.1674	34	.1654	35	.1689
36	.1689	37	.1696	38	.1659	39	.1640	40	.1640	41	.1631	42	.1855
43	.1700	44	.1657	45	.1652	46	.1665	47	.1657	48	.1672	49	.1652
50	.1660	51	.1673	52	.1691	53	.1637	54	.1655	55	.1698	56	.1674
57	.1654	58	.1661	59	.1638	60	.1662	61	.1676	62	.1685	63	.1668
64	.1615	65	.1640	66	.1656	67	.1657	68	.1707	69	.1679	70	.1674
71	.1713	72	.1660	73	.1629	74	.1659	75	.1681	76	.1642	77	.1672
78	.1688	79	.1665	80	.1668	81	.1659	82	.1661	83	.1667	84	.1681
85	.1680	86	.1644	87	.1659	88	.1655	89	.1667	90	.5757	91	1.7970
92	1.1092	93	.3157	94	.1755	95	.1715	96	.1731	97	.1760	98	.1749
99	.1770	**	.1136										

200 KC

01	1.2194	02	.4970	03	.3948	04	.3809	05	.3687	06	.3530	07	.3421
08	.3323	09	.3253	10	.3241	11	.3183	12	.3166	13	.3147	14	.3138
15	.3228	16	.3373	17	.3470	18	.3533	19	.3575	20	.3600	21	.3615
22	.3624	23	.3651	24	.3643	25	.3624	26	.3633	27	.3649	28	.3645
29	.3616	30	.3616	31	.3613	32	.3609	33	.3631	34	.3615	35	.3594
36	.3616	37	.3631	38	.3591	39	.3579	40	.3625	41	.3634	42	.3649
43	.3616	44	.3603	45	.3615	46	.3581	47	.3588	48	.3624	49	.3630
50	.3627	51	.3618	52	.3603	53	.3581	54	.3616	55	.3597	56	.3613
57	.3604	58	.3607	59	.3576	60	.3585	61	.3604	62	.3624	63	.3616
64	.3625	65	.3596	66	.3594	67	.3584	68	.3597	69	.3625	70	.3616
71	.3601	72	.3628	73	.3613	74	.3609	75	.3598	76	.3596	77	.3601
78	.3597	79	.3615	80	.3615	81	.3612	82	.3597	83	.3594	84	.3590
85	.3590	86	.3594	87	.3594	88	.3591	89	.3606	90	.3823	91	.3579
92	.3775	93	.3782	94	.3744	95	.3718	96	.3721	97	.3685	98	.3672
99	.3642	**	.1713										

500 KO

01	.7033	02	.6057	03	.5879	04	.5791	05	.5760	06	.5718	07	.5704
08	.5692	09	.5653	10	.5641	11	.5641	12	.5622	13	.5619	14	.5607
15	.5605	16	.5596	17	.5576	18	.5571	19	.5596	20	.5576	21	.5562
22	.5568	23	.5574	24	.5574	25	.5568	26	.5528	27	.5540	28	.5554
29	.5537	30	.5548	31	.5545	32	.5540	33	.5540	34	.5528	35	.5514
36	.5542	37	.5540	38	.5525	39	.5528	40	.5520	41	.5523	42	.5511
43	.5491	44	.5523	45	.5525	46	.5500	47	.5517	48	.5517	49	.5517
50	.5520	51	.5503	52	.5506	53	.5514	54	.5503	55	.5500	56	.5497
57	.5503	58	.5503	59	.5475	60	.5483	61	.5520	62	.5520	63	.5494
64	.5497	65	.5506	66	.5483	67	.5497	68	.5491	69	.5506	70	.5511
71	.5500	72	.5483	73	.5486	74	.5494	75	.5506	76	.5486	77	.5489
78	.5511	79	.5500	80	.5497	81	.5494	82	.5491	83	.5494	84	.5494
85	.5491	86	.5480	87	.5491	88	.5480	89	.5489	90	.5491	91	.5508
92	.5506	93	.5489	94	.5486	95	.5491	96	.5477	97	.5483	98	.5480
99	.5469	**	.3268										

Table 9 (c). **DIFFERENCES BETWEEN REFLECTIVITIES AT ADJACENT FREQUENCY ENVELOPES (120-80 kHz, 200-120 kHz, AND 500-200 kHz)**

```
PRINTOUT OF CHANNEL DIFFS?
>YES
 120-80 KC
 01  .9935 02  .1304 03  .0138 04 -.0010 05 -.0024 06 -.0019 07 -.0043
 08  .0106 09  .0041 10 -.0022 11 -.0056 12 -.0066 13 -.0071 14 -.0042
 15  .0002 16 -.0044 17 -.0032 18 -.0105 19 -.0094 20 -.0057 21 -.0033
 22 -.0119 23 -.0050 24 -.0046 25 -.0072 26 -.0031 27 -.0065 28 -.0119
 29 -.0076 30 -.0053 31 -.0051 32  .0001 33 -.0060 34 -.0073 35 -.0037
 36 -.0001 37 -.0003 38 -.0057 39 -.0060 40 -.0059 41 -.0089 42  .0119
 43  .0011 44 -.0056 45 -.0064 46 -.0011 47 -.0130 48 -.0079 49 -.0068
 50 -.0137 51 -.0081 52  .0004 53 -.0111 54 -.0066 55 -.0037 56 -.0006
 57 -.0045 58 -.0041 59 -.0093 60 -.0064 61 -.0047 62 -.0065 63 -.0141
 64 -.0084 65 -.0105 66 -.0050 67 -.0080 68  .0013 69 -.0047 70 -.0072
 71  .0010 72 -.0095 73 -.0118 74 -.0001 75 -.0006 76 -.0062 77 -.0020
 78 -.0022 79 -.0049 80 -.0093 81 -.0128 82 -.0021 83 -.0004 84 -.0019
 85 -.0027 86 -.0083 87 -.0034 88 -.0096 89 -.0097 90  .1259 91 1.4383
 92  .7832 93 -.7498 94 -.2533 95 -.0154 96  .0154 97  .0104 98  .0027
 99  .0045 **  .0118
 200-120 KC
 01  .0049 02  .1908 03  .2029 04  .2051 05  .1941 06  .1806 07  .1703
 08  .1582 09  .1502 10  .1536 11  .1461 12  .1455 13  .1490 14  .1460
 15  .1536 16  .1715 17  .1816 18  .1897 19  .1929 20  .1944 21  .1934
 22  .1950 23  .1981 24  .1966 25  .1972 26  .1946 27  .1985 28  .1966
 29  .1946 30  .1951 31  .1961 32  .1950 33  .1957 34  .1961 35  .1905
 36  .1927 37  .1935 38  .1932 39  .1939 40  .1985 41  .2003 42  .1795
 43  .1916 44  .1946 45  .1963 46  .1895 47  .1931 48  .1952 49  .1978
 50  .1967 51  .1945 52  .1912 53  .1943 54  .1961 55  .1899 56  .1939
 57  .1950 58  .1946 59  .1938 60  .1923 61  .1928 62  .1939 63  .1948
 64  .2010 65  .1955 66  .1938 67  .1926 68  .1890 69  .1946 70  .1942
 71  .1888 72  .1968 73  .1984 74  .1950 75  .1917 76  .1953 77  .1989
 78  .1909 79  .1950 80  .1947 81  .1953 82  .1936 83  .1927 84  .1908
 85  .1909 86  .1950 87  .1935 88  .1936 89  .1939 90 -.1934 91-1.4391
 92 -.7317 93  .0626 94  .1988 95  .2003 96  .1990 97  .1925 98  .1922
 99  .1871 **  .0577
 500-200 KC
 01 -.5161 02  .1087 03  .1931 04  .1982 05  .2074 06  .2188 07  .2283
 08  .2369 09  .2400 10  .2400 11  .2459 12  .2455 13  .2472 14  .2470
 15  .2377 16  .2224 17  .2106 18  .2038 19  .2022 20  .1976 21  .1947
 22  .1944 23  .1923 24  .1930 25  .1944 26  .1895 27  .1890 28  .1909
 29  .1920 30  .1932 31  .1932 32  .1931 33  .1908 34  .1913 35  .1920
 36  .1926 37  .1908 38  .1934 39  .1949 40  .1894 41  .1886 42  .1862
 43  .1875 44  .1920 45  .1910 46  .1919 47  .1929 48  .1893 49  .1887
 50  .1893 51  .1891 52  .1903 53  .1934 54  .1886 55  .1903 56  .1884
 57  .1898 58  .1895 59  .1898 60  .1898 61  .1915 62  .1896 63  .1878
 64  .1872 65  .1910 66  .1889 67  .1914 68  .1894 69  .1880 70  .1895
 71  .1898 72  .1855 73  .1872 74  .1885 75  .1907 76  .1890 77  .1887
 78  .1914 79  .1885 80  .1682 81  .1882 82  .1894 83  .1900 84  .1905
 85  .1902 86  .1886 87  .1897 88  .1889 89  .1883 90  .1669 91  .1989
 92  .1731 93  .1706 94  .1742 95  .1773 96  .1756 97  .1798 98  .1808
 99  .1827 **  .1555
```

Table 9 (d). THREE PROFILES AT CONSTANT 5 m INTERVALS, IN D.C. VOLTS/m^3. LAKE ONATRIO, STATION 17, AUGUST 1972.

PUNCHOUT CHANNEL DIFFERENCES?
>NO
AUG STA 17 PA 10**4 AVG 5 DEPTH 130 SCAN 170
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	.9935	200-120	.0049	500-200	-.2037	5M
CH	3- 4	120-80	1.1239	200-120	.1957	500-200	-.0080	10M
CH	5- 6	120-80	1.1377	200-120	.3986	500-200	.2051	15M
CH	7- 8	120-80	1.1366	200-120	.6037	500-200	.4377	20M
CH	9-10	120-80	1.1342	200-120	.7978	500-200	.6777	25M
CH	11-12	120-80	1.1323	200-120	.9785	500-200	.9234	30M
CH	13-14	120-80	1.1280	200-120	1.1483	500-200	1.1705	35M
CH	15-16	120-80	1.1366	200-120	1.3070	500-200	1.4005	40M
CH	17-18	120-80	1.1427	200-120	1.4571	500-200	1.6077	45M
CH	19-20	120-80	1.1404	200-120	1.6107	500-200	1.8076	50M
CH	21-22	120-80	1.1349	200-120	1.7566	500-200	2.0022	55M
CH	23-24	120-80	1.1282	200-120	1.9053	500-200	2.1946	60M
CH	25-26	120-80	1.1211	200-120	2.0514	500-200	2.3568	65M
CH	27-28	120-80	1.1169	200-120	2.1974	500-200	2.5767	70M
CH	29-30	120-80	1.1171	200-120	2.3510	500-200	2.7693	75M
CH	31-32	120-80	1.1127	200-120	2.5225	500-200	2.9625	80M
CH	33-34	120-80	1.1095	200-120	2.7041	500-200	3.1535	85M
CH	35-36	120-80	1.0990	200-120	2.8938	500-200	3.3456	90M
CH	37-38	120-80	1.0896	200-120	3.0866	500-200	3.5380	95M
CH	39-40	120-80	1.0839	200-120	3.2811	500-200	3.7301	100M
CH	41-42	120-80	1.0806	200-120	3.4745	500-200	3.9177	105M
CH	43-44	120-80	1.0687	200-120	3.6694	500-200	4.1074	110M
CH	45-46	120-80	1.0637	200-120	3.8676	500-200	4.2989	115M
CH	47-48	120-80	1.0589	200-120	4.0642	500-200	4.4900	120M
CH	49-50	120-80	1.0516	200-120	4.2613	500-200	4.6790	125M
CH	51-52	120-80	1.0486	200-120	4.4559	500-200	4.8686	130M

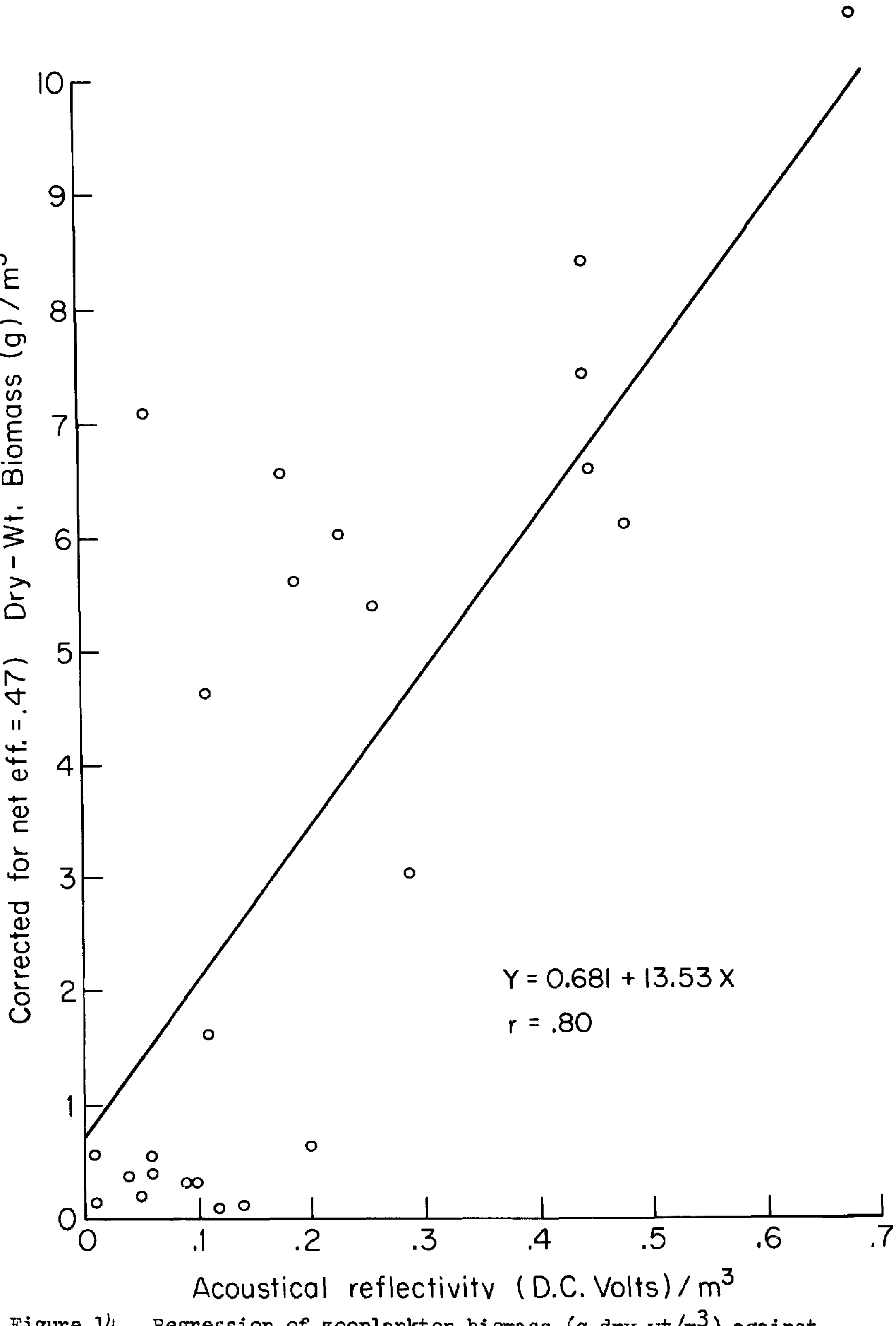

Figure 14. Regression of zooplankton biomass (g dry wt/m^3) against acoustical reflectivity (D.C. volts/m^3), made from actual samples and acoustical profiles collected simultaneously on Lake Ontario

VERTICAL PROFILES OF RELATIVE ZOOPLANKTON BIOMASS

Since the trophogenic zone, or the waters where phytoplankton photosynthesis exceeds respiration, is confined to the upper 30 m in Lake Ontario, previous studies of zooplankton abundance have centered upon the upper 50 m of water (Patalas, 1969; Watson, 1974). A major contribution of the zooplankton acoustical samples is an indication of abundant, zooplankton size particles at greater depths than 50 m.

Once acoustical data have been placed in 5 m depth intervals for each station (Table 9), it is relatively simple to produce a lakewide estimate (Table 10) for each cruise. On 30 October - 3 November 1972, 2 - 3 mm particles (200 - 120 kHz) and 0.8 - 2 mm particles (500 - 200 kHz) were both most abundant in the deepest waters at 230 m depth (Table 10). Summaries for the distribution of 0.8 - 3.0 mm particles, the size-range for most crustacean zooplankton, are presented in Table 11 and Figure 15. During 21 - 25 August 1972 particles were relatively most abundant between 100 and 200 m depth. From 30 October - 3 November 1972 zooplankton sized particles were most common in the deepest waters. Over the period 12 - 16 June 1973, these same particles were most abundant between 60 and 130 m depth. These average estimates of biomass, made using acoustical techniques, are for all 60 stations of the IFYGL grid and usually represent a mean derived from 5 days of measurements made both day and night.

Table 10. ACOUSTICAL RELFECTIVITY (D.C. VOLTS) FOR THREE FREQUENCY ENVELOPES (120-80 kHz, 200-120 kHz, AND 500-200 kHz), FOR 21-25 AUGUST 1972. (average over 5 m intervals)

Meters	No. of Stations	120-80 kHz	200-120 kHz	500-200 kHz
5	58	.1516	.3755	.0989
10	58	.2222	.5884	.3814
15	54	.1686	.8815	.7182
20	49	.1500	1.2811	.9395
25	41	.4181	1.4240	1.1877
30	32	.3023	1.2665	1.7210
35	29	.3819	1.1621	1.9927
40	27	.1746	1.2860	2.4312
45	26	.3236	1.4446	2.6259
50	26	.4201	1.5642	2.9302
55	25	.5493	1.4088	3.2152
60	25	.6532	1.5200	3.5127
65	25	.7583	1.6323	3.8100
70	23	1.1152	1.7753	3.9904
75	22	1.3273	1.9245	4.2193
80	21	.8720	1.5114	2.8713
85	21	.9278	1.6023	3.0559
90	19	1.2515	1.7767	3.2211
95	19	1.3220	1.8696	3.4035
100	17	-.0490	1.9648	5.6283
105	16	.0424	1.9873	6.1378
110	16	.0213	2.0753	6.4365
115	15	.4714	2.3157	7.0064
120	14	.4346	3.6347	7.5339
125	13	.3407	3.7682	8.6384
130	12	.2243	3.9223	9.1292
135	11	.1361	4.0181	9.8857
140	10	.0770	4.2136	10.9437
145	10	.0639	4.3700	11.3369
150	9	-.1263	4.9523	12.4129
155	8	-.1264	6.2623	13.7948
160	8	-.1446	6.4664	14.2425
165	8	-.1634	6.6709	14.6905
170	7	-.0553	7.6473	16.7466
175	5	-.6382	8.8057	20.2833
180	4	-.8859	9.5345	25.5993
185	4	-.9191	9.8014	26.3118
190	2	-.2769	4.4468	5.0913
195	2	-.2877	4.5589	5.2358
200	2	-.2913	4.6666	5.3754
205	1	-.7470	1.2507	1.7701
210	1	-.7710	1.2814	1.8172
215	1	-.8052	1.3164	1.8631
220	1	-.8364	1.3534	1.9085
225	1	-.8714	1.3887	1.9555
230	1	-.9040	1.4197	2.0050

Table 11. MEAN ACOUSTICAL REFLECTIVITY (D.C. [illegible] BIOMASS (%) FOR 5 m INTERVALS, LAKE ONTARIO, 1972-73.

Depth Interval (m)	August 1972 Acoustical Reflectivity	August 1972 Relative Biomass	November 1972 Acoustical Reflectivity	November 1972 Relative Biomass	February 1973	June 1973 Acoustical Reflectivity	June 1973 Relative Biomass
0-5	.46	.001	0.	.0	0.	0.	0.
5-10	.96	.002	0.	.0	0.	0.	0.
10-15	1.59	.004	.11	.0004	0.	0.	0.
15-20	2.21	.005	.11	.0004	0.	.15	.001
20-25	2.60	.006	.08	.0003	0.	0.	0.
25-30	2.98	.007	0.	.0	0.	.13	.001
30-35	3.15	.007	.03	.0001	0.	.25	.002
35-40	3.71	.009	.11	.0004	0.	.71	.007
40-45	4.06	.009	.31	.001	0.	.94	.009
45-50	4.49	.010	.53	.002	0.	1.16	.011
50-55	4.61	.011	.88	.003	0.	1.39	.013
55-60	5.03	.012	1.09	.004	0.	1.58	.016
60-65	5.44	.013	1.32	.004	0.	1.82	.018
65-70	5.76	.013	2.29	.007	0.	2.08	.020
70-75	6.13	.014					
75-80	4.38	.010	2.58	.008	0.	2.42	.024
80-85	4.65	.011	2.83	.009	0.	3.61	.036
85-90	4.99	.012	3.07	.009	0.	4.38	.044
90-95	5.25	.012	3.32	.010	0.	4.48	.044
95-100	7.58	.012	3.81	.012	0.	4.83	.048
100-105	8.11	.019	4.18	.014	0.	5.19	.051
105-110	8.50	.020	4.43	.014	0.	5.56	.055
110-115	9.31	.022	5.22	.017	0.	5.93	.059
115-120	11.16	.026	5.26	.017	0.	6.30	.062
120-125	12.39	.029	5.95	.019	0.	6.71	.067
125-130	13.04	.030	6.23	.020	0.	7.12	.070
130-135	13.89	.032	6.51	.021	0.	3.26	.032
135-140	15.15	.035	6.79	.022	0.	3.53	.035

Table 11 (continued). MEAN ACOUSTICAL REFLECTIVITY (D.C. VOLTS/m^3) AND RELATIVE BIOMASS (%) FOR 5 m INTERVALS, LAKE ONTARIO, 1972-73.

Depth Interval (m)	August 1972		November 1972		February 1973	June 1973	
	Acoustical Reflectivity	Relative Biomass	Acoustical Reflectivity	Relative Biomass		Acoustical Reflectivity	Relative Biomass
140-145	15.70	.037	7.63	.025	0.	3.74	.037
145-150	17.36	.041	7.91	.026	0.	3.98	.040
150-155	20.05	.047	9.04	.029	0.	4.21	.042
155-160	20.07	.048	9.34	.030	0.	4.45	.044
160-165	21.36	.050	9.63	.031	0.	4.69	.047
165-170	24.38	.057	9.93	.032	0.	6.14	.061
170-175	29.08	.068	10.29	.033	0.		
175-180	35.12	.082	11.32	.037			
180-185	36.11	.084	12.62	.041			
185-190	9.53	.022	11.52	.037			
190-195	9.78	.023	11.51	.037			
195-200	9.97	.023	11.83	.038			
200-205	3.02	.007	18.51	.060			
205-210	3.09	.007	18.97	.062			
210-215	3.17	.007	19.43	.063			
215-220	3.25	.008	19.83	.064			
220-225	3.33	.008	20.36	.066			
225-230	3.41	.008	20.81	.068			
	428.03	1.01	307.34	0.994		100.56	1.01

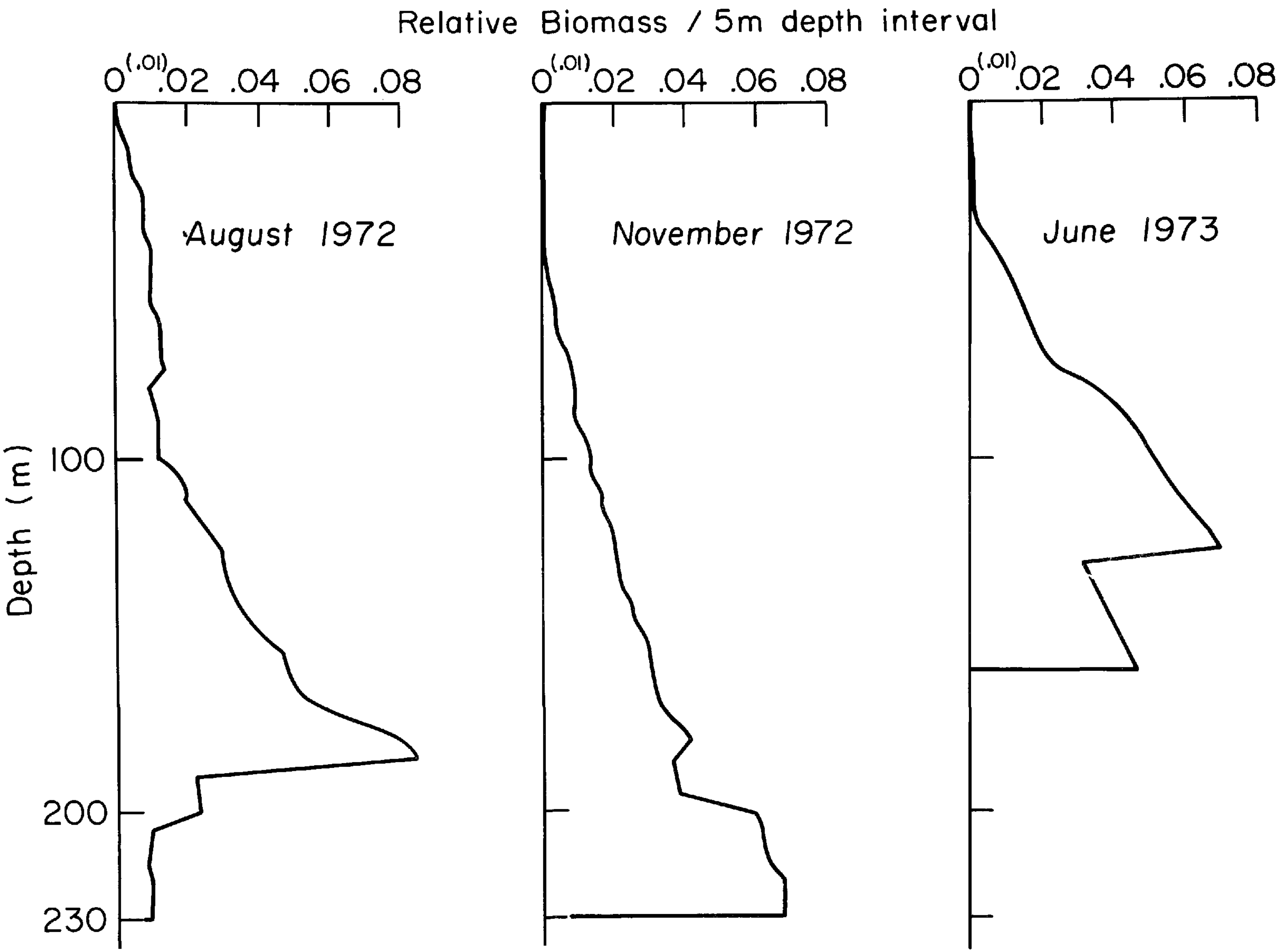

Figure 15. Relative biomass (%) per 5 m interval versus depth (m) for 21 - 25 August 1972, 30 October - 3 November 1972, and 12 - 16 June 1973

Table 12. ACOUSTIC REFLECTIVITY (D.C. VOLTS/m^3), ESTIMATED COLUMN BIOMASS (g dry wt/m^2), COLUMN VOLUME (m^3) AND BIOMASS PER UNIT VOLUME (g dry wt/m^3) FOR ALL STATIONS, LAKE ONTARIO, AUGUST 1972.

Field St.	Acoustic Biomass (120-200-500)	Total Column Biomass g dry wt/m^2 (from regression)	Volume depth m (x 1m^2)	Unit Volume Biomass g dry wt/m^3
1	11.15	151.541	30	5.05
2	1.77	24.629	15	1.64
3	13.79	187.260	20	9.36
5	74.00	1,001.901	95	10.54
7	6.38	87.002	25	3.48
8	46.38	628.20	70	8.97
10	50.58	685.03	115	5.95
12	8.21	111.76	20	5.59
14	1.26	17.73	10	1.77
15	59.04	799.49	100	7.99
17	95.98	1,299.29	130	9.99
19	1.22	17.19	10	1.72
20	1.70	23.68	15	1.58
24	30.91	418.89	110	3.80
26	83.79	1,134.36	145	7.82
30	11.37	154.52	20	7.73
31	49.45	669.74	25	26.78
32	429.94	5,817.77	170	34.2
34	24.95	338.26	85	3.98
35	14.62	198.49	25	7.94
36	20.08	272.36	30	9.07
38	131.13	1,774.87	125	14.19
40	153.03	2,071.18	170	12.18
41	6.23	84.97	25	3.40
42	3.55	48.71	15	3.24
44	367.88	4,978.10	170	29.2
45	350.11	4,737.67	200	23.68
46	86.43	1,170.08	120	9.75
48	8.63	117.45	25	4.70
49	1.90	26.39	20	1.32
52	14.17	192.40	65	2.95
54	111.64	1,511.17	135	11.19
56				
59	2.98	41.00	25	1.64
60	1.58	22.06	10	2.21
62	91.25	1,235.29	165	7.48
64	51.55	698.15	85	8.21
66	4.03	55.21	25	2.20
67	2.71	37.35	20	1.87

Table 12 (continued). ACOUSTIC REFLECTIVITY (D.C. VOLTS/m^3) ESTIMATED COLUMN BIOMASS (g dry wt/m^2), COLUMN VOLUME (m^3) AND BIOMASS PER UNIT VOLUME (g dry wt/m^3) FOR ALL STATIONS, LAKE ONTARIO, AUGUST 1972.

Field St.	Acoustic Biomass (120-200-500)	Total Column Biomass g dry wt/m^2 (from regression)	Volume depth m (x $1m^2$)	Unit Volume Biomass g dry wt/m^3
69	76.79	1,039.65	150	6.92
71	474.84	6,425.27	185	34.73
72	23.05	312.55	30	10.4
73	1.97	27.34	15	1.82
75	75.65	1,024.23	230	4.45
78	65.26	883.649	50	17.66
79	13.41	182.19	20	9.1
83	4.22	57.78	95	0.61
85	1,924.05	26,033.08	185	140.7
89	400.82	5,423.78	75	72.3
90	4.09	56.02	10	5.60
92	83.09	1,124.89	65	17.3
94	15.45	209.72	35	5.99
96	9.23	125.56	35	3.59
97	.34	5.28	15	.35
98	6.82	92.96	25	3.71
99	36.17	490.06	20	24.5
103	.85	12.18	40	.30
105	9.19	125.02	20	6.25
95	11.73	159.39	25	6.37

$\frac{687.01}{58}$ 11.84 g dry wt/m^3

(Mean for lake, all depth)

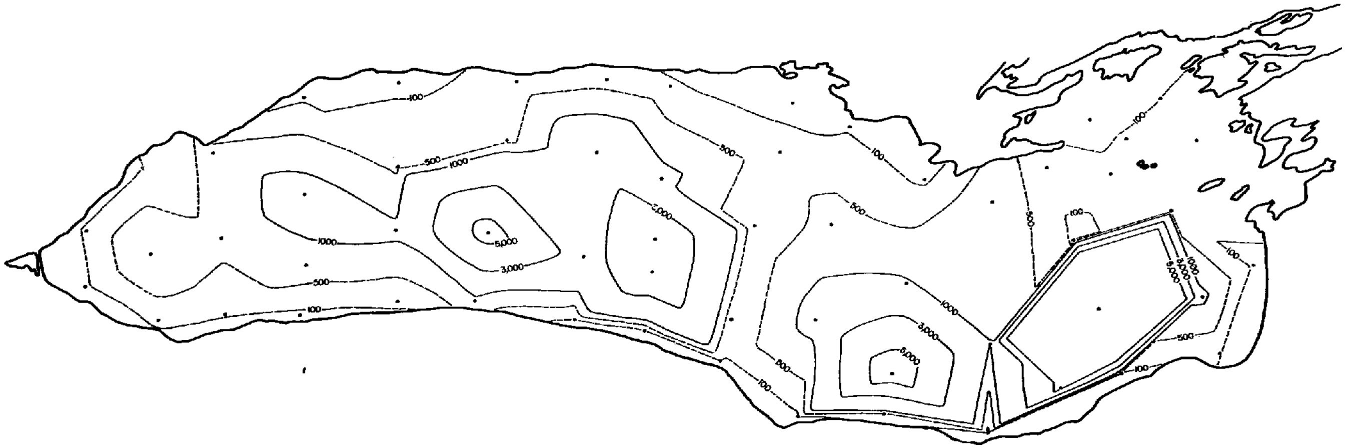

Figure 16. Column biomass (g dry wt/m^2) during August 1972

HORIZONTAL DISTRIBUTIONS OF ZOOPLANKTON BIOMASS (ACOUSTICAL EST.)

Detailed analysis of horizontal distribution of column biomass (zooplankton g dry-wt/m^2).

21-25 August 1972 ---

The lakewide distribution of zooplankton biomass reached a maximum during late summer 1972 (August). As expected the largest biomass per surface area was in deepwater. During 21-25 August 1972, notable concentrations of biomass were observed at stations 85 and 89 in eastern Lake Ontario and stations 32, 44 and 45 in western Lake Ontario (Figure 16). The mean biomass per unit volume of lakewater, considering all stations at all depths, was estimated to be 11.84 g dry wt/m^3. This very high value resulted, as indicated in the previous section, as a result of a large acoustical reflectivity from targets located at 100 - 200 m depth (Table 12).

5-9 February 1973 ---

The lakewide distribution of zooplankton biomass in February 1973 was, as expected, lower than in August 1972, but again greatest in deepwater. Three large cells are noted (Figure 17), one in the mid-western section of the lake with a large area greater than 500 g/m^2, one in midlake off Rochester, with 300 g/m^2, and one in eastern midlake with a biomass of 150 g/m^2. A single large inshore area of high zooplankton biomass was observed off the Oswego River, with a small area greater than 150 g/m^2, rather high for shallow water (Table 13).

June 1973 ---

By June 1973 the lakewide biomass had increased to a mean of 3.0 gm dry wt/m^3 (per unit volume), as shown in Table 14. Two large cells were located in western Lake Ontario, centered upon stations 10 and 32. An inshore cell was located west of Rochester, centered on station 56, and a high concentration of particles was observed in Mexico Bay. Again the general principal of a predominantly deepwater distribution of biomass is evident (Figure 18).

Comparison with Previous Estimates of Zooplankton Biomass

Zooplankton biomass estimates for Lake Ontario were made by Watson (1974) from animals taken in vertical tows from 50 m to the surface (Table 15). It is immediately obvious that our estimates are about 100x those made previously. This is because (a) the efficiency of net sampling, about 1%, was not considered, and (b) because we have placed much of the biomass (estimated acoustically) below 50 m. It is necessary at this time that our acoustical estimates be considered preliminary. But they should provide a considerable stimulus to verify or deny the existence of considerable zooplankton biomass at depths greater than 100 m in Lake Ontario.

Table 13. ACOUSTICAL REFLECTIVITY (D.C. VOLTS/m^3), ESTIMATED COLUMN BIOMASS (g dry wt/m^2), COLUMN VOLUME (m^3) AND BIOMASS PER UNIT VOLUME (g dry wt/m^3) FOR ALL STATIONS, LAKE ONTARIO, FEBRUARY 1973.

Field St.	Acoustic Biomass (120-200-500)	Total Column Biomass (g dry wt/m^2) (from regression)	Volume (m^3) depth m (x1 m^2)	Unit Volume Biomass g dry wt/m^3
1	5.07	69.27	30	2.31
3	.57	8.39	20	.42
5	.20	3.39	95	.04
8	0.	0.		0.
14	1.62	15.21	10	1.52
15	5.43	96.06	100	.96
20	9.35	127.19	15	8.47
24	0.	0.		0.
26	0.	0.		0.
30	11.85	161.01	20	8.05
31	7.83	106.62	25	4.26
32	76.31	1,033.15	170	6.07
34	12.22	166.01	85	1.95
35	.57	8.39	25	.34
42	10.02	136.25	15	9.08
44	0.	0.		0.
46	10.05	136.65	210	1.13
48	9.21	125.29	25	5.01
60	1.81	25.16	10	2.51
62	50.22	680.15	165	4.12
64	23.68	321.07	85	3.77
66	6.19	84.43	25	3.37
73	7.31	99.58	15	6.63
77	.21	3.52	117	.03
75	0.	0.	230	0.
78	4.16	56.96	50	1.13
79	.82	11.77	20	.59
83	11.74	159.52	95	1.68
85	0.	0.		0.
89	0.	0.		0.
90	16.52	224.19	10	22.4
92	3.23	44.38	65	.68
95	0.	0.		0.
105	0.	0.		0.
				96.52

$$\frac{96.52}{33} = 2.92$$

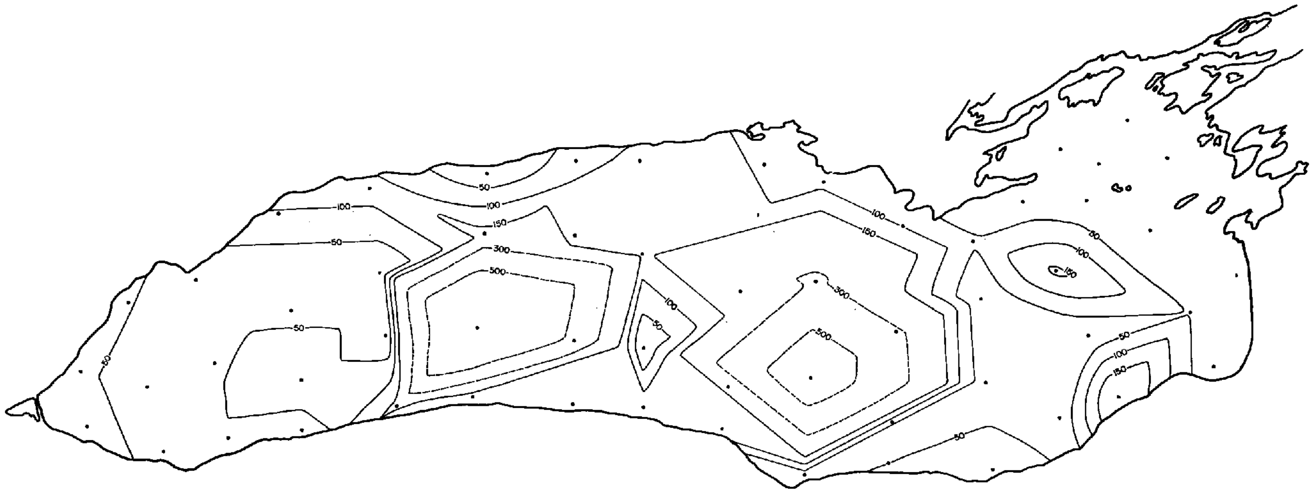

Figure 17. Column biomass (g dry wt/m^2) during February 1973

Table 14. ACOUSTICAL REFLECTIVITY (D.C. VOLTS/m^3), ESTIMATED COLUMN BIOMASS (g dry wt/m^2), COLUMN VOLUME (m^3) AND BIOMASS PER UNIT VOLUME (g dry wt/m^3) FOR ALL STATIONS, JUNE 1973.

Field St.	Acoustic Biomass (120-200-500)	Biomass mg dry wt (from regression)	Volume of depth (x1 m^2=m^3)	Unit Volume Biomass g dry wt/m^3
1	0.0	0.681	30	.02
2	0.0	0.681	15	.02
3	0.0	0.681	20	.02
5	5.3	72.39	95	.76
7	14.9	202.28	25	8.09
8	22.51	305.24	70	4.36
10	84.16	1,139.37	115	9.90
12	0.0	0.681	20	.03
14	0.94	13.40	10	1.34
19	0.0	0.681	10	.07
20	2.08	28.82	15	1.92
24	38.57	522.53	110	4.75
26	53.14	719.67	145	4.96
30	2.51	34.64	20	1.73
31	12.18	165.48	25	6.60
32	127.75	1,729.14	170	10.17
35	1.37	19.22	25	.77
36	3.14	43.17	30	1.43
41	0.0	0.681	25	.03
42	24.81	336.36	15	22.42
46	8.33	113.39	120	.94
48	4.22	57.78	25	2.31
56	145.49	1,969.16	129	15.26
59	0.0	0.681	25	.03
60	0.47	7.04	10	.70
62	10.73	145.86	165	.88
64	0.0	0.681	85	.00
66	0.0	0.681	25	.03
67	0.0	0.681	20	.03
72	0.0	0.681	30	.03
73	0.0	0.681	15	.05
75	0.0	0.681	230	.00
78	0.97	13.81	50	.28
79	1.46	20.44	20	1.02
89	0.16	2.846	75	.04
90	0.0	0.681	10	.07
92	55.90	757.01	65	11.64
94	10.19	138.55	35	3.95
96	4.64	63.46	35	1.81

Table 14 (continued). ACOUSTICAL REFLECTIVITY (D.C. VOLTS/m^3), ESTIMATED COLUMN BIOMASS (g dry wt/m^2), COLUMN VOLUME (m^3) AND BIOMASS PER UNIT VOLUME (g dry wt/m^3) FOR ALL STATIONS, JUNE 1973.

Field St.	Acoustic Biomass (120-200-500)	Biomass mg dry wt (from regression)	Volume of depth (x1 m^2=m^3)	Unit Volume Biomass g dry wt/m^3
97	2.80	38.57	15	2.57
77	7.84	106.76	121	.88
95	9.76	132.73	25	5.30
				127.19

$$\frac{127.19}{42}$$

mean = 3.02

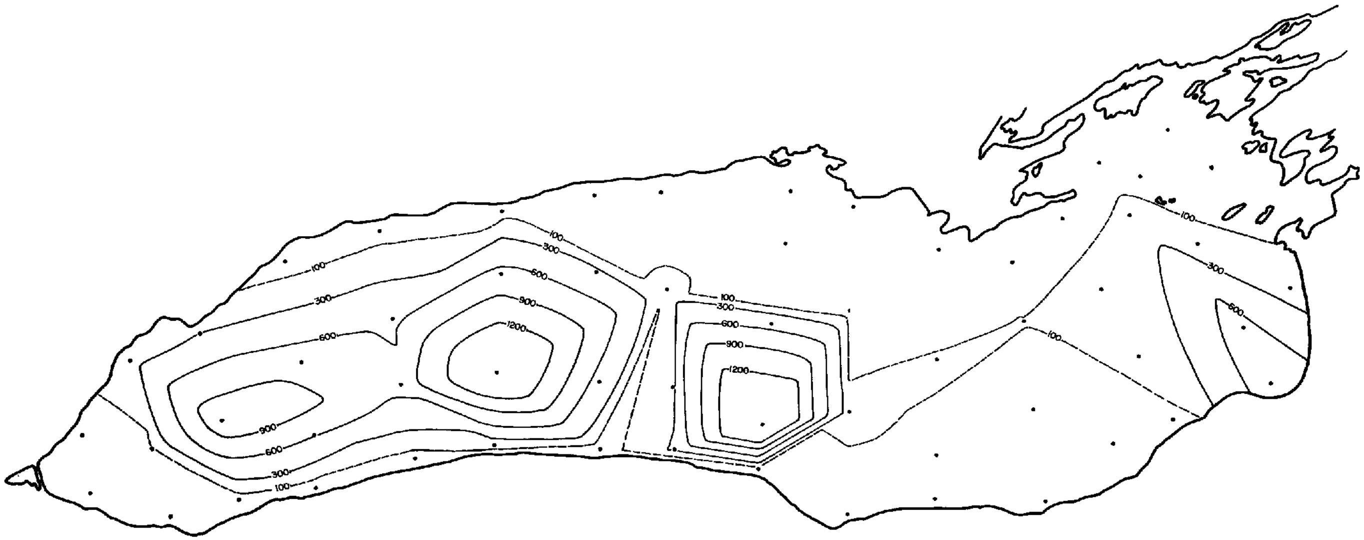

Figure 18. Column biomass (g dry wt/m^2) during June 1973

Table 15. COMPARISON OF ACOUSTICAL BIOMASS ESTIMATES (g dry-wt/m^3) OVER ENTIRE WATER COLUMN, WITH OTHER ESTIMATES (g dry-wt/m^3) OVER 0 - 50 m COLUMN.

Comparable Dates	Previous Estimate (Watson, 1974)	Acoustical Biomass Estimate	Ratio Acoustical:Previous Estimates
17-21 August 1970 (Watson) August 1972	.16	11.8	73.8:1
3-8 February 1970 (Watson) February 1973	.02	2.9	145:1
22-27 June 1970 (Watson) June 1973	.03	3.0	100:1

SECTION VII

COMPARATIVE MATHEMATICAL ANALYSIS OF ZOOPLANKTON COMMUNITIES

INTRODUCTION

One of the important topics of ecology is the comparison of different communities. Communities found in similar environments as well as those occupying very different environments can be compared for species composition, species interactions and mass and energy flow, as well as other community properties. Comparison can be descriptive and qualitative, or some quantitative measures of community structure and the roles of species can be developed.

This study utilizes the competition matrix by Levins (1968) as a model from which to develop such measures. A very simple definition of community is implied by this model, simply a group of species interacting at a time and place --- the question of whether the community is a natural biological unit (Poole, 1974) is of no concern.

The use of the competition matrix restricts the concept of community to a group of competitors and therefore to essentially one trophic level. This study considers a community consisting of only the dominant herbivorous zooplankters as the cladocerans, *Daphnia galeata*, *Daphnia longiremis*, *Bosmina*, *Diaphanosoma*, and the calanoid copepods, *Diaptomus minutus* and *Diaptomus sicilis*. Omnivores and carnivores are excluded from the model.

Three different levels of community structure are investigated with measures developed from the competition matrix. First, the individual interactions between species can be considered. Then the importance of each species in terms of competition levels can be investigated. Finally, at the community level, the average intensity of competition and community stability can be studied.

Additional measures not directly related to the competition matrix are also considered in this study. Niche breadths, as a property of species, and community diversity, a community property, are essentially information measures which can be applied to comparing communities.

Utilizing these measures of the entire community the following hypothesis can be investigated: During the period between spring and fall turnovers of the lake the zooplankton community evolves toward reduced competition, increased stability and increased diversity.

The competition matrix is based on a model of interacting species first used by Volterra (1926). This model has been given two interpretations. First, it can be considered as a simple model of population dynamics in its own right. Secondly, it can be viewed as an approximation to certain more complex models in some region around equilibrium. It is this latter interpretation which we are considering here with the resulting limiting assumption that the community under consideration is always in a near equilibrium state. For this reason the zooplankton communities considered all occur at summer dates when the equilibrium conditions are more nearly met.

MATHEMATICAL THEORY

Competition Matrix

The competition matrix arises from the Volterra (1926) system for m interacting species

$$n_i = \frac{P_i}{k_i}\left(k_i - \sum_{j=1}^{m} \alpha_{ij} n_j\right) n_i ; \quad \alpha_{ii} = 1; \; i = 1,2,---m \qquad (1)$$

where
- n_i - population density of the ith species
- P_i - intrinsic growth rate of the ith species
- k_i - carrying capacity of the ith species
- α_{ij} - competition coefficient jth species on the ith species

α_{ij} measures the number of individuals of species, i, displayed by one individual of species, j, when the system is near equilibrium. The α_{ij} can be grouped in an array known as the competition matrix (Levins, 1968). This matrix, A_α, is of the form

$$A_\alpha = \begin{bmatrix} \alpha_{11} & \alpha_{12} & \cdots & \alpha_{1m} \\ \alpha_{21} & & & \vdots \\ \vdots & & & \vdots \\ \alpha_{m1} & \cdots & \cdots & \alpha_{mm} \end{bmatrix} \qquad (2)$$

and contains information on competition between individuals of different species.

The α_{ij} measure the displacement of species i per individual of species j. It is often of more interest to consider the displacement of species i due to the entire population of species j. If we let $\hat{n}_j$ represent the equilibrium population of species j, then $\alpha_{ij}\hat{n}_j$ would be a measure of this displacement. We can think of this as weighting each element α_{ij} by the population density $\hat{n}_j$. In order that the new elements be scaled similarly to α_{ij}, a normalizing factor $(\hat{n}_{ave})^{-1}$, where $\hat{n}_{ave} = \frac{1}{m}\sum_{j=1}^{m} \hat{n}_j$, is used and an adjusted competition matrix A^1 is formed with elements

$$\alpha^1_{ij} = \frac{\hat{n}_j}{\hat{n}_{ave}} \alpha_{ij} \qquad (3)$$

These elements indicate the relative competitive impact of species j on species i.

While a comparison of communities can be made using the α_{ij} or α^1_{ij} values directly, data reduction techniques can often facilitate the analysis. A number of these techniques are based on averaging over the competition matrix in different fashion.

Vandermeer (1972a) suggested two approaches. First is the row average, which he termed the community effect. It measures the competition faced by a species. The ith row average, $\overline{\alpha}_{i\cdot}$ (or $\overline{\alpha}^1_{i\cdot}$), is defined as

$$\overline{\alpha}_{i\cdot} \underline{\Delta} \frac{1}{m} \sum_{j=1}^{m} \alpha_{ij} \qquad (4)$$

(where $\underline{\Delta}$ means "is defined as")

A second measure is the column average, termed the species effect. This is defined as

$$\overline{\alpha}_{\cdot j} \underline{\Delta} \frac{1}{m} \sum_{i=1}^{m} \alpha_{ij} \qquad (5)$$

and similarly for α^1_{ij}. This measures the impact of a species on the community. $\overline{\alpha}^1_{\cdot j}$ can be written

$$\overline{\alpha}^1_{\cdot j} = \left\{ \frac{\sum_{i=1}^{m} \alpha_{ij}}{m \hat{n}_{ave}} \right\} \hat{n} \qquad (6)$$

and considered to be a normalized effective population density (normalized by $\hat{n}_{ave}$), where effective refers to competitive impact. This measure is useful in rank ordering species in terms of their importance in the community as a function of competition.

Row and column averages are species' properties and can be used in comparing the roles of species within and between communities. Another species measure, not a function of the α's, is niche breadth. If species i has a one dimensional niche divided into r micro-environments and p_{ik} is the proportion of the species utilizing the <u>kth</u> environment, then

$$\beta_i = \frac{1}{\sum_{k=1}^{r} p_{ik}^2} \qquad (7)$$

is a measure of niche breadth (Levins, 1968). For a two dimensional niche such as is used in this study the relationship becomes

$$\beta_i = \frac{1}{\sum_{k=1}^{r} \sum_{\ell=1}^{s} p_{ik\ell}^2} \qquad (8)$$

If the two dimensions are independent equation (8) can be written

$$\beta_i = \frac{1}{\sum_{k=1}^{r} \sum_{\ell=1}^{s} (p_{ik}^{(1)}\, p_{i\ell}^{(2)})^2} \qquad (9)$$

Properties of whole communities can be measured as well. Levins (1968) suggested the average α as a measure of niche separation in the community. This parameter,

$$\bar{\alpha} \triangleq \frac{1}{m^2} \sum_{i=1}^{m} \sum_{j=1}^{m} \alpha_{ij} \qquad (10)$$

is a measure of average species co-occurrence in Levins' original formulation. $\bar{\alpha}^{1}$, analogous to $\bar{\alpha}$, is a community measure of competition in the present formulation.

Diversity is another example of a community property and is often measured by the Shannon-Weaver information measure, $\bar{d}$, community diversity, is defined as

$$\bar{d} \triangleq - \sum_{j=1}^{m} \frac{\hat{n}_j}{\sum_i \hat{n}_i} \ln \frac{\hat{n}_j}{\sum_i n_i} \qquad (11)$$

Utilizing $\bar{\alpha}^1_{\cdot j}$ as a weighted version of $\hat{n}_j$, a second diversity index, $\bar{d}^1$, can be formed in a way analogous to equation (11).

We now have four community measures. $\bar{\alpha}$ depends on niche structures and is essentially independent of population densities. $\bar{d}$, on the other hand, is a measure of population densities and does not depend on niche structure. $\bar{\alpha}^1$ and $\bar{d}^1$ are both mixed measures, including information on niche structure and population densities.

System Matrix

If we are interested in the dynamics of a community in a near equilibrium state and particularly in its local stability, analysis of the system matrix is required. To determine this matrix the system is linearized around its equilibrium point. The linearized system is

$$\dot{n}_i = \sum_{j=1}^{m} a_{ij} (n_j - \hat{n}_j); \; i = 1,2,---m \tag{12}$$

where the a_{ij} are defined as

$$a_{ij} \triangleq \frac{\partial}{\partial \hat{n}_j} \{ \frac{p_i}{k_i} (k_i - \sum_{\ell=1}^{m} \alpha_{i\ell} n_\ell) n_i \} \Big|_{n_i = \hat{n}_i} . \tag{13}$$

The resultant value of a_{ij} is

$$a_{ij} = \frac{p_i \hat{n}_i}{k_i} \alpha_{ij} \quad . \tag{14}$$

The a_{ij} form the elements of A, the system matrix. A and A_α are related by a simple matrix transformation. If D is a diagonal matrix (all zeros except along the main diagonal) and the diagonal elements are $d_{ii} = - \frac{p_i n_i}{k_i}$, then A = DA.

Equation (12) can be re-written in matrix form as

$$\dot{\underline{n}} = A(\underline{n} - \hat{\underline{n}}) \tag{15}$$

The solution for $\underline{n} - \hat{\underline{n}}$, valid only near $\hat{\underline{n}}$, is of the form

$$\underline{n} - \hat{\underline{n}} = \sum_{k=1}^{m} \underline{c}_k e^{\lambda_k t} \qquad (16)$$

Where the m values λ_k, known as the eigenvalues of the system matrix A, are the roots of the equation

$$|A-\lambda I| = 0. \qquad (17)$$

I is the identity matrix and $|A-\lambda I|$ is the determinant of $A-\lambda I$.

The stability of the equilibrium depends on the eigenvalues. If any λ_k has a positive real part the equilibrium is unstable. Thus, if we designate by λ_{max} the eigenvalue with the largest real part, λ_{max} seems a good measure of community stability (May, 1973). We shall return to this point later.

The Competition Coefficient

Basic to both the competition matrix and the system matrix is the competition coefficient. Levins (1968) initially used as an approximation to competition the probability of co-occurrence, essentially a niche overlap model of competition. Levins (Lane, 1971) and others (MacArthur, 1972; May, 1973; Schoener, 1974; Vandermeer, 1972b) have discussed other forms of niche overlap models. This study will utilize a rather simple form.

Assume initially a one dimensional resource spectrum, $\hat{R}_1$, $\hat{R}_2$, $\hat{R}_p$, where $\hat{R}_k$ is the equilibrium density (or standing crop) of the kth resource group. Let ϕ_{ik} be the rate per unit density at which species i utilizes resource k. Then $\sum_{k=1}^{p} R_k \phi_{ik}$

represents the resources utilized by species i at equilibrium. ϕ_{ik} can be expressed as $s_i p_{ik}$ where $\sum_{k=1}^{p} p_{ik} = 1$.

s_i, a magnitude term, is determined by filtering rates in this study.

A simple measure of niche overlap for species i and j is $\sum_{k=1}^{p} \hat{R}_k \phi_{ik} \phi_{jk}$.

In order to equate niche overlap as competition coefficients with their requirement that $\alpha_{ii} = 1$, a normalizing factor is needed, leading to

$$\alpha_{ij} = \frac{\sum_{k=1}^{p} \hat{R}_k^2 \phi_{ik} \phi_{jk}}{\sum_{k=1}^{p} \hat{R}_k^2 \phi_{ik}^2} \qquad (18)$$

This can be re-written as

$$\alpha_{ij} = \frac{s_j \sum_{k=1}^{p} \hat{R}_k^2 p_{ik} p_{jk}}{s_i \sum_{k=1}^{p} \hat{R}_k^2 p_{ik}^2} \qquad (19)$$

The model developed for herbivorous zooplankton considers a two-dimensional resource spectrum (or niche). These dimensions are known as habitat selection and resource allocation (Lane, 1971). Habitat selection refers to the vertical distribution of zooplankton species in the water column and overlap in this niche dimension is co-occurrence. Resource allocation refers to size-selective feeding by the zooplankton (Burns, 1968; Wilson, 1973). In turn the density of the resources, largely phytoplankton, must be described in terms of both vertical distribution and size distribution. The resource is now described as $\hat{R}_{k\ell}$ and the utilization function as $\phi_{ik\ell}$. As discussed for niche breadth, if it is assumed that the dimensions are independent $\hat{R}_{k\ell}$ and $\phi_{ik\ell}$ can be written as $R_k^{(1)} R_\ell^{(2)}$ and $\phi_{ik}^{(1)} \phi_{i\ell}^{(2)}$. Equation (19) becomes

$$\alpha_{ij} = \frac{s_j \sum_{k=1}^{p} \sum_{\ell=1}^{q} (\hat{R}_k^{(1)} \hat{R}_\ell^{(2)})^2 \, p_{ik}^{(1)} p_{i\ell}^{(2)} p_{jk}^{(1)} p_{j\ell}^{(2)}}{s_i \sum_{k=1}^{p} \sum_{\ell=1}^{q} (\hat{R}_k^{(1)} \hat{R}_\ell^{(2)})^2 (p_{ik}^{(1)} p_{i\ell}^{(2)})^2} \qquad (20)$$

This is the form of α_{ij} used in this study.

Thus we have developed a new approach to examining community interactions, which should in the future replace the α-analysis used in this study (Section V).

SECTION VIII

A HYPOTHESIS ON CALANOID SUCCESSION TO CLADOCERANS DURING EUTROPHICATION

INTRODUCTION

Changes in the species composition of the crustacean zooplankton have long been used as an indication of the increased eutrophication of freshwaters. The best known indicator, *Bosmina longirostris*, was observed to replace the larger *B. coregoni* after 50 years of enrichment of the Zurichsee (Minter, 1938). *B. longirostris* likewise replaced *B. coregoni* in Linsley Pond following a period of increased productivity (Deevey, 1942).

In the Laurentian Great Lakes a complicated series of changes have been detailed. In Lake Michigan the cladocerans *Daphnia retrocurva* and *D. galeata* dominated in 1927 (Brooks, 1969) and 1954 (Wells, 1960), gave way to the smaller and likely more predation-free *D. longiremis* by 1966, while *D. retrocurva* was again dominant by 1968 (Wells, 1970). Likewise, *Leptodora kindtii*, the largest cladoceran, was common in 1954, rare in 1966 and common again by 1968, as were the large calanoids *Limnocalanus macrurus*, *Epischura lacustris*, and *Diaptomus sicilis* (Wells, 1960 and 1970). Such data have been interpreted as a response to high alewife predation through 1966 (Brooks, 1969), with a return to 1954-like populations following the alewife dieoff after 1966 (Wells, 1970). By 1972, *Bosmina longirostris* and *Cyclops bicuspidatus* were dominant (Roth and Stewart, 1973).

Similarly, in Lake Ontario *Diaptomus* and *Daphnia* were abundant in 1939, whereas *Cyclops bicuspidatus* and *Bosmina longirostris* took over as in Lake Michigan by 1969 (McNaught and Buzzard, 1973). *Bosmina* is now especially abundant inshore and nearby urban areas (McNaught, 1974). In Lake Erie similar communities were dominated by *D. galeata* in 1938, with *D. retrocurva* second (Chandler, 1940), whereas by 1959 the smaller *D. retrocurva* had succeeded (Bradshaw, 1964). Again we could have interpreted these observations as evidence of size-selective predation, but in my opinion the size spectrum of food resources must also be considered.

Clearly a better understanding of eutrophication will result from a greater knowledge of selective factors governing changes in species composition. Brooks (1969) has suggested that, in addition to enrichment, planktivory by fishes and zooplankton filtering capacity are primary factors in species succession. But additional factors under two following headings are also vital; all emphasize the nutritional aspects of a nutritionally dilute environment:

I. Evolutionary responses to variable phytoplankton foods.

   A. evolution of generalists and specialists with regard to selective algal grazing by zooplankton
   B. evolution for increased filtering capacity
   C. evolution for increased ingestion rate and efficiency, both by size and density of algae
   D. evolution toward increased efficiency of digestion

II. Evolutionary responses to fish predation.

   A. evolution for small adult size at maturity
   B. evolution of biotic potential (r-selection organisms with high intrinsic birth rates (b_{max}) or low death rates)
   C. evolution for reduced visibility, especially of larger adults.

EVIDENCE FOR EVOLUTIONARY TRENDS

From studies of zooplankton feeding it has been evident that some oligotrophic forms are nannoplankton specialists, while many eutrophic species are generalists. But little argument exists regarding whether zooplankton are size-selective feeders. Calanoid copepods are specialists on nannoplankton, as confirmed by field studies. Eudiaptomus in Lake Erken preferred nannoplanktonic chrysomonads (Nauwerck, 1963). Similarly 70% of the diet of Diaptomus consisted of phytoplankton of less than 64μ diameter in one study (Lane, 1971), while in another most was less than 22μ (Bogdan and McNaught, 1974). In contrast, Bosmina longirostris had a preferred range of particles in the nannoplankton category (1 - 15μ) according to Gliwicz (1969), but has also been observed to consume a sizeable percentage (50%) of cells above 64μ (Lane, 1971). These differences in size will be used to calculate grazing (Table 16).

Thus each organism has been given an adaptive value within the framework of lake productivity. In actual application here, the relative values for each of the 8 components to which the zooplankton show adaptation are summed to determine the adaptive value. The 8 components had relative values from 5 to 100 and the resulting adaptive values for Diaptomus, Daphnia and Bosmina range from 346 to 642 (Table 16).

The advantages of increased filtering capacity were discussed by Brooks (1969), who found that filtering capacity increased as the square of body length (Brooks and Dodson, 1965). Indeed the larger Daphnia filtered nannoplankton at the same rate as Diaptomus (Table 16), while Bosmina longirostris lagged on all resources (Bogdan, 1974). Dodson (1974) has suggested that the advantages of size and filtering capacity alone were not enough to insure survival.

The efficiency of ingestion appears to be a dominant factor in contrasting the evolution of feeding. Studies by McMahon and Rigler (1963) on

Table 16. GROWTH CHARACTERISTICS AND A GRAZING ESTIMATE FOR HYPOTHETICAL POPULATIONS OF ZOOPLANKTON IN AN OLIGOTROPHIC VERSUS A MESOTROPHIC LAKE. ACTUAL (PARENTHESES) AND RELATIVE VALUES FOR FEEDING.

	Oligotrophic (L. Superior)			Mesotrophic (L. Ontario)		
	Diaptomus	Daphnia	Bosmina	Diaptomus	Daphnia	Bosmina
I. Organismic Characteristics						
Feeding related						
Filtering rate (ml/an/day)	(.42) 100	(.42) 100	(.15) 36	(.42) 100	(.42) 100	(.15) 36
Ingestion rate with cell density (cells/an/day)	(1800) 100	(400) 22	(400) 22	(5000) 100	(1300) 26	(1300) 26
Ingestion efficiency with cell size (%)	(.016) 24	(.065) 100	(.065) 100	(.010) 10	(.065) 100	(.065) 100
Growth related						
Size at maturity (mm) (reciprocal)	(1.6) 0	(0.7) 0 (no predation)	(0.3) 0	(1/1.6) 19	(1/0.7) 42	(1/0.3) 100
Birth rate (b_{max})	(.14) 70	(.23) 100	(.22) 91	(.20) 70	(.33) 100	(.31) 91
Organismic Subtotal	294	322	249	305	368	353
II. Production and Grazing Factors						
Relative grazing per individual	(6.21) 100	(5.55) 89	(1.98) 31	(5.46) 30	(18.45) 100	(6.59) 36
Relative net production in ten days	(4.1) 41	(10.) 100	(9.0) 90	(1.6) 12	(10.) 74	(13.4) 100
Production-Grazing Subtotal, or Relative Grazing	(4100) 46	(8900) 100	(2790) 31	(373) 5	(7400) 100	(3600) 48
III. Adaptation Value	481	611	401	346	642	537

Daphnia magna and Richman (1966) on Diaptomus oregonensis have been compared (Figure 19). The ingestion rate (I_r) has been described by the above authors in terms of cells ingested, where:

$$I_r = \text{cells ingested/animal/day}$$

Thus Diaptomus feeding in a concentration of cells characteristic of oligotrophic lakes (925 cells/ml), ingested cells at a rate of 1800 cells/an/day (Figure 19). Daphnia, filtering at similar rates, would ingest only 400 cells/an/day. In contrast, at an mesotrophic concentration of 2600 cells/ml, these graphs would indicate an ingestion rate for Diaptomus of 5000 cells/an/day, while Daphnia would ingest 1300 cells/an/day. Clearly at oligotrophic and mesotrophic concentrations of planktonic algae, Diaptomus has a higher ingestion rate (Figure 19). Diaptomus thus has a higher ingestion efficiency at low densities. In these experiments, Daphnia was fed yeast and Diaptomus algae. While more such efficiencies must be determined for natural assemblages, these comparative results suggest that Diaptomus is adapted to existing on a more dilute food source than Daphnia, which is better adapted to the rigors of life in eutrophic waters, with its highly developed respiratory system.

Just recently, Bogdan and McNaught (1974) have examined ingestion efficiency with regard to the size of algal foods. Diaptomus, the nannoplankton specialist, is three times more efficient on nannoplankton (.016) than netplankton (.005), but Daphnia, the generalist, was equally efficient on both (.065 and .062). These findings again suggest Diaptomus to be well adapted to oligotrophy.

The last nutritional item, the evolution of the efficiency of digestion, relates to both the size and packaging of the algae resource. Recently Porter (1973) has found that green algae encased in thick gelatinous sheaths pass the gut of Daphnia galeata in viable condition. Much needs to be done relating the efficiency of digestion to size, packaging, available digestive enzymes, etc. and this parameter will not be given a value here.

Growth related responses have likely evolved with regard to fish predation. Evolution toward small size of the adult at the time of first brooding is of considerable benefit under heavy predation. We have examined the size of Diaptomus sicilis (1.6 mm), Daphnia galeata (1.0 mm), and Bosmina longirostris (0.26 mm) at the time of first birth. Quite obviously, Bosmina has a considerable advantage in this regard. Within genera, certain species also have an advantage, as B. longirostris is smaller than B. coregoni (0.5 mm) of oligotrophic waters, possibly one of the important factors explaining the often noted succession between these two species.

In a similar fashion, r-selection organisms can withstand considerable predatory pressure through a high intrinsic growth rate. Additionally, selection for high growth rate (r) in planktonic organisms has enabled

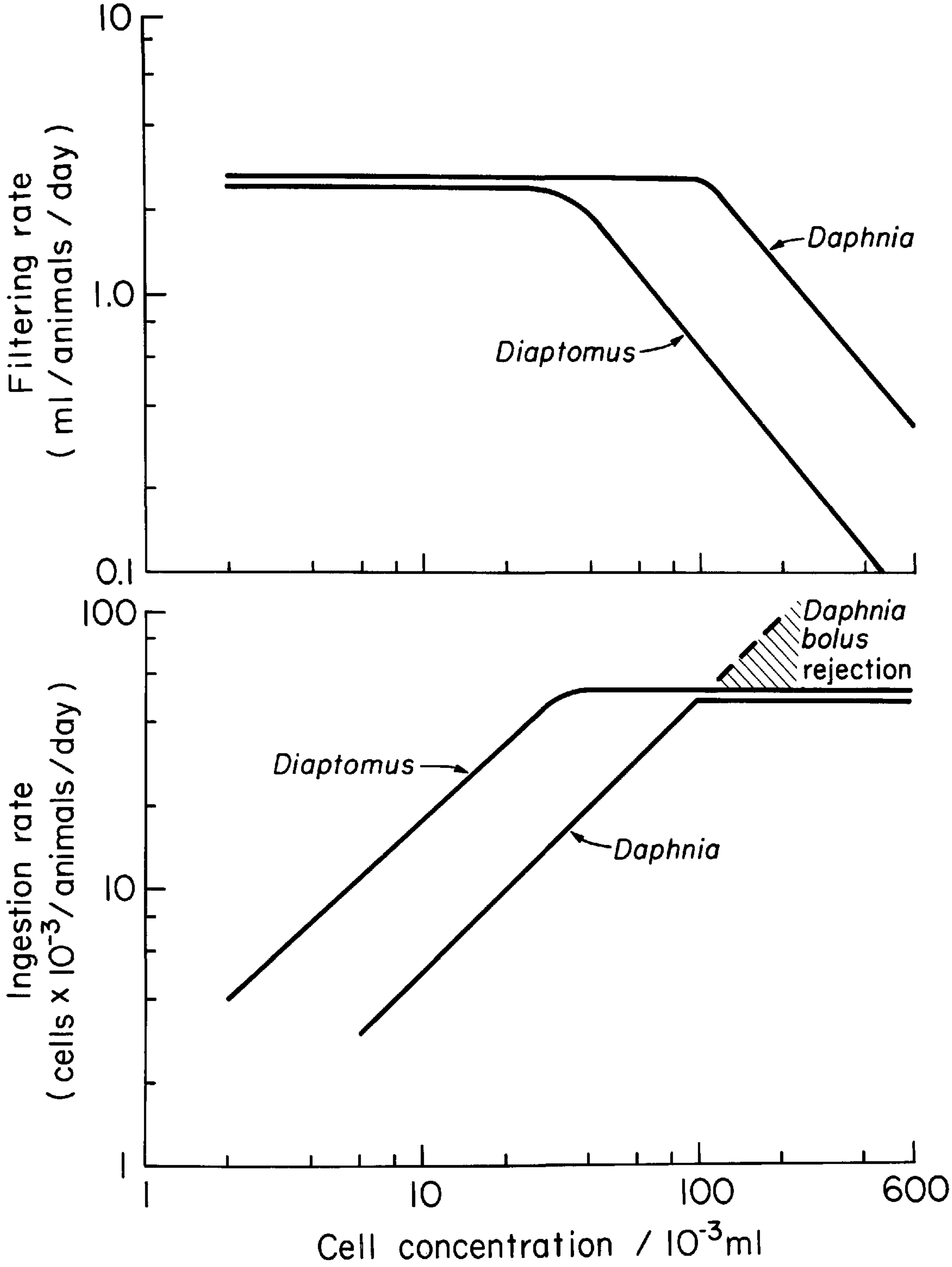

Figure 19. Filtering rate compared to food concentration for Daphnia (McMahon and Rigler, 1963) and Diaptomus (Richman, 1966) and ingestion rates at these same food concentrations

a rapid response to resource explosion. Our species have been calibrated using field data for Daphnia galeata (Hall, 1964) and Diaptomus and Bosmina longirostris (McNaught, unpublished). The significantly lower maximum birth rate for Diaptomus (Table 16) will likely become a limiting factor under eutrophic conditions.

Once the organismic factors had been described (Table 16, Section I), we proceed to give them relative values. However, it must be noted that individual feeding and growth factors have not been weighted. In nature some are certainly more important than others. In many cases, specific values for high or low foods were available. Potentially adaptive characteristics have been summarized (Table 16) by actual and relative value.

POPULATION GROWTH AND GRAZING

Determination of relative population growth and grazing in Lake Superior served as the calibration for our oligotrophic lake. During August three species of Cyclotella constituted 76% by density of the phytoplankton (Schelske, et al. 1972) and ranged in size from 2.5μ to 15μ in diameter. The remaining algae were predominantly flagellates. Thus the bulk of the phytoplankton was less than 15μ and fell in the 1 - 22μ category (Stoermer, 1973) while cell densities ranged from 350 - 1500 cells/ml.

Lake Ontario is the mesotrophic example. In August, the time of maximum phytoplankton standing crop, the plankton is evenly composed of chlorophytes (38%), cyanophytes (34%), cryptomonads (12%), dinoflagellates (12%) and chrysomonads (4%) (Munawar and Nauwerck, 1971). These forms ranged in size from 2 - 137μ in diameter, with almost all between 2 - 65μ, and the largest sub group of these between 2 - 22μ

To determine grazing, on an individual basis for each species, we have simply multiplied filtering rate (F) times the efficiencies for ingestion with size (E_s), times the ingestion rate (I_r) times the standing crop of phytoplankton (N_p), for Lake Superior within the 1 - 22μ size category (925 cells/ml) and for Ontario (Stoermer, 1973) within the 1 - 22μ (1300 cells/ml) and 22 - 65μ (1300 cells/ml) categories. This calibration suggests more Bosmina when netplankton is abundant, as Hrbáček et al. (1961) have observed. Thus relative grazing (G) is denoted:

$$G = F \cdot I_r \cdot E_s \cdot N_p \quad (21)$$

To determine net production, we used the exponential growth equation:

$$N_t = N_o e^{rt} \quad (22)$$

where N_t = number at time t, N_o = number at the onset, and r = the intrinsic growth rate. Furthermore:

$$r = b - d$$

where intrinsic birth rates (b) were used as designated in Table 7, and death rates for Diaptomus (0.10 ind/ind/day), Daphnia (0.5 ind/ind/day), and Bosmina (0.01 ind/ind/day) were based relative to size. Fish predation was considered negligible in Lake Superior, and high in Lake Ontario. Production was calculated for a period of 10 days, to illustrate the potential of these populations. Then to determine the impact of grazing, we simply multiplied the individual grazing rate (G) times herbivore abundance (N). As opposed to the organismic subtotal of relative values, we have termed this the Production-Grazing subtotal (Table 16, Section II).

Once each of these factors of evolutionary significance had been assigned a relative value, we applied the non-parametric Wilcoxon's paired, signed ranks test (Sokol and Rohlf, 1969) to see whether one column (components of adaptation for a species) was significantly different from another. Under oligotrophic conditions, Diaptomus totaled 481 pts., but was not significantly better adapted than Bosmina with 401 pts. ($T = 11$, $p > 0.1$); on the other hand, Daphnia was better adapted ($T = 0$, $p < 0.1$) than Bosmina. Under mesotrophic conditions, Daphnia was significantly ($T = 6$, $p < 0.1$) better adapted than Diaptomus, while Bosmina was not ($T = 9$, $p > 0.1$).

CONCLUSIONS

The sum total of all relative Organismic and Production-Grazing subtotals has been called the Adaptation Value (Table 16). These Adaptation Values suggest that Diaptomus would be successful in an oligotrophic lake like Superior, because of its superior filtering capacity and its high ingestion rate at low cell densities and high ingestion efficiency at small cell sizes. Bosmina was not predicted successful under similar conditions, because of its low filtering capacity.

In contrast, in mesotrophic Lake Ontario the feeding generalist, Bosmina, was predicted successful because of its ingestion efficiency on small and large cells alike, its small size at maturity, which reduces fish predation and its high intrinsic birth rate (b_{max}). Indeed, Diaptomus sicilis is the dominant organism in Lake Superior (Patalas, 1969), and occurs in all of the Great Lakes (Robertson, 1966), while Bosmina longirostris dominates in Lake Ontario (McNaught and Buzzard, 1973).

However, in both trophic simulations Daphnia was predicted more successful than observed in nature, due to its high filtering capacity, high ingestion efficiency on both small and large cells, and its high intrinsic birth rate. Clearly we have more to consider in this case. and possibly fish predation upon Daphnia has been undervalued. Also, Daphnia retrocurva and Diaptomus have been observed to co-occur, made possible through resource allocation (Lane and McNaught, 1973).

Regarding zooplankton succession, we have added the important concepts of ingestion rate with the size of food, and ingestion efficiency with the density of algae, to Brooks (1969) emphasis upon filtering capacity. Further investigation of feeding habits should detail the successes in the Great Lakes of species like Daphnia retrocurva, leading to a better understanding of eutrophication.

SECTION IX

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SECTION X

APPENDIX A

TABLES OF MEAN ZOOPLANKTON DENSITY BY SPECIES, DATE AND DEPTH OF WATER SAMPLED

Table 17. LAKEWIDE AVERAGE OF ZOOPLANKTON POPULATION DENSITIES. VALUES ($^n/m^3$) REPRESENT ANIMALS COLLECTED WITH A NET (64 APERTURE) AT STATIONS IN WATERS LESS THAN 30 m IN DEPTH, OVER A VERTICAL RANGE OF 0 - 5 m.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 March	24-28 April	12-16 June
Cladocera										
Bosmina coregoni	8	24	532	997	2755	978	24	19	7	52
Bosmina longirostris	48	382	11786	78230	1913	99	3	1	5	1755
Daphnia galeata	0	3	827	186	16	24	0.7	0.2	0.1	1.3
Daphnia retrocurva	6	6	55	10169	2001	352	0.6	0.1	0.7	18
Daphnia longiremis	0	0.05	15	0	0.4	0.2	0	0	0.4	0.2
Ceriodaphnia lacustris	0	1	23	4028	128	34	0	0	0.9	6
Chydorus sphaericus	0.1	3	94	213	35	41	0	0.05	0.3	7
Holopedium gibberum	0	0.1	0.9	17	1.3	0	0	0	0	0
Polyphemus pediculus	0	0	14	4	0	0	0	0	0	0
Diaphanosoma	0	0	0	10	0.2	0.7	0	0.5	0	0
Alona	0	0	0.6	0.2	3.5	18	0.2	0.05	0	0

Table 17 (continued). LAKEWIDE AVERAGE OF ZOOPLANKTON POPULATION DENSITIES. VALUES (n/m^3) REPRESENT ANIMALS COLLECTED WITH A NET (64 APERTURE) AT STATIONS IN WATERS LESS THAN 30 m IN DEPTH, OVER A VERTICAL RANGE OF 0 - 5 m.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 March	24-28 April	12-16 June
Cyclopoida										
Cyclopoida copepedites	70	431	1599	25331	10892	7146	2077	1407	987	13890
Cyclops bicuspidatus	740	1061	10707	8520	1054	519	126	232	887	529
Cyclops vernalis	1	6	91	737	176	849	10	7	22	81
Tropocyclops prasinus	0.5	4	26	1754	8022	1066	170	114	163	200
Calanoida										
Calanoida copepodites	37	57	113	130	405	170	41	69	108	219
Diaptomus ashlandi	0	0	0	0	0	0.2	1	0.5	0	.09
Diaptomus siciloides	0	0	0	0.3	4.9	6.8	0.04	0.2	0.3	0.5
Diaptomus minutus	114	132	53	60	30	35	37	49	43	29
Diaptomus oregonensis	15	22	26	46	47	60	42	8	20	1.3
Diaptomus sicilis	28	79	42	13	40	38	35	28	38	1.7
Limnocalanus macrurus	188	187	65	7	22	245	30	50	123	19
Eurytemora affinis	.08	9	10	1115	133	25	0.3	0	6	2.3

Table 18. MEAN ZOOPLANKTON POPULATION DENSITIES. VALUES (NUMBER/m^3) REPRESENT ANIMALS COLLECTED WITH A NET (64 u aperture).

Species	0-15m 12-16 June	0-15m 10-14 July	0-10m 15-19 May	0-10m 12-16 June	0-20m 12-16 June	0-20m 10-14 July	0-25m 15-19 May	0-25m 12-16 June	0-25m 10-14 July
Cladocera									
Bosmina coregoni	35	87	14	81	3	107	6	9	76
Bosmina longirostris	323	9137	70	3909	235	10376	27	125	6049
Daphnia galeata	0	127	0.3	19	1	103	0.7	0.2	129
Daphnia retrocurva	8.5	14	6	2	4	39	1.4	5	57
Daphnia longiremis	0.4	0	0	0	0	0.4	0	0.4	2
Ceriodaphnia lacustris	1	37	0	0	0	40	0	0.3	37
Chydorus sphaericus	3	4	1	0.9	0.3	4	0.8	2	4
Holopedium gibberum	0	0	0	0	0	0	0	0	0
Polyphemus pediculus	0	0	0	0	0	0	0	0	0
Diaphanosoma	0	0	0	0.9	0	0	0	0	0
Alona	0	8	0	0	0	0	0.7	0.1	13

Table 18 (continued). MEAN ZOOPLANKTON POPULATION DENSITIES. VALUES (NUMBER/m^3) REPRESENT ANIMALS COLLECTED WITH A NET (64 u aperture).

Species	0-15m 12-16 June	0-15m 10-14 July	0-10m 15-19 May	0-10m 12-16 June	0-20m 12-16 June	0-20m 10-14 July	0-25m 15-19 May	0-25m 12-16 June	0-25m 10-14 July
Cyclopoida									
Cyclopoid copepodites	580	2440	222	605	571	1599	161	362	1102
Cyclops bicuspidatus	166	5004	520	1332	562	4494	473	778	7929
Cyclops vernalis	10	52	0	16	7	102	1	12	100
Tropocyclops prasinus	17	55	1	21	28	76	0	1	42
Calanoida									
Calanoid copepodites	20	105	26	57	51	105	25	71	77
Diaptomus minutus	5	100	80	43	33	74	69	79	86
Diaptomus oregonensis	0.4	34	16		2	93	15	11	52
Diaptomus sicilis	0.5	39	14	0.9	17	25	14	29	46
Diaptomus ashlandi	0	0	0	0	0	0	0	0	0
Diaptomus siciloides	0	0	0	0	0	0	0	0.6	0
Limnocalanus macrurus	11	35	138	29	45	55		96	132
Eurytemora affinis	6	7	0	0	6	2	0	3	1
# of Stations	10	17		7	10	15	26	39	20

Table 19. MEAN ZOOPLANKTON POPULATION DENSITIES. VALUES (NUMBER/m^3) REPRESENT ANIMALS COLLECTED WITH A NET (64 APERTURE) AT STATIONS 50 m TO SURFACE.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 March	24-28 April	12-16 June
Cladocera										
Bosmina coregoni	1		5	157		176	14	0.7	.09	7
Bosmina longirostris	4		825	7399		35	1	1	0.2	185
Daphnia galeata	0		0.5	29		0.1	0.03	0	0	0
Daphnia retrocurva	0.4		0	1917		15	0.06	0.8	0.1	2
Daphnia longiremis	0		0	2		0.2	0	0	0	0.3
Ceriodaphnia lacustris	0		0	279		0.3	0	0	0	0
Chydorus sphaericus	0.1		0	2		0	0	0	0	0
Holopedium gibberum	0		0	0.5		0	0	0	0	0
Polyphemus pediculus	0		0	0.1		0	0	0	0	0
Diaphanosoma	0		0	0.5		0	0	0	0	0
Alona	0		0	0		0.1	0.03	0.1	0	0

Table 19 (continued). MEAN ZOOPLANKTON POPULATION DENSITIES. VALUES (NUMBER/m^3) REPRESENT ANIMALS COLLECTED WITH A NET (64 APERTURE) AT STATIONS 50 m TO SURFACE.

Species	15-19 May	12-16 June	10-14 July	21-25 Aug	Oct-Nov	Nov-Dec	5-9 Feb	19-22 March	24-28 April	12-16 June
Cyclopoida										
Cyclopoid copepodites	141		1363	8840		5753	2963	1181	511	2436
Cyclops bicuspidatus	608		2833	2604		69	25	92	562	250
Cyclops vernalis	0.3		59	453		0.4	0	0	0	0.2
Tropocyclops prasinus	0		54	190		576	163	79	89	23
Calanoida										
Calanoid copepodites	1099		76	58		119	35	52	82	126
Diaptomus ashlandi	0		0	0		.05	.02	0.2	0	0.2
Diaptomus siciloides	24		0	0.9		1	.06	0	0	0
Diaptomus minutus	87		17	18		23	2478	44	39	15
Diaptomus oregonensis	17		4	17		23	6	6	8	1
Diaptomus sicilis	14		29	6		20	8	9	8	2
Limnocalanus macrurus	182		196	84		57	16	82	147	143
Eurytemora affinis	0		5	22		4	0	0	0	0.1
# of Stations counted	16	0	4	20	0	20	14	17	17	17

SECTION X

APPENDIX B

ACOUSTICAL DATA BY STATION

AND CRUISE FOR EACH

5 m DEPTH INTERVAL

1972 AUG STATION 1 DEPTH 33 METERS PREAMP 10**4 AVE 5 DEPTH 45
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-12	120-80	-.5643	200-120	.5874	500-200	.0915	5M
CH	13-24	120-80	-1.0299	200-120	.9108	500-200	.2759	10M
CH	25-36	120-80	-1.5346	200-120	1.1654	500-200	.4794	15M
CH	37-48	120-80	-1.9403	200-120	1.4220	500-200	.6886	20M
CH	49-60	120-80	-2.2065	200-120	1.6947	500-200	.8855	25M
CH	61-72	120-80	-2.3221	200-120	1.9197	500-200	1.0674	30M

1972 AUG STATION 2 DEPTH 16 METERS PREAMP 10**4 AVE 5 DEPTH 22
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-24	120-80	.0983	200-120	.1698	500-200	.2730	5M
CH	25-48	120-80	.1962	200-120	.0009	500-200	.5195	10M
CH	49-72	120-80	.2941	200-120	-.2076	500-200	.8215	15M

1972 AUG STATION 3 DEPTH 22 METERS PREAMP 10** 4 AVE DEPTH 25
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-22	120-80	-.8661	200-120	1.4906	500-200	-.3045	5M
CH	23-44	120-80	-1.1103	200-120	2.3583	500-200	-.0124	10M
CH	45-66	120-80	-1.9279	200-120	3.7986	500-200	.2769	15M
CH	67-88	120-80	-2.7950	200-120	5.2875	500-200	.5655	20M

1972 AUG STATIØN 5 DEPTH 95 METERS PREAMP 10**4 AVE 5 DEPTH 120
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 4	120-80	.3357	200-120	-.0475	500-200	.2367	5M
CH	5- 8	120-80	.4238	200-120	.0712	500-200	.4987	10M
CH	9-12	120-80	.4475	200-120	.2511	500-200	.7778	15M
CH	13-16	120-80	.4618	200-120	.4306	500-200	1.0670	20M
CH	17-20	120-80	.4788	200-120	.6018	500-200	1.3620	25M
CH	21-24	120-80	.4872	200-120	.7691	500-200	1.6621	30M
CH	25-28	120-80	.4938	200-120	.9260	500-200	1.9516	35M
CH	29-32	120-80	.5070	200-120	1.0752	500-200	2.2204	40M
CH	33-36	120-80	.5191	200-120	1.2195	500-200	2.4838	45M
CH	37-40	120-80	.5302	200-120	1.3599	500-200	2.7435	50M
CH	41-44	120-80	.5297	200-120	1.4998	500-200	3.0027	55M
CH	45-48	120-80	.5316	200-120	1.6348	500-200	3.2610	60M
CH	49-52	120-80	.5456	200-120	1.7659	500-200	3.5204	65M
CH	53-56	120-80	.5578	200-120	1.8958	500-200	3.7776	70M
CH	57-60	120-80	.5682	200-120	2.0226	500-200	4.0364	75M
CH	61-64	120-80	.5785	200-120	2.1468	500-200	4.2958	80M
CH	65-68	120-80	.5836	200-120	2.2683	500-200	4.5563	85M
CH	69-72	120-80	.5804	200-120	2.3883	500-200	4.8178	90M
CH	73-76	120-80	.5800	200-120	2.5122	500-200	5.0774	95M

1972 AUG STATION 7 DEPTH 26 METERS PREAMP 10**4 AVE 5 DEPTH 32
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-16	120-80	-.8578	200-120	2.2553	500-200	.0629	5M
CH	17-32	120-80	.6694	200-120	1.2019	500-200	.2717	10M
CH	33-48	120-80	1.6884	200-120	.3961	500-200	.4961	15M
CH	49-64	120-80	2.3643	200-120	-.1168	500-200	.7288	20M
CH	65-80	120-80	2.7587	200-120	-.3537	500-200	.9637	25M

1972 AUG STATION 8 DEPTH 70 METERS PREAMP 10**4 AVE 5 DEPTH 78
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 6	120-80	-.7544	200-120	-.0040	500-200	.3683	5M
CH	7-12	120-80	-.8572	200-120	.0854	500-200	.7349	10M
CH	13-18	120-80	-.8782	200-120	.1730	500-200	1.1019	15M
CH	19-24	120-80	-.8818	200-120	.2494	500-200	1.4749	20M
CH	25-30	120-80	-.9070	200-120	.3502	500-200	1.8424	25M
CH	31-36	120-80	-.9225	200-120	.4498	500-200	2.2119	30M
CH	37-42	120-80	-.9237	200-120	.5330	500-200	2.5841	35M
CH	43-48	120-80	-.9189	200-120	.6080	500-200	2.9556	40M
CH	49-54	120-80	-.9222	200-120	.6800	500-200	3.3282	45M
CH	55-60	120-80	-.9273	200-120	.7570	500-200	3.7016	50M
CH	61-66	120-80	-.9311	200-120	.8307	500-200	4.0728	55M
CH	67-72	120-80	-.9325	200-120	.9055	500-200	4.4454	60M
CH	73-78	120-80	-.9383	200-120	.9836	500-200	4.8184	65M
CH	79-84	120-80	-.9426	200-120	1.0599	500-200	5.1922	70M

1972 AUG STATION 10 DEPTH 119 METERS PREAMP 10**4 AVE 5 DEPTH 150
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 3	120-80	.0650	200-120	-.6737	500-200	.2155	5M
CH	4- 6	120-80	.1426	200-120	-1.3181	500-200	.4146	10M
CH	7- 9	120-80	.1504	200-120	-1.8966	500-200	.6016	15M
CH	10-12	120-80	.1866	200-120	-2.5033	500-200	.7861	20M
CH	13-15	120-80	.2012	200-120	-3.0897	500-200	.9701	25M
CH	16-18	120-80	.2065	200-120	-3.6652	500-200	1.1493	30M
CH	19-21	120-80	.2279	200-120	-4.2656	500-200	1.3285	35M
CH	22-24	120-80	.2531	200-120	-4.8600	500-200	1.5059	40M
CH	25-27	120-80	.3032	200-120	-5.4827	500-200	1.6852	45M
CH	28-30	120-80	.4219	200-120	-6.1946	500-200	1.8621	50M
CH	31-33	120-80	.5052	200-120	-6.8528	500-200	2.0379	55M
CH	34-36	120-80	.5368	200-120	-7.4582	500-200	2.2156	60M
CH	37-39	120-80	.5633	200-120	-8.0667	500-200	2.3916	65M
CH	40-42	120-80	.6078	200-120	-8.6764	500-200	2.5671	70M
CH	43-45	120-80	.6399	200-120	-9.2788	500-200	2.7418	75M
CH	46-48	120-80	.6515	200-120	-9.8670	500-200	2.9136	80M
CH	49-51	120-80	.6778	200-120	-10.4684	500-200	3.0906	85M
CH	52-54	120-80	.7176	200-120	-11.0913	500-200	3.2640	90M
CH	55-57	120-80	.7520	200-120	-11.7079	500-200	3.4378	95M
CH	58-60	120-80	.7909	200-120	-12.3232	500-200	3.6113	100M
CH	61-63	120-80	.8403	200-120	-12.9473	500-200	3.7825	105M
CH	64-66	120-80	.8810	200-120	-13.5528	500-200	3.9554	110M
CH	67-69	120-80	.9039	200-120	-14.1330	500-200	4.1303	115M

1972 AUG STATION 12 DEPTH 21 METERS PREAMP 10**4 AVE 5 DEPTH 25
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-21	120-80	.0971	200-120	1.6866	500-200	.1297	5M
CH	22-42	120-80	-.5097	200-120	2.0719	500-200	.2317	10M
CH	43-63	120-80	-.5147	200-120	1.5431	500-200	.4288	15M
CH	64-84	120-80	-1.0890	200-120	1.5037	500-200	.6381	20M

1972 AUG STATION 14 DEPTH 10 METERS PREAMP 10**4 AVE 5 DEPTH 17
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-29	120-80	.1007	200-120	.5496	500-200	.0681	5M
CH	30-58	120-80	.3652	200-120	.3997	500-200	.2605	10M

1972 AUG STATION 15 DEPTH 102 METERS PERAMP 10**4 AVV 5 DEPTH 140
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	-.5227	200-120	.0542	500-200	.1461	5M
CH	4- 6	120-80	-1.0174	200-120	.2679	500-200	.2654	10M
CH	7- 9	120-80	-1.8632	200-120	.4646	500-200	.3591	15M
CH	10-12	120-80	-1.9734	200-120	.6575	500-200	.4875	20M
CH	13-15	120-80	-1.9819	200-120	.8414	500-200	.6556	25M
CH	16-18	120-80	-1.9782	200-120	1.0188	500-200	.8049	30M
CH	19-21	120-80	-1.9782	200-120	1.1820	500-200	.9541	35M
CH	22-24	120-80	-1.9940	200-120	1.3504	500-200	1.0749	40M
CH	25-27	120-80	-2.0053	200-120	1.6240	500-200	1.1788	45M
CH	28-30	120-80	-2.0046	200-120	1.8221	500-200	1.2794	50M
CH	31-33	120-80	-1.9826	200-120	1.9766	500-200	1.3796	55M
CH	34-36	120-80	-1.9415	200-120	2.0862	500-200	1.4772	60M
CH	37-39	120-80	-1.8873	200-120	2.1743	500-200	1.5763	65M
CH	40-42	120-80	-1.8558	200-120	2.2661	500-200	1.6724	70M
CH	43-45	120-80	-1.8505	200-120	2.3579	500-200	1.7689	75M
CH	46-48	120-80	-1.8423	200-120	2.4819	500-200	1.8675	80M
CH	49-51	120-80	-1.8376	200-120	2.6134	500-200	1.9658	85M
CH	52-54	120-80	-1.8320	200-120	2.7465	500-200	2.0644	90M
CH	55-57	120-80	-1.8320	200-120	2.8746	500-200	2.1592	95M
CH	58-60	120-80	-1.8261	200-120	3.0015	500-200	2.2563	100M

1972 AUG STA 17 PA 10**4 AVG 5 DEPTH 130 SCAN 170
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.9935	200-120	.0049	500-200	-.2037	5M
CH	3- 4	120-80	1.1239	200-120	.1957	500-200	-.0080	10M
CH	5- 6	120-80	1.1377	200-120	.3986	500-200	.2051	15M
CH	7- 8	120-80	1.1366	200-120	.6037	500-200	.4377	20M
CH	9-10	120-80	1.1342	200-120	.7978	500-200	.6777	25M
CH	11-12	120-80	1.1323	200-120	.9785	500-200	.9234	30M
CH	13-14	120-80	1.1280	200-120	1.1488	500-200	1.1705	35M
CH	15-16	120-80	1.1386	200-120	1.3070	500-200	1.4005	40M
CH	17-18	120-80	1.1427	200-120	1.4571	500-200	1.6077	45M
CH	19-20	120-80	1.1404	200-120	1.6107	500-200	1.8076	50M
CH	21-22	120-80	1.1349	200-120	1.7568	500-200	2.0022	55M
CH	23-24	120-80	1.1282	200-120	1.9023	500-200	2.1948	60M
CH	25-26	120-80	1.1211	200-120	2.0514	500-200	2.3868	65M
CH	27-28	120-80	1.1169	200-120	2.1974	500-200	2.5767	70M
CH	29-30	120-80	1.1171	200-120	2.3510	500-200	2.7693	75M
CH	31-32	120-80	1.1127	200-120	2.5225	500-200	2.9625	80M
CH	33-34	120-80	1.1095	200-120	2.7041	500-200	3.1535	85M
CH	35-36	120-80	1.0990	200-120	2.8938	500-200	3.3458	90M
CH	37-38	120-80	1.0896	200-120	3.0868	500-200	3.5380	95M
CH	39-40	120-80	1.0839	200-120	3.2811	500-200	3.7301	100M
CH	41-42	120-80	1.0806	200-120	3.4745	500-200	3.9177	105M
CH	43-44	120-80	1.0687	200-120	3.6694	500-200	4.1074	110M
CH	45-46	120-80	1.0637	200-120	3.8676	500-200	4.2989	115M
CH	47-48	120-80	1.0589	200-120	4.0642	500-200	4.4900	120M
CH	49-50	120-80	1.0518	200-120	4.2613	500-200	4.6790	125M
CH	51-52	120-80	1.0486	200-120	4.4559	500-200	4.8686	130M

1972 AUG STATION 19 DEPTH 14 METERS PREAMP 10**4 AVE 5 DEPTH 25
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-28	120-80	1.2320	200-120	.4721	500-200	.2866	5M
CH	29-56	120-80	.9767	200-120	-.3536	500-200	.4744	10M

1972 AUG STATIØN 20 DEPTH 18 PA 10**4 AVG 5 DEPTH 31
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-19	120-80	.4778	200-120	-1.5842	500-200	.2711	5M
CH	20-38	120-80	.6679	200-120	-.8995	500-200	.5612	10M
CH	39-57	120-80	.7308	200-120	-.7441	500-200	.8779	15M

1972 AUG STATION 24 DEPTH 114 METERS PREAMP 10**4 DEPTPH 150
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	-.4321	200-120	.0066	500-200	.2815	5M
CH	4- 6	120-80	-.8316	200-120	.0065	500-200	.4127	10M
CH	7- 9	120-80	-1.1702	200-120	.0033	500-200	.5139	15M
CH	10-12	120-80	-1.4915	200-120	-.0071	500-200	.6181	20M
CH	13-15	120-80	-1.7986	200-120	-.0045	500-200	.7270	25M
CH	16-18	120-80	-2.0931	200-120	-.0068	500-200	.8273	30M
CH	19-21	120-80	-2.3922	200-120	-.0177	500-200	.9320	35M
CH	22-24	120-80	-2.6911	200-120	-.0205	500-200	1.0356	40M
CH	25-27	120-80	-2.9874	200-120	-.0281	500-200	1.1363	45M
CH	28-30	120-80	-3.2784	200-120	-.0266	500-200	1.2445	50M
CH	31-33	120-80	-3.5677	200-120	-.0310	500-200	1.3494	55M
CH	34-36	120-80	-3.8623	200-120	-.0408	500-200	1.4528	60M
CH	37-39	120-80	-4.1684	200-120	-.0354	500-200	1.5624	65M
CH	40-42	120-80	-4.4585	200-120	-.0459	500-200	1.6651	70M
CH	43-45	120-80	-4.7553	200-120	-.0410	500-200	1.7717	75M
CH	46-48	120-80	-5.0507	200-120	-.0440	500-200	1.8754	80M
CH	49-51	120-80	-5.3399	200-120	-.0551	500-200	1.9802	85M
CH	52-54	120-80	-5.6402	200-120	-.0534	500-200	2.0943	90M
CH	55-57	120-80	-5.9366	200-120	-.0567	500-200	2.2031	95M
CH	58-60	120-80	-6.2276	200-120	-.0571	500-200	2.3211	100M
CH	61-63	120-80	-6.5223	200-120	-.0625	500-200	2.4366	105M
CH	64-66	120-80	-6.8180	200-120	-.0733	500-200	2.5467	110M

1972 AUG STATIØN 26 DEPTH 146 METERS PRE 10**4 AVE 5 DEPTH 200
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.8427	200-120	-.4925	500-200	.1155	5M
CH	3- 4	120-80	.6408	200-120	-.5509	500-200	.3108	10M
CH	5- 6	120-80	.6363	200-120	-.5153	500-200	.5065	15M
CH	7- 8	120-80	.6232	200-120	-.4598	500-200	.6989	20M
CH	9-10	120-80	.6187	200-120	-.3976	500-200	.8899	25M
CH	11-12	120-80	.6914	200-120	-.3774	500-200	1.0771	30M
CH	13-14	120-80	.7840	200-120	-.3585	500-200	1.2680	35M
CH	15-16	120-80	.8582	200-120	-.3143	500-200	1.4544	40M
CH	17-18	120-80	.9237	200-120	-.2685	500-200	1.6378	45M
CH	19-20	120-80	.9583	200-120	-.2274	500-200	1.8231	50M
CH	21-22	120-80	.9975	200-120	-.1813	500-200	2.0090	55M
CH	23-24	120-80	1.0322	200-120	-.1280	500-200	2.1914	60M
CH	25-26	120-80	1.0720	200-120	-.0833	500-200	2.3765	65M
CH	27-28	120-80	1.0997	200-120	-.0388	500-200	2.5560	70M
CH	29-30	120-80	1.1328	200-120	.0019	500-200	2.7358	75M
CH	31-32	120-80	1.1622	200-120	.0431	500-200	2.9144	80M
CH	33-34	120-80	1.1907	200-120	.0862	500-200	3.0979	85M
CH	35-36	120-80	1.2345	200-120	.1270	500-200	3.2834	90M
CH	37-38	120-80	1.2617	200-120	.1676	500-200	3.4689	95M
CH	39-40	120-80	1.2968	200-120	.2117	500-200	3.6536	100M
CH	41-42	120-80	1.3461	200-120	.2563	500-200	3.8386	105M
CH	43-44	120-80	1.3817	200-120	.2965	500-200	4.0287	110M
CH	45-46	120-80	1.4039	200-120	.3489	500-200	4.2177	115M
CH	47-48	120-80	1.4317	200-120	.3988	500-200	4.4073	120M
CH	49-50	120-80	1.4645	200-120	.4398	500-200	4.5970	125M
CH	51-52	120-80	1.4961	200-120	.4841	500-200	4.7880	130M
CH	53-54	120-80	1.5336	200-120	.5281	500-200	4.9801	135M
CH	55-56	120-80	1.5757	200-120	.5741	500-200	5.1733	140M
CH	57-58	120-80	1.6138	200-120	.6233	500-200	5.3676	145M

1972 AUG STATIØN 30 DEPTH 20 PRE 10**4 AVE 5 DEPTH 50
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-10	120-80	.5450	200-120	.6210	500-200	.0882	5M
CH	11-20	120-80	.8197	200-120	1.8323	500-200	.6114	10M
CH	21-30	120-80	1.9730	200-120	2.2402	500-200	1.1592	15M
CH	31-40	120-80	2.6396	200-120	3.1504	500-200	1.6984	20M

1972 AUG STATIØN 31 DEPTH 28 METERS PRE 10**4 AVE 5 DEPTH 45
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-12	120-80	1.1642	200-120	2.4777	500-200	-.6082	5M
CH	13-24	120-80	1.4776	200-120	6.4325	500-200	-.8262	10M
CH	25-36	120-80	1.3738	200-120	11.0377	500-200	-.8072	15M
CH	37-48	120-80	3.2533	200-120	13.7034	500-200	-.7972	20M
CH	49-60	120-80	5.1432	200-120	15.8231	500-200	-.7876	25M

1972 AUG STATIØN 32 DEPTH 171 METERS PRE 10**4 AV3 5 DEPTH 250
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.0424	200-120	.3145	500-200	.1344	5M
CH	3- 4	120-80	.0329	200-120	.5100	500-200	.3412	10M
CH	5- 6	120-80	.0242	200-120	.6792	500-200	.5704	15M
CH	7- 8	120-80	.0254	200-120	.8182	500-200	.8048	20M
CH	9-10	120-80	.0176	200-120	.9472	500-200	1.0072	25M
CH	11-12	120-80	.0122	200-120	1.0671	500-200	1.1884	30M
CH	13-14	120-80	.0076	200-120	1.1812	500-200	1.3624	35M
CH	15-16	120-80	.0031	200-120	1.2955	500-200	1.5345	40M
CH	17-18	120-80	-.0036	200-120	1.4347	500-200	1.7032	45M
CH	19-20	120-80	-.0116	200-120	1.5885	500-200	1.8729	50M
CH	21-22	120-80	-.0220	200-120	1.7552	500-200	2.0423	55M
CH	23-24	120-80	-.0292	200-120	1.9242	500-200	2.2119	60M
CH	25-26	120-80	-.0383	200-120	2.0986	500-200	2.3803	65M
CH	27-28	120-80	-.0388	200-120	2.2726	500-200	2.5485	70M
CH	29-30	120-80	-.0441	200-120	2.4442	500-200	2.7156	75M
CH	31-32	120-80	-.0508	200-120	2.6203	500-200	2.8842	80M
CH	33-34	120-80	-.0583	200-120	2.7933	500-200	3.0527	85M
CH	35-36	120-80	-.0627	200-120	2.9654	500-200	3.2184	90M
CH	37-38	120-80	-.0[illegible]29	200-120	3.1407	500-200	3.3859	95M
CH	39-40	120-80	-.0916	200-120	3.3163	500-200	3.5544	100M
CH	41-42	120-80	-.1046	200-120	3.4932	500-200	3.7229	105M
CH	43-44	120-80	-.1072	200-120	3.6628	500-200	3.8892	110M
CH	45-46	120-80	-.1222	200-120	3.8365	500-200	4.0566	115M
CH	47-48	120-80	-.1345	200-120	4.0095	500-200	4.2237	120M
CH	49-50	120-80	-.1545	200-120	4.1844	500-200	4.3928	125M
CH	51-52	120-80	-.1630	200-120	4.3572	500-200	4.5597	130M
CH	53-54	120-80	-.1682	200-120	4.5329	500-200	4.7267	135M
CH	55-56	120-80	-.1766	200-120	4.7067	500-200	4.8937	140M
CH	57-58	120-80	-.1836	200-120	4.8841	500-200	5.0623	145M
CH	59-60	120-80	-.1972	200-120	5.0608	500-200	5.2320	150M
CH	61-62	120-80	-.2160	200-120	5.2334	500-200	5.3991	155M
CH	63-64	120-80	-.2248	200-120	5.4060	500-200	5.5680	160M
CH	65-66	120-80	-.2310	200-120	5.5758	500-200	5.7369	165M
CH	67-68	120-80	-.2382	200-120	5.7413	500-200	5.9037	170M

1972 AUG STATIØN 34 DEPTH 85 M PA 10**4 AVG 5 DEPTH 150 M
MEAN VALUE OF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	-.1097	200-120	-.3552	500-200	-.0045	5M
CH	4- 6	120-80	-.3403	200-120	-.2320	500-200	-.0524	10M
CH	7- 9	120-80	-.4103	200-120	-.0387	500-200	.1140	15M
CH	10-12	120-80	-.4469	200-120	.1495	500-200	.1643	20M
CH	13-15	120-80	-.4720	200-120	.3239	500-200	.2153	25M
CH	16-18	120-80	-.4962	200-120	.5007	500-200	.2624	30M
CH	19-21	120-80	-.5129	200-120	.6820	500-200	.3074	35M
CH	22-24	120-80	-.5434	200-120	.8689	500-200	.3526	40M
CH	25-27	120-80	-.5719	200-120	1.0500	500-200	.4002	45M
CH	28-30	120-80	-.5948	200-120	1.2237	500-200	.4473	50M
CH	31-33	120-80	-.6266	200-120	1.4017	500-200	.4917	55M
CH	34-36	120-80	-.6650	200-120	1.5862	500-200	.5351	60M
CH	37-39	120-80	-.7031	200-120	1.7659	500-200	.5816	65M
CH	40-42	120-80	-.7352	200-120	1.9466	500-200	.6246	70M
CH	43-45	120-80	-.7584	200-120	2.1221	500-200	.6692	75M
CH	46-48	120-80	-.7818	200-120	2.2995	500-200	.7108	80M
CH	49-51	120-80	-.8093	200-120	2.4758	500-200	.7547	85M

1972 AUG STATIØN 35 DEPTH 29 METERS PRE 10**4 AVE 5 DEPTH 35
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	.6212	200-120	.6437	500-200	-.3281	5M
CH	17-32	120-80	1.0086	200-120	1.2381	500-200	-.1735	10M
CH	33-48	120-80	1.2079	200-120	1.6278	500-200	.0110	15M
CH	49-64	120-80	1.2170	200-120	4.3624	500-200	.2065	20M
CH	65-80	120-80	1.2077	200-120	6.1681	500-200	.4085	25M

1972 AUG STATION 36 DEPTH 30 METERS PREAMP 10**4 AVE 55 DEPTH 35
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	-.1437	200-120	.7650	500-200	-.1621	5M
CH	15-28	120-80	-.0319	200-120	1.2734	500-200	.1898	10M
CH	29-42	120-80	-.3958	200-120	2.2566	500-200	.5522	15M
CH	43-56	120-80	-.8767	200-120	3.3557	500-200	.9215	20M
CH	57-70	120-80	-1.0429	200-120	4.1117	500-200	1.2887	25M
CH	71-84	120-80	-.8993	200-120	3.7747	500-200	1.6411	30M

1972 AUG STATIØN 38 DEPTH 125 METERS AVE 5 PRE 10**4 DEPTH 145
MEAN VALUE OF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.5018	200-120	.2373	500-200	.2122	5M
CH	4- 6	120-80	-.1410	200-120	.8072	500-200	.4416	10M
CH	7- 9	120-80	-.1561	200-120	.5588	500-200	.7191	15M
CH	10-12	120-80	.1971	200-120	.3782	500-200	1.0368	20M
CH	13-15	120-80	.3645	200-120	.5391	500-200	1.3674	25M
CH	16-18	120-80	.7728	200-120	.4242	500-200	1.6967	30M
CH	19-21	120-80	1.0756	200-120	.3730	500-200	1.9927	35M
CH	22-24	120-80	1.1440	200-120	.5520	500-200	2.2770	40M
CH	25-27	120-80	1.2227	200-120	.7029	500-200	2.5570	45M
CH	28-30	120-80	1.3216	200-120	.8873	500-200	2.8355	50M
CH	31-33	120-80	1.3361	200-120	1.0394	500-200	3.1138	55M
CH	34-36	120-80	1.3089	200-120	1.2224	500-200	3.3918	60M
CH	37-39	120-80	1.3014	200-120	1.4048	500-200	3.6697	65M
CH	40-42	120-80	1.3204	200-120	1.5882	500-200	3.9471	70M
CH	43-45	120-80	1.3158	200-120	1.7722	500-200	4.2242	75M
CH	46-48	120-80	1.3206	200-120	1.9516	500-200	4.5030	80M
CH	49-51	120-80	1.3372	200-120	2.1395	500-200	4.7802	85M
CH	52-54	120-80	1.3202	200-120	2.3525	500-200	5.0598	90M
CH	55-57	120-80	1.4819	200-120	2.4030	500-200	5.3349	95M
CH	58-60	120-80	1.5665	200-120	2.5478	500-200	5.6111	100M
CH	61-63	120-80	1.5885	200-120	2.7592	500-200	5.8871	105M
CH	64-66	120-80	1.6004	200-120	2.9861	500-200	6.1630	110M
CH	67-69	120-80	1.6069	200-120	3.2215	500-200	6.4393	115M
CH	70-72	120-80	1.6178	200-120	3.4536	500-200	6.7147	120M
CH	73-75	120-80	1.6350	200-120	3.6857	500-200	6.9930	125M

1972 AUG STATIØN 40 DEPTH 175 METERS PRE 10 **4 AVE 5 DEPTH 250
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.2274	200-120	.6029	500-200	-.2473	5M
CH	3- 4	120-80	.2606	200-120	.8427	500-200	-.1545	10M
CH	5- 6	120-80	.2664	200-120	1.0325	500-200	-.0385	15M
CH	7- 8	120-80	.2718	200-120	1.2035	500-200	.0827	20M
CH	9-10	120-80	.2779	200-120	1.3541	500-200	.1895	25M
CH	11-12	120-80	.2829	200-120	1.4982	500-200	.2658	30M
CH	13-14	120-80	.2837	200-120	1.6472	500-200	.3318	35M
CH	15-16	120-80	.2851	200-120	1.7904	500-200	.3955	40M
CH	17-18	120-80	.2847	200-120	1.9367	500-200	.4556	45M
CH	19-20	120-80	.2888	200-120	2.0998	500-200	.5141	50M
CH	21-22	120-80	.2948	200-120	2.2747	500-200	.5735	55M
CH	23-24	120-80	.2946	200-120	2.4634	500-200	.6322	60M
CH	25-26	120-80	.2931	200-120	2.6535	500-200	.6911	65M
CH	27-28	120-80	.2883	200-120	2.8441	500-200	.7482	70M
CH	29-30	120-80	.2910	200-120	3.0400	500-200	.8044	75M
CH	31-32	120-80	.2868	200-120	3.2290	500-200	.8597	80M
CH	33-34	120-80	.2803	200-120	3.4249	500-200	.9150	85M
CH	35-36	120-80	.2729	200-120	3.6205	500-200	.9695	90M
CH	37-38	120-80	.2672	200-120	3.8189	500-200	1.0249	95M
CH	39-40	120-80	.2689	200-120	4.0143	500-200	1.0794	100M
CH	41-42	120-80	.2679	200-120	4.2120	500-200	1.1320	105M
CH	43-44	120-80	.2639	200-120	4.4076	500-200	1.1852	110M
CH	45-46	120-80	.2611	200-120	4.6027	500-200	1.2413	115M
CH	47-48	120-80	.2610	200-120	4.7963	500-200	1.2959	120M
CH	49-50	120-80	.2627	200-120	4.9884	500-200	1.3482	125M
CH	51-52	120-80	.2609	200-120	5.1826	500-200	1.4014	130M
CH	53-54	120-80	.2596	200-120	5.3792	500-200	1.4542	135M
CH	55-56	120-80	.2490	200-120	5.5744	500-200	1.5084	140M
CH	57-58	120-80	.2420	200-120	5.7725	500-200	1.5603	145M
CH	59-60	120-80	.2444	200-120	5.9643	500-200	1.6127	150M
CH	61-62	120-80	.2379	200-120	6.1638	500-200	1.6656	155M
CH	63-64	120-80	.2387	200-120	6.3570	500-200	1.7195	160M
CH	65-66	120-80	.2366	200-120	6.5526	500-200	1.7721	165M
CH	67-68	120-80	.2315	200-120	6.7451	500-200	1.8242	170M
CH	69-70	120-80	.2270	200-120	6.9406	500-200	1.8792	175M

1972 AUG STATIØN 41 DEPTH 26 METERS AVE 5 PREAMP 10**4 DEPTH 40
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-13	120-80	.1004	200-120	-.7465	500-200	.4527	5M
CH	14-26	120-80	-.3110	200-120	-.7353	500-200	.8795	10M
CH	27-39	120-80	-.6649	200-120	-.6441	500-200	1.3055	15M
CH	40-52	120-80	-.7378	200-120	-.5264	500-200	1.7299	20M
CH	53-65	120-80	-.6396	200-120	-.4435	500-200	1.8984	25M

1972 AUG STATION 42 DEPTH 15 METERSØ PRREAMP 10**4 AVE 5 DEPTH
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	.0990	200-120	1.3608	500-200	.3011	5M
CH	17-32	120-80	.1979	200-120	.6838	500-200	.4869	10M
CH	33-48	120-80	.0044	200-120	.0444	500-200	.6918	15M

1972 AUG STATIØN 44 DEPTH 174 PREAMP 10**4 DEPTH 200 METERS
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.8706	200-120	-.3853	500-200	.2628	5M
CH	3- 4	120-80	1.2459	200-120	-.5380	500-200	.1853	10M
CH	5- 6	120-80	1.3363	200-120	.1219	500-200	.4945	15M
CH	7- 8	120-80	1.4180	200-120	.6090	500-200	.9272	20M
CH	9-10	120-80	1.7678	200-120	.6527	500-200	1.3656	25M
CH	11-12	120-80	1.9710	200-120	.6555	500-200	1.7925	30M
CH	13-14	120-80	2.0850	200-120	.7194	500-200	2.1988	35M
CH	15-16	120-80	2.1324	200-120	.8388	500-200	2.5988	40M
CH	17-18	120-80	2.1682	200-120	.9667	500-200	2.9948	45M
CH	19-20	120-80	2.2081	200-120	1.0894	500-200	3.3889	50M
CH	21-22	120-80	2.2409	200-120	1.2190	500-200	3.7807	55M
CH	23-24	120-80	2.2678	200-120	1.3629	500-200	4.1743	60M
CH	25-26	120-80	2.2953	200-120	1.5175	500-200	4.5670	65M
CH	27-28	120-80	2.3339	200-120	1.6743	500-200	4.9580	70M
CH	29-30	120-80	2.3733	200-120	1.8337	500-200	5.3505	75M
CH	31-32	120-80	2.4027	200-120	2.0006	500-200	5.7426	80M
CH	33-34	120-80	2.4246	200-120	2.1713	500-200	6.1358	85M
CH	35-36	120-80	2.4405	200-120	2.3495	500-200	6.5294	90M
CH	37-38	120-80	2.4718	200-120	2.5162	500-200	6.9221	95M
CH	39-40	120-80	2.5100	200-120	2.6785	500-200	7.3157	100M
CH	41-42	120-80	2.5371	200-120	2.8429	500-200	7.7076	105M
CH	43-44	120-80	2.5659	200-120	3.0080	500-200	8.1009	110M
CH	45-46	120-80	2.5943	200-120	3.1744	500-200	8.4930	115M
CH	47-48	120-80	2.6209	200-120	3.3421	500-200	8.8865	120M
CH	49-50	120-80	2.6500	200-120	3.5105	500-200	9.2790	125M
CH	51-52	120-80	2.6786	200-120	3.6777	500-200	9.6717	130M
CH	53-54	120-80	2.7090	200-120	3.8468	500-200	10.0644	135M
CH	55-56	120-80	2.7366	200-120	4.0165	500-200	10.4553	140M
CH	57-58	120-80	2.7618	200-120	4.1846	500-200	10.8489	145M
CH	59-60	120-80	2.7901	200-120	4.3479	500-200	11.2401	150M
CH	61-62	120-80	2.8162	200-120	4.5141	500-200	11.6351	155M
CH	63-64	120-80	2.8477	200-120	4.6819	500-200	12.0277	160M
CH	65-66	120-80	2.8721	200-120	4.8504	500-200	12.4200	165M
CH	67-68	120-80	2.9014	200-120	5.0156	500-200	12.8146	170M

1972 AUG STATION 45 DEPTH 200 METERS PREAMP 10**4 AVE 5 DEPTH 220
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	.0876	200-120	.4578	500-200	-.6339	5M
CH	3- 4	120-80	.2836	200-120	1.0111	500-200	-.4951	10M
CH	5- 6	120-80	-.4215	200-120	1.4129	500-200	-.1980	15M
CH	7- 8	120-80	-.4959	200-120	1.6151	500-200	.1067	20M
CH	9-10	120-80	-.4790	200-120	1.7748	500-200	.3978	25M
CH	11-12	120-80	-.4539	200-120	1.9233	500-200	.6628	30M
CH	13-14	120-80	-.4314	200-120	2.0691	500-200	.9211	35M
CH	15-16	120-80	-.4060	200-120	2.2124	500-200	1.1713	40M
CH	17-18	120-80	-.3837	200-120	2.3583	500-200	1.4191	45M
CH	19-20	120-80	-.3644	200-120	2.5246	500-200	1.6695	50M
CH	21-22	120-80	-.3475	200-120	2.7006	500-200	1.9178	55M
CH	23-24	120-80	-.3328	200-120	2.8830	500-200	2.1657	60M
CH	25-26	120-80	-.3236	200-120	3.0698	500-200	2.4129	65M
CH	27-28	120-80	-.3059	200-120	3.2568	500-200	2.6584	70M
CH	29-30	120-80	-.2863	200-120	3.4441	500-200	2.9064	75M
CH	31-32	120-80	-.2686	200-120	3.6320	500-200	3.1510	80M
CH	33-34	120-80	-.2504	200-120	3.8209	500-200	3.3976	85M
CH	35-36	120-80	-.2229	200-120	4.0101	500-200	3.6453	90M
CH	37-38	120-80	-.1942	200-120	4.1965	500-200	3.8904	95M
CH	39-40	120-80	-.1769	200-120	4.3861	500-200	4.1358	100M
CH	41-42	120-80	-.1687	200-120	4.5788	500-200	4.3830	105M
CH	43-44	120-80	-.1495	200-120	4.7686	500-200	4.6281	110M
CH	45-46	120-80	-.1233	200-120	4.9547	500-200	4.8746	115M
CH	47-48	120-80	-.1077	200-120	5.1455	500-200	5.1185	120M
CH	49-50	120-80	-.0892	200-120	5.3283	500-200	5.3648	125M
CH	51-52	120-80	-.0715	200-120	5.5132	500-200	5.6101	130M
CH	53-54	120-80	-.0521	200-120	5.6983	500-200	5.8526	135M
CH	55-56	120-80	-.0430	200-120	5.8863	500-200	6.0973	140M
CH	57-58	120-80	-.0298	200-120	6.0726	500-200	6.3415	145M
CH	59-60	120-80	-.0111	200-120	6.2597	500-200	6.5871	150M
CH	61-62	120-80	.0021	200-120	6.4468	500-200	6.8288	155M
CH	63-64	120-80	.0186	200-120	6.6328	500-200	7.0732	160M
CH	65-66	120-80	.0381	200-120	6.8189	500-200	7.3173	165M
CH	67-68	120-80	.0547	200-120	7.0012	500-200	7.5604	170M
CH	69-70	120-80	.0656	200-120	7.1874	500-200	7.8071	175M
CH	71-72	120-80	.0794	200-120	7.3733	500-200	8.0533	180M
CH	73-74	120-80	.0913	200-120	7.5628	500-200	8.2976	185M
CH	75-76	120-80	.1122	200-120	7.7484	500-200	8.5416	190M
CH	77-78	120-80	.1203	200-120	7.9385	500-200	8.7875	195M
CH	79-80	120-80	.1420	200-120	8.1172	500-200	9.0277	200M

1972 AUG STATION 46 DEPTH 120 METERS PREAMP 10**4 AVE5 DEPTH 150
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.1903	200-120	2.1824	500-200	-1.3690	5M
CH	4- 6	120-80	.6815	200-120	2.7653	500-200	-1.6090	10M
CH	7- 9	120-80	1.1051	200-120	3.3084	500-200	-1.6026	15M
CH	10-12	120-80	1.2764	200-120	3.7686	500-200	-1.5978	20M
CH	13-15	120-80	1.4685	200-120	3.7109	500-200	-1.5843	25M
CH	16-18	120-80	1.5042	200-120	3.7329	500-200	-1.5920	30M
CH	19-21	120-80	1.5158	200-120	3.7431	500-200	-1.6158	35M
CH	22-24	120-80	1.5322	200-120	3.7317	500-200	-1.6460	40M
CH	25-27	120-80	1.5511	200-120	3.7170	500-200	-1.6818	45M
CH	28-30	120-80	1.5670	200-120	3.7138	500-200	-1.7193	50M
CH	31-33	120-80	1.5763	200-120	3.7088	500-200	-1.7579	55M
CH	34-36	120-80	1.5833	200-120	3.6966	500-200	-1.7983	60M
CH	37-39	120-80	1.5860	200-120	3.6871	500-200	-1.8404	65M
CH	40-42	120-80	1.5882	200-120	3.6727	500-200	-1.8796	70M
CH	43-45	120-80	1.5942	200-120	3.6622	500-200	-1.9198	75M
CH	46-48	120-80	1.6039	200-120	3.6632	500-200	-1.9594	80M
CH	49-51	120-80	1.6034	200-120	3.6716	500-200	-1.9960	85M
CH	52-54	120-80	1.5971	200-120	3.6887	500-200	-2.0386	90M
CH	55-57	120-80	1.5942	200-120	3.7085	500-200	-2.0811	95M
CH	58-60	120-80	1.5916	200-120	3.7358	500-200	-2.1247	100M
CH	61-63	120-80	1.5924	200-120	3.7655	500-200	-2.1654	105M
CH	64-66	120-80	1.5902	200-120	3.8021	500-200	-2.2065	110M
CH	67-69	120-80	1.5798	200-120	3.8386	500-200	-2.2460	115M
CH	70-72	120-80	1.5736	200-120	3.8790	500-200	-2.2840	120M

1972
AUG STATION 48 DEPTH 26 PREAMP 10**4 AVE 5 DEPTH 35
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	.7803	200-120	.6004	500-200	-.3011	5M
CH	15-28	120-80	.6181	200-120	1.8190	500-200	-.3170	10M
CH	29-42	120-80	.5725	200-120	2.1448	500-200	-.3083	15M
CH	43-56	120-80	.5984	200-120	2.1082	500-200	-.2894	20M
CH	57-70	120-80	.6273	200-120	1.9898	500-200	-.2676	25M

1972 AUG STATIØN 49 DEPTH 20 DEPTH 25 METERS AVE 5 PREAMP 10**4
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	-.8125	200-120	.0037	500-200	.1876	5M
CH	21-40	120-80	-1.5937	200-120	-.1135	500-200	.3831	10M
CH	41-60	120-80	-2.3075	200-120	-.2169	500-200	.5783	15M
CH	61-80	120-80	-2.9413	200-120	-.3028	500-200	.7734	20M

1972 AUG STATION 52 DEPTH 100 DEPTH 65 PA 10/4 AVE 5
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 5	120-80	.0939	200-120	-.2483	500-200	-.0787	5M
CH	6-10	120-80	.6248	200-120	-.9743	500-200	.0898	10M
CH	11-15	120-80	.2512	200-120	-1.0091	500-200	.2550	15M
CH	16-20	120-80	-.4655	200-120	-.9671	500-200	.4225	20M
CH	21-25	120-80	-1.0870	200-120	-.9341	500-200	.6143	25M
CH	26-30	120-80	-1.0277	200-120	-.8664	500-200	.8307	30M
CH	31-35	120-80	-2.2190	200-120	-.8103	500-200	1.0517	35M
CH	36-40	120-80	-2.9990	200-120	-.7717	500-200	1.2696	40M
CH	41-45	120-80	-3.4892	200-120	-.7387	500-200	1.4920	45M
CH	46-50	120-80	-3.7771	200-120	-.6998	500-200	1.7139	50M
CH	51-55	120-80	-3.9503	200-120	-.6492	500-200	1.9381	55M
CH	56-60	120-80	-4.0104	200-120	-.5935	500-200	2.1616	60M
CH	61-65	120-80	-4.0301	200-120	-.5268	500-200	2.3849	65M

1972 AUG STATIØN 54 DEPTH 180 DEPTH 139 PA 10/4 AVEE5
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.2321	200-120	1.9078	500-200	-.9021	5M
CH	3- 4	120-80	.2747	200-120	2.2473	500-200	-.7665	10M
CH	5- 6	120-80	.2934	200-120	2.3455	500-200	-.6143	15M
CH	7- 8	120-80	.3128	200-120	2.4114	500-200	-.4693	20M
CH	9-10	120-80	.3306	200-120	2.4702	500-200	-.3161	25M
CH	11-12	120-80	.3449	200-120	2.5272	500-200	-.1676	30M
CH	13-14	120-80	.3609	200-120	2.5853	500-200	-.0151	35M
CH	15-16	120-80	.3727	200-120	2.6462	500-200	.1379	40M
CH	17-18	120-80	.3839	200-120	2.7062	500-200	.2867	45M
CH	19-20	120-80	.3966	200-120	2.7565	500-200	.4425	50M
CH	21-22	120-80	.4097	200-120	2.8096	500-200	.5861	55M
CH	23-24	120-80	.4240	200-120	2.8598	500-200	.7403	60M
CH	25-26	120-80	.4347	200-120	2.9121	500-200	.8979	65M
CH	27-28	120-80	.4469	200-120	2.9621	500-200	1.0537	70M
CH	29-30	120-80	.4582	200-120	3.0126	500-200	1.2116	75M
CH	31-32	120-80	.4717	200-120	3.0630	500-200	1.3649	80M
CH	33-34	120-80	.4833	200-120	3.1143	500-200	1.5279	85M
CH	35-36	120-80	.4950	200-120	3.1674	500-200	1.6876	90M
CH	37-38	120-80	.5054	200-120	3.2159	500-200	1.8497	95M
CH	39-40	120-80	.5170	200-120	3.2646	500-200	2.0171	100M
CH	41-42	120-80	.5256	200-120	3.3195	500-200	2.1842	105M
CH	43-44	120-80	.5353	200-120	3.3728	500-200	2.3464	110M
CH	45-46	120-80	.5459	200-120	3.4204	500-200	2.5203	115M
CH	47-48	120-80	.5560	200-120	3.4702	500-200	2.6844	120M
CH	49-50	120-80	.5619	200-120	3.5206	500-200	2.8502	125M
CH	51-52	120-80	.5716	200-120	3.5691	500-200	3.0208	130M
CH	53-54	120-80	.5810	200-120	3.6171	500-200	3.1883	135M

1972 AUG STATION 59 DEPTH 35 DEPTH 26 80 KC PA LO // 4 AVE 5
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	1.2366	200-120	-1.1462	500-200	.1692	5M
CH	15-28	120-80	2.2606	200-120	-2.1760	500-200	.3616	10M
CH	29-42	120-80	3.0619	200-120	-3.0922	500-200	.5523	15M
CH	43-56	120-80	3.5004	200-120	-3.5886	500-200	.7478	20M
CH	57-70	120-80	3.6884	200-120	-3.7448	500-200	1.1789	25M

1972 AUG STATIØN 60 DEPTH 12 M PA 10**4 AVG 5 DEPTH 25
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-24	120-80	.0992	200-120	.5455	500-20(	-.3820	5M
CH	25-48	120-80	1.0234	200-120	1.0483	500-200	-.2651	10M

1972 AUG STATION 62 DEPTH 169 METERS PREAMP 10**4 AVE 5 DEPTH 210
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.1066	200-120	.0604	500-200	.1211	5M
CH	3- 4	120-80	-.1391	200-120	.1465	500-200	.2243	10M
CH	5- 6	120-80	-.1622	200-120	.2277	500-200	.3384	15M
CH	7- 8	120-80	-.1808	200-120	.2852	500-200	.4514	20M
CH	9-10	120-80	-.2063	200-120	.3331	500-200	.5607	25M
CH	11-12	120-80	-.2590	200-120	.3765	500-200	.6680	30M
CH	13-14	120-80	-.2998	200-120	.4198	500-200	.7942	35M
CH	15-16	120-80	-.3236	200-120	.4547	500-200	.9515	40M
CH	17-18	120-80	-.3315	200-120	.4801	500-200	1.0799	45M
CH	19-20	120-80	-.3553	200-120	.5209	500-200	1.2030	50M
CH	21-22	120-80	-.3826	200-120	.5625	500-200	1.3216	55M
CH	23-24	120-80	-.4095	200-120	.6047	500-200	1.4424	60M
CH	25-26	120-80	-.4364	200-120	.6443	500-200	1.5614	65M
CH	27-28	120-80	-.4632	200-120	.6793	500-200	1.6754	70M
CH	29-30	120-80	-.4939	200-120	.7218	500-200	1.7905	75M
CH	31-32	120-80	-.5264	200-120	.7602	500-200	1.9062	80M
CH	33-34	120-80	-.5572	200-120	.8003	500-200	2.0184	85M
CH	35-36	120-80	-.5858	200-120	.8380	500-200	2.1308	90M
CH	37-38	120-80	-.6134	200-120	.8780	500-200	2.2424	95M
CH	39-40	120-80	-.6410	200-120	.9218	500-200	2.3531	100M
CH	41-42	120-80	-.6720	200-120	.9682	500-200	2.4621	105M
CH	43-44	120-80	-.6990	200-120	1.0069	500-200	2.5724	110M
CH	45-46	120-80	-.7232	200-120	1.0354	500-200	2.6825	115M
CH	47-48	120-80	-.7531	200-120	1.0698	500-200	2.7943	120M
CH	49-50	120-80	-.7859	200-120	1.1064	500-200	2.9029	125M
CH	51-52	120-80	-.8181	200-120	1.1424	500-200	3.0101	130M
CH	53-54	120-80	-.8423	200-120	1.1826	500-200	3.1206	135M
CH	55-56	120-80	-.8794	200-120	1.2269	500-200	3.2292	140M
CH	57-58	120-80	-.9143	200-120	1.2662	500-200	3.3377	145M
CH	59-60	120-80	-.9443	200-120	1.3033	500-200	3.4473	150M
CH	61-62	120-80	-.9666	200-120	1.3392	500-200	3.5552	155M
CH	63-64	120-80	-.9965	200-120	1.3754	500-200	3.6640	160M
CH	65-66	120-80	-1.0310	200-120	1.4129	500-200	3.7704	165M

1972 AUG STATION 64 DEPTH 85 METERS PREA 10**4 AVE 5 DEPTH 125
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 4	120-80	-.8392	200-120	.4728	500-200	.2732	5M
CH	5- 8	120-80	-.2752	200-120	-.3633	500-200	.6212	10M
CH	9-12	120-80	-1.3822	200-120	-.5458	500-200	.9708	15M
CH	13-16	120-80	-1.6832	200-120	-.8314	500-200	1.3171	20M
CH	17-20	120-80	-1.8047	200-120	-1.0135	500-200	1.6568	25M
CH	21-24	120-80	-2.0649	200-120	-1.0911	500-200	1.9962	30M
CH	25-28	120-80	-2.2202	200-120	-1.1473	500-200	2.3365	35M
CH	29-32	120-80	-2.2819	200-120	-1.1559	500-200	2.6810	40M
CH	33-36	120-80	-2.2746	200-120	-1.1409	500-200	3.0189	45M
CH	37-40	120-80	-2.2744	200-120	-1.0975	500-200	3.3561	50M
CH	41-44	120-80	-2.2787	200-120	-1.0655	500-200	3.6934	55M
CH	45-48	120-80	-2.2831	200-120	-1.0352	500-200	4.0313	60M
CH	49-52	120-80	-2.2671	200-120	-1.0129	500-200	4.3681	65M
CH	53-56	120-80	-2.2821	200-120	-.9680	500-200	4.7051	70M
CH	57-60	120-80	-2.3054	200-120	-.9203	500-200	5.0427	75M
CH	61-64	120-80	-2.3208	200-120	-.8853	500-200	5.3799	80M
CH	65-68	120-80	-2.3373	200-120	-.8448	500-200	5.7186	85M

1972 AUG STATION 66 DEPTH 26 DEPTH 30 PA 10**4 AVE 5
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-17	120-80	-.3700	200-120	.1288	500-200	.1896	5M
CH	18-34	120-80	-.5099	200-120	.1770	500-200	.3870	10M
CH	35-51	120-80	-.5419	200-120	.2291	500-200	.5860	15M
CH	52-68	120-80	-.5302	200-120	.2840	500-200	.7862	20M
CH	69-85	120-80	-.5112	200-120	.3471	500-200	.9878	25M

1972 AUG STATION 67 DEPTH 20 METERS PREAMP 10*4 AVE 5 DEPTH 25
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-20	120-80	.0975	200-120	-.5574	500-200	-.1659	5M
CH	21-40	120-80	.6068	200-120	.3514	500-200	-.0423	10M
CH	41-60	120-80	-.0899	200-120	.8659	500-200	.0780	15M
CH	61-80	120-80	-.2030	200-120	1.2535	500-200	.1856	20M

1972 AUG STATION 69 DEPTH 152 DEPTH 180 PREAMP 10**4 AVE 5
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	.0672	200-120	-.0933	500-200	.0594	5M
CH	3- 4	120-80	.0314	200-120	-.2520	500-200	.2172	10M
CH	5- 6	120-80	.0043	200-120	-.3654	500-200	.3728	15M
CH	7- 8	120-80	-.1876	200-120	-.4749	500-200	.5394	20M
CH	9-10	120-80	-.2187	200-120	-.5747	500-200	.6946	25M
CH	11-12	120-80	-.1928	200-120	-.7134	500-200	.8563	30M
CH	13-14	120-80	-.1824	200-120	-.8416	500-200	1.0119	35M
CH	15-16	120-80	-.1794	200-120	-.9566	500-200	1.2111	40M
CH	17-18	120-80	-.1777	200-120	-1.0699	500-200	1.4122	45M
CH	19-20	120-80	-.1851	200-120	-1.1730	500-200	1.5986	50M
CH	21-22	120-80	-.1796	200-120	-1.2852	500-200	1.8027	55M
CH	23-24	120-80	-.1859	200-120	-1.3911	500-200	1.9889	60M
CH	25-26	120-80	-.1951	200-120	-1.4966	500-200	2.1721	65M
CH	27-28	120-80	-.2009	200-120	-1.6010	500-200	2.3552	70M
CH	29-30	120-80	-.2073	200-120	-1.7477	500-200	2.5377	75M
CH	31-32	120-80	-.2124	200-120	-1.8936	500-200	2.7258	80M
CH	33-34	120-80	-.2237	200-120	-2.0365	500-200	2.9023	85M
CH	35-36	120-80	-.2309	200-120	-2.1884	500-200	3.0792	90M
CH	37-38	120-80	-.2373	200-120	-2.3340	500-200	3.2505	95M
CH	39-40	120-80	-.2470	200-120	-2.4760	500-200	3.4137	100M
CH	41-42	120-80	-.2528	200-120	-2.6244	500-200	3.5732	105M
CH	43-44	120-80	-.2587	200-120	-2.7686	500-200	3.7377	110M
CH	45-46	120-80	-.2635	200-120	-2.9120	500-200	3.8860	115M
CH	47-48	120-80	-.2633	200-120	-3.0536	500-200	4.0520	120M
CH	49-50	120-80	-.2588	200-120	-3.1974	500-200	4.2133	125M
CH	51-52	120-80	-.2642	200-120	-3.3361	500-200	4.3646	130M
CH	53-54	120-80	-.2707	200-120	-3.4763	500-200	4.5177	135M
CH	55-56	120-80	-.2764	200-120	-3.6132	500-200	4.6520	140M
CH	57-58	120-80	-.2780	200-120	-3.7510	500-200	4.8036	145M
CH	59-60	120-80	-.2891	200-120	-3.8897	500-200	4.9395	150M

1972 AUG STATION 71 DEPTH 186 AVE 5 PREAMP 10**44 DEPTH 235
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.1804	200-120	1.2288	500-200	-.1572	5M
CH	3- 4	120-80	-.4407	200-120	1.5778	500-200	.3856	10M
CH	5- 6	120-80	-.7016	200-120	1.7188	500-200	.9394	15M
CH	7- 8	120-80	-.9374	200-120	1.8124	500-200	1.4929	20M
CH	9-10	120-80	-1.1700	200-120	1.9095	500-200	2.0310	25M
CH	11-12	120-80	-1.4033	200-120	2.0154	500-200	2.5757	30M
CH	13-14	120-80	-1.6395	200-120	2.1246	500-200	3.1160	35M
CH	15-16	120-80	-1.8798	200-120	2.2365	500-200	3.6593	40M
CH	17-18	120-80	-2.1224	200-120	2.3513	500-200	4.1985	45M
CH	19-20	120-80	-2.3552	200-120	2.4641	500-200	4.7347	50M
CH	21-22	120-80	-2.5999	200-120	2.5795	500-200	5.2780	55M
CH	23-24	120-80	-2.8414	200-120	2.6906	500-200	5.8084	60M
CH	25-26	120-80	-3.0774	200-120	2.7966	500-200	6.3344	65M
CH	27-28	120-80	-3.3123	200-120	2.8938	500-200	6.8644	70M
CH	29-30	120-80	-3.5462	200-120	2.9882	500-200	7.3901	75M
CH	31-32	120-80	-3.7712	200-120	3.0811	500-200	7.9232	80M
CH	33-34	120-80	-3.9970	200-120	3.1803	500-200	8.4452	85M
CH	35-36	120-80	-4.2286	200-120	3.2868	500-200	8.9724	90M
CH	37-38	120-80	-4.4627	200-120	3.3885	500-200	9.4906	95M
CH	39-40	120-80	-4.6888	200-120	3.4789	500-200	10.0090	100M
CH	41-42	120-80	-4.9194	200-120	3.5766	500-200	10.5298	105M
CH	43-44	120-80	-5.1481	200-120	3.6706	500-200	11.0528	110M
CH	45-46	120-80	-5.3768	200-120	3.7638	500-200	11.5617	115M
CH	47-48	120-80	-5.6088	200-120	3.8596	500-200	12.0824	120M
CH	49-50	120-80	-5.8369	200-120	3.9561	500-200	12.6052	125M
CH	51-52	120-80	-6.0728	200-120	4.0616	500-200	13.1188	130M
CH	53-54	120-80	-6.3112	200-120	4.1699	500-200	13.6348	135M
CH	55-56	120-80	-6.5465	200-120	4.2814	500-200	14.1596	140M
CH	57-58	120-80	-6.7912	200-120	4.4011	500-200	14.7138	145M
CH	59-60	120-80	-7.0314	200-120	4.5146	500-200	15.2569	150M
CH	61-62	120-80	-7.2649	200-120	4.6215	500-200	15.8098	155M
CH	63-64	120-80	-7.5024	200-120	4.7312	500-200	16.3598	160M
CH	65-66	120-80	-7.7342	200-120	4.8442	500-200	16.9131	165M
CH	67-68	120-80	-7.9665	200-120	4.9517	500-200	17.4651	170M
CH	69-70	120-80	-8.1971	200-120	5.0563	500-200	18.0086	175M
CH	71-72	120-80	-8.4287	200-120	5.1597	500-200	18.5610	180M
CH	73-74	120-80	-8.6630	200-120	5.2719	500-200	19.1014	185M

1972 AUG STATIØN 72 DEPTH 32 PREAMP 10**4 AVE 5 DEPTH 41
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-13	120-80	.0035	200-120	1.2893	500-200	.1968	5M
CH	14-26	120-80	-.0216	200-120	1.8298	500-200	.9246	10M
CH	27-39	120-80	.7510	200-120	2.1153	500-200	1.6104	15M
CH	40-52	120-80	1.5563	200-120	2.1656	500-200	2.2982	20M
CH	53-65	120-80	1.7330	200-120	2.5747	500-200	2.9821	25M
CH	66-78	120-80	3.2815	200-120	1.4586	500-200	3.6750	30M

1972 AUG STATIØN 73 DEPTH 17 AVE 5 PREAMP 10**4 DEPTH 24
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-23	120-80	-.0482	200-120	.6278	500-200	-.3105	5M
CH	24-46	120-80	-.0077	200-120	.3349	500-200	.2471	10M
CH	47-69	120-80	.8032	200-120	-.3910	500-200	.7836	15M

1972 AUG STATION 75 DEPTH 233 METERS PREAMP 10**4 AVE 5 DEPTH @250
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	.0521	200-120	.0970	500-200	.0072	5M
CH	3- 4	120-80	.0551	200-120	.1323	500-200	.0388	10M
CH	5- 6	120-80	.0496	200-120	.1664	500-200	.0750	15M
CH	7- 8	120-80	.1865	200-120	.0785	500-200	.1152	20M
CH	9-10	120-80	.2422	200-120	.0676	500-200	.1574	25M
CH	11-12	120-80	.2352	200-120	.0967	500-200	.2019	30M
CH	13-14	120-80	.2155	200-120	.1326	500-200	.2463	35M
CH	15-16	120-80	.1989	200-120	.1678	500-200	.2888	40M
CH	17-18	120-80	.1721	200-120	.2059	500-200	.3303	45M
CH	19-20	120-80	.1416	200-120	.2430	500-200	.3757	50M
CH	21-22	120-80	.1347	200-120	.2589	500-200	.4204	55M
CH	23-24	120-80	.1087	200-120	.2942	500-200	.4646	60M
CH	25-26	120-80	.0804	200-120	.3348	500-200	.5079	65M
CH	27-28	120-80	.0495	200-120	.3706	500-200	.5498	70M
CH	29-30	120-80	.0199	200-120	.4072	500-200	.5941	75M
CH	31-32	120-80	-.0118	200-120	.4438	500-200	.6395	80M
CH	33-34	120-80	-.0453	200-120	.4851	500-200	.6862	85M
CH	35-36	120-80	-.0725	200-120	.5234	500-200	.7330	90M
CH	37-38	120-80	-.0927	200-120	.5567	500-200	.7783	95M
CH	39-40	120-80	-.1202	200-120	.5896	500-200	.8225	100M
CH	41-42	120-80	-.1485	200-120	.6238	500-200	.8685	105M
CH	43-44	120-80	-.1757	200-120	.6567	500-200	.9123	110M
CH	45-46	120-80	-.2062	200-120	.6910	500-200	.9578	115M
CH	47-48	120-80	-.2063	200-120	.6939	500-200	1.0037	120M
CH	49-50	120-80	-.2171	200-120	.7128	500-200	1.0487	125M
CH	51-52	120-80	-.2379	200-120	.7432	500-200	1.0920	130M
CH	53-54	120-80	-.3250	200-120	.7760	500-200	1.1382	135M
CH	55-56	120-80	-.3773	200-120	.8110	500-200	1.1838	140M
CH	57-58	120-80	-.4076	200-120	.8424	500-200	1.2290	145M
CH	59-60	120-80	-.4388	200-120	.8763	500-200	1.2750	150M
CH	61-62	120-80	-.4680	200-120	.9120	500-200	1.3208	155M
CH	63-64	120-80	-.4954	200-120	.9444	500-200	1.3646	160M
CH	65-66	120-80	-.5233	200-120	.9778	500-200	1.4117	165M
CH	67-68	120-80	-.5513	200-120	1.0113	500-200	1.4561	170M
CH	69-70	120-80	-.5801	200-120	1.0475	500-200	1.5013	175M
CH	71-72	120-80	-.6094	200-120	1.0830	500-200	1.5472	180M
CH	73-74	120-80	-.6379	200-120	1.1170	500-20	1.5942	185M
CH	75-76	120-80	-.6659	200-120	1.1452	500-200	1.6410	190M
CH	77-78	120-80	-.6957	200-120	1.1793	500-200	1.6842	195M
CH	79-80	120-80	-.7246	200-120	1.2160	500-200	1.7231	200M
CH	81-82	120-80	-.7470	200-120	1.2507	500-200	1.7701	205M
CH	83-84	120-80	-.7710	200-120	1.2814	500-200	1.8172	210M
CH	85-86	120-80	-.8052	200-120	1.3164	500-200	1.8631	215M
CH	87-88	120-80	-.8364	200-120	1.3534	500-200	1.9085	220M
CH	89-90	120-80	-.8714	200-120	1.3887	500-200	1.9555	225M
CH	91-92	120-80	-.9040	200-120	1.4197	500-200	2.0050	230M

1972 AUG STATION 78 DEPTH 53 METERS PREAMP 10**4 AVE 5 DEPTH 60
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 8	120-80	-.5866	200-120	1.0277	500-200	-.4405	5M
CH	9-16	120-80	-.7701	200-120	1.5975	500-200	-.1336	10M
CH	17-24	120-80	-.2450	200-120	2.1723	500-200	.2780	15M
CH	25-32	120-80	-.1715	200-120	3.8303	500-200	.7074	20M
CH	33-40	120-80	-.1330	200-120	5.1836	500-200	1.1376	25M
CH	41-48	120-80	-.1513	200-120	6.4204	500-200	1.5674	30M
CH	49-56	120-80	-.4300	200-120	7.2193	500-200	1.9947	35M
CH	57-64	120-80	-.2914	200-120	7.6423	500-200	2.4212	40M
CH	65-72	120-80	-.1148	200-120	7.7984	500-200	2.8492	45M
CH	73-80	120-80	-.1798	200-120	8.2346	500-200	3.2749	50M

1972 AUG STATIØN 79 DEPTH 20 METERS AVE 5 PRE 10**4 DEPTH 30
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	-.5073	200-120	.5335	500-200	.8295	5M
CH	17-32	120-80	-1.0146	200-120	1.0658	500-200	1.6354	10M
CH	33-48	120-80	-1.5217	200-120	1.5971	500-200	2.4333	15M
CH	49-64	120-80	-2.0290	200-120	2.1279	500-200	3.2339	20M

1972 AUG STATIØN 83 DEPTH 99 METERS PRE 10**4 AVE 5 DEPTH 140
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	1.9414	200-120	-2.9074	500-200	-1.0924	5M
CH	4- 6	120-80	3.2773	200-120	-3.3017	500-200	-2.7439	10M
CH	7- 9	120-80	2.7640	200-120	-2.0621	500-200	-4.4289	15M
CH	10-12	120-80	2.1784	200-120	-.3913	500-200	-6.1054	20M
CH	13-15	120-80	3.3679	200-120	-.4644	500-200	-7.7837	25M
CH	16-18	120-80	4.9012	200-120	-.4324	500-200	-9.4589	30M
CH	19-21	120-80	6.4466	200-120	-.3228	500-200	-11.1347	35M
CH	22-24	120-80	8.0397	200-120	-.2156	500-200	-12.8102	40M
CH	25-27	120-80	9.5701	200-120	-.0897	500-200	-14.4849	45M
CH	28-30	120-80	11.1340	200-120	-.0023	500-200	-16.1599	50M
CH	31-33	120-80	12.7147	200-120	.0754	500-200	-17.8325	55M
CH	34-36	120-80	14.2706	200-120	.1709	500-200	-19.5047	60M
CH	37-39	120-80	15.8255	200-120	.2710	500-200	-21.1776	65M
CH	40-42	120-80	17.3766	200-120	.3781	500-200	-22.8502	70M
CH	43-45	120-80	18.9197	200-120	.4899	500-200	-24.5223	75M
CH	46-48	120-80	20.4682	200-120	.5879	500-200	-26.1928	80M
CH	49-51	120-80	22.0417	200-120	.6696	500-200	-27.8632	85M
CH	52-54	120-80	23.5701	200-120	.7657	500-200	-29.5354	90M
CH	55-57	120-80	25.1159	200-120	.8677	500-200	-31.2061	95M

1972 AUG 'STATION 85 DEPTH 188 PREAMP 10**4 AVE 5 DEPTH 230
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	-.0835	200-120	-.7370	500-200	3.3257	5M
CH	3- 4	120-80	1.3485	200-120	-.1650	500-200	5.3887	10M
CH	5- 6	120-80	1.4091	200-120	.5024	500-200	7.4320	15M
CH	7- 8	120-80	1.4918	200-120	1.2160	500-200	9.4740	20M
CH	9-10	120-80	1.6565	200-120	1.9057	500-200	11.5120	25M
CH	11-12	120-80	1.8006	200-120	2.6341	500-200	13.5475	30M
CH	13-14	120-80	1.9579	200-120	3.3476	500-200	15.5826	35M
CH	15-16	120-80	2.0879	200-120	4.0772	500-200	17.6119	40M
CH	17-18	120-80	2.2076	200-120	4.8099	500-200	19.6432	45M
CH	19-20	120-80	2.3644	200-120	5.5140	500-200	21.6714	50M
CH	21-22	120-80	2.4961	200-120	6.2411	500-200	23.6999	55M
CH	23-24	120-80	2.6164	200-120	6.9727	500-200	25.7260	60M
CH	25-26	120-80	2.7287	200-120	7.7033	500-200	27.7541	65M
CH	27-28	120-80	2.8469	200-120	8.4347	500-200	29.7804	70M
CH	29-30	120-80	2.9692	200-120	9.1713	500-200	31.8047	75M
CH	31-32	120-80	3.0910	200-120	9.9033	500-200	33.8288	80M
CH	33-34	120-80	3.2068	200-120	10.6352	500-200	35.8536	85M
CH	35-36	120-80	3.3270	200-120	11.3659	500-200	37.8793	90M
CH	37-38	120-80	3.4410	200-120	12.0990	500-200	39.8997	95M
CH	39-40	120-80	3.5612	200-120	12.8298	500-200	41.9213	100M
CH	41-42	120-80	3.6890	200-120	13.5607	500-200	43.9440	105M
CH	43-44	120-80	3.8102	200-120	14.2914	500-200	45.9638	110M
CH	45-46	120-80	3.9267	200-120	15.0247	500-200	47.9826	115M
CH	47-48	120-80	4.0378	200-120	15.7565	500-200	50.0050	120M
CH	49-50	120-80	4.1459	200-120	16.4899	500-200	52.0251	125M
CH	51-52	120-80	4.2638	200-120	17.2165	500-200	54.0448	130M
CH	53-54	120-80	4.3835	200-120	17.9442	500-200	56.0651	135M
CH	55-56	120-80	4.5078	200-120	18.6721	500-200	58.0841	140M
CH	57-58	120-80	4.6255	200-120	19.4039	500-200	60.1045	145M
CH	59-60	120-80	4.7408	200-120	20.1333	500-200	62.1256	150M
CH	61-62	120-80	4.8479	200-120	20.8674	500-200	64.1440	155M
CH	63-64	120-80	4.9569	200-120	21.6026	500-200	66.1632	160M
CH	65-66	120-80	5.0659	200-120	22.3345	500-200	68.1826	165M
CH	67-68	120-80	5.1810	200-120	23.0652	500-200	70.2021	170M
CH	69-70	120-80	5.2936	200-120	23.7969	500-200	72.2203	175M
CH	71-72	120-80	5.4152	200-120	24.5220	500-200	74.2359	180M
CH	73-74	120-80	5.5331	200-120	25.2539	500-200	76.2541	185M

1972 AUG STATION 89 DEPTH 76 METERS PREAMP 10**4 AVE 5 DEPTH 110
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 4	120-80	.0942	200-120	-.7729	500-200	3.1557	5M
CH	5- 8	120-80	.1881	200-120	.7602	500-200	5.5635	10M
CH	9-12	120-80	.2819	200-120	2.0368	500-200	7.9402	15M
CH	13-16	120-80	.3756	200-120	3.2336	500-200	10.3287	20M
CH	17-20	120-80	.7601	200-120	4.4253	500-200	12.7116	25M
CH	21-24	120-80	-.5563	200-120	6.3879	500-200	15.0783	30M
CH	25-28	120-80	.5447	200-120	6.9047	500-200	17.4518	35M
CH	29-32	120-80	1.9281	200-120	7.5444	500-200	19.8228	40M
CH	33-36	120-80	3.3494	200-120	8.2394	500-200	22.1902	45M
CH	37-40	120-80	4.7749	200-120	8.9431	500-200	24.5606	50M
CH	41-44	120-80	6.2385	200-120	9.6776	500-200	26.9285	55M
CH	45-48	120-80	7.7108	200-120	10.3669	500-200	29.2968	60M
CH	49-52	120-80	9.1733	200-120	11.0593	500-200	31.6645	65M
CH	53-56	120-80	10.6131	200-120	11.7678	500-200	34.0336	70M
CH	57-60	120-80	12.0490	200-120	12.4843	500-200	36.4006	75M

1972 AUG STATION 90 DEPTH 13 METERS PREAMP 10**4 AVE 5 DEPTH 27
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-24	120-80	.0488	200-120	1.8738	500-200	-.0346	5M
CH	25-48	120-80	-.6690	200-120	2.2172	500-200	.0168	10M

1972 AUG STATION 92 DEPTH 67 METERS PREAMP 10**4 AVE 5 DEPTH 80
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	.1614	200-120	1.1314	500-200	.3615	5M
CH	7-12	120-80	.2095	200-120	1.6034	500-200	.9856	10M
CH	13-18	120-80	.1890	200-120	1.7625	500-200	1.6254	15M
CH	19-24	120-80	.1249	200-120	1.8882	500-200	2.2605	20M
CH	25-30	120-80	-.0290	200-120	1.9955	500-200	2.8926	25M
CH	31-36	120-80	-.0559	200-120	2.2279	500-200	3.5217	30M
CH	37-42	120-80	-.0432	200-120	2.4157	500-200	4.1405	35M
CH	43-48	120-80	.0024	200-120	2.5094	500-200	4.7505	40M
CH	49-54	120-80	.0005	200-120	2.6409	500-200	5.3515	45M
CH	55-60	120-80	-.0176	200-120	2.7970	500-200	5.9423	50M
CH	61-66	120-80	-.0080	200-120	2.9171	500-200	6.5281	55M
CH	67-72	120-80	.0106	200-120	3.0194	500-200	7.1101	60M
CH	73-78	120-80	.0027	200-120	3.1352	500-200	7.6879	65M

1972 AUG STATION 94 DEPTH 35 METERS PREAP 10**4 AVE 5 DEPTH 45
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-11	120-80	.7611	200-120	1.0744	500-200	.2940	5M
CH	12-22	120-80	1.5873	200-120	1.5066	500-200	.6000	10M
CH	23-33	120-80	2.1540	200-120	1.5867	500-200	.8905	15M
CH	34-44	120-80	2.7801	200-120	1.3975	500-200	1.1099	20M
CH	45-55	120-80	3.4210	200-120	1.0677	500-200	1.3764	25M
CH	56-66	120-80	4.3513	200-120	.7495	500-200	1.6584	30M
CH	67-77	120-80	3.5186	200-120	.2747	500-200	1.9416	35M

1972 AUG STATIØN 96 DEPTH 35 METERS PER 10**4 AVE 5 DEPTH 45
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-11	120-80	.7127	200-120	.4800	500-200	-.9400	5M
CH	12-22	120-80	1.4250	200-120	.1084	500-200	-.9039	10M
CH	23-33	120-80	2.1370	200-120	1.7959	500-200	-.9166	15M
CH	34-44	120-80	2.8488	200-120	2.3794	500-200	-.9377	20M
CH	45-55	120-80	3.5603	200-120	2.2085	500-200	-.9662	25M
CH	56-66	120-80	4.2716	200-120	1.5924	500-200	-.9853	30M
CH	67-77	120-80	4.9827	200-120	.7074	500-200	-1.0021	35M

1972 AUG STATIØN 95 DEPTH 18METERS AVE 5 PRE 10**4 DETH 30
MEAN VALUE OF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.0969	200-120	.5313	500-200	1.4301	5M
CH	21-40	120-80	.1936	200-120	1.0621	500-200	2.8520	10M
CH	41-60	120-80	.2903	200-120	1.5924	500-200	4.2728	15M

1972 AUG STATIØN 97 DEPTH 29 MEYTERS PRE 10**4 AVE 5 DEPTH 42
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-13	120-80	.2513	200-120	.3475	500-200	-.3607	5M
CH	14-26	120-80	.5025	200-120	-.0884	500-200	-.3802	10M
CH	27-39	120-80	.7536	200-120	-1.0739	500-200	-.4178	15M
CH	40-52	120-80	1.1437	200-120	-2.3232	500-200	-.4588	20M
CH	53-65	120-80	2.0047	200-120	-3.8202	500-200	-.4964	25M

1972 AUG STATIØN 98 DEPTH 22 METERS PRE 10**4 AVE DEPTH 45
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-12	120-80	-.3069	200-120	-.0308	500-200	.2527	5M
CH	13-24	120-80	-1.1058	200-120	.2586	500-200	.8825	10M
CH	25-36	120-80	-.7386	200-120	.9981	500-200	1.5005	15M
CH	37-48	120-80	-.4742	200-120	.8523	500-200	2.1069	20M

1972 AUG STATION 99 DEPTH 40 METERS PREAMP 10**4 AVE 5 DEPTH 51
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 9	120-80	.2913	200-120	.7097	500-200	.1723	5M
CH	10-18	120-80	-.4882	200-120	.9494	500-200	.9309	10M
CH	19-27	120-80	-.8070	200-120	2.2671	500-200	1.6757	15M
CH	28-36	120-80	-1.0380	200-120	2.8857	500-200	2.4133	20M
CH	37-45	120-80	-2.0604	200-120	3.6385	500-200	3.1366	25M
CH	46-54	120-80	-1.6961	200-120	2.4831	500-200	3.8661	30M
CH	55-63	120-80	-1.2820	200-120	1.1293	500-200	4.5844	35M
CH	64-72	120-80	-1.2610	200-120	.1088	500-200	5.3165	40M

1972 AUG STATION 103 DEPTH 21 METERS PREAMP 10**4 @VE 5 DEPTH 25
MEAN VALUE ØF PRØFILES OVER 5M INTERVALS

CH	1-20	120-80	.8973	200-120	.6000	500-200	-.0238	5M
CH	21-40	120-80	.4600	200-120	.2540	500-200	-.0527	10M
CH	41-60	120-80	.6174	200-120	-.3432	500-200	-.0865	15M
CH	61-80	120-80	.8885	200-120	-1.1851	500-200	.0052	20M

1972 AUG STATION 105 DEPTH 26 METERS PREAMP 10**4 AVE 5 DEPTH 30
MEAN VALUE OF PRØFILES ØVER 5M INTERVALS

CH	1-17	120-80	.2742	200-120	.3470	500-200	-.2368	5M
CH	18-34	120-80	.2003	200-120	.1739	500-200	-.1487	10M
CH	35-51	120-80	-1.2186	200-120	2.1056	500-200	-.0537	15M
CH	52-68	120-80	-2.1356	200-120	2.9741	500-200	.0536	20M
CH	69-85	120-80	-2.9902	200-120	3.4154	500-200	.1530	25M

1972 NØV STATIØN 1 PA 10**4 AVG 5 DEPTH 44 M SCAN 50 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-11	120-80	-.6977	200-120	-.1475	500-200	.6816	5M
CH	12-22	120-80	-.7373	200-120	-.1488	500-200	.8320	10M
CH	23-33	120-80	-.7905	200-120	-.0793	500-200	.9730	15M
CH	34-44	120-80	-.8207	200-120	-.0416	500-200	1.1087	20M
CH	45-55	120-80	-.8121	200-120	.0027	500-200	1.2418	25M
CH	56-66	120-80	-.7774	200-120	-.0149	500-200	1.3725	30M
CH	67-77	120-80	-.7748	200-120	.0180	500-200	1.5090	35M
CH	78-88	120-80	-.7827	200-120	.0546	500-200	1.5819	40M

1972 NØV STATIØN 2 PA 10**4 AVG 5 DEPTH 20 M SCAN 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.0978	200-120	-.0274	500-200	.1870	5M
CH	21-40	120-80	-.2482	200-120	1.3897	500-200	.4249	10M
CH	41-60	120-80	-.6903	200-120	1.4362	500-200	.6835	15M
CH	61-80	120-80	-.7826	200-120	1.4663	500-200	.8851	20M

1972 NØV STATIØN 3 PA 10**4 AVE 5 DEPTH 22 M DEPTH 30 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-18	120-80	-.9900	200-120	-.3102	500-200	.1286	5M
CH	19-36	120-80	-1.0165	200-120	-.1315	500-200	.0789	10M
CH	37-54	120-80	-.9116	200-120	.0287	500-200	.0433	15M
CH	55-72	120-80	-.8384	200-120	.1239	500-200	.0082	20M

1972 NØV STATIØN 5 PA 10**4 AVG 5 DEPTH 115 M SCAN 150 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	-.3767	200-120	1.7085	500-200	-.4828	5M
CH	4- 6	120-80	-1.3035	200-120	1.7442	500-200	-.2699	10M
CH	7- 9	120-80	-1.3998	200-120	1.4211	500-200	-.0448	15M
CH	10-12	120-80	-1.5621	200-120	1.4854	500-200	.1946	20M
CH	13-15	120-80	-1.7383	200-120	1.6507	500-200	.4167	25M
CH	16-18	120-80	-1.8301	200-120	1.8086	500-200	.6310	30M
CH	19-21	120-80	-1.8365	200-120	1.9572	500-200	.8529	35M
CH	22-24	120-80	-1.8351	200-120	2.1003	500-200	1.0679	40M
CH	25-27	120-80	-1.8367	200-120	2.2351	500-200	1.2909	45M
CH	28-30	120-80	-1.8483	200-120	2.3779	500-200	1.5113	50M
CH	31-33	120-80	-1.8625	200-120	2.5273	500-200	1.7235	55M
CH	34-36	120-80	-1.8737	200-120	2.6705	500-200	1.9617	60M
CH	37-39	120-80	-1.8879	200-120	2.8144	500-200	2.1948	65M
CH	40-42	120-80	-1.8925	200-120	2.9553	500-200	2.4146	70M
CH	43-45	120-80	-1.8957	200-120	3.0912	500-200	2.6342	75M
CH	46-48	120-80	-1.9150	200-120	3.2329	500-200	2.8701	80M
CH	49-51	120-80	-1.9171	200-120	3.3712	500-200	3.0823	85M
CH	52-54	120-80	-1.9216	200-120	3.5105	500-200	3.3141	90M
CH	55-57	120-80	-1.9267	200-120	3.6554	500-200	3.5496	95M
CH	58-60	120-80	-1.9433	200-120	3.8045	500-200	3.7914	100M
CH	61-63	120-80	-1.9597	200-120	3.9545	500-200	4.0065	105M
CH	64-66	120-80	-1.9767	200-120	4.1034	500-200	4.2293	110M
CH	67-69	120-80	-1.9825	200-120	4.2409	500-200	4.4587	115M

1972 NØV STATIØN 7 PA 10**4 AVG 5 DEPTH 24 M SCAN 40 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-15	120-80	1.2347	200-120	-1.5888	500-200	.2447	5M
CH	16-30	120-80	1.8242	200-120	-2.0690	500-200	.4964	10M
CH	31-45	120-80	1.7908	200-120	-1.9488	500-200	.7412	15M
CH	46-60	120-80	1.7380	200-120	-1.8043	500-200	.8117	20M

1972 NØV STATIØN 8 PA 10**4 AVE 5 DEPTH 70 M SWEEP 77 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	.0953	200-120	.5177	500-200	-.7070	5M
CH	7-12	120-80	.1934	200-120	1.0353	500-200	-.5242	10M
CH	13-18	120-80	-.2051	200-120	2.6869	500-200	-.3591	15M
CH	19-24	120-80	.7839	200-120	1.4259	500-200	-.1931	20M
CH	25-30	120-80	1.1476	200-120	.2768	500-200	-.0270	25M
CH	31-36	120-80	.8243	200-120	-.2400	500-200	.1412	30M
CH	37-42	120-80	.2090	200-120	-.4401	500-200	.3103	35M
CH	43-48	120-80	-.5303	200-120	-.4928	500-200	.4797	40M
CH	49-54	120-80	-1.2206	200-120	-.4686	500-200	.6485	45M
CH	55-60	120-80	-1.2314	200-120	-.4228	500-200	.8207	50M
CH	61-66	120-80	-2.5254	200-120	-.3481	500-200	.9912	55M
CH	67-72	120-80	-3.5171	200-120	-.2941	500-200	1.1624	60M
CH	73-78	120-80	-4.3524	200-120	-.2232	500-200	1.3324	65M
CH	79-84	120-80	-4.8043	200-120	-.1497	500-200	1.5017	70M

1972 NØV STATIØN 10 PA 10**4 AVG 5 DEPTH 121 M SWEEP 160 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.5541	200-120	-1.4331	500-200	.0103	5M
CH	4- 6	120-80	.0501	200-120	-1.9139	500-200	.1655	10M
CH	7- 9	120-80	.0301	200-120	-2.2101	500-200	.3193	15M
CH	10-12	120-80	-.1143	200-120	-2.1341	500-200	.4750	20M
CH	13-15	120-80	-.2245	200-120	-2.0619	500-200	.6311	25M
CH	16-18	120-80	-.2818	200-120	-1.9978	500-200	.7905	30M
CH	19-21	120-80	-.3293	200-120	-1.9312	500-200	.9452	35M
CH	22-24	120-80	-.3555	200-120	-1.8664	500-200	1.1022	40M
CH	25-27	120-80	-.3597	200-120	-1.8111	500-200	1.2559	45M
CH	28-30	120-80	-.3706	200-120	-1.7459	500-200	1.4079	50M
CH	31-33	120-80	-.3766	200-120	-1.6769	500-200	1.5619	55M
CH	34-36	120-80	-.3872	200-120	-1.6061	500-200	1.7167	60M
CH	37-39	120-80	-.3873	200-120	-1.5382	500-200	1.8678	65M
CH	40-42	120-80	-.3874	200-120	-1.4880	500-200	2.0289	70M
CH	43-45	120-80	-.3980	200-120	-1.4272	500-200	2.1882	75M
CH	46-48	120-80	-.4061	200-120	-1.3634	500-200	2.3419	80M
CH	49-51	120-80	-.4158	200-120	-1.3067	500-200	2.4982	85M
CH	52-54	120-80	-.4339	200-120	-1.2431	500-200	2.6499	90M
CH	55-57	120-80	-.4453	200-120	-1.1807	500-200	2.8015	95M
CH	58-60	120-80	-.4609	200-120	-1.1118	500-200	2.9555	100M
CH	61-63	120-80	-.4681	200-120	-1.0491	500-200	3.1096	105M
CH	64-66	120-80	-.4769	200-120	-.9920	500-200	3.2597	110M
CH	67-69	120-80	-.4882	200-120	-.9354	500-200	3.4135	115M
CH	70-72	120-80	-.5126	200-120	-.8684	500-200	3.5688	120M

1972 NØV STATIØN 12 PA 10**4 AVG 5 DEPTH 27 M SCAN 34 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-15	120-80	.0924	200-120	-.2057	500-200	.0587	5M
CH	16-30	120-80	-.0880	200-120	1.3242	500-200	.2464	10M
CH	31-45	120-80	-1.0226	200-120	2.4418	500-200	.4246	15M
CH	46-60	120-80	-.4519	200-120	1.4596	500-200	.6069	20M
CH	61-75	120-80	-1.3085	200-120	.8104	500-200	.7862	25M

1972 NØV STATIØN 14 PA 10**4 AVG 5 DEPTH 15 M SCAN 19 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-26	120-80	-.2593	200-120	.1821	500-200	-.3249	5M
CH	27-52	120-80	-.6868	200-120	-.2926	500-200	-.2127	10M
CH	53-78	120-80	-.3162	200-120	.6333	500-200	.0316	15M

1972 NØV STATIØN 15 PA 10**4 AVG 5 DEPTH 102 M SCAN 150 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.0251	200-120	-.2582	500-200	-.0411	5M
CH	4- 6	120-80	.6095	200-120	-.9864	500-200	.1592	10M
CH	7- 9	120-80	1.0050	200-120	-1.8701	500-200	.3447	15M
CH	10-12	120-80	2.2499	200-120	-3.0962	500-200	.5294	20M
CH	13-15	120-80	2.3311	200-120	-3.1674	500-200	.7145	25M
CH	16-18	120-80	2.2227	200-120	-3.0844	500-200	.8987	30M
CH	19-21	120-80	2.1322	200-120	-3.0011	500-200	1.0839	35M
CH	22-24	120-80	2.0160	200-120	-2.9185	500-200	1.2689	40M
CH	25-27	120-80	1.9191	200-120	-2.8295	500-200	1.4573	45M
CH	28-30	120-80	1.9030	200-120	-2.7739	500-200	1.6442	50M
CH	31-33	120-80	1.9099	200-120	-2.7347	500-200	1.8321	55M
CH	34-36	120-80	1.8906	200-120	-2.6521	500-200	2.0198	60M
CH	37-39	120-80	1.8806	200-120	-2.5719	500-200	2.2039	65M
CH	40-42	120-80	1.8661	200-120	-2.4916	500-200	2.3945	70M
CH	43-45	120-80	1.8517	200-120	-2.4163	500-200	2.5787	75M
CH	46-48	120-80	1.8420	200-120	-2.3383	500-200	2.7643	80M
CH	49-51	120-80	1.8315	200-120	-2.2599	500-200	2.9502	85M
CH	52-54	120-80	1.8223	200-120	-2.1773	500-200	3.1269	90M
CH	55-57	120-80	1.8069	200-120	-2.1030	500-200	3.3110	95M
CH	58-60	120-80	1.7968	200-120	-2.0371	500-200	3.4948	100M

1972 NØV STATIØN 17 DEPTH 150 M PA 10**4 AVG 5 DEPTH 180
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.7646	200-120	-1.4088	500-200	.1158	5M
CH	3- 4	120-80	.7174	200-120	-2.1263	500-200	.2739	10M
CH	5- 6	120-80	.9866	200-120	-2.3593	500-200	.4235	15M
CH	7- 8	120-80	.1466	200-120	-2.2655	500-200	.5737	20M
CH	9-10	120-80	-.0651	200-120	-2.1834	500-200	.7231	25M
CH	11-12	120-80	-.0731	200-120	-2.1011	500-200	.8678	30M
CH	13-14	120-80	-.0805	200-120	-2.0094	500-200	1.0180	35M
CH	15-16	120-80	-.0856	200-120	-1.9209	500-200	1.1683	40M
CH	17-18	120-80	-.1022	200-120	-1.8297	500-200	1.3231	45M
CH	19-20	120-80	-.0934	200-120	-1.7473	500-200	1.4746	50M
CH	21-22	120-80	-.0989	200-120	-1.6593	500-200	1.6296	55M
CH	23-24	120-80	-.1084	200-120	-1.5713	500-200	1.7832	60M
CH	25-26	120-80	-.1167	200-120	-1.4823	500-200	1.9385	65M
CH	27-28	120-80	-.1223	200-120	-1.3905	500-200	2.0903	70M
CH	29-30	120-80	-.1292	200-120	-1.3078	500-200	2.2451	75M
CH	31-32	120-80	-.0916	200-120	-1.2633	500-200	2.4029	80M
CH	33-34	120-80	-.0530	200-120	-1.2292	500-200	2.5621	85M
CH	35-36	120-80	-.0606	200-120	-1.1389	500-200	2.7177	90M
CH	37-38	120-80	-.0719	200-120	-1.0520	500-200	2.8773	95M
CH	39-40	120-80	-.0827	200-120	-.9669	500-200	3.0363	100M
CH	41-42	120-80	-.0804	200-120	-.8783	500-200	3.1982	105M
CH	43-44	120-80	-.0908	200-120	-.7925	500-200	3.3555	110M
CH	45-46	120-80	-.0925	200-120	-.7087	500-200	3.5149	115M
CH	47-48	120-80	-.0968	200-120	-.6245	500-200	3.6707	120M
CH	49-50	120-80	-.1108	200-120	-.5399	500-200	3.8250	125M
CH	51-52	120-80	-.1173	200-120	-.4569	500-200	3.9774	130M
CH	53-54	120-80	-.1333	200-120	-.3668	500-200	4.1341	135M
CH	55-56	120-80	-.1557	200-120	-.2763	500-200	4.2837	140M
CH	57-58	120-80	-.1507	200-120	-.1971	500-200	4.4364	145M
CH	59-60	120-80	-.1640	200-120	-.1126	500-200	4.5869	150M

1972V STATIØN 19 PA 10**4 AVG 5 DEPTH 24 M SWEEP 30 M
MEAN VALUE ØF PRØFILES ØVER 5M-INTERVALS

CH	1-20	120-80	.0971	200-120	.5313	500-200	-.2728	5M
CH	21-40	120-80	.1941	200-120	1.0619	500-200	-.1256	10M
CH	41-60	120-80	.2909	200-120	1.5916	500-200	-.0037	15M
CH	61-80	120-80	.3876	200-120	2.1204	500-200	.2508	20M

1972 NØV STATIØN 20 PA 10**4 AVG 5 DEPTH 29 M SCAN 36 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	.0968	200-120	.5269	500-200	-.4800	5M
CH	17-32	120-80	.1935	200-120	1.0531	500-200	-.3715	10M
CH	33-48	120-80	.2898	200-120	1.5785	500-200	-.2615	15M
CH	49-64	120-80	.3860	200-120	2.0122	500-200	-.1490	20M
CH	65-80	120-80	.6402	200-120	1.3910	500-200	.3132	25M

1972 NØV STATIØN 24 PA 10**4 AVG 5 DEPTH 123 M SWEEP 160 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.0600	200-120	1.3697	500-200	-1.3089	5M
CH	4- 6	120-80	-.1806	200-120	2.7553	500-200	-1.7289	10M
CH	7- 9	120-80	-.3633	200-120	5.5751	500-200	-1.5620	15M
CH	10-12	120-80	-.4917	200-120	6.6161	500-200	-1.3918	20M
CH	13-15	120-80	-.5302	200-120	7.2420	500-200	-1.2306	25M
CH	16-18	120-80	-.4990	200-120	7.5275	500-200	-1.0708	30M
CH	19-21	120-80	-.4963	200-120	7.5966	500-200	-.9079	35M
CH	22-24	120-80	-.4889	200-120	7.6351	500-200	-.7494	40M
CH	25-27	120-80	-.5172	200-120	7.6840	500-200	-.5924	45M
CH	28-30	120-80	-.5190	200-120	7.7436	500-200	-.4283	50M
CH	31-33	120-80	-.5155	200-120	7.7951	500-200	-.2683	55M
CH	34-36	120-80	-.5195	200-120	7.8473	500-200	-.1130	60M
CH	37-39	120-80	-.5324	200-120	7.9073	500-200	.0488	65M
CH	40-42	120-80	-.5255	200-120	7.9632	500-200	.2080	70M
CH	43-45	120-80	-.5064	200-120	7.9996	500-200	.3605	75M
CH	46-48	120-80	-.4946	200-120	8.0484	500-200	.5166	80M
CH	49-51	120-80	-.4713	200-120	8.0908	500-200	.6774	85M
CH	52-54	120-80	-.4727	200-120	8.1473	500-200	.8325	90M
CH	55-57	120-80	-.4819	200-120	8.2062	500-200	.9863	95M
CH	58-60	120-80	-.4956	200-120	8.2667	500-200	1.1424	100M
CH	61-63	120-80	-.4921	200-120	8.3200	500-200	1.2932	105M
CH	64-66	120-80	-.4989	200-120	8.3861	500-200	1.4424	110M
CH	67-69	120-80	-.4926	200-120	8.4398	500-200	1.5949	115M
CH	70-72	120-80	-.4906	200-120	8.4923	500-200	1.7435	120M

1972 NØV STATIØN 31 PA 10**4 AVG 5 DEPTH 28 M SCAN 39 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	-.8770	200-120	-.5026	500-200	.1422	5M
CH	15-28	120-80	-1.3849	200-120	-.6732	500-200	.2622	10M
CH	29-42	120-80	-1.4034	200-120	-.7541	500-200	.3836	15M
CH	43-56	120-80	-1.3848	200-120	-.7862	500-200	.5107	20M
CH	57-70	120-80	-1.4316	200-120	-.7315	500-200	.6427	25M

1972 NØV STATION 32 PA 10**4 AVG 5 DEPTH 171 M SWEEP 210 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	.2045	200-120	-1.0326	500-200	.2765	5M
CH	3- 4	120-80	.2400	200-120	-1.2940	500-200	.5358	10M
CH	5- 6	120-80	.3336	200-120	-1.3231	500-200	.7982	15M
CH	7- 8	120-80	.3208	200-120	-1.2558	500-200	1.0625	20M
CH	9-10	120-80	.3190	200-120	-1.1968	500-200	1.3264	25M
CH	11-12	120-80	.2991	200-120	-1.1319	500-200	1.5908	30M
CH	13-14	120-80	.2863	200-120	-1.0680	500-200	1.8509	35M
CH	15-16	120-80	.2727	200-120	-1.0036	500-200	2.1140	40M
CH	17-18	120-80	.2926	200-120	-.9659	500-200	2.3778	45M
CH	19-20	120-80	.3045	200-120	-.9169	500-200	2.6501	50M
CH	21-22	120-80	.3101	200-120	-.8602	500-200	2.9163	55M
CH	23-24	120-80	.3028	200-120	-.8067	500-200	3.1818	60M
CH	25-26	120-80	.3999	200-120	-.8459	500-200	3.4502	65M
CH	27-28	120-80	.3940	200-120	-.7873	500-200	3.7151	70M
CH	29-30	120-80	.3927	200-120	-.7288	500-200	3.9915	75M
CH	31-32	120-80	.4105	200-120	-.6973	500-200	4.2642	80M
CH	33-34	120-80	.4126	200-120	-.6449	500-200	4.5320	85M
CH	35-36	120-80	.3847	200-120	-.5750	500-200	4.8007	90M
CH	37-38	120-80	.3766	200-120	-.5308	500-200	5.0671	95M
CH	39-40	120-80	.3687	200-120	-.4768	500-200	5.3332	100M
CH	41-42	120-80	.3528	200-120	-.4196	500-200	5.6000	105M
CH	43-44	120-80	.3365	200-120	-.3549	500-200	5.8652	110M
CH	45-46	120-80	.3437	200-120	-.3009	500-200	6.1347	115M
CH	47-48	120-80	.3378	200-120	-.2397	500-200	6.4075	120M
CH	49-50	120-80	.3260	200-120	-.1760	500-200	6.6800	125M
CH	51-52	120-80	.3206	200-120	-.1260	500-200	6.9556	130M
CH	53-54	120-80	.3182	200-120	-.0673	500-200	7.2276	135M
CH	55-56	120-80	.3288	200-120	-.0064	500-200	7.5013	140M
CH	57-58	120-80	.3190	200-120	.0310	500-200	7.7763	145M
CH	59-60	120-80	.3183	200-120	.0833	500-200	8.0509	150M
CH	61-62	120-80	.2967	200-120	.1459	500-200	8.3287	155M
CH	63-64	120-80	.2836	200-120	.2009	500-200	8.6042	160M
CH	65-66	120-80	.2666	200-120	.2613	500-200	8.8827	165M
CH	67-68	120-80	.2487	200-120	.3240	500-200	9.1579	170M

1972 NØV STATION 34 PA 10**4 AVG 5 DEPTH 110 M SWEEP 135 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 3	120-80	.0951	200-120	-.5886	500-200	.0076	5M
CH	4- 6	120-80	.1897	200-120	-1.4252	500-200	.1151	10M
CH	7- 9	120-80	.8193	200-120	-2.8364	500-200	.2057	15M
CH	10-12	120-80	.4867	200-120	-3.2705	500-200	.3011	20M
CH	13-15	120-80	-.1501	200-120	-3.4019	500-200	.3967	25M
CH	16-18	120-80	-1.0107	200-120	-3.3345	500-200	.4942	30M
CH	19-21	120-80	-1.2204	200-120	-3.2531	500-200	.5912	35M
CH	22-24	120-80	-1.5758	200-120	-3.1702	500-200	.6871	40M
CH	25-27	120-80	-1.5875	200-120	-3.0952	500-200	.7809	45M
CH	28-30	120-80	-1.5314	200-120	-3.0229	500-200	.8740	50M
CH	31-33	120-80	-1.5321	200-120	-2.9433	500-200	.9668	55M
CH	34-36	120-80	-1.5099	200-120	-2.8666	500-200	1.0617	60M
CH	37-39	120-80	-1.5058	200-120	-2.7880	500-200	1.1568	65M
CH	40-42	120-80	-1.4938	200-120	-2.7068	500-200	1.2492	70M
CH	43-45	120-80	-1.4866	200-120	-2.6344	500-200	1.3402	75M
CH	46-48	120-80	-1.4917	200-120	-2.5575	500-200	1.4355	80M
CH	49-51	120-80	-1.4955	200-120	-2.4821	500-200	1.5290	85M
CH	52-54	120-80	-1.5113	200-120	-2.4037	500-200	1.6281	90M
CH	55-57	120-80	-1.5133	200-120	-2.3259	500-200	1.7237	95M
CH	58-60	120-80	-1.5112	200-120	-2.2568	500-200	1.8223	100M
CH	61-63	120-80	-1.5202	200-120	-2.1785	500-200	1.9182	105M
CH	64-66	120-80	-1.5289	200-120	-2.1010	500-200	2.0164	110M

1972 NØV STATIØN 35 DEPTH 28 M SCAN 35 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	-.0245	200-120	.5270	500-200	-.5212	5M
CH	17-32	120-80	-.0494	200-120	1.0532	500-200	-.4092	10M
CH	33-48	120-80	-.0744	200-120	1.5787	500-200	-.3063	15M
CH	49-64	120-80	-.0997	200-120	2.1035	500-200	-.2013	20M
CH	65-80	120-80	-.3085	200-120	2.8112	500-200	-.0680	25M

1972 NØV STATIØN 36 PA 10**4 AVE 5 DEPTH 28 M SWEEP 35 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	-.0111	200-120	.5250	500-200	-.4139	5M
CH	17-32	120-80	-.0241	200-120	.9106	500-200	-.4008	10M
CH	33-48	120-80	-.0359	200-120	2.6753	500-200	-.3473	15M
CH	49-64	120-80	-.3657	200-120	3.6360	500-200	-.2813	20M
CH	65-80	120-80	.5835	200-120	2.5516	500-200	-.0467	25M

1972 NØV STATIØN 38 PA 10**4 AVE 5 DEPTH 120 M SWEEP 155 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	-.0264	200-120	.2464	500-200	.0410	5M
CH	4- 6	120-80	.0219	200-120	.4797	500-200	.1159	10M
CH	7- 9	120-80	-.0195	200-120	.7245	500-200	.2162	15M
CH	10-12	120-80	-.0143	200-120	.8916	500-200	.3318	20M
CH	13-15	120-80	-.0092	200-120	1.0605	500-200	.4535	25M
CH	16-18	120-80	.0135	200-120	1.2219	500-200	.5786	30M
CH	19-21	120-80	.0366	200-120	1.3892	500-200	.6603	35M
CH	22-24	120-80	.0518	200-120	1.5279	500-200	.7304	40M
CH	25-27	120-80	.0764	200-120	1.6567	500-200	.7907	45M
CH	28-30	120-80	.1186	200-120	1.7886	500-200	.8469	50M
CH	31-33	120-80	.1665	200-120	1.9102	500-200	.9079	55M
CH	34-36	120-80	.2296	200-120	2.0181	500-200	.9562	60M
CH	37-39	120-80	.2962	200-120	2.1314	500-200	1.0143	65M
CH	40-42	120-80	.3867	200-120	2.2165	500-200	1.0695	70M
CH	43-45	120-80	.4466	200-120	2.3379	500-200	1.1251	75M
CH	46-48	120-80	.5255	200-120	2.4507	500-200	1.1843	80M
CH	49-51	120-80	.6000	200-120	2.5581	500-200	1.2368	85M
CH	52-54	120-80	.6753	200-120	2.6915	500-200	1.3001	90M
CH	55-57	120-80	.7418	200-120	2.8459	500-200	1.3551	95M
CH	58-60	120-80	.8150	200-120	3.0015	500-200	1.4131	100M
CH	61-63	120-80	.8761	200-120	3.1642	500-200	1.4734	105M
CH	64-66	120-80	.9418	200-120	3.3387	500-200	1.5276	110M
CH	67-69	120-80	1.0156	200-120	3.5156	500-200	1.5895	115M
CH	70-72	120-80	1.0844	200-120	3.7152	500-200	1.6437	120M

1972 NØV STATIØN 40 PA 10**4 AVG 5 DEPTH 175 M SCAN 220 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.5987	200-120	.2188	500-200	-.0616	5M
CH	3- 4	120-80	-.6693	200-120	.4561	500-200	-.0964	10M
CH	5- 6	120-80	-.7048	200-120	.6851	500-200	-.0960	15M
CH	7- 8	120-80	-.6924	200-120	.8765	500-200	-.0791	20M
CH	9-10	120-80	-.4836	200-120	.8769	500-200	-.0616	25M
CH	11-12	120-80	-.4349	200-120	1.0591	500-200	-.0752	30M
CH	13-14	120-80	-.3662	200-120	1.2135	500-200	-.1155	35M
CH	15-16	120-80	-.3015	200-120	1.3674	500-200	-.1648	40M
CH	17-18	120-80	-.2343	200-120	1.5255	500-200	-.2151	45M
CH	19-20	120-80	-.1776	200-120	1.6896	500-200	-.2721	50M
CH	21-22	120-80	-.1291	200-120	1.8754	500-200	-.3235	55M
CH	23-24	120-80	-.0843	200-120	2.0920	500-200	-.3745	60M
CH	25-26	120-80	-.0225	200-120	2.3183	500-200	-.4290	65M
CH	27-28	120-80	.0284	200-120	2.5455	500-200	-.4804	70M
CH	29-30	120-80	.1058	200-120	2.7679	500-200	-.5297	75M
CH	31-32	120-80	.1563	200-120	3.0191	500-200	-.5837	80M
CH	33-34	120-80	.2099	200-120	3.2560	500-200	-.6320	85M
CH	35-36	120-80	.2548	200-120	3.5154	500-200	-.6866	90M
CH	37-38	120-80	.3305	200-120	3.7532	500-200	-.7386	95M
CH	39-40	120-80	.3855	200-120	3.9907	500-200	-.7882	100M
CH	41-42	120-80	.4241	200-120	4.2404	500-200	-.8420	105M
CH	43-44	120-80	.4950	200-120	4.4807	500-200	-.8963	110M
CH	45-46	120-80	.5333	200-120	4.7262	500-200	-.9475	115M
CH	47-48	120-80	.5830	200-120	4.9613	500-200	-1.0053	120M
CH	49-50	120-80	.6448	200-120	5.2028	500-200	-1.0611	125M
CH	51-52	120-80	.7027	200-120	5.4417	500-200	-1.1145	130M
CH	53-54	120-80	.7469	200-120	5.6826	500-200	-1.1719	135M
CH	55-56	120-80	.8059	200-120	5.9248	500-200	-1.2272	140M
CH	57-58	120-80	.8517	200-120	6.1588	500-200	-1.2828	145M
CH	59-60	120-80	.9100	200-120	6.3933	500-200	-1.3440	150M
CH	61-62	120-80	.9461	200-120	6.6417	500-200	-1.3990	155M
CH	63-64	120-80	1.0051	200-120	6.8822	500-200	-1.4565	160M
CH	65-66	120-80	1.0520	200-120	7.1263	500-200	-1.5177	165M
CH	67-68	120-80	1.1126	200-120	7.3683	500-200	-1.5725	170M
CH	69-70	120-80	1.1581	200-120	7.6135	500-200	-1.6312	175M

1972 NØV STATIØN 41 PA 10**4 AVG 5 DEPTH 35 M SCAN 46 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-11	120-80	.0259	200-120	.0144	500-200	.1390	5M
CH	12-22	120-80	.0699	200-120	.0504	500-200	.2796	10M
CH	23-33	120-80	.0634	200-120	.1169	500-200	.4172	15M
CH	34-44	120-80	.0597	200-120	.1785	500-200	.5554	20M
CH	45-55	120-80	.0976	200-120	.2361	500-200	.6946	25M
CH	56-66	120-80	.1170	200-120	.2931	500-200	.8350	30M
CH	67-77	120-80	.1178	200-120	.3404	500-200	1.0808	35M

1972 NØV STATIØN 42 PA 10**4 AVG 5 DEPTH 35 M SCAN 45 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-11	120-80	.0963	200-120	.5172	500-200	.5181	5M
CH	12-22	120-80	.1923	200-120	-.1722	500-200	.7328	10M
CH	23-33	120-80	.2885	200-120	-.6570	500-200	.9375	15M
CH	34-44	120-80	.3844	200-120	-1.6203	500-200	1.1432	20M
CH	45-55	120-80	.4814	200-120	-.5276	500-200	1.3466	25M
CH	56-66	120-80	.5775	200-120	-.1307	500-200	1.5483	30M
CH	67-77	120-80	.1466	200-120	.1788	500-200	1.8545	35M

1972 NØV STATIØN 44 PA 10**4 AVG 5 DEPTH 190 M SCAN 250 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.4689	200-120	.3845	500-200	1.2568	5M
CH	3- 4	120-80	-.6043	200-120	.6414	500-200	1.7988	10M
CH	5- 6	120-80	-.5669	200-120	.6503	500-200	2.3788	15M
CH	7- 8	120-80	-.5227	200-120	.9284	500-200	2.9022	20M
CH	9-10	120-80	-.4337	200-120	1.0848	500-200	3.4096	25M
CH	11-12	120-80	-.2748	200-120	1.2083	500-200	3.7804	30M
CH	13-14	120-80	-.1951	200-120	1.4019	500-200	4.1070	35M
CH	15-16	120-80	-.1328	200-120	1.6029	500-200	4.4665	40M
CH	17-18	120-80	-.0640	200-120	1.7961	500-200	4.6788	45M
CH	19-20	120-80	-.0090	200-120	2.0352	500-200	4.7820	50M
CH	21-22	120-80	.0510	200-120	2.2970	500-200	4.7760	55M
CH	23-24	120-80	.1067	200-120	2.5626	500-200	4.6641	60M
CH	25-26	120-80	.1469	200-120	2.8425	500-200	4.5545	65M
CH	27-28	120-80	.2003	200-120	3.1240	500-200	4.4583	70M
CH	29-30	120-80	.2520	200-120	3.4107	500-200	4.3418	75M
CH	31-32	120-80	.2889	200-120	3.7008	500-200	4.2612	80M
CH	33-34	120-80	.3115	200-120	3.9959	500-200	4.1618	85M
CH	35-36	120-80	.3450	200-120	4.2824	500-200	4.0603	90M
CH	37-38	120-80	.3807	200-120	4.5751	500-200	3.9758	95M
CH	39-40	120-80	.4277	200-120	4.8601	500-200	3.8853	100M
CH	41-42	120-80	.4741	200-120	5.1539	500-200	3.8000	105M
CH	43-44	120-80	.4964	200-120	5.4523	500-200	3.7097	110M
CH	45-46	120-80	.5165	200-120	5.7572	500-200	3.6280	115M
CH	47-48	120-80	.5516	200-120	6.0366	500-200	3.5416	120M
CH	49-50	120-80	.5858	200-120	6.3156	500-200	3.4585	125M
CH	51-52	120-80	.6272	200-120	6.5956	500-200	3.3732	130M
CH	53-54	120-80	.6671	200-120	6.8808	500-200	3.2888	135M
CH	55-56	120-80	.7165	200-120	7.1578	500-200	3.2037	140M
CH	57-58	120-80	.7640	200-120	7.4325	500-200	3.1208	145M
CH	59-60	120-80	.7858	200-120	7.7099	500-200	3.0399	150M
CH	61-62	120-80	.8019	200-120	7.9946	500-200	2.9535	155M
CH	63-64	120-80	.8329	200-120	8.2685	500-200	2.8681	160M
CH	65-66	120-80	.8645	200-120	8.5438	500-200	2.7831	165M
CH	67-68	120-80	.9034	200-120	8.8149	500-200	2.6989	170M
CH	69-70	120-80	.9428	200-120	9.0895	500-200	2.6147	175M
CH	71-72	120-80	.9799	200-120	9.3682	500-200	2.5306	180M
CH	73-74	120-80	1.0205	200-120	9.6394	500-200	2.4446	185M
CH	75-76	120-80	1.0718	200-120	9.9130	500-200	2.2697	190M

1972 NOV STATION 46 PA 10**4 AVE 5 DEPTH 150 M DEPTH 200 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	-.0263	200-120	-.5117	500-200	-.1157	5M
CH	3- 4	120-80	.2989	200-120	-1.1983	500-200	-.1011	10M
CH	5- 6	120-80	.3031	200-120	-1.1829	500-200	-.0847	15M
CH	7- 8	120-80	.3327	200-120	-.9278	500-200	-.0435	20M
CH	9-10	120-80	.3860	200-120	-.6870	500-200	.0044	25M
CH	11-12	120-80	.4245	200-120	-.4590	500-200	.0587	30M
CH	13-14	120-80	.4464	200-120	-.2248	500-200	.0936	35M
CH	15-16	120-80	.4743	200-120	-.0070	500-200	.1004	40M
CH	17-18	120-80	.5119	200-120	.2043	500-200	.0932	45M
CH	19-20	120-80	.5365	200-120	.4138	500-200	.0875	50M
CH	21-22	120-80	.5691	200-120	.6263	500-200	.0778	55M
CH	23-24	120-80	.6082	200-120	.8264	500-200	.0663	60M
CH	25-26	120-80	.6357	200-120	1.0392	500-200	.0538	65M
CH	27-28	120-80	.6716	200-120	1.2770	500-200	.0386	70M
CH	29-30	120-80	.6987	200-120	1.5282	500-200	.0298	75M
CH	31-32	120-80	.7198	200-120	1.7870	500-200	.0141	80M
CH	33-34	120-80	.7333	200-120	2.0538	500-200	.0086	85M
CH	35-36	120-80	.7580	200-120	2.3214	500-200	-.0049	90M
CH	37-38	120-80	.7793	200-120	2.6017	500-200	-.0136	95M
CH	39-40	120-80	.8136	200-120	2.8763	500-200	-.0264	100M
CH	41-42	120-80	.8322	200-120	3.1473	500-200	-.0395	105M
CH	43-44	120-80	.8488	200-120	3.4214	500-200	-.0475	110M
CH	45-46	120-80	.8639	200-120	3.6933	500-200	-.0602	115M
CH	47-48	120-80	.8889	200-120	3.9694	500-200	-.0684	120M
CH	49-50	120-80	.9304	200-120	4.2394	500-200	-.0787	125M
CH	51-52	120-80	.9684	200-120	4.5132	500-200	-.0855	130M
CH	53-54	120-80	.9924	200-120	4.7822	500-200	-.0960	135M
CH	55-56	120-80	1.0241	200-120	5.0491	500-200	-.1044	140M
CH	57-58	120-80	1.0531	200-120	5.3236	500-200	-.1122	145M
CH	59-60	120-80	1.0832	200-120	5.5870	500-200	-.1264	150M

1972 NOV STATION 48 PA 10**4 AVE 5 DEPTH 26 SWEEP 39 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-13	120-80	-.0467	200-120	.5266	500-200	-.3348	5M
CH	14-26	120-80	-.0938	200-120	1.0524	500-200	-.3424	10M
CH	27-39	120-80	-.1411	200-120	1.5774	500-200	-.2684	15M
CH	40-52	120-80	-.1885	200-120	1.6722	500-200	-.1745	20M
CH	53-65	120-80	-.2362	200-120	1.4207	500-200	-.0783	25M

1972 NOV STATION 49 PA 10**4 AVE 5 DEPTH 30 M SWEEP 40 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-12	120-80	-.8646	200-120	.5281	500-200	-.0002	5M
CH	13-24	120-80	-1.7294	200-120	2.1463	500-200	.2924	10M
CH	25-36	120-80	-2.5943	200-120	3.0383	500-200	.5513	15M
CH	37-48	120-80	-3.4593	200-120	3.4313	500-200	.8099	20M
CH	49-60	120-80	-4.3245	200-120	3.2220	500-200	1.0711	25M
CH	61-72	120-80	-5.1897	200-120	2.6471	500-200	1.3335	30M

1978ØV STATION 45 PA 10**4 AVG 5 DEPTH 183 M SWEEP 250 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.0197	200-120	-.3466	500-200	-.3163	5M
CH	3- 4	120-80	.6051	200-120	-.8062	500-200	-.3597	10M
CH	5- 6	120-80	.7312	200-120	-.6050	500-200	-.3716	15M
CH	7- 8	120-80	.7988	200-120	-.3798	500-200	-.3612	20M
CH	9-10	120-80	.9454	200-120	-.2368	500-200	-.3676	25M
CH	11-12	120-80	1.0058	200-120	-.0041	500-200	-.4252	30M
CH	13-14	120-80	1.0692	200-120	.2044	500-200	-.4999	35M
CH	15-16	120-80	1.1677	200-120	.4027	500-200	-.5797	40M
CH	17-18	120-80	1.2478	200-120	.6107	500-200	-.6613	45M
CH	19-20	120-80	1.2925	200-120	.8767	500-200	-.7468	50M
CH	21-22	120-80	1.3448	200-120	1.1632	500-200	-.8324	55M
CH	23-24	120-80	1.3983	200-120	1.4570	500-200	-.9158	60M
CH	25-26	120-80	1.4597	200-120	1.7649	500-200	-.9977	65M
CH	27-28	120-80	1.5053	200-120	2.0678	500-200	-1.0837	70M
CH	29-30	120-80	1.5638	200-120	2.3864	500-200	-1.1645	75M
CH	31-32	120-80	1.6074	200-120	2.7072	500-200	-1.1384	80M
CH	33-34	120-80	1.6608	200-120	3.0293	500-200	-1.1770	85M
CH	35-36	120-80	1.7098	200-120	3.3492	500-200	-1.2591	90M
CH	37-38	120-80	1.7560	200-120	3.6735	500-200	-1.3409	95M
CH	39-40	120-80	1.7977	200-120	3.9972	500-200	-1.4262	100M
CH	41-42	120-80	1.8402	200-120	4.3151	500-200	-1.5133	105M
CH	43-44	120-80	1.8963	200-120	4.6366	500-200	-1.6125	110M
CH	45-46	120-80	1.9452	200-120	4.9541	500-200	-1.6371	115M
CH	47-48	120-80	1.9832	200-120	5.2792	500-200	-1.7175	120M
CH	49-50	120-80	2.0360	200-120	5.5960	500-200	-1.8002	125M
CH	51-52	120-80	2.0817	200-120	5.9097	500-200	-1.8781	130M
CH	53-54	120-80	2.1207	200-120	6.2299	500-200	-1.9563	135M
CH	55-56	120-80	2.1596	200-120	6.5492	500-200	-2.0360	140M
CH	57-58	120-80	2.2018	200-120	6.8614	500-200	-2.1153	145M
CH	59-60	120-80	2.2465	200-120	7.1758	500-200	-2.1918	150M
CH	61-62	120-80	2.3013	200-120	7.4902	500-200	-2.2666	155M
CH	63-64	120-80	2.3483	200-120	7.8028	500-200	-2.3454	160M
CH	65-66	120-80	2.3845	200-120	8.1205	500-200	-2.4245	165M
CH	67-68	120-80	2.4424	200-120	8.4676	500-200	-2.5007	170M
CH	69-70	120-80	2.4930	200-120	8.7784	500-200	-2.5791	175M
CH	71-72	120-80	2.5308	200-120	9.0930	500-200	-2.6597	180M

1972 NØV STATIØN 52 PA 10**4 AVE 5 DEPTH 65 M SWEEP 77 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	.0951	200-120	1.3956	500-200	-.3514	5M
CH	7-12	120-80	.1902	200-120	1.3932	500-200	-.2014	10M
CH	13-18	120-80	.2849	200-120	.8149	500-200	-.0329	15M
CH	19-24	120-80	.3797	200-120	-.0473	500-200	.1343	20M
CH	25-30	120-80	.4742	200-120	-.8396	500-200	.2981	25M
CH	31-36	120-80	.5689	200-120	-1.6616	500-200	.4623	30M
CH	37-42	120-80	.6633	200-120	-2.5248	500-200	.6243	35M
CH	43-48	120-80	.4465	200-120	-3.0351	500-200	.7912	40M
CH	49-54	120-80	.0798	200-120	-3.4153	500-200	.9570	45M
CH	55-60	120-80	-1.1490	200-120	-3.3653	500-200	1.1202	50M
CH	61-66	120-80	.1034	200-120	-4.6985	500-200	1.2869	55M
CH	67-72	120-80	.7206	200-120	-5.2441	500-200	1.4498	60M
CH	73-78	120-80	.8036	200-120	-5.2349	500-200	1.6135	65M

1972 NØV STATIØN 56 PA 10**4 AVG 5 DEPTH 154 M SWEEP 200 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.0939	200-120	.0468	500-200	-.2235	5M
CH	3- 4	120-80	1.1171	200-120	-1.4694	500-200	.0152	10M
CH	5- 6	120-80	2.1985	200-120	-2.5269	500-200	.3569	15M
CH	7- 8	120-80	1.6340	200-120	-2.5169	500-200	.7043	20M
CH	9-10	120-80	1.6300	200-120	-2.4452	500-200	1.0489	25M
CH	11-12	120-80	1.6087	200-120	-2.3709	500-200	1.3968	30M
CH	13-14	120-80	1.5879	200-120	-2.3101	500-200	1.7409	35M
CH	15-16	120-80	1.5708	200-120	-2.2492	500-200	2.0865	40M
CH	17-18	120-80	1.5245	200-120	-2.1775	500-200	2.4315	45M
CH	19-20	120-80	1.5017	200-120	-2.1233	500-200	2.7733	50M
CH	21-22	120-80	1.4753	200-120	-2.0672	500-200	3.1225	55M
CH	23-24	120-80	1.4489	200-120	-2.0093	500-200	3.4646	60M
CH	25-26	120-80	1.4180	200-120	-1.9496	500-200	3.8147	65M
CH	27-28	120-80	1.3829	200-120	-1.8825	500-200	4.1588	70M
CH	29-30	120-80	1.3589	200-120	-1.8273	500-200	4.4993	75M
CH	31-32	120-80	1.3353	200-120	-1.7728	500-200	4.8424	80M
CH	33-34	120-80	1.3048	200-120	-1.7153	500-200	5.1873	85M
CH	35-36	120-80	1.2802	200-120	-1.6495	500-200	5.5315	90M
CH	37-38	120-80	1.2529	200-120	-1.5858	500-200	5.8736	95M
CH	39-40	120-80	1.2219	200-120	-1.5291	500-200	6.2181	100M
CH	41-42	120-80	1.1868	200-120	-1.4731	500-200	6.5686	105M
CH	43-44	120-80	1.1693	200-120	-1.4350	500-200	6.9133	110M
CH	45-46	120-80	1.1906	200-120	-1.4488	500-200	7.2590	115M
CH	47-48	120-80	1.1653	200-120	-1.3957	500-200	7.5982	120M
CH	49-50	120-80	1.1476	200-120	-1.3487	500-200	7.9423	125M
CH	51-52	120-80	1.0948	200-120	-1.2837	500-200	8.2856	130M
CH	53-54	120-80	1.0678	200-120	-1.2339	500-200	8.6321	135M
CH	55-56	120-80	1.0345	200-120	-1.1753	500-200	8.9760	140M
CH	57-58	120-80	1.0160	200-120	-1.1256	500-200	9.3195	145M
CH	59-60	120-80	.9767	200-120	-1.0552	500-200	9.6630	150M

1972 NØV STATIØN 59 PA 10**4 AVG 5 DEPTH 40 M SWEEP 50 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-10	120-80	.0961	200-120	.5244	500-200	-.0644	5M
CH	11-20	120-80	.1918	200-120	1.0492	500-200	-.0936	10M
CH	21-30	120-80	.2874	200-120	.2109	500-200	-.0071	15M
CH	31-40	120-80	.3829	200-120	1.7536	500-200	.0797	20M
CH	41-50	120-80	.4783	200-120	2.7067	500-200	.1650	25M
CH	51-60	120-80	.5737	200-120	3.0188	500-200	.2545	30M
CH	61-70	120-80	.6689	200-120	2.8647	500-200	.3429	35M
CH	71-80	120-80	.7640	200-120	2.4727	500-200	.4299	40M

1972 NØV STATIØN 60 PA 10**4 AVE 5 DEPTH 20 M SWEEP 24 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.0973	200-120	.5339	500-200	-.0895	5M
CH	21-40	120-80	-.1488	200-120	1.4328	500-200	-.0258	10M
CH	41-60	120-80	.5700	200-120	.6961	500-200	.0566	15M
CH	61-80	120-80	.7586	200-120	.3200	500-200	.1398	20M

1972 NØV STATIØN 62 PA 10**4 AVG 5 DEPTH 185 M SWEEP 210 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.4897	200-120	.0048	500-200	.1283	5M
CH	3- 4	120-80	-.4700	200-120	.0667	500-200	.2527	10M
CH	5- 6	120-80	-.4722	200-120	.1263	500-200	.3770	15M
CH	7- 8	120-80	-.4596	200-120	.1919	500-200	.5021	20M
CH	9-10	120-80	-.4633	200-120	.2693	500-200	.6264	25M
CH	11-12	120-80	-.4556	200-120	.3309	500-200	.7502	30M
CH	13-14	120-80	-.4344	200-120	.3957	500-200	.8722	35M
CH	15-16	120-80	-.4241	200-120	.4710	500-200	.9965	40M
CH	17-18	120-80	-.4117	200-120	.5476	500-200	1.1234	45M
CH	19-20	120-80	-.3985	200-120	.6219	500-200	1.2473	50M
CH	21-22	120-80	-.3871	200-120	.6944	500-200	1.3742	55M
CH	23-24	120-80	-.3751	200-120	.7586	500-200	1.4953	60M
CH	25-26	120-80	-.3639	200-120	.8395	500-200	1.6168	65M
CH	27-28	120-80	-.3467	200-120	.9075	500-200	1.7325	70M
CH	29-30	120-80	-.3435	200-120	.9833	500-200	1.8469	75M
CH	31-32	120-80	-.3656	200-120	1.0591	500-200	1.9654	80M
CH	33-34	120-80	-.3471	200-120	1.1154	500-200	2.0854	85M
CH	35-36	120-80	-.3464	200-120	1.1915	500-200	2.2023	90M
CH	37-38	120-80	-.3115	200-120	1.2599	500-200	2.3204	95M
CH	39-40	120-80	-.3236	200-120	1.3506	500-200	2.4406	100M
CH	41-42	120-80	-.3295	200-120	1.4288	500-200	2.5611	105M
CH	43-44	120-80	-.3271	200-120	1.5038	500-200	2.6806	110M
CH	45-46	120-80	-.3104	200-120	1.5712	500-200	2.7991	115M
CH	47-48	120-80	-.2924	200-120	1.6421	500-200	2.9188	120M
CH	49-50	120-80	-.2889	200-120	1.7250	500-200	3.0354	125M
CH	51-52	120-80	-.2573	200-120	1.7868	500-200	3.1550	130M
CH	53-54	120-80	-.2380	200-120	1.8615	500-200	3.2751	135M
CH	55-56	120-80	-.2211	200-120	1.9298	500-200	3.3939	140M
CH	57-58	120-80	-.2018	200-120	1.9969	500-200	3.5169	145M
CH	59-60	120-80	-.2060	200-120	2.0683	500-200	3.6367	150M
CH	61-62	120-80	-.1918	200-120	2.1453	500-200	3.7589	155M
CH	63-64	120-80	-.1874	200-120	2.2239	500-200	3.8807	160M
CH	65-66	120-80	-.1759	200-120	2.2924	500-200	4.0047	165M
CH	67-68	120-80	-.1615	200-120	2.3563	500-200	4.1297	170M
CH	69-70	120-80	-.1455	200-120	2.4198	500-200	4.2519	175M
CH	71-72	120-80	-.1312	200-120	2.4943	500-200	4.3721	180M
CH	73-74	120-80	-.1288	200-120	2.5738	500-200	4.4952	185M

1972 NØV STATIØN 64 PA 10**4 AVE 5 DEPTH 114 M SWEEP 130 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.0948	200-120	.4909	500-200	-.5811	5M
CH	4- 6	120-80	.1894	200-120	.0647	500-200	-.5008	10M
CH	7- 9	120-80	.2763	200-120	-.4583	500-200	-.3443	15M
CH	10-12	120-80	-.9471	200-120	-.4829	500-200	-.1926	20M
CH	13-15	120-80	.0702	200-120	-1.8453	500-200	-.0411	25M
CH	16-18	120-80	1.2298	200-120	-3.1107	500-200	.1109	30M
CH	19-21	120-80	2.0867	200-120	-3.8655	500-200	.2624	35M
CH	22-24	120-80	2.2817	200-120	-4.0597	500-200	.4159	40M
CH	25-27	120-80	2.2605	200-120	-3.9865	500-200	.5707	45M
CH	28-30	120-80	2.2642	200-120	-3.9315	500-200	.7210	50M
CH	31-33	120-80	2.2528	200-120	-3.8805	500-200	.8742	55M
CH	34-36	120-80	2.2424	200-120	-3.8276	500-200	1.0305	60M
CH	37-39	120-80	2.2493	200-120	-3.7705	500-200	1.1822	65M
CH	40-42	120-80	2.2479	200-120	-3.7141	500-200	1.3332	70M
CH	43-45	120-80	2.2231	200-120	-3.6540	500-200	1.4867	75M
CH	46-48	120-80	2.2318	200-120	-3.6121	500-200	1.6414	80M
CH	49-51	120-80	2.2231	200-120	-3.5557	500-200	1.7916	85M
CH	52-54	120-80	2.2174	200-120	-3.4997	500-200	1.9432	90M
CH	55-57	120-80	2.2182	200-120	-3.4481	500-200	2.0978	95M
CH	58-60	120-80	2.2138	200-120	-3.3935	500-200	2.2489	100M
CH	61-63	120-80	2.2165	200-120	-3.3417	500-200	2.4009	105M
CH	64-66	120-80	2.2988	200-120	-3.3785	500-200	2.5506	110M

1972 NØV STATIØN 66 PA 10**4 AVE 5 DEPTH 12 M SWEEP 29 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.0704	200-120	-.2911	500-200	-.0181	5M
CH	21-40	120-80	-.0065	200-120	-.7533	500-200	.0384	10M

1972 NØV STATIØN 69 PA 10**4 AVE 5 DEPTH 152 SWEEP 190 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-1.2321	200-120	.2080	500-200	.0478	5M
CH	3- 4	120-80	-1.4479	200-120	.3609	500-200	.1173	10M
CH	5- 6	120-80	-1.4394	200-120	.5125	500-200	.1926	15M
CH	7- 8	120-80	-1.4131	200-120	.6672	500-200	.2739	20M
CH	9-10	120-80	-1.3968	200-120	.8136	500-200	.3506	25M
CH	11-12	120-80	-1.3949	200-120	.9617	500-200	.4156	30M
CH	13-14	120-80	-1.3941	200-120	1.1032	500-200	.4753	35M
CH	15-16	120-80	-1.3921	200-120	1.2422	500-200	.5328	40M
CH	17-18	120-80	-1.3855	200-120	1.3841	500-200	.5920	45M
CH	19-20	120-80	-1.3801	200-120	1.5410	500-200	.6491	50M
CH	21-22	120-80	-1.3736	200-120	1.6958	500-200	.7046	55M
CH	23-24	120-80	-1.3712	200-120	1.8597	500-200	.7599	60M
CH	25-26	120-80	-1.3772	200-120	2.0288	500-200	.8165	65M
CH	27-28	120-80	-1.3625	200-120	2.1961	500-200	.8722	70M
CH	29-30	120-80	-1.3531	200-120	2.3621	500-200	.9274	75M
CH	31-32	120-80	-1.3540	200-120	2.5323	500-200	.9845	80M
CH	33-34	120-80	-1.3469	200-120	2.6941	500-200	1.0379	85M
CH	35-36	120-80	-1.3421	200-120	2.8635	500-200	1.0939	90M
CH	37-38	120-80	-1.3337	200-120	3.0319	500-200	1.1489	95M
CH	39-40	120-80	-1.3301	200-120	3.1978	500-200	1.2083	100M
CH	41-42	120-80	-1.3380	200-120	3.3688	500-200	1.2646	105M
CH	43-44	120-80	-1.3286	200-120	3.5362	500-200	1.3201	110M
CH	45-46	120-80	-1.3331	200-120	3.7097	500-200	1.3762	115M
CH	47-48	120-80	-1.3312	200-120	3.8809	500-200	1.4326	120M
CH	49-50	120-80	-1.3286	200-120	4.0490	500-200	1.4896	125M
CH	51-52	120-80	-1.3152	200-120	4.2116	500-200	1.5421	130M
CH	53-54	120-80	-1.2798	200-120	4.3439	500-200	1.5970	135M
CH	55-56	120-80	-1.2309	200-120	4.4661	500-200	1.6486	140M
CH	57-58	120-80	-1.2236	200-120	4.6216	500-200	1.7026	145M
CH	59-60	120-80	-1.2131	200-120	4.7847	500-200	1.7560	150M

1972 NØV STATIØN 71 PA 10**4 AVG 5 DEPTH 204 M SWEEP 240 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.5958	200-120	-.6335	500-200	.0989	5M
CH	3- 4	120-80	.6703	200-120	-.7139	500-200	.1909	10M
CH	5- 6	120-80	.7419	200-120	-.7117	500-200	.2845	15M
CH	7- 8	120-80	.7486	200-120	-.6399	500-200	.3817	20M
CH	9-10	120-80	.7532	200-120	-.5769	500-200	.4776	25M
CH	11-12	120-80	.7598	200-120	-.5124	500-200	.5737	30M
CH	13-14	120-80	.7713	200-120	-.4552	500-200	.6693	35M
CH	15-16	120-80	.7703	200-120	-.3893	500-200	.7677	40M
CH	17-18	120-80	.7655	200-120	-.3226	500-200	.8753	45M
CH	19-20	120-80	.7650	200-120	-.2582	500-200	.9718	50M
CH	21-22	120-80	.7654	200-120	-.1909	500-200	1.0683	55M
CH	23-24	120-80	.7618	200-120	-.1195	500-200	1.1683	60M
CH	25-26	120-80	.7631	200-120	-.0558	500-200	1.2676	65M
CH	27-28	120-80	.7519	200-120	.0102	500-200	1.3635	70M
CH	29-30	120-80	.7357	200-120	.0821	500-200	1.4624	75M
CH	31-32	120-80	.7321	200-120	.1465	500-200	1.5608	80M
CH	33-34	120-80	.7207	200-120	.2046	500-200	1.6610	85M
CH	35-36	120-80	.7201	200-120	.2544	500-200	1.7613	90M
CH	37-38	120-80	.7182	200-120	.3228	500-200	1.8605	95M
CH	39-40	120-80	.7122	200-120	.3818	500-200	1.9588	100M
CH	41-42	120-80	.7110	200-120	.4444	500-200	2.0575	105M
CH	43-44	120-80	.7055	200-120	.5052	500-200	2.1564	110M
CH	45-46	120-80	.7022	200-120	.5655	500-200	2.2548	115M
CH	47-48	120-80	.6927	200-120	.6346	500-200	2.3533	120M
CH	49-50	120-80	.6769	200-120	.7028	500-200	2.4554	125M
CH	51-52	120-80	.6731	200-120	.7700	500-200	2.5604	130M
CH	53-54	120-80	.6713	200-120	.8344	500-200	2.6627	135M
CH	55-56	120-80	.6795	200-120	.8955	500-200	2.7634	140M
CH	57-58	120-80	.6761	200-120	.9573	500-200	2.8647	145M
CH	59-60	120-80	.6753	200-120	1.0138	500-200	2.9646	150M
CH	61-62	120-80	.6701	200-120	1.0721	500-200	3.0672	155M
CH	63-64	120-80	.6693	200-120	1.1332	500-200	3.1704	160M
CH	65-66	120-80	.6679	200-120	1.1912	500-200	3.2730	165M
CH	67-68	120-80	.6731	200-120	1.2469	500-200	3.3770	170M
CH	69-70	120-80	.6579	200-120	1.3063	500-200	3.4813	175M
CH	71-72	120-80	.6506	200-120	1.3677	500-200	3.5835	180M
CH	73-74	120-80	.6353	200-120	1.4331	500-200	3.6864	185M
CH	75-76	120-80	.6299	200-120	1.4917	500-200	3.7894	190M
CH	77-78	120-80	.6270	200-120	1.5484	500-200	3.8942	195M
CH	79-80	120-80	.6191	200-120	1.6111	500-200	3.9949	200M

1972 NØV STATIØN 72 PA 10**4 AVE 5 DEPTH 31 M SWEEP 39 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-13	120-80	.0960	200-120	-.4659	500-200	-.0625	5M
CH	14-26	120-80	.1918	200-120	-.9213	500-200	.0548	10M
CH	27-39	120-80	.2875	200-120	-1.4382	500-200	.1568	15M
CH	40-52	120-80	-.2095	200-120	-2.0314	500-200	.2622	20M
CH	53-65	120-80	-.2941	200-120	-2.7568	500-200	.3646	25M
CH	66-78	120-80	-.4870	200-120	-3.4899	500-200	.4735	30M

1972 NØV STATIØN 73 PA 10**4 AVE 5 DEPTH 17 M SWEEP 27 M
MEAN VALUE OF PRØFILES OVER 5M INTERVALS

CH	1-20	120-80	-.7611	200-120	1.3980	500-200	-.6087	5M
CH	21-40	120-80	-.6103	200-120	1.4903	500-200	-.5652	10M
CH	41-60	120-80	-1.1354	200-120	2.3782	500-200	-.5128	15M

1972 NØV STATIØN 75 PA 10**4 AVG 5 DEPTH 233 M SWEEP 270 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 1	120-80	.0631	200-120	.1422	500-200	.2774	5M
CH	2- 2	120-80	.1224	200-120	.2848	500-200	.5674	10M
CH	3- 3	120-80	.3161	200-120	.2621	500-200	.8661	15M
CH	4- 4	120-80	.3323	200-120	.4018	500-200	1.1718	20M
CH	5- 5	120-80	.3522	200-120	.5534	500-200	1.4780	25M
CH	6- 6	120-80	.3792	200-120	.7095	500-200	1.7706	30M
CH	7- 7	120-80	.3965	200-120	.8773	500-200	2.0610	35M
CH	8- 8	120-80	.4253	200-120	1.0425	500-200	2.3431	40M
CH	9- 9	120-80	.4543	200-120	1.2085	500-200	2.6257	45M
CH	10-10	120-80	.4714	200-120	1.3824	500-200	2.9108	50M
CH	11-11	120-80	.4785	200-120	1.5636	500-200	3.1917	55M
CH	12-12	120-80	.4938	200-120	1.7441	500-200	3.4710	60M
CH	13-13	120-80	.5090	200-120	1.9191	500-200	3.7561	65M
CH	14-14	120-80	.5151	200-120	2.1086	500-200	4.0365	70M
CH	15-15	120-80	.5273	200-120	2.2865	500-200	4.3200	75M
CH	16-16	120-80	.5407	200-120	2.4628	500-200	4.6042	80M
CH	17-17	120-80	.5658	200-120	2.6330	500-200	4.8910	85M
CH	18-18	120-80	.5768	200-120	2.8155	500-200	5.1738	90M
CH	19-19	120-80	.5953	200-120	2.9870	500-200	5.4574	95M
CH	20-20	120-80	.6124	200-120	3.1608	500-200	5.7352	100M
CH	21-21	120-80	.6353	200-120	3.3373	500-200	6.0149	105M
CH	22-22	120-80	.6586	200-120	3.5090	500-200	6.3007	110M
CH	23-23	120-80	.6750	200-120	3.6807	500-200	6.5813	115M
CH	24-24	120-80	.6851	200-120	3.8553	500-200	6.8679	120M
CH	25-25	120-80	.6948	200-120	4.0295	500-200	7.1465	125M
CH	26-26	120-80	.7103	200-120	4.2010	500-200	7.4310	130M
CH	27-27	120-80	.7259	200-120	4.3748	500-200	7.7104	135M
CH	28-28	120-80	.7415	200-120	4.5488	500-200	7.9997	140M
CH	29-29	120-80	.7590	200-120	4.7212	500-200	8.2830	145M
CH	30-30	120-80	.7696	200-120	4.8966	500-200	8.5671	150M
CH	31-31	120-80	.7844	200-120	5.0698	500-200	8.8551	155M
CH	32-32	120-80	.8063	200-120	5.2385	500-200	9.1382	160M
CH	33-33	120-80	.8299	200-120	5.4115	500-200	9.4248	165M
CH	34-34	120-80	.8520	200-120	5.5846	500-200	9.7122	170M
CH	35-35	120-80	.8651	200-120	5.7560	500-200	9.9998	175M
CH	36-36	120-80	.8763	200-120	5.9319	500-200	10.2857	180M
CH	37-37	120-80	.8982	200-120	6.1072	500-200	10.5708	185M
CH	38-38	120-80	.9116	200-120	6.2780	500-200	10.8588	190M
CH	39-39	120-80	.9206	200-120	6.4600	500-200	11.1417	195M
CH	40-40	120-80	.9389	200-120	6.6305	500-200	11.4292	200M
CH	41-41	120-80	.9539	200-120	6.8050	500-200	11.7191	205M
CH	42-42	120-80	.9731	200-120	6.9786	500-200	12.0062	210M
CH	43-43	120-80	.9958	200-120	7.1543	500-200	12.2892	215M
CH	44-44	120-80	1.0096	200-120	7.3286	500-200	12.5760	220M
CH	45-45	120-80	1.0192	200-120	7.5041	500-200	12.8613	225M
CH	46-46	120-80	1.0329	200-120	7.6793	500-200	13.1468	230M

1972 NOV STATION 77 PA 10**4 AVG 5 DEPTH 144 M SWEEP 170 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 3	120-80	1.6363	200-120	-.3044	500-200	-.5985	5M
CH	4- 6	120-80	2.4774	200-120	-1.1408	500-200	-.5941	10M
CH	7- 9	120-80	3.7617	200-120	-2.2903	500-200	-.5928	15M
CH	10-12	120-80	4.6335	200-120	-3.1335	500-200	-.5951	20M
CH	13-15	120-80	4.6852	200-120	-3.0758	500-200	-.6146	25M
CH	16-18	120-80	4.6648	200-120	-2.8941	500-200	-.6408	30M
CH	19-21	120-80	4.6694	200-120	-2.7154	500-200	-.6708	35M
CH	22-24	120-80	4.7071	200-120	-2.5410	500-200	-.7009	40M
CH	25-27	120-80	4.7449	200-120	-2.3718	500-200	-.7334	45M
CH	28-30	120-80	4.7712	200-120	-2.1947	500-200	-.7624	50M
CH	31-33	120-80	4.7998	200-120	-2.0112	500-200	-.7913	55M
CH	34-36	120-80	4.8228	200-120	-1.8190	500-200	-.8196	60M
CH	37-39	120-80	4.8450	200-120	-1.6170	500-200	-.8485	65M
CH	40-42	120-80	4.8649	200-120	-1.4157	500-200	-.8761	70M
CH	43-45	120-80	4.8906	200-120	-1.2106	500-200	-.9042	75M
CH	46-48	120-80	4.9164	200-120	-1.0047	500-200	-.9301	80M
CH	49-51	120-80	4.9376	200-120	-.7923	500-200	-.9600	85M
CH	52-54	120-80	4.9524	200-120	-.5841	500-200	-.9911	90M
CH	55-57	120-80	4.9704	200-120	-.3762	500-200	-1.0221	95M
CH	58-60	120-80	4.9813	200-120	-.1615	500-200	-1.0534	100M
CH	61-63	120-80	5.0046	200-120	.0434	500-200	-1.0830	105M
CH	64-66	120-80	5.0348	200-120	.2435	500-200	-1.1128	110M
CH	67-69	120-80	5.0588	200-120	.4488	500-200	-1.1441	115M
CH	70-72	120-80	5.0774	200-120	.6614	500-200	-1.1741	120M
CH	73-75	120-80	5.0905	200-120	.8712	500-200	-1.2054	125M
CH	76-78	120-80	5.1154	200-120	1.0795	500-200	-1.2382	130M
CH	79-81	120-80	5.1384	200-120	1.2857	500-200	-1.2710	135M
CH	82-84	120-80	5.1550	200-120	1.4931	500-200	-1.3018	140M

1972 NOV STATION 78 PA 10**4 AVG 5 DEPTH 53 M SWEEP 67 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 7	120-80	.3595	200-120	-.5584	500-200	-.1004	5M
CH	8-14	120-80	.8311	200-120	-1.3389	500-200	-.0491	10M
CH	15-21	120-80	1.5551	200-120	-2.0402	500-200	.0139	15M
CH	22-28	120-80	3.3663	200-120	-3.4425	500-200	.0755	20M
CH	29-35	120-80	4.0532	200-120	-3.7056	500-200	.1226	25M
CH	36-42	120-80	4.2313	200-120	-3.9088	500-200	.1665	30M
CH	43-49	120-80	4.5809	200-120	-4.1312	500-200	.2100	35M
CH	50-56	120-80	5.0347	200-120	-4.4249	500-200	.2499	40M
CH	57-63	120-80	5.3143	200-120	-4.6019	500-200	.2925	45M
CH	64-70	120-80	5.4653	200-120	-4.5997	500-200	.3358	50M

1972=NOV STATION 79 PA 10**4 AVE 5 DEPTH 25 M SWEEP 30 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-16	120-80	.0966	200-120	-.5368	500-200	.0716	5M
CH	17-32	120-80	.1930	200-120	.7284	500-200	.1062	10M
CH	33-48	120-80	-.0654	200-120	.0359	500-200	.1374	15M
CH	49-64	120-80	.0956	200-120	-.0663	500-200	.1790	20M
CH	65-80	120-80	1.1285	200-120	-.9235	500-200	.2068	25M

1972 NOV STATION 83 PA 10**4 AVG 5 DEPTH 120 M SWEEP 140 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 3	120-80	.2449	200-120	-.1820	500-200	.0856	5M
CH	4- 6	120-80	.4570	200-120	-.3430	500-200	.1894	10M
CH	7- 9	120-80	.3711	200-120	-.5158	500-200	.3110	15M
CH	10-12	120-80	.4727	200-120	-.7128	500-200	.4425	20M
CH	13-15	120-80	.6786	200-120	-.9139	500-200	.5760	25M
CH	16-18	120-80	.8766	200-120	-1.1070	500-200	.6975	30M
CH	19-21	120-80	1.1005	200-120	-1.3182	500-200	.8103	35M
CH	22-24	120-80	1.3287	200-120	-1.5398	500-200	.9201	40M
CH	25-27	120-80	1.5700	200-120	-1.7721	500-200	1.0273	45M
CH	28-30	120-80	1.7407	200-120	-1.9694	500-200	1.1357	50M
CH	31-33	120-80	1.9580	200-120	-2.2051	500-200	1.2413	55M
CH	34-36	120-80	2.1657	200-120	-2.4303	500-200	1.3476	60M
CH	37-39	120-80	2.3931	200-120	-2.6693	500-200	1.4543	65M
CH	40-42	120-80	2.6025	200-120	-2.8940	500-200	1.5604	70M
CH	43-45	120-80	2.8162	200-120	-3.1264	500-200	1.6628	75M
CH	46-48	120-80	3.0210	200-120	-3.3424	500-200	1.7657	80M
CH	49-51	120-80	3.2294	200-120	-3.5532	500-200	1.8682	85M
CH	52-54	120-80	3.4532	200-120	-3.7709	500-200	1.9730	90M
CH	55-57	120-80	3.6557	200-120	-3.9775	500-200	2.0777	95M
CH	58-60	120-80	3.8686	200-120	-4.1828	500-200	2.1850	100M
CH	61-63	120-80	4.1133	200-120	-4.4133	500-200	2.2906	105M
CH	64-66	120-80	4.3425	200-120	-4.6260	500-200	2.3965	110M
CH	67-69	120-80	4.5583	200-120	-4.8244	500-200	2.5023	115M
CH	70-72	120-80	4.7723	200-120	-5.0272	500-200	2.6084	120M

1972 NØV STATIØN 85 PA 10**4 AVE 5 DEPTH 188 M SWEEP 192 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.2492	200-120	.2692	500-200	.3568	5M
CH	3- 4	120-80	-.2832	200-120	.5285	500-200	.7185	10M
CH	5- 6	120-80	-.2449	200-120	.7787	500-200	1.0876	15M
CH	7- 8	120-80	-.2458	200-120	1.0244	500-200	1.4682	20M
CH	9-10	120-80	-.2052	200-120	1.2517	500-200	1.8410	25M
CH	11-12	120-80	-.1684	200-120	1.4797	500-200	2.2000	30M
CH	13-14	120-80	-.1265	200-120	1.6992	500-200	2.5550	35M
CH	15-16	120-80	-.0904	200-120	1.9167	500-200	2.9084	40M
CH	17-18	120-80	-.0538	200-120	2.1425	500-200	3.2620	45M
CH	19-20	120-80	-.0169	200-120	2.3781	500-200	3.6129	50M
CH	21-22	120-80	.0189	200-120	2.6178	500-200	3.9613	55M
CH	23-24	120-80	.0540	200-120	2.8648	500-200	4.3125	60M
CH	25-26	120-80	.0895	200-120	3.1119	500-200	4.6633	65M
CH	27-28	120-80	.1209	200-120	3.3666	500-200	5.0140	70M
CH	29-30	120-80	.1567	200-120	3.6162	500-200	5.3672	75M
CH	31-32	120-80	.1898	200-120	3.8694	500-200	5.7167	80M
CH	33-34	120-80	.2211	200-120	4.1219	500-200	6.0708	85M
CH	35-36	120-80	.2540	200-120	4.3723	500-200	6.4196	90M
CH	37-38	120-80	.2834	200-120	4.6282	500-200	6.7735	95M
CH	39-40	120-80	.3230	200-120	4.8788	500-200	7.1252	100M
CH	41-42	120-80	.3643	200-120	5.1294	500-200	7.4799	105M
CH	43-44	120-80	.3955	200-120	5.3832	500-200	7.8328	110M
CH	45-46	120-80	.5119	200-120	5.5532	500-200	8.1877	115M
CH	47-48	120-80	.5591	200-120	5.7960	500-200	8.5415	120M
CH	49-50	120-80	.6009	200-120	6.0424	500-200	8.8977	125M
CH	51-52	120-80	.6404	200-120	6.2894	500-200	9.2501	130M
CH	53-54	120-80	.6770	200-120	6.5381	500-200	9.6032	135M
CH	55-56	120-80	.7165	200-120	6.7851	500-200	9.9554	140M
CH	57-58	120-80	.7464	200-120	7.0340	500-200	10.3047	145M
CH	59-60	120-80	.7886	200-120	7.2833	500-200	10.6576	150M
CH	61-62	120-80	.8270	200-120	7.5314	500-200	11.0097	155M
CH	63-64	120-80	.8731	200-120	7.7775	500-200	11.3628	160M
CH	65-66	120-80	.9095	200-120	8.0223	500-200	11.7186	165M
CH	67-68	120-80	.9319	200-120	8.2853	500-200	12.0734	170M
CH	69-70	120-80	.9705	200-120	8.5401	500-200	12.4307	175M
CH	71-72	120-80	1.0020	200-120	8.7988	500-200	12.7896	180M
CH	73-74	120-80	1.0402	200-120	9.0468	500-200	13.1472	185M

1972 NØV STATIØN 89 PA 10**4 AVE 5 DEPTH 68 M SWEEP 80 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	.0946	200-120	-.7421	500-200	.0068	5M
CH	7-12	120-80	.8720	200-120	-2.1821	500-200	.0404	10M
CH	13-18	120-80	1.5918	200-120	-3.5882	500-200	.0859	15M
CH	19-24	120-80	1.7826	200-120	-4.4446	500-200	.1292	20M
CH	25-30	120-80	1.8959	200-120	-5.2017	500-200	.1599	25M
CH	31-36	120-80	1.2547	200-120	-5.2321	500-200	.1858	30M
CH	37-42	120-80	.3843	200-120	-5.0345	500-200	.2123	35M
CH	43-48	120-80	-.4963	200-120	-4.8367	500-200	.2353	40M
CH	49-54	120-80	-1.3239	200-120	-4.6906	500-200	.2728	45M
CH	55-60	120-80	-2.1477	200-120	-4.5621	500-200	.2948	50M
CH	61-66	120-80	-3.0031	200-120	-4.4009	500-200	.3186	55M
CH	67-72	120-80	-3.8611	200-120	-4.2409	500-200	.3420	60M
CH	73-78	120-80	-4.1122	200-120	-4.0845	500-200	.3638	65M

1972 NØV STATIØN 90 PA 10**4 AVG 5 DEPTH 24 M SWEEP 30 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.0978	200-120	-.7552	500-200	.4106	5M
CH	21-40	120-80	-.5087	200-120	-.8043	500-200	.7112	10M
CH	41-60	120-80	-.4720	200-120	-1.6714	500-200	1.0245	15M
CH	61-80	120-80	-1.0150	200-120	-1.9675	500-200	1.3324	20M

1972 NØV STATIØN 92 PA 10**4 AVG 5 DEPTH 67 M SWEEP 100 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 5	120-80	1.3079	200-120	-1.5868	500-200	.0397	5M
CH	6-10	120-80	2.8920	200-120	-3.0342	500-200	.1028	10M
CH	11-15	120-80	2.9327	200-120	-2.8930	500-200	.1829	15M
CH	16-20	120-80	1.9396	200-120	-2.8501	500-200	.2687	20M
CH	21-25	120-80	.9189	200-120	-2.8353	500-200	.3375	25M
CH	26-30	120-80	2.7873	200-120	-4.5669	500-200	.4005	30M
CH	31-35	120-80	3.7091	200-120	-5.4865	500-200	.4574	35M
CH	36-40	120-80	4.1464	200-120	-5.8055	500-200	.5121	40M
CH	41-45	120-80	4.2989	200-120	-5.8203	500-200	.5693	45M
CH	46-50	120-80	4.4190	200-120	-5.8360	500-200	.6231	50M
CH	51-55	120-80	4.6177	200-120	-5.9308	500-200	.6802	55M
CH	56-60	120-80	4.7017	200-120	-5.9048	500-200	.7492	60M
CH	61-65	120-80	4.6262	200-120	-5.7151	500-200	.8056	65M

1972 NØV STATIØN 94 PA 10**4 AVE 5 DEPTH 39 M SWEEP 45 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-12	120-80	-.2660	200-120	-.3432	500-200	.0636	5M
CH	13-24	120-80	-.8184	200-120	-.5138	500-200	.1547	10M
CH	25-36	120-80	-1.6567	200-120	-.4034	500-200	.2605	15M
CH	37-48	120-80	-2.5243	200-120	-.2682	500-200	.3605	20M
CH	49-60	120-80	-3.3878	200-120	-.1374	500-200	.4472	25M
CH	61-72	120-80	-4.2615	200-120	-.0016	500-200	.5308	30M
CH	73-84	120-80	-5.1381	200-120	.1407	500-200	.6128	35M

1972 NØV STATIØN 95 PA 10**4 AVE 5 DEPTH 33 M SWEEP 40 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-13	120-80	.0970	200-120	.4064	500-200	-.1459	5M
CH	14-26	120-80	.8793	200-120	-.9041	500-200	-.1585	10M
CH	27-39	120-80	.3669	200-120	-1.1571	500-200	-.1568	15M
CH	40-52	120-80	-.0180	200-120	-1.1612	500-200	-.1556	20M
CH	53-65	120-80	.0306	200-120	-1.0858	500-200	-.1653	25M
CH	66-78	120-80	-1.3912	200-120	-.9611	500-200	-.1780	30M

1972 NØV STATIØN 96 PA 10**4 AVE 5 DEPTH 35 M SWEEP 42 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-11	120-80	.1287	200-120	-.9014	500-200	.1135	5M
CH	12-22	120-80	.2557	200-120	-1.6050	500-200	.2039	10M
CH	23-33	120-80	-.2119	200-120	-1.7887	500-200	.2888	15M
CH	34-44	120-80	.3618	200-120	-3.0630	500-200	.4095	20M
CH	45-55	120-80	.2065	200-120	-3.6621	500-200	.5231	25M
CH	56-66	120-80	-.3752	200-120	-3.8271	500-200	.6305	30M
CH	67-77	120-80	-1.1883	200-120	-3.7676	500-200	.7357	35M

1972 NØV STATIØN 97 PA 10**4 AVG 5 DEPTH 29 M SWEEP 38 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-15	120-80	-.8487	200-120	-.3892	500-200	.1324	5M
CH	16-30	120-80	-.4276	200-120	-.8441	500-200	.2686	10M
CH	31-45	120-80	-.1704	200-120	-1.1566	500-200	.4173	15M
CH	46-60	120-80	.0706	200-120	-1.2718	500-200	.5616	20M
CH	61-75	120-80	.1947	200-120	-1.2711	500-200	.7025	25M

1972 NØV STATIØN 98 PA 10**4 AVE 5 DEPTH 30 M SWEEP 36 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-13	120-80	-.1633	200-120	-.8041	500-200	.0478	5M
CH	14-26	120-80	-.7325	200-120	-.9913	500-200	.0932	10M
CH	27-39	120-80	-1.4240	200-120	-.9897	500-200	.1520	15M
CH	40-52	120-80	-2.2039	200-120	-.9156	500-200	.2171	20M
CH	53-65	120-80	-3.0533	200-120	-.7745	500-200	.2718	25M
CH	66-78	120-80	-3.9241	200-120	-.6180	500-200	.3236	30M

1972 NØV STATIØN 99 PA 10**4 AVE 5 DEPTH 40 M SWEEP 54 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 9	120-80	.0963	200-120	.5061	500-200	.3354	5M
CH	10-18	120-80	.1926	200-120	-.2969	500-200	.5441	10M
CH	19-27	120-80	.2885	200-120	-1.0945	500-200	.7675	15M
CH	28-36	120-80	.3842	200-120	-1.9135	500-200	.9904	20M
CH	37-45	120-80	.4798	200-120	-2.7257	500-200	1.1989	25M
CH	46-54	120-80	.1847	200-120	-3.1383	500-200	1.4036	30M
CH	55-63	120-80	1.1136	200-120	-4.7828	500-200	1.6077	35M
CH	64-72	120-80	1.5971	200-120	-5.9861	500-200	1.8032	40M

1972 NØV STATIØN 103 PA 10**4 AVE 5 DEPTH 27 M SWEEP 29 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-18	120-80	.0972	200-120	.4629	500-200	.1129	5M
CH	19-36	120-80	.1941	200-120	.9023	500-200	.3166	10M
CH	37-54	120-80	.2909	200-120	.5214	500-200	.5488	15M
CH	55-72	120-80	.3876	200-120	-.1561	500-200	.7782	20M
CH	73-90	120-80	.2619	200-120	-.7775	500-200	.9796	25M

1972 NØV STATIØN 105 PA 10**4 AVE 5 DEPTH 26 M SWEEP 31 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	.0977	200-120	-.8351	500-200	.1192	5M
CH	17-32	120-80	-.8395	200-120	-.0104	500-200	.2514	10M
CH	33-48	120-80	-.6596	200-120	-.5077	500-200	.3970	15M
CH	49-64	120-80	-.7898	200-120	-.8787	500-200	.5460	20M
CH	65-80	120-80	-1.3465	200-120	-.9469	500-200	.6914	25M

1973 FEB STA 1 PA 10**4 AVG 5 DEPTH 33M DEPTH 35M SCAN 50 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-10	120-80	.1125	200-120	.2220	500-200	-.3060	5M
CH	11-20	120-80	.2678	200-120	.5775	500-200	-.0952	10M
CH	21-30	120-80	1.1600	200-120	.7082	500-200	.1095	15M
CH	31-40	120-80	.1962	200-120	1.0101	500-200	.3151	20M
CH	41-50	120-80	.6561	200-120	-.0086	500-200	.5217	25M
CH	51-60	120-80	.9536	200-120	-.8594	500-200	.7301	30M
CH	61-70	120-80	1.1588	200-120	-1.5034	500-200	.9390	35M

1973 STATIØN 3 FEB PA 10**4 AVE 5 DEPTH 15 M DEPTH 18 M SCAN 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-24	120-80	-1.3841	200-120	.5780	500-200	-.5970	5M
CH	25-48	120-80	-3.0360	200-120	-.0353	500-200	-.5342	10M
CH	49-72	120-80	-4.6428	200-120	-.7348	500-200	-.4740	15M

1973 FEB STA 7 PA 10**4 AVG 5 DEPPTH 16 DEPTH 24 M SCAN 35 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-17	120-80	.7373	200-120	-1.2644	500-200	-.0314	5M
CH	18-34	120-80	-.1422	200-120	-1.1144	500-200	.0248	10M
CH	35-51	120-80	.5749	200-120	-2.4339	500-200	.0682	15M
CH	52-68	120-80	.8997	200-120	-3.5311	500-200	.1100	20M

1973 FEB STATIØN 8 PA **4 AVE 5 DEPTH 15 M DEPTH 65 M SWEEP 72 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	.0982	200-120	-.0886	500-200	-.3443	5M
CH	7-12	120-80	.7623	200-120	-.7466	500-200	-.3762	10M
CH	13-18	120-80	1.1129	200-120	-2.2914	500-200	-.4043	15M
CH	19-24	120-80	.5492	200-120	-2.5793	500-200	-.4338	20M
CH	25-30	120-80	.0418	200-120	-2.6226	500-200	-.4863	25M
CH	31-36	120-80	-.3578	200-120	-2.5898	500-200	-.5141	30M
CH	37-42	120-80	-.5799	200-120	-2.5678	500-200	-.5455	35M
CH	43-48	120-80	-.7505	200-120	-2.5267	500-200	-.5667	40M
CH	49-54	120-80	-.8398	200-120	-2.5099	500-200	-.6011	45M
CH	55-60	120-80	-.8722	200-120	-2.4949	500-200	-.6337	50M
CH	61-66	120-80	-.9014	200-120	-2.4705	500-200	-.6648	55M
CH	67-72	120-80	-.9282	200-120	-2.4559	500-200	-.6955	60M
CH	73-78	120-80	-.9562	200-120	-2.4405	500-200	-.7239	65M

1973 STATIØN 14 FEB PA 10**4 AVE 5 DEPTH 10 M DEPTH 14 M SWEEP 14 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-50	120-80	.1038	200-120	.5431	500-200	-.4788	5M
CH	51-**	120-80	.8514	200-120	1.0852	500-200	-.6596	10M

1973 STATIØN 19 FEB PA 10**4 AVE 5 DEPTH 14 M DEPTH 21.M SWEEP 24 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-21	120-80	-.5907	200-120	.5455	500-200	-1.2900	5M
CH	22-42	120-80	.0475	200-120	1.0907	500-200	-2.0821	10M
CH	43-63	120-80	.5645	200-120	1.6347	500-200	-2.0663	15M
CH	64-84	120-80	1.2147	200-120	2.1780	500-200	-2.0553	20M

1973 FEB STATIØN 20 PA 10**4 AVE 5 DEPTH 18 DEPTH 23 SWEEP 27
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-21	120-80	-.7741	200-120	1.5747	500-200	-.2452	5M
CH	22-42	120-80	-1.1313	200-120	2.1972	500-200	-.2476	10M
CH	43-63	120-80	-1.2090	200-120	2.5493	500-200	-.2478	15M
CH	64-84	120-80	-1.2169	200-120	3.0525	500-200	-.2448	20M

1973 STATIØN 24 PA 10**4 AVE 5 DEPTH 114 M DEPTH 123 M SWEEP 150 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-3	120-80	.1785	200-120	-.2741	500-200	-.2559	5M
CH	4-6	120-80	.3038	200-120	-.3126	500-200	-.2606	10M
CH	7-9	120-80	-.6011	200-120	-.3417	500-200	-.2599	15M
CH	10-12	120-80	-.7063	200-120	-.3112	500-200	-.2606	20M
CH	13-15	120-80	-.7110	200-120	-.3071	500-200	-.2600	25M
CH	16-18	120-80	-.7014	200-120	-.3031	500-200	-.2619	30M
CH	19-21	120-80	-.7001	200-120	-.3002	500-200	-.2633	35M
CH	22-24	120-80	-.6921	200-120	-.2971	500-200	-.2635	40M
CH	25-27	120-80	-.6851	200-120	-.2971	500-200	-.2652	45M
CH	28-30	120-80	-.6906	200-120	-.2969	500-200	-.2682	50M
CH	31-33	120-80	-.6894	200-120	-.2956	500-200	-.2702	55M
CH	34-36	120-80	-.6964	200-120	-.2916	500-200	-.2717	60M
CH	37-39	120-80	-.7053	200-120	-.2886	500-200	-.2727	65M
CH	40-42	120-80	-.7078	200-120	-.2899	500-200	-.2752	70M
CH	43-45	120-80	-.7116	200-120	-.2902	500-200	-.2756	75M
CH	46-48	120-80	-.7102	200-120	-.2866	500-200	-.2747	80M
CH	49-51	120-80	-.7211	200-120	-.2836	500-200	-.2744	85M
CH	52-54	120-80	-.7234	200-120	-.2817	500-200	-.2725	90M
CH	55-57	120-80	-.7284	200-120	-.2787	500-200	-.2734	95M
CH	58-60	120-80	-.7387	200-120	-.2745	500-200	-.2722	100M
CH	61-63	120-80	-.7429	200-120	-.2738	500-200	-.2702	105M
CH	64-66	120-80	-.7505	200-120	-.2734	500-200	-.2668	110M
CH	67-69	120-80	-.7536	200-120	-.2739	500-200	-.2644	115M
CH	70-72	120-80	-.7559	200-120	-.2726	500-200	-.2639	120M

1973 FEB STATIØN 26 PA 10**4 AVE 5 DEPTH 146 M SCAN 175 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.2514	200-120	-1.1803	500-200	.0054	5M
CH	3- 4	120-80	.5200	200-120	-2.4454	500-200	-.0012	10M
CH	5- 6	120-80	.6059	200-120	-2.6405	500-200	-.0030	15M
CH	7- 8	120-80	.6002	200-120	-2.6300	500-200	-.0067	20M
CH	9-10	120-80	.6071	200-120	-2.6253	500-200	-.0086	25M
CH	11-12	120-80	.6022	200-120	-2.6137	500-200	-.0160	30M
CH	13-14	120-80	.6018	200-120	-2.6056	500-200	-.0181	35M
CH	15-16	120-80	.6029	200-120	-2.5969	500-200	-.0251	40M
CH	17-18	120-80	.5967	200-120	-2.5847	500-200	-.0282	45M
CH	19-20	120-80	.5936	200-120	-2.5761	500-200	-.0373	50M
CH	21-22	120-80	.5900	200-120	-2.5638	500-200	-.0426	55M
CH	23-24	120-80	.5931	200-120	-2.5530	500-200	-.0543	60M
CH	25-26	120-80	.5951	200-120	-2.5461	500-200	-.0617	65M
CH	27-28	120-80	.6008	200-120	-2.5443	500-200	-.0700	70M
CH	29-30	120-80	.5937	200-120	-2.5334	500-200	-.0776	75M
CH	31-32	120-80	.5962	200-120	-2.5229	500-200	-.0872	80M
CH	33-34	120-80	.5933	200-120	-2.5116	500-200	-.0981	85M
CH	35-36	120-80	.5934	200-120	-2.5041	500-200	-.1062	90M
CH	37-38	120-80	.5909	200-120	-2.4905	500-200	-.1176	95M
CH	39-40	120-80	.5907	200-120	-2.4796	500-200	-.1270	100M
CH	41-42	120-80	.5904	200-120	-2.4686	500-200	-.1415	105M
CH	43-44	120-80	.5979	200-120	-2.4657	500-200	-.1534	110M
CH	45-46	120-80	.6000	200-120	-2.4559	500-200	-.1676	115M
CH	47-48	120-80	.5990	200-120	-2.4410	500-200	-.1799	120M
CH	49-50	120-80	.5973	200-120	-2.4276	500-200	-.1953	125M
CH	51-52	120-80	.5975	200-120	-2.4173	500-200	-.2096	130M
CH	53-54	120-80	.5978	200-120	-2.4105	500-200	-.2231	135M
CH	55-56	120-80	.5946	200-120	-2.3968	500-200	-.2370	140M
CH	57-58	120-80	.5967	200-120	-2.3840	500-200	-.2488	145M

1973 FEB STA 30 PA 10** 4 AVG 5 DEPTH 20 M DEPTH 24 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.6594	200-120	1.4782	500-200	-.6290	5M
CH	21-40	120-80	.9171	200-120	2.5723	500-200	-.5389	10M
CH	41-60	120-80	1.1878	200-120	3.4764	500-200	-.4517	15M
CH	61-80	120-80	1.4397	200-120	4.3405	500-200	-.3527	20M

1973 FEB STA 31 PA 10**4 AVG 5 DEPTH 28 M DEPTH 29 M SCAN 35 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	.0985	200-120	.5618	500-200	-.6616	5M
CH	15-28	120-80	.1969	200-120	1.0879	500-200	-.6274	10M
CH	29-42	120-80	.2951	200-120	1.0697	500-200	-.5889	15M
CH	43-56	120-80	.3930	200-120	.2656	500-200	-.5045	20M
CH	57-70	120-80	.4907	200-120	1.8102	500-200	-.4070	25M
CH	71-84	120-80	.5883	200-120	3.0687	500-200	-.2403	30M

1973 FEB STA 32 PA 10**4 AVG 5 DEPTH 171 M DEPTH 180 M SCAN 200 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.1686	200-120	.5542	500-200	-.1864	5M
CH	3- 4	120-80	-.1786	200-120	.5742	500-200	-.0797	10M
CH	5- 6	120-80	-.1938	200-120	.5824	500-200	.0258	15M
CH	7- 8	120-80	-.1962	200-120	.5808	500-200	.1310	20M
CH	9-10	120-80	-.1950	200-120	.5787	500-200	.2379	25M
CH	11-12	120-80	-.2001	200-120	.5785	500-200	.3437	30M
CH	13-14	120-80	-.2041	200-120	.5815	500-200	.4486	35M
CH	15-16	120-80	-.2044	200-120	.5736	500-200	.5563	40M
CH	17-18	120-80	-.2011	200-120	.5622	500-200	.6635	45M
CH	19-20	120-80	-.2032	200-120	.5567	500-200	.7686	50M
CH	21-22	120-80	-.1997	200-120	.5475	500-200	.8740	55M
CH	23-24	120-80	-.1937	200-120	.5350	500-200	.9786	60M
CH	25-26	120-80	-.1998	200-120	.5295	500-200	1.0819	65M
CH	27-28	120-80	-.2013	200-120	.5248	500-200	1.1843	70M
CH	29-30	120-80	-.1955	200-120	.5118	500-200	1.2884	75M
CH	31-32	120-80	-.1944	200-120	.5004	500-200	1.3925	80M
CH	33-34	120-80	-.1994	200-120	.4957	500-200	1.4957	85M
CH	35-36	120-80	-.2007	200-120	.4864	500-200	1.5988	90M
CH	37-38	120-80	-.2047	200-120	.4792	500-200	1.7026	95M
CH	39-40	120-80	-.2169	200-120	.4796	500-200	1.8055	100M
CH	41-42	120-80	-.2181	200-120	.4755	500-200	1.9099	105M
CH	43-44	120-80	-.2168	200-120	.4625	500-200	2.0149	110M
CH	45-46	120-80	-.2230	200-120	.4600	500-200	2.1182	115M
CH	47-48	120-80	-.2239	200-120	.4528	500-200	2.2204	120M
CH	49-50	120-80	-.2160	200-120	.4367	500-200	2.3244	125M
CH	51-52	120-80	-.2129	200-120	.4264	500-200	2.4265	130M
CH	53-54	120-80	-.2176	200-120	.4219	500-200	2.5300	135M
CH	55-56	120-80	-.2114	200-120	.4079	500-200	2.6312	140M
CH	57-58	120-80	-.2088	200-120	.3945	500-200	2.7331	145M
CH	59-60	120-80	-.2131	200-120	.3901	500-200	2.8333	150M
CH	61-62	120-80	-.2081	200-120	.3774	500-200	2.9337	155M
CH	63-64	120-80	-.2000	200-120	.3563	500-200	3.0343	160M
CH	65-66	120-80	-.2017	200-120	.3505	500-200	3.1348	165M
CH	67-68	120-80	-.2065	200-120	.3465	500-200	3.2342	170M
CH	69-70	120-80	-.1976	200-120	.3305	500-200	3.3311	175M
CH	71-72	120-80	-.2007	200-120	.3246	500-200	3.4294	180M

1973 FEB STA 34 PA 10**4 AVG 5 DEPTH 85 DEPTH 88 M SCAN 125 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 4	120-80	.0954	200-120	-.1242	500-200	-.1152	5M
CH	5- 8	120-80	.6751	200-120	-.9629	500-200	-.0080	10M
CH	9-12	120-80	.1283	200-120	-1.0829	500-200	.0973	15M
CH	13-16	120-80	.0605	200-120	-1.0558	500-200	.1927	20M
CH	17-20	120-80	-.0412	200-120	-1.0649	500-200	.2969	25M
CH	21-24	120-80	-.1193	200-120	-1.0766	500-200	.4027	30M
CH	25-28	120-80	-.0950	200-120	-1.0952	500-200	.5094	35M
CH	29-32	120-80	-.0892	200-120	-1.1012	500-200	.6141	40M
CH	33-36	120-80	-.1011	200-120	-1.0904	500-200	.7162	45M
CH	37-40	120-80	-.1032	200-120	-1.0875	500-200	.8235	50M
CH	41-44	120-80	-.1084	200-120	-1.0871	500-200	.9291	55M
CH	45-48	120-80	-.1049	200-120	-1.0964	500-200	1.0270	60M
CH	49-52	120-80	-.1006	200-120	-1.0954	500-200	1.1293	65M
CH	53-56	120-80	-.1135	200-120	-1.0744	500-200	1.2361	70M
CH	57-60	120-80	-.1157	200-120	-1.0744	500-200	1.3389	75M
CH	61-64	120-80	-.1216	200-120	-1.0743	500-200	1.4440	80M
CH	65-68	120-80	-.1272	200-120	-1.0844	500-200	1.5450	85M

1973 FEB STA 35 PA 10**4 AVG 5 DEPTH 18 M DEPTH 16 M SCAN 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-21	120-80	.1115	200-120	.5798	500-200	-.8430	5M
CH	22-42	120-80	.2223	200-120	-.0810	500-200	-1.0417	10M
CH	43-63	120-80	.3329	200-120	-.9458	500-200	-.9306	15M

1973 FEB STA 42 PA 10**4 AVG 5 DEPTH 15 M DEPTH 29 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	.1021	200-120	.6362	500-200	-1.1758	5M
CH	17-32	120-80	.2041	200-120	1.2714	500-200	-1.1877	10M
CH	33-48	120-80	.3060	200-120	1.9058	500-200	-1.1843	15M
CH	49-64	120-80	.4080	200-120	2.5392	500-200	-1.1861	20M
CH	65-80	120-80	.3497	200-120	3.6953	500-200	-1.1883	25M

1973 FEB STATION 44 PA 10**4 AVG 5 DEPTH 174 M DEPTH 189 M SCAN 200 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.8657	200-120	-.8411	500-200	-.1005	5M
CH	3- 4	120-80	1.4492	200-120	-1.9877	500-200	-.1018	10M
CH	5- 6	120-80	1.7975	200-120	-2.3305	500-200	-.1051	15M
CH	7- 8	120-80	1.8102	200-120	-2.3275	500-200	-.1088	20M
CH	9-10	120-80	1.7981	200-120	-2.3139	500-200	-.1113	25M
CH	11-12	120-80	1.7988	200-120	-2.3061	500-200	-.1150	30M
CH	13-14	120-80	1.7953	200-120	-2.2983	500-200	-.1203	35M
CH	15-16	120-80	1.7828	200-120	-2.2865	500-200	-.1266	40M
CH	17-18	120-80	1.7760	200-120	-2.2788	500-200	-.1331	45M
CH	19-20	120-80	1.7662	200-120	-2.2673	500-200	-.1401	50M
CH	21-22	120-80	1.7562	200-120	-2.2594	500-200	-.1456	55M
CH	23-24	120-80	1.7448	200-120	-2.2491	500-200	-.1511	60M
CH	25-26	120-80	1.7361	200-120	-2.2386	500-200	-.1572	65M
CH	27-28	120-80	1.7312	200-120	-2.2305	500-200	-.1645	70M
CH	29-30	120-80	1.7251	200-120	-2.2199	500-200	-.1727	75M
CH	31-32	120-80	1.7158	200-120	-2.2110	500-200	-.1814	80M
CH	33-34	120-80	1.6997	200-120	-2.1991	500-200	-.1895	85M
CH	35-36	120-80	1.6901	200-120	-2.1876	500-200	-.1993	90M
CH	37-38	120-80	1.6805	200-120	-2.1756	500-200	-.2083	95M
CH	39-40	120-80	1.6736	200-120	-2.1658	500-200	-.2187	100M
CH	41-42	120-80	1.6666	200-120	-2.1564	500-200	-.2282	105M
CH	43-44	120-80	1.6563	200-120	-2.1466	500-200	-.2388	110M
CH	45-46	120-80	1.6480	200-120	-2.1333	500-200	-.2479	115M
CH	47-48	120-80	1.6389	200-120	-2.1216	500-200	-.2595	120M
CH	49-50	120-80	1.6288	200-120	-2.1124	500-200	-.2707	125M
CH	51-52	120-80	1.6185	200-120	-2.1018	500-200	-.2795	130M
CH	53-54	120-80	1.6106	200-120	-2.0914	500-200	-.2912	135M
CH	55-56	120-80	1.6011	200-120	-2.0804	500-200	-.3017	140M
CH	57-58	120-80	1.5978	200-120	-2.0738	500-200	-.3127	145M
CH	59-60	120-80	1.5903	200-120	-2.0678	500-200	-.3220	150M
CH	61-62	120-80	1.5827	200-120	-2.0569	500-200	-.3293	155M
CH	63-64	120-80	1.5721	200-120	-2.0439	500-200	-.3373	160M
CH	65-66	120-80	1.5602	200-120	-2.0314	500-200	-.3440	165M
CH	67-68	120-80	1.5517	200-120	-2.0206	500-200	-.3507	170M
CH	69-70	120-80	1.5432	200-120	-2.0098	500-200	-.3576	175M
CH	71-72	120-80	1.5386	200-120	-2.0028	500-200	-.3625	180M
CH	73-74	120-80	1.5293	200-120	-1.9931	500-200	-.3684	185M

1973 STATIØN 46 FEB PA 10**4 AVE 5 DEPTH 120 DEPTH 130 SWEEP 180
MEAN VALUE OF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.0404	200-120	.2818	500-200	-.4419	5M
CH	3- 4	120-80	.0345	200-120	.2164	500-200	-.4403	10M
CH	5- 6	120-80	.0299	200-120	.2273	500-200	-.4465	15M
CH	7- 8	120-80	.0305	200-120	.2364	500-200	-.4465	20M
CH	9-10	120-80	.0246	200-120	.2502	500-200	-.4558	25M
CH	11-12	120-80	.0183	200-120	.2642	500-200	-.4540	30M
CH	13-14	120-80	.0106	200-120	.2783	500-200	-.4628	35M
CH	15-16	120-80	.0081	200-120	.2934	500-200	-.4631	40M
CH	17-18	120-80	.0013	200-120	.3143	500-200	-.4741	45M
CH	19-20	120-80	-.0062	200-120	.3322	500-200	-.4770	50M
CH	21-22	120-80	-.0113	200-120	.3455	500-200	-.4900	55M
CH	23-24	120-80	-.0191	200-120	.3609	500-200	-.4948	60M
CH	25-26	120-80	-.0257	200-120	.3801	500-200	-.5076	65M
CH	27-28	120-80	-.0336	200-120	.3976	500-200	-.5126	70M
CH	29-30	120-80	-.0379	200-120	.4105	500-200	-.5257	75M
CH	31-32	120-80	-.0441	200-120	.4267	500-200	-.5314	80M
CH	33-34	120-80	-.0516	200-120	.4422	500-200	-.5411	85M
CH	35-36	120-80	-.0616	200-120	.4592	500-200	-.5494	90M
CH	37-38	120-80	-.0657	200-120	.4730	500-200	-.5613	95M
CH	39-40	120-80	-.0715	200-120	.4886	500-200	-.5699	100M
CH	41-42	120-80	-.0763	200-120	.5036	500-200	-.5786	105M
CH	43-44	120-80	-.0848	200-120	.5237	500-200	-.5871	110M
CH	45-46	120-80	-.0949	200-120	.5424	500-200	-.5984	115M
CH	47-48	120-80	-.0973	200-120	.5541	500-200	-.6088	120M
CH	49-50	120-80	-.1027	200-120	.5710	500-200	-.6153	125M
CH	51-52	120-80	-.1089	200-120	.5895	500-200	-.6260	130M

1973 FEB STA 48 PA 10**4 AVG 5 DEPTH 26 DEPTH 29 SWEEP 35
MEAN VALUE OF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	-.6173	200-120	1.2849	500-200	-.8625	5M
CH	15-28	120-80	.3128	200-120	.9321	500-200	-.8409	10M
CH	29-42	120-80	.9339	200-120	-.4614	500-200	-.8226	15M
CH	43-56	120-80	.8715	200-120	1.0192	500-200	-.8059	20M
CH	57-70	120-80	.4674	200-120	2.3054	500-200	-.7905	25M
CH	71-84	120-80	.0103	200-120	3.6965	500-200	-.7752	30M

1973 FEB STA 60 PPAMP 10**4 AVG 5 DEPTH 12 DEPTH 12 M SCAN 20 M
MEAN VALUE OF PRØFILES ØVER 5M INTERVALS

CH	1-30	120-80	.1107	200-120	.5831	500-200	.1354	5M
CH	31-60	120-80	-.8597	200-120	.9655	500-200	.1448	10M

1973 FEB STA 62 PA 10**4 AVG 5 DEPTH 169 M DEPTH 185 M SCAN 250 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.0170	200-120	-.0014	500-200	.0651	5M
CH	3- 4	120-80	-.0442	200-120	.0058	500-200	.1282	10M
CH	5- 6	120-80	-.0676	200-120	.0154	500-200	.1912	15M
CH	7- 8	120-80	-.0932	200-120	.0283	500-200	.2552	20M
CH	9-10	120-80	-.1224	200-120	.0387	500-200	.3213	25M
CH	11-12	120-80	-.1575	200-120	.0534	500-200	.3894	30M
CH	13-14	120-80	-.1806	200-120	.0623	500-200	.4549	35M
CH	15-16	120-80	-.2061	200-120	.0688	500-200	.5201	40M
CH	17-18	120-80	-.2383	200-120	.0776	500-200	.5864	45M
CH	19-20	120-80	-.2649	200-120	.0833	500-200	.6522	50M
CH	21-22	120-80	-.2911	200-120	.0887	500-200	.7201	55M
CH	23-24	120-80	-.3193	200-120	.0956	500-200	.7839	60M
CH	25-26	120-80	-.3432	200-120	.1034	500-200	.8491	65M
CH	27-28	120-80	-.3725	200-120	.1127	500-200	.9164	70M
CH	29-30	120-80	-.4000	200-120	.1184	500-200	.9828	75M
CH	31-32	120-80	-.4269	200-120	.1251	500-200	1.0502	80M
CH	33-34	120-80	-.4542	200-120	.1314	500-200	1.1149	85M
CH	35-36	120-80	-.4774	200-120	.1377	500-200	1.1800	90M
CH	37-38	120-80	-.5056	200-120	.1459	500-200	1.2454	95M
CH	39-40	120-80	-.5320	200-120	.1511	500-200	1.3099	100M
CH	41-42	120-80	-.5611	200-120	.1545	500-200	1.3740	105M
CH	43-44	120-80	-.5923	200-120	.1626	500-200	1.4390	110M
CH	45-46	120-80	-.6216	200-120	.1695	500-200	1.5036	115M
CH	47-48	120-80	-.6446	200-120	.1783	500-200	1.5692	120M
CH	49-50	120-80	-.6608	200-120	.1706	500-200	1.6336	125M
CH	51-52	120-80	-.6825	200-120	.1740	500-200	1.6966	130M
CH	53-54	120-80	-.7071	200-120	.1776	500-200	1.7606	135M
CH	55-56	120-80	-.7387	200-120	.1794	500-200	1.8241	140M
CH	57-58	120-80	-.7685	200-120	.1828	500-200	1.8876	145M
CH	59-60	120-80	-.7977	200-120	.1896	500-200	1.9501	150M
CH	61-62	120-80	-.8242	200-120	.1911	500-200	2.0131	155M
CH	63-64	120-80	-.8494	200-120	.1963	500-200	2.0749	160M
CH	65-66	120-80	-.8738	200-120	.2016	500-200	2.1378	165M
CH	67-68	120-80	-.9006	200-120	.2052	500-200	2.2005	170M
CH	69-70	120-80	-.9267	200-120	.2129	500-200	2.2634	175M
CH	71-72	120-80	-.9520	200-120	.2158	500-200	2.3249	180M
CH	73-74	120-80	-.9760	200-120	.2179	500-200	2.3877	185M

1973 STATION 64 FEB PA 10**4 AVE 5 DEPTH 85 M DEPTH 94 M SCAN 150 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.8763	200-120	-.4489	500-200	.5206	5M
CH	4- 6	120-80	1.6036	200-120	-.7837	500-200	.6192	10M
CH	7- 9	120-80	1.3965	200-120	-.7949	500-200	.7113	15M
CH	10-12	120-80	1.3559	200-120	-.7930	500-200	.8032	20M
CH	13-15	120-80	1.3487	200-120	-.7886	500-200	.8968	25M
CH	16-18	120-80	1.3515	200-120	-.7884	500-200	.9950	30M
CH	19-21	120-80	1.3375	200-120	-.7783	500-200	1.0885	35M
CH	22-24	120-80	1.3535	200-120	-.7911	500-200	1.1799	40M
CH	25-27	120-80	1.3505	200-120	-.7831	500-200	1.2731	45M
CH	28-30	120-80	1.3415	200-120	-.7697	500-200	1.3677	50M
CH	31-33	120-80	1.3360	200-120	-.7642	500-200	1.4618	55M
CH	34-36	120-80	1.3265	200-120	-.7532	500-200	1.5550	60M
CH	37-39	120-80	1.3242	200-120	-.7497	500-200	1.6530	65M
CH	40-42	120-80	1.3175	200-120	-.7435	500-200	1.7443	70M
CH	43-45	120-80	1.3113	200-120	-.7355	500-200	1.8373	75M
CH	46-48	120-80	1.3081	200-120	-.7286	500-200	1.9290	80M
CH	49-51	120-80	1.3038	200-120	-.7381	500-200	2.0216	85M
CH	52-54	120-80	1.3036	200-120	-.7349	500-200	2.1142	90M

1973 STATIØN 66 FEB PA 10**4 AVE 5 DEPTH 12 M DEPTH 21 M SWEEP 27 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-19	120-80	.1250	200-120	1.0223	500-200	.0826	5M
CH	20-38	120-80	.4456	200-120	1.2761	500-200	.0958	10M
CH	39-57	120-80	1.2381	200-120	1.4655	500-200	.1031	15M
CH	58-76	120-80	2.2753	200-120	2.0621	500-200	.1116	20M

1973 STATIØN 73 FEB PA 10**4 AVE 5 DEPTH 17 M DEPTH 18 M SWEEP 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-24	120-80	-.1606	200-120	2.2960	500-200	-.3296	5M
CH	25-48	120-80	-.3956	200-120	1.8056	500-200	-.3192	10M
CH	49-72	120-80	-.0980	200-120	3.2243	500-200	-.3111	15M

1973 STATIØN 75 FEB PA 10**4 AVE 5 DEPTH 233 M DEPTH 240 M SWEEP 260 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 1	120-80	.0112	200-120	-.1016	500-200	-.0133	5M
CH	2- 2	120-80	-.1174	200-120	-.0952	500-200	-.0226	10M
CH	3- 3	120-80	-.3888	200-120	-.0902	500-200	-.0339	15M
CH	4- 4	120-80	-.5040	200-120	-.0885	500-200	-.0458	20M
CH	5- 5	120-80	-.5427	200-120	-.0852	500-200	-.0524	25M
CH	6- 6	120-80	-.5638	200-120	-.0875	500-200	-.0566	30M
CH	7- 7	120-80	-.5906	200-120	-.0863	500-200	-.0623	35M
CH	8- 8	120-80	-.6086	200-120	-.0849	500-200	-.0690	40M
CH	9- 9	120-80	-.6304	200-120	-.0889	500-200	-.0749	45M
CH	10-10	120-80	-.6496	200-120	-.0895	500-200	-.0797	50M
CH	11-11	120-80	-.6653	200-120	-.0923	500-200	-.0864	55M
CH	12-12	120-80	-.6874	200-120	-.0955	500-200	-.0910	60M
CH	13-13	120-80	-.7086	200-120	-.0991	500-200	-.0940	65M
CH	14-14	120-80	-.7298	200-120	-.1033	500-200	-.0997	70M
CH	15-15	120-80	-.7513	200-120	-.1030	500-200	-.1057	75M
CH	16-16	120-80	-.7710	200-120	-.1092	500-200	-.1111	80M
CH	17-17	120-80	-.7986	200-120	-.1059	500-200	-.1155	85M
CH	18-18	120-80	-.8195	200-120	-.1141	500-200	-.1135	90M
CH	19-19	120-80	-.8351	200-120	-.1235	500-200	-.1128	95M
CH	20-20	120-80	-.8564	200-120	-.1279	500-200	-.1135	100M
CH	21-21	120-80	-.8657	200-120	-.1471	500-200	-.1166	105M
CH	22-22	120-80	-.8848	200-120	-.1522	500-200	-.1198	110M
CH	23-23	120-80	-.8941	200-120	-.1614	500-200	-.1212	115M
CH	24-24	120-80	-.9023	200-120	-.1673	500-200	-.1251	120M
CH	25-25	120-80	-.9162	200-120	-.1744	500-200	-.1278	125M
CH	26-26	120-80	-.9328	200-120	-.1764	500-200	-.1332	130M
CH	27-27	120-80	-.9573	200-120	-.1805	500-200	-.1360	135M
CH	28-28	120-80	-.9783	200-120	-.1807	500-200	-.1395	140M
CH	29-29	120-80	-.9944	200-120	-.1876	500-200	-.1411	145M
CH	30-30	120-80	-1.0130	200-120	-.1935	500-200	-.1386	150M
CH	31-31	120-80	-1.0360	200-120	-.2013	500-200	-.1384	155M
CH	32-32	120-80	-1.0571	200-120	-.2058	500-200	-.1395	160M
CH	33-33	120-80	-1.0762	200-120	-.2104	500-200	-.1409	165M
CH	34-34	120-80	-1.0975	200-120	-.2146	500-200	-.1423	170M
CH	35-35	120-80	-1.1197	200-120	-.2179	500-200	-.1443	175M
CH	36-36	120-80	-1.1432	200-120	-.2227	500-200	-.1472	180M
CH	37-37	120-80	-1.1675	200-120	-.2272	500-200	-.1494	185M
CH	38-38	120-80	-1.1862	200-120	-.2332	500-200	-.1507	190M
CH	39-39	120-80	-1.2089	200-120	-.2387	500-200	-.1528	195M
CH	40-40	120-80	-1.2267	200-120	-.2431	500-200	-.1551	200M
CH	41-41	120-80	-1.2451	200-120	-.2473	500-200	-.1565	205M
CH	42-42	120-80	-1.2657	200-120	-.2515	500-200	-.1579	210M
CH	43-43	120-80	-1.2860	200-120	-.2559	500-200	-.1563	215M
CH	44-44	120-80	-1.3076	200-120	-.2608	500-200	-.1558	220M
CH	45-45	120-80	-1.3269	200-120	-.2630	500-200	-.1562	225M
CH	46-46	120-80	-1.3478	200-120	-.2655	500-200	-.1587	230M
CH	47-47	120-80	-1.3653	200-120	-.2728	500-200	-.1598	235M
CH	48-48	120-80	-1.3826	200-120	-.2773	500-200	-.1614	240M

1973 STATIØN 77 FEB PA 10**4 AVE 5 DEPTH 114 M DEPTH 117 M SWEEP 170 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.0287	200-120	.2137	500-200	-.4932	5M
CH	3- 4	120-80	.6334	200-120	-.6268	500-200	-.4741	10M
CH	5- 6	120-80	1.0943	200-120	-1.2711	500-200	-.4803	15M
CH	7- 8	120-80	1.0966	200-120	-1.3357	500-200	-.4839	20M
CH	9-10	120-80	1.1000	200-120	-1.3169	500-200	-.4970	25M
CH	11-12	120-80	1.1023	200-120	-1.3169	500-200	-.4966	30M
CH	13-14	120-80	1.0905	200-120	-1.3089	500-200	-.5061	35M
CH	15-16	120-80	1.0861	200-120	-1.3028	500-200	-.5065	40M
CH	17-18	120-80	1.0769	200-120	-1.2899	500-200	-.5137	45M
CH	19-20	120-80	1.0697	200-120	-1.2836	500-200	-.5163	50M
CH	21-22	120-80	1.0632	200-120	-1.2872	500-200	-.5239	55M
CH	23-24	120-80	1.0527	200-120	-1.2903	500-200	-.5286	60M
CH	25-26	120-80	1.0281	200-120	-1.2909	500-200	-.5324	65M
CH	27-28	120-80	1.0206	200-120	-1.2876	500-200	-.5353	70M
CH	29-30	120-80	.9865	200-120	-1.2902	500-200	-.5365	75M
CH	31-32	120-80	.9662	200-120	-1.2996	500-200	-.5429	80M
CH	33-34	120-80	.9511	200-120	-1.3022	500-200	-.5454	85M
CH	35-36	120-80	.9404	200-120	-1.2993	500-200	-.5510	90M
CH	37-38	120-80	.9351	200-120	-1.2996	500-200	-.5502	95M
CH	39-40	120-80	.9121	200-120	-1.3050	500-200	-.5561	100M
CH	41-42	120-80	.8915	200-120	-1.3050	500-200	-.5542	105M
CH	43-44	120-80	.8678	200-120	-1.2983	500-200	-.5620	110M
CH	45-46	120-80	.8633	200-120	-1.2988	500-200	-.5592	115M

1973 STATIØN 78 FEB PA 10**4 AVE 5 DEPTH 53 M DEPTH 60 M SWEEP 62 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 8	120-80	.1114	200-120	-.6706	500-200	.3350	5M
CH	9-16	120-80	.2226	200-120	-1.6379	500-200	.3489	10M
CH	17-24	120-80	-.1835	200-120	-2.1752	500-200	.3570	15M
CH	25-32	120-80	-.5899	200-120	-2.7118	500-200	.3656	20M
CH	33-40	120-80	-1.3538	200-120	-2.8909	500-200	.3737	25M
CH	41-48	120-80	-1.4856	200-120	-2.8857	500-200	.3846	30M
CH	49-56	120-80	-2.1025	200-120	-2.8816	500-200	.3943	35M
CH	57-64	120-80	-2.3286	200-120	-2.8796	500-200	.4031	40M
CH	65-72	120-80	-2.3058	200-120	-2.8701	500-200	.4122	45M
CH	73-80	120-80	-2.3735	200-120	-2.8576	500-200	.4191	50M
CH	81-88	120-80	-2.3784	200-120	-2.8424	500-200	.4256	55M
CH	89-96	120-80	-2.3732	200-120	-2.8323	500-200	-.2371	60M

1973 FEB STA 79 PA 10**4 AVG 5 DEPTH 20 DEPTH 20 SCAN 25
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.4707	200-120	-1.1038	500-200	.0150	5M
CH	21-40	120-80	.3578	200-120	-.5487	500-200	.0340	10M
CH	41-60	120-80	-1.3082	200-120	-.0337	500-200	.0511	15M
CH	61-80	120-80	-2.8882	200-120	.6505	500-200	.0710	20M

1973 STATIØN 83 FEB PA 10** 4 AVE 5 DEPTH 99 M DEPTH 96 M SWEEP 130 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	.7863	200-120	.3639	500-200	-.5240	5M
CH	4- 6	120-80	1.1546	200-120	.2903	500-200	-.5934	10M
CH	7- 9	120-80	1.3321	200-120	.1645	500-200	-.6616	15M
CH	10-12	120-80	1.3190	200-120	.2255	500-200	-.7316	20M
CH	13-15	120-80	1.3024	200-120	.2902	500-200	-.7971	25M
CH	16-18	120-80	1.2793	200-120	.3573	500-200	-.8633	30M
CH	19-21	120-80	1.2572	200-120	.4256	500-200	-.9269	35M
CH	22-24	120-80	1.2397	200-120	.4897	500-200	-.9933	40M
CH	25-27	120-80	1.2218	200-120	.5549	500-200	-1.0573	45M
CH	28-30	120-80	1.1975	200-120	.6244	500-200	-1.1230	50M
CH	31-33	120-80	1.1851	200-120	.6893	500-200	-1.1867	55M
CH	34-36	120-80	1.1667	200-120	.7578	500-200	-1.2478	60M
CH	37-39	120-80	1.1580	200-120	.8128	500-200	-1.3098	65M
CH	40-42	120-80	1.1983	200-120	.8145	500-200	-1.3724	70M
CH	43-45	120-80	1.1770	200-120	.8800	500-200	-1.4346	75M
CH	46-48	120-80	1.1614	200-120	.9425	500-200	-1.4963	80M
CH	49-51	120-80	1.1442	200-120	1.0062	500-200	-1.5577	85M
CH	52-54	120-80	1.1230	200-120	1.0684	500-200	-1.6204	90M
CH	55-57	120-80	1.1025	200-120	1.1301	500-200	-1.6834	95M

1973 STATIØN 85 FEB PA 10**4 AVE 5 DEPTH 188 M DEPTH 186 M SWEEP 225 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	-.0046	200-120	-.0275	500-200	-.0033	5M
CH	3- 4	120-80	-.0221	200-120	-.0455	500-200	-.0100	10M
CH	5- 6	120-80	-.0379	200-120	-.0602	500-200	-.0167	15M
CH	7- 8	120-80	-.0504	200-120	-.0752	500-200	-.0202	20M
CH	9-10	120-80	-.0702	200-120	-.0870	500-200	-.0226	25M
CH	11-12	120-80	-.0891	200-120	-.0998	500-200	-.0240	30M
CH	13-14	120-80	-.1045	200-120	-.1191	500-200	-.0243	35M
CH	15-16	120-80	-.1240	200-120	-.1358	500-200	-.0269	40M
CH	17-18	120-80	-.1418	200-120	-.1537	500-200	-.0290	45M
CH	19-20	120-80	-.1544	200-120	-.1735	500-200	-.0314	50M
CH	21-22	120-80	-.1695	200-120	-.1937	500-200	-.0319	55M
CH	23-24	120-80	-.1828	200-120	-.2087	500-200	-.0292	60M
CH	25-26	120-80	-.1972	200-120	-.2299	500-200	-.0265	65M
CH	27-28	120-80	-.2126	200-120	-.2487	500-200	-.0263	70M
CH	29-30	120-80	-.2274	200-120	-.2672	500-200	-.0246	75M
CH	31-32	120-80	-.2415	200-120	-.2858	500-200	-.0235	80M
CH	33-34	120-80	-.2543	200-120	-.3053	500-200	-.0228	85M
CH	35-36	120-80	-.2670	200-120	-.3283	500-200	-.0221	90M
CH	37-38	120-80	-.2846	200-120	-.3483	500-200	-.0216	95M
CH	39-40	120-80	-.3014	200-120	-.3670	500-200	-.0207	100M
CH	41-42	120-80	-.3142	200-120	-.3898	500-200	-.0200	105M
CH	43-44	120-80	-.3250	200-120	-.4179	500-200	-.0201	110M
CH	45-46	120-80	-.3451	200-120	-.4385	500-200	-.0192	115M
CH	47-48	120-80	-.3625	200-120	-.4576	500-200	-.0179	120M
CH	49-50	120-80	-.3749	200-120	-.4787	500-200	-.0174	125M
CH	51-52	120-80	-.3909	200-120	-.5009	500-200	-.0159	130M
CH	53-54	120-80	-.4033	200-120	-.5207	500-200	-.0162	135M
CH	55-56	120-80	-.4188	200-120	-.5409	500-200	-.0154	140M
CH	57-58	120-80	-.4346	200-120	-.5615	500-200	-.0126	145M
CH	59-60	120-80	-.4491	200-120	-.5811	500-200	-.0123	150M
CH	61-62	120-80	-.4647	200-120	-.6014	500-200	-.0114	155M
CH	63-64	120-80	-.4771	200-120	-.6242	500-200	-.0118	160M
CH	65-66	120-80	-.4911	200-120	-.6485	500-200	-.0143	165M
CH	67-68	120-80	-.5043	200-120	-.6697	500-200	-.0165	170M
CH	69-70	120-80	-.5179	200-120	-.6874	500-200	-.0185	175M
CH	71-72	120-80	-.5343	200-120	-.7087	500-200	-.0181	180M
CH	73-74	120-80	-.5485	200-120	-.7280	500-200	-.0180	185M

1973 FEB STA 89 PA 10**4 AVG 5 DEPTH 76 M DEPTH 77 M SCAN 80 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	.7308	200-120	-.8955	500-200	-.0806	5M
CH	7-12	120-80	1.4288	200-120	-1.4917	500-200	-.0845	10M
CH	13-18	120-80	1.5022	200-120	-1.4980	500-200	-.0881	15M
CH	19-24	120-80	1.4920	200-120	-1.4435	500-200	-.0897	20M
CH	25-30	120-80	1.4869	200-120	-1.4026	500-200	-.0884	25M
CH	31-36	120-80	1.4941	200-120	-1.4088	500-200	-.0834	30M
CH	37-42	120-80	1.5038	200-120	-1.4183	500-200	-.0767	35M
CH	43-48	120-80	1.4808	200-120	-1.4012	500-200	-.0709	40M
CH	49-54	120-80	1.4838	200-120	-1.4036	500-200	-.0659	45M
CH	55-60	120-80	1.4932	200-120	-1.4117	500-200	-.0625	50M
CH	61-66	120-80	1.4891	200-120	-1.4207	500-200	-.0616	55M
CH	67-72	120-80	1.4408	200-120	-1.4317	500-200	-.0621	60M
CH	73-78	120-80	1.4345	200-120	-1.4453	500-200	-.0597	65M
CH	79-84	120-80	1.4277	200-120	-1.4556	500-200	-.0575	70M
CH	85-90	120-80	1.4351	200-120	-1.4695	500-200	-.1928	75M

1973 FEB STA 90 PA 10**4 AVG 5 DEPTH L3 DEPTH (SOUNDER) 20 SCAN 25
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	-.6544	200-120	1.6677	500-200	.1194	5M
CH	21-40	120-80	-1.4540	200-120	1.6052	500-200	.0292	10M
CH	41-60	120-80	-1.6804	200-120	1.4637	500-200	-.0634	15M
CH	61-80	120-80	-1.4496	200-120	.7840	500-200	-.1611	20M

1973 FEB STA 92 PRE AMP 10*4 AVG 5 DEPTH 67 M@DEPTH 86 M SCAN 100 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 5	120-80	1.0658	200-120	1.5550	500-200	-.6730	5M
CH	6-10	120-80	2.0924	200-120	1.0485	500-200	-.7816	10M
CH	11-15	120-80	2.6162	200-120	.6488	500-200	-.8944	15M
CH	16-20	120-80	4.4286	200-120	-1.0404	500-200	-1.0069	20M
CH	21-25	120-80	5.4838	200-120	-1.9746	500-200	-1.1173	25M
CH	26-30	120-80	5.7512	200-120	-2.1232	500-200	-1.2288	30M
CH	31-35	120-80	5.8356	200-120	-2.0902	500-200	-1.3405	35M
CH	36-40	120-80	5.9163	200-120	-2.0524	500-200	-1.4528	40M
CH	41-45	120-80	5.9479	200-120	-1.9641	500-200	-1.5674	45M
CH	46-50	120-80	5.9550	200-120	-1.8513	500-200	-1.6793	50M
CH	51-55	120-80	5.9536	200-120	-1.7304	500-200	-1.7922	55M
CH	56-60	120-80	5.9611	200-120	-1.6160	500-200	-1.9069	60M
CH	61-65	120-80	5.9678	200-120	-1.5021	500-200	-2.0234	65M
CH	66-70	120-80	5.9766	200-120	-1.3924	500-200	-2.1378	70M
CH	71-75	120-80	5.9901	200-120	-1.2860	500-200	-2.2525	75M
CH	76-80	120-80	5.9998	200-120	-1.1779	500-200	-2.3666	80M
CH	81-85	120-80	6.0088	200-120	-1.0712	500-200	-2.4801	85M

1973 FEB STA 95 PA 10**4 AVG 5 DEPTH 18 M DEPTH 25 M SCAN 30 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	.1014	200-120	-.7959	500-200	-.5320	5M
CH	17-32	120-80	.2023	200-120	-1.4958	500-200	-.8000	10M
CH	33-48	120-80	.3033	200-120	-1.4673	500-200	-.7688	15M
CH	49-64	120-80	.4044	200-120	-.9192	500-200	-.7344	20M
CH	65-80	120-80	.5053	200-120	-.3733	500-200	-.6988	25M

1973 FEB STA 105 PA 10**4 AVG 5 DEPTH26 1 DEPTH 18 SWEEP 30
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	1.1257	200-120	-.7816	500-200	-.0717	5M
CH	21-40	120-80	.9819	200-120	-1.6272	500-200	-.0661	10M
CH	41-60	120-80	.8454	200-120	-2.1278	500-200	-.0630	15M

73 JUN STATIØN 1 DEPTH 31 M SWEEP 36 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	.0661	200-120	-.0614	500-200	.0000	5M
CH	15-28	120-80	.2090	200-120	-.1548	500-200	.0000	10M
CH	29-42	120-80	.2688	200-120	-.2269	500-200	.0000	15M
CH	43-56	120-80	.2456	200-120	-.2657	500-200	.0000	20M
CH	57-70	120-80	.1483	200-120	-.2867	500-200	.0000	25M
CH	71-84	120-80	.1245	200-120	-.2703	500-200	.0000	30M

1973 JUN STATIØN 2 DEPTH 20 M SWEEP 26 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-19	120-80	.0047	200-120	-1.0095	500-200	.0000	5M
CH	20-38	120-80	-.5464	200-120	-1.9888	500-200	.0000	10M
CH	39-57	120-80	-1.5684	200-120	-2.4983	500-200	.0000	15M
CH	58-76	120-80	-2.8411	200-120	-2.7273	500-200	.0000	20M

1973 JUN STATIØN 3 DEPTH 15 M SWEEP 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	.6524	200-120	-.9229	500-200	.0000	5M
CH	21-40	120-80	1.5677	200-120	-2.2619	500-200	.0000	10M
CH	41-60	120-80	2.5898	200-120	-3.7662	500-200	.0000	15M

1973 JUN STATIØN 5 DEPTH 92 M SWEEP 80 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	-1.3735	200-120	-.0858	500-200	.0000	5M
CH	7-12	120-80	-2.7449	200-120	-.0459	500-200	.0000	10M
CH	13-18	120-80	-3.8318	200-120	.0092	500-200	.0000	15M
CH	19-24	120-80	-4.5961	200-120	.0653	500-200	.0000	20M
CH	25-30	120-80	-4.8751	200-120	.1233	500-200	.0000	25M
CH	31-36	120-80	-4.8662	200-120	.1778	500-200	.0000	30M
CH	37-42	120-80	-4.8622	200-120	.2365	500-200	.0000	35M
CH	43-48	120-80	-4.8603	200-120	.2949	500-200	.0000	40M
CH	49-54	120-80	-4.8591	200-120	.3539	500-200	.0000	45M
CH	55-60	120-80	-4.8593	200-120	.4117	500-200	.0000	50M
CH	61-66	120-80	-4.8590	200-120	.4701	500-200	.0000	55M
CH	67-72	120-80	-4.8566	200-120	.5293	500-200	.0000	60M
CH	73-78	120-80	-4.8553	200-120	.5883	500-200	.0000	65M
CH	79-84	120-80	-4.8527	200-120	.6460	500-200	.0000	70M
CH	85-90	120-80	-4.8525	200-120	.7063	500-200	.0000	75M
CH	91-96	120-80	-4.8510	200-120	.7656	500-200	.0000	80M

1973 JUN STATION 7 DEPTH 23 M SWEEP 45 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-12	120-80	-.0226	200-120	1.5001	500-200	.0000	5M
CH	13-24	120-80	-.0167	200-120	2.9902	500-200	.0000	10M
CH	25-36	120-80	.0061	200-120	4.4763	500-200	.0000	15M
CH	37-48	120-80	.0902	200-120	5.9475	500-200	.0000	20M

1973 JUN STATION 8 DEPTH 75 M SWEEP 77 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 6	120-80	1.4886	200-120	-1.8061	500-200	.1487	5M
CH	7-12	120-80	2.2592	200-120	-2.5997	500-200	.3355	10M
CH	13-18	120-80	3.0620	200-120	-3.2899	500-200	.5250	15M
CH	19-24	120-80	3.8796	200-120	-3.9801	500-200	.7164	20M
CH	25-30	120-80	4.7051	200-120	-4.6675	500-200	.9094	25M
CH	31-36	120-80	5.5224	200-120	-5.3547	500-200	1.1024	30M
CH	37-42	120-80	6.3356	200-120	-6.0414	500-200	1.2982	35M
CH	43-48	120-80	7.1514	200-120	-6.7287	500-200	1.4950	40M
CH	49-54	120-80	7.9677	200-120	-7.4185	500-200	1.6931	45M
CH	55-60	120-80	8.7856	200-120	-8.1093	500-200	1.8922	50M
CH	61-66	120-80	9.6028	200-120	-8.7996	500-200	2.0921	55M
CH	67-72	120-80	10.4195	200-120	-9.4914	500-200	2.2925	60M
CH	73-78	120-80	11.2377	200-120	-10.1841	500-200	2.4942	65M
CH	79-84	120-80	12.0472	200-120	-10.8679	500-200	2.6962	70M
CH	85-90	120-80	12.8663	200-120	-11.5620	500-200	2.8989	75M

1973 JUN STATION 10 DEPTH 117 M SWEEP 200 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	.0019	200-120	.1065	500-200	.1882	5M
CH	3- 4	120-80	.0023	200-120	.2123	500-200	.3773	10M
CH	5- 6	120-80	-.0009	200-120	.3207	500-200	.5701	15M
CH	7- 8	120-80	-.0008	200-120	.4277	500-200	.7353	20M
CH	9-10	120-80	-.0020	200-120	.5343	500-200	.9065	25M
CH	11-12	120-80	-.0013	200-120	.6344	500-200	1.0983	30M
CH	13-14	120-80	-.0024	200-120	.7643	500-200	1.2461	35M
CH	15-16	120-80	-.0024	200-120	.8960	500-200	1.4510	40M
CH	17-18	120-80	.0000	200-120	1.0164	500-200	1.6573	45M
CH	19-20	120-80	.0023	200-120	1.1464	500-200	1.8635	50M
CH	21-22	120-80	.0046	200-120	1.2509	500-200	2.0706	55M
CH	23-24	120-80	.0092	200-120	1.3542	500-200	2.2783	60M
CH	25-26	120-80	.0124	200-120	1.4576	500-200	2.4856	65M
CH	27-28	120-80	.0164	200-120	1.6517	500-200	2.6943	70M
CH	29-30	120-80	.0200	200-120	1.7417	500-200	2.9024	75M
CH	31-32	120-80	.0248	200-120	1.8328	500-200	3.1119	80M
CH	33-34	120-80	.0298	200-120	1.9220	500-200	3.3210	85M
CH	35-36	120-80	.0350	200-120	2.0129	500-200	3.5975	90M
CH	37-38	120-80	.0397	200-120	2.1041	500-200	3.8049	95M
CH	39-40	120-80	.0449	200-120	2.1934	500-200	4.0119	100M
CH	41-42	120-80	.0496	200-120	2.2812	500-200	4.2200	105M
CH	43-44	120-80	.0536	200-120	2.3709	500-200	4.4282	110M
CH	45-46	120-80	.0593	200-120	2.4604	500-200	4.6373	115M

1973 JUN STATIØN 12 DEPTH 20 M SWEEP 35 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	1.0789	200-120	-.9582	500-200	.0000	5M
CH	15-28	120-80	2.7489	200-120	-2.2200	500-200	.0000	10M
CH	29-42	120-80	2.6272	200-120	-1.4739	500-200	.0000	15M
CH	43-56	120-80	2.6024	200-120	-.7371	500-200	.0000	20M

1973 JUN STATIØN 14 DEPTH 10 M SWEEP 16 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-31	120-80	1.7635	200-120	.3129	500-200	-.1166	5M
CH	32-62	120-80	1.8336	200-120	.5652	500-200	.0738	10M

1973 JUN STATIØN 19 DEPTH 24 M SWEEP 30 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	-.1868	200-120	-1.4627	500-200	.0000	5M
CH	21-40	120-80	-.4055	200-120	-2.9283	500-200	.0000	10M
CH	41-60	120-80	-.3634	200-120	-4.4732	500-200	.0000	15M
CH	61-80	120-80	-.3863	200-120	-5.7904	500-200	.0000	20M

1973 JUN STATIØN 20 DEPTH 20 M SWEEP 35 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	.3982	200-120	-.4693	500-200	.2099	5M
CH	15-28	120-80	.5869	200-120	-.7431	500-200	.4192	10M
CH	29-42	120-80	.7083	200-120	-.9830	500-200	.6307	15M
CH	43-56	120-80	.8313	200-120	-1.2037	500-200	.8432	20M

1973 JUN STATIØN 24 DEPTH 118 M SWEEP 80 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	.6946	200-120	.8519	500-200	-.6396	5M
CH	7-12	120-80	1.0869	200-120	1.7899	500-200	-.4675	10M
CH	13-18	120-80	1.5844	200-120	2.2507	500-200	-.2935	15M
CH	19-24	120-80	2.0422	200-120	2.3849	500-200	-.1154	20M
CH	25-30	120-80	2.5621	200-120	2.0919	500-200	.0689	25M
CH	31-36	120-80	2.8827	200-120	1.8680	500-200	.2534	30M
CH	37-42	120-80	3.1063	200-120	1.7185	500-200	.4377	35M
CH	43-48	120-80	3.2490	200-120	1.6447	500-200	.6208	40M
CH	49-54	120-80	3.4023	200-120	1.5558	500-200	.8015	45M
CH	55-60	120-80	3.6563	200-120	1.3712	500-200	.9828	50M
CH	61-66	120-80	3.7983	200-120	1.3005	500-200	1.1672	55M
CH	67-72	120-80	3.8523	200-120	1.3154	500-200	1.3539	60M
CH	73-78	120-80	3.9225	200-120	1.3181	500-200	1.5391	65M
CH	79-84	120-80	3.9475	200-120	1.3627	500-200	1.7217	70M
CH	85-90	120-80	3.9438	200-120	1.4357	500-200	1.9045	75M
CH	91-96	120-80	3.9485	200-120	1.5015	500-200	2.0878	80M

1973 JUN STATIØN 26 DEPTH 150 M SWEEP 80 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	-.1899	200-120	2.2907	500-200	-.5982	5M
CH	7-12	120-80	1.3670	200-120	2.2182	500-200	-.6518	10M
CH	13-18	120-80	2.4373	200-120	1.9633	500-200	-.7166	15M
CH	19-24	120-80	3.4168	200-120	1.5367	500-200	-.7798	20M
CH	25-30	120-80	4.1056	200-120	1.3485	500-200	-.8569	25M
CH	31-36	120-80	4.6301	200-120	1.3248	500-200	-.9414	30M
CH	37-42	120-80	4.7887	200-120	1.6649	500-200	-1.0178	35M
CH	43-48	120-80	4.7360	200-120	2.2156	500-200	-1.1004	40M
CH	49-54	120-80	4.6541	200-120	2.7989	500-200	-1.1824	45M
CH	55-60	120-80	4.5655	200-120	3.3873	500-200	-1.2662	50M
CH	61-66	120-80	4.4800	200-120	3.9672	500-200	-1.3477	55M
CH	67-72	120-80	4.3947	200-120	4.5465	500-200	-1.4304	60M
CH	73-78	120-80	4.3109	200-120	5.1252	500-200	-1.5181	65M
CH	79-84	120-80	4.2256	200-120	5.7049	500-200	-1.6072	70M
CH	85-90	120-80	4.1430	200-120	6.2826	500-200	-1.6957	75M
CH	91-96	120-80	4.0599	200-120	6.8589	500-200	-1.7845	80M

1973 JUN STATIØN 30 DEPTH 28 MSWEEP 34 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	1.5484	200-120	-1.5676	500-200	.1422	5M
CH	17-32	120-80	1.7214	200-120	-3.1265	500-200	.3206	10M
CH	33-48	120-80	.3102	200-120	-2.8317	500-200	.5026	15M
CH	49-64	120-80	.9679	200-120	-4.3425	500-200	.6876	20M
CH	65-80	120-80	1.7152	200-120	-5.7465	500-200	.8759	25M

1973 JUN STATIØN 31 DEPTH 36 M SWEEP 44 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-11	120-80	-1.3670	200-120	.9092	500-200	-.1578	5M
CH	12-22	120-80	-2.6180	200-120	1.8419	500-200	.0157	10M
CH	23-33	120-80	-3.4127	200-120	2.5003	500-200	.1876	15M
CH	34-44	120-80	-3.7807	200-120	2.9365	500-200	.3609	20M
CH	45-55	120-80	-2.1054	200-120	1.3575	500-200	.5351	25M
CH	56-66	120-80	-.6794	200-120	.0030	500-200	.7097	30M
CH	67-77	120-80	.3050	200-120	-.9270	500-200	.8843	35M

1973 JUN STATIØN 32 DEPTH 166 M SWEEP 210 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 2	120-80	.3403	200-120	-.0829	500-200	.0922	5M
CH	3- 4	120-80	.3895	200-120	-.0716	500-200	.2785	10M
CH	5- 6	120-80	.3968	200-120	-.0135	500-200	.4655	15M
CH	7- 8	120-80	.4021	200-120	.0445	500-200	.6539	20M
CH	9-10	120-80	.4068	200-120	.1036	500-200	.8425	25M
CH	11-12	120-80	.4136	200-120	.1613	500-200	1.0316	30M
CH	13-14	120-80	.4228	200-120	.2172	500-200	1.2215	35M
CH	15-16	120-80	.4273	200-120	.2742	500-200	1.4104	40M
CH	17-18	120-80	.4353	200-120	.3304	500-200	1.5999	45M
CH	19-20	120-80	.4424	200-120	.3866	500-200	1.7894	50M
CH	21-22	120-80	.4483	200-120	.4439	500-200	1.9795	55M
CH	23-24	120-80	.4514	200-120	.5017	500-200	2.1695	60M
CH	25-26	120-80	.4574	200-120	.5577	500-200	2.3586	65M
CH	27-28	120-80	.4613	200-120	.6143	500-200	2.5489	70M
CH	29-30	120-80	.4704	200-120	.6675	500-200	2.7392	75M
CH	31-32	120-80	.4857	200-120	.7150	500-200	2.9293	80M
CH	33-34	120-80	.5150	200-120	.7478	500-200	3.1210	85M
CH	35-36	120-80	.5337	200-120	.7910	500-200	3.3124	90M
CH	37-38	120-80	.5445	200-120	.8425	500-200	3.5033	95M
CH	39-40	120-80	.5521	200-120	.8958	500-200	3.6937	100M
CH	41-42	120-80	.5664	200-120	.9430	500-200	3.8839	105M
CH	43-44	120-80	.5738	200-120	.9977	500-200	4.0744	110M
CH	45-46	120-80	.5803	200-120	1.0520	500-200	4.2648	115M
CH	47-48	120-80	.5826	200-120	1.1115	500-200	4.4550	120M
CH	49-50	120-80	.5845	200-120	1.1702	500-200	4.6456	125M
CH	51-52	120-80	.5848	200-120	1.2305	500-200	4.8353	130M
CH	53-54	120-80	.5901	200-120	1.2862	500-200	5.0262	135M
CH	55-56	120-80	.5964	200-120	1.3417	500-200	5.2164	140M
CH	57-58	120-80	.6025	200-120	1.3980	500-200	5.4063	145M
CH	59-60	120-80	.6078	200-120	1.4539	500-200	5.5973	150M
CH	61-62	120-80	.6110	200-120	1.5118	500-200	5.7882	155M
CH	63-64	120-80	.6173	200-120	1.5680	500-200	5.9785	160M
CH	65-66	120-80	.6213	200-120	1.6231	500-200	6.1686	165M

1973 JUN STATIØN 35 DEPTH 17 M SWEEP 23 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-24	120-80	-.7731	200-120	-.2594	500-200	.2465	5M
CH	25-48	120-80	-1.9868	200-120	-.5706	500-200	.4588	10M
CH	49-72	120-80	-3.2522	200-120	-.8169	500-200	.6831	15M

1973 JUN STATIØN 36 DEPTH 23 M SWEEP 30 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-19	120-80	.2627	200-120	.2553	500-200	-.3951	5M
CH	20-38	120-80	.8282	200-120	.1325	500-200	-.1846	10M
CH	39-57	120-80	-.3681	200-120	1.6889	500-200	.0313	15M
CH	58-76	120-80	.5869	200-120	1.0506	500-200	-.0130	20M

1973 JUN STATIØN 41 DEPTH 24 M SWEEP 30 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-20	120-80	-.8813	200-120	-.0138	500-200	.0000	5M
CH	21-40	120-80	-1.5833	200-120	-.1566	500-200	.0000	10M
CH	41-60	120-80	-2.4400	200-120	-.3096	500-200	.0000	15M
CH	61-80	120-80	-3.0622	200-120	-.4188	500-200	.0000	20M

1973 JUN STATIØN 42 DEPTH 24 M SWEEP 40 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-15	120-80	.0161	200-120	2.6496	500-200	.0000	5M
CH	16-30	120-80	.3133	200-120	5.0390	500-200	.0000	10M
CH	31-45	120-80	-.9740	200-120	7.4506	500-200	.0000	15M
CH	46-60	120-80	-2.1247	200-120	9.6900	500-200	.0000	20M

1973 JUN STATIØN 46 DEPTH 128 M SWEEP 80 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 6	120-80	-.6775	200-120	.0238	500-200	.0000	5M
CH	7-12	120-80	-1.1781	200-120	.0868	500-200	.0000	10M
CH	13-18	120-80	-1.1340	200-120	.1574	500-200	.0000	15M
CH	19-24	120-80	-2.0774	200-120	.2207	500-200	.0000	20M
CH	25-30	120-80	-2.5017	200-120	.2829	500-200	.0000	25M
CH	31-36	120-80	-2.6689	200-120	.3504	500-200	.0000	30M
CH	37-42	120-80	-2.6752	200-120	.4215	500-200	.0000	35M
CH	43-48	120-80	-2.6654	200-120	.4901	500-200	.0000	40M
CH	49-54	120-80	-2.6583	200-120	.5603	500-200	.0000	45M
CH	55-60	120-80	-2.6542	200-120	.6270	500-200	.0000	50M
CH	61-66	120-80	-2.6454	200-120	.6911	500-200	.0000	55M
CH	67-72	120-80	-2.6390	200-120	.7573	500-200	.0000	60M
CH	73-78	120-80	-2.6253	200-120	.8222	500-200	.0000	65M
CH	79-84	120-80	-2.6153	200-120	.8911	500-200	.0000	70M
CH	85-90	120-80	-2.6067	200-120	.9601	500-200	.0000	75M
CH	91-96	120-80	-2.5985	200-120	1.0305	500-200	.0000	80M

1973 JUN STATIØN 48 DEPTH 33 M SWEEP 40 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-13	120-80	.8276	200-120	-.7323	500-200	.1921	5M
CH	14-26	120-80	.3252	200-120	-1.5277	500-200	.3992	10M
CH	27-39	120-80	-.0821	200-120	-2.0739	500-200	.6053	15M
CH	40-52	120-80	-.7952	200-120	-2.3069	500-200	.8119	20M
CH	53-65	120-80	-1.6802	200-120	-2.3536	500-200	1.0188	25M
CH	66-78	120-80	-2.4513	200-120	-2.3489	500-200	1.2257	30M

1973 JUN STATIØN 56 DEPTH 129 M SWEEP 160 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 3	120-80	-.0852	200-120	.0266	500-200	.2683	5M
CH	4- 6	120-80	-.0844	200-120	.0787	500-200	.5741	10M
CH	7- 9	120-80	-.0853	200-120	.1296	500-200	.9414	15M
CH	10-12	120-80	-.0874	200-120	.1834	500-200	1.3118	20M
CH	13-15	120-80	-.0898	200-120	.2382	500-200	1.6877	25M
CH	16-18	120-80	-.0913	200-120	.2925	500-200	2.0413	30M
CH	19-21	120-80	-.0925	200-120	.3471	500-200	2.3957	35M
CH	22-24	120-80	-.0910	200-120	.4012	500-200	2.7860	40M
CH	25-27	120-80	-.0928	200-120	.4536	500-200	3.1943	45M
CH	28-30	120-80	-.0933	200-120	.5060	500-200	3.6144	50M
CH	31-33	120-80	-.0940	200-120	.5567	500-200	4.0321	55M
CH	34-36	120-80	-.0964	200-120	.6078	500-200	4.4797	60M
CH	37-39	120-80	-.1006	200-120	.6602	500-200	4.9467	65M
CH	40-42	120-80	-.1030	200-120	.7124	500-200	5.4239	70M
CH	43-45	120-80	-.1027	200-120	.7602	500-200	5.9134	75M
CH	46-48	120-80	-.1027	200-120	.8087	500-200	6.3698	80M
CH	49-51	120-80	-.1045	200-120	.8594	500-200	6.8208	85M
CH	52-54	120-80	-.1067	200-120	.9110	500-200	7.2695	90M
CH	55-57	120-80	-.1069	200-120	.9593	500-200	7.7464	95M
CH	58-60	120-80	-.1060	200-120	1.0082	500-200	8.2712	100M
CH	61-63	120-80	-.1090	200-120	1.0612	500-200	8.8151	105M
CH	64-66	120-80	-.1090	200-120	1.1121	500-200	9.3450	110M
CH	67-69	120-80	-.1107	200-120	1.1641	500-200	9.8784	115M
CH	70-72	120-80	-.1157	200-120	1.2193	500-200	10.3782	120M
CH	73-75	120-80	-.1159	200-120	1.2715	500-200	10.9133	125M

1973 JUN STATIØN 59 DEPTH 16 M SWEEP 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-21	120-80	.1392	200-120	-.1365	500-200	-.5320	5M
CH	22-42	120-80	.4157	200-120	-.0527	500-200	-.3452	10M
CH	43-63	120-80	.7346	200-120	-.0909	500-200	-.1578	15M

1973 JUN STATIØN 60 DEPTH 16 M SWEEP 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-21	120-80	-.9337	200-120	.0874	500-200	.0000	5M
CH	22-42	120-80	-2.0217	200-120	.1784	500-200	.0000	10M
CH	43-63	120-80	-3.1040	200-120	.2210	500-200	.0000	15M

1973 JUN STATION 62 DEPTH 170 M SWEEP 80 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 6	120-80	-.9102	200-120	.1181	500-200	.0000	5M
CH	7-12	120-80	-1.2875	200-120	.1882	500-200	.0000	10M
CH	13-18	120-80	-1.3485	200-120	.3025	500-200	.0000	15M
CH	19-24	120-80	-1.3381	200-120	.4177	500-200	.0000	20M
CH	25-30	120-80	-1.3330	200-120	.4743	500-200	.0000	25M
CH	31-36	120-80	-1.3195	200-120	.5306	500-200	.0000	30M
CH	37-42	120-80	-1.3115	200-120	.5910	500-200	.0000	35M
CH	43-48	120-80	-1.3010	200-120	.6604	500-200	.0000	40M
CH	49-54	120-80	-1.2879	200-120	.7231	500-200	.0000	45M
CH	55-60	120-80	-1.2805	200-120	.7844	500-200	.0000	50M
CH	61-66	120-80	-1.2728	200-120	.8451	500-200	.0000	55M
CH	67-72	120-80	-1.2664	200-120	.9077	500-200	.0000	60M
CH	73-78	120-80	-1.2580	200-120	.9709	500-200	.0000	65M
CH	79-84	120-80	-1.2513	200-120	1.0322	500-200	.0000	70M
CH	85-90	120-80	-1.2422	200-120	1.0936	500-200	.0000	75M
CH	91-96	120-80	-1.2359	200-120	1.1548	500-200	.0000	80M

1973 JUN STATION 64 DEPTH 84 M SWEEP 80 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 5	120-80	.0304	200-120	-.7905	500-200	.0000	5M
CH	6-10	120-80	.1315	200-120	-1.4903	500-200	.0000	10M
CH	11-15	120-80	.2685	200-120	-1.8483	500-200	.0000	15M
CH	16-20	120-80	.4162	200-120	-2.0222	500-200	.0000	20M
CH	21-25	120-80	.5611	200-120	-2.1323	500-200	.0000	25M
CH	26-30	120-80	.6525	200-120	-2.1727	500-200	.0000	30M
CH	31-35	120-80	.6938	200-120	-2.1509	500-200	.0000	35M
CH	36-40	120-80	.7128	200-120	-2.0970	500-200	.0000	40M
CH	41-45	120-80	.7277	200-120	-2.0332	500-200	.0000	45M
CH	46-50	120-80	.7447	200-120	-1.9815	500-200	.0000	50M
CH	51-55	120-80	.7809	200-120	-1.9420	500-200	.0000	55M
CH	56-60	120-80	.8036	200-120	-1.8952	500-200	.0000	60M
CH	61-65	120-80	.8051	200-120	-1.8410	500-200	.0000	65M
CH	66-70	120-80	.8279	200-120	-1.7928	500-200	.0000	70M
CH	71-75	120-80	.8342	200-120	-1.7292	500-200	.0000	75M
CH	76-80	120-80	.8424	200-120	-1.6670	500-200	.0000	80M

1973 JUN STATION 66 DEPTH 24 M SWEEP 35 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-17	120-80	1.0051	200-120	-.1764	500-200	.0000	5M
CH	18-34	120-80	2.3576	200-120	-.6524	500-200	.0000	10M
CH	35-51	120-80	1.9263	200-120	-1.2624	500-200	.0000	15M
CH	52-68	120-80	1.4810	200-120	-1.8572	500-200	.0000	20M

1973 JUN STATION 67 DEPTH 23 M SWEEP 25 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-23	120-80	-.0013	200-120	-.2649	500-200	.0000	5M
CH	24-46	120-80	.1191	200-120	-.8394	500-200	.0000	10M
CH	47-69	120-80	.5065	200-120	-1.7142	500-200	.0000	15M
CH	70-92	120-80	1.2782	200-120	-2.9300	500-200	.0000	20M

1973 JUN STATION 77 DEPTH 121 M SWEEP 80 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 6	120-80	-.6439	200-120	.0010	500-200	.0000	5M
CH	7-12	120-80	-.9571	200-120	.0701	500-200	.0000	10M
CH	13-18	120-80	-1.0026	200-120	.1374	500-200	.0000	15M
CH	19-24	120-80	-1.0083	200-120	.2051	500-200	.0000	20M
CH	25-30	120-80	-1.0053	200-120	.2705	500-200	.0000	25M
CH	31-36	120-80	-1.0034	200-120	.3340	500-200	.0000	30M
CH	37-42	120-80	-1.0054	200-120	.4007	500-200	.0000	35M
CH	43-48	120-80	-1.0082	200-120	.4655	500-200	.0000	40M
CH	49-54	120-80	-1.0095	200-120	.5296	500-200	.0000	45M
CH	55-60	120-80	-1.0114	200-120	.5927	500-200	.0000	50M
CH	61-66	120-80	-1.0108	200-120	.6562	500-200	.0000	55M
CH	67-72	120-80	-1.0112	200-120	.7219	500-200	.0000	60M
CH	73-78	120-80	-1.0106	200-120	.7861	500-200	.0000	65M
CH	79-84	120-80	-1.0127	200-120	.8495	500-200	.0000	70M
CH	85-90	120-80	-1.0131	200-120	.9141	500-200	.0000	75M
CH	91-96	120-80	-1.0139	200-120	.9791	500-200	.0000	80M

1973 JUN STATION 78 DEPTH 56 M SWEEP 65 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 7	120-80	-.6326	200-120	-.2973	500-200	.0000	5M
CH	8-14	120-80	-.9786	200-120	-.2996	500-200	.0000	10M
CH	15-21	120-80	-1.1685	200-120	-.2393	500-200	.0000	15M
CH	22-28	120-80	-1.1920	200-120	-.1626	500-200	.0000	20M
CH	29-35	120-80	-1.1907	200-120	-.0888	500-200	.0000	25M
CH	36-42	120-80	-1.1882	200-120	-.0153	500-200	.0000	30M
CH	43-49	120-80	-1.1737	200-120	.0493	500-200	.0000	35M
CH	50-56	120-80	-1.1643	200-120	.1173	500-200	.0000	40M
CH	57-63	120-80	-1.1654	200-120	.1978	500-200	.0000	45M
CH	64-70	120-80	-1.1737	200-120	.2815	500-200	.0000	50M
CH	71-77	120-80	-1.1743	200-120	.3599	500-200	.0000	55M

1973 JUN STATION 79 DEPTH 21 M SWEEP 25 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-21	120-80	-.9098	200-120	-.2965	500-200	.1380	5M
CH	22-42	120-80	-2.0332	200-120	-.7768	500-200	.2917	10M
CH	43-63	120-80	-3.1336	200-120	-1.2460	500-200	.4471	15M
CH	64-84	120-80	-4.1114	200-120	-1.8193	500-200	.6042	20M

1973 JUN STATION 72 DEPTH 19 M SWEEP 25 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-25	120-80	-.3708	200-120	-.8728	500-200	.0000	5M
CH	26-50	120-80	-.9020	200-120	-1.4381	500-200	.0000	10M
CH	51-75	120-80	-1.3041	200-120	-2.0534	500-200	.0000	15M

1973 JUN STATION 73 DEPTH 16 M SWEEP 25 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1-21	120-80	-.6939	200-120	-.2668	500-200	.0000	5M
CH	22-42	120-80	-1.8630	200-120	-.4519	500-200	.0000	10M
CH	43-63	120-80	-3.1527	200-120	-.5469	500-200	.0000	15M

1973 JUN STATION 75 DEPTH 225 M SWEEP 250 M
MEAN VALUE OF PROFILES OVER 5M INTERVALS

CH	1- 2	120-80	.3001	200-120	-.7141	500-200	.0000	5M
CH	3- 4	120-80	.7334	200-120	-1.5796	500-200	.0000	10M
CH	5- 6	120-80	1.1243	200-120	-2.4481	500-200	.0000	15M
CH	7- 8	120-80	1.3270	200-120	-3.1870	500-200	.0000	20M
CH	9-10	120-80	1.4641	200-120	-3.8199	500-200	.0000	25M
CH	11-12	120-80	1.5024	200-120	-4.2906	500-200	.0000	30M
CH	13-14	120-80	1.5427	200-120	-4.6332	500-200	.0000	35M
CH	15-16	120-80	1.5437	200-120	-4.8557	500-200	.0000	40M
CH	17-18	120-80	1.5375	200-120	-4.9778	500-200	.0000	45M
CH	19-20	120-80	1.4947	200-120	-4.9985	500-200	.0000	50M
CH	21-22	120-80	1.4473	200-120	-4.9746	500-200	.0000	55M
CH	23-24	120-80	1.4195	200-120	-4.9548	500-200	.0000	60M
CH	25-26	120-80	1.3940	200-120	-4.9206	500-200	.0000	65M
CH	27-28	120-80	1.3728	200-120	-4.8862	500-200	.0000	70M
CH	29-30	120-80	1.3549	200-120	-4.8464	500-200	.0000	75M
CH	31-32	120-80	1.3356	200-120	-4.7958	500-200	.0000	80M
CH	33-34	120-80	1.3276	200-120	-4.7540	500-200	.0000	85M
CH	35-36	120-80	1.3201	200-120	-4.7095	500-200	.0000	90M
CH	37-38	120-80	1.3183	200-120	-4.6634	500-200	.0000	95M
CH	39-40	120-80	1.3228	200-120	-4.6217	500-200	.0000	100M
CH	41-42	120-80	1.3336	200-120	-4.5813	500-200	.0000	105M
CH	43-44	120-80	1.3387	200-120	-4.5380	500-200	.0000	110M
CH	45-46	120-80	1.3429	200-120	-4.4974	500-200	.0000	115M
CH	47-48	120-80	1.3456	200-120	-4.4566	500-200	.0000	120M
CH	49-50	120-80	1.3468	200-120	-4.4160	500-200	.0000	125M
CH	51-52	120-80	1.3504	200-120	-4.3747	500-200	.0000	130M
CH	53-54	120-80	1.3542	200-120	-4.3342	500-200	.0000	135M
CH	55-56	120-80	1.3570	200-120	-4.2936	500-200	.0000	140M
CH	57-58	120-80	1.3584	200-120	-4.2574	500-200	.0000	145M
CH	59-60	120-80	1.3619	200-120	-4.2180	500-200	.0000	150M
CH	61-62	120-80	1.3675	200-120	-4.1791	500-200	.0000	155M
CH	63-64	120-80	1.3706	200-120	-4.1410	500-200	.0000	160M
CH	65-66	120-80	1.3741	200-120	-4.0994	500-200	.0000	165M
CH	67-68	120-80	1.3786	200-120	-4.0600	500-200	.0000	170M
CH	69-70	120-80	1.3834	200-120	-4.0217	500-200	.0000	175M
CH	71-72	120-80	1.3870	200-120	-3.9789	500-200	.0000	180M
CH	73-74	120-80	1.3886	200-120	-3.9380	500-200	.0000	185M
CH	75-76	120-80	1.3916	200-120	-3.8997	500-200	.0000	190M
CH	77-78	120-80	1.3942	200-120	-3.8577	500-200	.0000	195M
CH	79-80	120-80	1.3959	200-120	-3.8165	500-200	.0000	200M
CH	81-82	120-80	1.3983	200-120	-3.7780	500-200	.0000	205M
CH	83-84	120-80	1.3994	200-120	-3.7363	500-200	.0000	210M
CH	85-86	120-80	1.4027	200-120	-3.6953	500-200	.0000	215M
CH	87-88	120-80	1.4044	200-120	-3.6545	500-200	.0000	220M
CH	89-90	120-80	1.4075	200-120	-3.6124	500-200	.0000	225M

1973 JUN STATIØN 89 DEPTH 72 M SWEEP 80 M.
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS.

CH	1- 6	120-80	-.0724	200-120	.1673	500-200	.0000	5M
CH	7-12	120-80	1.1972	200-120	-1.0258	500-200	.0000	10M
CH	13-18	120-80	1.8808	200-120	-1.6540	500-200	.0000	15M
CH	19-24	120-80	2.1632	200-120	-1.8865	500-200	.0000	20M
CH	25-30	120-80	2.2313	200-120	-1.8888	500-200	.0000	25M
CH	31-36	120-80	2.2476	200-120	-1.8378	500-200	.0000	30M
CH	37-42	120-80	2.2577	200-120	-1.7774	500-200	.0000	35M
CH	43-48	120-80	2.2718	200-120	-1.7228	500-200	.0000	40M
CH	49-54	120-80	2.2849	200-120	-1.6646	500-200	.0000	45M
CH	55-60	120-80	2.2984	200-120	-1.6084	500-200	.0000	50M
CH	61-66	120-80	2.3108	200-120	-1.5488	500-200	.0000	55M
CH	67-72	120-80	2.3220	200-120	-1.4833	500-200	.0000	60M
CH	73-78	120-80	2.3358	200-120	-1.4191	500-200	.0000	65M
CH	79-84	120-80	2.3474	200-120	-1.3588	500-200	.0000	70M

1973 JUN STATIØN 90 DEPTH 16 M SWEEP 25 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-21	120-80	-.4795	200-120	.0017	500-200	.0000	5M
CH	22-42	120-80	-.7790	200-120	-.1091	500-200	.0000	10M
CH	43-63	120-80	-1.0059	200-120	-.2032	500-200	.0000	15M

1973 JUN STATIØN 92 DEPTH 85 M SWEEP 110 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1- 4	120-80	.7034	200-120	1.0918	500-200	-.3655	5M
CH	5- 8	120-80	.9638	200-120	1.3326	500-200	-.1512	10M
CH	9-12	120-80	1.0260	200-120	1.4306	500-200	.0625	15M
CH	13-16	120-80	1.0235	200-120	1.4902	500-200	.2781	20M
CH	17-20	120-80	1.0227	200-120	1.5461	500-200	.4938	25M
CH	21-24	120-80	1.0241	200-120	1.6044	500-200	.7123	30M
CH	25-28	120-80	1.0266	200-120	1.6566	500-200	.9622	35M
CH	29-32	120-80	1.0299	200-120	1.7094	500-200	1.2201	40M
CH	33-36	120-80	1.0353	200-120	1.7614	500-200	1.4778	45M
CH	37-40	120-80	1.0383	200-120	1.8136	500-200	1.7377	50M
CH	41-44	120-80	1.0398	200-120	1.8697	500-200	1.9984	55M
CH	45-48	120-80	1.0420	200-120	1.9215	500-200	2.2598	60M
CH	49-52	120-80	1.0462	200-120	1.9721	500-200	2.5222	65M
CH	53-56	120-80	1.0501	200-120	2.0212	500-200	2.7853	70M
CH	57-60	120-80	1.0523	200-120	2.0711	500-200	3.0487	75M
CH	61-64	120-80	1.0567	200-120	2.1202	500-200	3.3124	80M
CH	65-68	120-80	1.0591	200-120	2.1705	500-200	3.5740	85M

1973 JUN STATIØN 94 DEPTH 39 M SWEEP 43M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-12	120-80	-.3647	200-120	.9939	500-200	.0276	5M
CH	13-24	120-80	-.4811	200-120	1.6060	500-200	.2414	10M
CH	25-36	120-80	-.7694	200-120	2.0218	500-200	.4598	15M
CH	37-48	120-80	.6710	200-120	.6465	500-200	.6872	20M
CH	49-60	120-80	-.3225	200-120	.0523	500-200	.9295	25M
CH	61-72	120-80	-1.2742	200-120	-.2305	500-200	1.1717	30M
CH	73-84	120-80	-1.9256	200-120	-.4318	500-200	1.4150	35M

1973 JUN STATIØN 95 DEPTH 29 M SWEEP 36 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-16	120-80	.7342	200-120	.7404	500-200	-.4187	5M
CH	17-32	120-80	1.6290	200-120	1.5052	500-200	-.2376	10M
CH	33-48	120-80	2.5813	200-120	2.0692	500-200	-.0564	15M
CH	49-64	120-80	2.1100	200-120	2.3300	500-200	.1246	20M
CH	65-80	120-80	1.9330	200-120	2.7151	500-200	.3057	25M

1973 JUN STATIØN 96 DEPTH 37 M SWEEP 42 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-12	120-80	1.5756	200-120	-.9032	500-200	.0820	5M
CH	13-24	120-80	1.5822	200-120	-2.0692	500-200	.2767	10M
CH	25-36	120-80	1.7257	200-120	-3.3155	500-200	.4731	15M
CH	37-48	120-80	1.7588	200-120	-4.3875	500-200	.6681	20M
CH	49-60	120-80	1.7285	200-120	-5.1666	500-200	.8637	25M
CH	61-72	120-80	1.7813	200-120	-5.6759	500-200	1.0596	30M
CH	73-84	120-80	1.7997	200-120	-5.9004	500-200	1.2594	35M

1973 JUN STATIØN 97 DEPTH 31 M SWEEP 35 M
MEAN VALUE ØF PRØFILES ØVER 5M INTERVALS

CH	1-14	120-80	1.3671	200-120	.5094	500-200	-.3356	5M
CH	15-28	120-80	2.9357	200-120	.4200	500-200	-.1604	10M
CH	29-42	120-80	4.4587	200-120	.3413	500-200	.0170	15M
CH	43-56	120-80	5.5974	200-120	.1452	500-200	.1954	20M
CH	57-70	120-80	6.3758	200-120	.2209	500-200	.3735	25M
CH	71-84	120-80	6.8454	200-120	.0839	500-200	.5374	30M

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15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Crustacean zooplankton are excellent indicators of environmental perturbation, especially if enough of their biology is known to explain why certain species increase with nutrient enrichment of lakes. The distribution of zooplankton in Lake Ontario suggested that eutrophic indicators were found in the vicinity of major urban centers.* Furthermore, mathematical indices, including diversity, the community competition coefficient, and carrying capacity, separated urban inshore from rural inshore waters, further evidence of perturbation. Biomass estimates made with new acoustical techniques indicated that most of the zooplankton biomass was in deep waters, thus the eutrophication of Ontario's waters, both nearshore and in the vicinity of cities, is still localized in nature. Mathematical techniques have been developed to model such perturbations.

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*The ratio of the number of Bosmina longirostris, the most successful eutrophic species, to Diaptomus sicilis, the most oligotrophic form, supported this conclusion.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Zooplankton, perturbed watermasses	Lake Ontario, IFYGL, Zooplankton	

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