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Narragansett Bay Estuary Program

Current Report

The Narragansett Bay Project

A Review of Narragansett Bay Phytoplankton Data: Status and Trends

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the New England Interstate Water Pollution Control Commission

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FOREWORD

The United States Congress created the National Estuary Program in 1984, citing its concern for the "health and ecological integrity" of the nation's estuaries and estuarine resources. Narragansett Bay was selected for inclusion in the National Estuary Program in 1984 and designated an "estuary of national significance" in 1988. The Narragansett Bay Project (NBP) was established in 1985. Under the joint sponsorship of the U.S. Environmental Protection Agency and the Rhode Island Department of Environmental Management, the NBP's mandate is to direct a five-year program of research and planning focussed on managing Narragansett Bay and its resources for future generations. The NBP will develop a comprehensive management plan by December, 1990, which will recommend actions to improve and protect the Bay and its natural resources.

The NBP has established the following seven priority issues for Narragansett Bay:

* management of fisheries
* nutrients and potential for eutrophication
* impacts of toxic contaminants
* health and abundance of living resources
* health risk to consumers of contaminated seafood
* land-based impacts on water quality
* recreational uses

The NBP is taking an ecosystem/watershed approach to address these problems and has funded research that will help to improve our understanding of various aspects of these priority problems. The Project is also working to expand and coordinate existing programs among state agencies, governmental institutions, and academic researchers in order to apply research findings to the practical needs of managing the Bay and improving the environmental quality of its watershed.

This report represents the technical results of an investigation performed for the Narragansett Bay Project. The information in this document has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement #CX812680 to the Rhode Island Department of Environmental Management. It has been subject to the Agency's and the Narragansett Bay Project's peer and administrative review and has been accepted for publication as a technical report by the Management Committee of the Narragansett Bay Project. The results and conclusions contained herein are those of the author(s), and do not necessarily represent the views or recommendations of the NBP. Final recommendations for management actions will be based upon the results of this and other investigations.

Abstract

This paper reviews the data on phytoplankton abundance in Narragansett Bay. The objectives were to: 1) assemble the available descriptive data on the phytoplankton of Narragansett Bay; 2) provide a description of patterns of abundance and members of the phytoplankton community of Narragansett Bay; and, 3) see if any long term trends may be found in the abundance, composition, or distribution of the phytoplankton of Narragansett Bay. The physiology and general ecology of the phytoplankton were not addressed.

The annual abundance pattern of phytoplankton in any region of the Bay is quite variable from year to year. In the mid- and lower Bay, low and high abundances may be found at any time of year. However, seasonal abundance averages for sufficient years do show abundance maximums in winter-spring and summer for mid and lower Bay. The upper Bay (Providence River and Mt. Hope Bay) has higher overall abundances than the remainder of the Bay and a slightly different seasonal abundance pattern. A single broad maximum abundance in phytoplankton is found during summer in the upper bay.

Trends in abundance patterns within the Bay can only be investigated over aproximately the last 35 years. There are no studies before the late 1950's which can be used for comparison to more recent conditions. In addition, many of the studies were never intended to provide a description of the phytoplankton in the Bay in general and are of short term or limited spatial coverage. The interannual variability makes data sets of less than about 10 years of little use in long term trend analysis. Assembly of data from a number of sources provides a record of abundances for a mid-Bay area from 1957 to 1980. No trends could be seen in the record of counts. A record of abundances in the lower Bay (at the GSO dock) from 1976 to 1987 also showed no discernable trends. Lists of dominant phytoplankton species do not indicate any major species shifts within the last 35 years. However, the abundance of a number of minor species has changed over that period.

The phytoplankton community in Narragansett Bay does not appear to have changed appreciably over the last 35 years. If there are important changes occuring in the Bay they are apparently not reflected in the gross measures of the phytoplankton. However, our overall power to discern what may be significant changes in the

phytoplankton community is not great. It is possible, for example, that some minor species, by abundance, have a relatively great influence on other species in the Bay.

It is clearly impossible to go back and resample the Bay in past years. Future work which may be directed toward looking for changes in the bay should take into consideration where past sampling has been conducted so the records can be extemded into the future.

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Introduction

This report reviews the available data on the phytoplankton of Narragansett Bay. Our intent was:

1. To assemble the available descriptive data on the phytoplankton of Narragansett Bay;

2. To provide a description of patterns of abundance and members of the phytoplankton community of Narragansett Bay; and,

3. To see if any long term trends may be found in the abundance, composition, or distribution of the phytoplankton of Narragansett Bay.

To address the first objective, abundance measures of phytoplankton were compiled. All the abundance data we could locate, which represented more than a few isolated samples, is included in the appendicies even though much of it was not useful in looking for temporal trends. We had no basis to reject any of the data. However the reader should pay close attention of the discussions and notes on the uncertainties in the data. This compilation is restricted to data describing phytoplankton communities in the Bay. Studies on topics such as the physiology of phytoplankton species which live in the Bay or phytoplankton-zooplankton relationships are not included. The references, however, contain a number of studies which may be useful to the reader seeking to delve further into the mechanisms responsible for the patterns of phytoplankton abundance and productivity reviewed here. Data from the Pettaquamscutt River and Rhode Island coastal ponds has not been included except in the summary tables describing the nature of the data available.

In addressing the second objective, the primary form of presentation will be graphs of phytoplankton abundance over the course of a calender year. This is done for two reasons. It has been suggested that phytoplankton in Narragansett Bay follow a regular seasonal pattern of abundance and succession. And, as will be shown later there is a considerable variability in the patterns. Small data sets which do not cover most of a year are simply not useful for consideration of the third objective above.

Four basic types of data are considered:

Chlorophyll measurements,

Abundance counts (total diatoms, total flagellates, a dominant species, or total phytoplankton),

Primary production measurements

Species lists and lists of dominant species.

All the useful data we could locate and obtain on the first three types of data may be found in appendices A, B, and, C respectively. In each appendix there is a table summarizing the available data sets, a map of station locations, graphs of each data set by year, and a tabular list of the data. In some cases the original data were only available in graphical form and were hand digitized into the resultant tables. (Each data set digitized from a graph is so noted in the appendicies tables.) The uncertainty associated with digitization depends on the quality of the original graph and is quite variable. In any case, the possible errors in digitization are probably small relative to the gross patterns and are not likely to impair the analyses presented here.

Species data are presented as a presence or absence table and as a table of dominant species. Raw counts of each individual species, where such counts were made, are not tabulated in this report but may be found in the original references, most of which are readily available in the Pell Marine Science Library. A summary table of studies with species counts and a map of station locations may be found in Appendix D.

Our ability to address the third objective, to uncover any trends in phytoplankton communities over time, is severely restricted by the nature of the data and by the history of phytoplankton studies in the Bay. The earliest studies we could locate date back to the late 1800's (Anonymous, 1900; Briggs, 1873). Both of these studies consisted of species lists. Unfortunately, the species in these lists consisted almost entirely of attached types such as one would find scraping the shell of an oyster or stirring up the sediment water-interface as might occur if one wadded into shallow water to collect a sample. It is interesting to note that we found no modern epiphytic studies to compare to these early studies.

The modern history of Narragansett Bay phytoplankton studies began in the 1950's with the works of Ferrara (1953), Pratt (1959,1965, 1966), and Smayda (1955, 1957). Hence we can only look for changes in the phytoplankton communities over roughly the last 35 years, a period of time after which the upper Bay was already heavily industrialized and populated. There are no data to document any changes which may have occurred as coincident with or a result of rapidly increasing population and industrialization before the middle of this century.

Small Scale Variability and Other Errors

Before the data from any particular sample are compared to other data it is important to have a feeling for how representative a given sample may be of the surrounding area. McAlice (1969, 1970) conducted a very interesting study of the small scale horizontal variability of phytoplankton in Narragansett Bay. Surface samples taken at intervals of 0.9 to 6 meters varied by as much as a factor of four in the abundance of total phytoplankton and of a dominant species (Figure 1). The variability was much greater for less abundant species which may be in part due to the lower number of cells counted. At his station IV (Figure 1c) the total number of cells decreased systematically over a distance of 36 meters. This may represent the edge of a front or patch of phytoplankton.

Metcalf and Eddy (1985) examined the variability in abundances over distance of a few kilometers. In a series of stations, which extended roughly the length of Connanicut Island (Jamestown) in East Passage, taken on a single day (April 30, 1984), clear gradients of abundance were found. Counts of total *Skeletonema costatum* and total flagellates increased up the Bay, while those of a *Chaetoceros* species decreased (Figure 2a-c). Chlorophyll measurements on the samples did not show a strong gradient (Figure 2d). These gradients may reflect a transition between persistent regional differences within the Bay.

An elegant application of modern technology provided an even more detailed look at variability within the Bay. Farmer et al. (1982) conducted an overflight of West Passage with a helicopter-borne laser fluorometer. Simultaneous ground-truth samples were taken along the flight path by boats. Figure 3 is a map of the portion of lower West Passage which was covered by the survey in two dimensions. (The survey was on March 16, 1978.) Kilometer-scale patches and filaments of chlorophyll-a concentrations were found. These patches are superimposed on a generally increasing (up-Bay) gradient of chlorophyll through this region of the Bay. The overall gradient is evident in a flight transect that covered the entire length of the Bay (Figure 3b; the region between stations 7 and 9 corresponds to the region covered by figure 3a). While the transect in the lower Bay appeared fairly smooth on this day, there was up to a factor of two variability in chlorophyll abundance over distances of about 5 km in the upper Bay.

Vertical variability in the Bay has not often been addressed. As expressed by Pratt (1959) "There are, however, in the entire body of data, some 60 pairs of surface and bottom samples at these same stations, and they show fair to excellent agreement in most instances." He, and many others have gone on to use surface samples only and explicitly or implicitly assumed they adequately represent the entire water column. Inspection of later data sets generally support Pratt's interpretation but it is important to note the nature of the exceptions. In Figure 2, for example, some moderate (up to factor of three) differences may be seen between shallow and deep samples, even though shallow and deep samples, on April 30, follow the same trends. On other dates in East Passage (August 23, July 19) single shallow samples would be reasonably representative of much of the upper water column (Figure 4). However, on August 6 there was a great deal of structure to the vertical distribution of chlorophyll. Occurrences of vertically structured phytoplankton communities are probably a result of a stratified water column and are probably not random. We might expect stratification, and significant differences between surface and deep samples, to occur in summer as shown by three representative stations from Kremer and Nixon (1978) in Figure 5. Some studies have used a pooled sample from two or three depths in an attempt to better represent the water column with a single analysis.

To summarize, one must expect that single samples may misrepresent the average conditions of the area from which it was sampled by about a factor of two, and occasionally by more. This must be kept in mind when evaluating the data. Fortunately, the abundances of phytoplankton as measured by counts or chlorophyll determinations vary by many orders of magnitude in the Bay. Hence the small-scale and kilometer-scale variability seldom interferes with the type of interpretations attempted here.

A second source of error exists when comparing the data generated by investigators using different techniques, and perhaps between different investigators using what appear to be identical techniques. For example, Lorenzen and Jeffrey (1979) compared a variety of techniques for measuring chlorophylls. They found different techniques differed by up to about 30% in reported values of chlorophyll-a. Similarly, the counting of phytoplankton cells is at least partly a subjective operation by the person attending the microscope. Identification of all the species observed was not always attempted (nor was it appropriate to the objectives of some of the studies). One must expect that especially small forms of phytoplankton cells were not counted with the same diligence as larger or more distinctive types. Without the ability to peer over the shoulders of the original investigators and carefully evaluate and compare their techniques, we cannot hope to correct for differences in techniques. Hence, we have taken all data at face value and will not trust any possible conclusions that rest upon small differences between individual data sets.

Annual patterns of phytoplankton abundance

One of the basic perceptions of the nature of phytoplankton in Narragansett Bay is of the annual cycle of their abundance and composition. In the first major multi-station, multi-year, analysis of Narragansett Bay phytoplankton, Pratt (1959) provided the model into which subsequent data are often placed. (Pratt also provided a similar analysis based on an additional 4 years of data; Pratt, 1965. See Smayda, 1955 or 1957, for an earlier and slightly different model based upon a single year of data.) Pratt's (1959) text is worth repeating here:

> "In the yearly cycle diatoms and flagellates alternate in dominating the phytoplankton of the Bay. A diatom flowering is sustained for about the first five months of the year, flagellate numbers reaching their nadir in January or February and then slowly increasing. In late spring a precipitous decline in diatom concentrations, while flagellates are gradually increasing to their moderate annual maximum results in an early summer flagellate dominance. Subsequently, diatoms regain

dominance in one or more intense but brief blooms, usually toward the end of summer, and thereafter fall off to a minimum in late autumn, when flagellates are again dominant, if only by default. During the year, diatom numbers usually fluctuate between 5 and 40,000 cells/ml with observed extremes of zero and more than 80,000 cells/ml, while variations in flagellate concentrations are usually confined to the range 50-5,000 cells/ml (extremes, 17 and 13,000). From these figures it is clear that flagellates are the conservative and less important element, and that the major features of the phytoplankton annual cycle-the seasonal variations in total standing crop and the alternation of diatom and flagellate dominance-must be largely due to changes in the number of diatoms.

This brief description shows that the annual cycle of phytoplankton is divided into four natural periods or phases:

Season 1 (winter and spring) with diatoms dominant,

Season 2 (usually late spring, early summer), flagellates dominant,

Season 3 (usually late summer) diatoms dominant, and

Season 4 (fall) with flagellates dominant."(Pratt 1959)

His grand averages (Cells/ml, whole-bay, Aug.1952-Aug.1956) for each season were (Pratt, 1959, from his Table 6):

Season	1	2	3	4
Diatoms	7,650	498	10,094	378
Flagellates	370	1,568	601	692
Total	8,020	2,066	11,295	1,070

Figure 6 provides examples of "typical" years demonstrating the above pattern. Inspection of the entire collection of annual graphs (in Appendices A and B) lends one to conclude that the "typical" pattern is no more common than "non-typical" patterns. Pratt (1959) also pointed out that the time of occurrence of his "seasons" varies:

"From year to year the beginning dates of the first, second, and fourth seasons, have varied by only six to eight weeks, while for the third period the variation has been 20 weeks. Whereas the durations of the first and fourth seasons have been relatively constant, those of the middle periods have varied widely."

The net result of this variation , and of the abundance patterns in years that Pratt might wish to call exceptions to his model, is that either high or low abundances can occur at nearly any time of the year. This is shown by three of the larger data sets available. Figure 7 shows the record of chlorophyll-a concentrations for 11 years at the Graduate School of Oceanography (GSO) dock in lower West Passage. Figure 8 shows about five years of chlorophyll-a measurements Pratt's Station 2 (now the traditional Station 2, off Wickford near the northern tip of Connanicut Island). Figure 9 shows counts of total abundances for 1972-1977, also from the traditional Station 2. The expected bloom pattern is somewhat evident in the linear version of each figure. The distribution of low abundances, which is probably equally important character of the pattern is particularly evident in the semi-log version of each figure.

Nevertheless, averages and medians of the available data do show peaks corresponding to the higher abundances of the winter-spring and late summer "seasons" of Pratt (1959). It should be recognized that Figures 7, 8, and 9 represent data from 11, 5, and 17 years, respectively. Although hundreds of data points may be available, these graphs only represent 5 to 17 cycles. The calculated averages may still be somewhat sensitive to additions of data from additional years even if no systematic trends over time are occurring. For example, the averages calculated in Figure 10a are noticeably different from that reported by Pilson (1985) which covers the first six years of the same data set.

Regional abundance differences within the Bay

The annual cycle discussed by Pratt (1959) was largely based upon data from the central portions of the Bay. He had only one station north of Prudence Island, and that station was south of Conimicut Point (which is often treated as the lower extent of the Providence River area of the Bay). Two of his total of 15 stations, however, were near the mouth of the Bay, in East Passage. The annual cycles shown in Figures 7-10 are for two stations in mid-and lower- West Passage. Do other regions of the Bay have similar patterns of abundance?

Figure 11a shows observations from Mt. Hope Bay, near Spar Island (MRI, 1975-1983). Unlike the data from the GSO dock or Station 2 (Figures 7-9), there is an absence of low values during the summer months in Mt. Hope Bay. Data from the upper West Passage and the lower Providence River (Kremer and Nixon, 1978, Stations 3,4 and 5, surface; Smayda, 1987, Stations 3,4,and 5). consist only of a few measurements with low values in the summer (Figure 11b) but only represent two years. The means and medians of annual cycles of abundance in both of these upper Bay regions have major maxima in the summer with minor, if any, maximum/minimum pairs in winter/spring (Figure 12a, b)

Stations at the mouth of the Bay (stations near or more oceanward of Beavertail Point), have a major bloom in the winter-spring and a minor bloom in the late summer (Figures 11c and 12 c). Again it should be kept in mind that these patterns represent relatively few years and could easily change with the addition of more data.

Pratt (1959) averaged his stations for the lower and upper halves of the Bay for his 1955/1956 sampling period and found that the upper half had an annual average about three times that of the lower. This observation is supported by comparing the averages shown in earlier figures. A systematic increase in phytoplankton abundance is found for most of the year as one moves up the Bay. This may be seen in the chlorophyll data (Figure 13a) and in the total phytoplankton cell counts (Figure 13b). Taken together, this data covers most of the bay.

Primary Production

The data for planktonic primary production in the Bay is the most difficult set from which to draw conclusions about spatial or temporal trends. Primary production measurements comprise the smallest data set of the three discussed here. In addition, different measures of primary production have been used (net, gross, carbon-14; per unit area and per volume of water). It is probable that no two studies have used exactly the same analytical procedures.

Nevertheless, it is useful to inspect some of the more complete data sets to obtain a general impression of the annual pattern of primary production in the Bay. In each of Figures 14-17 the highest production values occur in mid to late summer. In all but one of these data sets, low production does not occur through the middle part of the year. The lowest productions occur in November, December and January (except for January 1987, Figure 17), and are typically an order of magnitude lower than summer highs.

Figures 14 and 17 show data both from central portions of the Bay and from the lower Providence River area. Although there is considerable overlap in the data, highest production measurements are found in the Providence River area. Figure 15 provides an example of the differences between different investigations. The two data sets depicted in the figure are from the same nominal station and the same year but do not track each other particularly well, especially in the spring.

Table 1 summarizes the published values of yearly primary production (in gC m^{-2} y^{-1}) for various regions within Narragansett Bay, and for a few other selected estuarine and coastal areas. Between regions, annual primary productivity in Narragansett Bay varied by about a factor of three ranging from a low of 152 gC m^{-2} y^{-1}. at the seaward extent of the sampling (GSO dock) to a high of 429 gC m^{-2} y^{-1} in the Providence River. Productivity increased in an up-bay direction. Annual values of productivity varied by a factor of less than two over a four year period which probably indicates that the temporal variability is less than the spatial variability for the locations sampled within the Bay. The values of annual primary productivity for Narragansett Bay are within the range of values reported for other East Coast estuaries (Table 1).

<u>Phytoplankton Species</u>

Table 2 is a list of species identified in each study where individual species were counted. Also included is a list of the species which have been identified and verified by Paul Hargraves in his studies of Narragansett Bay over the years (Hargraves, 1988). His list can be considered a master list of species occurring in the Bay. The number of species identified by various authors is quite variable. This variability may be attributed to a number of factors.

First some of the studies did not cover all seasons. The occurrence of many species in the Bay is seasonally dependent. This is seen in the summary figures in Pratt (1959, his Figure 3) and in Karentz and Smayda (1984, their Figures 1-6). For example *Detonula* *confervacea* and *Thalassiosira nordenskioeldii* occur almost exclusively in the colder months. *Olisthodiscus luteus, Prorocentrum redfieldii,* and *P.triangulatum* occur almost exclusively during the summer and fall. One species, *O. luteus*, has been shown to have a bimodal distribution which can be predicted by the difference between 15^{o} C and the temperature of the Bay (Thomas, 1980). Another species, *D. covfervacea* grows best at 12^{o} C but usually reaches its maximum abundance below 1^{o} (Smayda, 1969; see also Karentz and Smayda, 1984). In some cases there appears to be at least a temporary conditioning of the water by one species which inhibits another (Pratt, 1966; Stuart, 1972). Since, the mechanisms responsible for the patterns of succession are beyond the scope of this review, it is sufficient to simply restate that the species present at any time in the Bay can be quite variable. Unless a study covers at least a year it is unlikely to adequately sample the full suite of phytoplankton in the Bay.

One might also expect that the species present in the Bay could be different in the various areas of the Bay. It is remarkable how infrequently this topic has been addressed. Since most of the studies in the Bay are from samples in its central portions there are simply no spatial differences to report. In those few studies where species were identified from different regions of the Bay, there is usually no detailed discussion of regional species occurrences. In one study, Pratt, (1959) states:

> "The two parts of the Bay most distinctive in species composition are the highly estuarine upper West Passage, with a flora characterized by certain dinoflagellates, and the lower East occupied by relatively coastal water distinguished by seven diatoms, one dinoflagellate, and one silicoflagellate. Comparisons of mean frequencies for the two upper quarters versus the two lower quarters show *Peridinium trochoideum* in significantly greater frequency in the upper Bay than the lower, and *Rhizosolenia stolterfothii* preferring the lower Bay to the upper. No contrasts between the East and West Passages reached the 5% level of significance.
>
> If we consider only the "dominant" species, defined as those accounting for 5% or more of any sample, the significant regional contrasts are *Leptocylindrus danicus*

> occurring more frequently as a dominant in the lower than in the upper Bay, and *Peridinium trochoideum* and *Olisthodiscus leteus* in the upper West Passage more frequently than in other quarters."

It should be kept in mind that the above analysis is primarily based upon a single year. The overall impression one obtains is that the regional differences in species composition within the Bay are subtle.

Some of the studies in Table 2 which appear to have adequate sampling, still have shorter species lists than other studies. In part this must be due to the care with which counts were made and the effort put into speciation. Often investigators would lump unidentified cells into general categories. However, it appears that different studies treated the smaller (on average) forms quite differently. This can be seen in Table 3 where the ratio of total diatoms to total flagellates is calculated. A group of studies within a few years in the late 1950's had diatom to flagellate ratios which differed by two orders of magnitude. It seems unlikely that the community structure could change so drastically from year to year and that these wide variations reflect different counting practices.or perhaps sampling techniques.

<u>Trends over the last 35 years</u>

Have there been changes over the last 35 years in the composition or dynamics of phytoplankton in Narragansett Bay? Or more correctly, can we discern any trends given the data available?

Given the inherent variability in the phytoplankton abundance, the differences between techniques used in various studies, and irregularly spaced studies which were not optimally placed to seek out trends in time, we do not have a very powerful data set to test for trends. We cannot rule out the possibility that some systematic changes may be occurring in Narragansett Bay but cannot be observed in the available data. Some trends have been speculated upon before. For example it has been suggested that in the 1950's the winter-spring bloom was the major bloom and that more recently the summer blooms are the major blooms. While this may be the case, it cannot really be stated with any confidence since this model is based upon only a few years in the 1950's. Comparisons based upon anything less than about ten years are probably too subject to natural variability to be significant.

Similarly one may wish to conclude from Table 3 that the relative portions of flagellates in the populations have increased with time. The early studies in this table have higher diatom/flagellate ratios than the later two studies. While there may have been a change, the trend may also be a result of mproved microscopy, of different sampling techniques, and of a greater sensitivity of the investigators to flagellates resulting from other studies (e.g.Johnson and Sieburth, 1979, 1982).

Three data sets are sufficiently long to look for trends within these sets. A 22 year record of mean annual diatom abundance at station 2 was given in Smayda 1984 (redrawn here as Figure 18a). A regression through this data gives a slope that cannot be distinguished from, zero. Again if we look at a 14 year record of diatoms plus dinoflagellates (Smayda, 1976) no slope to the data is evident (Figure 18b). The eleven year record of chlorophyll-a at the GSO dock had two high years then has remained nearly constant (Figure 19a). Similarly, annual averages of weekly counts over 18 years at the traditional station 2 do not have any discernable trend (Figure 19b). There does not appear to be any major, steady, shifts in the overall abundance of phytoplankton in the mid and lower bay since the late 1950's.

However a major deviation from normal conditions occurred with a brown tide event in the Bay in 1985 (Smayda, 1987). A small chrysophycean picoalga, *Aureococcus anophagefferens*, appeared and grew to very dense populations of 10^9 L^{-1}. These blooms appeared to interfere with the feeding of many filters and caused shellfish losses. The "bay bug," as it is often popularly refered to, did not occur in the next two years in large numbers (Smayda, 1987, 1989). Some might be tempted to claim that the bay is deterioriating citing the apperance of the "bay bug." Basically nothing can be concluded from the event as to changes in the "health" of Narragansett Bay. Eutrophication of estuarine waters is one of a number of factors which seem necessary for nuisance organisms (see review by Paerl, 1988). However the "bay bug" is a newly defined species and the factors which control its distribution, natural or anthropogenic, are not yet known.

The species composition may also be examined to see if there were changes over time. Table 4 lists the dominant species which were found in the major studies. The 22 year record of Karentz and Smayda (1984) has been broken into five year intervals. With the exception of the recent brown-tide year *Skeletonema coastatum* has always been found to be the dominant diatom. The species of diatoms which make up the next six most dominant diatoms in most studies is also quite consistent with *Detonula confervacea*, *Asterionella glacialis* and *Thalassiosira nordenskioeldii* being important in most years. In some years other species may temporarily become one of the dominant species. The record of dominant "other algae" shown in Table 4 is not as consistent as the diatom list. This may be in part due to counting and identification difficulties with the smaller and less distinctive forms. However, in the four 5-year periods of Karentz and Smayda (1984) the list is nearly constant.

Smayda (1984) conducted a discriminant analysis to see if there were changes in the community structure over time on a 22 year record at the traditional Station 2. If only the 5 dominant species were included, there were no steady shifts between 1959 and 1980. However, if 41 species were included in the analysis a clear change in community structure began in about 1960 and continued through 1980. Hence the composition of the minor species has probably been changing with time. Abundance shifts in a few species, notably *Katodinium rotundatum* and an unidentified *Thalassiosira* species, are evident in Karentz and Smayda (1984).

In summary, there have probably been no major shifts in the dynamics of phytoplankton in Narragansett Bay over the last 35 years. On the other hand, there have certainly been a few changes among the less abundant species. The available data is not sufficient to clearly delineate what important changes may have occurred between these two general findings.

Table 1. Yearly integrated primary production for Narragansett Bay and selected coastal environments.

AREA	PERIOD	PRODUCTION $gC\ m^{-2}\ y^{-1}$	SOURCE
Narragansett Bay			
West Passage	1971-1973	277	Oviatt et al., 1981
GSO dock	1971-1973	221	" "
East Passage	1971-1973	218	" "
Providence River	1971-1973	429	" "
Mid Bay	1954-1955	220	Smayda, 1973
	1972-1973	440	Vargo, 1976, 1979
	1974	308	Furnas et al., 1976
GSO dock	1978	250	Keller, 1988
	1979	164	" "
	1980	152	" "
Hudson Estuary			
Bight	1973-1974	370	Malone, 1976
Lower Bay	1973-1974	200	Malone, 1977
Delaware Bay	1981-1983	190-400	Pennock and Sharp, 1986
Chesapeake Bay	1972-1977	335-700	Boynton et al., 1986

Table 2

REFERENCE (see notes $)	12	1	1	1	2	3	5	5	5	6	6	6	6	6a	6a	7	8	8	9	10	11
YEAR OF SAMPLING	1988	1952	1953	comb.	5455	5256	2'67	6'67	comb.	6869	6869	6869	comb.	1970	1971	7273	1978	1979	5980	1984	8586
Number of months covered during sampling	* * *	5	5	9	9	36	1day	1day	2days	12	12	12	12	5	6	12	6	4	243	1day	9
Number of samples	* * *	15	17	32	82	927	7	12	19	21	21	21	36	11	19	21*2	19	16	@729	18*3	140
Centric diatoms	103	10	12	15	21	44	10	12	16	36	25	21	36	18	19	35	22	13	31	15	20
Pennate diatoms	9	12	10	13	20	18	6	9	11	8	9	5	10	4	3	7	5	5	4	5	3
Diatoms	112	22	22	28	41	62	16	21	27	44	34	26	46	22	22	42	27	18	35	20	23
Dinoflagellates	48	9	4	9	14	29	0	10	10	19	13	9	22	0	0	8	13	16	8	7	9
Other Algae	50	3	3	3	7	11	0	2	2	9	9	11	13	1	3	6	13	12	5	11	8
Total	210	34	29	40	62	102	16	33	39	72	56	46	81	23	25	56	53	46	48	38	40
CENTRIC DIATOMS																					
Actinoptychus senarius (A. undulatus)	P															P					
Atheya dicora 1																	P				
Atheya decora 1A	P															P			P		
Bacteriastrum delicatulum	P																				
B. hyalinum	P																				
Bacteriastrum sp.*						P															
Biddulphia alternans										P			P								
Biddulphia sp. *			P	P	P												P	P			
Cerataulina pelagica	P									P	P	P	P			P	P	P	P	P	P
Chaetoceros affine 2										P	P	P	P	P	P						
C. affinis 2A	P					P										P			P		
C. amanita	P																				
C. atlanticus	P																				
C. borealis	P																				
C. brevis																					
C. ceratosporus	P																				
C. compressum 3										P		P	P	P	P						
C. compressus 3A	P															P	P		P		
C. constrictus	P																				
C. convolutus	P																				
C. coronatus	P																				
C. costatus	P																				
C. crinitus	P																				
C. curvisetum 4										P	P		P		P				P		P
C. curviseltus 4A	P				P	P										P					
C. danicum 5										P	P		P								
C. danicus 5A	P							P	P												
C. debilis	P																P		P		P
C. decipiens	P					P				P	P	P	P			P			P		
C. densus	P															P					
C. diadema	P									P	P	P	P	P	P	P	P		P		
C. didymum 6										P	P	P	P				P				
C. didymus 6A	P					P										P			P		P
C. eibenii	P																				
C. fallax	P																				
C. gracilis		P	P	P	P	P													P		
C. holsaticus	P																				
C. ingolfianus	P																				
C. laciniosus	P					P	P		P							P					
C. lauderi	P																				
C. lorenzianum 7										P			P								P
C. lorenzianus 7A	P				P	P		P	P										P		
C. pelagicus	P																				
C. perpusillus	P																				
C. peruvianus	P																				
C. pseudocrinitus	P																				

Table 2, continued.

C. pseudocurvisetus	p																				
C. radicans	p									p		p	p	p	p						
C. rostratus	p																				
C. seiracanthus	p																				
C. septentrionale 8																				p	
C. septentrionalis 8A	p																				
C. similis	p					p													p		
C. simplex	p					p				p	p		p								
C. sociale 9																				p	
C. socialis 9A	p				p	p													p		p
C. subsecundus																p					
C. subtile 10										p	p	p	p	p	p						
C. subtilis 10A	p		p	p													p	p	p		p
C. tenuissimus (C. calcitrans)	p																				
C. teres	p				p	p				p			p		p						
C. tortissima 11																			p		
C. tortissimum 11										p	p		p				p				
C. tortissimus 11A	p					p															
Chaetoceros spp. **	p	p	p	p	p	p				p	p	p		p	p	p	p	p		p	
Corethron criophilum (C. hystrix)	p	p		p	p	p				p	p		p			p	p	p			
Coscinodiscus asteromphalus	p																				
C. centralis	p																				
C. concinnus	p																				
C. granii	p																				
C. oculus-iridis	p																				
C. wailesii	p																				
Coscinodiscus sp. *		p		p		p		p	p	p	p	p	p	p		p	p	p		p	
Cyclotella caspia	p																		p		
C. meneghiniana	p																				
C. striata	p																				
Cyclotella sp. *										p	p	p	p			p					
Dactyliosolen mediterraneus																p				p	
Dactyliosolen sp. *																p					
Detonula confervacea (D. cystifera)	p		p	p	p	p				p	p	p	p	p	p	p	p		p		p
D. delicatula						p								p							
D. pumila	p																				
Ditylum brightwellii	p		p	p		p	p	p	p	p	p		p			p			p		p
Eucampia zoodiacus	p					p				p			p	p		p			p		
Guinardia flaccida	p	p	p	p		p	p		p											p	
Hemiaulus sinensis	p					p															
Hemiaulus sp. *										p			p								
Lauderia annulata	p																				
Leptocylindrus danicus	p				p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p	p
L. mediterraneus	p																				
L. minimus Gran	p		p	p	p	p				p	p	p	p	p	p	p	p	p	p	p	p
Lithodesmium undulatum	p					p													p		p
Melosira sp. *					p	p				p		p	p		p						
Minidiscus trioculatus	p																				
Minutocellus polymorphus	p																				
Minutocellus sp. *																					p
Odontella (Biddulphia) aurita						p		p	p												
Odontella sinensis	p																				
Paralia (Melosira) sulcata	p	p	p	p		p										p				p	
Porosira glacialis	p																				
Rhizosolenia alata	p				p											p					
R. calcar-avis	p																				
R. delicatulum 12																				p	
R. delicatula 12A	p				p	p		p	p							p	p	p	p		p

Table 2, continued.

R. faeroense						P															
R. fragilissima	P				P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
R. hebetata f. hemialis																P					
R. hebetata f. semispina						P				P			P								
R. imbricata	P									P			P								
R. imbricata var. shrubsolei																P					
R. pungens	P																				
R. setigera	P					P	P	P	P	P	P		P	P	P	P	P		P		
R. stolterfothii	P				P	P															
R. styliformis	P					P															
Rhizosolenia sp. *		P		P		P															
Roperia tesselata	P																				
Skeletonema costatum	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Stephanopyxis palmeriana	P																				
S. turris	P					P	P		P	P			P								
Thalassiosira anguste-lineata	P																				
T. binata	P																				
T. bioculata	P																				
T. constricta	P																				
T. decipiens	P					P	P	P	P	P	P	P	P			P			P		
T. delicatula	P																				
T. eccentrica (Coscinodiscus excentricus)	P				P																
T. gravida	P	P	P	P	P	P		P	P	P	P	P	P	P	P				P	P	P
T. mala	P																				
T. nana						P															
T. nordenskioldii	P	P	P	P	P	P	P		P	P	P	P	P	P	P	P	P		P		P
T. oestrupii	P																				
T. profunda	P																				
T. pseudonana	P																		P		
T. rotula	P				P	P				P	P	P	P	P	P	P	P	P	P		P
T. solitaria	P																				
T. weissflogii	P																				
Thalassiosira spp. **	P					P									P	P	P	P	P		P
small centrics																				P	

Table 2, continued.

PENNATE DIATOMS																					
Achnanthes longipes						P															
Achnanthes sp. *					P																
Amphiprora sp. *		P	P	P	P	P															
Asterionella bleakleyi	P																				
A. formosa											P	P	P								
A. glacialis (A. japonica)	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
A. notata	P																				
Cocconeis scutellum		P	P	P																	
Cocconeis sp. *					P															P	
Cylindrotheca (Nitzschia) closterium	P	P	P	P	P	P	P	P	P	P	P		P	P		P			P	P	
Cylindrotheca sp. *																	P	P			
Fragilaria sp. *		P	P	P	P	P	P		P												
Grammatophora marina					P	P															
Grammatophora sp. *		P		P																	
Gyrosigma sp. *					P	P	P		P												
Licmophora abbreviata		P	P	P	P																
Licmophora sp. *						P				P	P		P								
Navicula spp. **		P	P	P	P	P															
Nitzschia delicatissima					P			P	P												
N. longissima					P	P															
N. paradoxa					P																
N. pseudodelicatissima	P																				
N. pungens	P																P	P			
N. reversa		P		P	P	P				P	P		P		P	P					
N. seriata	P	P		P	P	P	P	P	P	P	P	P	P			P			P		P
Pleurosigma fasciola								P	P												
Pleurosigma sp. *		P	P	P	P			P	P											P	
Rhabdonema adriaticum		P	P	P		P															
Striatella unipunctata					P	P		P	P	P			P								
Surirella sp. *					P	P															
Synedra sp. *								P	P												
Thalassionema nitzschioides	P		P	P	P	P	P	P	P	P	P	P	P	P		P	P	P	P		P
Thalassiothrix frauenfeldii	P					P					P		P			P					
T. longissima					P	P															
Pennate spp. **										P	P	P	P	P	P	P	P	P		P	

Table 2, continued.

DINOFLAGELLATES																					
Amphidinium carteri	P																				
A. sphenoides	P																				
Amphidinium sp. *	P	P		P	P	P											P	P			
Ceratium furca	P															P					
C. fusus	P				P	P															
C. lineatum	P	P		P	P	P															
C. longipes	P					P				P			P								
C. minutum	P					P															
C. tripos	P				P	P				P			P								
Cochlodinium spp. **	P				P																
Dinophysis acuminata	P	P		P	P	P		P	P												
D. acuta										P			P								
D. caudata	P																				
D. lachmanni										P	P	P	P								
D. norvegica	P									P			P								
D. punctata																				P	
D. rotundata	P																				
Dinophysis sp. *																P	P	P			P
Diplopeltopsis minor																	P	P			
Dissodinium pseudolunula	P																				
Exuviella apora		P	P	P																	
E. marina		P	P	P	P																
Glenodinium lenticula						P															
Gonyaulax digitale	P																				
G. polyedra	P																				
Gonyaulax sp. * (Goniaulax)	P					P		P	P												
Gymnodinium abbreviatum	P																				
G. nelsoni						P															
G. splendens	P											P	P								
Gymnodinium spp. **	P	P	P	P	P	P		P	P	P	P	P	P			P'	P	P	P	P	
Gymnodiniaceae																	P	P			P
Gyrodinium aureolum	P																				
G. spirale	P																				
G. uncatenum	P																				
Gyrodinium spp. **	P	P		P	P	P		P	P	P	P	P	P				P	P		P	
Helgolandinium subglobosum	P																				
Heterocapsa triquetra (Peridinium triquetrum)	P				P	P		P	P								P	P	P		P
H. triquetrum										P	P	P	P					P			
Katodinium rotundatum (Massartia sp.)	P					P											P	P	P	P	P
Oxyrrhis marina	P																				
Oxytoxum sp. *						P		P	P	P	P		P								
Paulsenella chaetoceratis	P																				
Peridinium conicum						P															
P. depressum						P				P			P								
P. excentricum						P		P	P												
P. globulus										P			P								
P. granii						P															
P. minusculum						P				P			P								
P. minutum						P															
P. steinii						P					P		P								
P. trochoideum		P	P	P	P	P		P	P	P	P	P	P			P					
Peridinium spp. **					P	P		P	P	P	P	P	P			P	P	P	P		P
Podolampas sp. *										P		P	P								
Polykrikos schwarzii (P. sp.)	P	P		P	P	P					P		P								
Prorocentrum balticum	P																				
P. gracile	P					P															
P. marina																	P	P			

Table 2, continued.

P. micans	P				P	P				P	P		P					P			
P. minimum	P																P	P			
P. redfieldii										P	P	P	P			P			P		P
P. scutellum	P					P				P	P		P						P		P
P. triangulatum								P	P	P	P		P						P		P
P. triostinum	P																P	P			
Prorocentrum sp. *																P					
Protogonyaulax tamarensis	P																				
Protoperidinium bipes	P																			P	
P. conicum	P																				
P. depressum	P																				
P. excentricum	P																				
P. granii	P																				
P. leonis	P																				
P. minutum	P																				
P. steinii	P																				
Protoperidinium spp. **	P																			P	
Pyrocystis (Dissodinium) lunula						P															
Scrippsiella trochoidea	P																P	P	P		P
misc. dinoflagellate spp. **																P		P		P	

Table 2, continued.

OTHER ALGAE																					
Ankistrodesmus sp. *																			P		
Apedinella spinifera	P																				
Aureococcus (Pardococcus) anophagefferns	P																				P
Carteria sp. *	P																				
Chilomonas spp. **					P	P															
Chlamydomonas sp. *	P																			P	
Chlorella sp. *	P																				
choanoflagellates										P	P		P			P				P	
Chroomonas amphioxela																			P		
C. salina	P																				
Chroomonas spp. **	P																				
Chrysochromulina ericina	P																				
C. parkae	P																				
C. pringsheimii																	P	P			
Chrysochromulina spp. **	P																	P			
Coccolithus pelagicus	P																				
Cricosphaera roscoffensis	P																				
cryptomonad sp. * (small)																	P	P			
Cryptomonas amphioxelae																					P
Cryptomonas spp. **	P				P	P															
cryptophytes																				P	
Dichtyocha fibula (silicoflagellate)	P					P				P			P								
D. speculum (silicoflagellate)										P		P	P		P						
Dinobryon balticum	P																				
Dinobryon sp. *										P	P	P	P			P					
Distephanus speculum	P	P	P	P	P	P		P	P												
Dunaliella sp. *	P																				
Ebria tripartita (ebridian)	P				P	P				P	P	P	P		P		P	P		P	P
Euglena proxima	P																				
Euglena spp. **	P				P	P															
euglenid spp. **																P	P	P		P	P
Eutreptia scotica	P																				
Eutreptia sp.						P					P	P	P							P	
Eutreptiella hirudoidea	P																				
Eutreptiella sp. *	P																				
Fibrocapsa japonica	P																				P
Hemiselmis sp. *	P																				
Hermesinum adriaticum (ebridian)	P																				
Heteronema acus	P																				
Isochrysis sp. *	P																				
Mesocena polymorpha (silicoflagellate)	P																				
Mesodinium rubrum (M. sp.)																	P	P			
Micromonas pusilla	P																				
Nannochloris sp. *	P											P	P								
Nephroselmis rotunda	P																				
Nephroselmis sp. *	P																				
Ochromonas sp. *	P																				
Olisthodiscus luteus	P					P		P	P	P	P	P	P			P	P	P	P		P
Oltmannsiella sp. *																					P
Oltmannsiellopsis (Oltmannsiella) virida	P																				
Paraphysomonas sp. *	P																				
Pavlova gyrans	P																				
P. salina																	P	P			
Pavlova sp. *	P																				
Pedinomonas minor	P																				
Phaeocystis pouchetii	P									P		P	P	P	P	P	P		P		
Pseudopedinella pyreformis 13																	P	P			

Table 2, continued.

P. pyriforme 13																				P	
P. pyriformis 13A	P																				
Pterosperma sp. *	P																				
Pyramimonas amylifera	P																P	P			
P. torta	P									P	P	P	P				P	P	P		
Pyramimonas sp. *	P	P	P	P	P	P														P	P
Rhodomonas sp. *						P															
Scenedesmus sp. * ·						P					P	P	P								
Spirulina subsalsa (cyanobacteria)	P																				
Synechococcus sp. * (cyanobacteria)	P																				
Tetraselmis spp. **	P																				
Urceolus sp. *	P																				
monad																				P	
non motile ultraplankton																	P				
unidentified micro-flagellates		P	P	P	P					P	P	P	P			P	P	P	P	P	
unidentified green algae											P	P	P								

Table 2, continued

NOTES:

$ references:

1) Ferrara, 1953: one station,
sampling dates, July 18, 1952 to March 18, 1953, 40 spp.

2) Smayda, 1957: three stations,
sampling dates: June 1954 to February 1955 (2 hurricanes), 75 spp.

3) Pratt, 1959: fifteen stations,
sampling dates: July 1952 to October 1956, weekly, not continuous sampling over space or time, 102 spp.

4) Martin, 1966: three stations,
sampling dates: April to Jan, the year is not specified, **only dominant species listed**

5) McAlice, 1969: two stations,
sampling dates: February 14, 1967 and June 28, 1967, means over a transect, one day at each station, 16 spp.,and 33 spp. respectively

6) Mitchell-Innes, 1973: three stations,
sampling dates: July 9, 1968 to June 2, 1969, weekly, not continuous, 81 spp.

6a) Mitchell-Innes, 1973: one station,
sampling dates: January 1970 to May 1970, 23 spp., and
December 1970 to May 1971, 25 spp., **winter/spring bloom periods only**

7) Durbin et al., 1975: one station,
sampling dates: November 1972 to October 1973,
21 mixed samples from 9 meters, mid depth and surface, 56 spp.

8) Furnas, 1982: one station,
sampling dates: March 7, 1978 to September 19, 1978, 53 spp.and
June 5, 1979 to September 25, 1979, 46 spp., weekly, not continuous

9) Karentz and Smayda, 1984: one station,
sampling dates: 1959 to 1980, not continuous, **only dominants species listed**, 49 spp.

10) Metcalf & Eddy, Inc., 1985: nine stations,
sampling dates: Spring 1984, averaged shallow and deep samples, 38 spp.

11) Smayda, 1987: seven stations,
sampling dates: July 25, 1985 to June 18, 1986, weekly, not continuous, **only dominant species listed,** 49 spp.

12) Hargraves, in press: species verified at one time or another by the author from various locations in Narragansett Bay, 210 spp.

* indicates that there was only one unidentified species of the genus among the various author's reports--it is probably the same species but not necessarily

** indicates that there was at least one author who reported more than one unidentified species of the genus, thus there is no way to tell what species are the

Table 2, continued.

same (or different) between the various reports

* * * this work of compiling and verifying a species list for Narragansett Bay was started by Dr. Hargraves in 1968 and is ongoing

1,1A ; 2,2A; etc. indicate species' names that are most likely the same species but are reported differently or incorrectly by some authors. The A denotes the correct usage.

Table 3

Ratio of total diatoms to total flagellates.

study/ Year of sampling	Upper Bay	Central Bay	Mouth of Bay
Ferrara, 1953			
52/53		10.8	
Smayda, 1955			
54/55		11.5,10.5,9.75	
Pratt, 1959			
55/56	3.72		5.34
Martin, 1966			
58/59(?)	126	35.4	414
Mitchell-Innes			
68/69	0.35,2.47		3.06
MRI (Mt Hope Bay)			
76	1.70		
77	0.87		
78	0.64		
79	0.90		
80	0.71		
81	1.13		
82	0.55		
83	1.63		
84	0.98		

Table 4.

Narragansett Bay Phytoplankton Dominants

	Sampling years:	52/53	54/55	52/56	59/64	66*	68/69	65/69	72/73	70/74	75/80	85/86
	Number of months of sampling:	9	9	36		10	12		12			9
	Number of samples:	32	82	927		66	63		21			140
	reference:	1	2	3	9	4	6	9	7	9	9	11
Rank of	**Karentz and Smayda 1959-1980**											
	Dominant Diatoms											
1	Skeletonema costatum	1	1	1	1	1	1	1	1	1	1	2
2	Detonula confervacea	2		X	3	7.5**		3	2	4	4	5
3	Asterionella glacialis(A. japonica)		3	X	2	5	3	2	7	5	3	
4	Thalassiosira nordenskioldii	3	5.5**	X	4		6	4	4	2	5	4
5	Thalassiosira sp.								3	6	2	3
6	Leptocylindrus minimus			X	6	6		7	5	7		
7	Leptocylindrus danicus		8	X	5	2				3		
	Thalassiosira gravida	4	5.5**	X								
	Chaetoceros sp.	5					2					
	Cylindrotheca closterium	6				7.5**						
	Rhizosolenia fragilissima		2	X			5	5			6	
	Thalassiosira rotula		5.5**									
	Chaetoceros curvisetus		5.5**		7							
	Chaetoceros spp.			2								
	Thalassiosira nana			X								
	Nitzschia seriata			X								
	Thalassionema nitzschioides			X		4					7	
	Rhizosolenia delicatula					3		6				
	Cyclotella sp.						4					
	Cerataulina pelagica						7					
	Chaetoceros decipiens								6			
	Minutocellus sp.											1
	Chaetoceros debilis											6
	Lithodesmium undulatum											7

Table 4, continued.

Narragansett Bay Phytoplankton Dominants

Rank of	Karentz and Smayda 1959-1980											
	Dominant other algae											
1	Olisthodiscus luteus			X	1			1	1	1	1	2
2	Katodinium rotundatum				3			3		3	2	
3	Prorocentrum redfieldii				2	1		2	3	2		3
	small flagellates	1	1	1			2		2			
	Peridinium trochoideum	2		X								
	Prorocentrum micans		2									
	Gymnodinium spp.		3	X								
	Gyrodinium spp.			X								
	Heterocapsa triquetra			X								
	Mesodinium rubrum (M. sp.)			X								
	Prorocentrum gracile			X								
	Prorocentrum scutellum					2						
	Peridinium sp.					3						
	Nannochloris sp.						1					
	Eutreptia sp.						3					
	Aureococcus anophagefferens											1
	Prorocentrum triangulatum										3	
NOTES:												

* this is actually the year that the work was published, there is no reference to the year of sampling

** these species' ranks are averaged since their reported abundances were the same

X indicates that it was abundant but ranking was not possible with the data set available

Notes on the figures

Figure 1. (a), R.fragilissima is *Rhizosolenia fragilissima,;*(b) and (c), Skel is *Skeletonema coastatum.*

Figure 2. (a), Skel is *S. coastatum*; (b), flag is "unidentified small flagellates"; (c), Chaet. is "*Chaetocerous sp.*"

Figure 3. Reproductions of figures from Farmer et al., 1982. (a), section of lower West Passage. Lines show location of flight path. (b), zero distance is about 3 km south of Beavertail Point. Station 21 is in the upper Providence River. Originals not under copyright.

Figure 4. Stations are listed in order of most oceanward (sta 6) to furthest up the Bay (sta 1).

Figure 5. Arrow on ordinate axis shows the time of year when sampling started and finished.

Figure 6. Left arrow on ordinate axis shows when sampling started in first year, right arrow shows when sampling finished in second year.

Figure 7. Samples were collected from the pier at the Bay Campus of the University of Rhode Island. Data were taken directly from records at the Marine Ecosystem Research Laboratory which analyzed the samples.

Figure 8. Includes data from; Durbin et al., 1975; Furnas et al., 1976, Hitchcock and Smayda, 1977; Kremer and Nixon, 1978, Durbin and Durbin, 1981, Furnas, 1982; and, Smayda, 1977. Data are from the years: 1972,1973,1974,1976,1979,1985, and 1986.

Figure 9. Data for the years 1960 through 1974 are from Dwyer, 1980. Data from 1975 through 1977 are from Deason, 1980, and Deason and Smayda, 1982.

Figure 10. Monthly averages and medians were calculated from the data shown in Figures 7 through 9.

Figure 11. (a) is data from MRI reports. (b) Includes data from Kremer and Nixon, 1978, and from Smayda, 1987. (c) Includes data from Pratt, 1959, Martin, 1965, and Mitchell-Innes, 1973.

Figure 12. see notes on Figure 11.

Figure 13. see notes on figure 7 through 12.

Figure 16. Data from Keller, 1988.

Figure 18 (b) Data points are annual averages of monthly maximum values.

Figure 1a

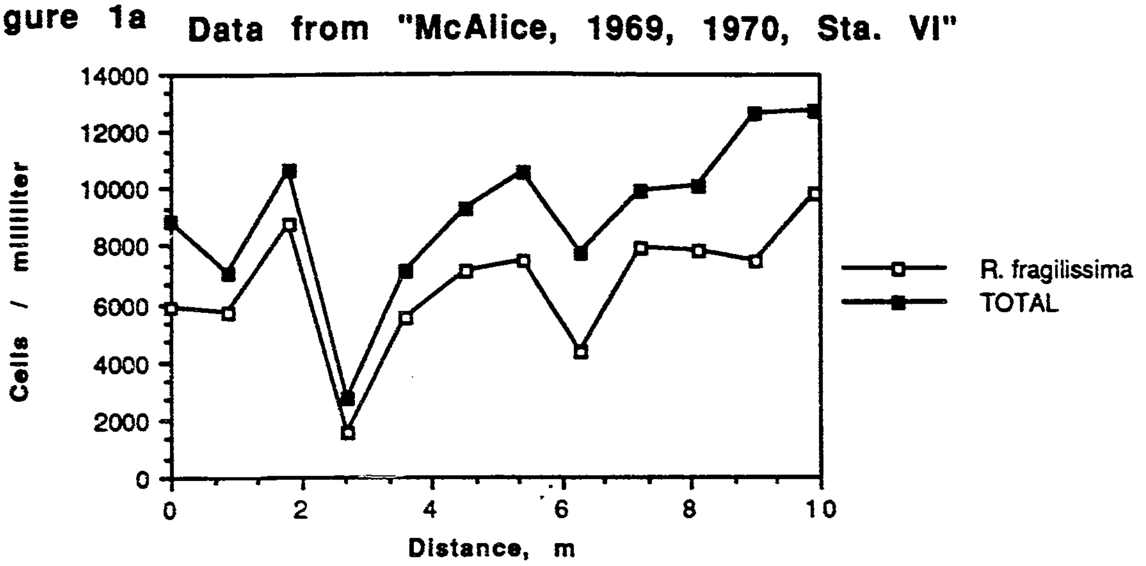


Figure 1b

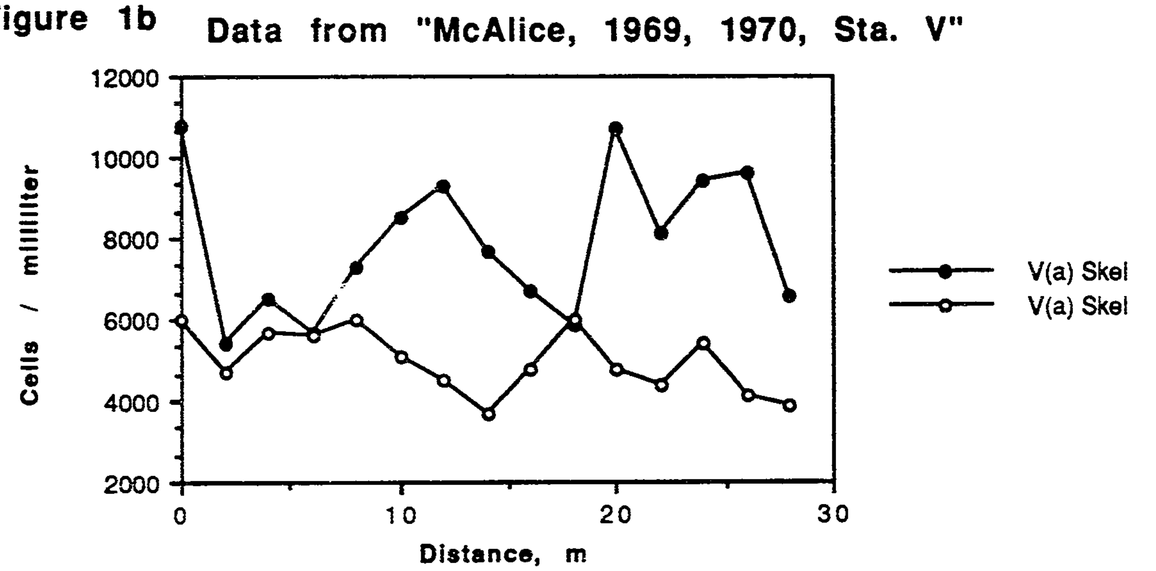


Figure 1c

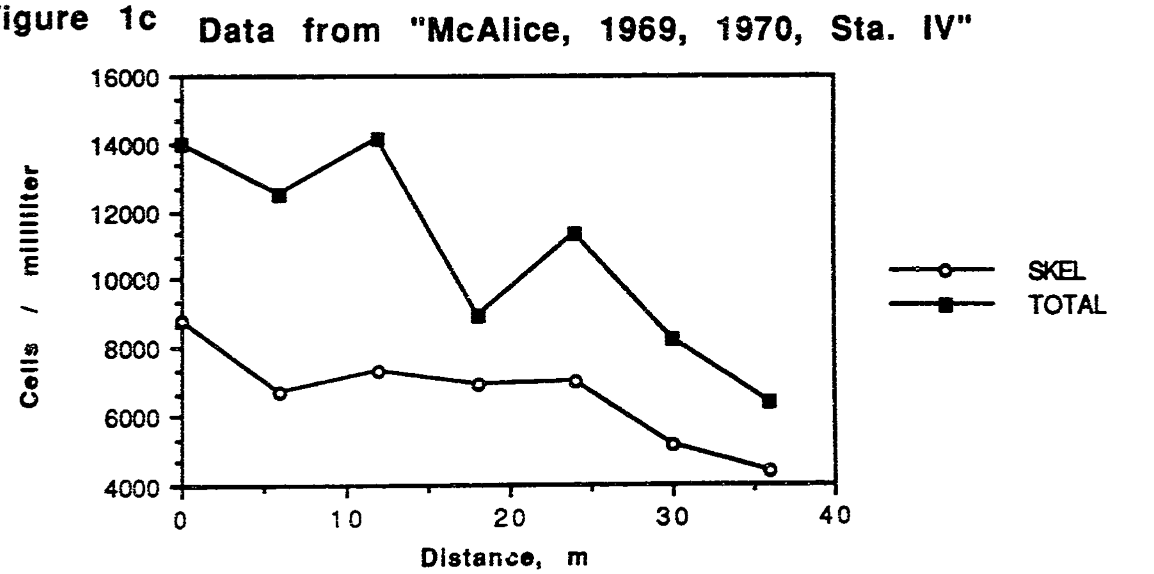


Figure 2a Data from "Metclaf and Eddy, 1985"

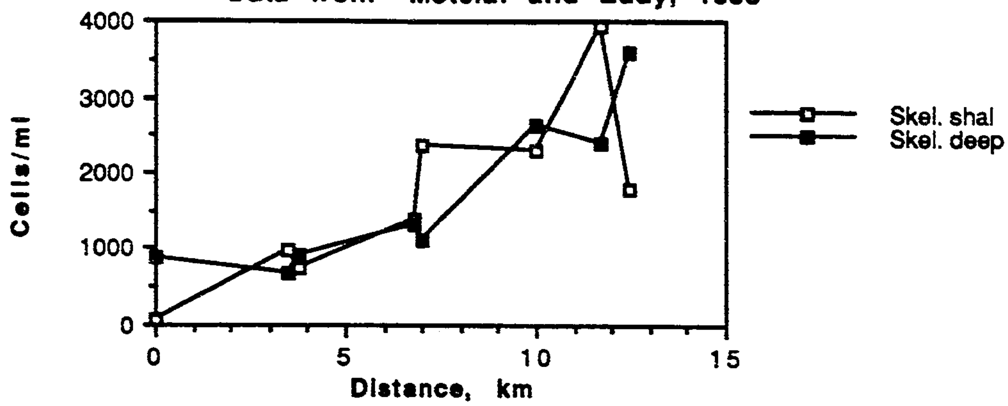


Figure 2b Data from "Metcalf and Eddy, 1985"

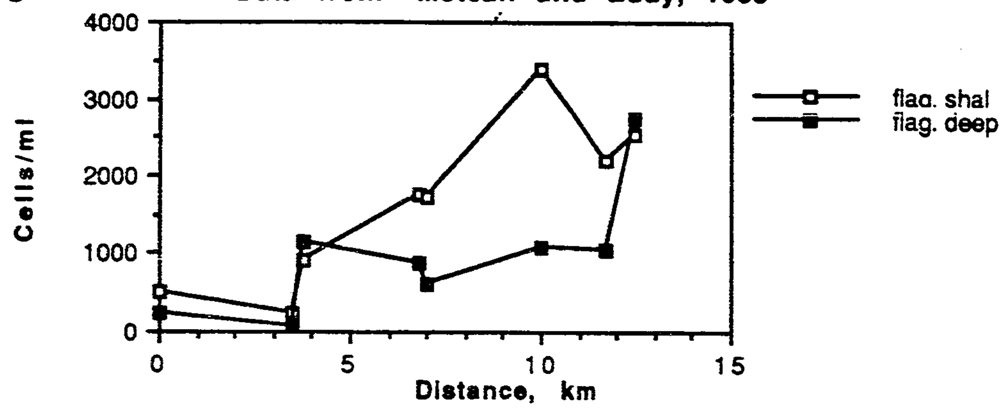


Figure 2c Data from "Metcalf and Eddy, 1985"

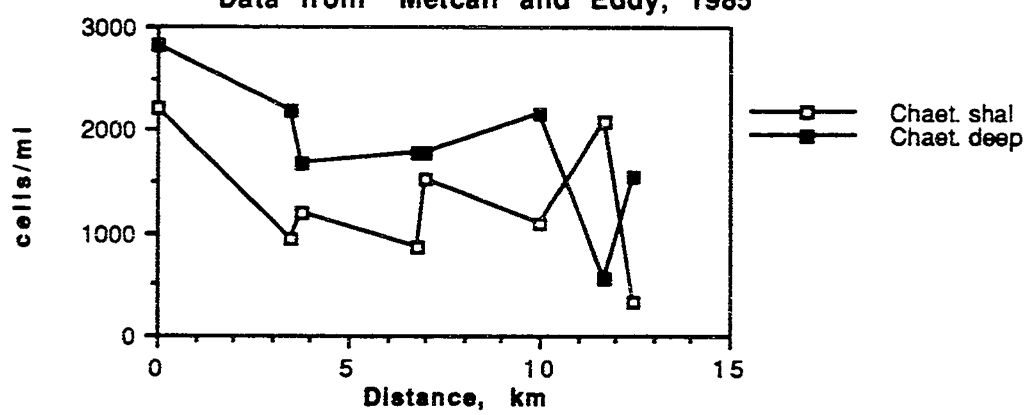


Figure 2d Data from "Metcalf and Eddy, 1985"

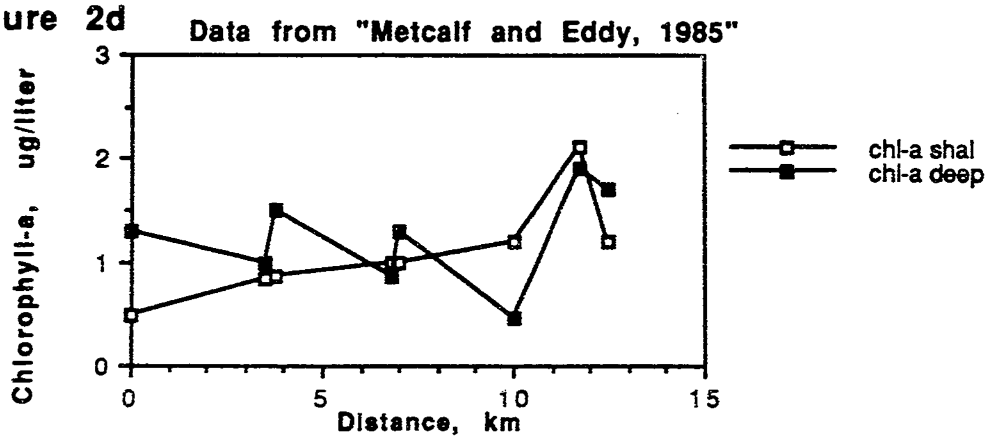
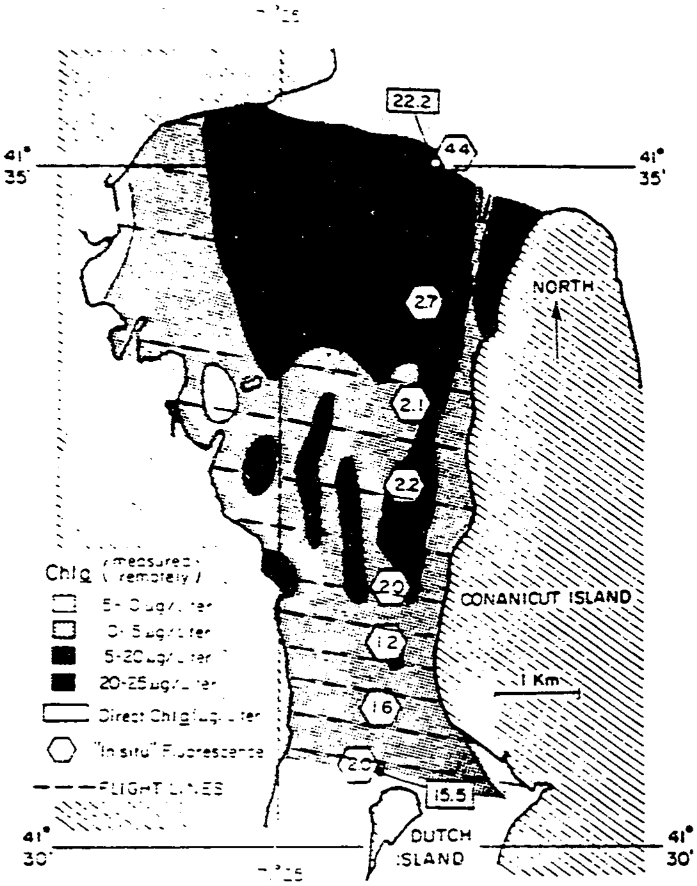
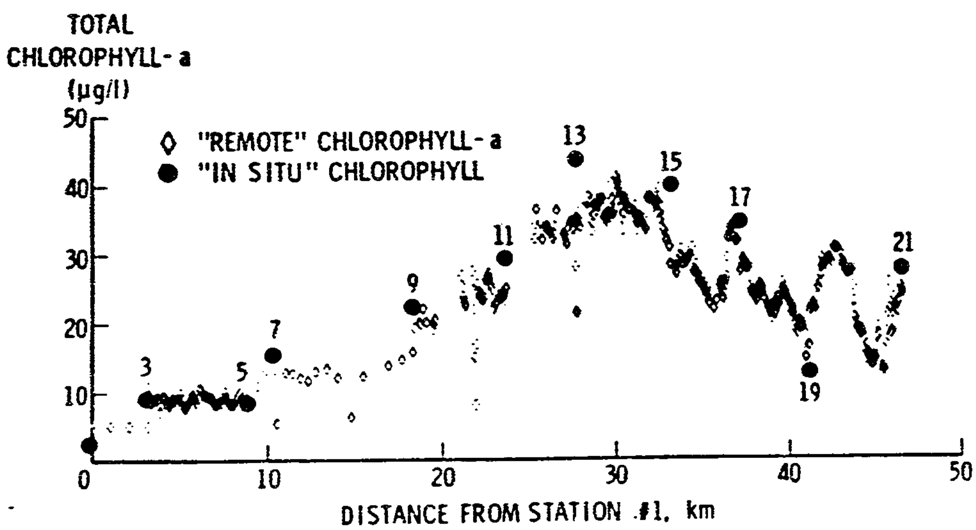


Fig. 3a



41° 35'
41° 35'
22.2
4.4
2.7
NORTH
2.1
2.2
2.0
CONANICUT ISLAND
1.2
1 Km
1.6
2.0
15.5
DUTCH ISLAND
41° 30'
41° 30'

Fig. 3b



TOTAL CHLOROPHYLL-a (µg/l)
"REMOTE" CHLOROPHYLL-a
"IN SITU" CHLOROPHYLL
DISTANCE FROM STATION #1, km

Data from "Meltcalf and Eddy, 1985"

Figure 4a July 19

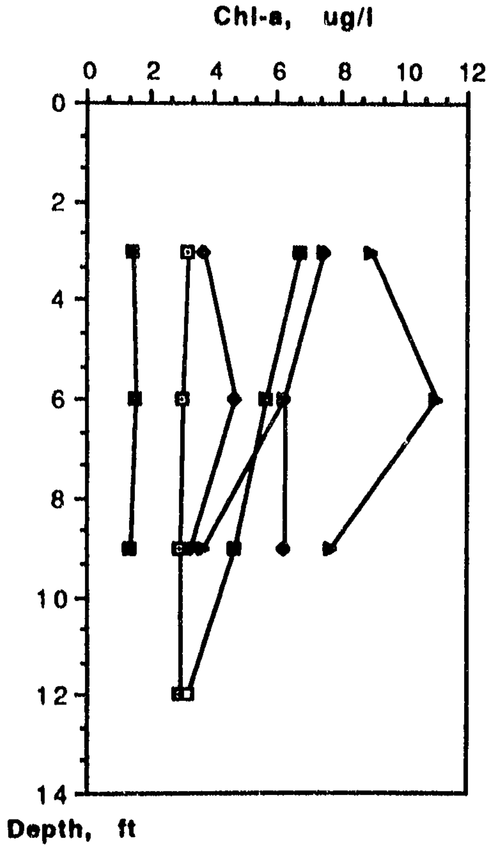


Figure 4b Aug. 23

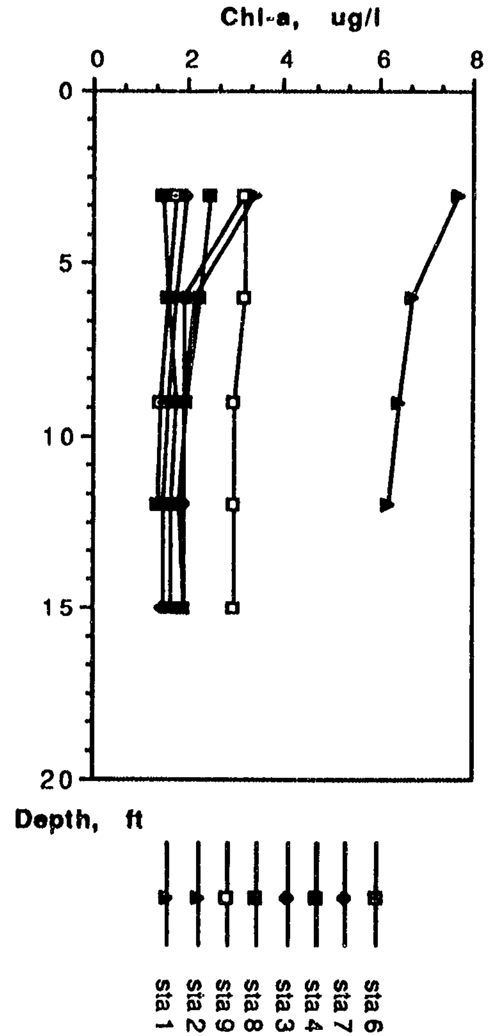


Figure 4c Aug. 6

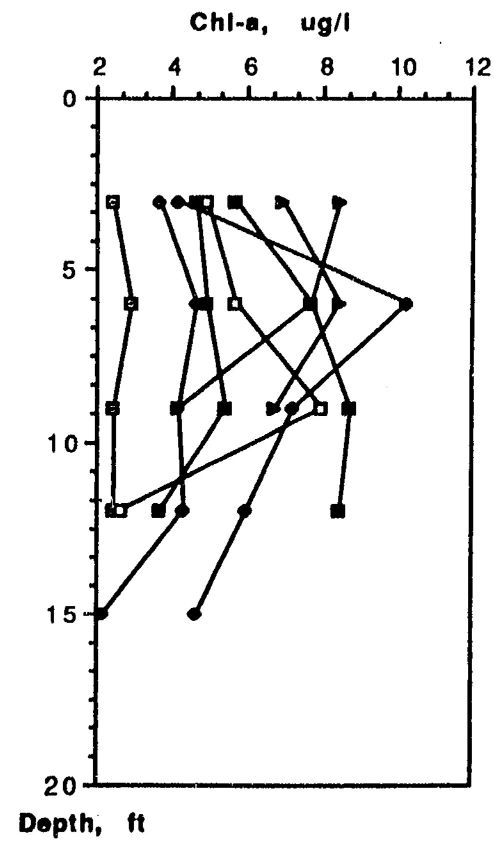


Figure 5a Data from "KREMER & NIXON, 78 STATION 5"

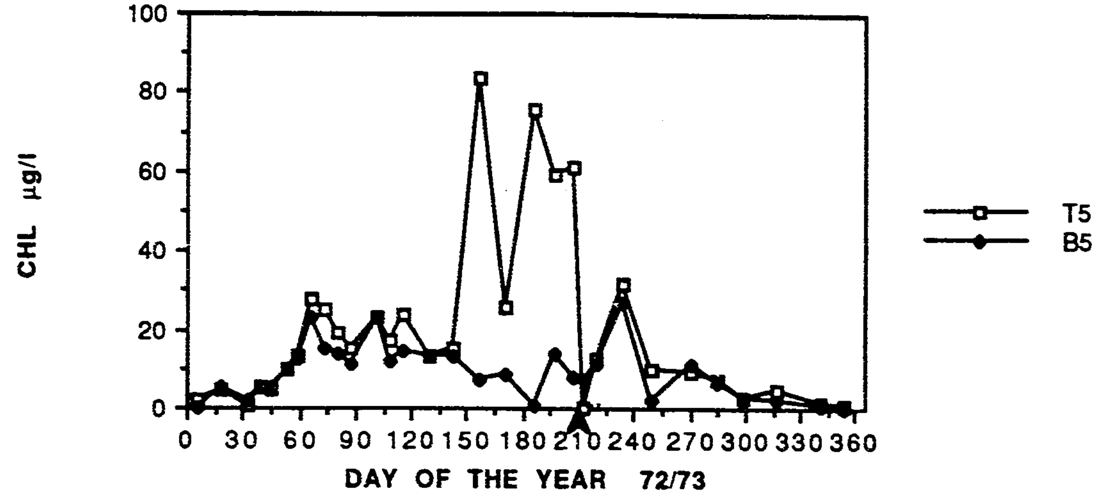


Figure 5b Data from "KREMER & NIXON, 78 STATION 8"

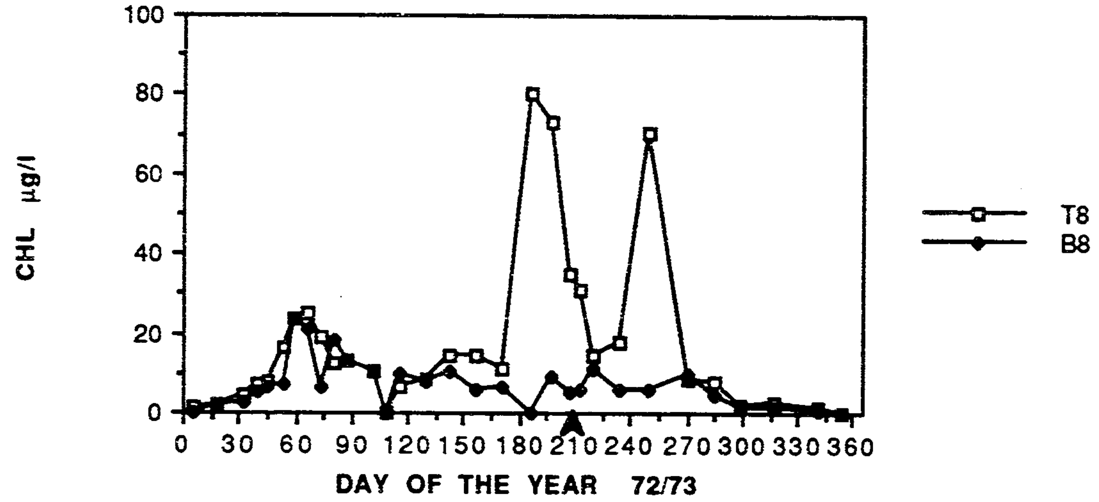


Figure 5c Data from "KREMER & NIXON, 78, STATION14"

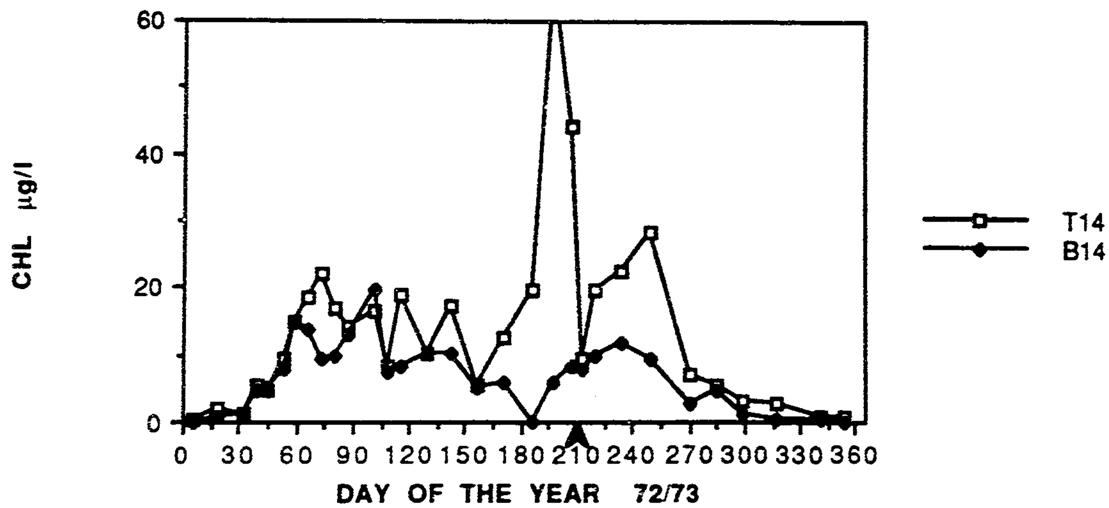


Figure 6a Data from "Pratt, 1959 St. E1"

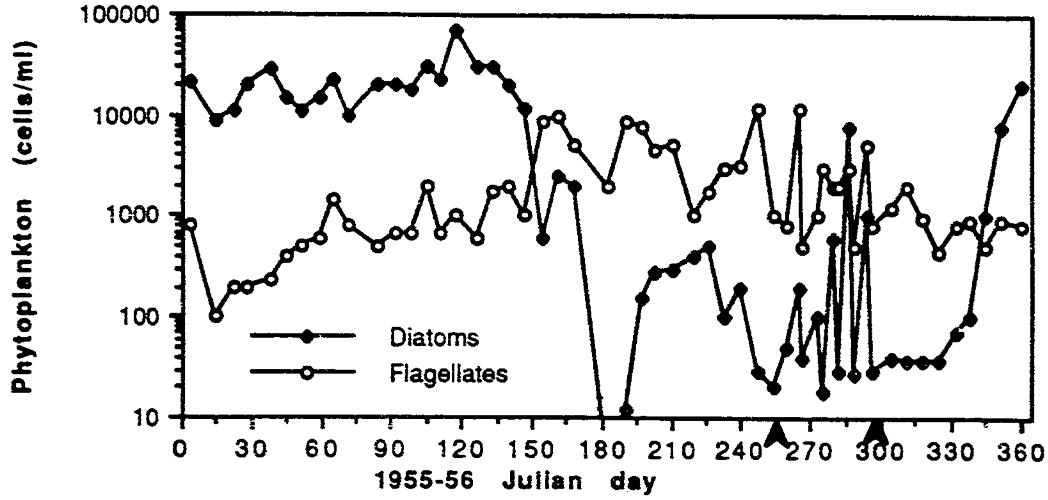


Figure 6b Data from "Pratt,1959 St. E6"

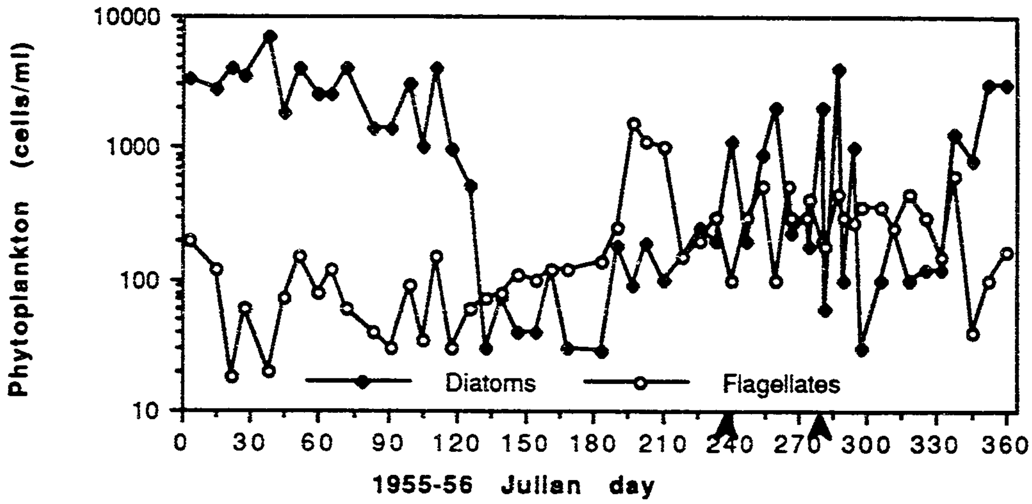


Figure 6c Data from Mitchell-Innes, 1973
Station 3: Nayatt Pt.

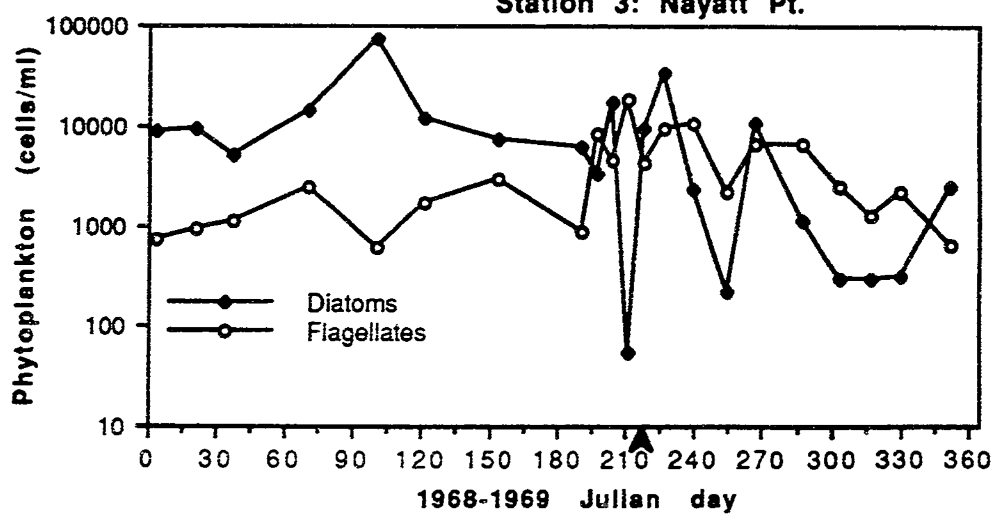


Figure 7a

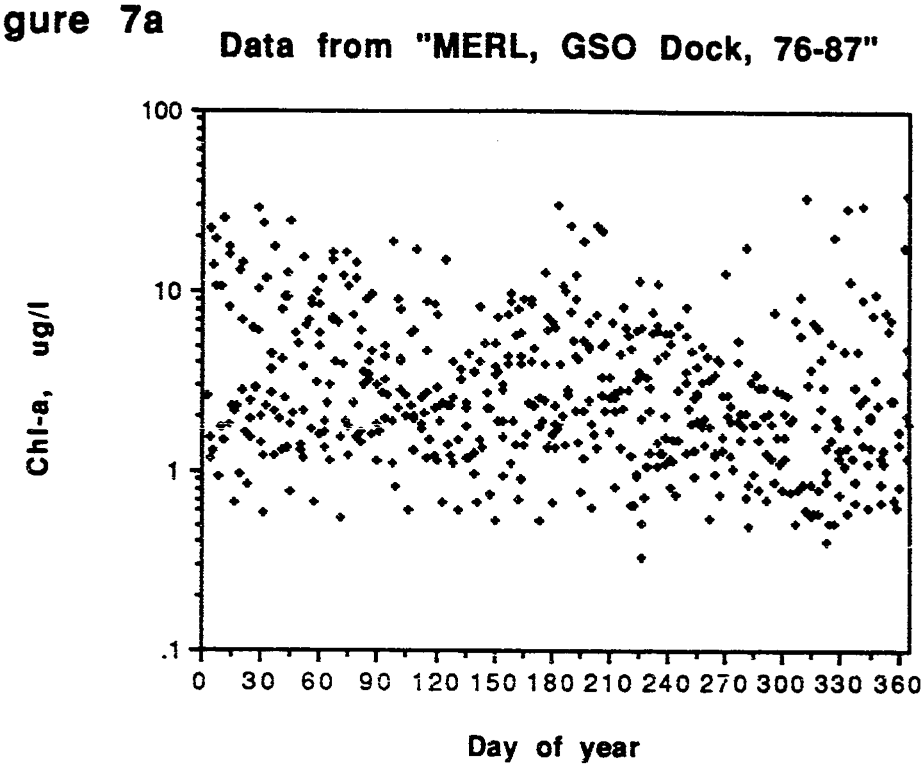


Figure 7b

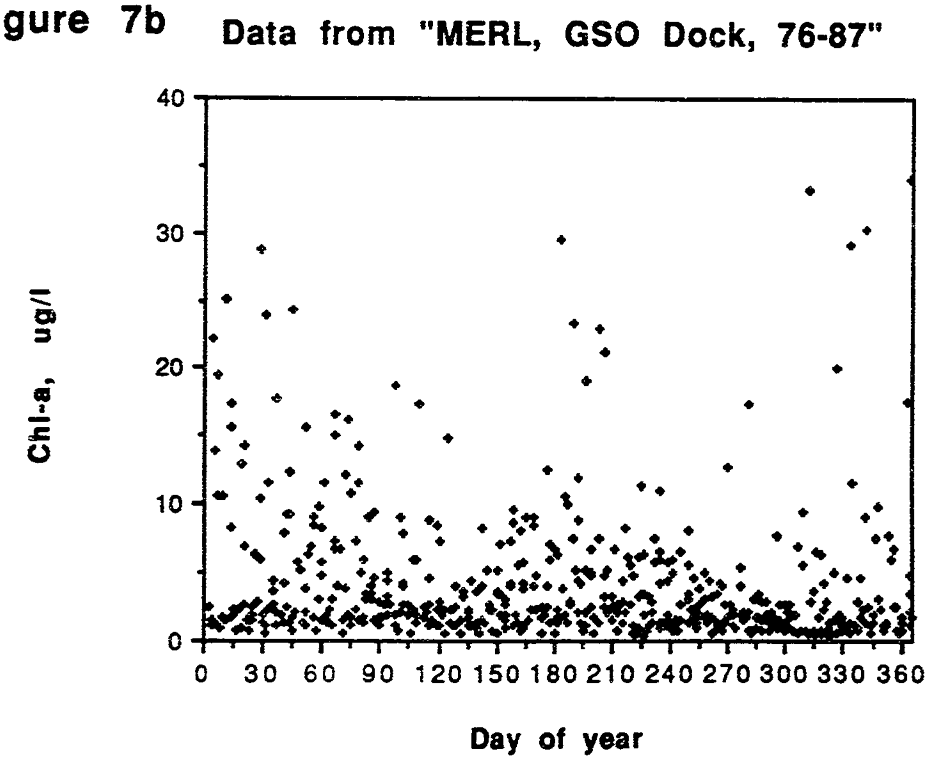


Figure 8a Data from "Traditional station 2"

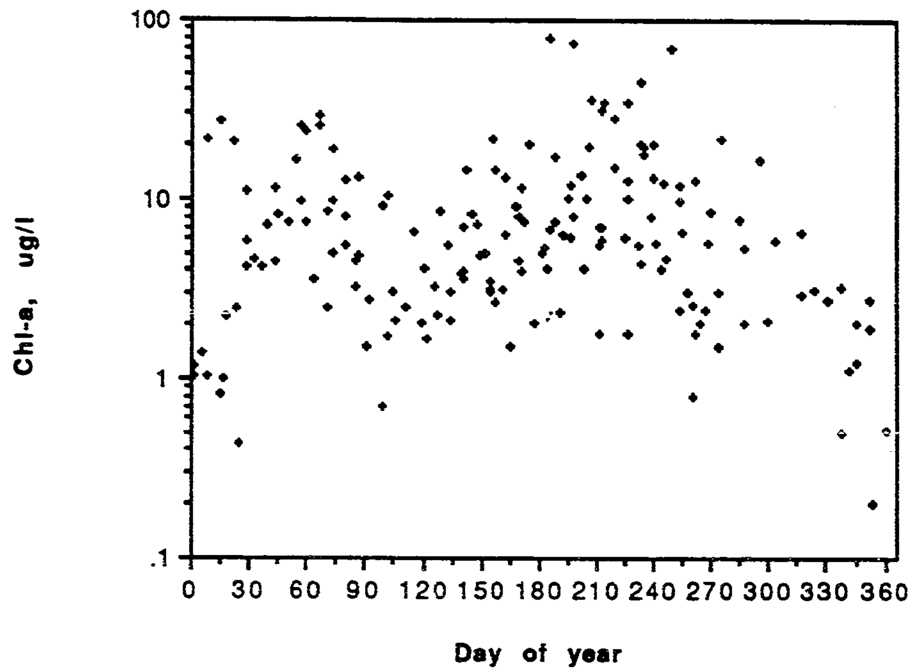


Figure 8b Data from "Traditional station 2"

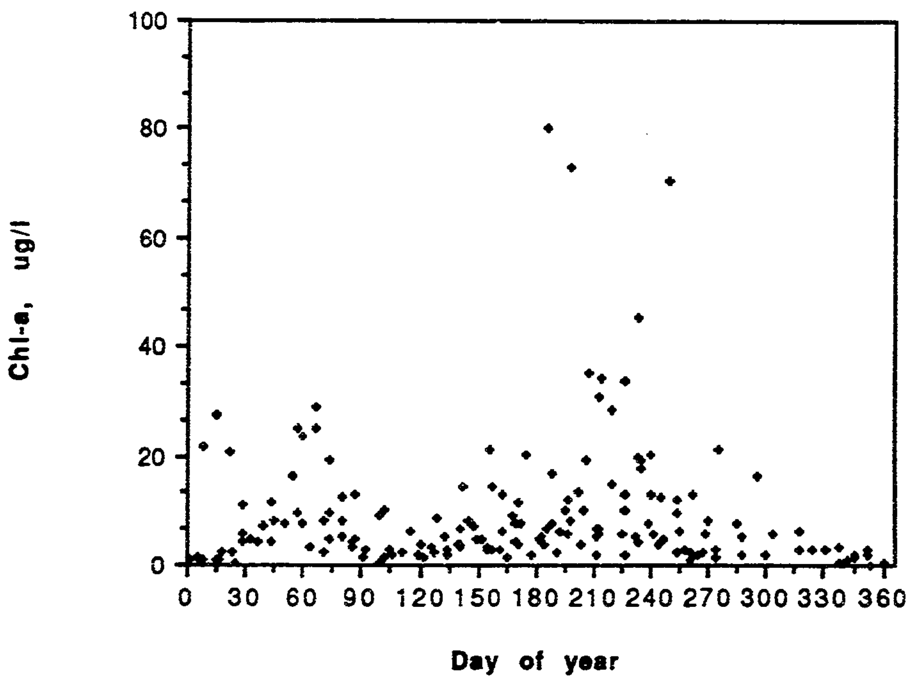


Figure 9a Data from "DWYER, 1980, DEASON, 1980, AND DEASON AND SMAYDA, 1982"

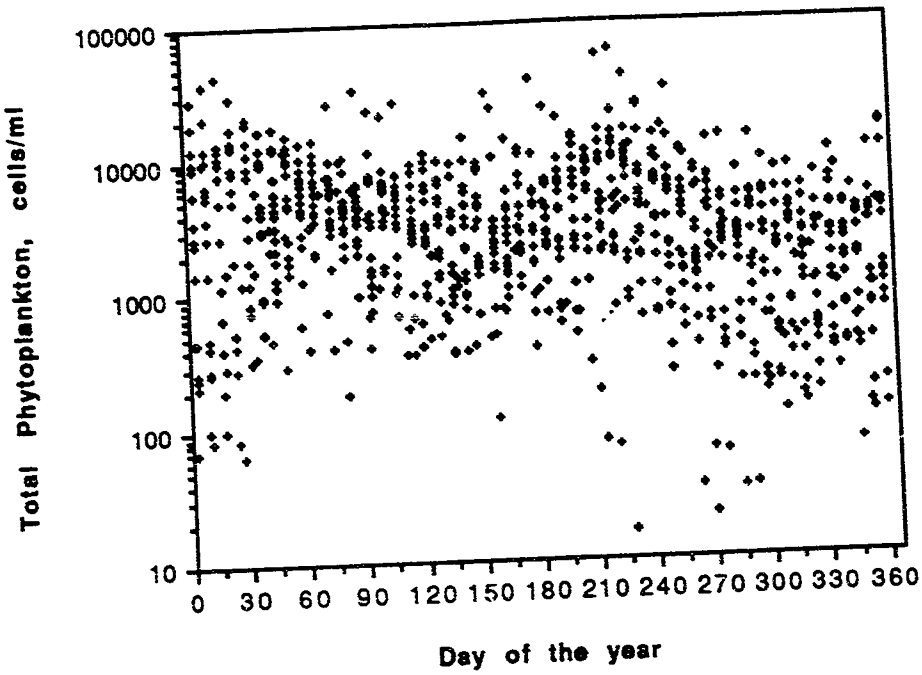


Figure 9b Data from "DWYER, 1980, DEASON, 1980, AND DEASON AND SMAYDA, 1982"

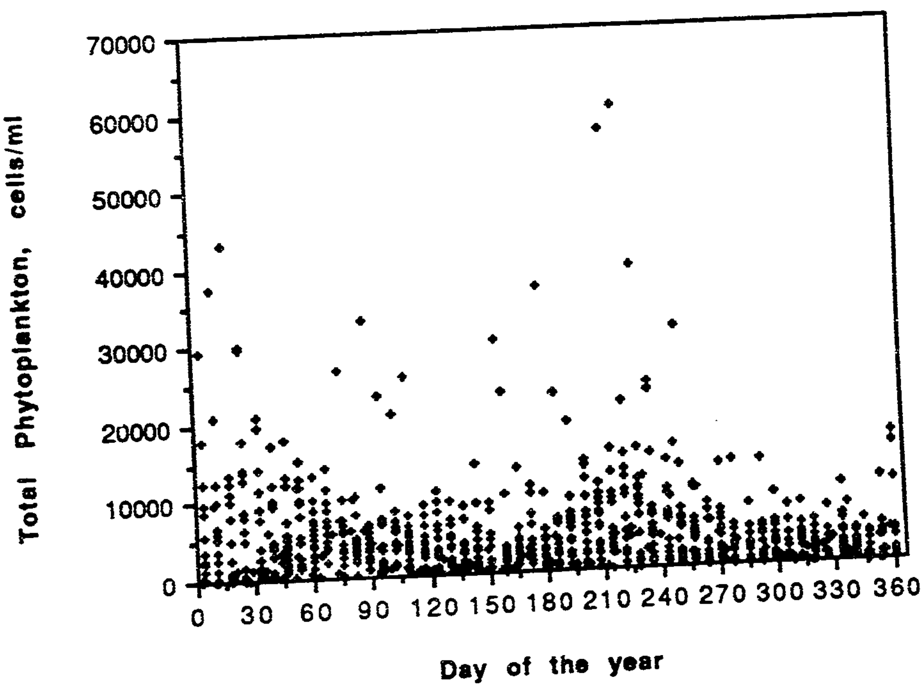


Figure 10a Data from "MERL, GSO Dock, 76-87"

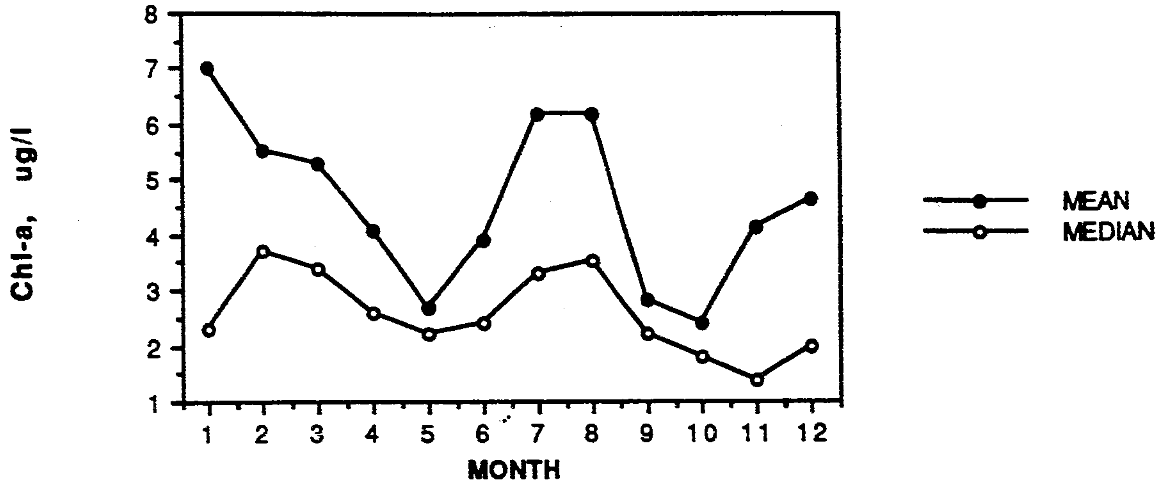


Figure 10b Data from "Traditional station 2"

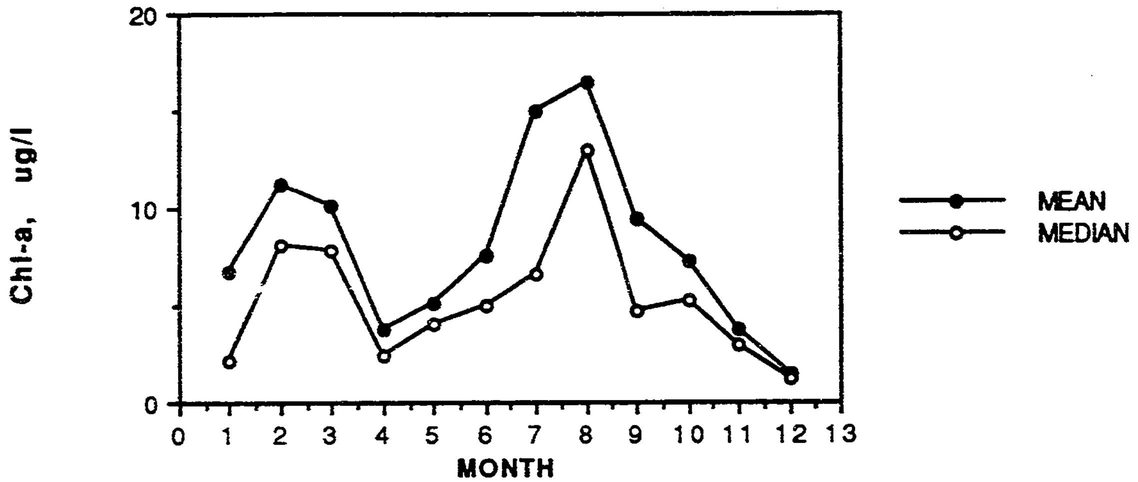


Figure 10c Data from "Dwyer, 1980, Deason, 1980 and Deason and Smayda, 1982"

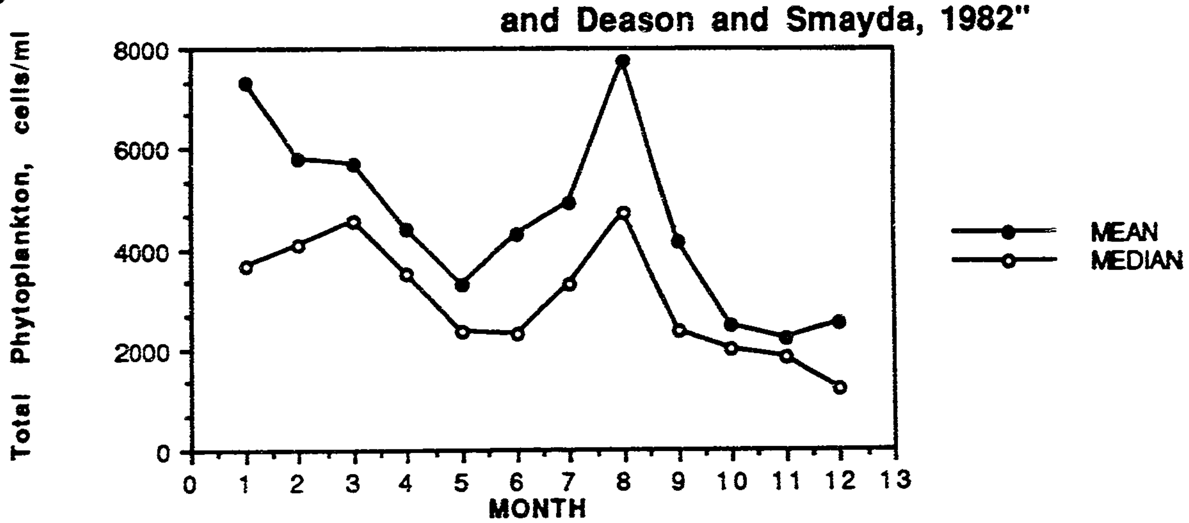


Figure 11a Data from "Mt. Hope Bay, Spar Island"

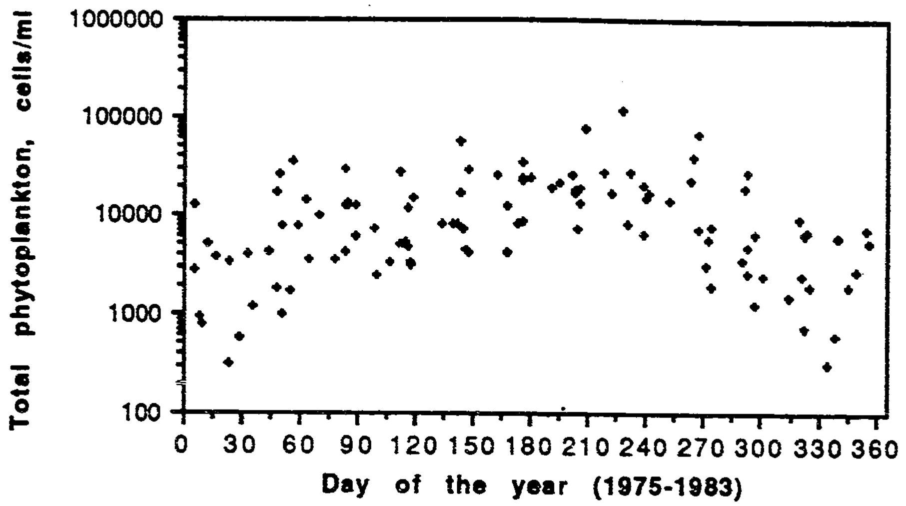


Figure 11b Data from "upper bay stations"

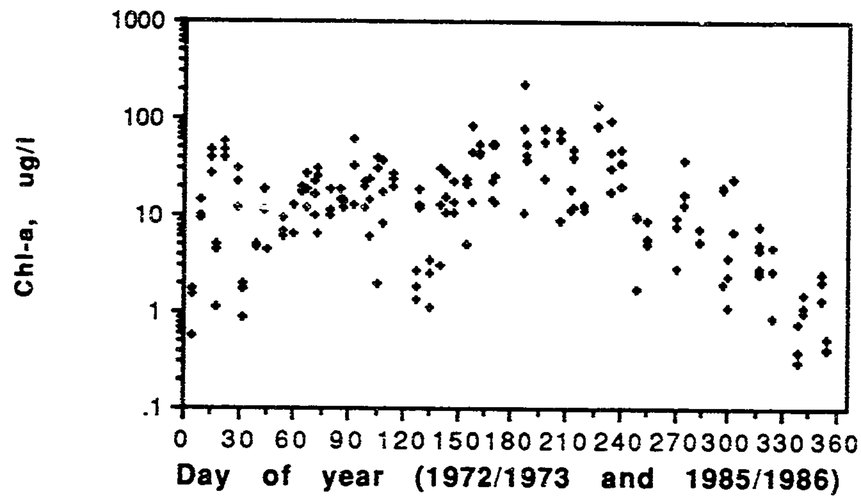


Figure 11c Data from "mouth of Bay"

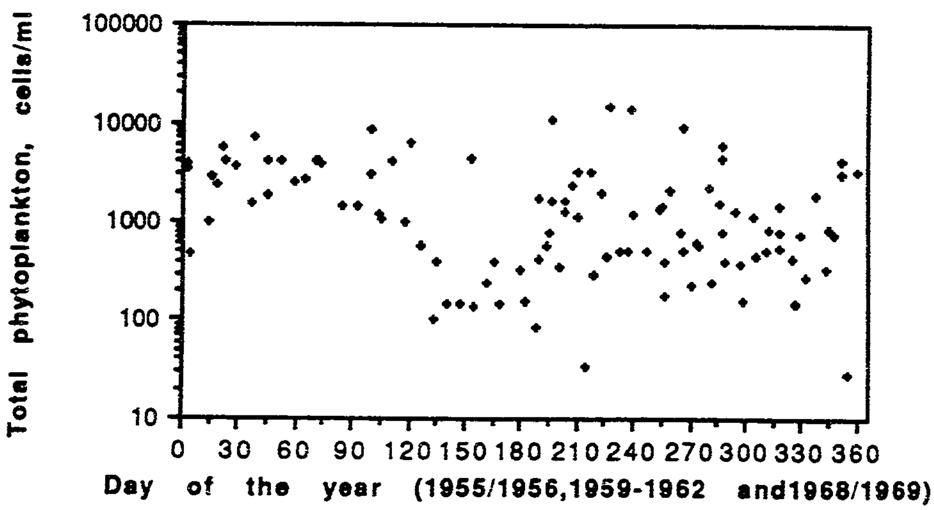


Figure 12a Data from "Mt Hope Bay, Spar Island"

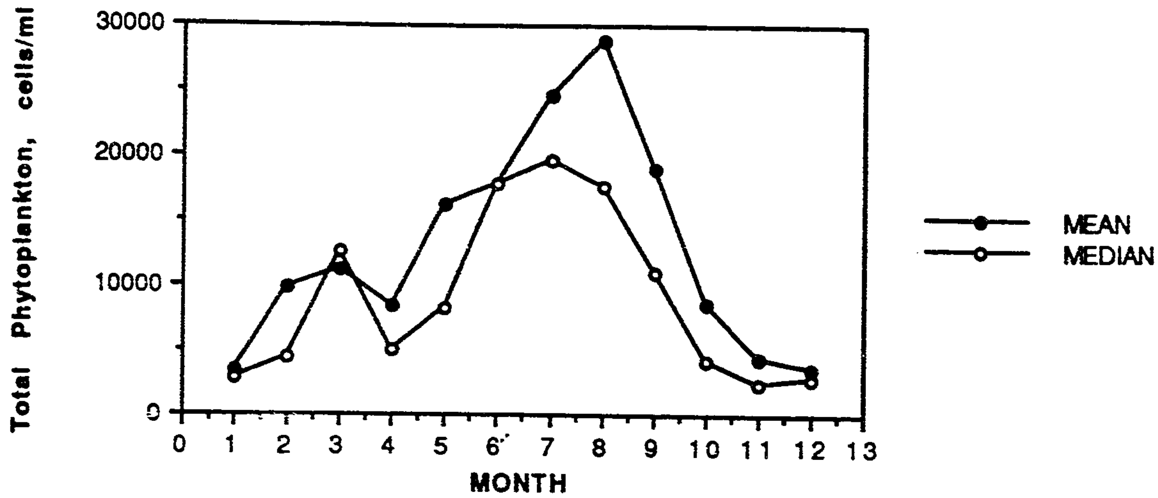


Figure 12b Data from "Upper west passage and lower Providence river, "

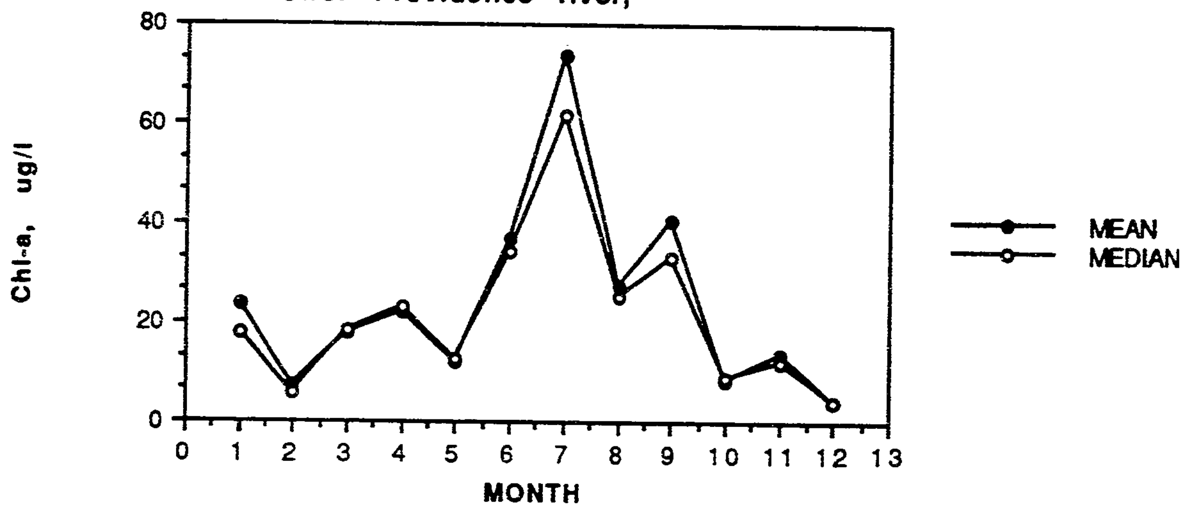


Figure 12c Data from "mouth of Bay"

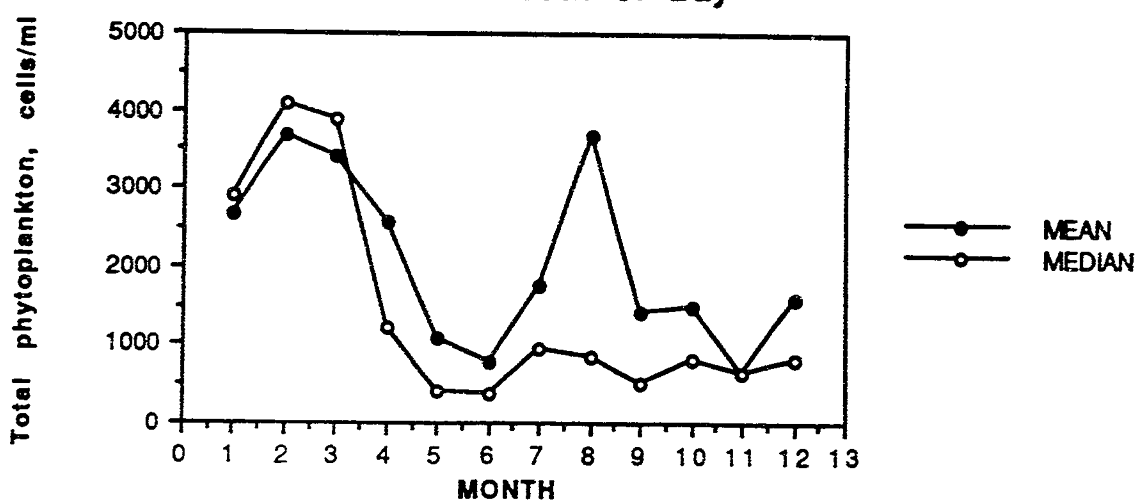


Figure 13a

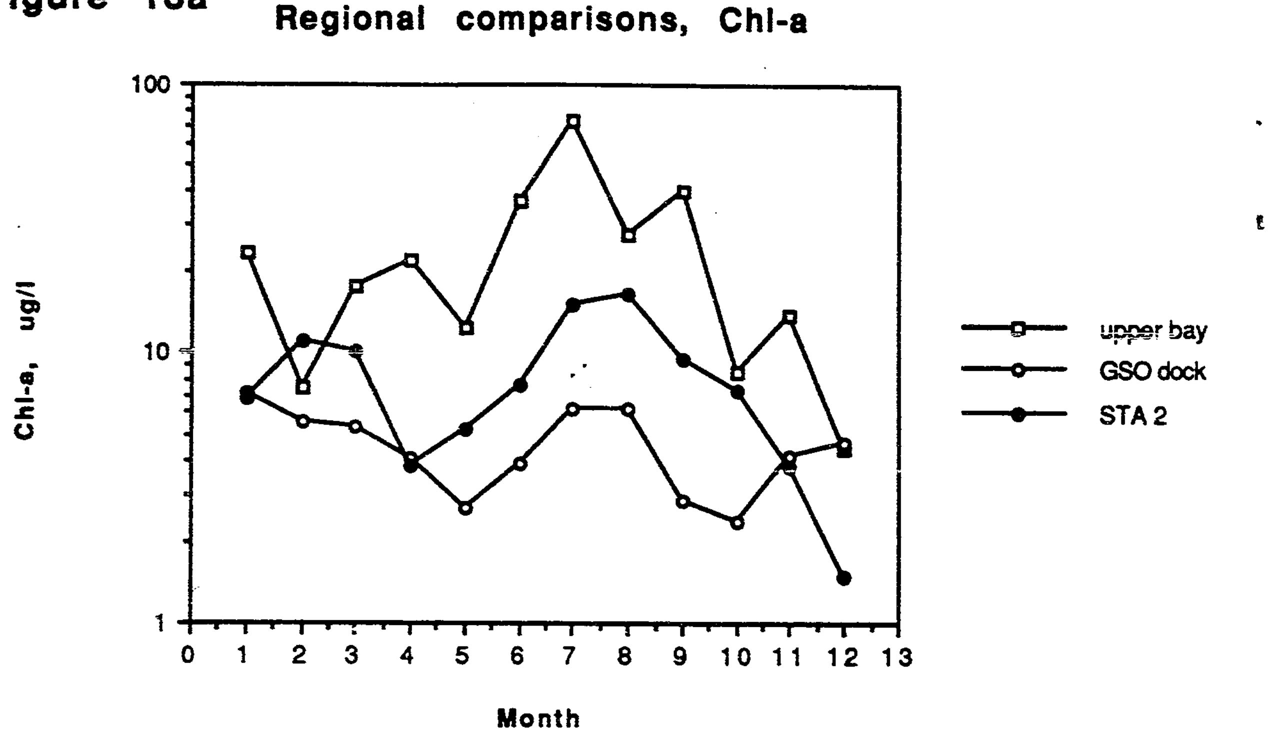


Figure 13b

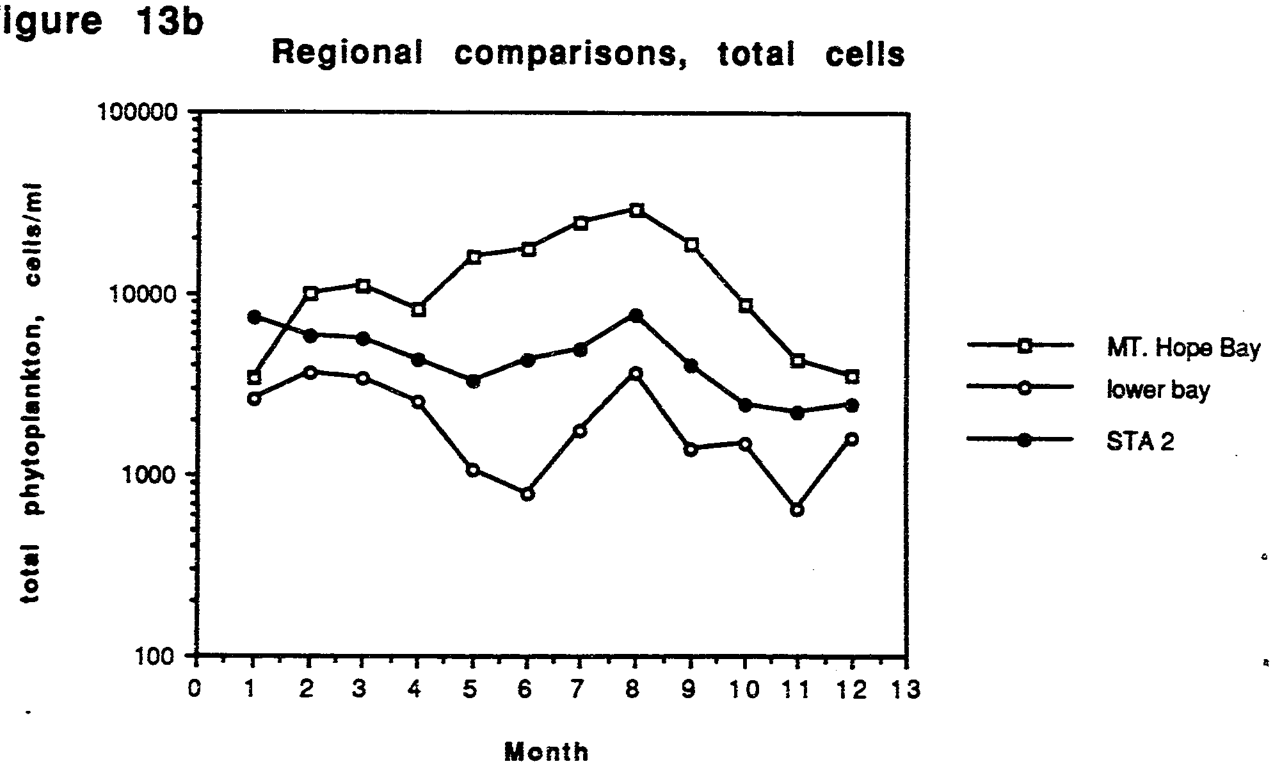


Figure 14a

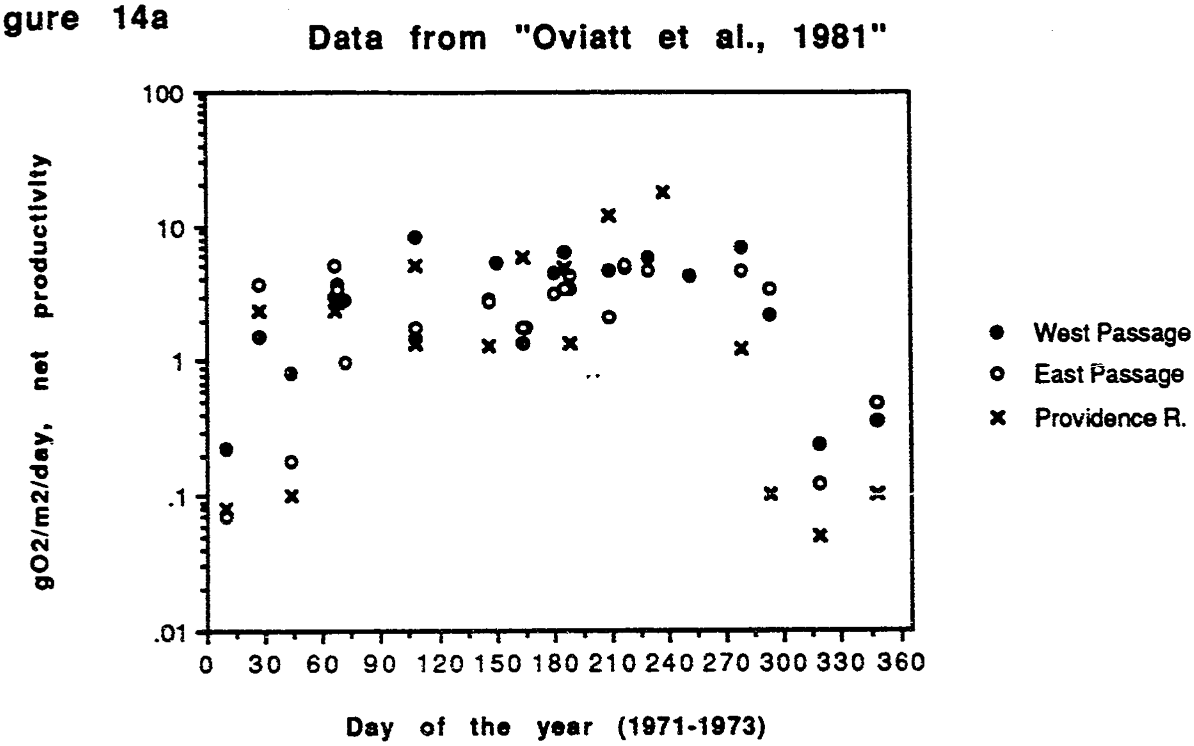


Figure 14b

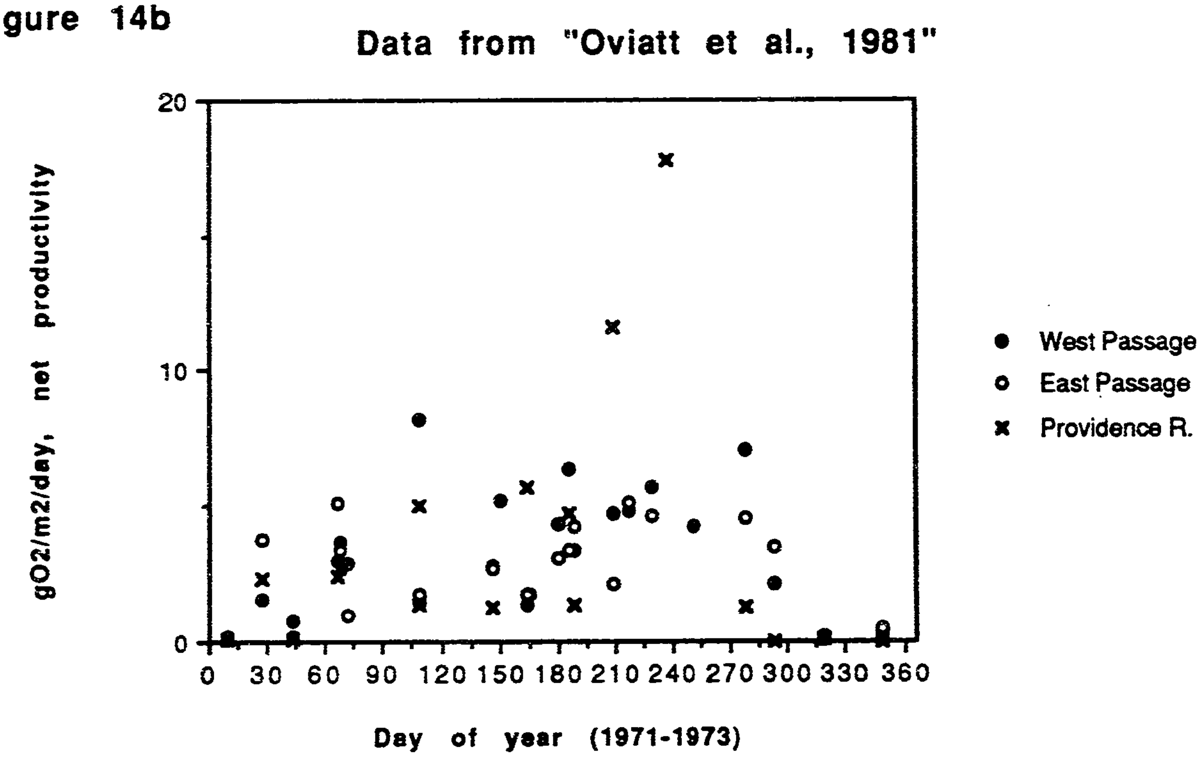


Figure 15a Data from "Durbin et al., 1985, and Vargo, 1979"

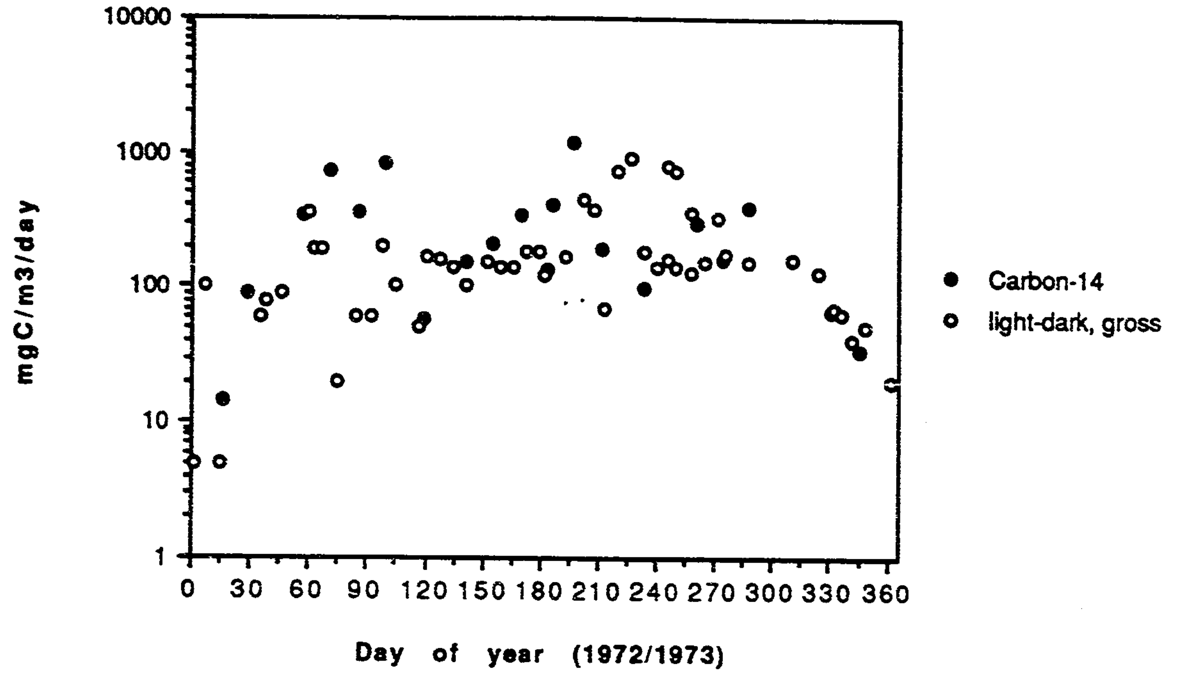


Figure 15b Data from "Durbin et al., 1985, and Vargo, 1979"

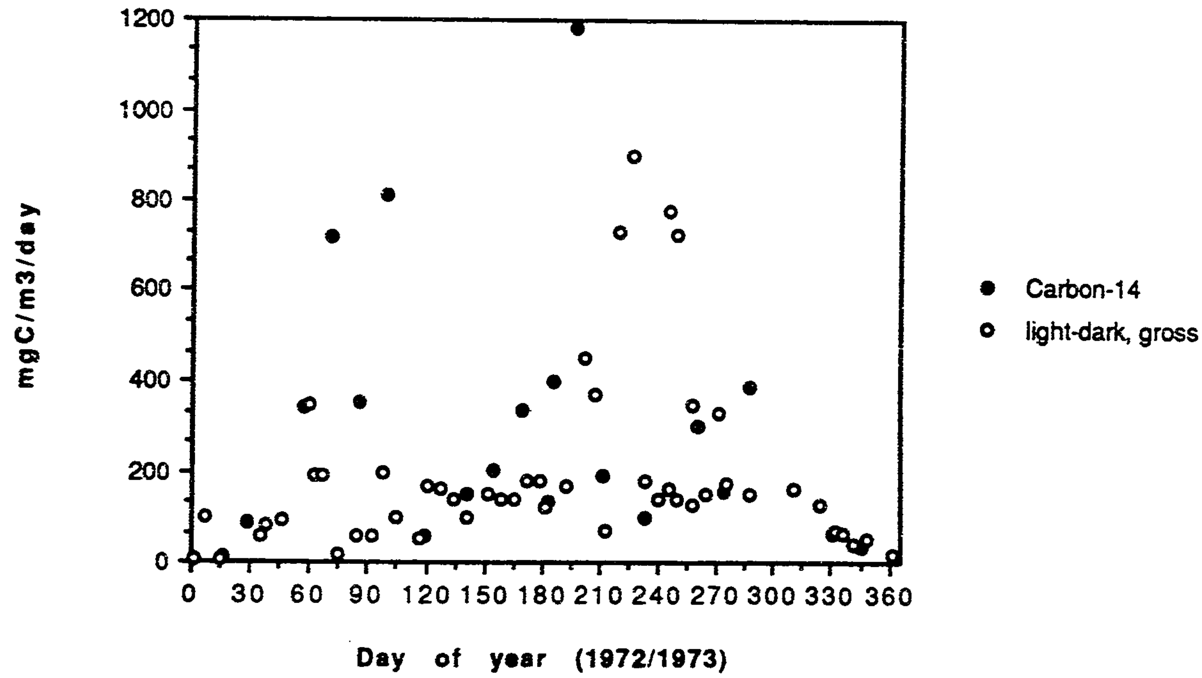


Figure 16a

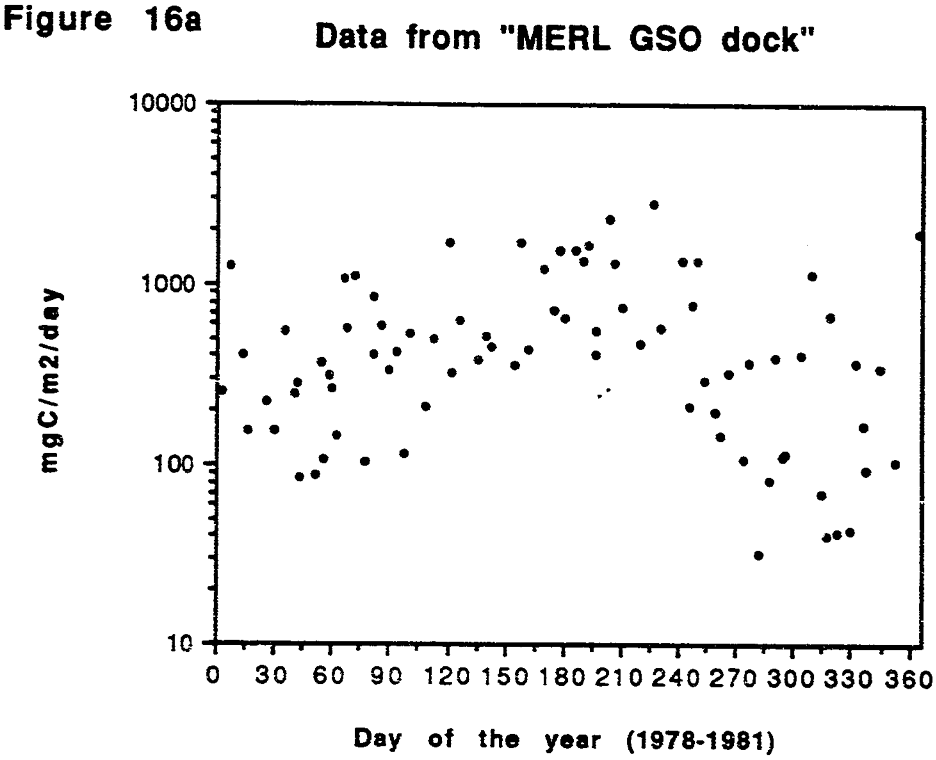


Figure 16b

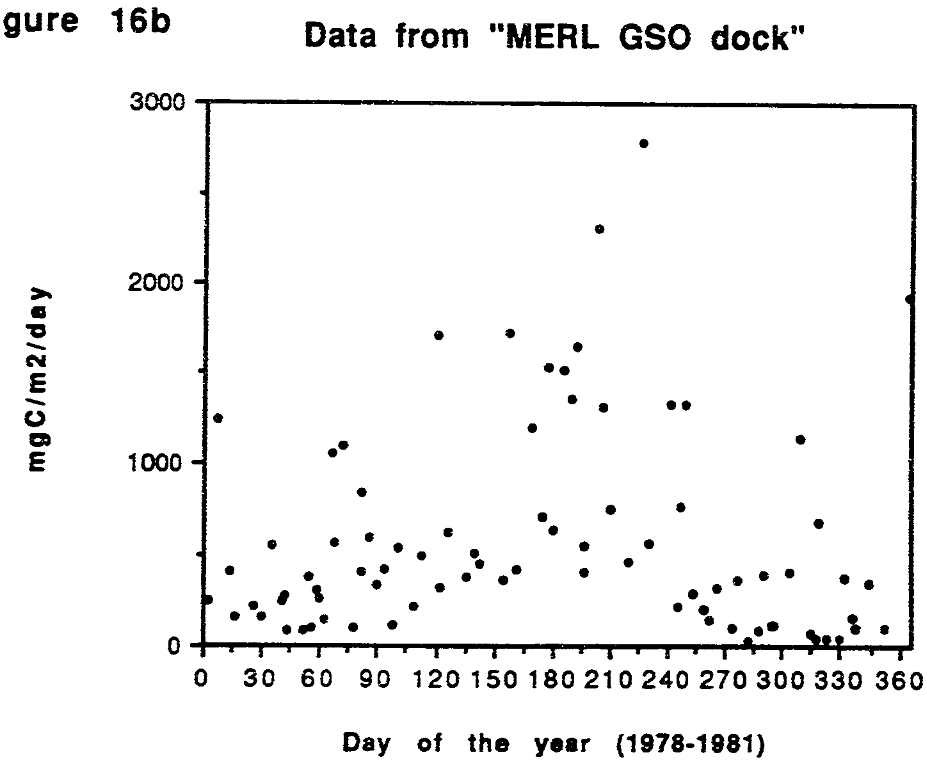
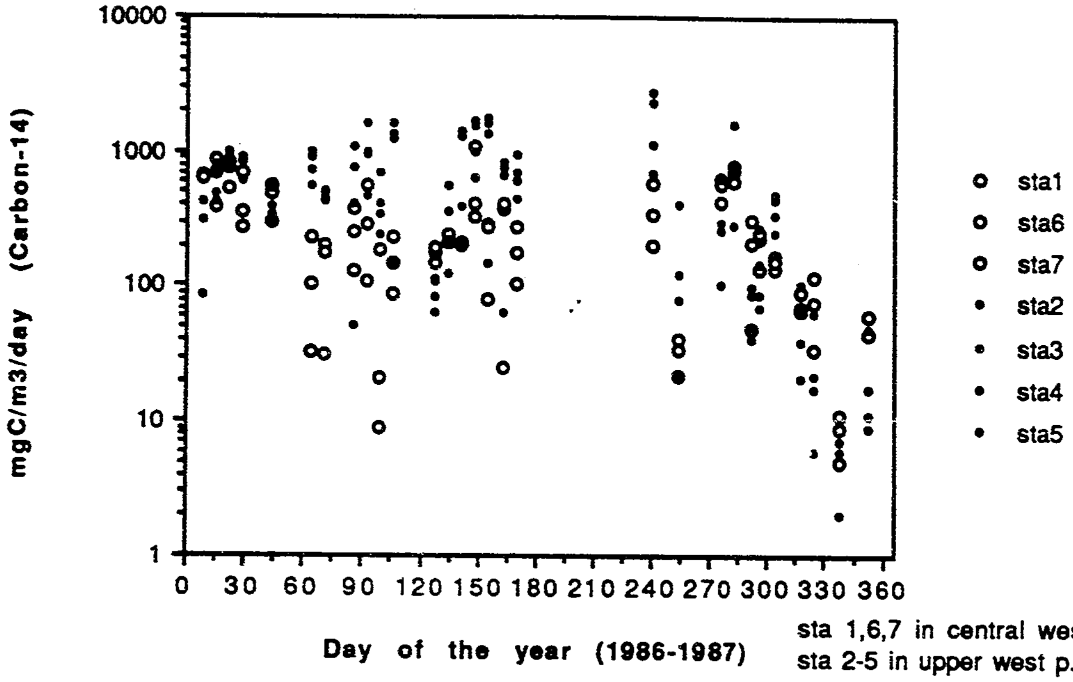


Figure 17a

Data from "Smayda, 1987"



sta 1,6,7 in central west p.
sta 2-5 in upper west p. and Prov R.

Figure 17b

Data from "Smayda, 1987"

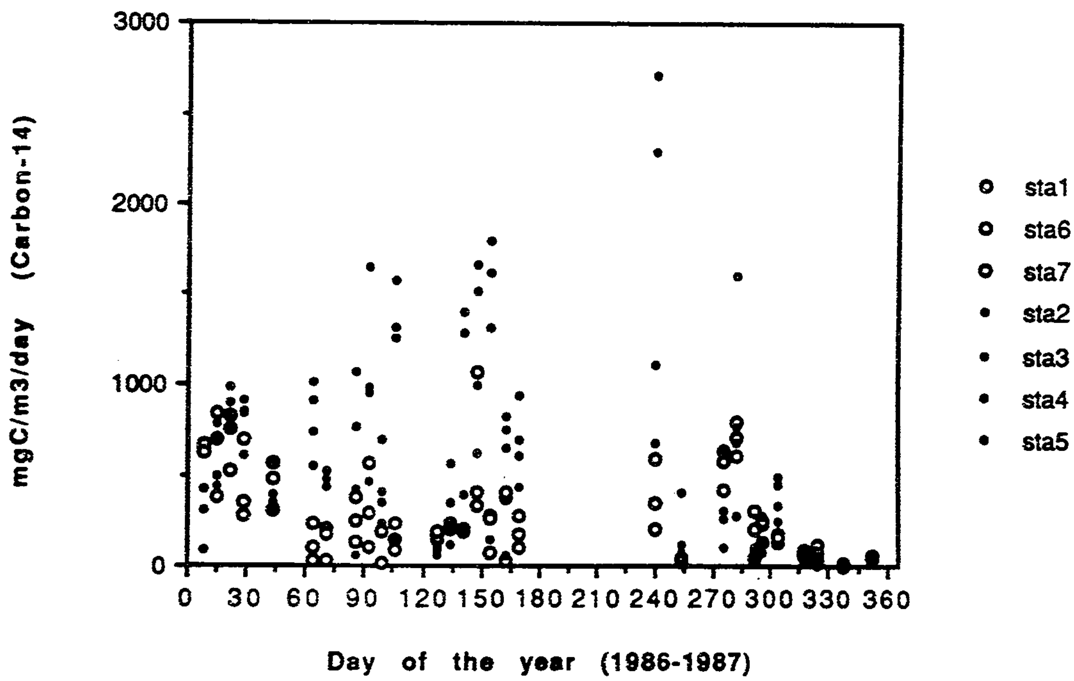


Figure 18a

Redrawn from Smayda, 1984

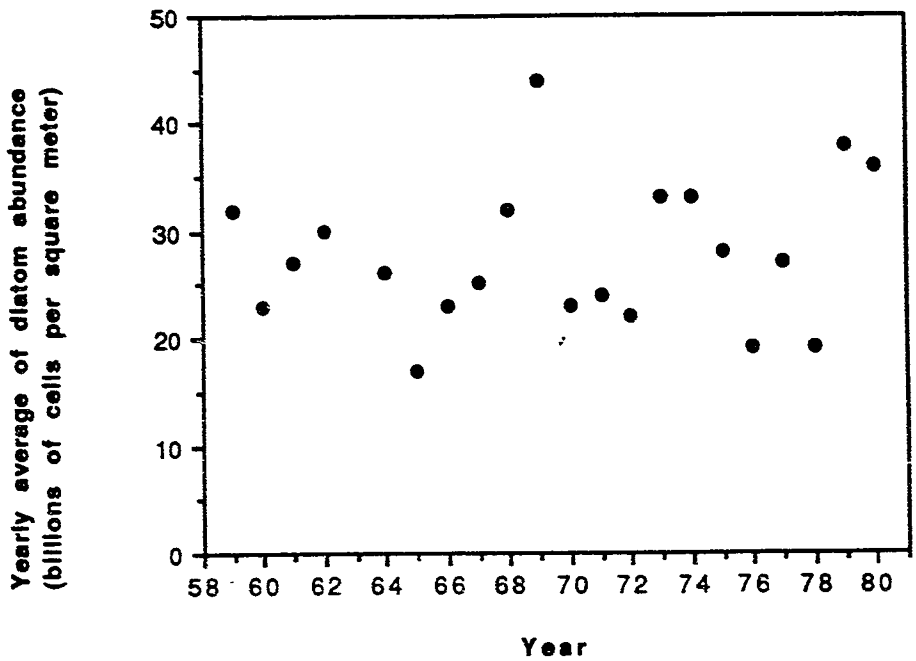


Figure 18b

Data from "Smayda, 1976"

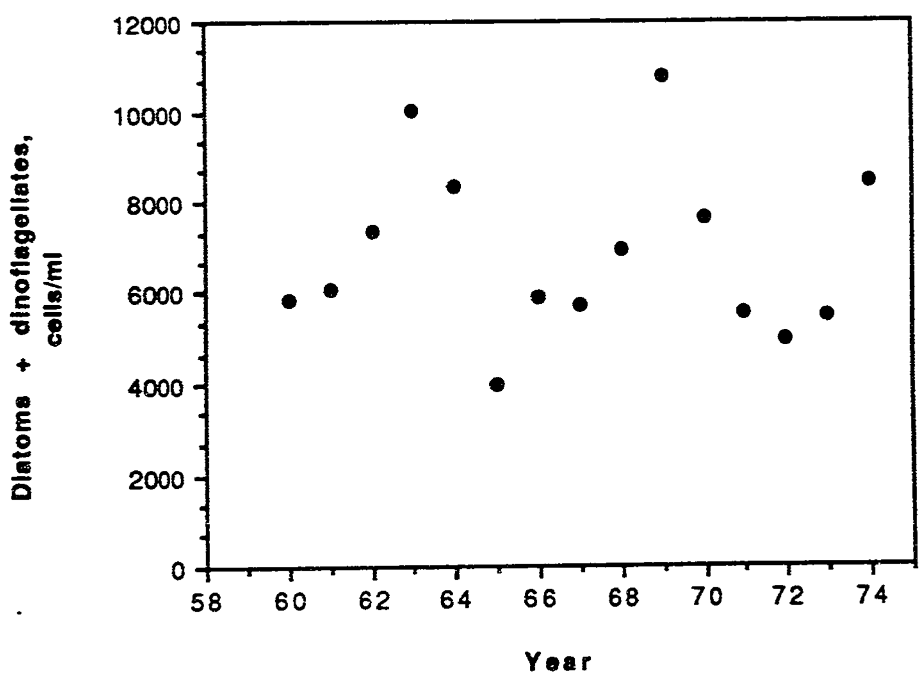


Figure 19a Data from "MERL, GSO dock"

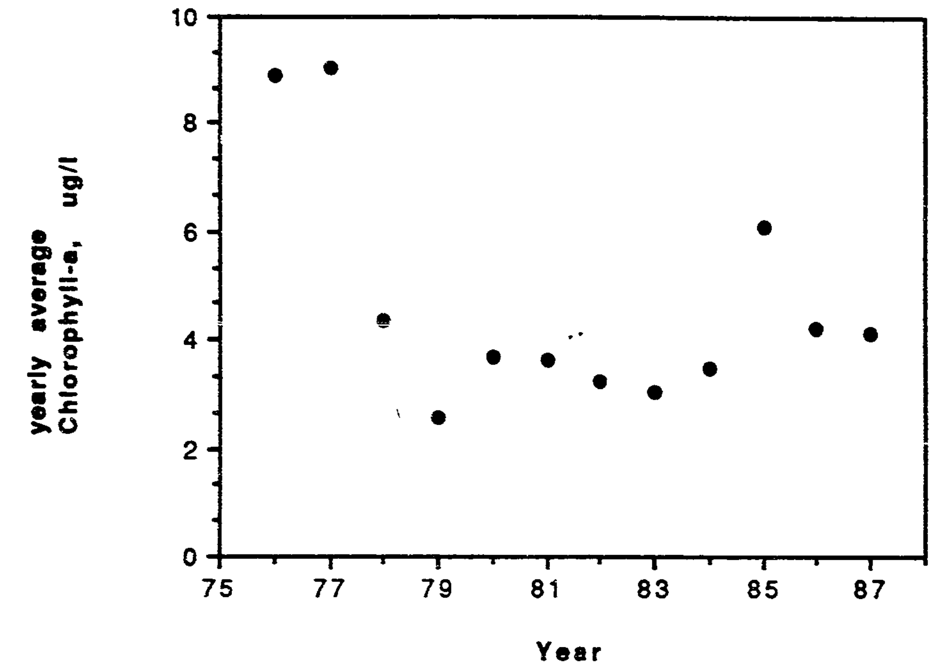
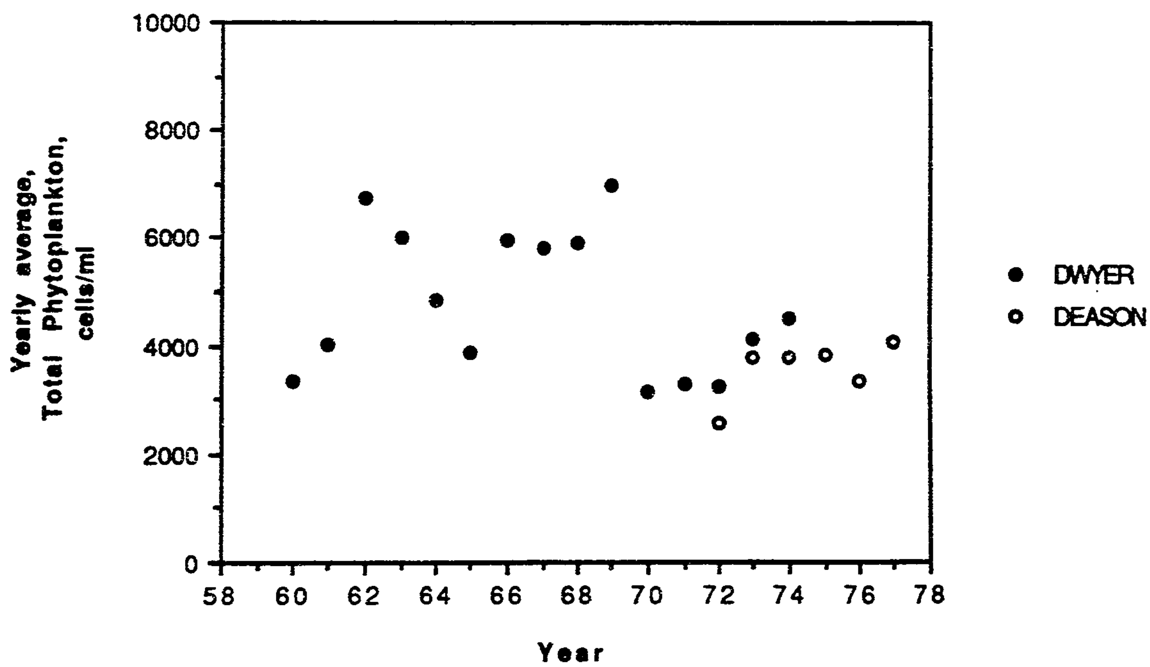


Figure 19b Data from "Dwyer, 1980, Deason, 1980 and Deason and Smayda, 1982"



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Appendix A:

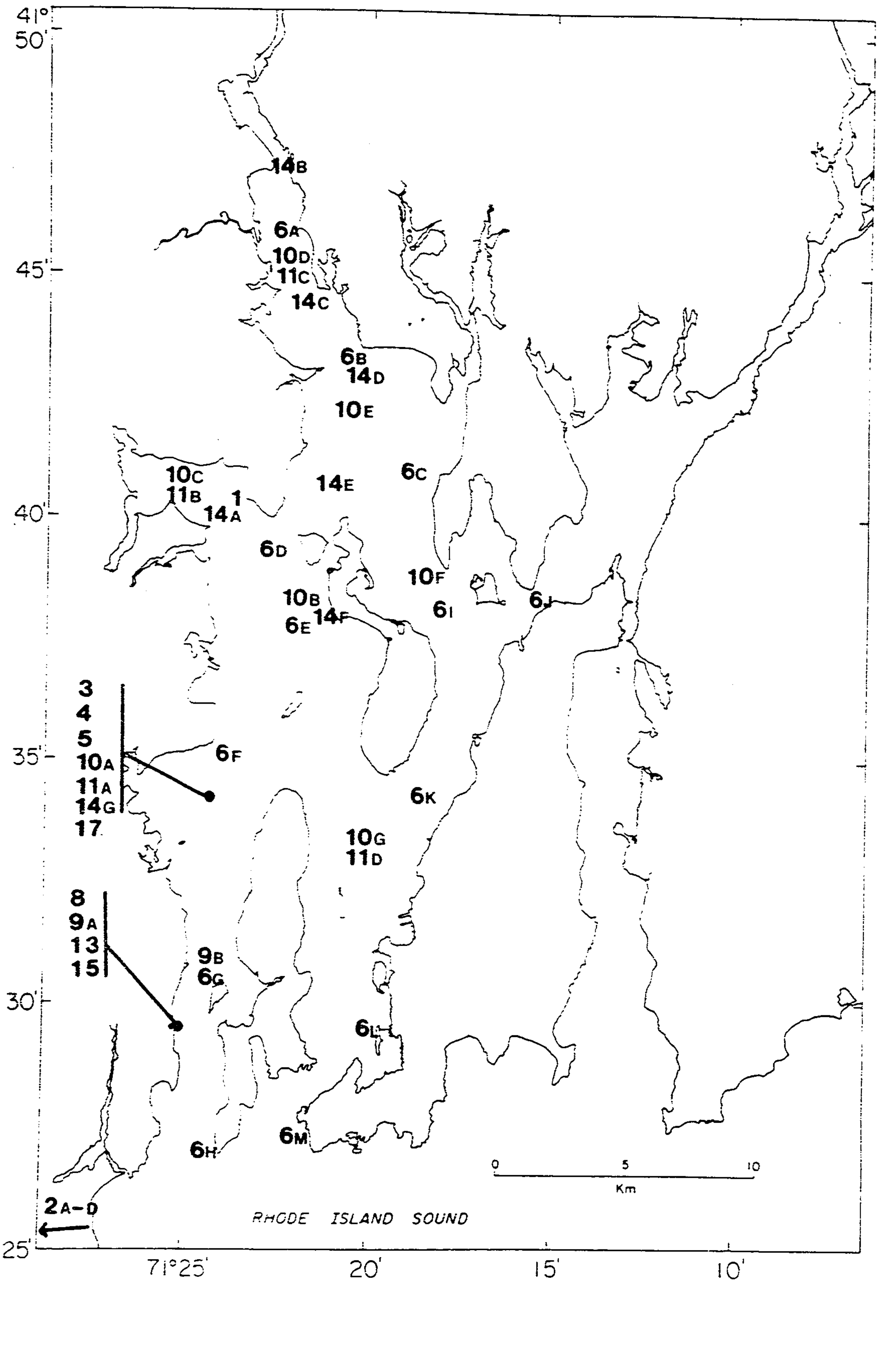
Summary of studies which contain:

Chlorophyll data

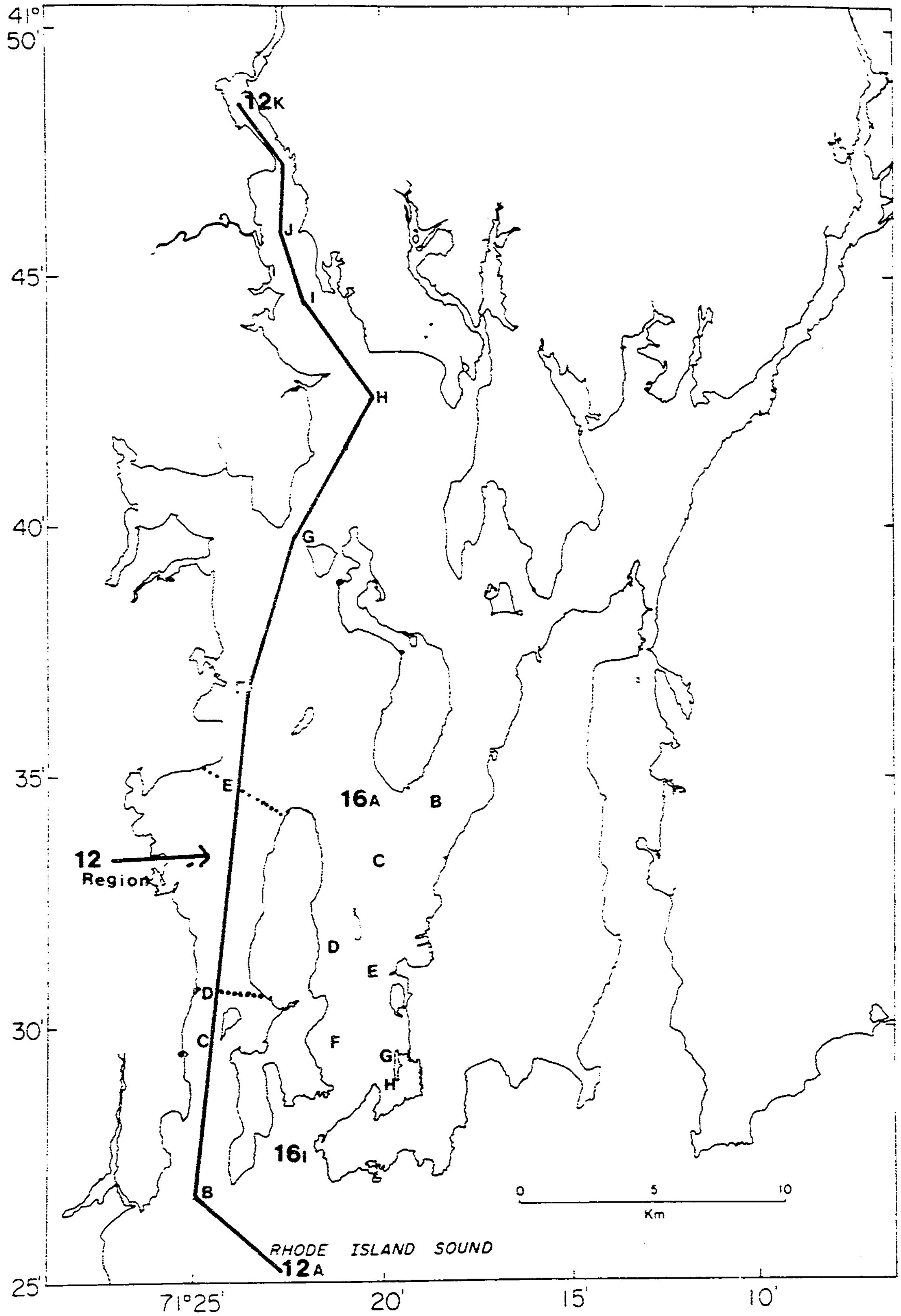
and

lists and graphs of data;
map of stations

Map of stations, chlorophyll data.



Map of stations, chlorophyll data, continued.



MAP I.D.	REFERENCE	ORIGINAL STATION ID	LOCATION	DATA TYPE	DATA PRESENTATION	DATA DURATION	COMMENTS
1	Ferarra, 1953	Station 1	rom pier in Greenwich Bay,10(yards from SW tip of Warwick N (41 40.0 N 71 23.0 W, est)	Seasonal distribution of Chlorophyll a	Figure	32 sampling dates 7/25/52-3/18/53	Other data include dominant species and abundances of species, diatoms, flagellates
2-A	Conover, 1961	Station 1	Charlestown Pond	ısonal distribution of Chlorophyl	Figure	Aug 1955-Feb 1958	Other data include productivity estimates
2-B		Station 2	Fort Neck Pond				
2-C		Station 3	Charlestown Pond				
2-D		Station 4	Green Hill Pond				
3	Durbin et al., 1975	Station 2	41 34'7" N 71 23'31" W	'ophyll a measurements for each fraction (>100um, 60-100um, 20-60um, <20um) and total sample	Table	Biweekly from 11/27/72-10/15/73	
				Cumulative Chlorophyll a for each ε fraction	Figure		
4	Furnas et al., 1976	Station 2	41 34'7" N 71 23'31" W	Chlorophyll a versus time	Figure	Weekly from May to Sept. 1974	
5	Hitchcock and Smayda, 1977	Station 2	41 34'7" N 71 23'31" W	Chlorophyll a versus time	Figure and Table	Weekly from 12/4/72 - 2/26/73	
6-A	Kremer and Nixon, 1978; Nixon, pers. comm., 1987	Station 3	41 45.4' N 71 22.5' W (est.)	Average chl-a versus time for 8 spatial elements surface and bottom	Figures	Aug 1972-Aug 1973	Figures in Kremer and Nixon; table in personal communication
6-B		Station 4	41 44' N 71 22' W (est.)				
6-C		Station 5	41 42' N 71 19.6' W (est.)				
6-D		Station 6	41 39.4' N 71 23' W (est.)				
6-E		Station 7	41 37.4' N 71 22' W	Chlorophyll a concentrations for eachstation, surface and bottom	Table	7/26/72-8/1/73	
6-F		Station 8	41 34.5' N 71 24' W (est.)				
6-G		Station 9	41 30.9' N 71 24.4' W (est.)				
6-H		Station 10	41 27' N 71 24.8' W (est.)				
6-I		Station 14	41 38.4' N 71 18.7' W (est.)				
6-J		Station 15	41 38.2' N 71 16' W (est.)				
6-K		Station 13	41 34.3' N 71 19' W (est.)				
6-L		Station 12	41 29.6' N 71 20.1' W (est.)				
6-M		Station 11	41 27' N 71 22.4' W (est.)				
7	Sosnowski et al., 1979	None specified	ion located "in the west pas: of lower Narragansett Bay"	Chlorophyll a versus time	Figura	Twice weekly, 9/20 to mid-Nov	
8	Oviatt et al., 1980	None specified	GSO Dock(41 29.6 N 71 25.2 W)	Weekly chlorophyll-a	Figure	ʌug 1976-Sept 1977	
9-A	Pilson et al., 1980	None specified	GSO Dock(41 29.6 N 71 25.2 W)	Chlorophyll a versus time	Figure	8/16/76-9/12/77	
9-B		Station 7	41 30.5' N 71 24.5' W (est.)				
10-A	Durbin and Durbin, 1981	Station 1	41 34'7" N 71 23'31" W	Total chlorophyll a for each station	Figures	3/1/76 - 10/8/76	
10-B		Station 2	41 36' N 71 23' W (est.)	Chlorophyll a of < 20 um fraction for each station	Figures		
10-C		Station 3	41 40.5' N 71 25.5' W (est.)				
10-D		Station 4	41 44.5' N 71 23' W (est.)				
10-E		Station 5	41 42' N 71 20.5' W (est.)				
10-F		Station 6	41 39' N 71 21' W (est.)				

10-G		Station 7	41 33' N 71 19.5' W (est.)				
11-A	Hargraves, 1981	Station 1	41 34'7" N 71 23'31" W	Chlorophyll a of < 20um fraction versus time for each station	Figure	Approx. weekly, March-Nov 1976	
11-B		Station 3	41 40.5' N 71 25.5' W (est.)				
11-C		Station 4	41 44.5' N 71 23' W (est.)				
11-D		Station 7	41 33' N 71 19.5' W (est.)				
12-A	Farmer et al., 1982	Station 1	41 25.5' N 71 22.5' W (est.):	Chlorophyll a at each station	Table	3/16/78 (AM)	Sampling date a few days after
			RI Sound	in situ and "remote" chlorophyll a	Figure		winter-spring bloom
12-B		Station 3	41 27' N 71 25' W (est.)	by distance from Station 12-A (1)			Remote sensing from helicopter
12-C		Station 5	41 29.5' N 71 24' W (est.): S of	Contoured map of chlorophyll a	Figure		
			Dutch Island	concentrations by remote sensing			
12-D		Station 7	41 31.25' N 71 24' W (est.)	Remote of a of green and green-	Table		
12-E		Station 9	41 34.5' N 71 23.5' W (est.)	brown algae along flight path			
12-F		Station 11	41 37.5' N 71 23.2' W (est.)	Distribution of remote chl a	Figures		
12-G		Station 13	41 39.5' N 71 22.5' W (est.):	between Stations 12-D and 12-E,			
			S. of Warwick Neck	green and green-brown algae			
12-H		Station 15	41 42' N 71 20.5' W (est.)				
12-I		Station 17	41 44.2' N 71 21' W (est.)				
12-J		Station 19	41 45.5' N 71 22.5' W (est.): near mouth of Pawtuxet R.				
12-K		Station 21	41 48.5' N 71 23.5' W (est.): Providence Harbor				
13	Pilson, 1985	None specified	GSO Dock(41 29.6 N 71 25.2 W)	Mean monthly chlorophyll a versus time	Figure	Weekly, Jan 1977 - Dec 1982	
14-A	Smayda, 1987	Station 1	41 40.4' N 71 25' W (est.)	Surface chlorophyll a	Table	7/25/85-6/18/86	
14-B		Station 2	41 47.5' N 71 24' W (est.)				
14-C		Station 3	41 45' N 71 23.5' W (est.)				
14-D		Station 4	41 43.5' N 71 21' W (est.)				
14-E		Station 5	41 40.5' N 71 22' W (est.)				
14-F		Station 6	41 37.8' N 71 23' W (est.)				
14-G		Station 7	41 34' N 71 24' W (est.)				
15	MERL, unpublished		GSO Dock(41 29.6 N 71 25.2 W)	Chlorophyll a		Aprox. weekly 1977-1987	
16A	Metcalf & Eddy, 1985	Station 1	41 34'18"N 71 21' 86"W	Chlorophyll a vs. Depth		Three days, April '84-Sept '84	
16B		Station 2	41 33' 53"N 71 19' 03"W				
16C		Station 9	41 32' 53"N 71 20'10"W				
16D		Station 8	41 31' 20"N 71 21' 05"W				
16E		Station 3	41 31' 08"N 71 19' 59"W				
16F		Station 7	41 29' 35"N 71 21' 12"W				
16G		Station 4	41 29' 24"N 71 19' 58"W				
16H		Station 5	41 28' 56"N 71 20' 00"W				
16I		Station 6	41 27' 47"N 71 22' 13"W				

17	Furnas, 1982	None specified	41 34'7" N 71 23'31" W (probably)	total Chlorophyll a and <10um, <8um, <5um size fractions versus time	Figure and Table (I appendix)	Weekly, from 5/29/79 - 9/25/79
				Percentage of total chlorophyll a I >10um, 8-10um, 5-8um, <5um size fractions versus time	Figure	
18-A	Gallagher, 1979	Station 1	41 45'51" N 71 22'48" W	Chl a versus time and depth (3 depths)	Table	7/13/74, 7/14/74, 8/14/74, 8/15/74
18-B		Station 1A	41 38' N 71 23' W (est.)			
18-C		Station 2	41 34'7" N 71 23'31" W	Contours of chl a : lateral and vertical profiles for each sampling date	Figures	
18-D		Station 2A	41 30.5' N 71 25' W (est.)			
18-E		Station 3	41 26'47" N 71 25'9" W			

Durbin AG. and Durbin EG., 1981, Standing stock and estimated production rates of phytoplankton and zooplankton in Narragansett Bay, Rhode Island, Estuaries 4:24-41.

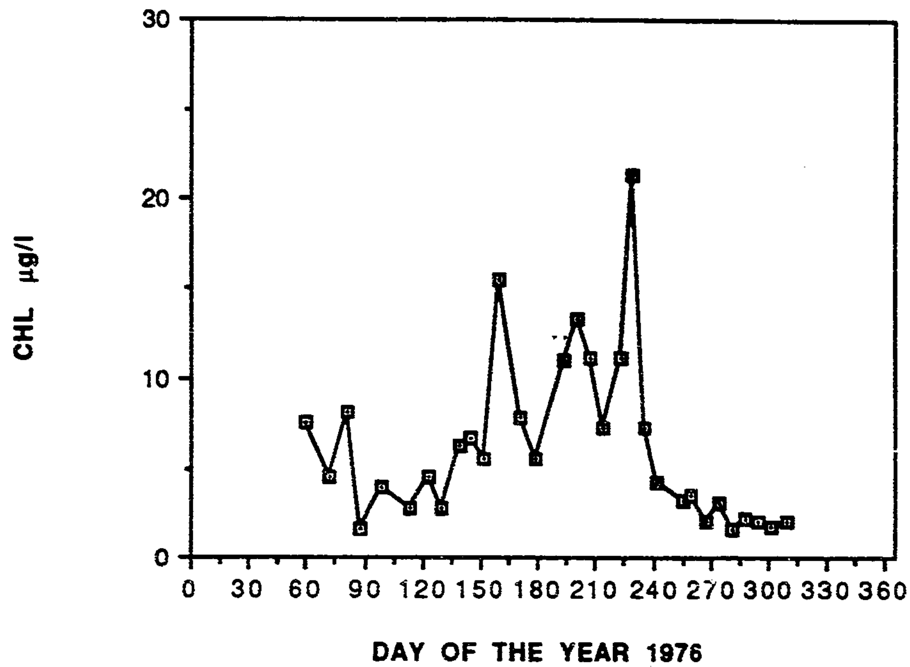
ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 34'7" N 71 23'31" W	10-A
Station 2	41 38' N 71 23' W (est.)	10-B
Station 3	41 41'N 71 24' W (est.)	10-C
Station 4	41 45'N 71 21.2' W (est.)	10-D
Station 5	41 42' N 71 20.5' W (est.)	10-E
Station 6	41 39' N 71 19.5' W (est.)	10-F
Station 7	41 34 ' N 71 20' W (est.)	10-G

Data was in tabular form

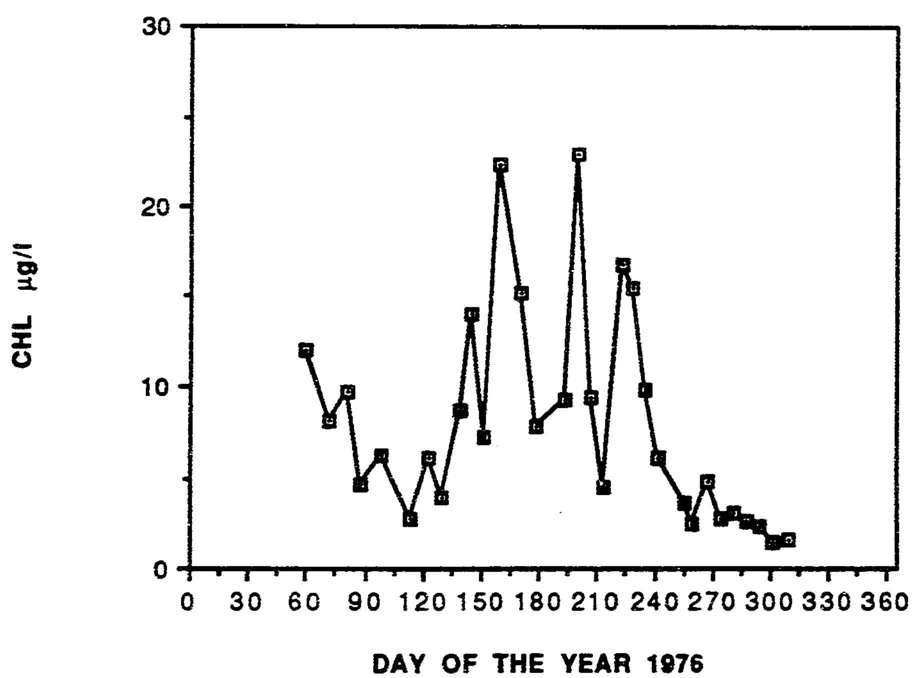
UNITS: µg/l

DATE	JULIAN DAY	ST 1	ST 2	ST3	ST 4	ST 5	ST 6	ST 7
3/1/76	60	7.5	12.1	14.37	23.13	25.85	23.1	12.75
3/12/76	71	4.54	8.18	6.12	7.22	19.32	15.37	5.45
3/22/76	81	8.18	9.78	9.91	21.76	18.3	12.58	4.52
3/29/76	88	1.53	4.6	3.78	10.22	7.76	9.01	3.12
4/9/76	99	3.98	6.19	5.54	12.25	12.88	3.41	1.74
4/23/76	113	2.8	2.8	2.59	14	4.91	2.1	1.26
5/3/76	123	4.48	6.05	6.05	6.8	9.45	6.43	2.94
5/10/76	130	2.74	3.89	10.11	2.72	5.24	7.39	3.5
5/19/76	139	6.22	8.75			18.66		
5/24/76	144	6.61	14	12.05	3.11	12.05	30.33	15.16
6/1/76	152	5.44	7.19	23.72	24.11	21	10.3	5.05
6/9/76	160	15.55	22.32	24.55	49.1	60.26	25.11	5.83
6/19/76	170	7.78	15.16	44.63	100.43	72.53	17.85	7.39
6/28/76	179	5.44	7.78	15.55	9.33	2.25	3.11	3.89
7/12/76	193	11.08	9.33	17.85	55.79	17.85	17.85	6.22
7/19/76	200	13.4	22.9	26.8	8.36	25.7	23.43	6.22
7/26/76	207	11.16	9.48	12.83	25.66	21.2	22.32	10.04
8/2/76	214	7.19	4.47	31.24	8.36	4.47	4.47	3.31
8/11/76	223	11.16	16.74	35.71	9.72	12.44	9.49	11.72
8/16/76	228	21.25	15.55	22.37	41.39	41.39	27.96	16.72
8/23/76	235	7.21	9.88			10.95		
8/30/76	242	4.14	6.14	16.02	15.49	8.81	6.01	2.94
9/13/76	256	3.2	3.61	7.88	6.03	7.81	5.87	2.42
9/17/76	260	3.5	2.53	3.89	4.67	5.44	2.06	2.39
9/24/76	267	2	4.73	6.31	9.66	7.1	14.42	4.32
10/1/76	274	3.06	2.75	8.01	1.61	3.44	5.32	1.68
10/8/76	281	1.61	3	16.02	2	2.6	6.7	4.93
10/15/76	288	2.14	2.6	2.37	2.14	5.52		
10/22/76	295	2.07	2.27	1.97	1.38	1.77	2.07	1.58
10/29/76	302	1.77	1.38	1.58	0.92	1.15	1.07	1.38
11/5/76	309	2.02	1.63	2.37	0.88	1.26	1.64	1.26

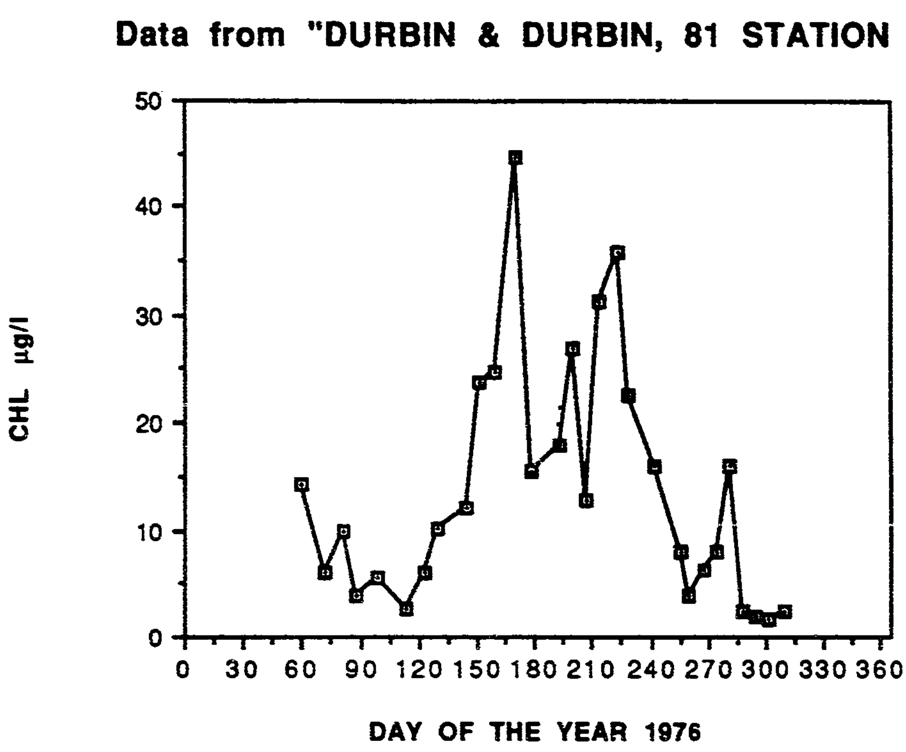
Data from "DURBIN & DURBIN, 81 STATION 1"



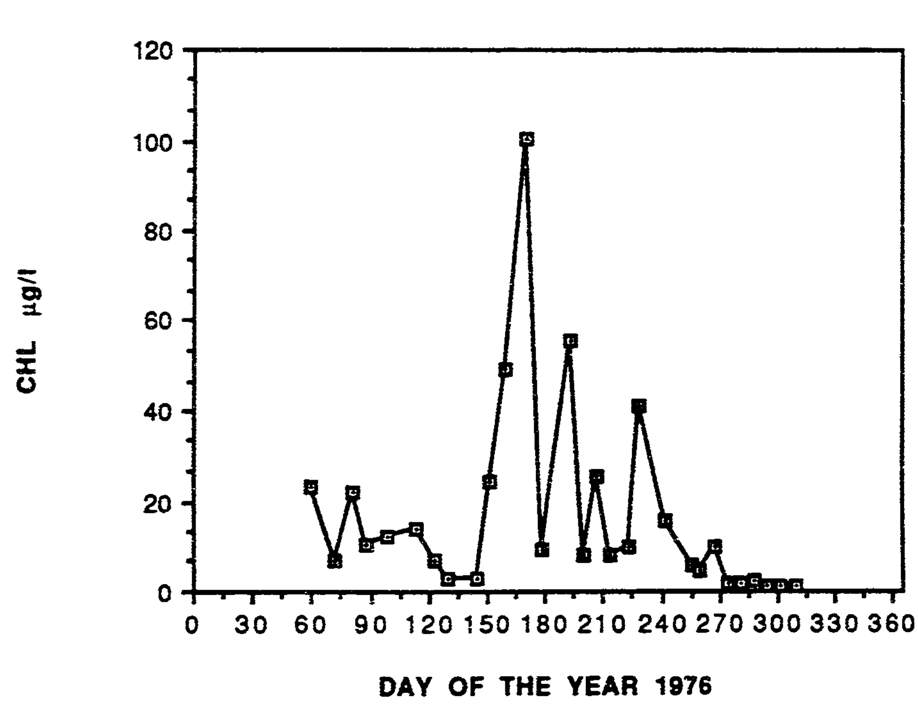
Data from "DURBIN & DURBIN, 81 STATION 2"



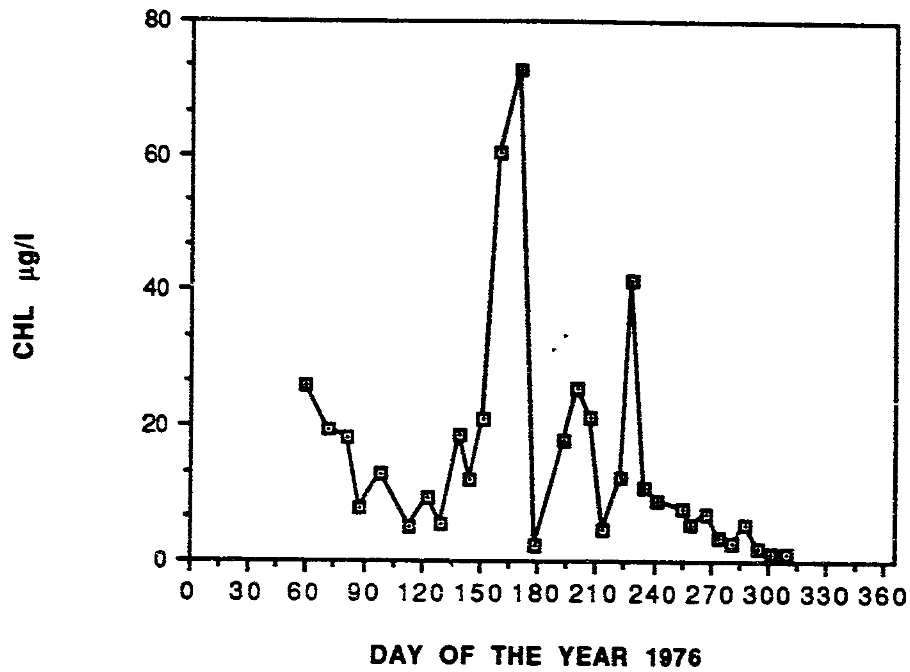
Data from "DURBIN & DURBIN, 81 STATION 3"



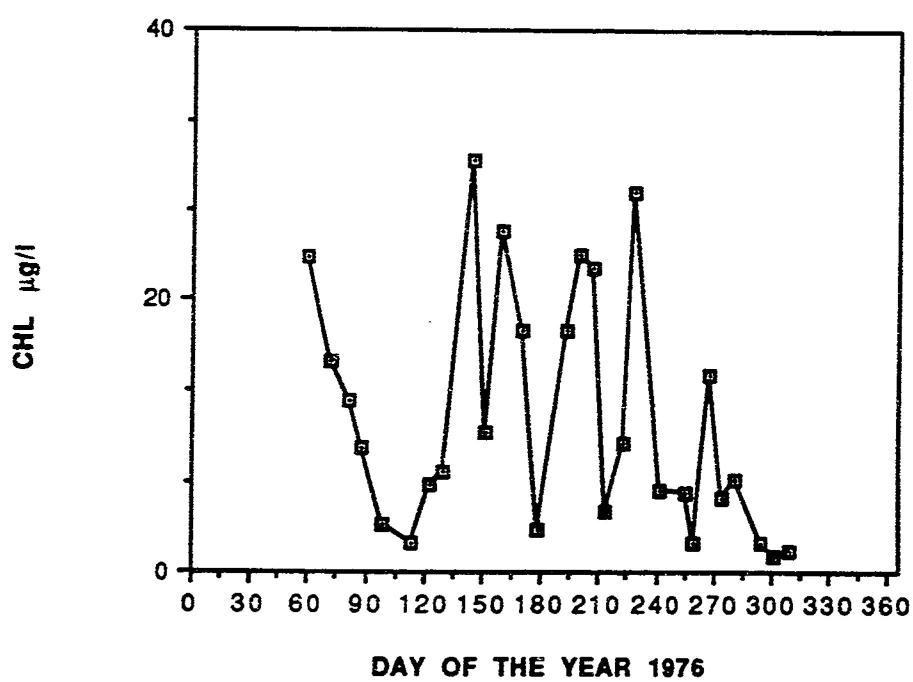
Data from "DURBIN & DURBIN, 81 STATION 4"



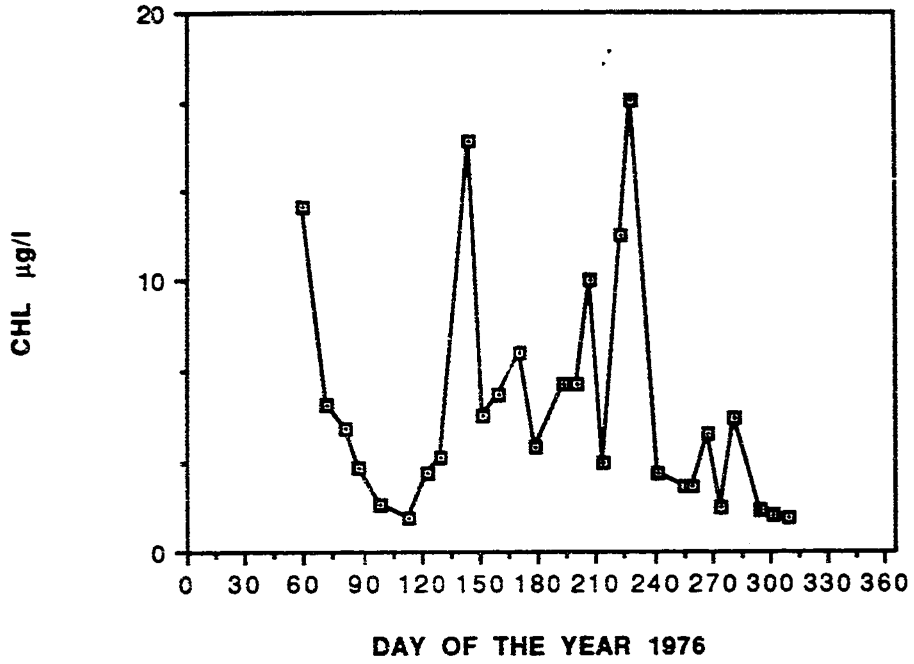
Data from "DURBIN & DURBIN, 81 STATION 5"



Data from "DURBIN & DURBIN, 81 STATION 6"



Data from "DURBIN & DURBIN, 81 STATION 7"

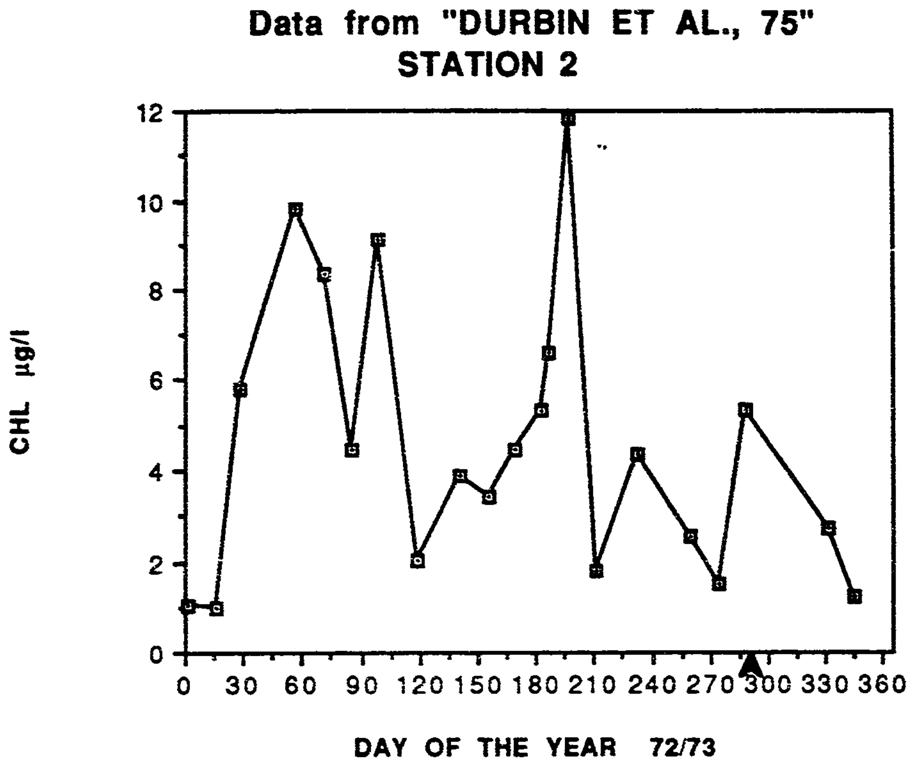


Durbin EG., Krawiec RW. and Smayda TJ., 1975, Seasonal studies on the relative importance of different size fractions of phytoplankton in Narragansett Bay, Marine Biology 32:271-287.

ORIGINAL STATION ID	LOCATION	MAP ID
Pratt St. 2	41 34'7" N 71 23'31" W	5

Original data in tabular form
UNITS: µg/l

DATE	DAY	ST 2
11/27/72	331	2.74
12/11/72	345	1.24
1/2/73	2	1.02
1/16/73	6	1.01
1/29/73	29	5.78
2/26/73	57	9.78
3/12/73	71	8.35
3/26/73	85	4.46
4/9/73	99	9.13
4/23/73	119	2.01
5/7/73	186	6.61
5/21/73	141	3.91
6/4/73	155	3.44
6/18/73	169	4.49
7/2/73	183	5.35
7/16/73	197	11.85
7/30/73	211	1.78
8/21/73	233	4.35
9/17/73	260	2.54
10/1/73	274	1.49
10/15/73	288	5.31



Data from "DURBIN ET AL., 75"
STATION 2
CHL µg/l
12
10
8
6
4
2
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 72/73

Farmer FH., Vargo GA., Brown CA. Jr. and Jarrett O., 1982, Spatial distributions of major phytoplankton community components in Narragansett Bay at the peak of the winter-spring bloom, J. Marine Research, 40:593-614.

UNITS:µg/l

16-Mar 78

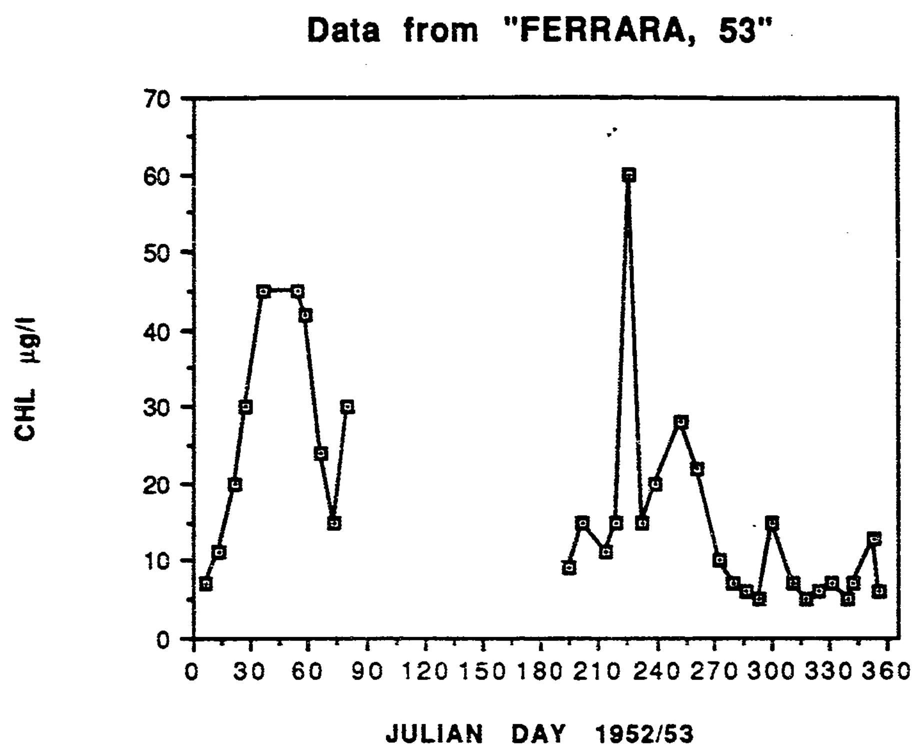
ST 1	2.7
ST 3	7.1
ST 5	8.4
ST 7	15.5
ST 9	22.2
ST 11	29.8
ST 13	43.8
ST 15	37
ST 17	31.5
ST 19	9.4
ST 21	24.6

Ferrara RN., 1953, Phytoplankton studies in upper Narragansett Bay, MS Thesis, URI, Kingston, Rhode Island, 62p.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	From pier in Greenwich Bay, 100 yards from SW tip of Warwick Neck	1

UNITS: µg/l

DATE	DAY	ST 1
7/14/52	195	9
7/21	202	15
8/1	213	11
8/7	219	15
8/14	226	60
8/21	233	15
8/27	239	20
9/10	253	28
9/18	261	22
9/30	273	10
10/7	280	7
10/14	287	6
10/21	294	5
10/27	300	15
11/7	311	7
11/14	318	5
11/21	325	6
11/27	331	7
12/5	339	5
12/8	342	7
12/19	353	13
12/21	355	6
1/7/53	7	7
1/14	14	11
1/21	21	20
1/27	27	30
2/5	36	45
2/23	54	45
2/27	58	42
3/7	66	24
3/14	73	15
3/21	80	30


Data from "FERRARA, 53"
70
60
50
40
30
20
10
0
CHL µg/l
0
30
60
90
120
150
180
210
240
270
300
330
360
JULIAN DAY 1952/53

Furnas, MJ., 1982, The dynamics of summer phytoplankton populations in Narragansett Bay, PhD Thesis, URI, Kingston, RI, 340p.

ORIGINAL
STATION ID
non specified

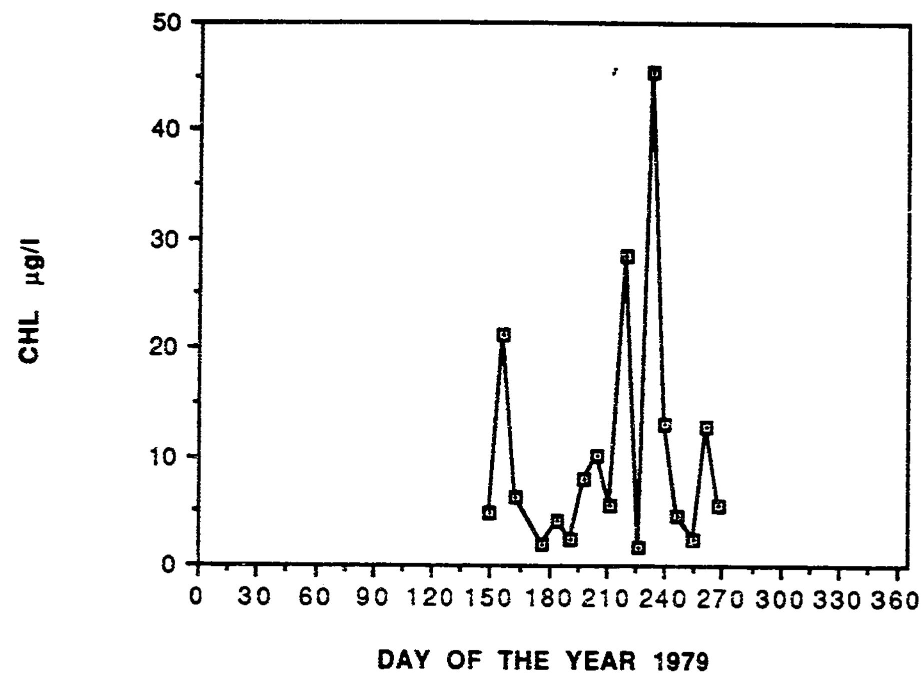
MAP ID

Original data in tabular
UNITS: µgC/l

LOCATION
41 34'7" N 71 23'31" (probably)

DATE	DAY	STATION
5/29/79	149	4.73
6/5	156	21.29
6/12	163	6.25
6/26	177	2.01
7/3	184	4.01
7/10	191	2.3
7/17	198	8.01
7/24	205	10.06
7/31	212	5.5
8/7	219	28.58
8/14	226	1.75
8/21	233	45.41
8/28	240	13.01
9/4	247	4.7
9/11	254	2.41
9/18	261	12.81
9/25	268	5.67

Data from "FURNAS, 82"



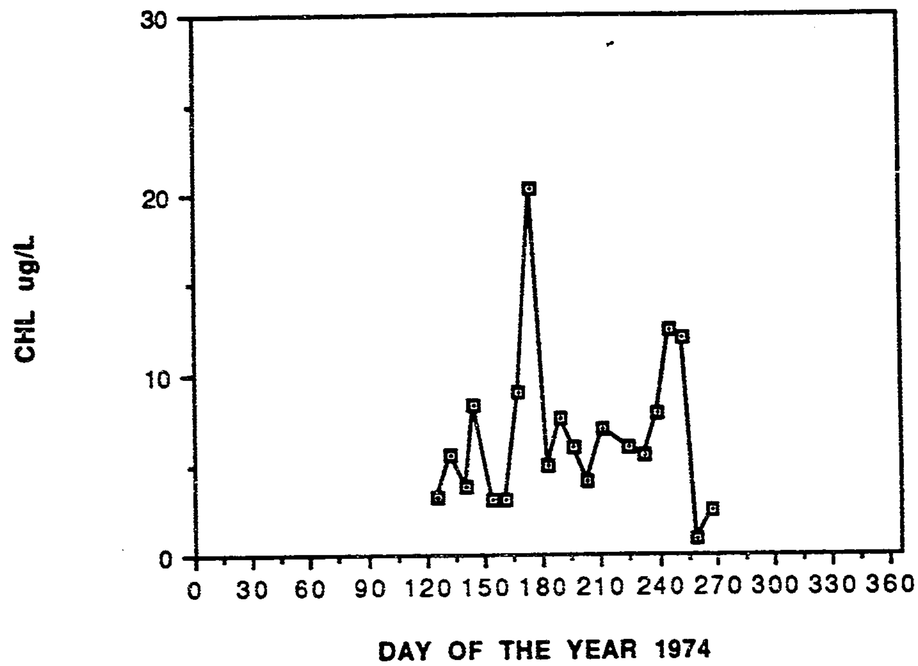
Furnas MJ., Hitchcock GL. and Smayda TJ, 1976, Nutrient-phytoplankton relationships in Narragansett Bay during the 1974 summer bloom, Estuarine Processes, Wiley M, Academic Press, New York, NY, 118-133.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 2	41 34'7" N 71 23'31" W	6

Data was digitized from graph in original paper, dates were given in paper
UNITS: µg/l

DATE	DAY	ST 2
5/6/74	126	3.2
5/13/74	133	5.5
5/20/74	140	3.8
5/28/74	145	8.2
6/3/74	154	3
6/10/74	161	3.1
6/17/74	168	9
6/24/74	175	20.3
7/1/74	182	5
7/8/74	189	7.5
7/15/74	196	6
7/22/74	203	4
7/30/74	211	7
8/13/74	225	6
8/20/74	232	5.5
8/27/74	239	7.8
9/3/74	246	12.4
9/10/74	253	12
9/17/74	260	0.8
9/24/74	267	2.4

Data from "FURNAS ET AL., 76"



Hargraves PE., 1981, Seasonal variations of tintinnids (Ciliophora: Oligotrichida) in Narragansett Bay, Rhode Island, USA., J. Plankton Research 3:81-92.

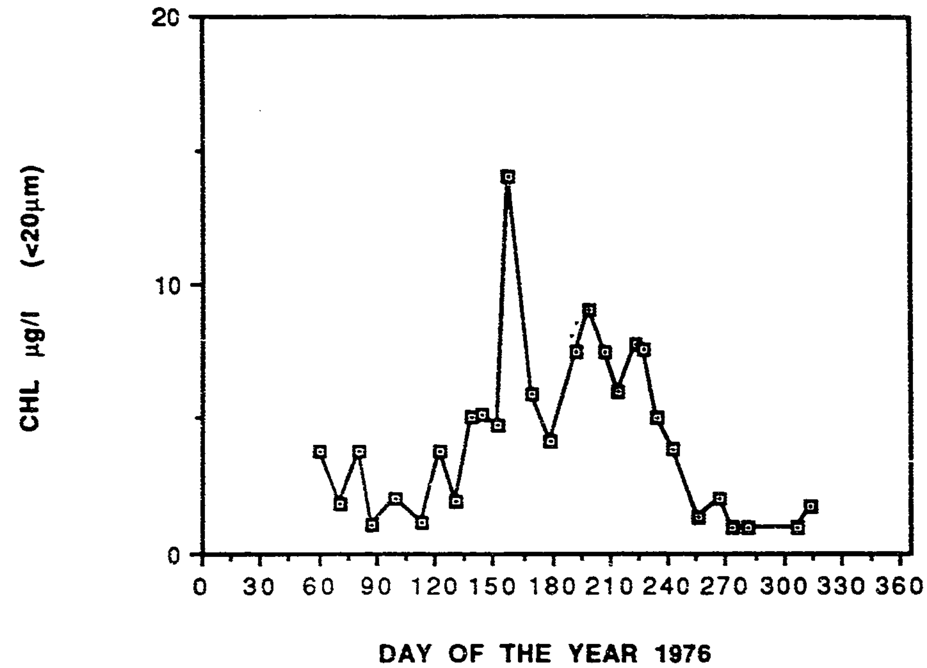
ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 34'7" N 71 23'31" W	11-A
Station 2	41 40.5' N 71 25.5' W	11-B
Station 4	41 44.5' N 71 23' W (est.)	11-C
Station 7	41 33' N 71 19.5' W (est.)	11-D

Data digitized from graph, sampling dates were given in paper, data points were taken rom inflection points.

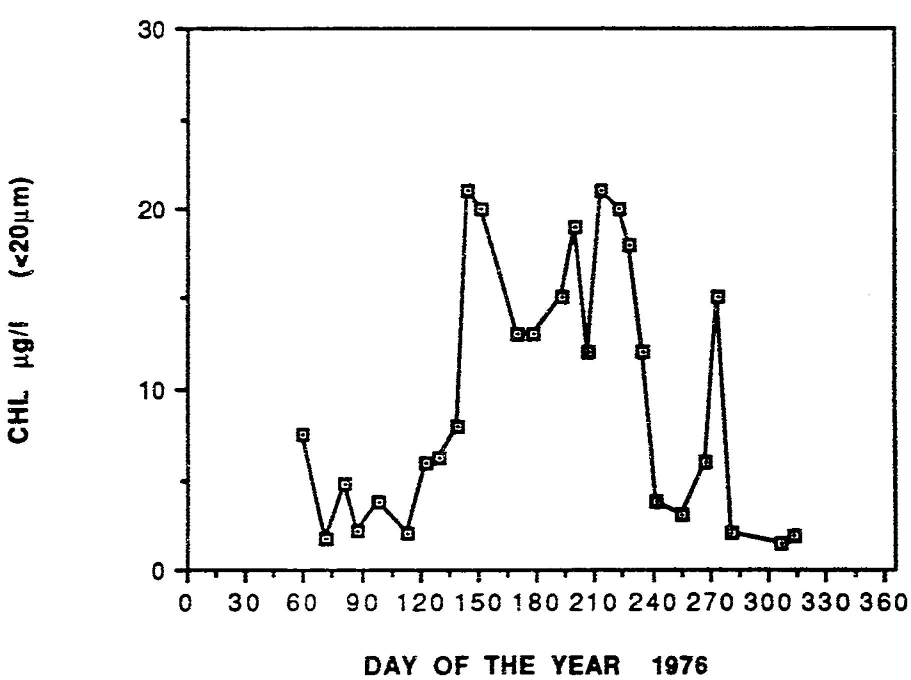
UNITS: µg/l (<20µm)

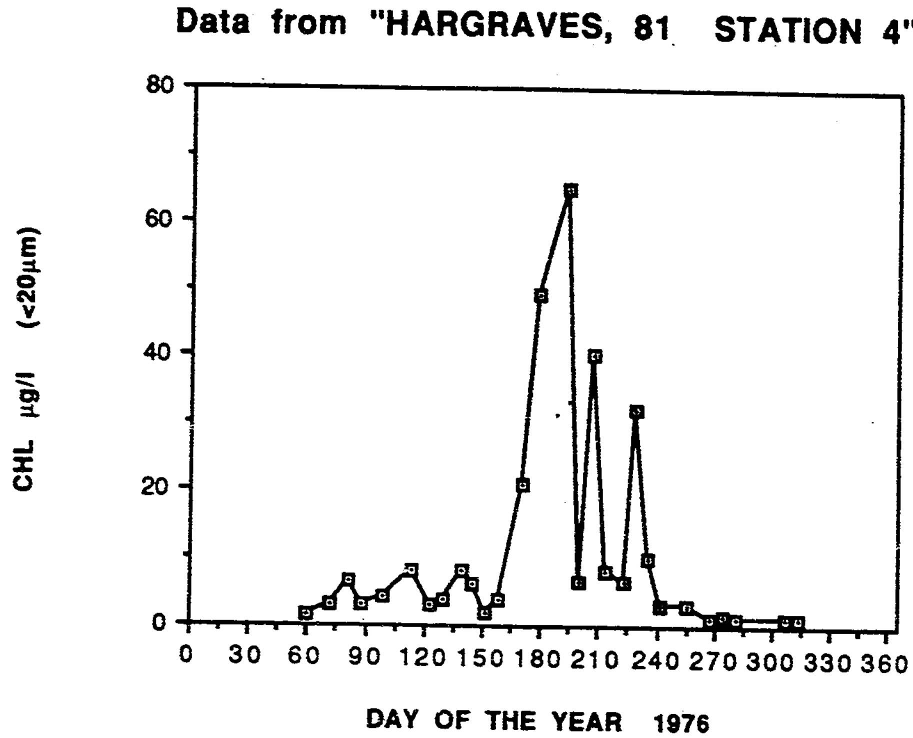
DATE	DAY	ST 1	ST 3	ST 4	ST 7
3/1/76	60	3.8		15	5.5
3/12	69	1.7	2.7	2.8	1.7
3/22	79	3.8	4.9	6.5	1.8
3/29	91	1.1	2.1	3	1.4
4/9	100	2	3.7	4	1
4/23	110	1.2	2.1	8.5	1
5/3	121	3.7	6	6.1	2.7
5/10	130	1.9	6.1	2	1.8
5/19	140	6	8	2.5	8
5/24	152	4.8	22	21	8
6/1	161	15	21	45	4.5
6/7	171	6.1		60	5.7
6/19	182	4.4	13	6.5	3
6/28	190	7	17	40	5.5
7/12	201	9	22	7	5.4
7/19	208	7	12	22	9.4
7/26	213	6	23	8	1.8
8/2	222	7	22	6	5.3
8/11	232	5.1	17	35	10.2
8/16	239	3	11	13	2.4
8/23	244	2.8	4	2.8	1.5
8/30	253	3.5	3.6	3	1.6
9/13	263	1.4	3.5	3.2	2
9/24	274	2	6	1	1
10/1	283	1	1.3	1.5	4
10/8	293	1	2	1.2	1
11/3	307	1.5	1.4	1	1
11/10	314	3.1			

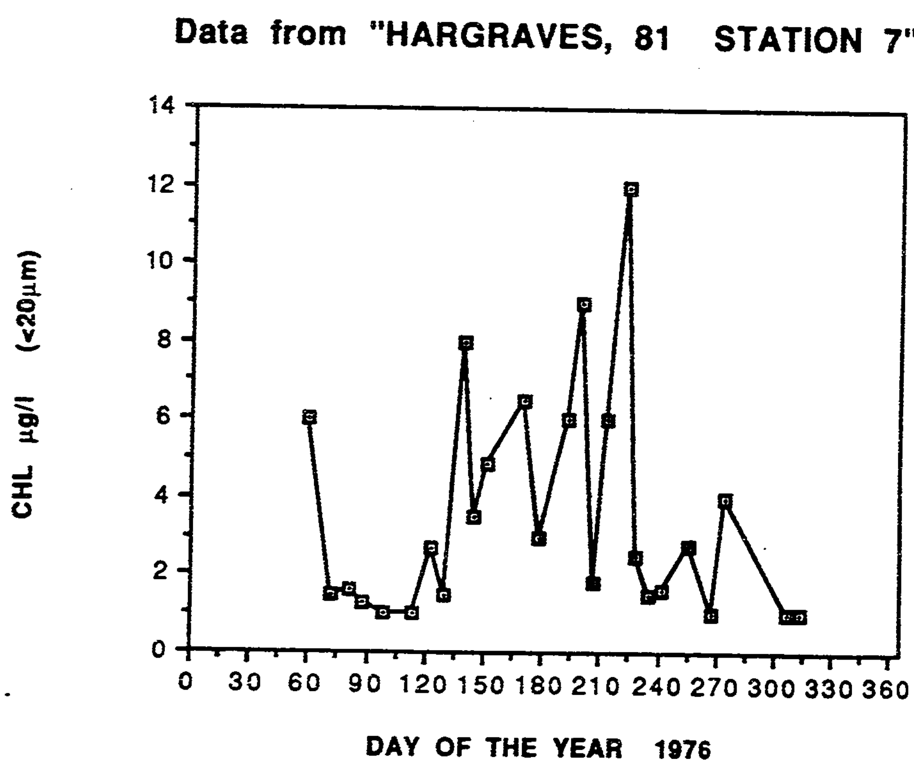
Data from "HARGRAVES, 81   STATION 1"



Data from "HARGRAVES, 81   STATION 3"




Data from "HARGRAVES, 81 STATION 4"
CHL µg/l (<20µm)
80
60
40
20
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 1976


Data from "HARGRAVES, 81 STATION 7"
CHL µg/l (<20µm)
14
12
10
8
6
4
2
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 1976

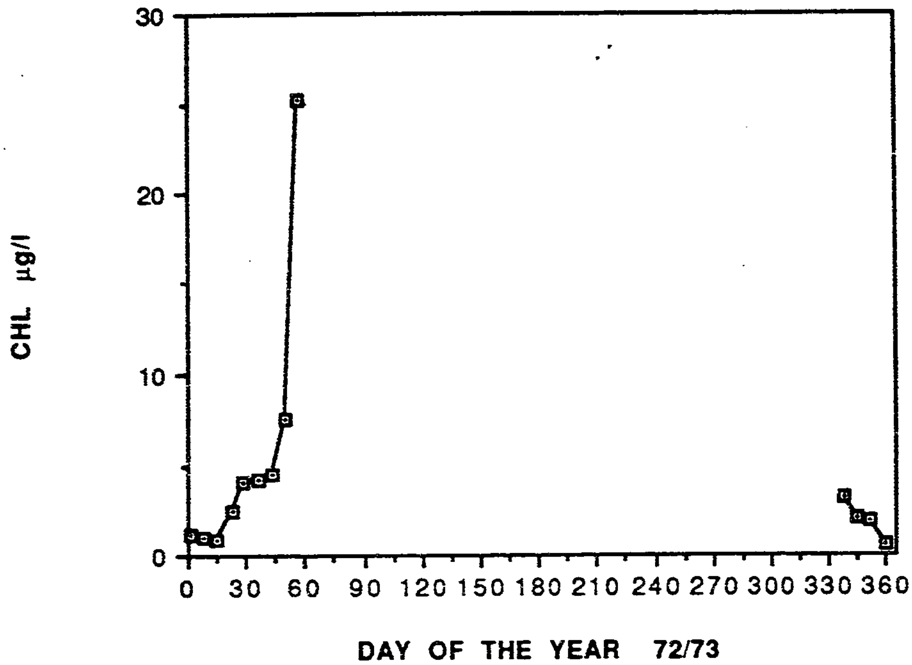
Hitchcock GL. and Smayda TJ., 1977, The importance of light in the initiation of the 1972-1973 winter-spring diatom bloom in Narragansett Bay, Limnology & Oceanography 22:126-1131.

ORIGINAL
STATION ID | MAP ID
Pratt St. 2 | 5

Original data was in ta LOCATION
UNITS: µg/l 41 34'7" N 71 23'31" W

DATE	DAY	ST 2
12/4/72	338	3.26
12/11	345	2
12/18	352	1.89
12/26	360	0.51
1/2/73	2	1.18
1/8	8	1.02
1/15	15	0.83
1/23	23	2.5
1/29	29	4.13
2/5	36	4.25
2/12	43	4.5
2/19	50	7.49
2/26	57	25.2

Data from "HITCHCOCK & SMAYDA, 77"



MERL DATA

Keller, A., personal communication, includes GSO Dock data used in Oviatt et al., 1980, Pilson et al., 1980.
Oviatt CA., Walker H. and Pilson ME., 1980, An exploratory analysis of microcosm and ecosystem behavior using multivariate techniques, Marine Ecology-Progress Series 2:179-191.
Pilson ME., Oviatt CA. and Nixon SW., 1980, Microcosms in ecological research, US Technical Information Center, JP Giesy,Washington, DC., 753-777.

ORIGINAL STATION ID	LOCATION	MAP ID
non specific	GSODOCK	8

Original data was in tabular form
UNITS: µg/l

DATE	JULIAN DAY	CHL	DATE	JULIAN DAY	CHL
76238	238	5.79	77004	4	22.22
76243	243	1.47	77011	11	25.12
76257	257	1.79	77031	31	24.04
76264	264	3.49	77045	45	24.27
76271	271	2.61	77052	52	15.64
76278	278	2.09	77059	59	5.79
76286	286	1.8	77066	66	7.26
76301	301	2.09	77073	73	16.3
76313	313	2.99	77080	80	4.97
76320	320	4.24	77087	87	9.54
76327	327	20.1	77094	94	4.97
76334	334	29.25	77101	101	2.77
76341	341	30.4	77108	108	1.99
76349	349	9.79	77115	115	8.84
76357	357	6.85	77124	124	2.36
76363	363	17.68	77136	136	2.36
			77145	145	5.14
			77152	152	3.51
			77157	157	7.42
			77164	164	5.79
			77180	180	6.69
			77187	187	10.11
			77192	192	12.02
			77199	199	6.77
			77206	206	21.3
			77213	213	2.53
			77221	221	4.81
			77227	227	3.43
			77234	234	4.2
			77241	241	5.96
			77250	250	8.16
			77255	255	2.61

DATE	JULIAN DAY	CHL	DATE	JULIAN DAY	CHL
78019	19	0.96	79003	9	2.6
78024	24	1.53	79009	16	1.76
78031	31	0.58	79016	23	2.15
78045	45	1.81	79023	30	1.62
78052	52	2.13	79030	37	1.42
78059	59	4.92	79037	44	1.23
78066	66	16.65	79044	50	1.37
78082	82	6.02	79050	58	1.3
78087	87	4.65	79058	65	3.06
78094	94	4.38	79065	72	3
78101	101	4.04	79072	79	12.18
78108	108	1.93	79079	86	14.36
78115	115	2.74	79086	93	3.4
78122	122	2.33	79093	100	1.96
78129	129	4.1	79100	107	2.22
78137	137	4.48	79107	115	2.29
78143	143	1.48	79115	120	1.17
78150	150	3.76	79120	127	7.42
78151	151	5.2	79127	135	1.23
78157	157	3.97	79135	143	1.74
78164	164	4.31	79143	152	8.32
78171	171	2.33	79152	155	1.87
78178	178	7.18	79155	163	2.77
78186	186	2.01	79163	169	0.7
78192	192	4.38	79169	176	4.05
78199	199	4.79	79176	180	3.97
78206	206	4.92	79180	183	0.66
78213	213	2.19	79183	197	1.72
78220	220	2.78	79197	221	5.24
78227	227	6.36	79221	224	0.65
78234	234	6.02	79224	226	0.97
78241	241	5.06	79226	227	0.33
78249	249	5.61	79227	228	0.52
78255	255	3.83	79228	232	0.71
78262	262	1.78	79232	235	5.77
78268	268	2.61	79235	239	1.42
78276	276	4.04	79239	253	1.12
78283	283	3.08	79253	260	0.93
78290	290	2.01	79260	267	4.35
78297	297	2.8	79267	274	0.74
78304	304	1.9	79274	282	1.03
78312	312	33.28	79282	288	0.49
78318	318	6.29	79288	295	0.79
78325	325	5.06	79295	309	0.87
78332	332	4.65	79309	317	5.69
78339	339	1.71	79317	323	1.75
78346	346	2.02	79323	330	0.41
78353	353	1.09	79330	337	0.74
78361	361	1.65	79337	344	0.88
			79344	351	1.09
			79351	360	1.2
			79360	365	1.41
			79365	1007	4.87

DATE	JULIAN DAY	CHL	DATE	JULIAN DAY	CHL
80007	7	19.47	81005	5	13.89
80014	14	8.24	81014	14	17.47
80021	21	6.89	81019	19	12.99
80028	28	6.07	81026	26	6.37
80035	35	4.42	81033	33	11.64
80042	42	2.55	81040	40	4.2
80056	56	1.69	81047	47	5.77
80063	63	1.63	81054	54	6.86
80070	70	0.55	81061	61	11.64
80077	77	2.4	81068	68	4.05
80084	84	9.07	81075	75	1.23
80098	98	1.12	81082	82	1.66
80105	105	2.62	81089	89	1.8
80112	112	1.83	81155	155	1.53
80119	119	1.22	81159	159	1.09
80126	126	2.31	81166	166	1.39
80133	133	3.22	81173	173	0.535
80140	140	0.98	81180	180	1.58
80148	148	0.74	81187	187	1.415
80154	154	0.92	81194	194	1.445
80161	161	1.41	81201	201	0.63
80168	168	2.35	81208	208	5.165
80175	175	1.86	81215	215	4.425
80182	182	1.34	81223	223	6.14
80190	190	7.57	81229	229	1.065
80196	196	2.18	81236	236	1.26
80203	203	7.49	81243	243	1.145
80210	210	1.64	81251	251	2.235
80217	217	2.21	81264	264	1.225
80225	225	3.52	81271	271	2.02
80231	231	2.95	81278	278	1.475
80238	238	1.99	81285	285	1.825
80246	246	1.5	81292	292	1.28
80252	252	1.83	81299	299	0.79
80259	259	1.39	81306	306	0.505
80266	266	4.27	81314	314	0.85
80273	273	1.88	81320	320	2.25
80280	280	2.05	81327	327	0.52
80294	294	1.17	81334	334	0.585
80301	301	1.19	81342	342	1.415
80315	315	0.56	81348	348	3.165
80322	322	1.01	81355	355	6.065
80329	329	1.17	81364	364	1.2
80336	336	1.2			
80343	343	2.51			
80350	350	2.32			
80358	358	2.43			
80365	365	34.04			

DATE	JULIAN DAY	CHL
82004	4	1.165
82011	11	1.5
82025	25	2.475
82032	32	2.325
82039	39	1.935
82046	46	2.07
82053	53	6.44
82060	60	8.39
82067	67	15.005
82074	74	1.745
82082	82	1.42
82089	89	1.145
82095	95	2.62
82102	102	4.2
82109	109	1.31
82116	116	1.475
82123	123	0.66
82131	131	1.47
82137	137	1.185
82144	144	1.36
82152	152	7.19
82158	158	9.63
82165	165	9.065
82173	173	1.745
82181	181	2.29
82188	188	2.615
82194	194	4.2
82200	200	1.8
82207	207	2.125
82215	215	2.85
82222	222	0.655
82229	229	3.3
82235	235	1.06
82242	242	1.47
82250	250	3.075
82257	257	4.945
82264	264	0.975
82270	270	12.665
82277	277	5.39
82285	285	0.98
82291	291	0.69
82298	298	1.115
82305	305	1.965
82312	312	0.605
82319	319	0.79
82326	326	1.475
82333	333	1.365
82340	340	2.345
82347	347	7.49
82354	354	7.715
82361	361	0.82

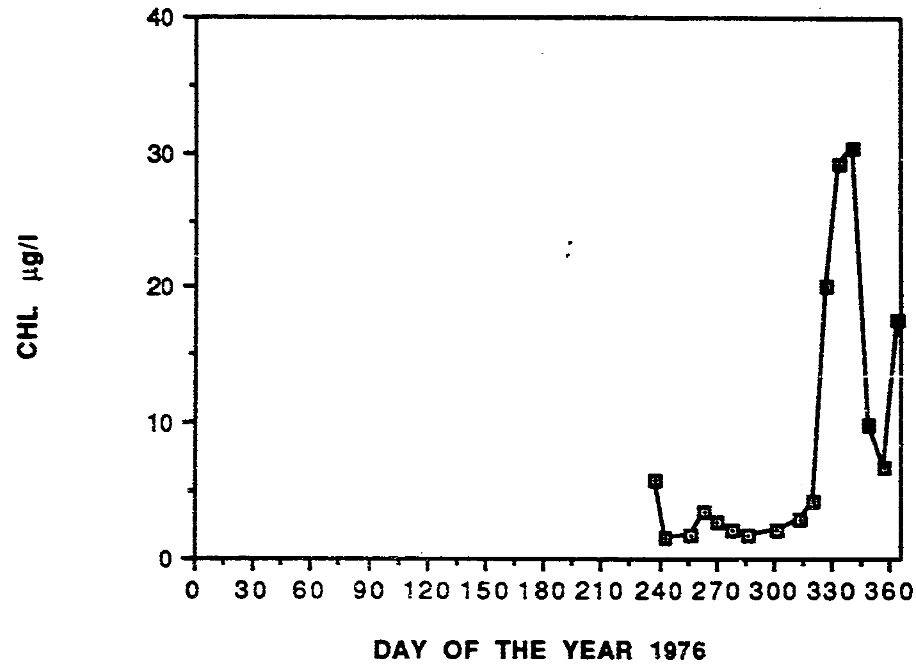
DATE	JULIAN DAY	CHL
83004	4	1.555
83010	10	10.64
83017	17	2.29
83024	24	1.965
83031	31	1.225
83040	40	1.31
83045	45	0.76
83052	52	1.17
83059	59	1.58
83066	66	6.815
83073	73	1.88
83080	80	1.61
83087	87	1.585
83094	94	4.945
83101	101	7.995
83109	109	5.99
83115	115	4.575
83122	122	1.88
83129	129	1.09
83136	136	1.165
83151	151	0.53
83157	157	4.275
83164	164	0.9
83171	171	2.295
83178	178	1.36
83186	186	10.565
83192	192	2.155
83199	199	4.96
83206	206	2.6
83213	213	2.7
83221	221	1.23
83227	227	1.965
83234	234	10.975
83241	241	1.175
83249	249	1.26
83255	255	1.885
83262	262	0.545
83269	269	1.31

DATE	JULIAN DAY	CHL	DATE	JULIAN DAY	CHL
84016	16	0.68	85008	8	0.935
84023	23	0.84	85015	15	2.31
84030	30	2.015	85022	22	1.635
84037	37	2.125	85029	29	10.45
84044	44	12.435	85036	36	17.69
84051	51	3.84	85043	43	9.365
84058	58	9.945	85050	50	1.39
84065	65	1.155	85057	57	0.68
84072	72	3.955	85064	64	2.38
84079	79	11.65	85070	70	1.53
84086	86	4	85078	78	1.53
84093	93	3.245	85085	85	3.175
84100	100	9.02	85092	92	2.76
84107	107	5.94	85099	99	0.815
84114	114	2.08	85106	106	0.6
84121	121	1.16	85113	113	1.68
84129	129	2.56	85120	120	2.885
84136	136	2.205	85128	128	2.275
84143	143	4.035	85135	135	2.35
84150	150	3.49	85141	141	0.675
84158	158	8.76	85148	148	2.265
84164	164	3.91	85155	155	3
84171	171	4.8	85162	162	8.03
84178	178	5.98	85169	169	8.99
84185	185	3.95	85176	176	12.625
84192	192	8.92	85183	183	29.66
84199	199	2.43	85190	190	23.41
84206	206	3.275	85197	197	19.09
84213	213	0.81	85204	204	22.9
84220	220	5.58	85211	211	6.77
84234	234	6.52	85218	218	6.22
84241	241	0.83	85225	225	11.38
84249	249	3.5	85232	232	7.57
84255	255	2.755	85239	239	4.525
84262	262	3.255	85246	246	6.545
84268	268	1.55	85253	253	2.54
84276	276	1.88	85267	267	4.02
84282	282	0.855	85281	281	17.44
84290	290	2.955	85288	288	2.885
84297	297	1.565	85295	295	7.7
84304	304	0.775	85302	302	2.65
84310	310	0.835	85309	309	9.47
84318	318	0.59	85316	316	6.595
84324	324	0.51	85323	323	1.345
84332	332	1.07	85330	330	1.3
84339	339	4.705	85337	337	0.68
84346	346	1.97	85344	344	0.625
84353	353	1.315	85351	351	0.68
84359	359	0.63	85357	357	2.465
84366	366	1.8	85365	365	3.53

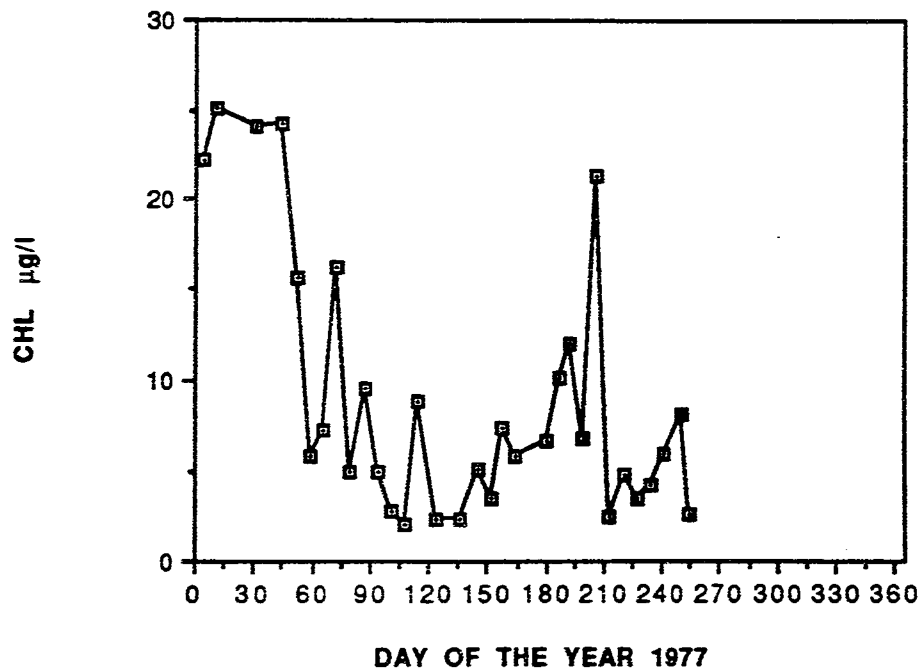
DATE	JULIAN DAY	CHL
86007	7	10.555
86014	14	15.745
86021	21	14.26
86028	28	28.73
86035	35	2.745
86042	42	9.355
86049	49	5.19
86056	56	9.15
86063	63	1.915
86077	77	7.385
86083	83	3.545
86091	91	1.65
86098	98	1.905
86105	105	1.99
86112	112	2.57
86119	119	2.24
86126	126	1.395
86133	133	3.675
86140	140	3.6
86147	147	2.68
86154	154	1.9
86161	161	5.65
86170	170	8.535
86176	176	2.465
86182	182	6.31
86191	191	5.25
86196	196	1.175
86203	203	1.345
86210	210	3.28
86217	217	8.25
86224	224	3.19
86231	231	2.15
86238	238	1.565
86245	245	2.775
86252	252	4.69
86259	259	1.96
86273	273	2.285
86280	280	0.71
86287	287	1.49
86294	294	1.8
86301	301	1.565
86308	308	0.79
86316	316	0.59
86322	322	0.87
86330	330	1.74
86337	337	2.925
86345	345	1.35
86351	351	0.84
86358	358	0.695
86364	364	2.04

DATE	JULIAN DAY	CHL
87006	6	1.325
87013	13	1.83
87020	20	2.8
87027	27	2.895
87035	35	3.735
87041	41	7.97
87055	55	8.42
87062	62	1.35
87069	69	6.785
87075	75	10.86
87083	83	3.025
87090	90	2.96
87098	98	18.835
87110	110	17.3
87119	119	8.545
87125	125	14.87
87131	131	0.615
87139	139	1.26
87146	146	2.26
87154	154	1.895
87160	160	1.89
87167	167	1.58
87174	174	2.515
87181	181	1.825
87188	188	2.845
87195	195	0.755
87202	202	1.575
87210	210	2.585
87216	216	1.335
87223	223	0.925
87230	230	1.26
87237	237	1.25
87244	244	0.745
87253	253	1.3
87258	258	3.125
87265	265	1.274
87272	272	1.2373
87279	279	1.7682
87286	286	3.43
87293	293	2.0518
87300	300	2.7069
87307	307	6.9688
87314	314	3.6736
87321	321	2.9566
87328	328	1.9806
87335	335	11.5414
87342	342	9.0073

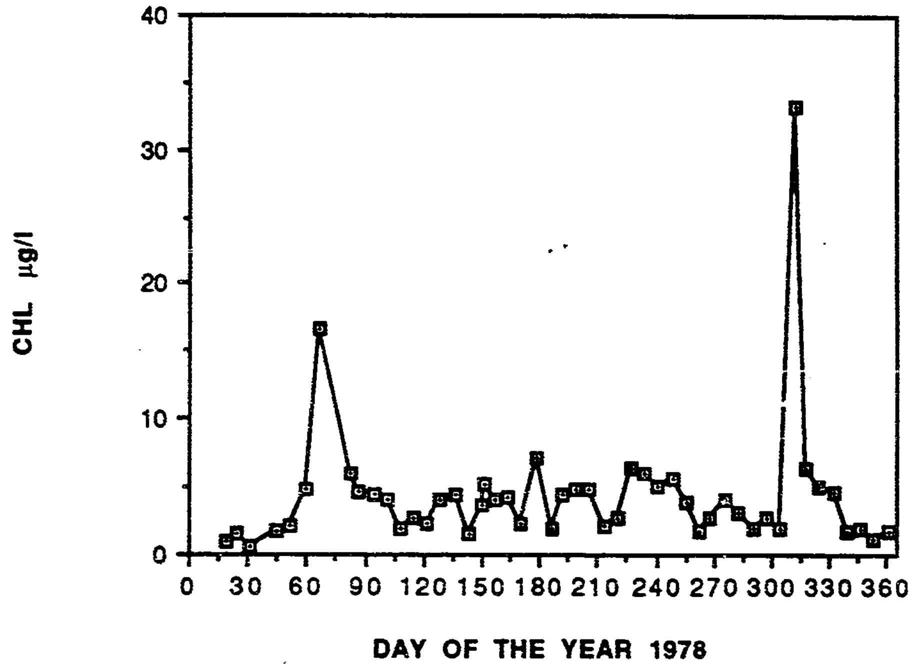
Data from "MERL 1976"



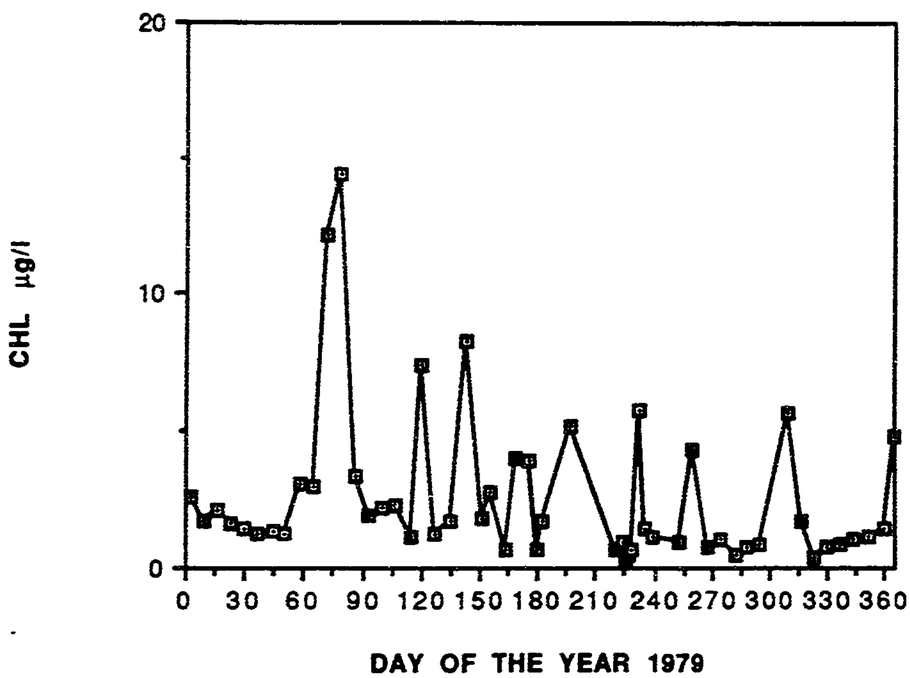
Data from "MERL 1977"

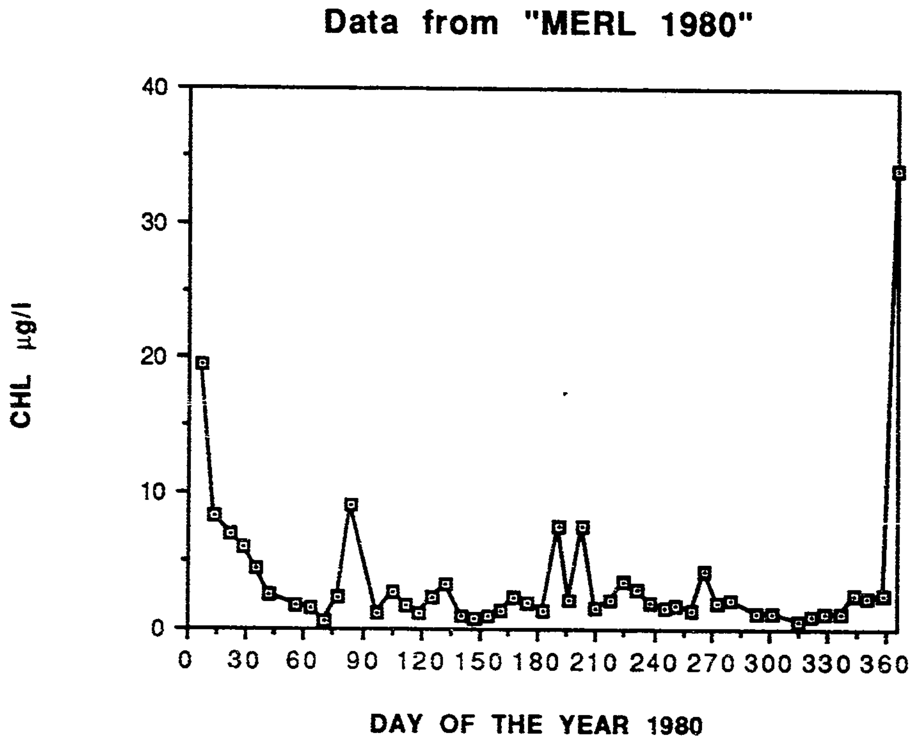


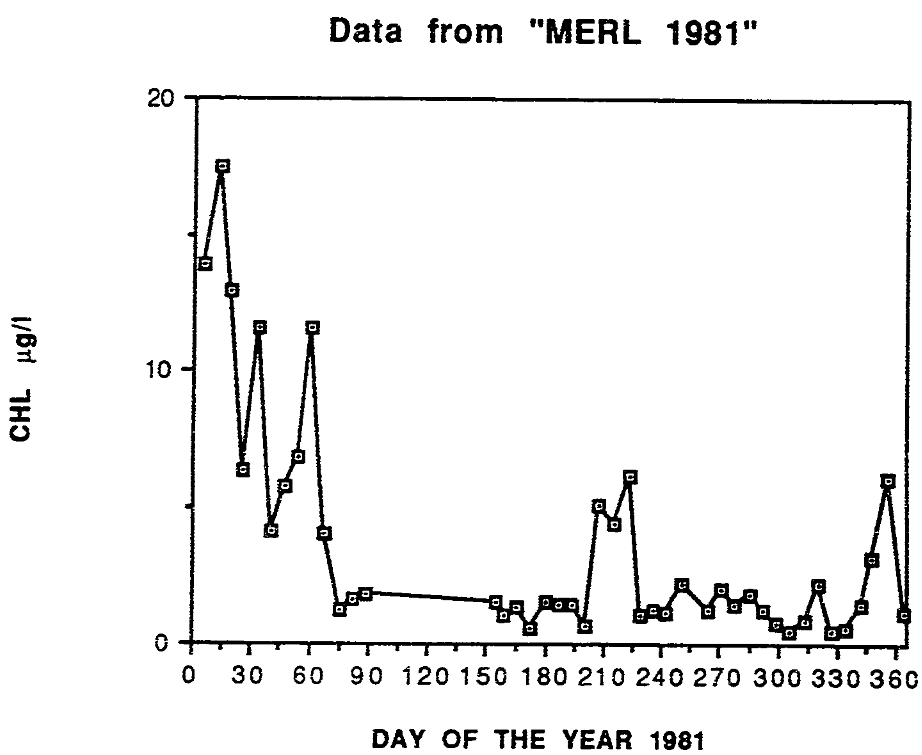
Data from "MERL 1978"



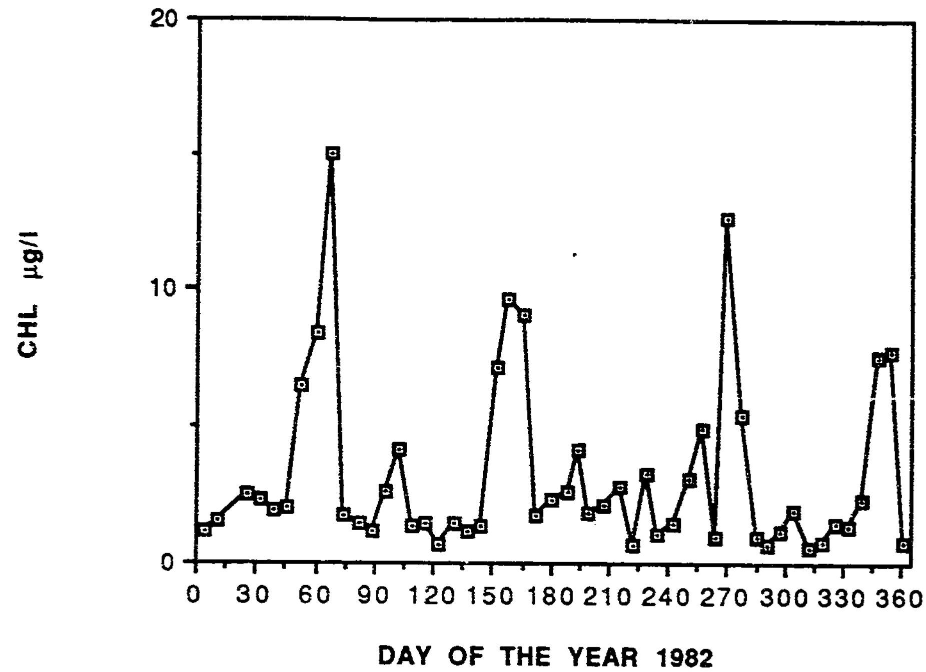
Data from "MERL 1979"




Data from "MERL 1980"
40
30
20
10
0
CHL µg/l
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 1980


Data from "MERL 1981"
20
10
0
CHL µg/l
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 1981

Data from "MERL 1982"



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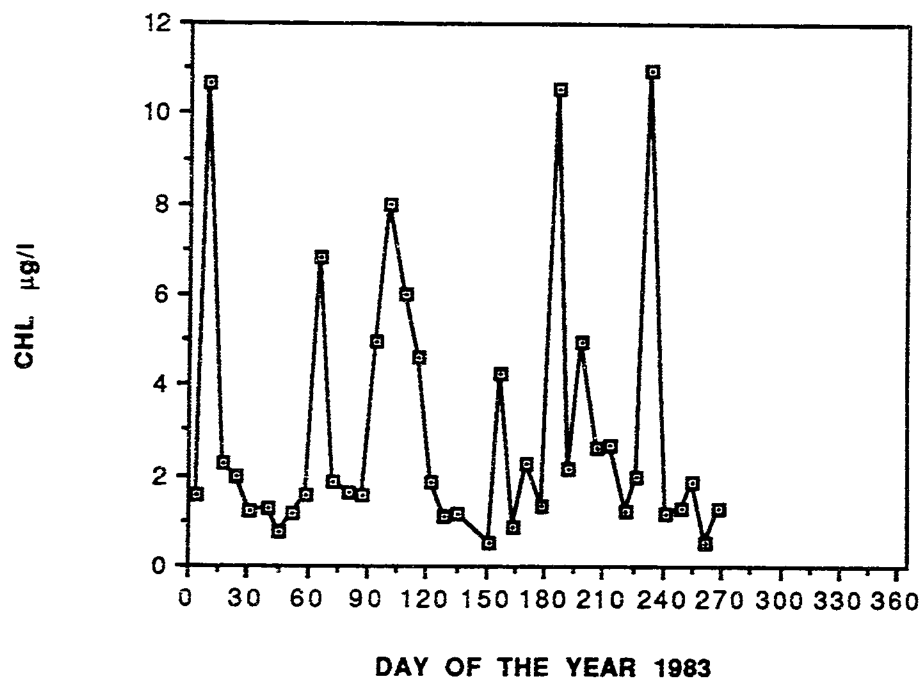
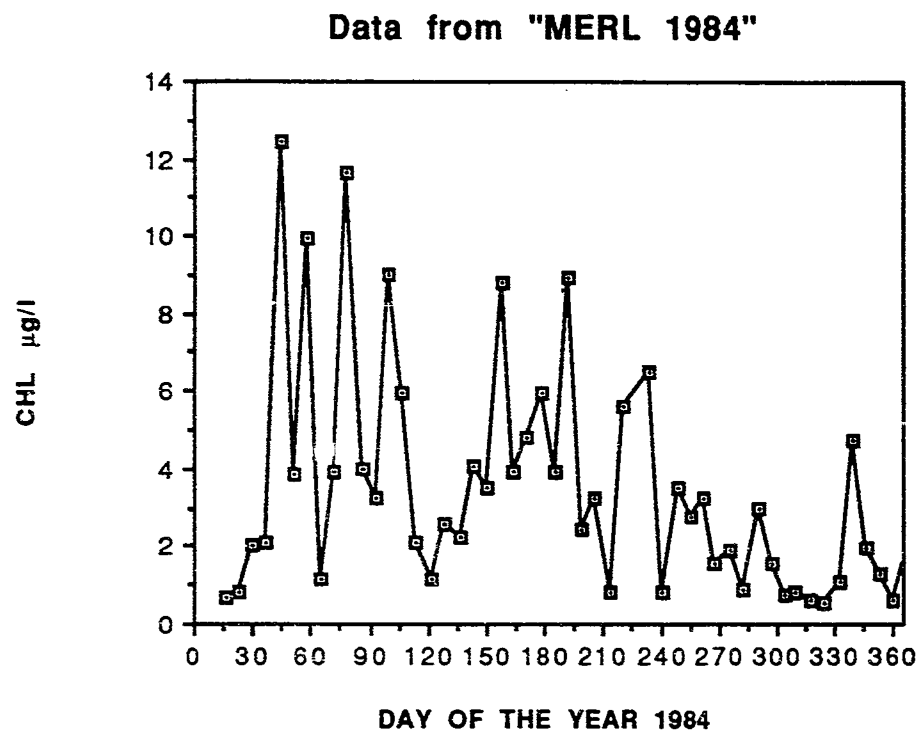
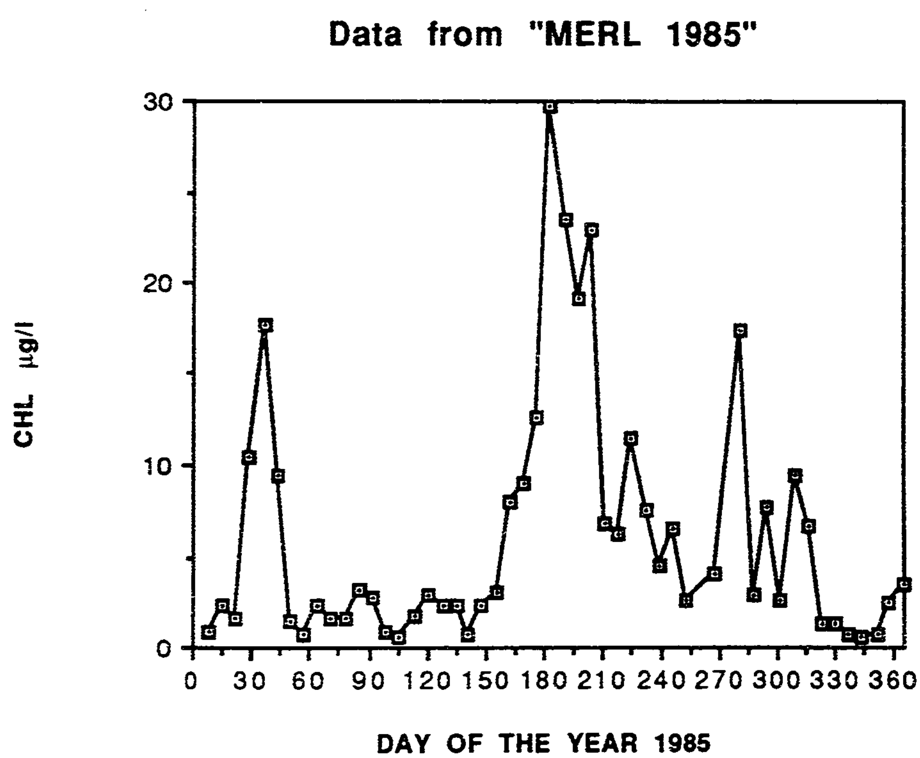
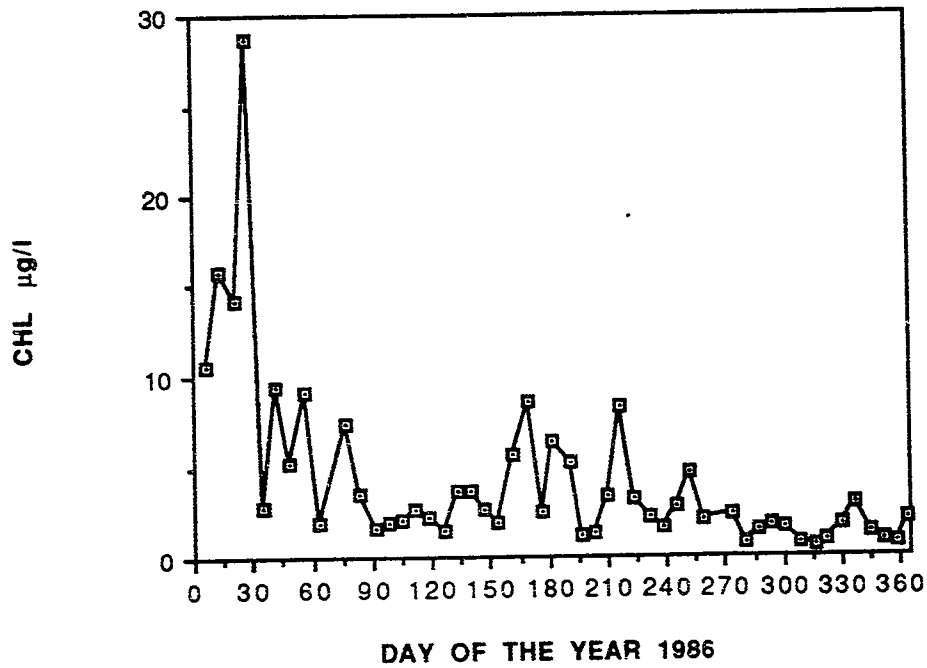



Data from "MERL 1984"
CHL µg/l
14
12
10
8
6
4
2
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 1984


Data from "MERL 1985"
CHL µg/l
30
20
10
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 1985

Data from "MERL 1986"



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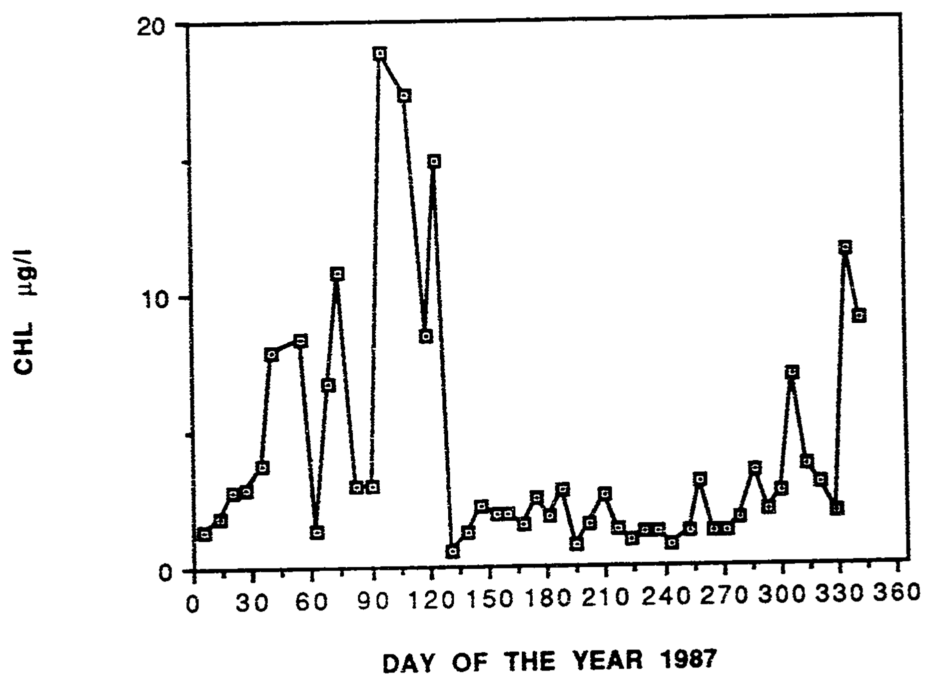


Kremer JN, and Nixon SW, 1978, A coastal marine ecosystem, similation and analysis. Springer-Verlag, New York, NY, 217p. (tabluar data provided by Nixon).

ORIGINAL SAMPLE ID	LOCATION	MAP ID
Station 3	41 45.4' N 71 22.5' W (est.)	6-A
Station 4	41 44' N 71 22' W (est.)	6-B
Station 5	41 42' N 71 19.6' W (est.)	6-C
Station 6	41 39.4' N 71 23' W (est.)	6-D
Station 7	41 37.4' N 71 22' W	6-E
Station 8	41 34.5' N 71 24' W (est.)	6-F
Station 9	41 30.9' N 71 24.4' W (est.)	6-G
Station 10	41 27' N 71 24.8' W (est.)	6-H
Station 11	41 38.4' N 71 18.7' W (est.)	6-I
Station 12	41 38.2' N 71 16' W (est.)	6-J
Station 13	41 34.3' N 71 19' W (est.)	6-K
Station 14	41 29.6' N 71 20.1' W (est.)	6-L
Station 15	41 27' N 71 22.4' W (est.)	6-M

UNITS:µg/l

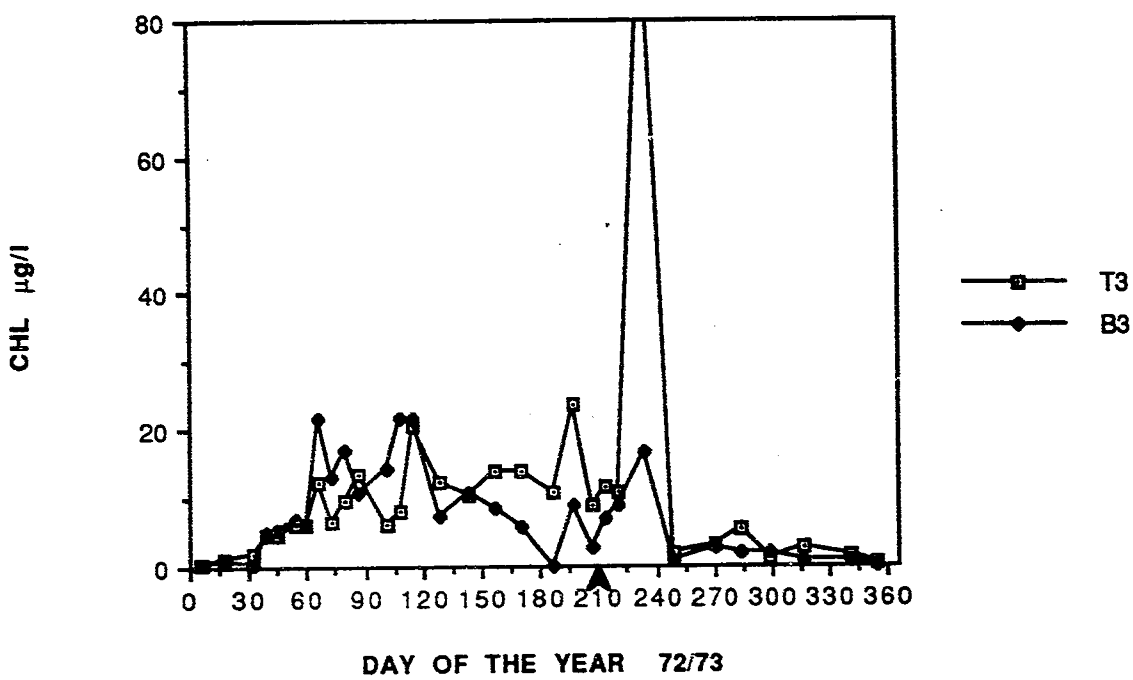
DAY	YEAR	DATE	CHLT3	CHLT4	CHLT5	CHLT6	CHLB3	CHLB4	CHLB5	CHLB6
207	72	07-26	8.863	73.907	61.349	30.92	2.745	9.2172	7.8326	8.6215
220	72	08-08	11.005	11.747	12.688	11.451	9.0745	11.629	11.203	11.847
234	72	08-22	94.4	45.19	31.5	17.81	16.589	59.99	27.06	10.04
249	72	09-06	1.789	9.485	9.855	8.19	0.716	1.9	2.196	5.119
270	72	09-27	2.9067	7.585	9.2494	8.1014	2.8493	5.0879	11.144	7.1543
284	72	10-11	5.4025	5.295	7.359	5.725	1.7475	5.209	6.7785	0
299	72	10-26	1.124	3.747	2.371	2.242	1.941	3.575	2.715	1.726
317	72	11-13	2.7795	2.586	4.3275	3.661	0.78	1.21	2.199	1.0165
341	72	12-07	1.554	1.102	0.995	0.995	0.6725	0.909	0.8875	0.6725
354	72	12-20	0.4145	0.414	0.522	1.3175	0	0.3285	0.1135	0.1995
5	73	01-05	0.565	1.511	1.7045	5.424	0.522	0.135	0	1.0165
18	73	01-18	1.1455	4.908	4.3705	5.08	0.78	1.4465	5.4455	2.457
32	73	02-01	1.7475	1.962	0.8875	3.36	0.565	2.285	2.285	3.8975
39	73	02-08	4.61	4.923	5.092	5.9355	5.092	6.0078	5.574	7.5743
45	73	02-14	4.5618	4.369	4.369	7.743	5.333	5.8632	5.2848	6.8513
54	73	02-23	6.0072	6.943	9.6792	15.828	7.116	6.684	10.039	15.396
59	73	02-28	6.3471	6.528	13.127	18.359	6.155	5.9629	12.178	18.495
66	73	03-07	12.37	18.777	27.817	28.19	21.783	24.043	22.732	29.32
73	73	03-14	6.465	30.63	24.956	24.061	13.178	21.823	15.111	14.52
80	73	03-21	9.7472	11.65	18.977	16.393	17.103	13.07	14.007	18.977
87	73	03-28	13.588	12.044	14.961	17.306	10.642	13.445	10.871	12.73
101	73	04-11	6.06	14.54	23.285	18.515	14.275	14.275	23.02	17.455
108	73	04-18	8.205	36.885	17.287	13.463	21.589	23.262	11.91	15.375
115	73	04-25	20.295	26.655	23.608	17.38	21.753	18.97	14.465	13.67
129	73	05-09	12.286	19.048	13.07	14.54	7.288	18.46	12.874	13.266
143	73	05-23	10.588	26.609	15.076	16.3	10.86	15.96	12.832	13.104
157	73	06-06	13.798	44.435	83.673	57.873	8.315	16.378	7.455	9.605
171	73	06-20	13.983	54.21	25.644	85.26	5.703	10.74	8.325	9.912
186	73	07-05	10.97	17.99	75.58	21.37	0	7.72	0.57	5.77
198	73	07-17	23.567	79.797	58.913	94.013	8.8253	15.143	13.494	16.196
213	73	08-01	11.452	18.206	0	16.055	7.0303	9.6433	7.2313	8.8996

DAY	YEAR	DATE	CHLT7	CHLT8	CHLT9	CHLT10	CHLB7	CHLB8	CHLB9	CHLB10
207	72	07-26	15.206	35.058	14.901	14.659	14.401	5.3693	11.503	4.9024
220	72	08-08	14.074	14.767	15.222	12.876	12.292	11.253	14.678	8.2825
234	72	08-22	7.82	17.81	3.75	7.08	8.93	5.97	5.23	5.6
249	72	09-06	12.667	70.35	8.745	8.375	7.08	5.933	5.785	2.566
270	72	09-27	7.757	8.4458	3.5381	7.2404	7.183	9.766	2.3327	0.008
284	72	10-11	5.94	7.574	4.3275	4.65	4.2415	4.392	2.0485	1.64
299	72	10-26	2.027	2.113	1.21	1.468	1.296	1.425	0.909	1.468
317	72	11-13	4.0695	2.9085	3.1665	2.6075	1.21	1.468	1.382	0.651
341	72	12-07	1.0165	1.1025	0.565	0.8875	1.1025	0.565	0.565	0
354	72	12-20	0.608	0.1995	0.4145	0.565	0	0	0.4145	0.35
5	73	01-05	2.4785	1.382	0.737	0.6725	2.242	0	0.393	0.092
18	73	01-18	3.403	2.242	1.7475	0.135	3.79	2.1775	1.167	0.522
32	73	02-01	2.5645	4.65	3.188	2.285	3.8975	2.3925	2.5	0.995
39	73	02-08	7.5743	7.261	7.6225	4.851	7.743	5.574	7.9358	7.02
45	73	02-14	6.2488	8.1045	8.2732	5.7668	7.1405	6.297	6.4175	4.0075
54	73	02-23	15.684	16.332	17.844	13.092	15.54	7.3464	13.452	6.0072
59	73	02-28	22.167	23.478	19.15	21.41	17.828	23.478	7.85	20.088
66	73	03-07	27.715	25.173	14.63	10.483	26.687	21.037	13.873	8.98
73	73	03-14	12.73	19.138	7.36	5.8743	12.587	6.3218	7.8075	6.7693
80	73	03-21	16.137	12.587	5.26	3.6128	20.397	18.267	2.9028	3.6412
87	73	03-28	18.593	13.016	19.165	10.385	17.163	13.188	16.019	13.159
101	73	04-11	18.25	10.3	5.265	4.894	18.515	10.3	7.65	3.41
108	73	04-18	24.935	0	0	0	9.7585	0	0	0
115	73	04-25	13.14	6.515	6.515	6.6475	12.875	9.5625	6.515	4.766
129	73	05-09	9.052	8.464	5.916	4.642	9.15	8.072	7.68	4.446
143	73	05-23	17.116	14.6	10.112	9.976	12.628	10.52	9.976	9.16
157	73	06-06	18.205	14.443	5.6275	4.445	7.455	5.95	4.23	3.585
171	73	06-20	12.81	11.361	5.91	6.048	6.531	6.6	7.635	4.875
186	73	07-05	41.13	80.13	2	0	0	0	0	0
198	73	07-17	55.228	72.953	33.044	20.057	14.792	9.071	20.83	7.4213
213	73	08-01	16.055	30.789	12.055	5.2213	15.573	6.0253	10.869	4.6183

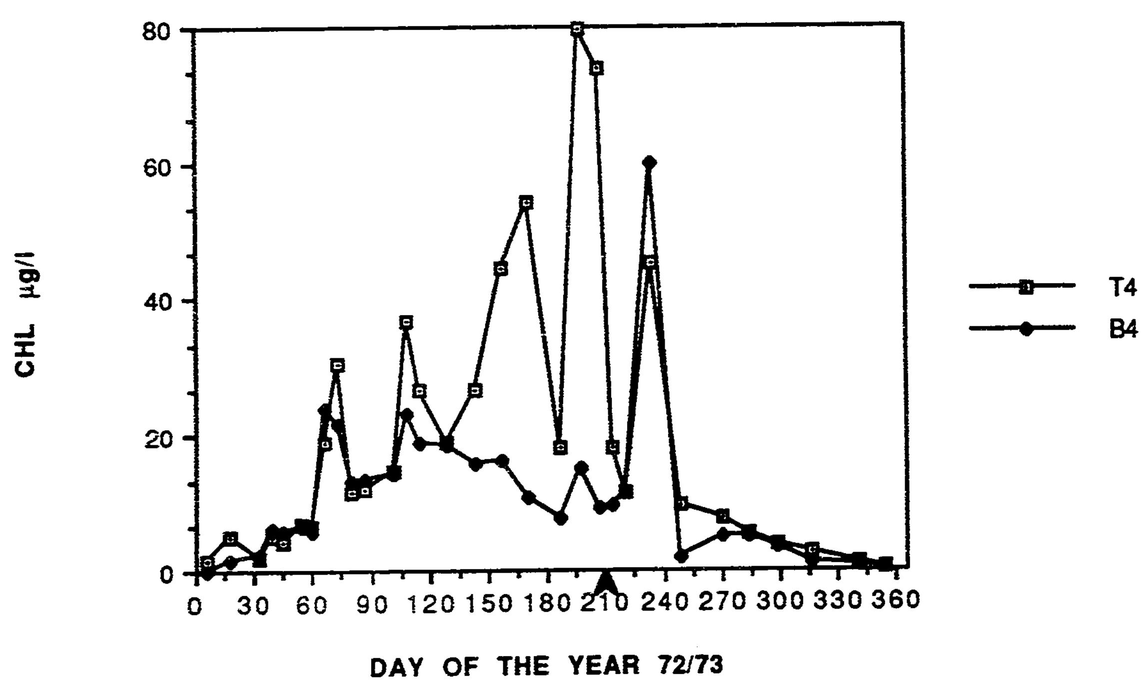
DAY	YEAR	DATE	CHLT11	CHLT12	CHLT13	CHLT14	CHLT15	CHLB11	CHLB12	CHLB13
207	72	07-26	6.3836	16.205	25.124	44.122	29.31	4.6609	5.965	6.3031
220	72	08-08	7.8865	10.619	14.47	19.786	19.717	7.54	7.54	10.302
234	72	08-22	5.97	11.15	13.37	22.62	15.59	4.49	9.67	10.78
249	72	09-06	1.974	4.934	13.555	28.355	12.408	0.494	3.306	6.488
270	72	09-27	3.9112	2.9354	4.7148	6.9821	6.0924	1.0412	1.3856	5.174
284	72	10-11	2.242	2.414	6.241	5.338	5.811	0.78	3.446	5.166
299	72	10-26	1.9625	1.683	1.855	2.973	0	1.081	2.156	1.425
317	72	11-13	1.3175	2.07	2.3925	2.8225	3.0375	0.565	0.3715	0.4575
341	72	12-07	0.3715	0.135	0.4575	0.6725	0.8875	0.0275	0.0275	0.2425
354	72	12-20	0.2425	0.1565	0.436	0.7155	0.9305	0	0.0275	0.694
5	73	01-05	0	0	0.7155	0.2855	0.952	0.092	0.0275	0
18	73	01-18	0.307	0.479	1.0165	1.9195	2.07	0.092	0	0.7155
32	73	02-01	0.78	0.8875	1.7905	1.124	1.3175	0.2425	0.4145	1.425
39	73	02-08	4.7305	4.3208	4.9233	5.5258	5.4053	4.128	4.0798	4.369
45	73	02-14	3.7665	4.6582	4.4895	4.851	5.0438	3.405	4.0075	4.61
54	73	02-23	5.028	7.116	9.492	9.492	7.836	5.244	4.5672	7.476
59	73	02-28	4.8329	7.85	14.065	15.195	11.432	4.8329	7.85	7.85
66	73	03-07	7.85	8.6749	10.958	18.393	20.28	7.6579	7.059	10.223
73	73	03-14	5.8743	7.8075	19.138	22.128	19.138	2.885	12.139	10.349
80	73	03-21	8.3272	7.8728	9.2928	16.847	15.683	18.977	10.457	8.1
87	73	03-28	10.556	11.357	11.872	14.017	22.168	11.357	10.757	12.158
101	73	04-11	2.615	6.1925	11.625	16.395	11.89	0.76	5.53	11.36
108	73	04-18	0	0	7.966	8.3245	0	0	0	8.205
115	73	04-25	5.985	9.0325	13.803	18.97	9.96	6.25	6.3825	8.5025
129	73	05-09	3.662	6.406	8.758	10.13	11.698	3.956	6.602	7.876
143	73	05-23	9.092	13.036	18.476	17.184	17.456	8.82	9.228	9.296
157	73	06-06	3.9075	4.7675	8.4225	5.6275	7.7775	3.155	5.09	4.23
171	73	06-20	5.1234	7.221	9.498	12.81	13.983	5.2614	5.358	5.22
186	73	07-05	0	0	14.87	19.81	33.33	0	0	0
198	73	07-17	12.686	14.792	31.851	65.056	51.823	7.667	7.0703	10.791
213	73	08-01	2.9701	5.4223	6.6886	9.6433	12.035	5.5228	5.9047	4.8193

DAY	YEAR	DATE	CHLB14	CHLB15
207	72	07-26	8.1063	8.0741
220	72	08-08	9.9655	17.44
234	72	08-22	11.89	11.15
249	72	09-06	9.3	7.635
270	72	09-27	2.878	5.4897
284	72	10-11	4.564	4.9725
299	72	10-26	1.296	1.511
317	72	11-13	0.4575	0.5005
341	72	12-07	0.4575	0.4575
354	72	12-20	0.1135	0.3715
5	73	01-05	0	0.995
18	73	01-18	0.8445	1.7905
32	73	02-01	1.21	1.5755
39	73	02-08	4.61	4.6823
45	73	02-14	5.2848	4.851
54	73	02-23	7.8792	8.34
59	73	02-28	14.822	5.3979
66	73	03-07	13.692	18.02
73	73	03-14	9.5975	11.531
80	73	03-21	9.7472	8.1
87	73	03-28	13.016	12.73
101	73	04-11	19.575	15.07
108	73	04-18	7.3685	0
115	73	04-25	8.37	9.43
129	73	05-09	10.13	12.384
143	73	05-23	10.248	11.88
157	73	06-06	5.09	5.735
171	73	06-20	5.841	8.67
186	73	07-05	0	1.808
198	73	07-17	6.0875	11.493
213	73	08-01	7.8343	6.0253

Data from "KREMER & NIXON, 78 STATION 3"



Data from "KREMER & NIXON, 78 STATION4"



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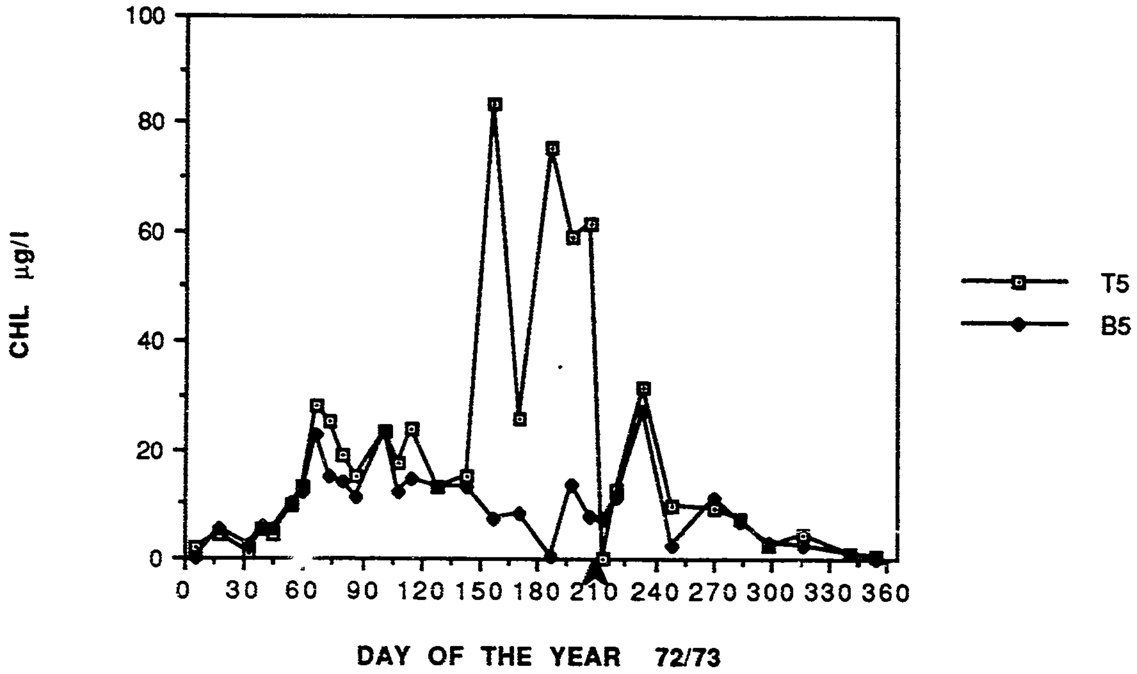

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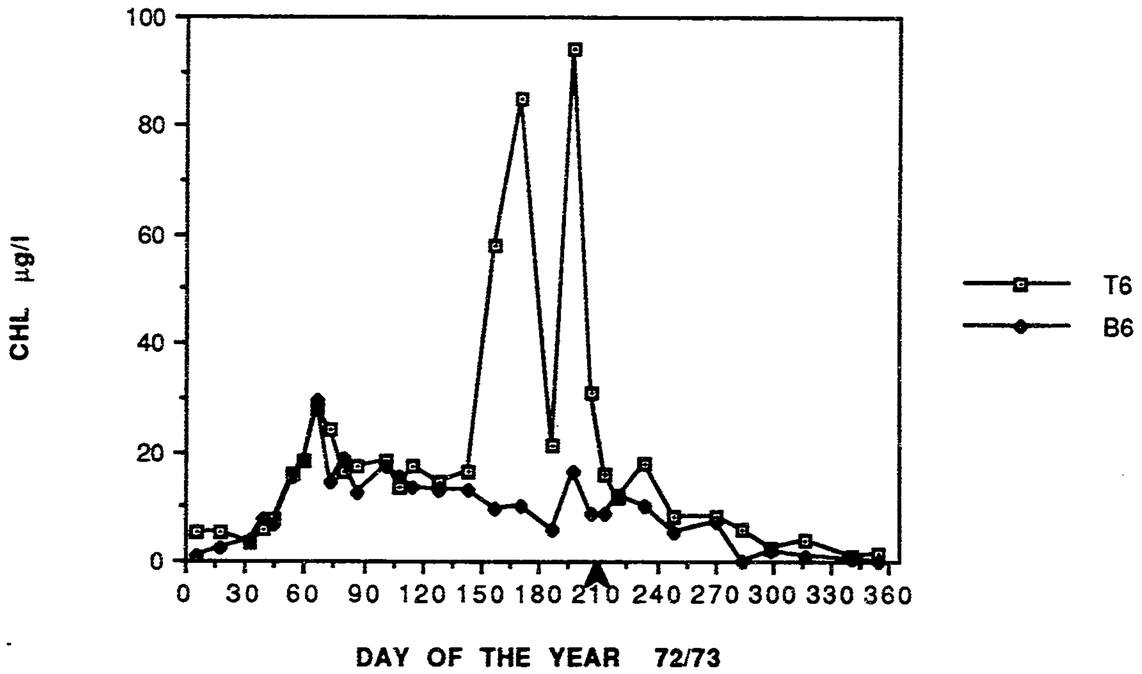
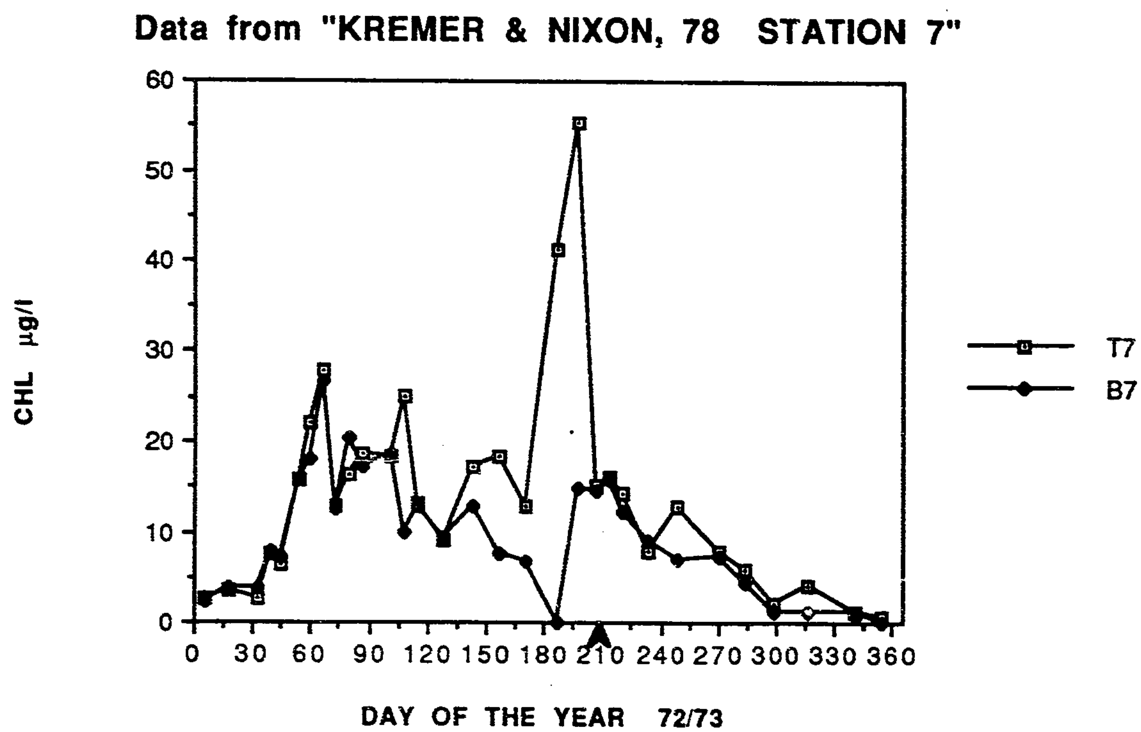
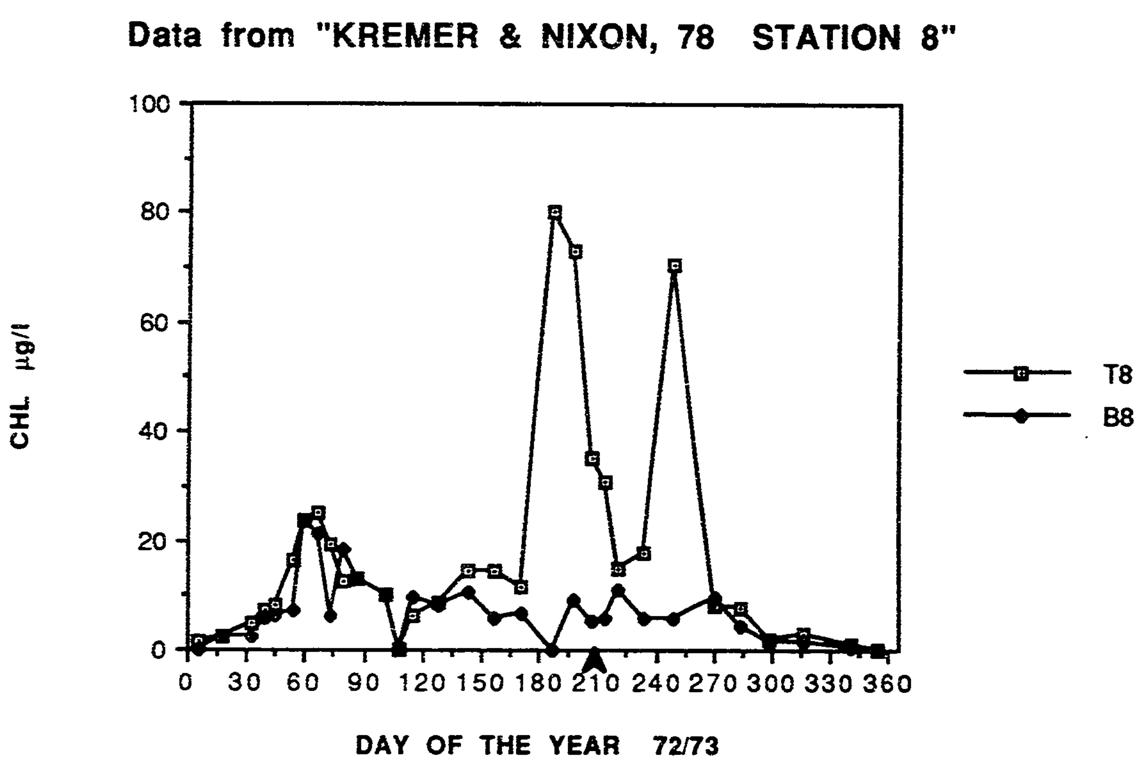


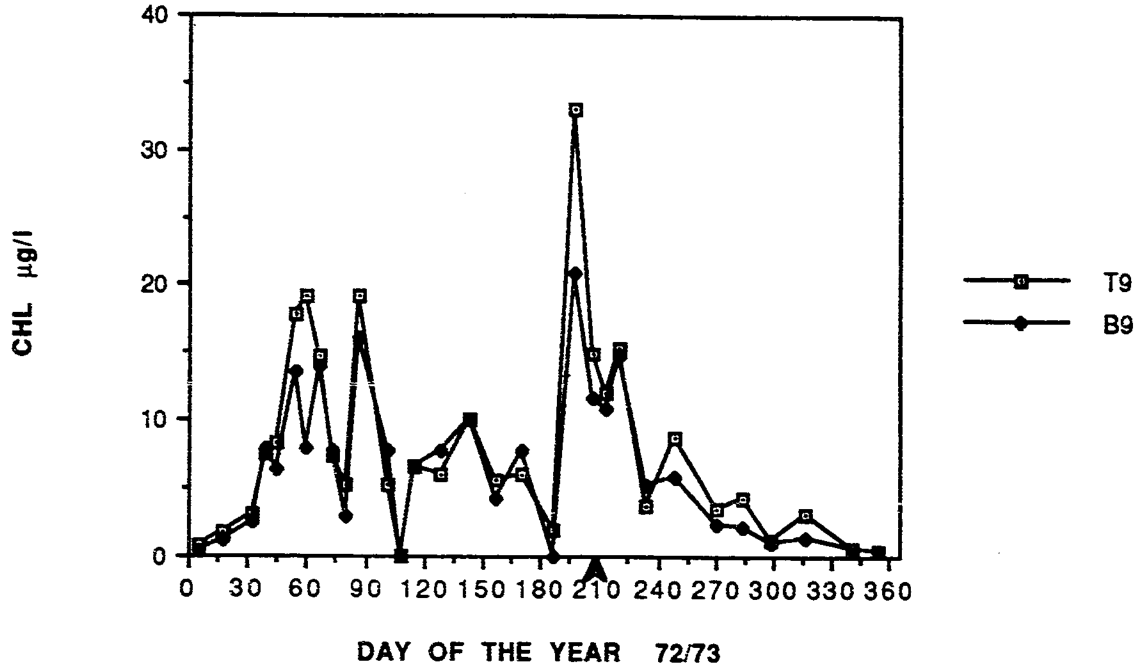


Data from "KREMER & NIXON, 78 STATION 7"
CHL µg/l
60
50
40
30
20
10
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 72/73
T7
B7

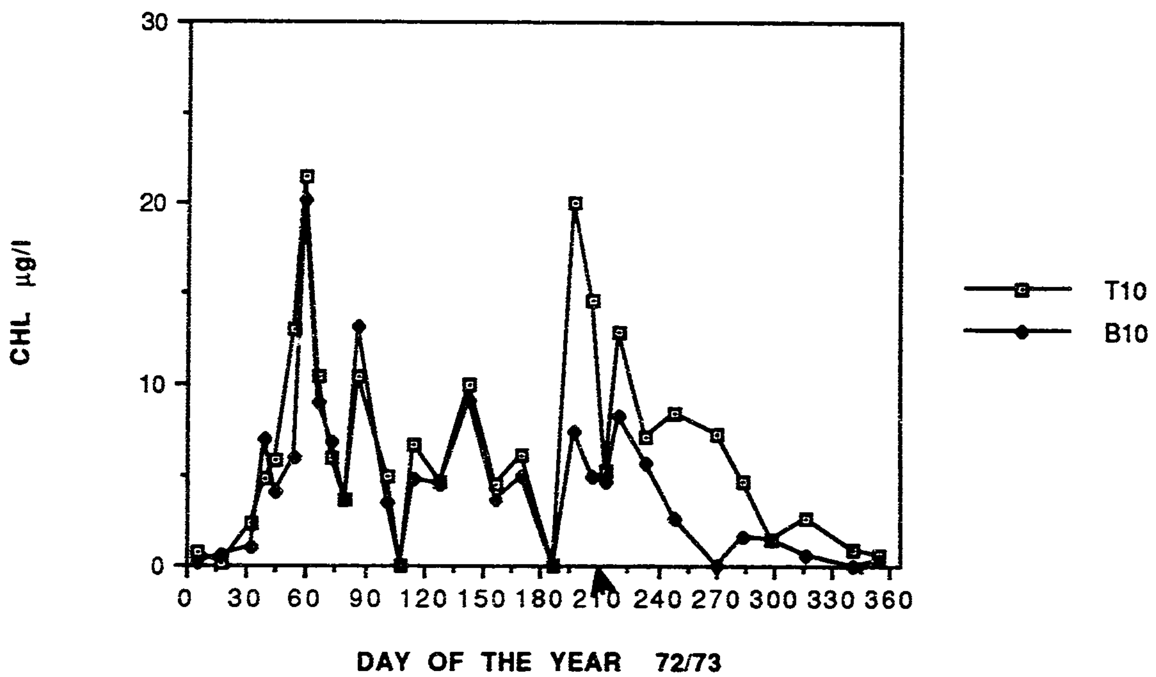


Data from "KREMER & NIXON, 78 STATION 8"
CHL µg/l
100
80
60
40
20
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 72/73
T8
B8

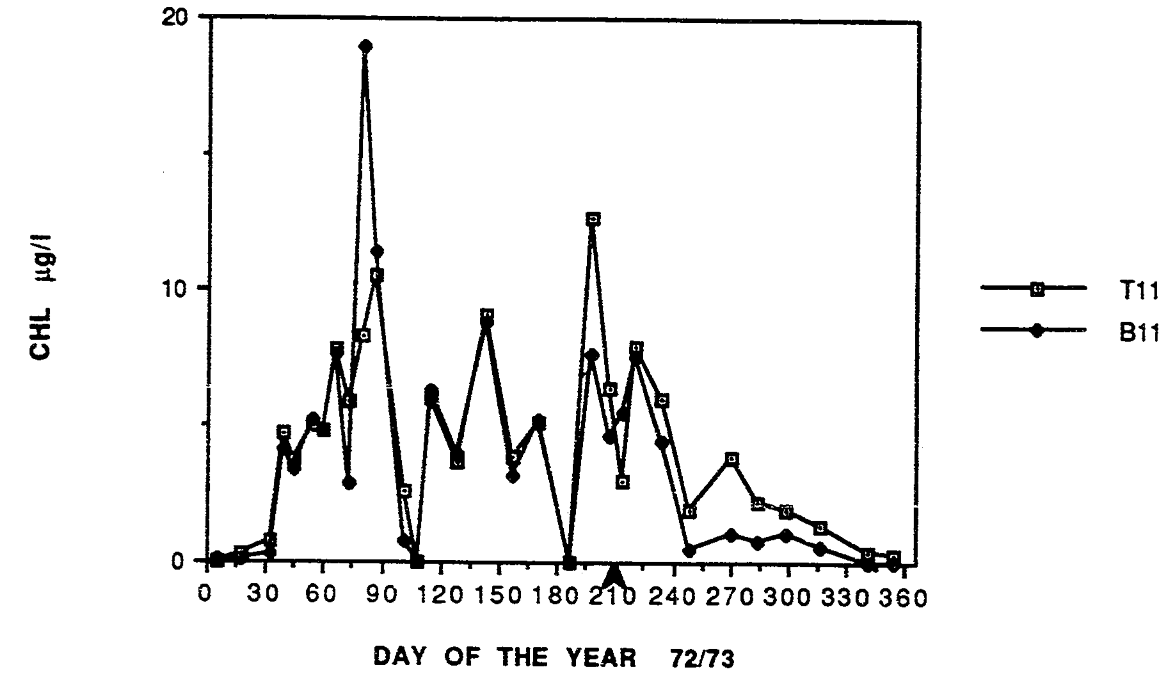
Data from "KREMER & NIXON, 78 STATION 9"



Data from "KREMER & NIXON, 78 STATION 10"



Data from "KREMER & NIXON, 78 STATION11"



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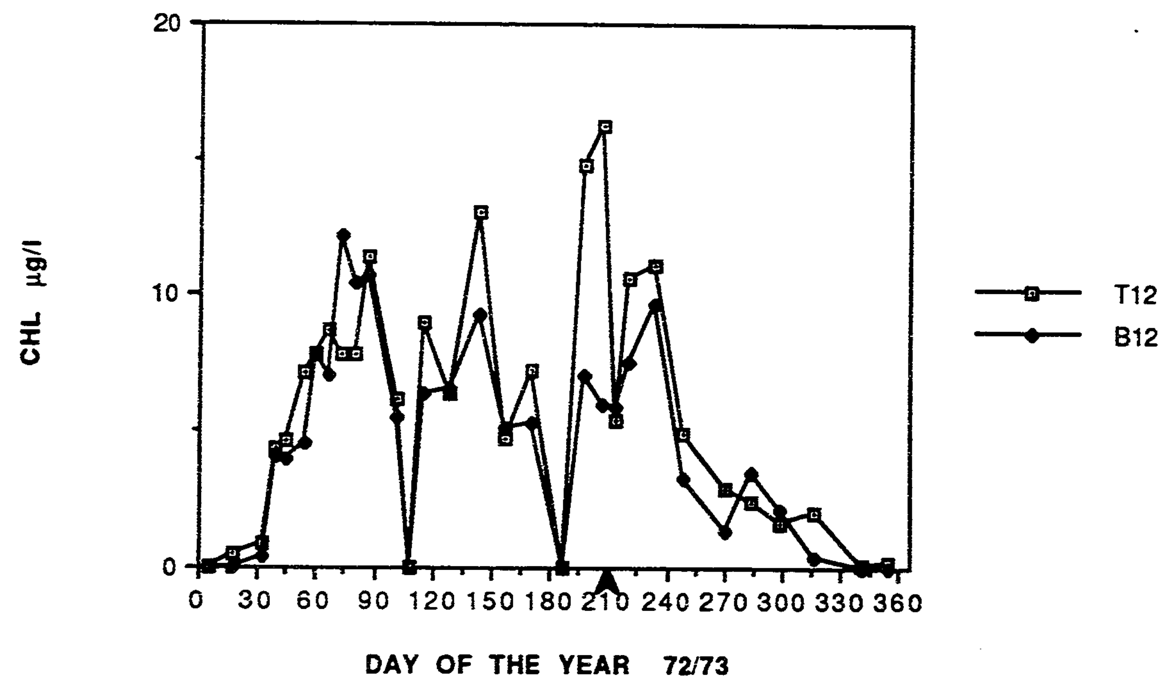

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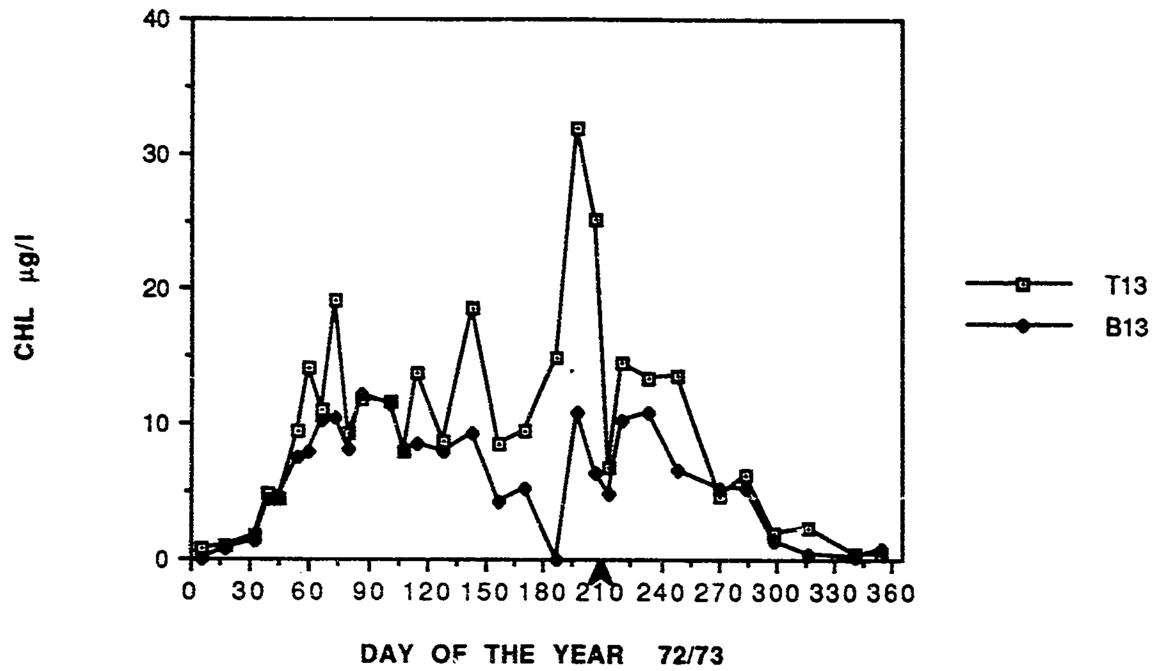
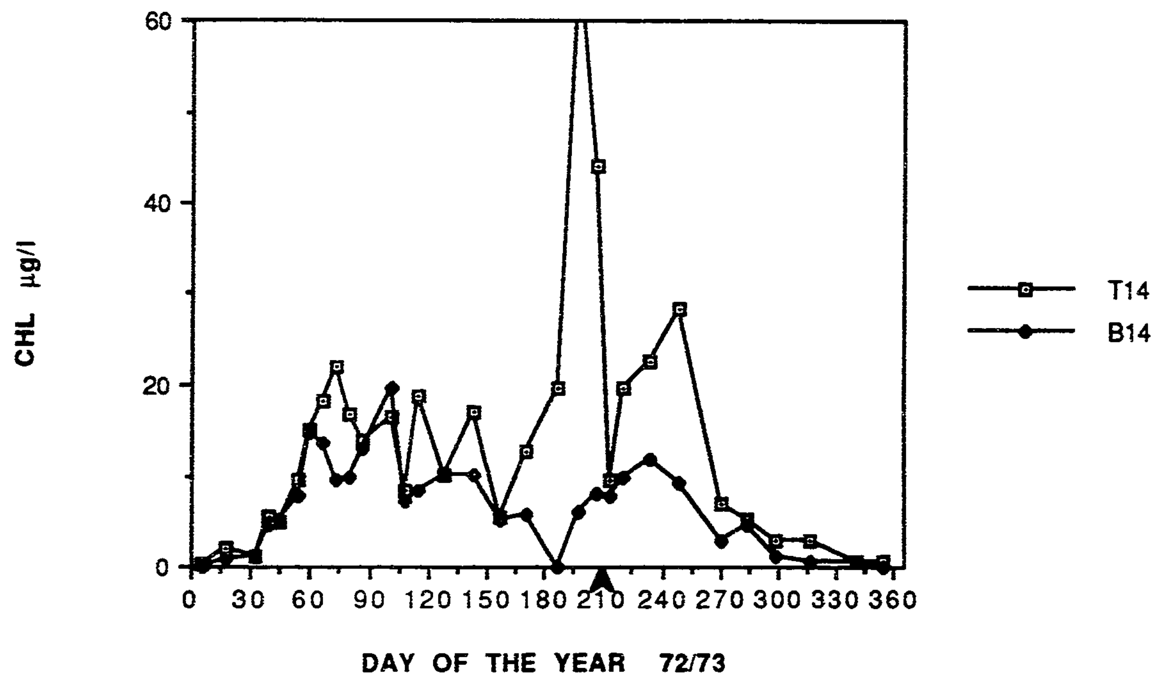
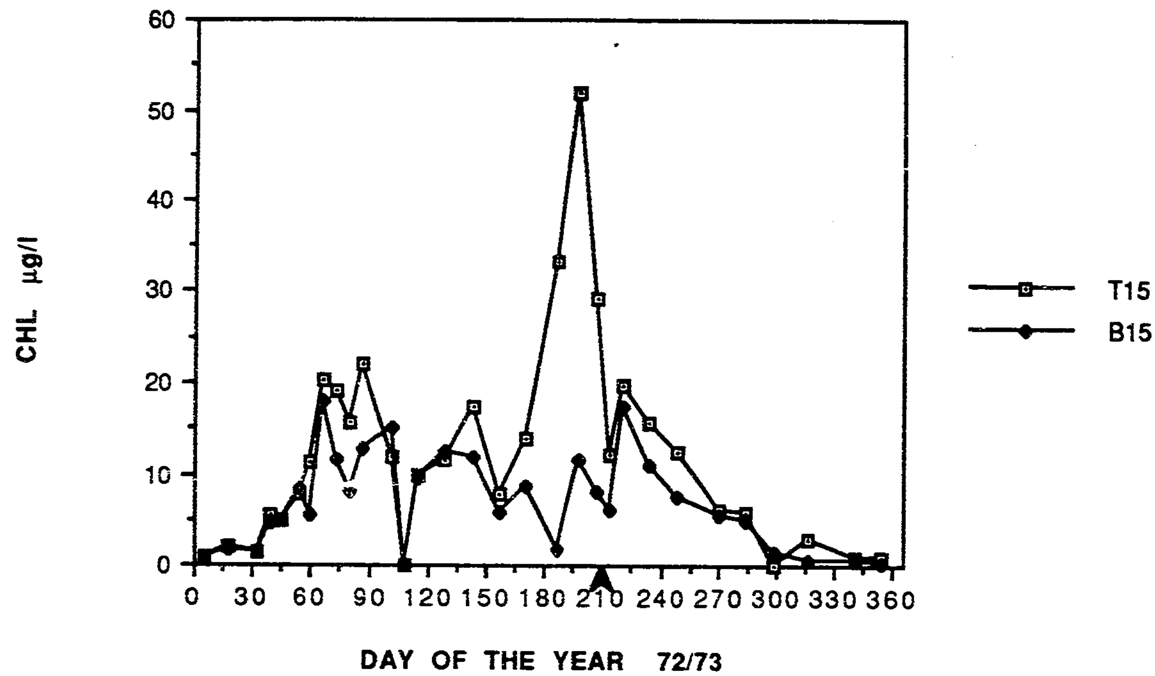


Data from "KREMER & NIXON, 78 STATION14"



Data from "KREMER & NIXON, 78 STATION 15"



Smayda TJ., 1987, Environmental Conditions and Plankton Dynamics in Narragansett Bay during an Annual Cycle Characterized by a Brown-Tide, Narragansett Bay Project Report, Narragansett, RI. Draft.

Smayda TJ., 1988, Survey of environmental conditions and plankton dynamics along a euthrophication gradient in Narragansett Bay during an annual cycle. Unpublished contract report to the Narragansett Bay Project, Narragansett Bay Project, Providence RI.

Data from 7/2/86-6/29/87 taken from Smayda (1988)

ORIGINAL

STATION ID	LOCATION	MAP ID
Station 1	41 40.4 N 71 25' W (est)	14A
Station 2	41 47.5 N 71 24' W (est.)	14B
Station 3	41 45' N 71 23.5' W (est.)	14C
Station 4	41 43.5' N 71 21' W (est.)	14D
Station 5	41 40.5' N 71 22' W (est.)	14E
Station 6	41 37.8' N 71 23' W (est.)	14F
Station 7	41 34' N 71 25.4' W (est.)	14G

Original data in tabular form   T=surface, M=mid-depth, B=bottom

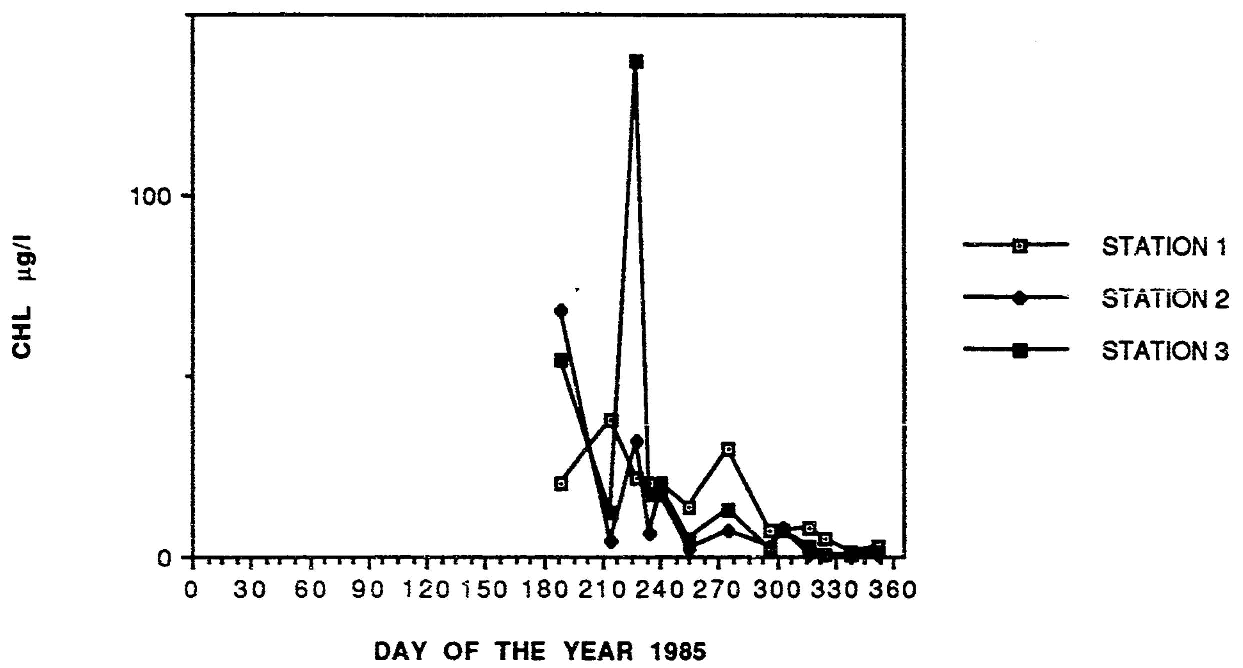
UNITS: µg/l

DATE	DAY	ST 1	ST 2	ST 3	ST 4	ST 5	ST 6	ST 7
7/15/85	188	20.4	67.9	54.3	40.7	38	18.6	17
8/2	214	37.6	4.3	12.4	38.3	46.2	34.8	34.4
8/9	221							
8/15	227	21.9	31.7	137.3	84.5			34
8/22	234	20.1	6.4	17.2	30.8	30.1	20.1	19.4
8/28	240	20.1	17.2	19.4	35.1	46.6	22.9	20.1
9/11	254	14	2.2	4.9	8.9	5.7	2.9	9.6
10/2	275	29.7	7.2	13	37.2	16.9	37.2	21.3
10/23	296	6.9	3	2	18.1	20.3	6.3	16.6
10/30	303	6.9	7.8	6.9	23.6	24	13.9	5.9
11/13	317	7.8	0.9	2.8	5.1	7.8	6.7	6.4
11/20	324	5.2	0.6	0.9	2.7	4.8	4.3	3.1
12/4	338	1.1	0.4	0.8	0.3	0.4	0.9	0.5
12/18	352	3.2	0.6	1.4	2.1	2.6	2.6	2.7
1/8/86	8	47	7.5	9.3	10.3	14.1	21.3	21.6
1/15	15	49.3	23.6	27.7	38.2	48	42.2	27.4
1/22	22	42.2	19.6	38.2	55.9	47.3	29.7	20.9
1/29	29	29.7	18.5	11.9	22	31.4	17.2	10.9
2/12	43	23.5	12.7	11.4	18.1	19.1	21.7	11.6
3/5	64	8.7	18.1	17.4	19.8	20.3	11.8	3.5
3/12	71	8	14.5	10	23	16.2	8.3	2.5
3/26	85	7.3	4.2	18.4	14.2		7.7	3.2
4/2	92	7.5	18.6	60.5	32.4	13.2	4.2	2.7
4/9	99	2.1	5.5	11.7	23	19.9	5.8	0.7
4/16	106	3.7	20.1	31.6	38.8	2	2.3	2.1
5/8	128	2.9	2	1.4	2.7	1.9	3	2.2
5/14	134	2.8	0.9	3.5	2.5	1.1	2.3	2.1

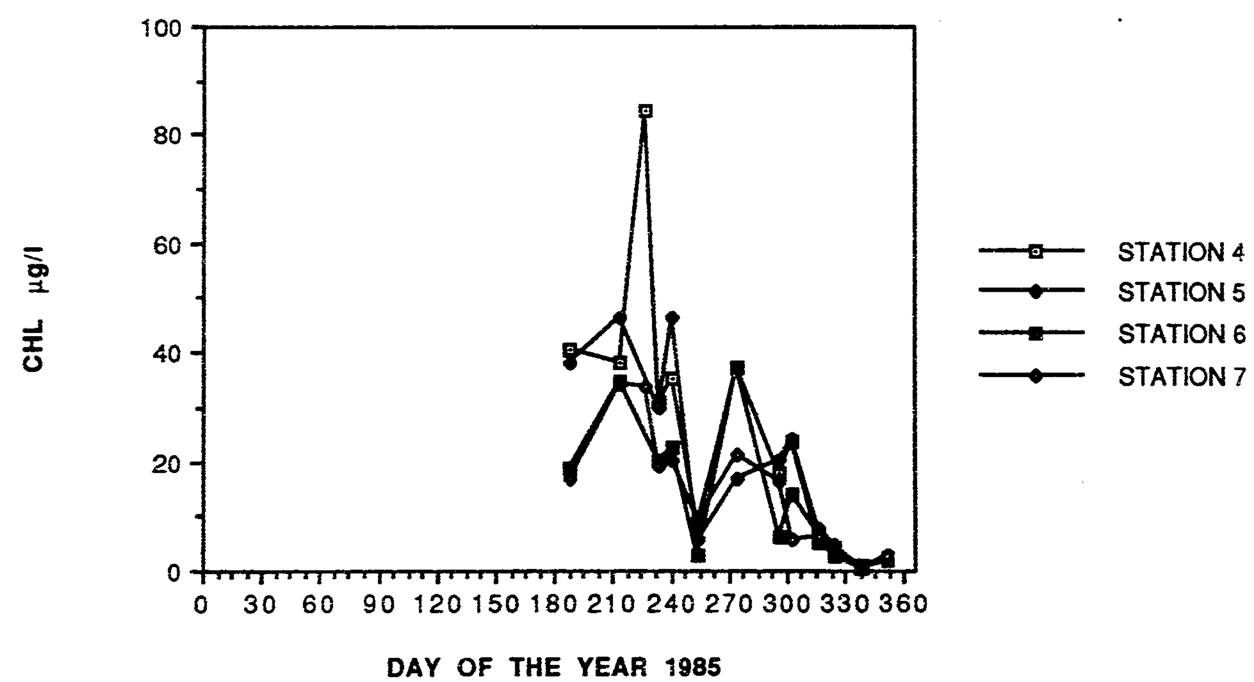
5/21		141	5.8	36.6	30.7	12.8	3	3.9	3.5
DATE		DAY	ST 1	ST 2	ST 3	ST 4	ST 5	ST 6	ST 7
5/28		148	16.2	8.4	13.7	21.8	10.8	8.8	7.1
6/4		155	10	11.2	21.3	23.5	5.1	6.1	3.1
6/11		162	22.6	6.5	44.6	54.2	42.6	26.7	13.2
6/18		169	9.8	53.2	14.9	23	54.2	22.3	7.8
7/02	T	184	5.3	4.2	9.8	14.4	35.8	15	7.6
	M		5	1.5	2.2	5.8	11	6.5	8.9
	B		1.3	0.6	0.9	1.6	4.7	7.6	8.9
7/10	T	191	13.6	4	9.8	18.6	51.5	20.2	8.7
	M		27	1.4	4.3	9.3	17.9	18.8	7.5
	B		9.8	1.1	2.9	7.1	6.8	11.2	5.4
7/16	T	197	13.3	6.4	13.9	17.3	25	25.3	8.7
	M		5.1	8.7	2.2	3.1	2.5	6.7	18.1
	B		2	6		1.3	2.4	6.7	7.5
7/23	T	204	9.1	30.7	16.7	6	3.7	9.5	8.4
	M		2.4	5.4	1.9	2.7	3.6	10.6	5
	B		1.9	2.8	1.9	1.8	2.6	3.9	2.8
7/30	T	211	12.5	13.2	55.6	29.4	33	16.1	8.9
	M		5.9	4.9	2	4.8	7.1	4.7	8.3
	B		2.5	2.8	3.2	4.9	3.2	4	8.9
8/20	T	232	8.8	3.9	47	25.8	172.6	3.7	5.3
	M		1.5	1.8	2.8	3.3	3.1	1.7	2.2
	B		6.1	2.4	1.9	2.5	2.6	3.4	2.2
9/03	T	246	14.5	18.4	43.4		21.3	13.2	4.1
	M		20.3	5.4	5.8	17.2	5.4	5.9	9
	B		16.9	4.1	4.4	12.5	7.4	9.3	12.2
9/10	T	253	10.1	4.6	27.6	21.7	11.3	10.1	11.3
	M		8.8	7.1	6.5	20.8	8.8	8.8	10.5
	B		3.1	2.8	4.9	8.6	8.3	10.1	10.1
9/17	T	260	2.8	1.9	1.8	3.4	2.1	2.5	2.4
	M		4.2	1.9	1.9	3.2	2.6	2.9	2.1
	B		3.3	2.2	2.9	1.5	1.7	2.8	2.2
10/01	T	274	7.3	5.5	12.3	23.8	11.3	7.1	3.6
	M		6.1	4.9	6.8	10.1	11.2	7.6	3.9
	B		4.1	0.9	2.9	3.5	8.8	7.9	3.5
10/22	T	295	3.3	0.6	1.2	1.7	1.2	3.8	3.5
	M		1.3	1.2	1.2	1.5	1.3	2.8	2.4
	B		0.9	1.1	0.8	0.8	1.1	1.6	2.6
11/05	T	309	4	0.7	0.7	1.1	1.4	1.4	1.2
	M		4.2	0.8	0.7	1.1	1.1	1.7	1.2
	B		4.9	1.1	0.7	0.7	1	1.5	1.1
11/24	T	328	3.1	0.8	0.8	1.1	1.2	1.3	1
	M		2.1	0.4	0.6	0.7	1	1.2	1
	B		1.7	0.6	0.4	0.5	1	1	1.2

DATE			ST1	ST2	ST3	ST4	ST5	ST6	ST7
12/08	T	342	2.1	0.6	0.7	0.7	1.1	1.1	2.1
	M		2.1	0.9		1	1.5	0.9	1.8
	B		2.2	1	0.8	1.1	1	0.9	1.2
12/17	T	351	0.3	0.5	0.3	0.4	0.3	0.8	0.5
	M		0.8	0.3	0.3	0.3	1.2	0.9	0.8
	B		0.8	0.5	0.3	0.5	0.9	0.6	0.9
1/05/87	T	5	2.7	1.7	2.4	2.2	1.8	2.6	2.8
	M		3.5	2.2	1.9	2.4	2.8	3.3	2.9
	B		2.1	2.8	1.8	2.1	2.8	3.3	2.6
1/12	T	12	2.2	1.9	0.9	0.9	1.3	1.3	
	M		6.4	2	1.6	1.4	1.3	1.4	1
	B		3.4	2.7	1.4	2.1	1.5	1.2	1.5
2/02	T	33	5.3	1.1	0.8	1.2	2.1	2.2	2.7
	M		3.4	3.8	2.6	2.9	3.7	2.4	3.5
	B		4.2	3.5	2.6	2.8	3	5.9	4.1
2/24	T	55	12	11.5	19.3	15.7	21	20.4	9.8
	M		12.8	11.7	17.2	17.7	19.6	15	9.7
	B		15.4	15.5	15.2	12.3	17.2	16.9	9.8
3/02	T	61	8		8.7	18.6	10.1	5.5	2.7
	M		8.4		13.6		9.9	4.3	2.6
	B		9.2		15	14.6	15.9	3.2	1.7
3/16	T	75	15.5	5.5	9.1	10.3	13.2	14.9	18.6
	M		18.8	13.2	12.3	13.7	14	15.9	16.7
	B		19.3	10.3	11.3	12.2	13.5	12.8	18.2
3/30	T	89	9	8.1	2.89	23.5	11.5	8.8	6.4
	M		11.5	26.2	31.2	14.5	10.1	8.8	6.4
	B		17.1	28	20.8	18.1	8.1	9.1	6.1
4/15	T	105	19.8	0.6	1.4	0.5	12.2	19.1	19.9
	M		16.7	5.8	7.1	11.8	11.8	15.9	11.8
	B		11.5	6.8	6.3	6.8	9.7	9.5	6.9
4/27	T	117	25.3	5.9	12.8	19.3	20.8	18.08	22.6
	M		37.9	16.7	17.4	17.7	19.9	21	18.5
	B		23	16.6	16.1	15.5	15.5	22.6	12.7
5/12	T	132	9.6	3.2	4.7	6	7.6	7.6	8.1
	M		7.4	9.8	9.4	7.6	7.6	1.8	2
	B		7.6	6	9.8	7.6	5.8		4
5/26	T	146	8.8	1	8.5	8.5	12	13.3	6.9
	M		3.6	1.2	1.9	2.2	4.4	6.8	7.1
	B		3.2	1.5	1.9	2.1	2.2	6.8	6.3
6/15	T	166	14.5	17.2	27	39.2	9.8	11.6	4.6
	M		15	2.7	4.5	2	14.5	8.3	6
	B		14.1	4.7	4.2	6.1	12.1	10.1	6
6/29	T	180	18.6	40.9	105.7	36.2	13.4	16.7	9.6
	M		8.8	7.1	8.1	14.2	10.5	17.1	11.3
	B		8.6	2.6	13.5	5	6.3	16.7	11.7

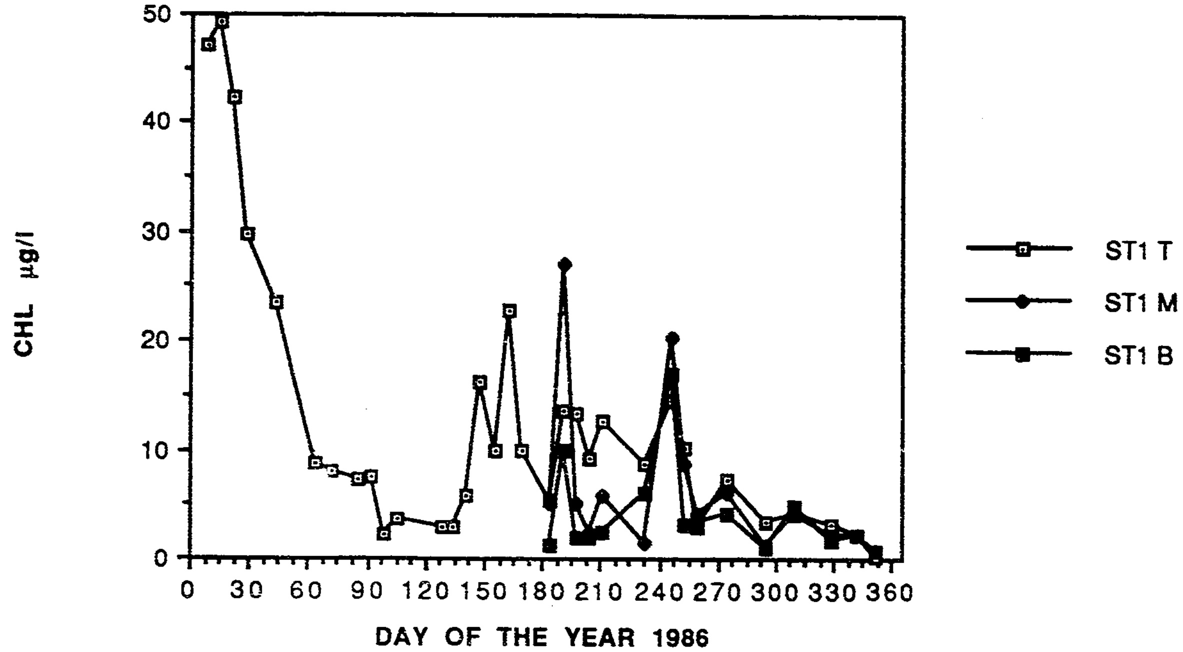
Data from "SMAYDA 87"



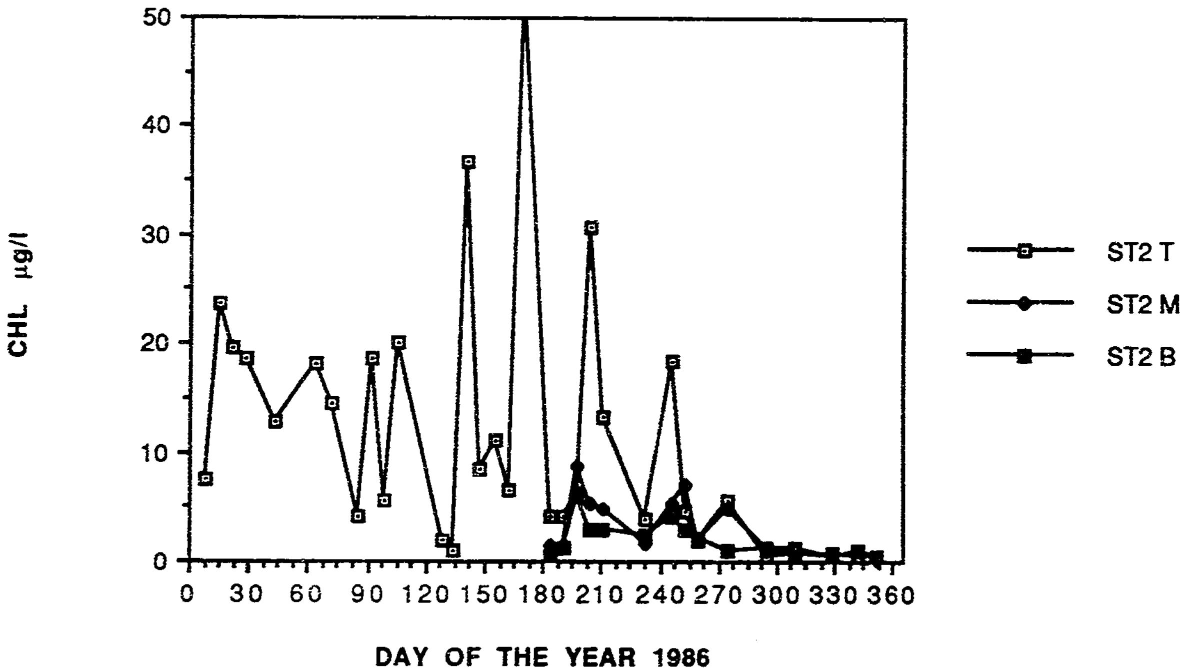
Data from "SMAYDA, 87"



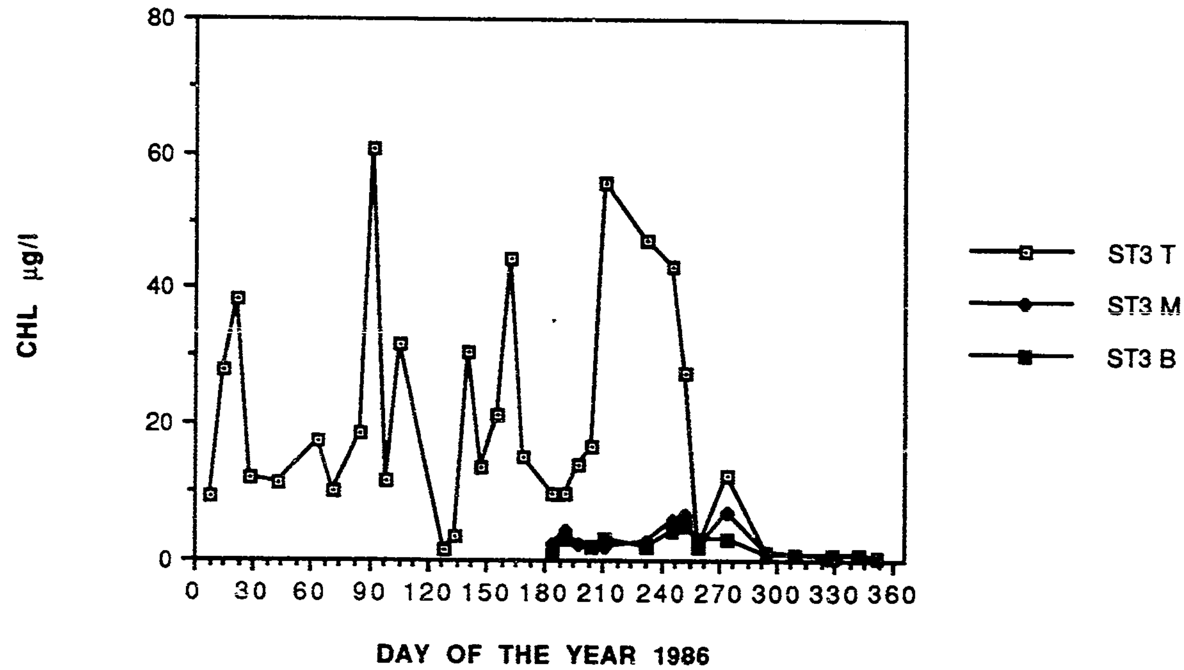
Data from "SMAYDA, 87,88 STATION 1"



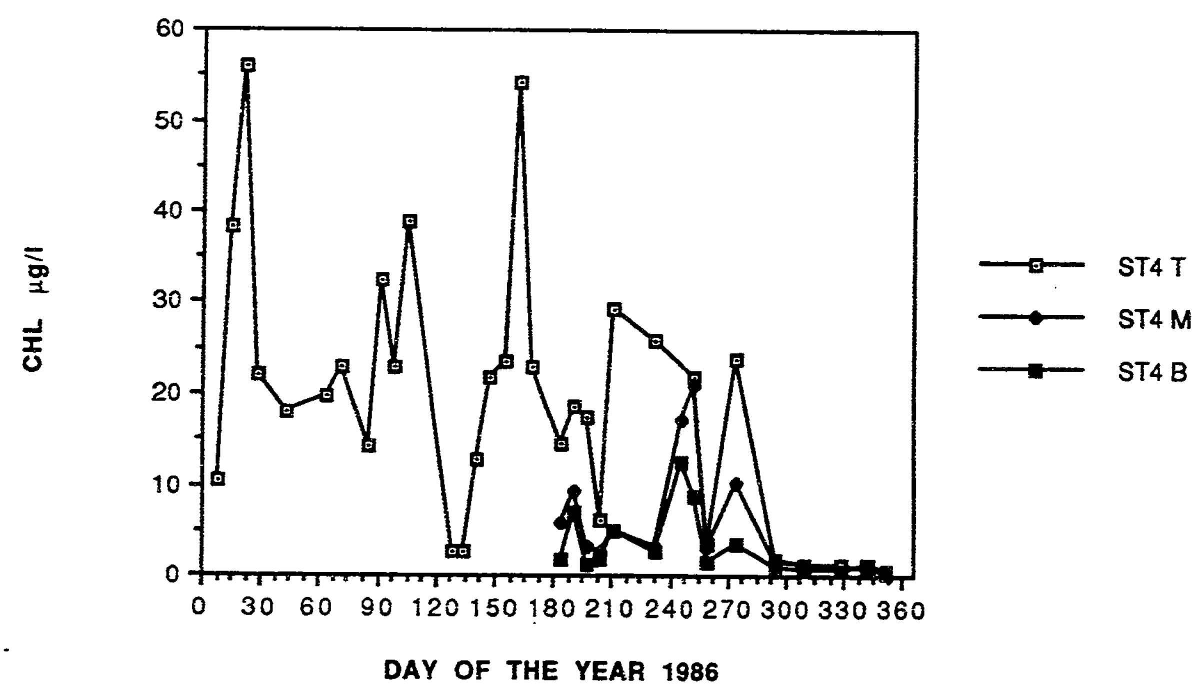
Data from "SMAYDA, 87, 88 STATION 2"



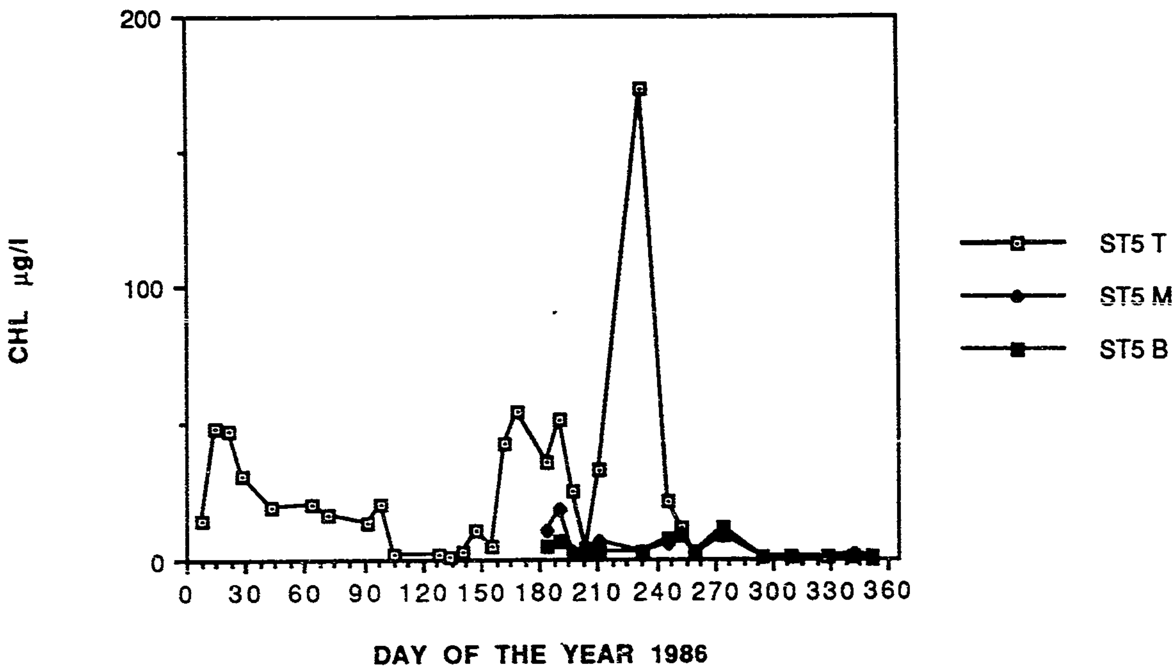
Data from "SMAYDA, 87, 88 STATION 3"



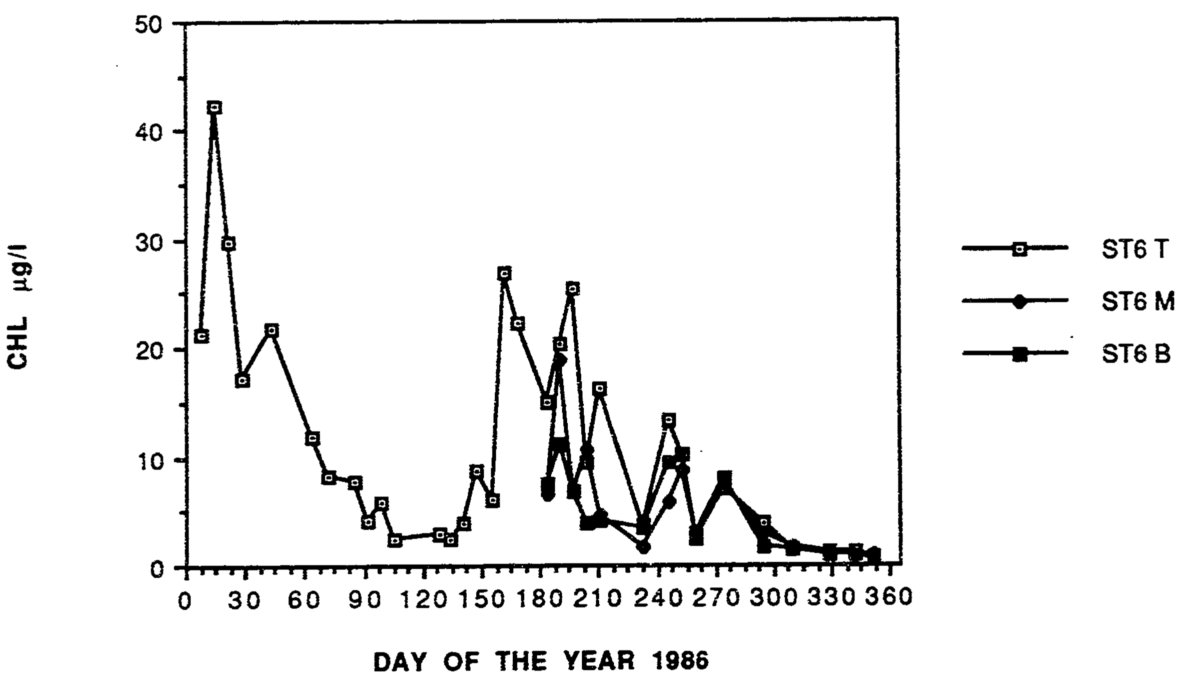
Data from "SMAYDA, 87, 88 STATION 4"



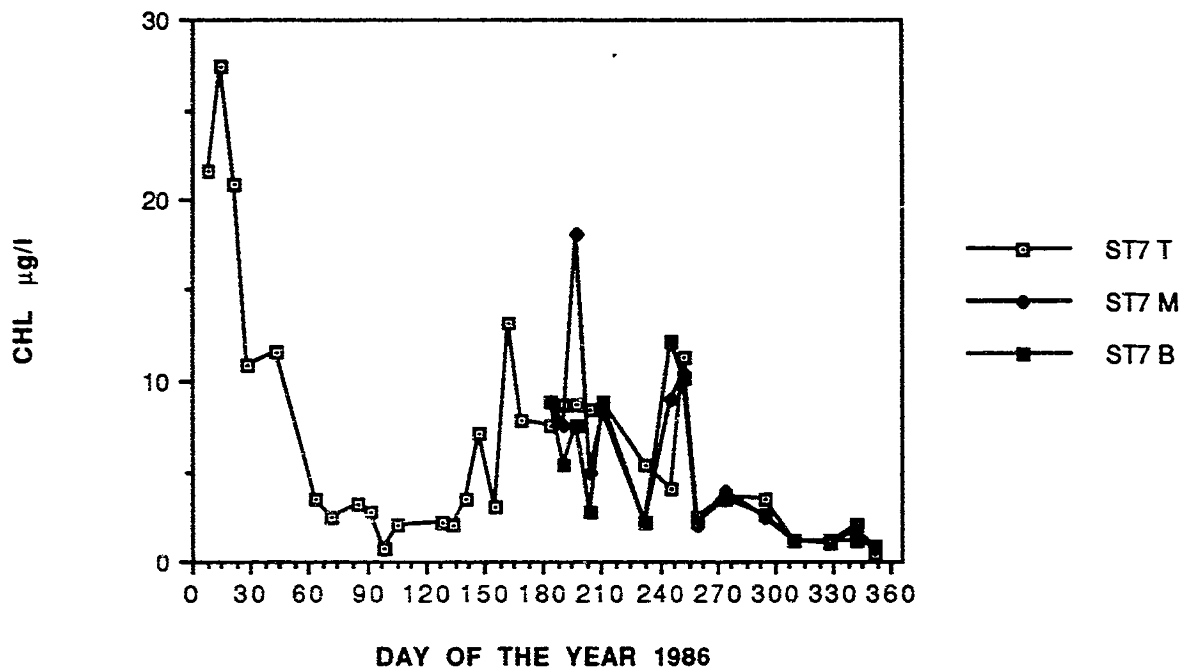
Data from "SMAYDA, 87, 88 STATION 5"



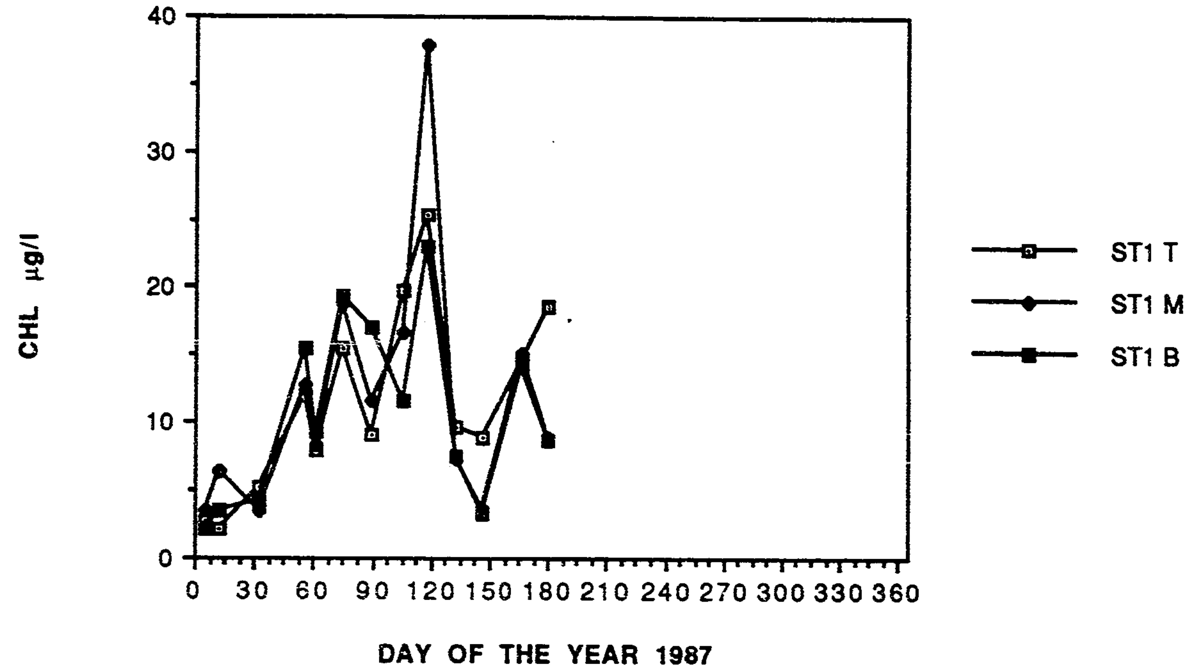
Data from "SMAYDA, 87, 88 STATION 6"



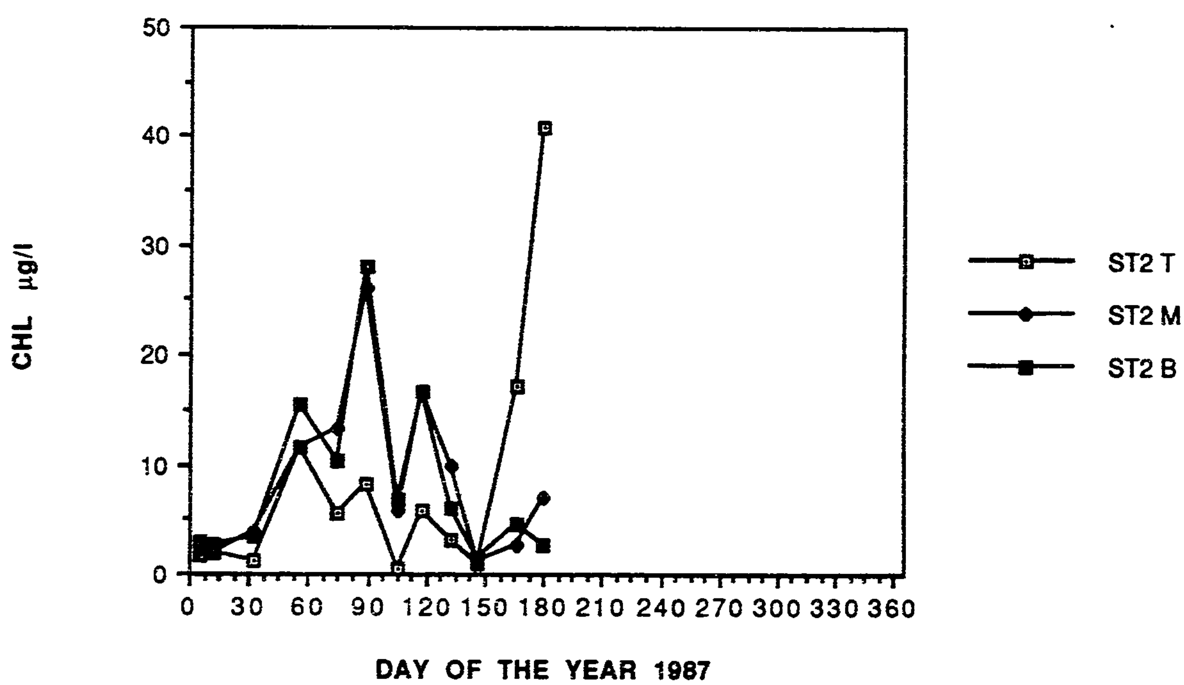
Data from "SMAYDA, 87, 88 STATION 7"



Data from "SMAYDA, 88 STATION 1"



Data from "SMAYDA, 88 STATION 2"



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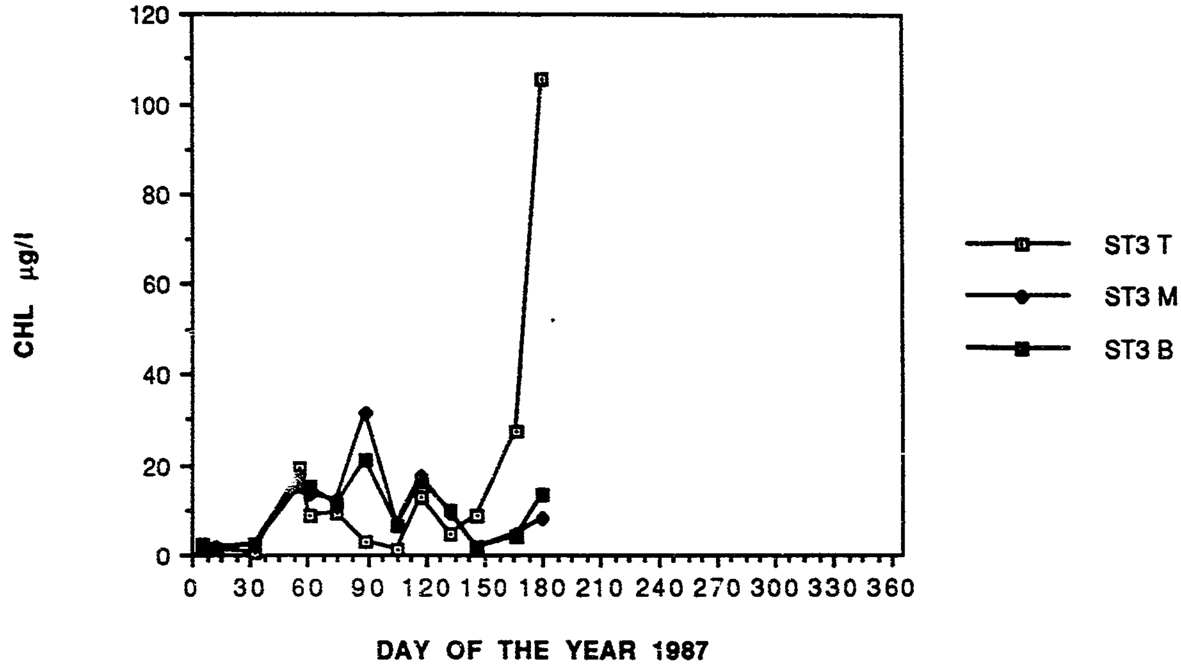
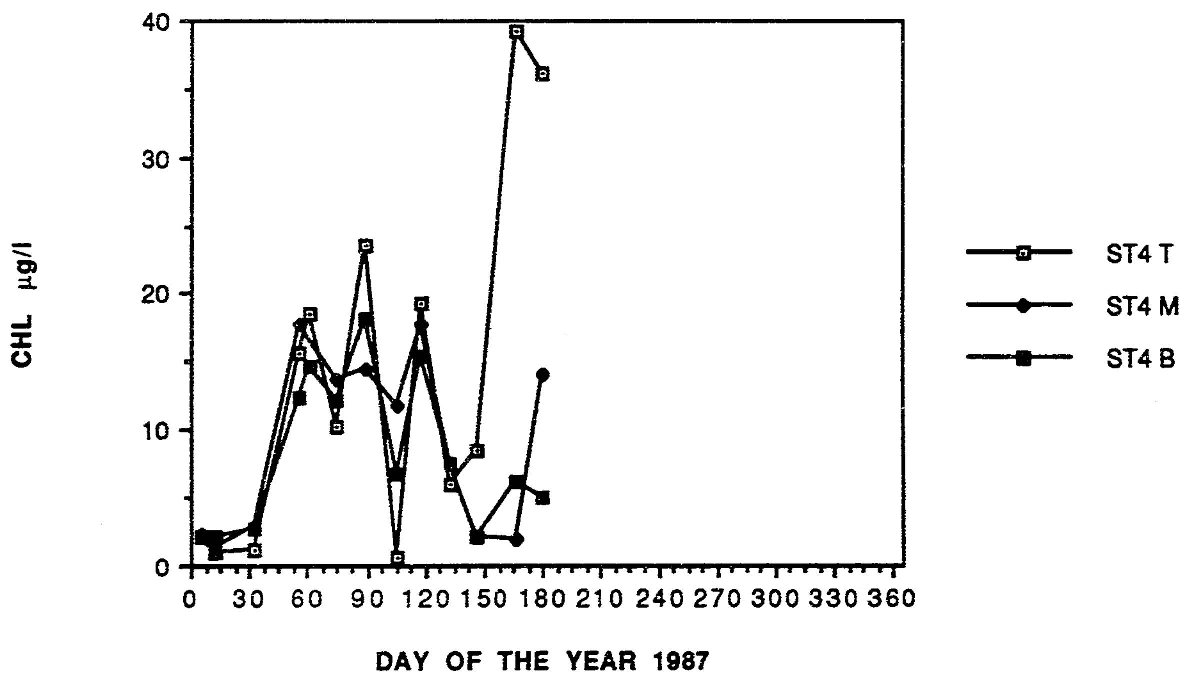
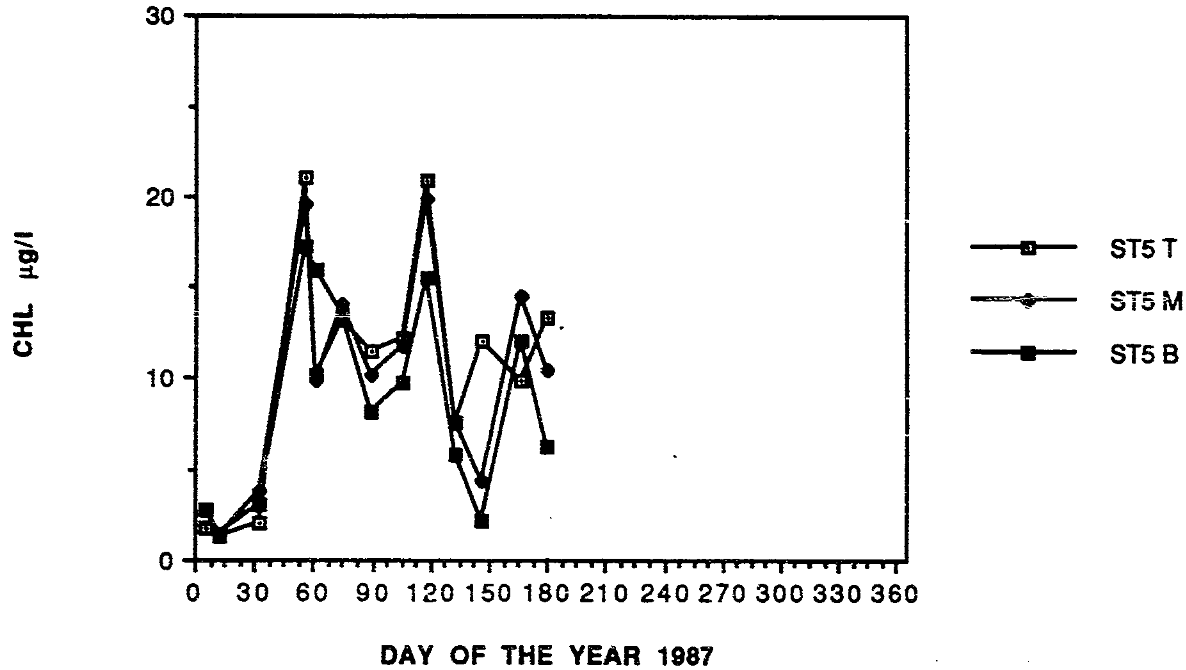


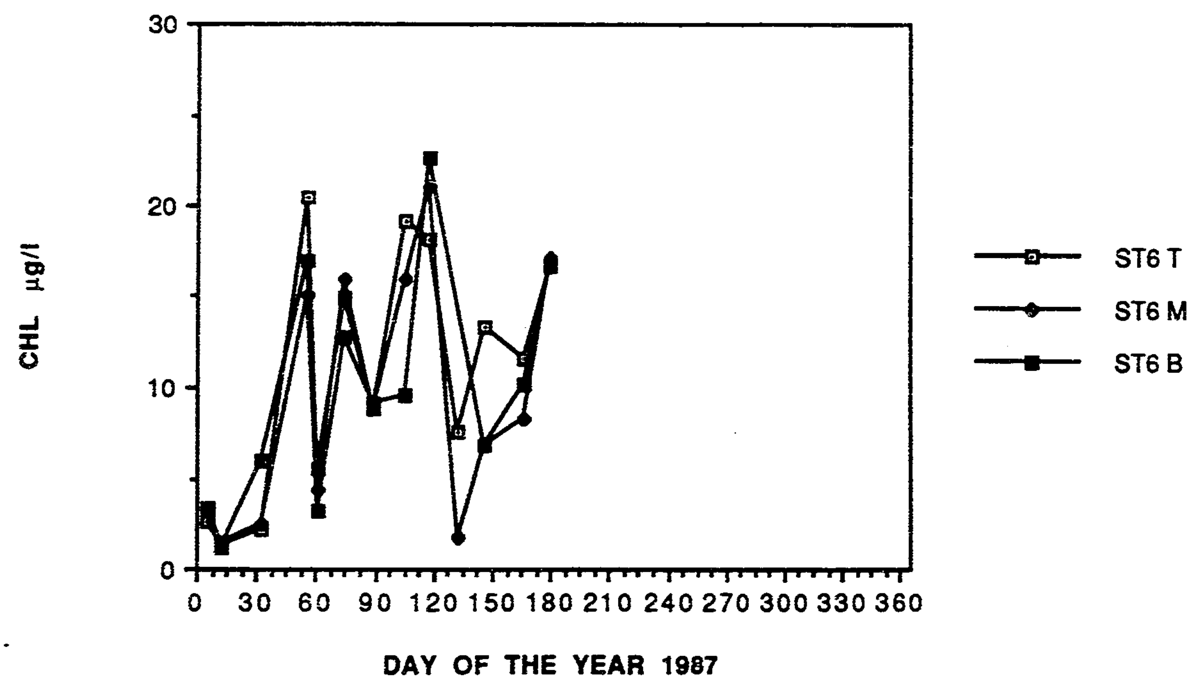
Data from "SMAYDA, 88 STATION 4"



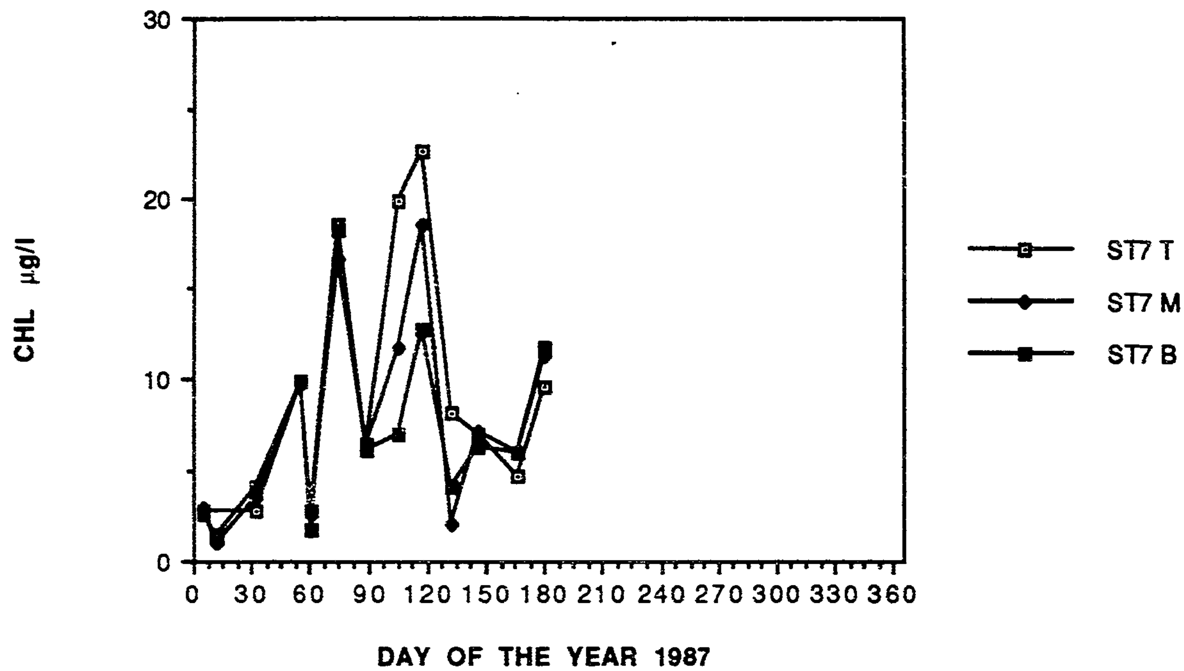
Data from "SMAYDA, 88 STATION 5"



Data from "SMAYDA, 88 STATION 6"



Data from "SMAYDA, 88 STATION 7"



Sosnowski SL., Germond DJ. and Gentile JH., 1979, The effect of nutrition on the response of field populations of the calanoid copepod Acartia tonsa to copper, Water Research 13:449-452.

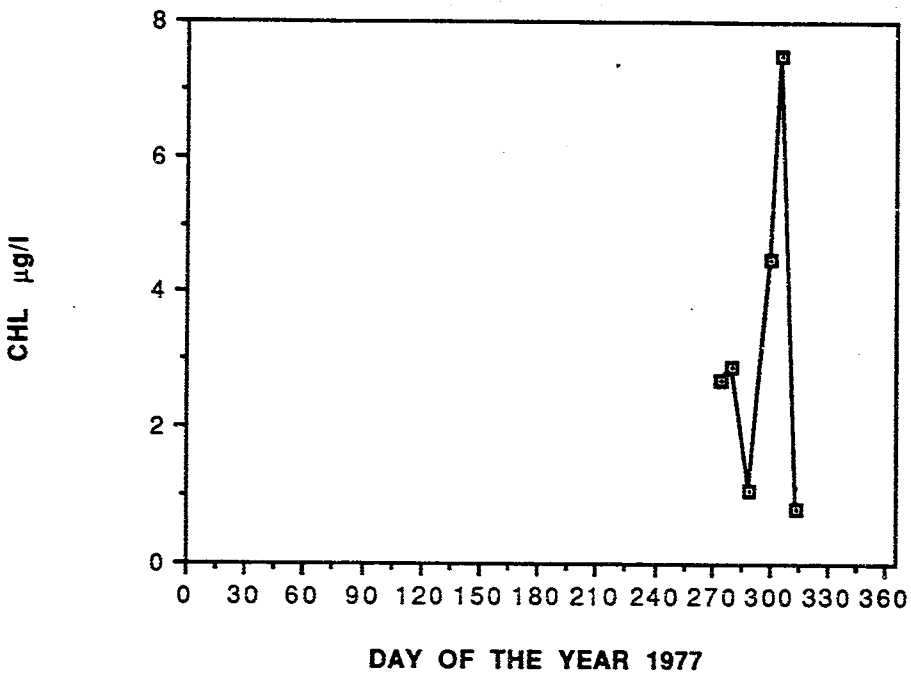
ORIGINAL STATION ID	LOCATION	MAP ID
non specific	"In the west passage of lower Narragansett Bay"	7

Dates and data were digitized from a graph in original paper, both are approximate values

UNITS: µg/l

DATE	DAY	Station
10/1/77	274	2.7
10/7	280	2.9
10/16	289	1.1
10/27	300	4.5
11/1	305	7.5
11/10	314	0.8

Data from "SOSNOWSKI ET AT., 79"



Appendix B:

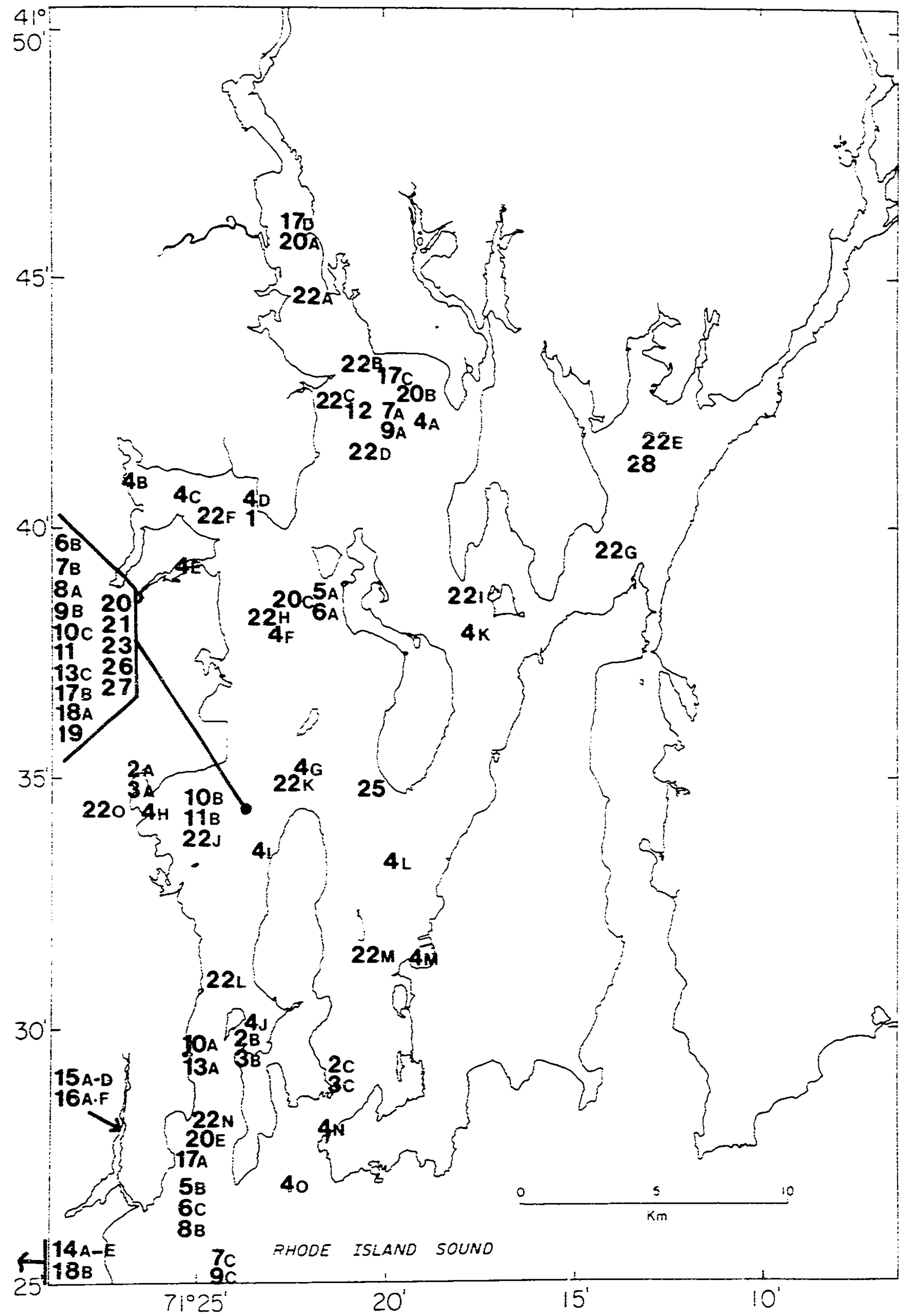
Summary of studies which contain:

Counts of diatoms, flagellates, a dominant speices or total phytoplankton

and

lists and graphs of data;
map of stations

Map of stations, abundance data.



MAP I.D.	REFERENCE	ORIGINAL STATION ID	LOCATION	DATA TYPE	DATA PRESENTATION	DATA DURATION	COMMENTS
1	Ferarra, 1953	Station 1	From pier in Greenwich Bay, 100 yards from SW tip of Warwick Neck (41 40.0 N 71 23.0 W, est)	Diatom, flagellate and total phytoplankton abundances versus time	Figure	Weekly, from 7/25/52 - 3/18/53	
2-A	Smayda, 1955	Station I	Wickford Harbor: Mill Creek/Cove (41 34.8 N 71 27.4 W, est)	Average abundances of diatoms, flagellates	Table	Weekly, from	
2-B		Station II	From end of dock near S. boundary of Dutch Island Harbor (41 29.7 N 71 23.8 W, est)	and total phytoplankton at each station, and grand total during summer,		June 1954-Feb 1955	
2-C		Station III	150 feet from E. shore of S. end of Conanicut Island (41 28.8 N 71 20.5 W, est)	summer-fall, mid-fall, fall-winter Abundances of diatoms, flagellates and total phytoplankton versus time at each station	 Figures		
3-A	Smayda, 1957	Station I	same as 2-A	Abundances of diatoms, flagellates and total phytoplankton versus time for each station and mean of all stations	Figures	Weekly, from June 1954-Feb 1955	
3-B		Station II	same as 2-B				
3-C		Station III	same as 2-C	Average seasonal abundances of phytoplankton at each station and grand total mean (same seasons as Smayda, 1955)	Table		
4-A	Pratt, 1959	E1	41 42' N 71 19.3' W (est.): Providence River mouth	Average concentration of diatoms, by season (winter-spring, late spring-early summer, late summer, fall) for individual stations (not all stations sampled for same time period)	Table	St. 4-A: 9/26/55-5/15/56	
4-B		W1	41 41.2 'N 71 26.9' W (est.): Greenwich Bay			St. 4-B: 8/18/52 - 11/10/53, 5/13/53-12/16/53	
4-C		W2	41 40.6' N 71 25.3 'W (est.): Greenwich Bay	Average concentrations of flagellates, by season for individual stations	Table	St. 4-C: 10/4/55-10/15/56	
4-D		W3	41 40.3' N 71 23.8 'W (est.): SE tip of Warwick Neck	Average total population , by season	Table	St. 4-D: 8/18/52-11/10/52	
4-E		W4	41 39.4' N 71 25.4' W (est.): Greenwich Bay	Average and mean deviations of concentrations of diatoms, flagellates, total, combining all stations and years	Table	St. 4-E: 8/18/52-11/10/52	
4-F		W5	41 37.8' N 71 23.2' W (est.): W of Prudence Island	Average concentrations of diatoms, flagellates, total for 52-53, 53-54, 55-56	Table	St. 4-F: 9/22/55-10/15/56	
4-G		W6	41 35.1' N 71 22.5 'W (est.): N of Beaverhead	Seasonal and total average concentrations of diatoms, flagellates, total, for W. Passage, E. Passage, U. Bay, L. Bay (1955-1956)	Table	St. 4-G: 12/17/52-9/29/53, 9/22/55-10/15/56	
4-H		W7	41 34.8 'N 71 27.3 'W (est.): Wickford Harbor			St. 4-H: 8/25/52-11/10/52, 5/13/53-11/18/54	
4-I		W8	41 33.3' N 71 24' W (est.): SE of Wickford Harbor	Concentrations of diatoms, flagellates, total phytoplankton versus time for Sts. 4-A and 4-O	Figure	St. 4- I: 9/22/55-10/15/56	
4-J		W9	41 29.9' N 71 23.8' W (est.): E of S end of Dutch Island			St. 4-J: 8/25/52-11/10/52, 5/13/53-9/27/53, 1/6/54-11/18/54, 9/22/55-10/15/56	
4-K		E2	41 38' N 71 18 'W (est.): E of Prudence Island				
4-L		E3	41 33.2' N 71 19.8' W (est.): middle of East Passage				
4-M		E4	41 31.2' N 71 19' W (est.): Newport Harbor				

4-N		E5	41 28' N 71 21.5' W (est.): W. of Castle Hill light			St. 4-K: 9/26/55-10/15/56
4-O		E6	41 27' N 71 22.6' W (est.): mouth of East Passage			St. 4-L: 9/22/55-10/15/56 St. 4-M: 9/1/52-11/10/52, 5/13/53-9/16/53 St. 4-N: 9/1/52-11/10/52, 5/13/53-9/16/53 St. 4-O: 9/22/55-10/15/56
5-A 5-B	Martin, 1965	Station 1 Station 3	41 38'8" N 781 22'17" W 41 26'47" N 71 25'9" W	Phtoplankton abundances versus time Skeletonema costatum abundances versus time	Figures Figure	Biweekly, from 1/28/59 - 1/9/62
6-A 6-B 6-C	Pratt, 1965	Station 1 Station 2 Station 3	41 38'8" N 71 22'17" W: head of Bay 41 34'7" N 71 23'31" W: mid-Bay 41 26'47" N 71 25'9" W: Bay mouth	Abundances of Skeletonema costatum and total diatoms versus time at Sts. 6-A and 6-C	Figures	Weekly, from 1/21/59 - 6/25/63
				Abundances of diatoms at each station, at diatom maximum, and at post-max flowering	Table	Weekly, from 1/29/59 - 6/25/63
7-A	Martin, 1966	Station 1	41 42.5' N 71 20' W: head of Narragansett Bay	Abundances of Skeletonema costatum and total phytoplankton versus time at each station	Figure	Weekly or biweekly, St. 7-A: 28 sampling dates, 4/27 - 1/18	No year specified
7-B		Station 2	41 34' N 71 23.5' W: in W. Passage, off Wickford	Total phytoplankton at each station and sampling date	Table	St. 7-B: 20 sampling dates, 6/22 - 1/18
7-C		Station 3	41 25' N 71 24' W : 3.2 km S. of Bay mouth			St. 7-C: 18 sampling dates, 6/29 - 1/18
8-A	Pratt, 1966	Middle of W. Passage	41 34'7" N 71 23'31" W	Olisthodiscus luteus versus time	Figures	St. 8-B: 1959-1962, 1964
		Mouth of W. Passage	41 26' 47" N 71 25'9" W	Abundances of Skeletonema costatum and		St. 8-A: 1963,
9-A	Martin, 1968	Station 1	41 42.5' N 71 20' W: head of Narragansett Bay	Abundances of total phytoplankton versus time at each station	Figure	Weekly or biweekly, St. 7-A: 28 sampling dates, 4/27 - 1/18	No year specified
9-B		Station 2	41 34' N 71 23.5' W: in W. Passage, off Wickford			St. 7-B: 20 sampling dates, 6/22 - 1/18
9-C		Station 3	41 25' N 71 24' W : 3.2 km S. of Bay mouth			St. 7-C: 18 sampling dates, 6/29 - 1/18

10-A	McAlice, 1969	Series IV	Seven sampling locations parallel to ebb current from GSO dock (41 29.6 N 71 25.2 W)	Abundances of Skeletonema costatum at each station in Series (10-A, 10-B, 10-C)	Figure	St. 10-A: 2/14/67 St. 10-B:4/4/67 and 4/10/67 St. 10-C:6/28/67
10-B		Series VA and VB	2 series of 15 sampling locations parallel and perpendicular to current direction, near Wickford (41 35.5N 71 26.0 W)			
10-C		Series VI	Stations from drifting boat between Wickford Harbor and Conanicut Point (411 35.5 N 71 25.5 W)			
11	Smayda, 1969	None specified	41 34'7" N 71 23'31" W (probable)	Maximum weekly abundance of Detonula converacea versus time	Table	Jan 1959-April 1967
12	Martin, 1970	Head of Narr. Bay	41 42.5' N 71 20' W	Abundance of Skeletonema costatum versus time	Figure	Weeklu or biweekly, 4/27/65 - 1/10/66
13-A 13-B 13-C	McAlice, 1970	same as McAlice,1969	same as 10-A same as 10-B same as 10-C	Abundances of Skeletonema costatum at each statio in each Series (10-A, 10-B 10-C)	Figures	St. 10-A: 2/14/67 St. 10-B:4/4/67 and 4/10/67 St. 10-C:6/28/67
14-A	Tomas, 1971	Station 1	41 25'41" N 71 29'58" W: S. of Spring Brook Cove	Abundances of diatoms and flagellates at each station versus time	Figures	Biweekly, from May 1968 - May 1969
14-B		Station 2	41 24'48" N 71 30'26" W: opposite mouth of Smelt Brook Cove	Abundances of total phytoplankton at Sts. 14-B, C, D, E versus time	Table	
14-C		Station 3	41 23'12" N 71 30'46" W: opposite S. Jerry Cove			
14-D		Station 4	41 22'14" N 71 30'54" W: near nun buoy N°2			
14-E		Station 5	41 21'48" N 71 30.5' W: at nun buoy near outer Pt. Judith breakwater			
15-A	Miller, 1972	Station A	41 30.25' N 71 27'5" W: 7.2 km above mouth of Pettaquamscutt R.	Abundances of phytoplankton and micro-plankton versus time at 1 meter depth and 1 meter above anoxic layer	Figure	Biweekly, from Oct 1969 - Sept1970, except Nov and Dec
15-B		Station B	41 29.25' N 71 26'35" W (est.): Bridgetown			
15-C		Station C	41 27.25' N 71 26'56" W (est.): Middlebridge			
15-D		Station D	in Narragansett Bay, approx. 0.8 km S. of mouth of Pettaquamscutt R. 41 26 .0 N 71 25.2 W (est.)			

16-A	Hanisak, 1973	Station 1	41 26.5' N 71 25'56" W: Pettaquamscutt R. mouth	Abundances of total phytoplankton, diatoms, flagellates versus time for each station	Figure	Biweekly, from 4/23/72 - 3/13/73
16-B		Station 2	41 26'55" N 71 26'46" W: at Governor Sprague Bridge	Relative abundances of total phytoplankton, diatoms, flagellates versus time for each station	Figure	
16-C		Station 3	41 27'14" N 71 26' 56" W: Middlebridge			
16-D		Station 4	41 29'14" N 71 26'35" W: Bridgetown			
16-E		Station 5	41 31'2" N 71 26'36" W: near inlet of Gilbert Stuart Brook			
16-F		Station 6	41 31.25' N 71 26'38" W: near fish ladder in Gilbert Stuart Brook			
17-A	itchell-Innes, 19:	Station 1	41 26'47" N 71 25'9" W: Whale Rock	Abundances of total phytoplankton, diatoms, flagellates versus time for Sts. 17-A, C, D	Figure	Sts. 17-A, C, D: Biweekly, from July 1968-June 1969
17-B		Station 2	41 34'7" N 71 23'31" W	Mean annual abundances of diatoms, flagellates, and other algae at Sts. 17-A, 17-C, D	Table	St. 17-B: Weekly, from Feb - May 1970; Dec 1970 - May 1971
17-C		Station 3	41 42'48" N 71 20' W: near Nayatt Point (Providence R.)	Mean annual percentage of total population of diatoms, flagellates, and other algae at Sts. 17-A, C, D	Table	
17-D		Station 4	41 45'51" N 71 22'48" W: Sabin Point in Providence R.	Abundances of total phytoplankton, Skeletonema costatum versus time: St. 17-B	Figure	
				Abundances of total phytoplankton for each sampling date	Table	
18-A 18-B	Smayda, 1976	None specified	41 34'7" N 71 23'31" W Charlestown Pond	Maximum monthly abundances of diatoms and flagellates St. 18-A	Figure	St. 18-A: 1960-1974
				Mean annual phytoplankton abundances Narr. Bay and Charlestown Pond	Figure	
19	Hitchcock and Smayda, 1977	Station 2	41 34'7" N 71 23'31" W	Abundances of Skeletonema costatum versus time	Figure	Dec 1972 - Mar 1973
20-A	Gallagher, 1979	Station 1	41 45'51" N 71 22'48" W	Abundances of Skeletonema costatum versus time and depth (3 depths)	Table	7/13/74, 7/14/74, 8/14/74, 8/15/74
20-B		Station 1A	41 38' N 71 23' W (est.)	Contours of Skeletonema costatum: lateral and vertical profiles for each sampling date	Figures	
20-C		Station 2	41 34'7" N 71 23'31" W			
20-D		Station 2A	41 30.5' N 71 25' W (est.)			
20-E		Station 3	41 26'47" N 71 25'9" W			
21	Deason, 1980	Lower Narr. Bay	41 34'7" N 71 23'31" W (probably)	Abundances of Skeletonema costatum and total phytoplankton versus time	Figures	Jan 1972 - Dec 1977, except most summer months
22-A	Tomas, 1980	Station 1	41 45' N 71 23' W (est.): Prov. R.	Average monthly abundances of Olisthodiscus luteus for St. 22-O, 1959-1975	Figure	5/1/74 - 7/6/74
22-B		Station 2	41 43' N 71 20.5' W (est.): Prov. R.	Distribution of O. luteus at each station	Figures and Table	
22-C		Station 3	41 42.5' N 71 21.5' W (est.): Prov. R.	Summary of maximum abundances of O. luteus at each station		
22-D		Station 4	41 42' N 71 20.5' W (est.): mouth of Providence R.			

22-E		Station 5	41 42' N 71 13.5' W (est.): Mt. Hope Bay	Some vertical abundances of O. luteus at stations in Wickford Harbor (not all station have vertical profiles) 6/19/75	Figure		
22-F		Station 6	41 40.8' N 71 25' W (est.): Greenwich Bay				
22-G		Station 7	41 39.7'N 71 13' W (est.): Mt. Hope Bay				
22-H		Station 8	41 28.5' N 71 23.5' W (est.): west of Prudence Island				
22-I		Station 9	41 28.5' N 71 17.5' W (est.): south of Hog Island				
22-J		Station 10	41 35' N 71 26' W (est.): outside Wickford Harbor				
22-K		Station 11	41 35' N 71 22.5' W (est.): north of Conanicut Island				
22-L		Station 12	41 31' N 71 26' W (est.): NW of Dutch Island				
22-M		Station 13	41 32' N 71 20' W (est.): East of Newport Harbor				
22-N		Station 14	41 27' N 71 26' W (est.): mouth of West Passage				
22-O		Station II	41 34'7" N 71 23'31" W				
22-P		Sts. A through	Wickford Harbor				
23	Deason and Smayda, 1982	Station 2	41 34'7" N 71 23'31" W	Abundances of Skeletonema costatum and total phytoplankton versus time	Figure	June 1972-Nov 1977	
23	Dwyer, 1980	Station 2	41 34'7" N 71 23'31" W	Weekly counts of total phytoplankton	tables	1960-1974	
24-A	Farmer et al., 1982	Station 1	41 25.5' N 71 22.5' W (est.): RI Sound	Abundances of total phytoplankton and diatoms for each station	Tables	3/16/78 (am)	Sampling date a few days following winter-spring diatom bloom
24-B		Station 3	41 27' N 71 25' W (est.)				
24-C		Station 5	41 29.5' N 71 24' W (est.): S of Dutch Island				
24-D		Station 7	41 31.25' N 71 24' W (est.)				
24-E		Station 9	41 34.5' N 71 23.5' W (est.)				
24-F		Station 11	41 37.5' N 71 23.2' W (est.)				
24-G		Station 13	41 39.5' N 71 22.5' W (est.): S. of Warwick Neck				
24-H		Station 15	41 42' N 71 20.5' W (est.)				
24-I		Station 17	41 44.2' N 71 21' W (est.)				
24-J		Station 19	41 45.5' N 71 22.5' W (est.): near mouth of Pawtuxet R.				
24-K		Station 21	41 48.5' N 71 23.5' W (est.): Providence Harbor				
25	Gallagher, 1982	None specified	41 35' N 71 20' W	Abundances of Skeletonema costatum and total phytoplankton versus time	Figure	May 1975-Mar 1977	

26	Karentz and Smayda, 1984	Station II	41 34' N 71 23' W	Occurences of Skeletonema costatum, O. luteus, etc.	Figures	1959- 1980
27	Smayda, 1984	None specified	41 34'7" N 71 23'31" W (probably)	Maximum monthly abundances of diatom plus flagellates versus time	Figure	1960-1974
28	MRI 1974-1983	Spar Island	Mt. Hope Bay 41 40 N 71 13 W (est.)	Monthly abundances of diatoms, flagellates, ciliates	Table	12/5/74 - 10/19/83

Deason EE., 1980, Grazing of Acartia hudsonica (A. clausi) on Skeletonema costatum in Narragansett Bay (USA): influence of food concentration and temperature. Marine Biology 60:101-113.

Deason EE. and Smayda TJ., 1980, Ctenophore-zooplankton-phytoplankton interactions in Narragansett Bay, Rhode Island, USA, during 1972-1977, J. Plankton Research 4:219-236.

Data sets were combined

ORIGINAL STATION ID: Station 2
LOCATION: 41 34'7" N 71 23'31" W (lower Narr Bay)
MAP ID: 21

Dates and data were digitized from a graph in original paper, both are approximate

UNITS: cells/ml

Month	JUL DAY	SKEL	TOTAL
1/72	4	2500	2600
	12	4000	5200
	19	12000	12000
	25	9000	13000
2/72	35	1200	1300
	43	70	500
	50	80	800
	56	45	1300
3/72	64	55	3900
	71	50	3200
	79	85	4000
	84	60	2000
4/72	94	62	600
	102	1300	1300
	109	10	580
	115	500	2600
5/72	125	520	2400
	131	7000	7300
	139	900	1300
	144	800	1200
	151	600	1200
6/72	155	200	500
	163	700	2100
	170	210	10000
	178	260	380
7/72	183	2200	6600
	201	3300	5900
8/72	224	10100	10200
	229	3300	3400
9/72	247	560	610
	253	1100	1150
	260	1150	3000
	267	240	600
	272	26	450
10/72	277	400	500
	283	340	640

Month	Julian day	SKEL	TOTAL
1/73	4	40	200
	12	40	90
	19	20	100
	24	110	250
	31	400	700
2/73	37	510	900
	45	600	1000
	50	1100	2000
	59	4000	10000
3/73	65	3500	9000
	73	3800	8000
	80	600	1800
	87	120	1900
4/73	95	34	1700
	102	120	5000
	109	60	1900
	115	50	640
	120	60	2300
5/73	126	0	4800
	142	0	1000
6/73	157	5	110
	165	0	1750
	172	0	1650
	181	5	650
7/73	187	0	2400
	195	0	700
	202	0	2100
	211	0	780
8/73	217	19000	19200
	223	32000	21200
	231	19500	19700
	240	8400	8500
9/73	247	6900	7000
	255	3400	4000
	261	60	370
	267	450	2000

	291	70	180
	302	45	450
11/72	308	190	470
	315	0	195
	324	9	180
	332	95	320
12/72	338	400	650
	345	95	450
	353	50	190
	362	55	105

Month	Julian day	SKEL	TOTAL
1/74	1	5	250
	7	4	245
	15	20	200
	20	49	75
	27	200	35
2/74	35	700	900
	42	1000	1050
	51	4200	4400
	58	10000	11000
3/74	62	10500	11500
	70	110	410
	79	52	450
	83	2	1000
	90	49	2000
4/74	94	30	1800
	102	100	3800
	109	40	3000
	118	80	2900
5/74	124	105	1900
	132	120	900
	139	75	350
	147	4000	5000
6/74	154	800	1900
	161	0	5050
	169	0	10000
	177	0	650
7/74	184	18000	19000
	192	11000	12000
	201	4500	5000
	210	9000	10000
8/74	217	14000	15000
	224	7000	8000
	233	5500	7000
	242	28000	30000
9/74	248	9000	11500
	256	29	40
	262	2	65
	270	28	65
10/74	279	0	32
	285	0	35

	273	40	310
10/73	278	1700	7000
	286	3100	4200
	294	5000	4300
	303	6100	6500
11/73	309	2500	2900
	316	2100	2200
	324	4000	4100
	331	5000	5100
12/73	336	350	400
	341	2	65
	354	50	80

Month	Julian day	SKEL	TOTAL
1/75	3	2	70
	10	0	100
	19	0	300
	27	1	65
2/75	35	1	350
	44	20	450
	50	25	300
	58	90	600
3/75	64	360	3200
	73	2200	7500
	80	3000	10000
	89	2000	4500
4/75	94	0	700
	103	1	4000
	108	0	1100
	114	0	560
	120	30	610
5/75	126	5	1900
	134	1	640
	140	35	1300
	148	0	400
6/75	156	5	450
	164	50	720
	170	500	2000
7/75	185	3900	4500
	192	130	720
	200	160	700
	208	20	300
8/75	215	4000	4400
	221	57000	60000
	228	7800	9000
	234	20000	24000
9/75	244	6000	9000
	250	3000	6000
	256	450	6100
	269	500	4000
10/75	277	520	2200
	285	42	730
	293	120	1700
	301	200	750

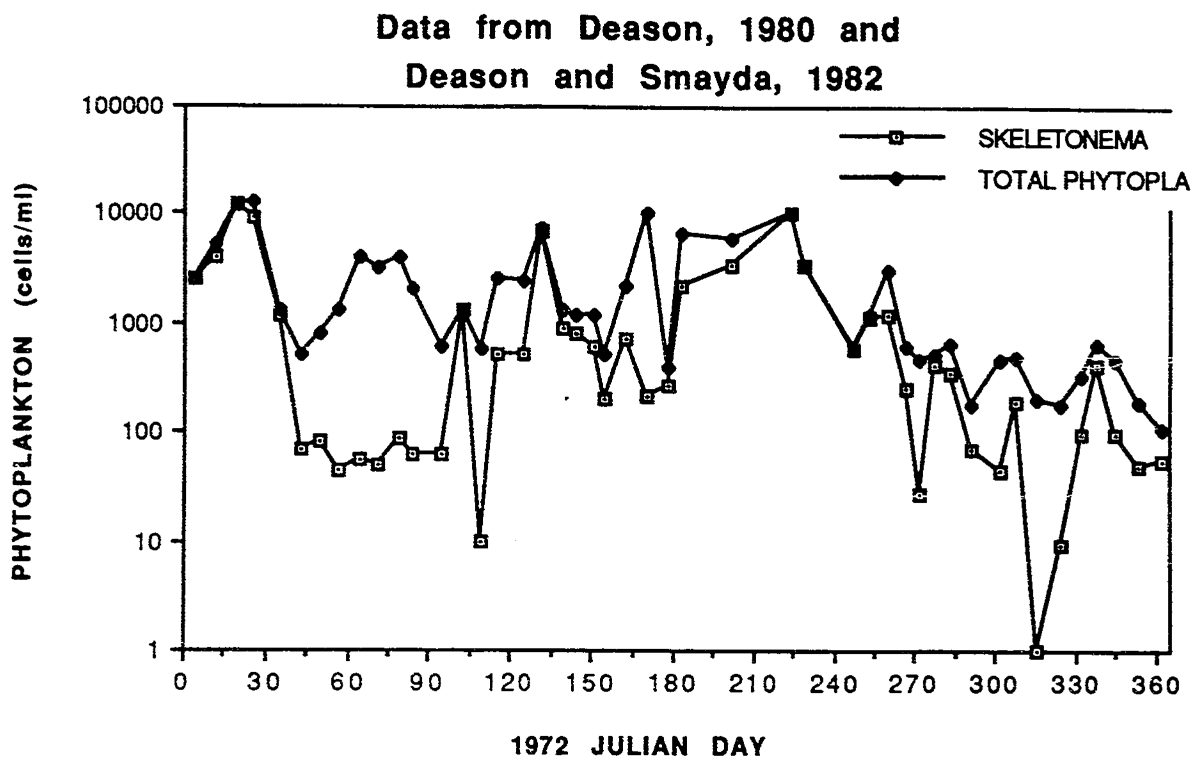
	293	0	220
	303	0	350
11/74	311	600	770
	319	330	500
	324	110	490
	333	2	400
12/74	337	65	750
	344	140	1500
	347	140	490

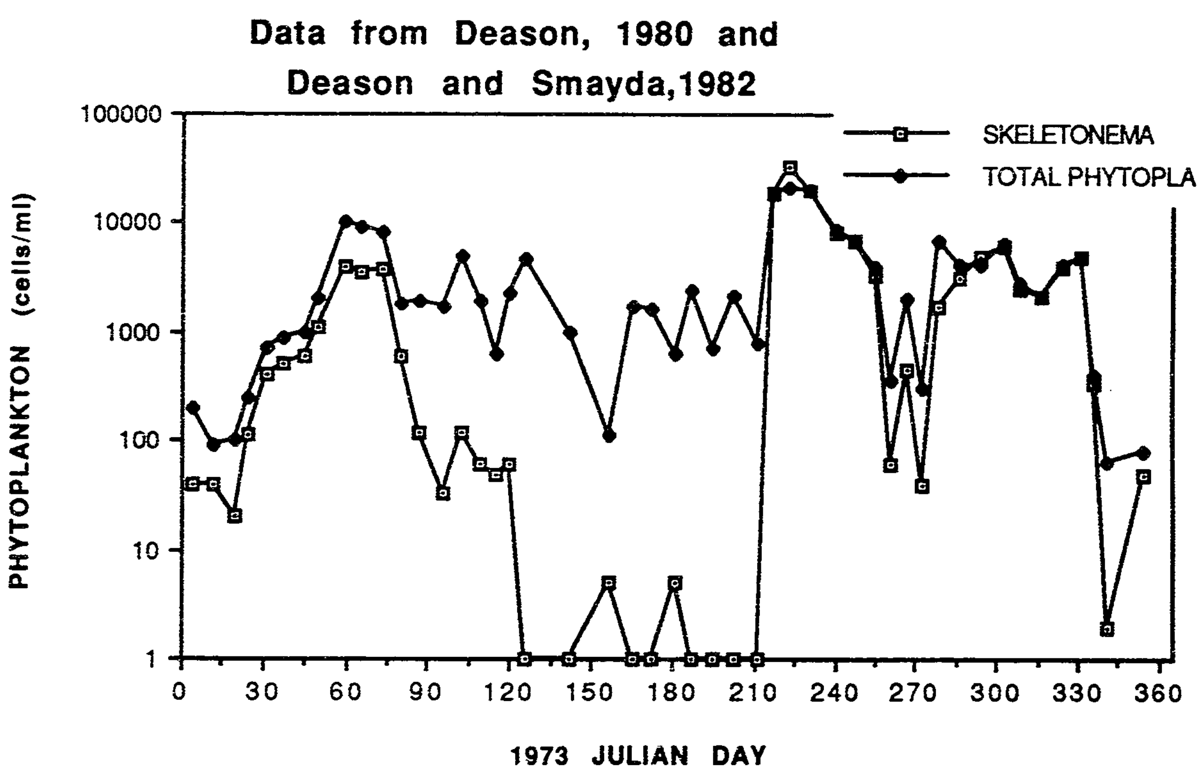
11/75	308	0	120
	315	1	1600
	324	1	1050
12/75	336	0	250
	346	0	400
	353	5	130
	360	120	700

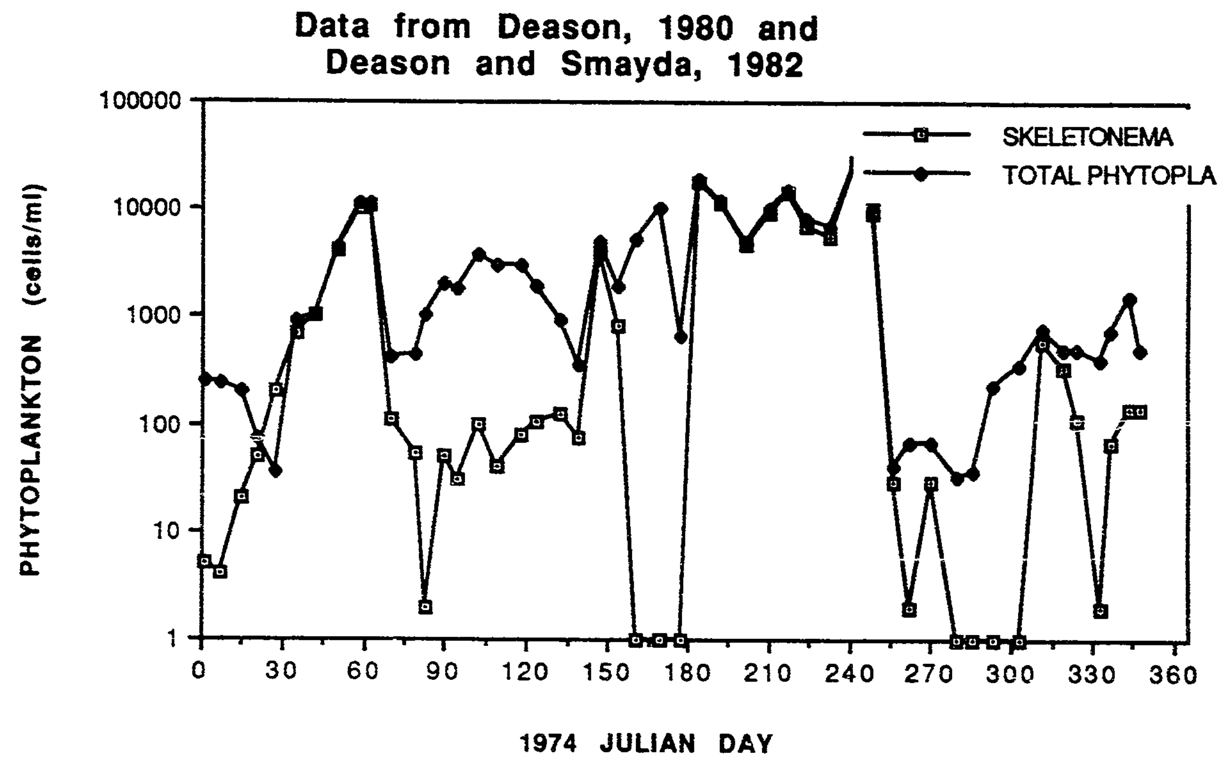
Month	Julian day	SKEL	TOTAL
1/76	3	300	450
	11	350	420
	20	1000	1500
	29	950	1200
2/76	35	1100	1500
	44	1900	2200
	51	11000	12000
	59	3000	5000
3/76	63	200	400
	72	500	750
	79	5000	6000
	88	3500	5000
4/76	93	200	400
	99	600	1100
	107	300	1000
	113	1	350
	120	10	400
5/76	125	9	450
	133	1	700
	140	400	1100
	149	0	3000
6/76	156	0	30000
	163	0	750
	171	25	3000
	181	105	1000
7/76	186	80	2100
	195	140	790
	202	190	690
	211	1	180
8/76	216	90	2100
	223	3900	5000
	231	11000	12000
	239	3800	4100
9/76	248	1050	3400
	257	0	10000
	265	0	5800
	272	0	250
10/76	300	1	200
11/76	308	1	400
	315	50	420
	322	800	1900
	328	550	3000
	334	290	6200

Month	Julian day	SKEL	TOTAL
1/77	4	2000	9900
	10	4500	9900
2/77	36	2500	6000
	43	1200	3300
	51	1100	2900
3/77	69	2600	5800
	74	6000	10000
	86	5500	6100
4/77	93	3300	3700
	102	3000	3300
	109	800	1400
	117	2900	3300
5/77	123	2800	3250
	130	2750	3250
8/77	223	120	4000
	232	110	2200
	242	5800	14000
9/77	247	11500	16000
	255	160	1800
	263	45	1850
	272	50	1800
10/77	278	600	3000
	285	41	1900
	292	1	290
	301	28	600
11/77	317	19	160
	325	60	390
12/77	336	55	1000
	345	110	550
	355	120	990

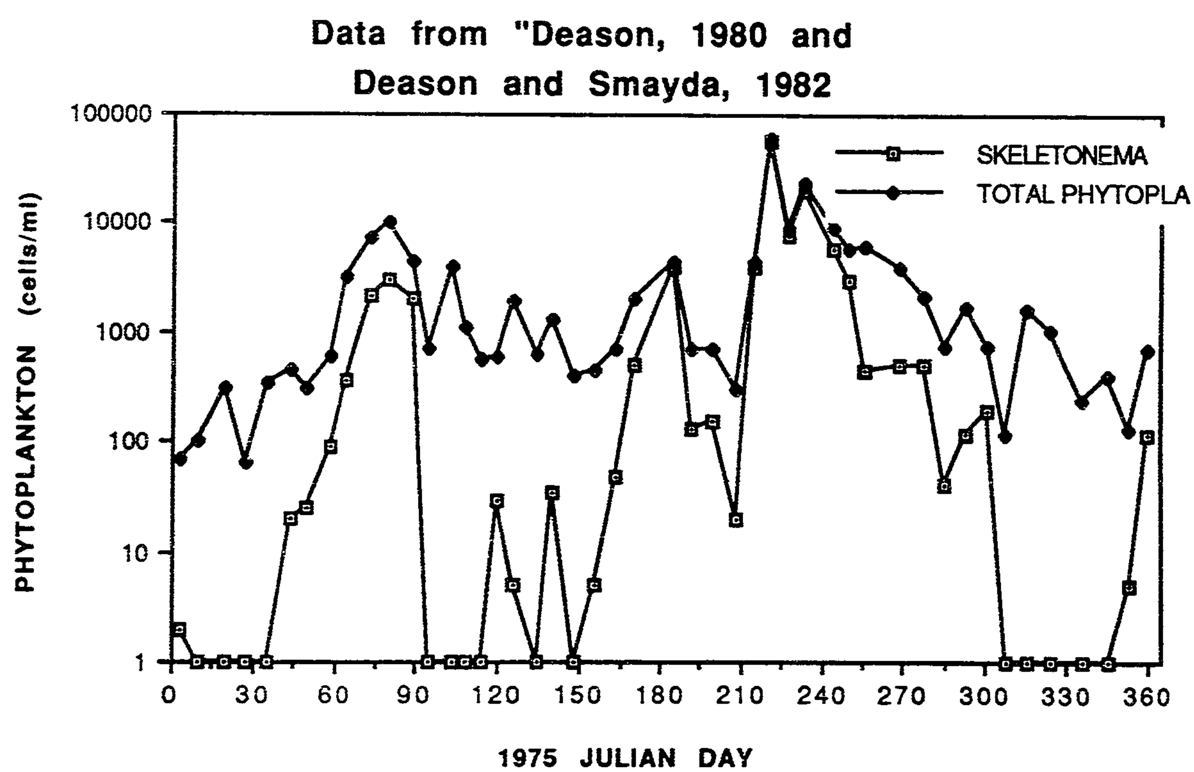
12/76	336	310	7500
	344	260	5400
	352	550	3000
	358	1000	4000


Data from Deason, 1980 and
Deason and Smayda, 1982
SKELETONEMA
TOTAL PHYTOPLA
PHYTOPLANKTON (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1972 JULIAN DAY


Data from Deason, 1980 and
Deason and Smayda,1982
SKELETONEMA
TOTAL PHYTOPLA
PHYTOPLANKTON (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1973 JULIAN DAY

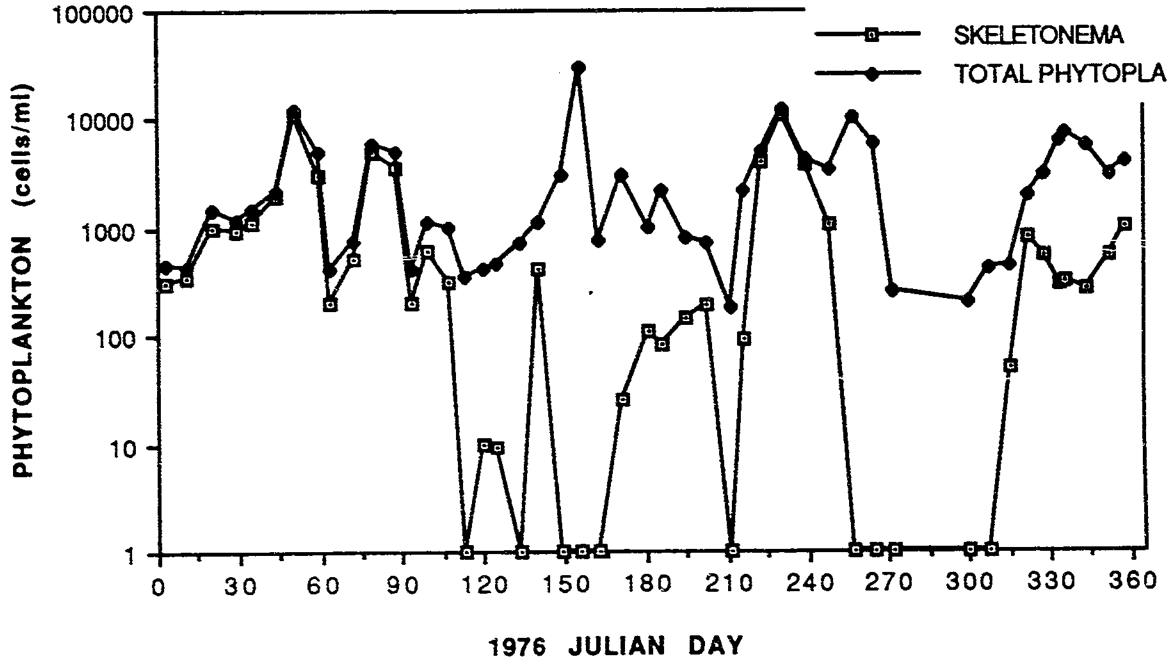


Data from Deason, 1980 and
Deason and Smayda, 1982
100000
10000
1000
100
10
1
PHYTOPLANKTON (cells/ml)
SKELETONEMA
TOTAL PHYTOPLA
0 30 60 90 120 150 180 210 240 270 300 330 360
1974 JULIAN DAY

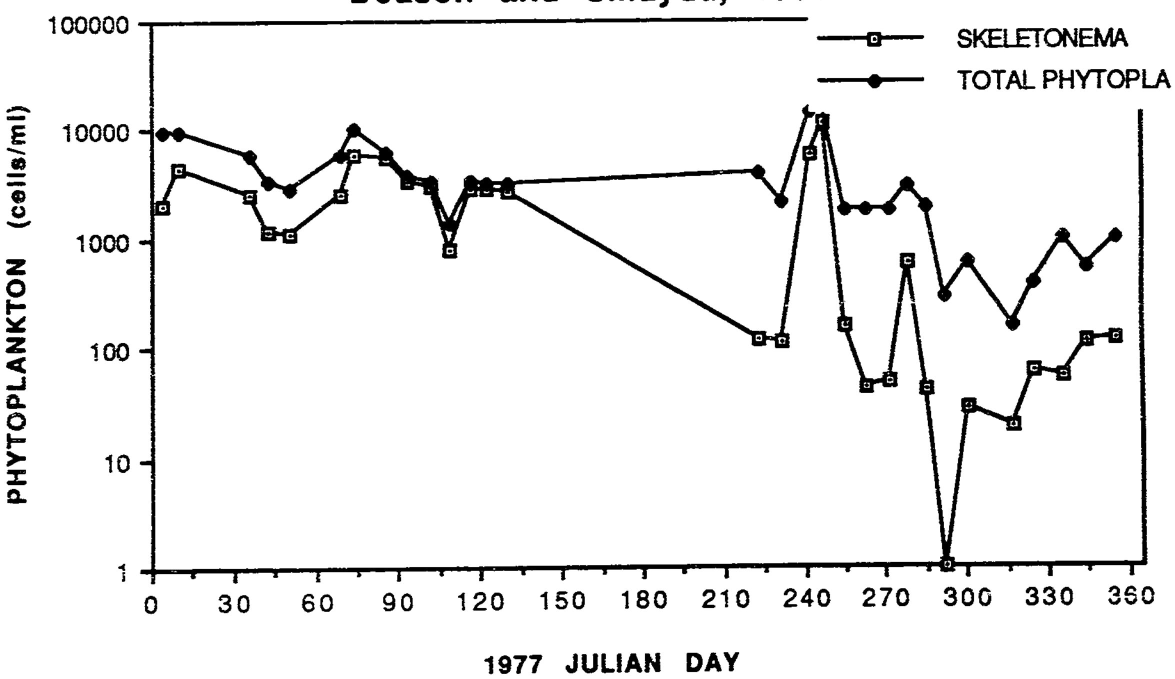


Data from "Deason, 1980 and
Deason and Smayda, 1982
100000
10000
1000
100
10
1
PHYTOPLANKTON (cells/ml)
SKELETONEMA
TOTAL PHYTOPLA
0 30 60 90 120 150 180 210 240 270 300 330 360
1975 JULIAN DAY

Data from "Deason, 1980 and Deason and Smayda, 1982



Data from Deason, 1980 and Deason and Smayda, 1982



Dwyer R. L., 1980, Frequency Domain Studies of the Dynamics of an Estuarine Ecosystem, PH. D Dissertation, University of Rhode Island, Kingston RI., 158p.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 2	41 34'7" N 71 23'31" W	21

Data was taken from a table

UNITS: cells/ml

WEEK	YEAR 1960	1961	1962	1963	1964	1965
1	249	3591	2514	29256	1475	1437
2	279	6113	3786	37445	2670	1441
3	393	10071	11020	43411	2666	1176
4	523	13799	12771	30112	5142	1823
5	856	9167	21009	2802	14215	1792
6	4040	9607	10112	4421	17152	2914
7	5721	7522	13025	2725	17964	4345
8	10140		4672	4870	12910	15200
9	6502	10266	4158	5849	1300	7202
10	4157	11528		9917	1998	4839
11	2813	5755	6845	4430	26883	3575
12	4497	3873	10504	4601	3001	1916
13	2654	3340	6267	2371	3763	5651
14	7481	1160	7225	3224	3281	6822
15	4535	4310	6942	4216	1470	5900
16	3895	3878	5549	7619	6385	1401
17	3511	2411	3200	4325	9158	4159
18	1156	3108	9301	5778	10742	2288
19	2121	487	3731	7079	1275	1393
20	2807	364	1085	3005	1394	354
21	5447	1231	983	2151	2117	915
22	1614	1529	4536	4273	1637	1845
23	2750	2062	2414	2276	1610	2272
24	909	1059	4074	3004	1741	1309
25	1866	1299	6126	2672	1943	1047
26	1598	2923	36866	2055	2740	921
27	2571	6176			2134	1151
28	582	3881	6673	1985	5403	7491
29	471	3233	7541	1950	2519	2293
30	3249	8479	9641	1915	7580	3208
31	9165	2714	2002	1880	5039	12353
32	1993	762	2446	1845	14786	11682
33	1600	8839		1810	817	8071
34	1802	14812	5267	1775	1064	4439
35	3248	6346	3350	1740	686	10208
36	243	1426	889	1705	13207	5557

WEEK	YEAR 1960	1961	1962	1963	1964	1965
37	508	1027	10607	1670	3443	4786
38	1236	561	8025	1636	1266	1610
39	4282	938	13068	1600	2358	5789
40	2726	13473	2546	1564	628	4953
41	726	2734	2388	1529	2172	4850
42	13538	1338	4214	1494	3741	4042
43	4799	1483	9238	1459	3777	2900
44	1153	489	3845		1959	2599
45	7785	735	5205		2886	2088
46	5542	1064	4363		1214	1959
47	6971	537	2881		248	1102
48	10262	1060	2157		1680	2615
49	1701	728	4001		3802	2182
50	1624	567	1780			3679
51	957	679	3728	1179		3584
52	3657	1012	16492	1379		3052

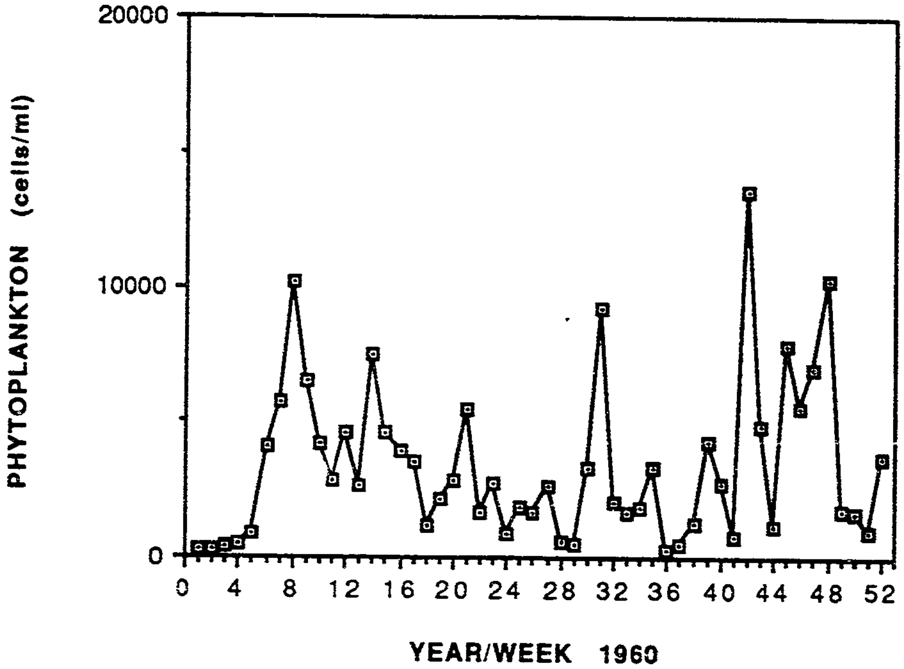
WEEK	YEAR 1966	1967	1968	1969	1970	1971
1	5830	8858	12541	18082	466	2493
2	10206	6683	12517	21005	480	3757
3	13416	13645	12492	8048	677	5013
4	18021	29616	8902	8200	416	6269
5	7811	19593	4023	2795	1205	11428
6	3087	9901	12267	4840	958	9795
7	2146	4082	12262	3275	1793	4985
8	1735	11974	5457	9779	2628	8272
9	8658	2886	7412	8761	2410	4032
10	6649	3633	5744	6657	2130	7386
11	5738	3433	3234	5642	1594	6243
12	4724	3233	8122	4222	2383	5099
13	3885	3706	6725	33191	4540	4483
14	3992	3518	11523	23366	998	1384
15	21085	6008	8319	6464	3533	6563
16	5837	4458	5114	25751	3117	3456
17	5004	2908	7936	6265	991	349
18	8157	4813	2931	6280	931	969
19	2027	6340	3547	6296	870	4985
20	8903	3799	2935	7101	810	4045
21	14101	3536	4359	9276	749	6001
22	5040	9001	8167	3325	689	7958
23	10054	3454	2992	23384	1476	736
24	1520	3409	4258	13444	2609	1415
25	5981	4205	7309	3503	1293	2132
26	4410	5436	10170	5299	1643	5432

WEEK	YEAR 1966	1967	1968	1969	1970	1971
27	22902	3991	6424	3377	2259	2323
28	9330	4087	2281	2340	1679	6127
29	9300	4687	11858	6696	1099	14055
30	2412	5398	2339	11051	9176	5902
31	4252	2946	3658	15407	56722	4467
32	3724	4702	2400	6324	9495	70
33	16	10061	6685	4433	10352	919
34	4794	6793	7088	2542	2669	626
35	6644	6191	6091	651	2340	1075
36		5036	2151	368	6410	2087
37	5306	3881	3908	1367	1000	669
38	1453	2634	5665	7098	1510	932
39	3770	4901	6998	21	6529	544
40	2065	3405	2347	2564	4403	377
41	3802	2562	2479	2860	397	210
42	5013	4220	2611	962	344	208
43	2748	5116	2375	1180	610	205
44	2603	5367	2138	1948	495	202
45	3244	4020	2854	3648	317	199
46	2638	3300	1813	1546	139	325
47	2511	2975	772	2499	493	535
48	4103	3819	1206	2438	440	617
49	2606	3806	1503	2376	387	1192
50	2639	3415	3227	1671	334	799
51	4773	3025	10867	3457	711	405
52	4069	10592	15159	1186	1228	814

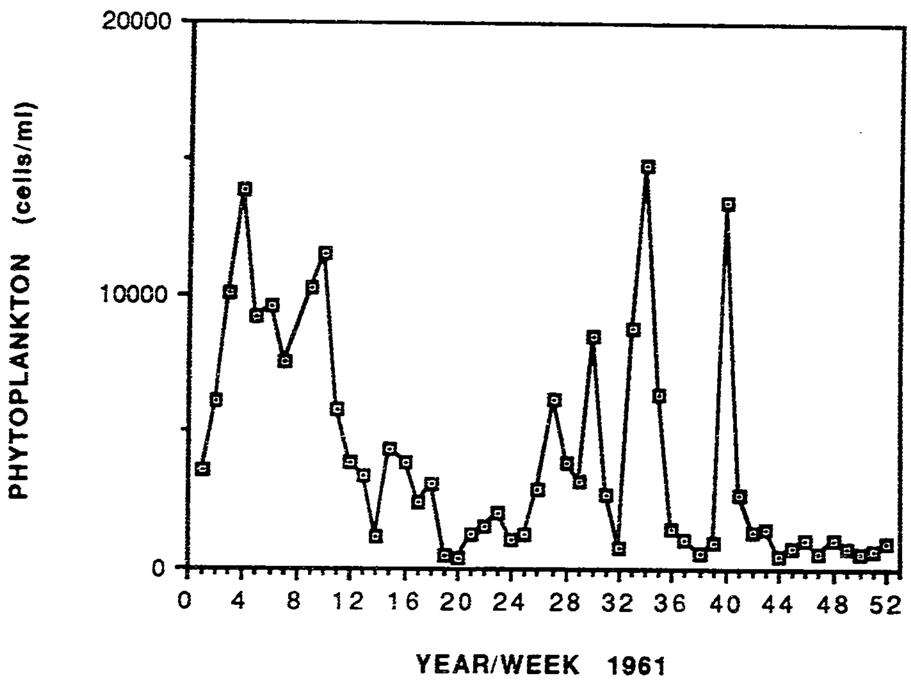
WEEK	YEAR 1972	1973	1974
1	2761	220	272
2	5465	84	265
3	12475	100	195
4	14040	280	83
5	1840	756	326
6	517	939	971
7	935	1157	1321
8	1470	1986	5441
9	4450	10265	13238
10	4077	8712	14117
11	3703	7575	407
12	4649	180	458
13	2334	1990	984
14	734	1560	1868
15	1604	4362	1627

WEEK	YEAR 1972	1973	1974
16	678	1894	3822
17	2923	667	2612
18	2365	2439	2567
19	9350	4568	1825
20	1606	824	933
21	1389	3079	373
22	1323	1598	5083
23	490	116	1901
24	2275	1598	5596
25	11326	1969	10200
26	387	673	4163
27	6729	2688	691
28	6311	788	19436
29	5893	2285	13521
30	7256	1182	5410
31	8620	79	9894
32	9983	21542	12724
33	11346	39182	15554
34	4077	23099	7809
35	2389	9429	7052
36	701	7522	31202
37	1328	4334	10252
38	3015	381	35
39	631	2036	64
40	462	344	62
41	535	7657	33
42	704	4831	34
43	170	5317	239
44	444	7407	228
45	487	3049	769
46	189	2512	479
47	176	4011	449
48	337	5424	363
49	672	369	
50	387	70	
51	179	115	
52	124	194	

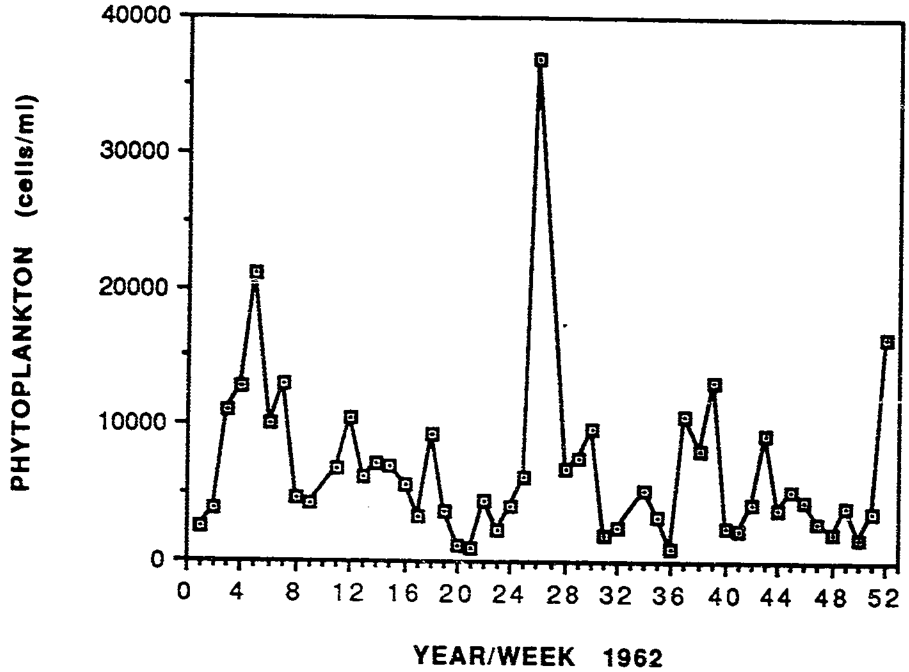
Data from "DWYER, 1980"



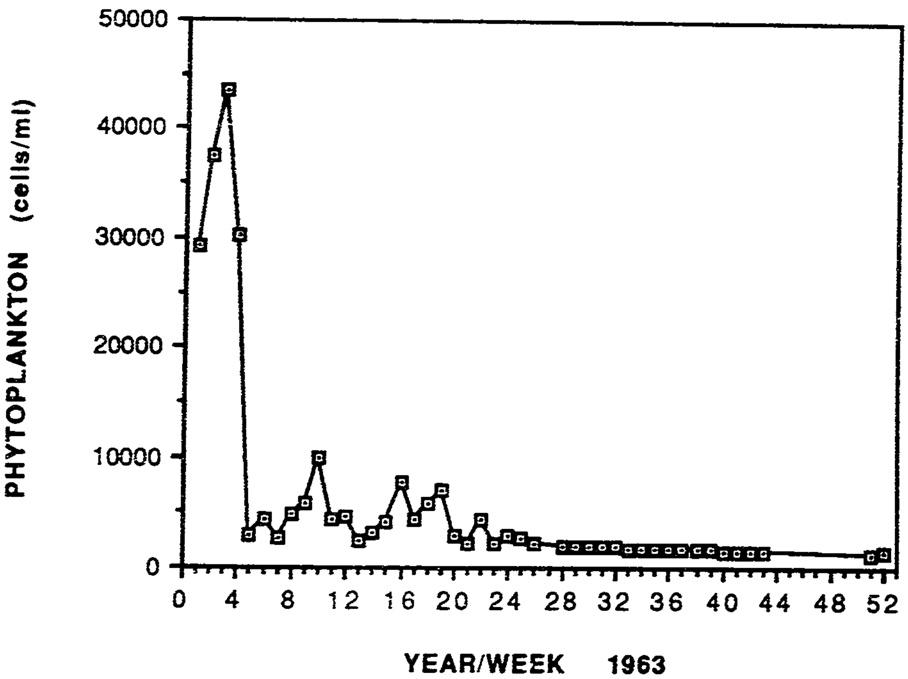
Data from "DWYER, 1980"



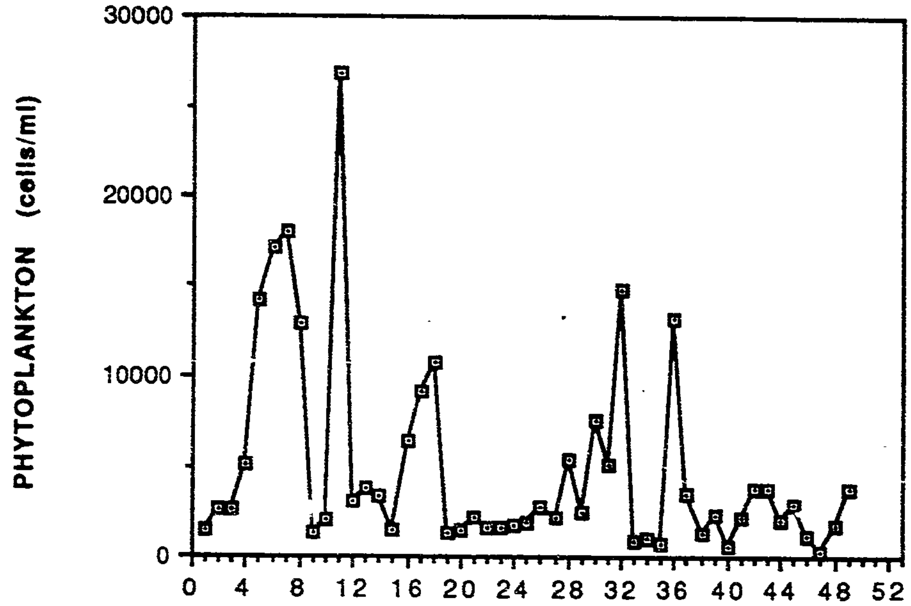
Data from "DWYER, 1980"



Data from "DWYER, 1980"

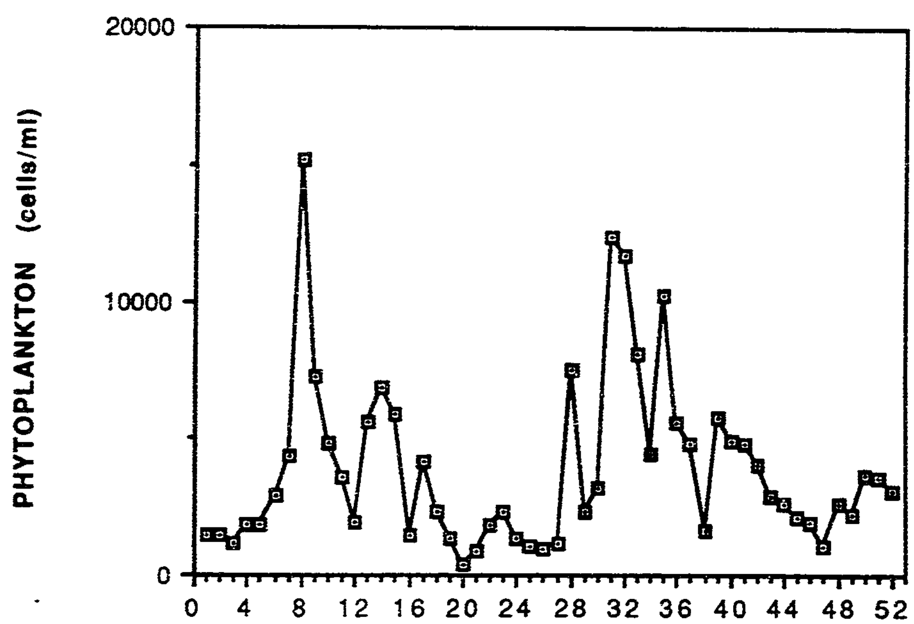


Data from "DWYER, 1980"



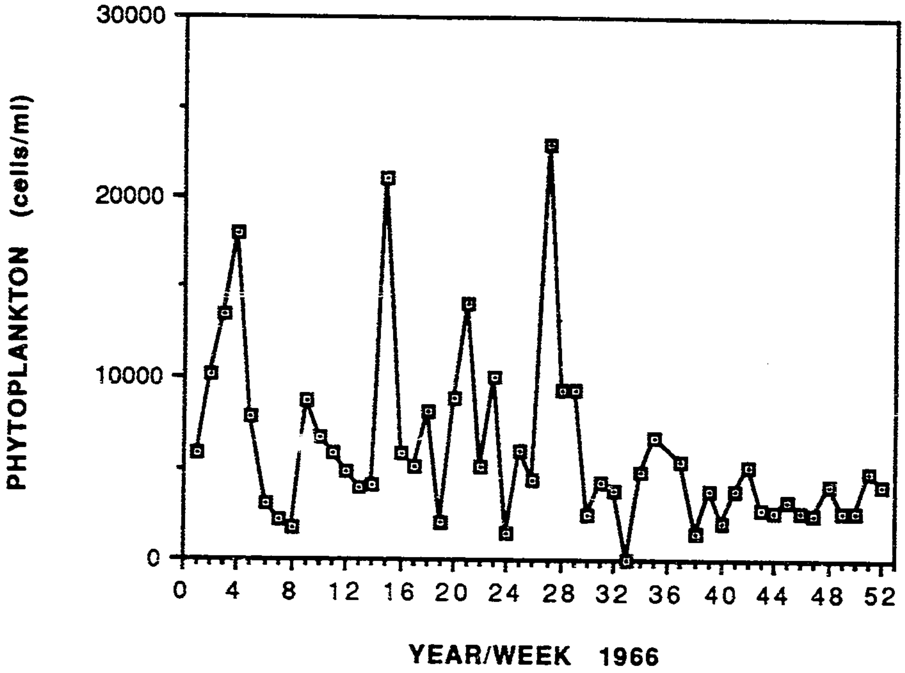
YEAR/WEEK 1964

Data from "DWYER, 1980"



YEAR/WEEK 1965

Data from "DWYER, 1980"



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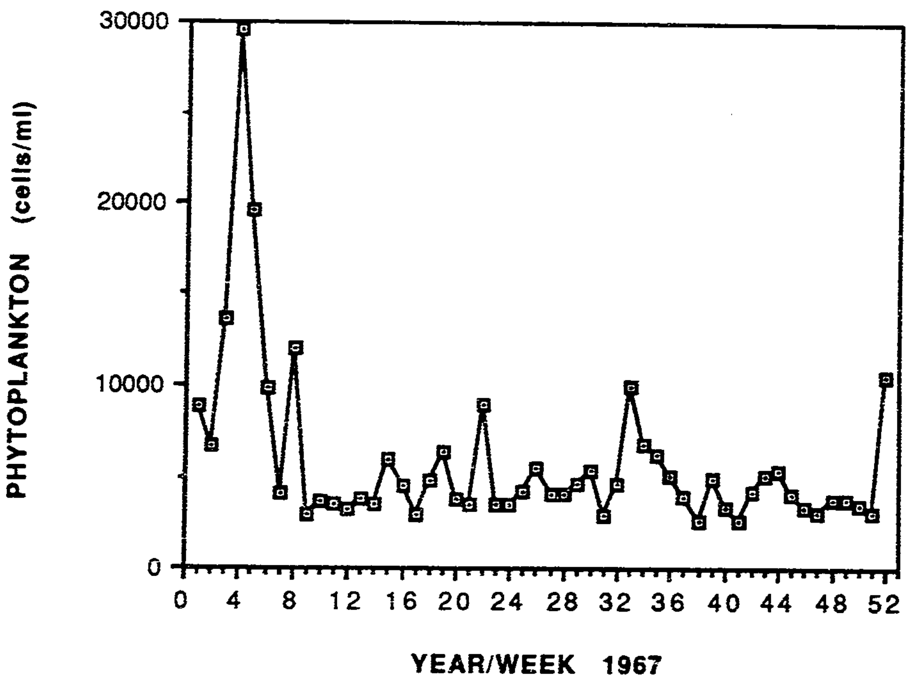

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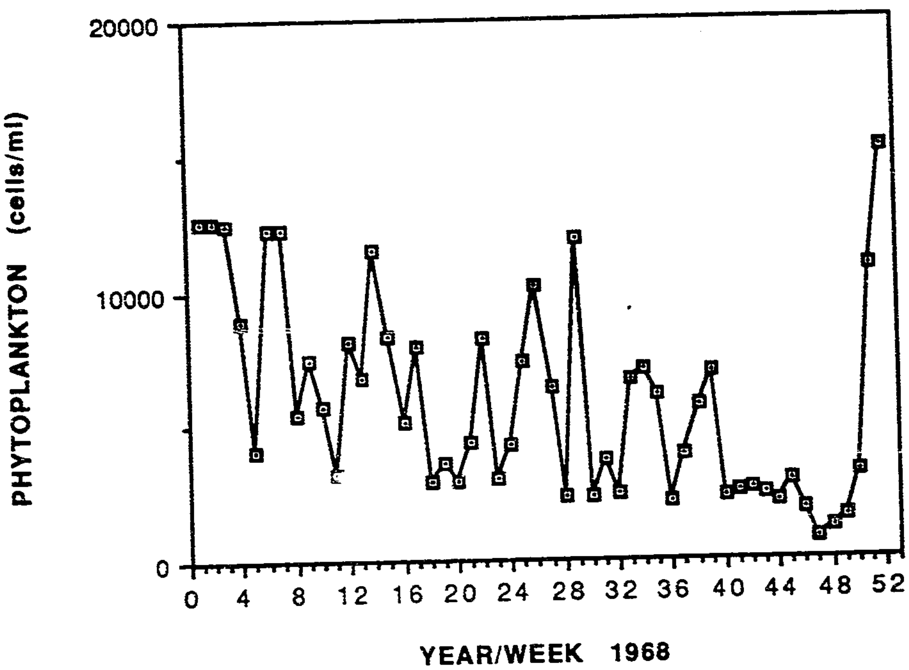

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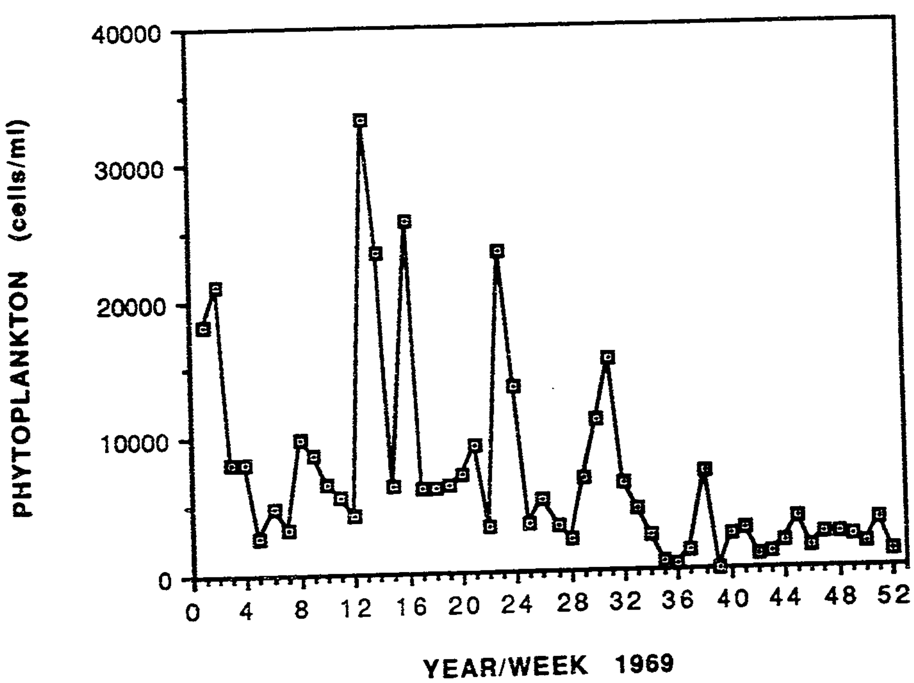

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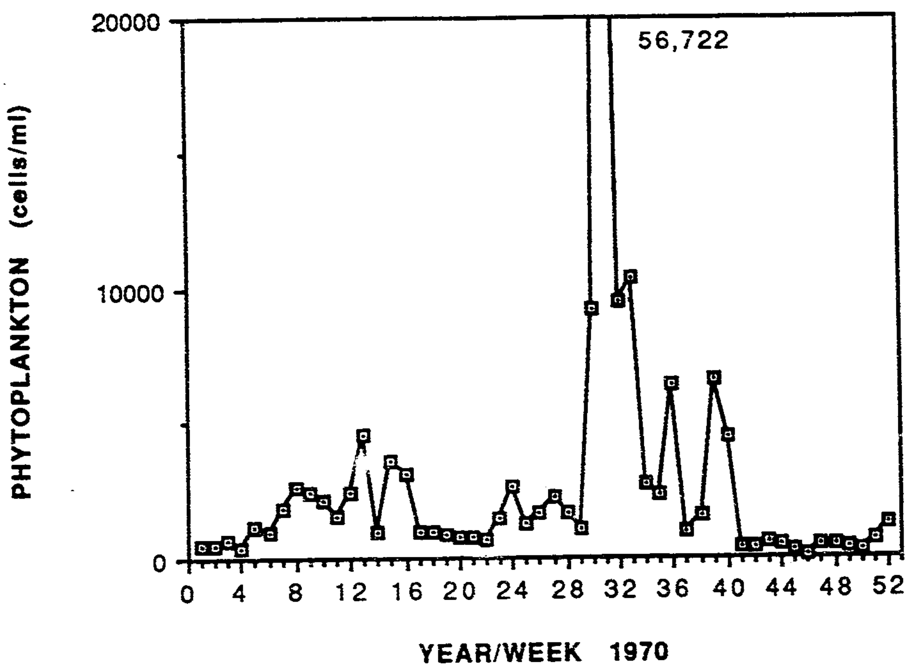

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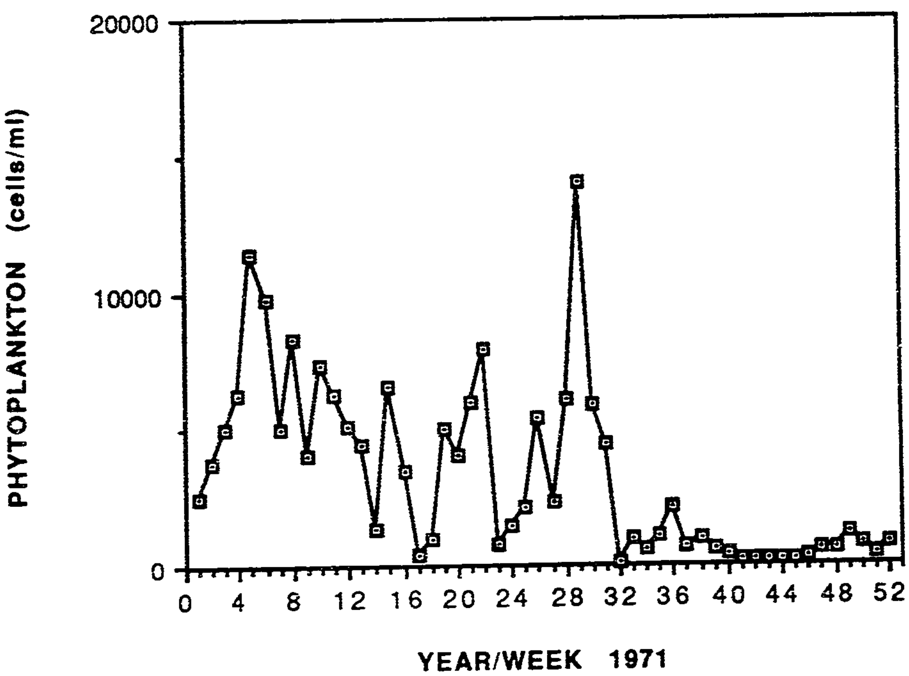
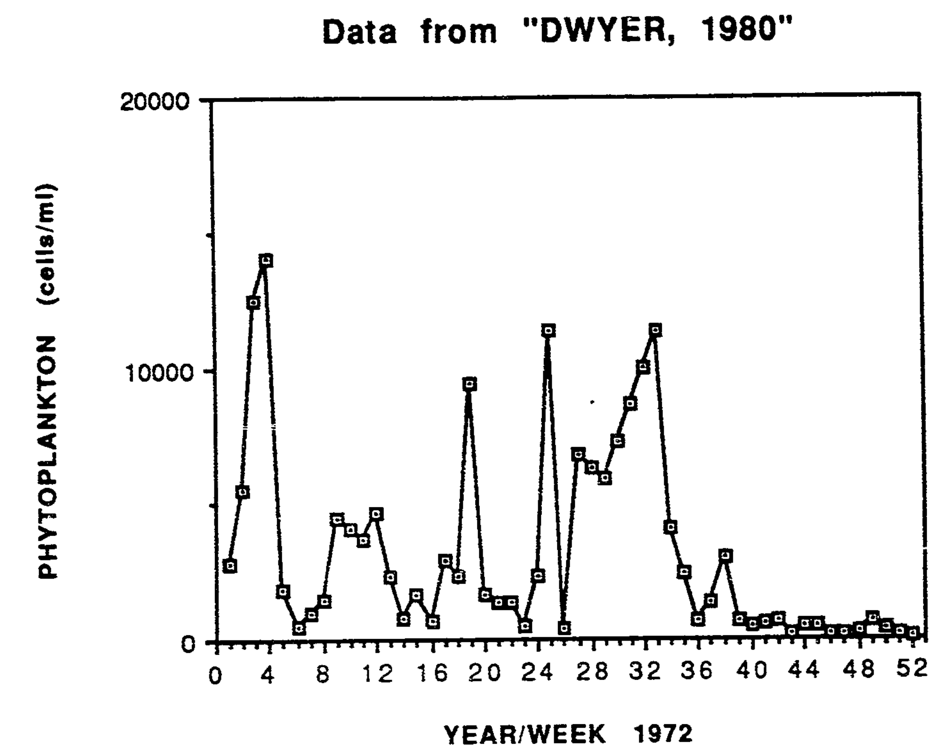
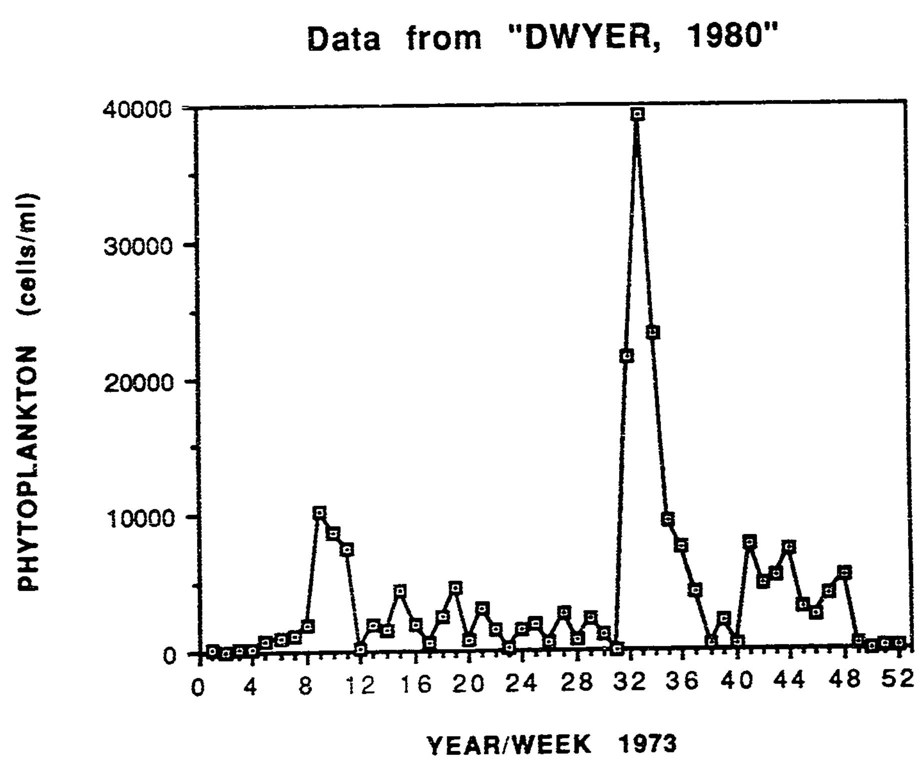
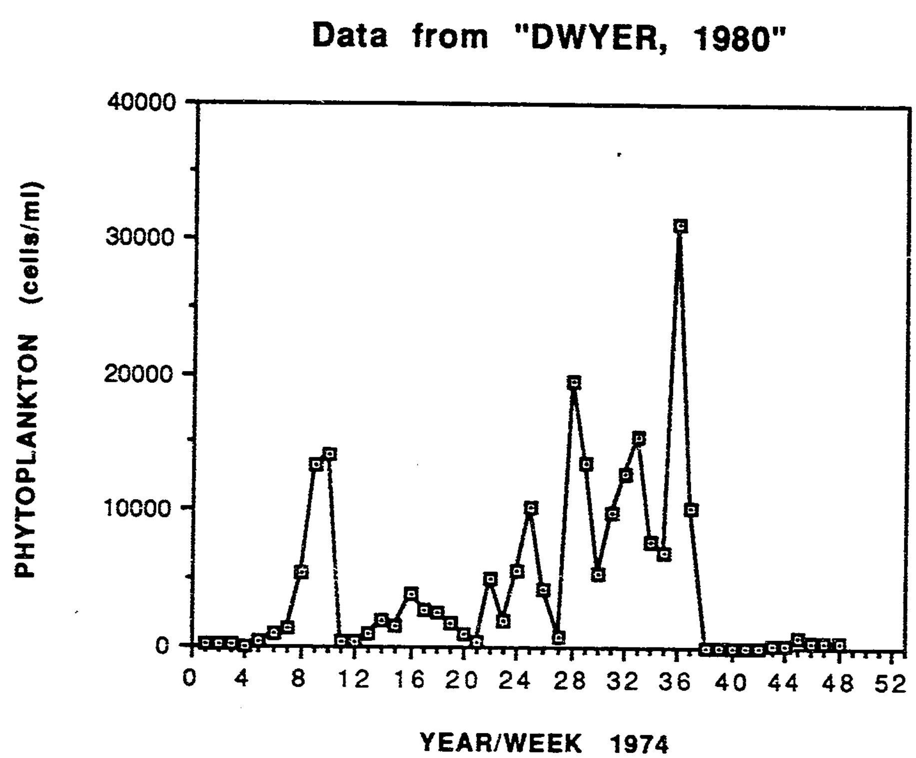



Data from "DWYER, 1980"
20000
10000
0
0 4 8 12 16 20 24 28 32 36 40 44 48 52
PHYTOPLANKTON (cells/ml)
YEAR/WEEK 1972


Data from "DWYER, 1980"
40000
30000
20000
10000
0
0 4 8 12 16 20 24 28 32 36 40 44 48 52
PHYTOPLANKTON (cells/ml)
YEAR/WEEK 1973


Data from "DWYER, 1980"
40000
30000
20000
10000
0
PHYTOPLANKTON (cells/ml)
0 4 8 12 16 20 24 28 32 36 40 44 48 52
YEAR/WEEK 1974

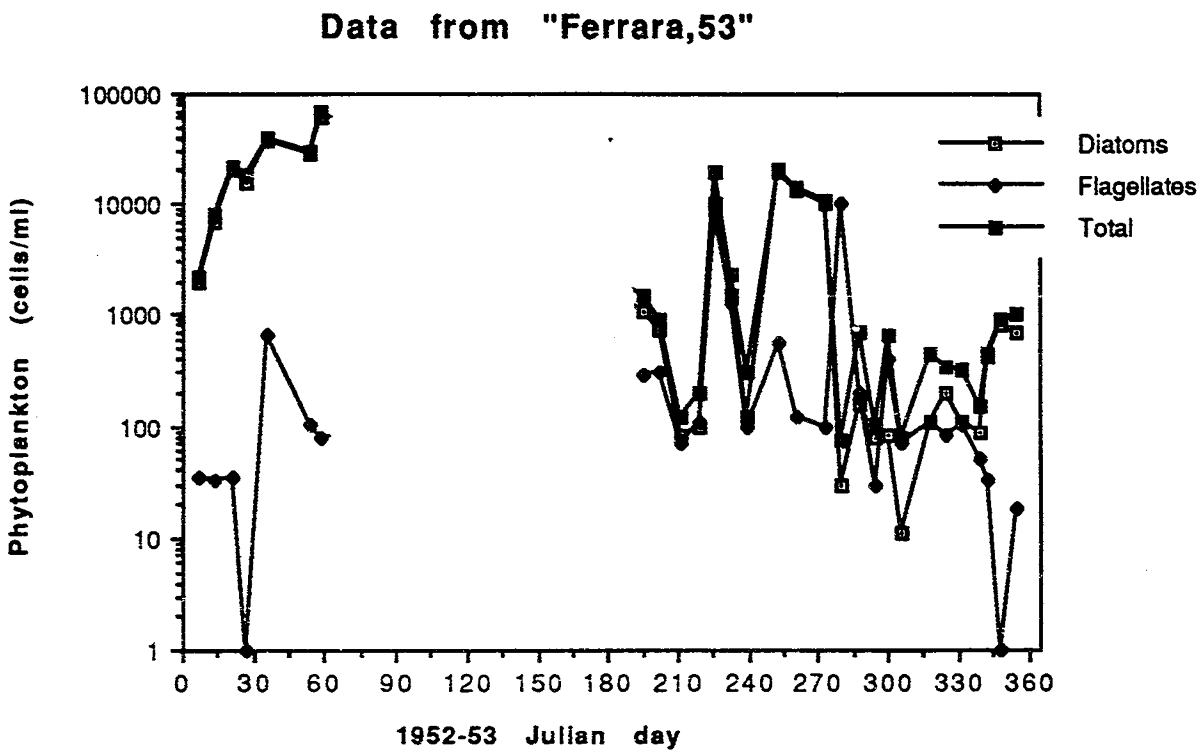
Ferrara RN., 1953, Phytoplankton Studies in Upper Narragansett Bay, MS Thesis, University of Rhode Island, Kingston, RI, 62p.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	From pier in Greenwich Bay, 100 yards from SW tip of Warwick Neck	1

Dates and data were digitized from a graph in original paper, both are approximate

UNITS: cells/ml

Date	Julian day	Diatoms	Flagellates	Total
7/14/52	195	1100	290	1500
7/21	202	750	310	940
7/30	211	85	70	120
8/7	219	100	110	200
8/14	226	10000	8000	19000
8/21	233	1500	1300	2300
8/27	239	120	98	300
9/10	253	19000	550	20000
9/18	261	13000	120	14000
9/30	273	10000	100	10500
10/7	280	30	10000	75
10/14	287	160	200	700
10/21	294	80	30	105
10/27	300	85	400	650
11/1	305	11	70	80
11/14	318	110	110	450
11/21	325	200	81	340
11/27	331	110	101	330
12/5	339	90	50	150
12/8	342	420	32	440
12/14	348	800	1	900
12/21	355	700	18	1000
1/7/53	7	2000	34	2200
1/14	14	7000	32	8000
1/21	21	21000	35	22000
1/27	27	16000	1	18000
2/5	36	38000	650	40000
2/23	54	29000	105	30000
2/27	58	60000	80	70000


Data from "Ferrara,53"
Phytoplankton (cells/ml)
100000
10000
1000
100
10
1
0
30
60
90
120
150
180
210
240
270
300
330
360
1952-53 Julian day
Diatoms
Flagellates
Total

Gallagher JC., 1982, Physiological variation and electrophoretic banding patterns of genetically different seasonal populations of Skeletonema costatum (Bacillariophyceae), J. Phycol. 18:148-162.

ORIGINAL STATION ID	LOCATION	MAP ID
Non specific	41 35' N 71 20' W	25

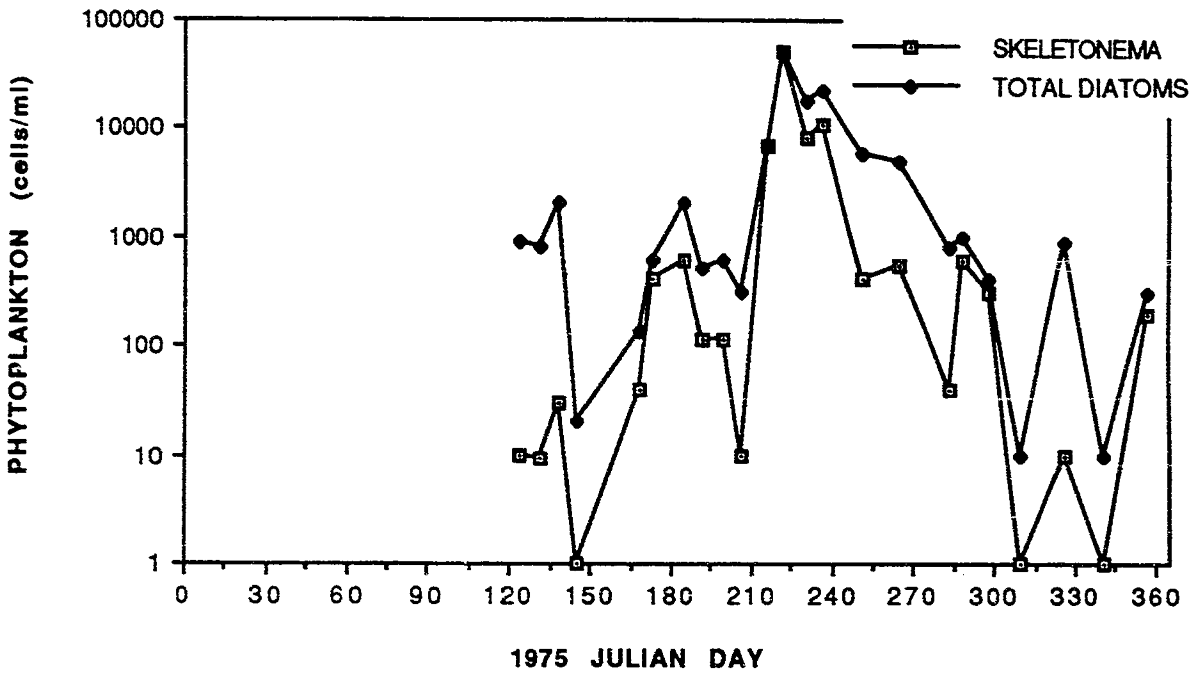
Dates and data were digitized from a graph in original paper, both are approximate

UNITS: cells/ml

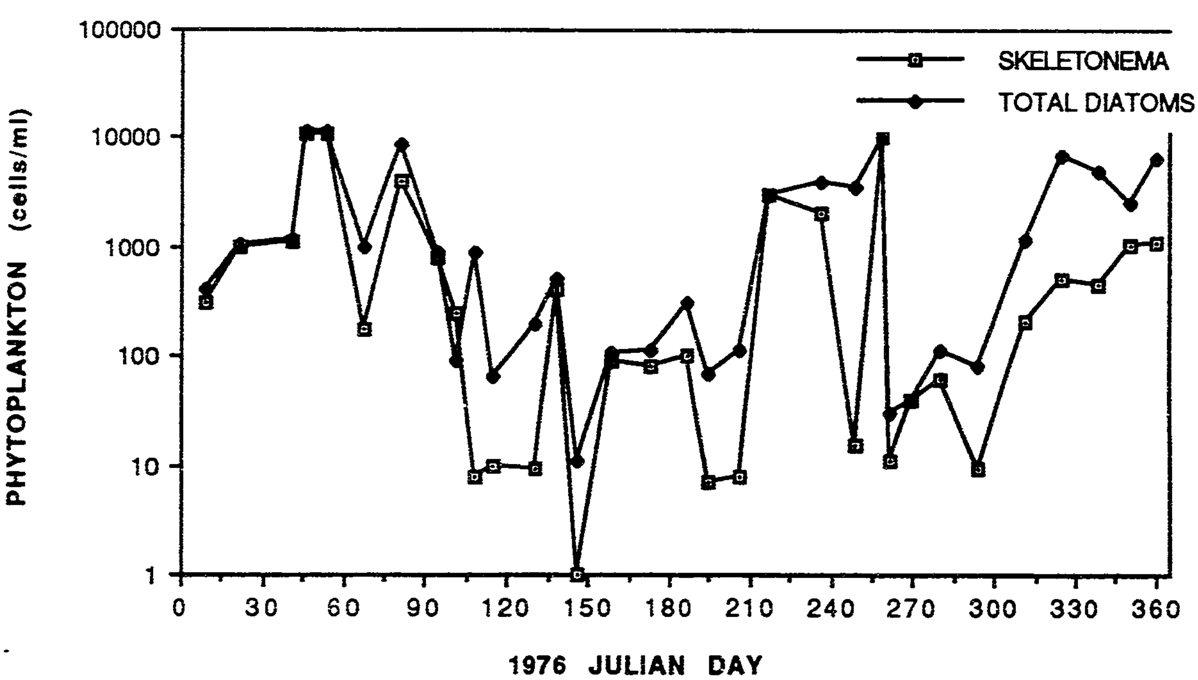
1975	Julian Day	Skel	Total Dia	1976	Julian day	Skel	Total dia
5/75	124	10	900	1/76	9	300	400
	131	9	800		21	1000	1050
	138	30	2000	2/76	41	1100	1200
	145	1	20		46	11000	11500
6/75	168	40	130		54	11000	11500
	173	400	600	3/76	67	180	1000
7/75	185	600	2000		81	4000	8500
	192	110	500	4/76	94	800	900
	200	110	600		101	250	90
	206	10	300		108	8	900
8/75	216	7000	7050		115	10	65
	222	50000	50000	5/76	130	9	200
	231	8000	18000		138	400	500
	237	11000	22000		146	1	11
9/75	251	400	6000	6/76	159	90	105
	265	550	5000		173	80	110
10/75	283	40	800	7/76	187	100	300
	288	600	1000		195	7	70
	298	300	400		206	8	110
11/75	310	1	10	8/76	217	3000	3000
	326	10	900		259	10000	10000
12/75	341	1	10		237	2000	4000
	357	200	300	9/76	249	15	3500
					262	11	30
					270	40	40
				10/76	280	60	110
					294	9	80
				11/76	311	210	1200
					325	500	7000
				12/76	339	450	5000
					350	1050	2500
					360	1100	6500

1977	Julian day	Skel	Total dia
1/77	8	1100	6500
	21	2000	8000
2/77	36	4000	8000
	47	1100	3000
	54	3000	6000
3/77	63	4500	8000
	70	2000	6000
	76	3000	7500
	84	1050	3000
4/77	99	1800	4000
	114	750	800

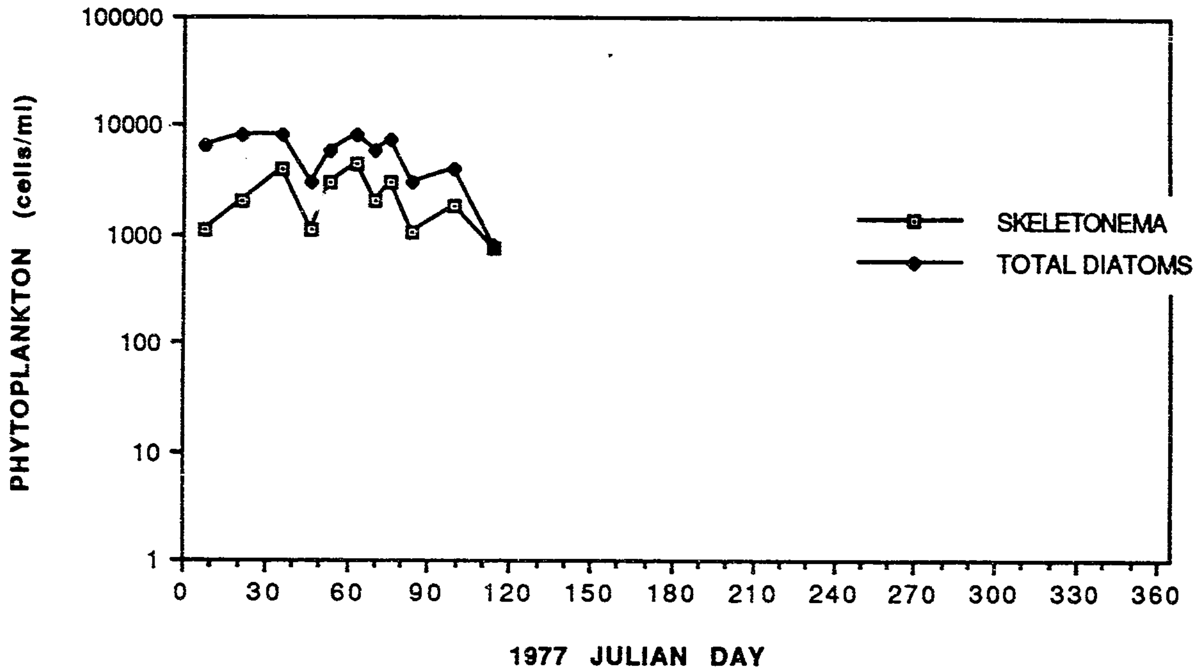
Data from Gallagher, 1982



Data from Gallagher, 1982



Data from Gallagher, 1982



Hitchcock GL. and Smayda TJ., 1977b, The importance of light in the initiation of the 1972-1973 winter-spring bloom, Limn. & Oceanogr. 6:357-364.

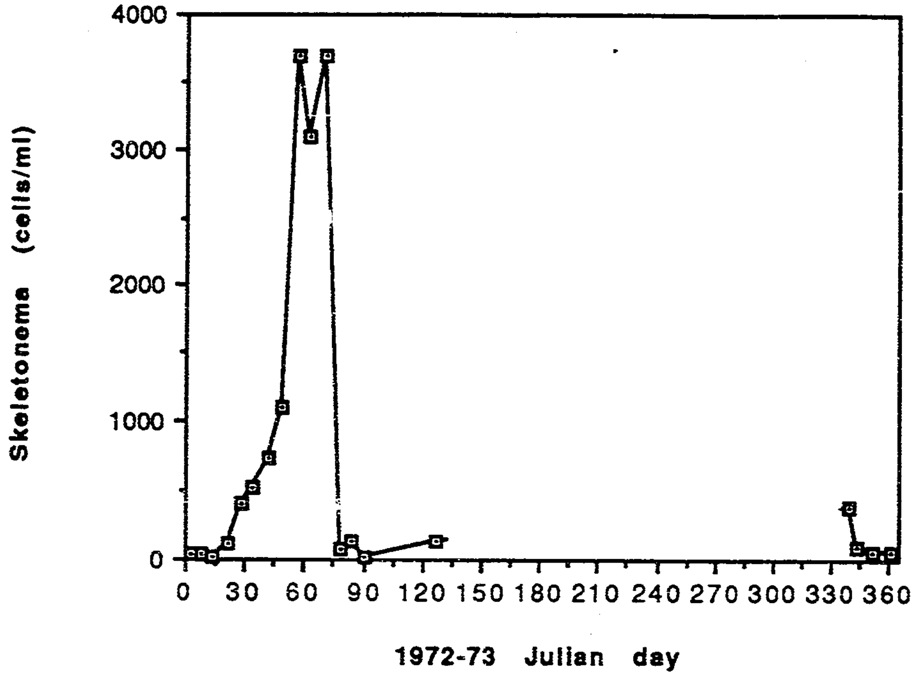
ORIGINAL STATION ID	LOCATION	MAP ID
Station 2	41 34'7" N 71 23'31" W	19

Dates and data were digitized from a graph in original paper, both are approximate

UNITS: cells/ml

date	Julian day	Skeletonema
12/5/72	339	380
12/10	344	93
12/18	352	50
12/27	361	60
1/3/73	3	40
1/8	8	40
1/14	14	20
1/21	21	120
1/28	28	400
2/3	34	520
2/11	42	730
2/18	49	1100
2/26	57	3700
3/3	62	3100
3/11	70	3700
3/19	78	70
3/25	84	130
4/1	91	21
4/7	127	130

Data from "Hitchcock and Smayda, 1977b"



Martin JH., 1965, Phytoplankton-zooplankton relationships in Narragansett Bay. Limn. & Oceanogr. 10: 185-191.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 38'8" N 781 22'17" W	5-A
Station 3	41 26'47" N 71 25'9" W	5-B

Data was taken from a table

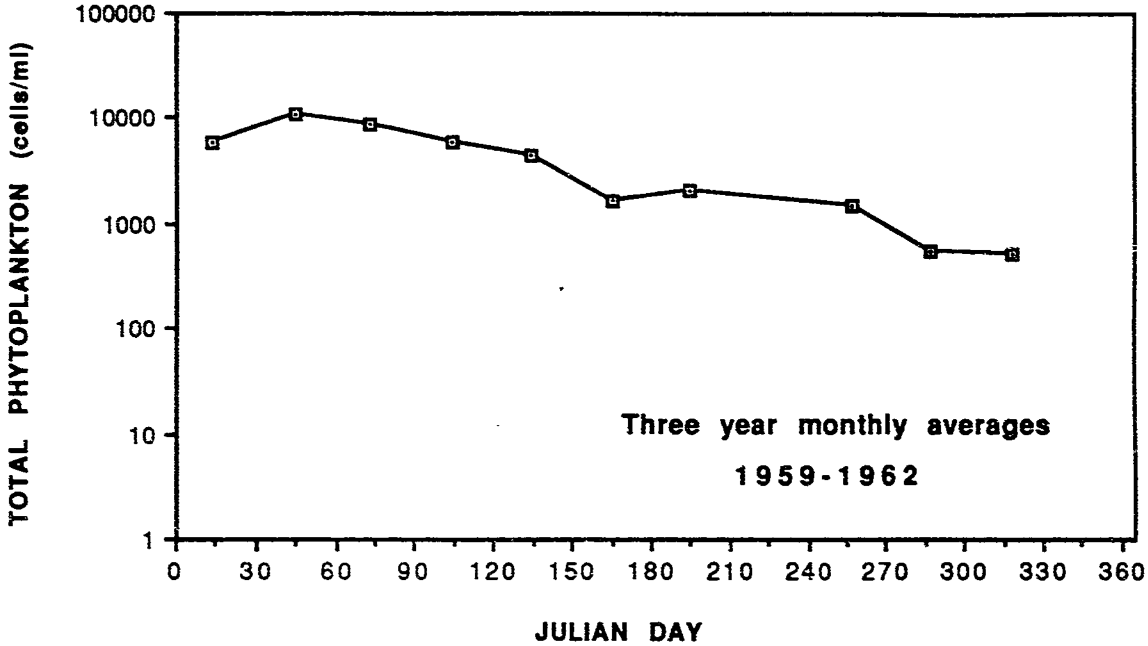
UNITS: cells/ml

Three year averages; 1959, 1960, 1961.

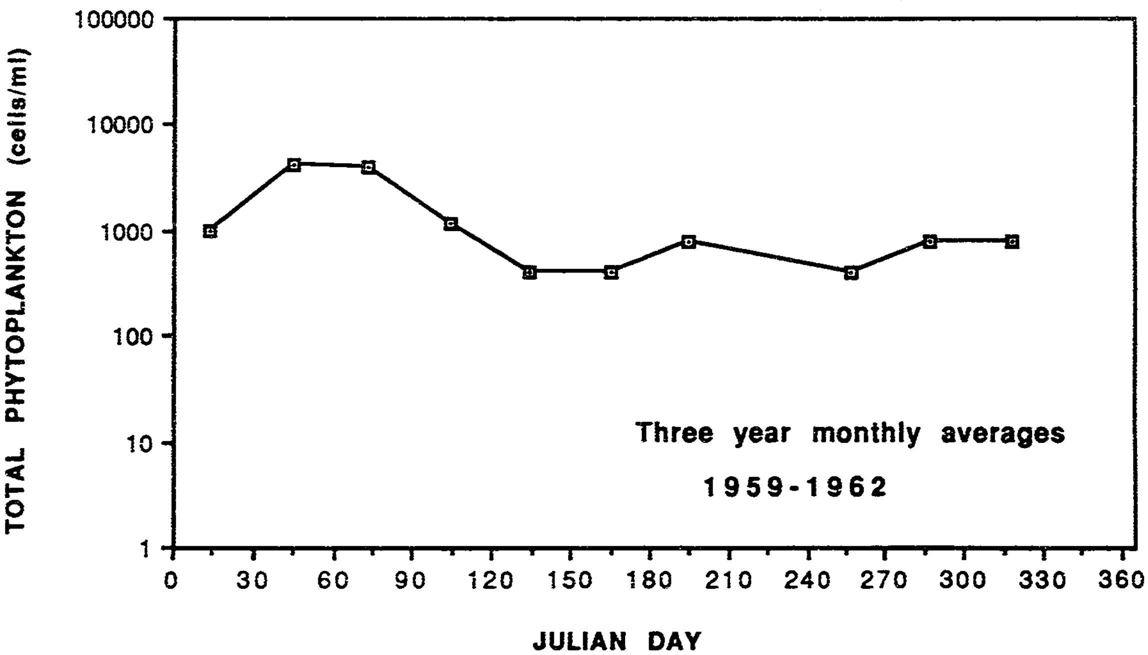
	Date	Julian day	total phyto
Station 1	DEC	348	990
	JAN	14	6000
	FEB	45	11000
	MAR	73	8800
	APRIL	104	5800
	MAY	134	4500
	JUNE	165	1600
	JULY	195	2000
	SEPT	257	1500
	OCT	287	550
	NOV	318	500

Station 3	Date	Julian day	Total phyto.
	DEC	348	750
	JAN	14	1000
	FEB	45	4100
	MAR	73	3900
	APRIL	104	1200
	MAY	134	400
	JUNE	165	400
	JULY	195	800
	SEPT	257	400
	OCT	287	800
	NOV	318	800

Data from Martin, 1965
Station 1



Data from Martin, 1965
Station 3



Martin JH., 1966, Phytoplankton-zooplankton relationships in Narragansett Bay.
II. The seasonal importance of zooplankton grazing
and nutrient excretin, PhD Thesis, URI, Kingston,RI,99p.

Martin JH., 1970, Phytoplankton-zooplankton relationships in Narragansett Bay.
The seasonal importance of grazing. Linm. & Oceanogr. 15:413-418

Data sets were combined

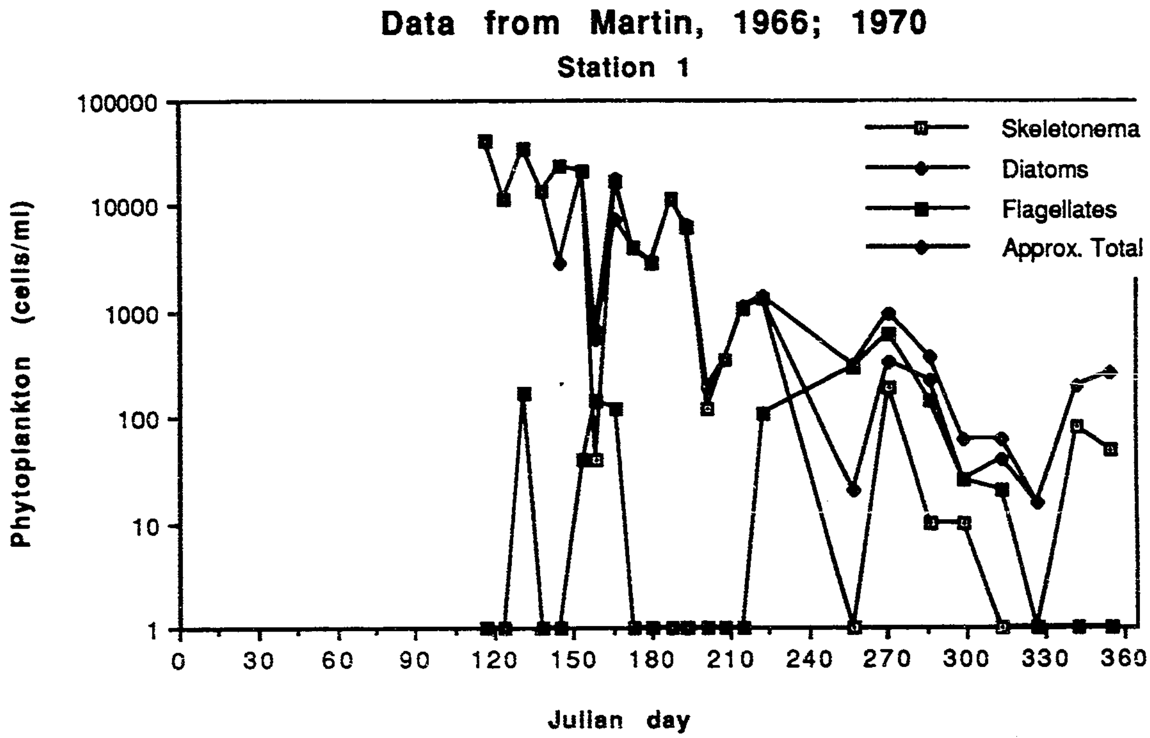
ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 42.5' N 71 20'W: head of Bay	7-A
Station 2	41 34' N 71 23.5'W:W. Pass Wickford	7-B
Station 3	41 25'N 71 24' W: 3.2 km S. of Bay mouth	7-C

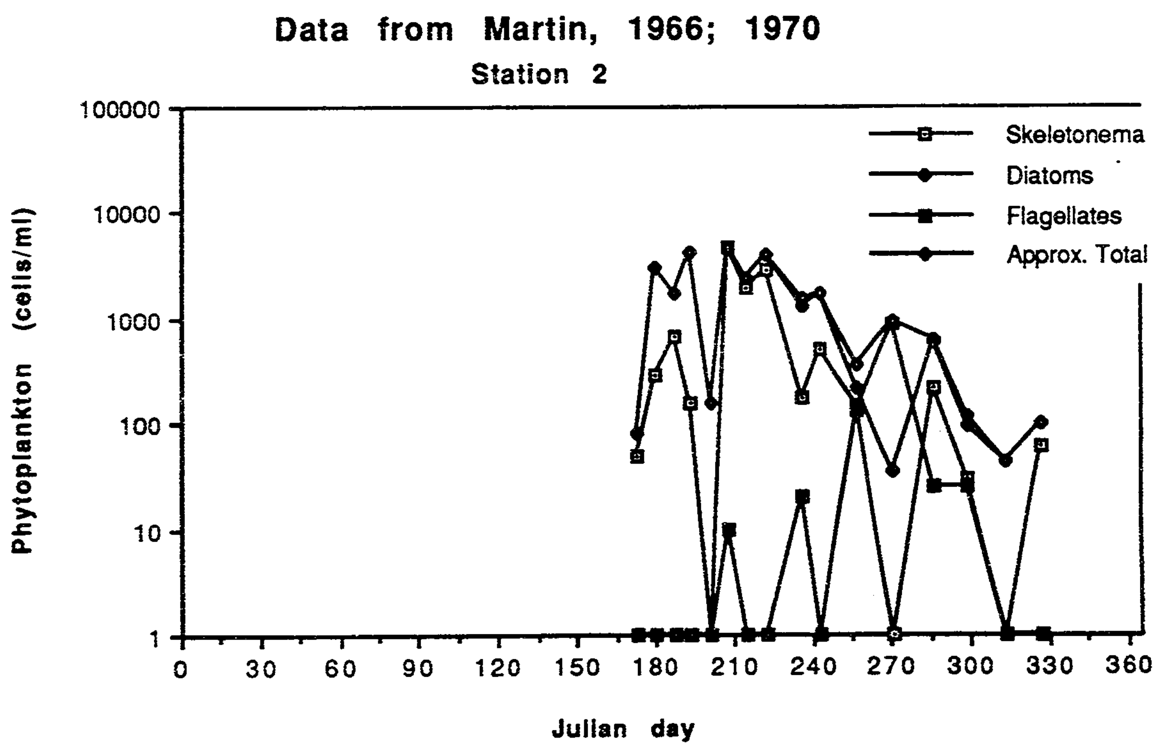
Data was taken from a table
UNITS: cells/ml

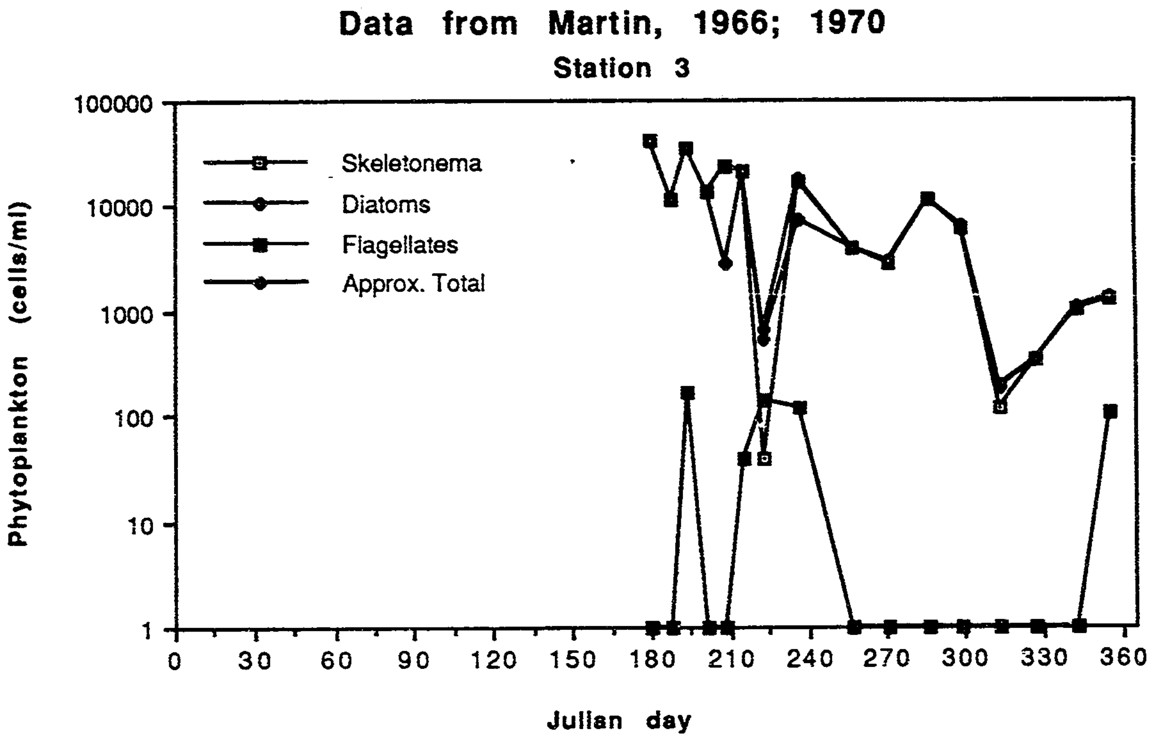
	DATE	JULIAN DAY	SKELETONEMA	DIATOMS	FLAGELLATES	TOTAL PHYTO
STATION 1	4/27/65	117	42120	42120	0	42130
	5/4	124	11120	11130	0	11140
	5/11	131	34390	34390	170	34560
	5/18	138	13690	13800	0	13810
	5/25	145	23830	23830	0	2830
	6/2	154	20750	21420	40	21460
	6/8	159	40	535	145	655
	6/15	166	17110	7340	120	17470
	6/22	173	3960	4015	0	4080
	6/29	180	2850	3000	0	3000
	7/7	188	11160	11160	0	11160
	7/13	194	6330	6380	0	6380
	7/20	201	120	190	0	200
	7/27	208	350	350	0	350
	8/3	215	1060	1090	0	1090
	8/11	223	1280	1285	105	1390
	8/25	237	5570	6950	50	7000
	8/31	243	2130	2760	0	2770
	9/14	257	0	20	290	310
	9/28	271	190	325	595	920
	10/13	286	10	220	140	360
	10/26	299	10	25	25	60
	11/9	313	0	40	20	60
	11/23	327	0	15	0	15
	12/9	343	80	200	0	200
	12/21	355	50	265	0	265
	1/4/66	4	3590	4420	0	4370
	1/18	18	14660	17180	0	17180

STATION 2	DATE	JULIAN DAY	SKELETONEMA	DIATIOM	FLAGELLATES	APPROX. TOTAL
	6/22/65	173	50	80	0	80
	6/29	180	285	3000	0	3000
	7/7	188	680	1680	0	1680
	7/13	194	160	4180	0	4180
	7/20	201	0	160	0	160
	7/27	208	4620	4790	10	4800
	8/3	215	1930	2360	0	2360
	8/11	223	2920	3960	0	3960
	8/25	237	180	1320	20	1520
	8/31	243	500	1680	0	1680
	9/14	257	150	225	135	360
	9/28	271	0	35	905	940
	10/13	286	215	595	25	625
	10/26	299	30	95	25	120
	11/9	313	0	45	0	45
	11/23	327	60	100	0	100
	12/9	343	76	174	0	174
	12/21	355	155	715	0	715
	1/4/66	4	4250	7400	0	7400
	1/18	18	5180	7030	0	7030

STATION 3	DATE	JULIAN DAY	SKELETONEMA	DIATOMS	FLAGELLATES	APPROX. TOTAL
	6/29/65	180	0	295	20	325
	7/7	188	10	85	0	85
	7/13	194	0	590	0	590
	7/20	201	280	360	0	360
	7/27	208	2340	2390	0	2390
	8/3	215	20	35	0	35
	8/11	223	180	1940	0	1940
	8/25	237	0	500	0	500
	9/14	257	0	170	0	180
	9/28	271	0	220	0	230
	10/13	286	1235	1535	0	1535
	10/26	299	20	145	10	155
	11/9	313	745	835	0	835
	11/23	327	70	150	0	150
	12/9	343	75	330	0	330
	12/21	355	0	28	0	28
	/66	4	90	470	0	470
	1/18	18	1790	2390	0	2390


Data from Martin, 1966; 1970
Station 1
Phytoplankton (cells/ml)
100000
10000
1000
100
10
1
0
30
60
90
120
150
180
210
240
270
300
330
360
Julian day
Skeletonema
Diatoms
Flagellates
Approx. Total


Data from Martin, 1966; 1970
Station 2
Phytoplankton (cells/ml)
100000
10000
1000
100
10
1
0
30
60
90
120
150
180
210
240
270
300
330
360
Julian day
Skeletonema
Diatoms
Flagellates
Approx. Total



Data from Martin, 1966; 1970
Station 3
Phytoplankton (cells/ml)
100000
10000
1000
100
10
1
Skeletonema
Diatoms
Flagellates
Approx. Total
0
30
60
90
120
150
180
210
240
270
300
330
360
Julian day

Mitchell-Innes BA., 1973, Ecology of the phytoplankton of Narragansett Bay and the uptake of silica by natural populations and the diatoms Skeletonema costatum and Detonula confervacea, PhD Thesis, URI, Kingston, RI, 212p.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 26'47" N 71 25'9" W: Whale Rock	17-A
Station 2	41 34'7" N 71 23'31" W	17-B
Station 3	41 42'48" N 71 20' W: near Nayatt Point (Providence R.)	17-C
Station 4	41 45'51" N 71 22'48" W: Sabin Point in Providence R.	17-d

Dates and data were digitized from a graph in original paper, both are approximate

UNITS: cells/ml

	Date	Julian day	Diatoms	Skeletonema	Flagellates	Total
ST. 1						
WHALE	7/9/68	190	206	0	1570	1776
ROCK	7/16	197	9744	6115	1300	11044
	7/23	204	442	162	1200	1642
	7/30	211	1410	109	1777	3187
	8/6	218	575	138	2693	3268
	8/15	227	12174	10215	2356	14537
	8/27	239	12971	11723	1247	14225
	9/12	255	185	162	1264	1449
	9/24	267	8652	3453	1002	9354
	10/15	288	2876	213	2927	5885
	10/31	304	203	0	943	1156
	11/14	318	757	436	722	1479
	11/26	330	78	46	656	734
	12/18	352	3864	720	240	4104
	1/3/69	3	2918	742	898	3816
	1/21	21	5119	3647	394	5513
	2/6	37	1245	711	284	1529
	3/11	70	3297	2195	687	3984
	4/10	100	8037	7771	643	8680
	5/1	121	4734	4323	1747	6481
	6/2	153	2164	69	2132	4288

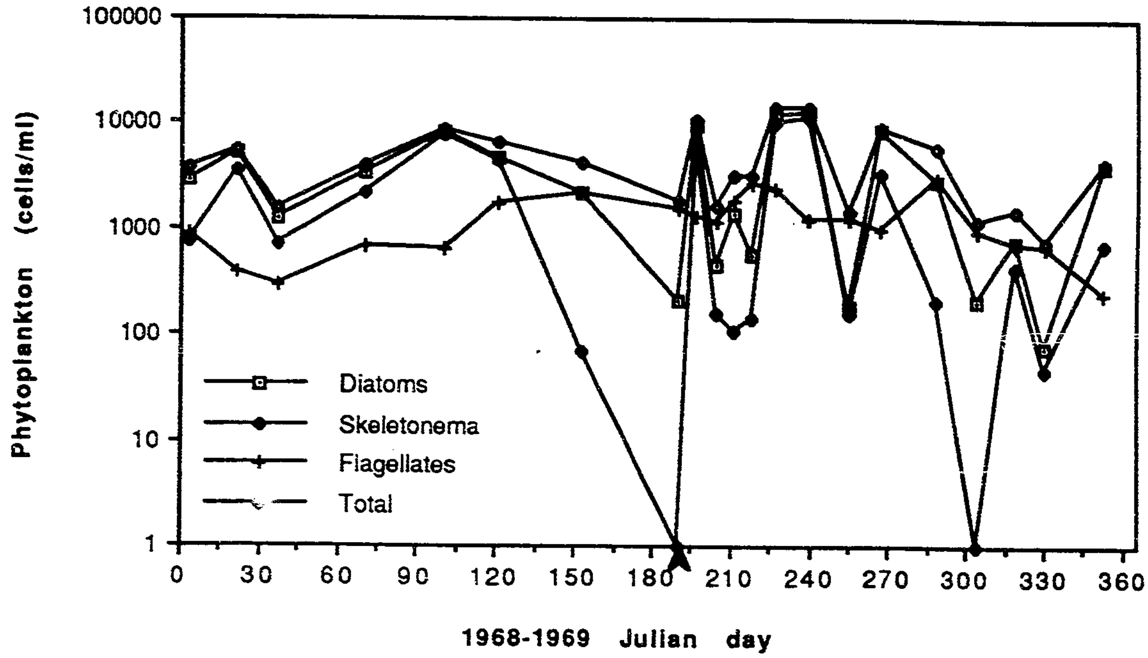
	Date	Julian day	Diatoms	Skeletonema	Flagellates	Total
ST. 3	7/9/68	190	6260	3524	888	7148
NAYATT F	7/16	197	3329	711	8534	12566
	7/23	204	16850	15754	4452	21803
	7/30	211	53	0	18232	18323
	8/6	218	9674	305	4205	13929
	8/15	227	33147	31211	9324	42501
	8/27	239	2321	1291	10782	13176
	9/12	255	225	0	2210	2442
	9/24	267	10575	6714	6620	17318

10/15	288	1117	479	6391	7566
10/31	304	298	0	2452	2750
11/14	318	290	87	1259	1564
11/26	330	312	35	2184	2496
12/18	352	2442	618	668	3116
1/3/69	3	8991	3374	732	9723
1/21	21	9666	5338	944	10610
2/6	37	5136	1916	1124	6260
3/11	70	14517	9884	2431	16948
4/10	100	74436	71514	629	75065
5/1	121	12215	11841	1700	13922
6/2	153	7231	237	3016	10286

	Date	Julian day	Diatoms	Skeletonema	Flagellates	Total
ST. 4	7/9/68	190	4525	1718	3597	8267
SABIN PT	7/16	197	900	116	3552	104147
	7/23	204	1075	392	9961	114500
	7/30	211	44	29	7546	8192
	8/6	218	2554	0	18177	72519
	8/15	227	1640	1189	27252	28935
	8/27	239	690	261	9979	10669
	9/12	255	0	0	13633	13684
	9/24	267	1509	674	5682	7467
	10/15	288	845	594	9478	10333
	10/31	304	117	113	2378	2495
	11/14	318	801	159	693	1513
	11/26	330	181	54	1566	1751
	12/18	352	1365	648	236	1610
	1/3/69	3	3772	1392	259	4034
	1/21	21	2387	1840	592	2982
	3/11	70	4874	4235	1557	6431
	4/10	100	7742	7235	363	8105
	5/1	121	4905	4756	2110	7022
	6/2	153	2101	265	2755	4885

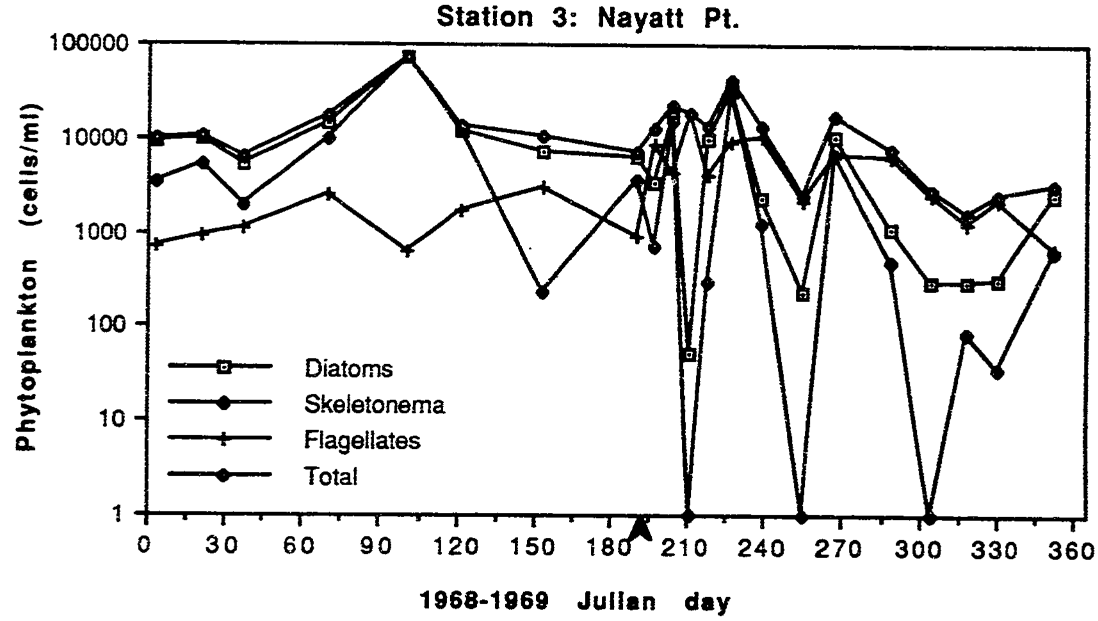
Data from Mitchell-Innes, 1973

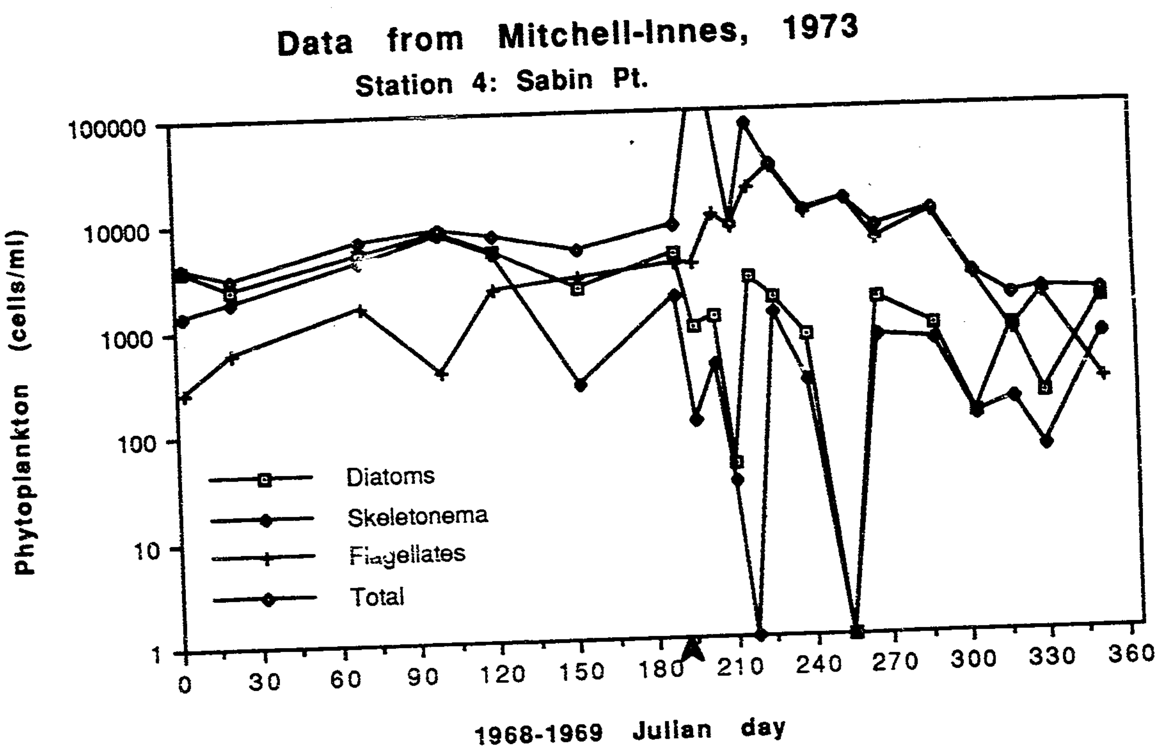
Station 1: Whale Rock



Data from Mitchell-Innes, 1973

Station 3: Nayatt Pt.




Data from Mitchell-Innes, 1973
Station 4: Sabin Pt.
100000
10000
1000
100
10
1
Phytoplankton (cells/ml)
Diatoms
Skeletonema
Flagellates
Total
0
30
60
90
120
150
180
210
240
270
300
330
360
1968-1969 Julian day

MRI., 1972-1983, Brayton Point Investigation; Quarterly Progress Reports, May 1972-January 1983. Report to New England Power Co., Marine Resources, Inc., Falmouth, MA.

STATION ID	LOCATION	MAP ID
Spar Island	Spar Island	28

UNITS: cells/ml

Data was provided in summary electronic form by S. Nixon.

DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
12/5/74	339	110	520	630
1/10/75	10	40	740	780
1/23/75	23	1	310	311
2/5/75	36	30	1180	1210
2/20/75	51	460	560	1020
3/5/75	64	1950	1550	3500
3/24/75	83	11590	1260	12850
4/10/75	100	2500	30	2530
4/24/75	114	3740	1860	5600

DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
1/8/76	8	80	890	970
1/28/76	28	540	30	570
2/12/76	43	4380	1	4381
2/25/76	56	34940	1	34941
3/11/76	70	9990	1	9991
3/25/76	84	12680	1	12681
4/8/76	98	7140	130	7270
4/22/76	112	4930	160	5090
5/14/76	134	1880	6600	8480
5/27/76	147	2790	1440	4230
6/11/76	162	11230	14430	25660
6/24/76	175	840	22010	22850
7/9/76	190	1100	18560	19660
7/22/76	203	3990	13320	17310
8/6/76	218	11140	16650	27790
8/26/76	238	14800	5460	20260
9/9/76	252	9230	4890	14120
9/23/76	266	61850	7180	69030
10/28/76	301	350	2170	2520
11/18/76	322	370	390	760

DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
1/6/77	6	12410	310	12720
3/3/77	62	14800	1	14801
4/27/77	117	2320	960	3280
5/26/77	146	1610	2900	4510
6/16/77	167	4120	8470	12590
7/14/77	195	3900	18010	21910
8/18/77	230	1130	7170	8300
9/29/77	272	1390	4450	5840
10/20/77	293	220	4760	4980
11/10/77	314	440	1080	1520
12/1/77	335	1	320	321

DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
1/5/78	5	170	2630	2800
2/17/78	48	150	1680	1830
3/29/78	88	9870	2850	12720
4/27/78	117	1790	1340	3130
5/24/78	144	2860	4360	7220
6/22/78	173	4000	4580	8580
7/20/78	201	13660	12420	26080
8/10/78	222	2230	14950	17180
9/28/78	271	300	2870	3170
10/18/78	291	7830	11540	19370
11/16/78	320	1910	7750	9660
12/6/78	340	1490	4830	6320

DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
1/23/79	23	1270	2010	3280
2/28/79	59	3910	3820	7730
3/29/79	88	6070	1	6071
4/26/79	116	6700	5350	12050
5/23/79	143	11270	6220	17490
6/29/79	180	3010	21310	24320
7/25/79	206	5650	14100	19750
8/29/79	241	9000	8630	17630
9/19/79	262	17610	6240	23850
10/17/79	290	420	3080	3500
11/21/79	325	440	1490	1930
12/12/79	346	870	1070	1940

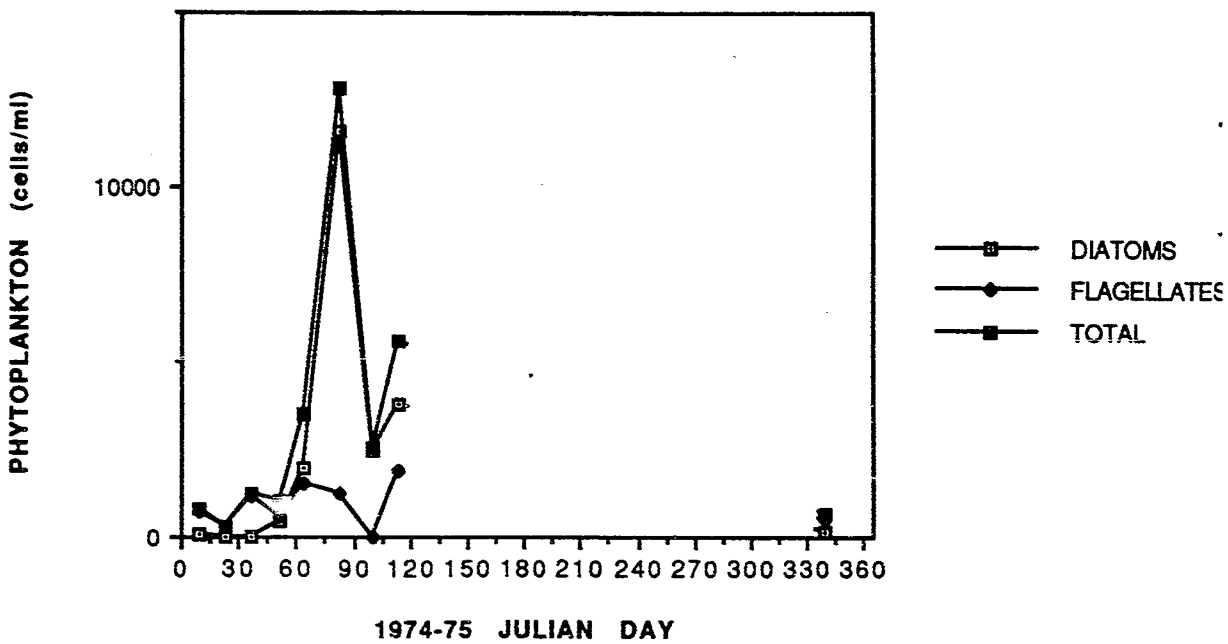
DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
1/16/80	16	2360	1480	3840
2/20/80	51	5340	2480	7820
3/19/80	78	1400	2270	3670
4/16/80	106	940	2500	3440
5/22/80	142	5700	2520	8220
6/25/80	176	920	7680	8600
7/23/80	204	830	6530	7360
8/28/80	240	11580	3910	15490
9/30/80	273	2510	5240	7750
10/23/80	296	160	1150	1310
11/20/80	324	650	6440	7090
12/23/80	357	930	4570	5500

DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
2/18/81	49	18500	8530	27030
3/26/81	85	7620	5740	13360
4/28/81	118	8610	7070	15680
5/27/81	147	20050	9370	29420
6/24/81	175	9720	14410	24130
7/22/81	203	7810	10260	18070
8/19/81	231	23330	5170	28500
9/23/81	266	810	6520	7330
10/23/81	296	370	6210	6580
11/18/81	322	480	6200	6680
12/21/81	355	630	6930	7560

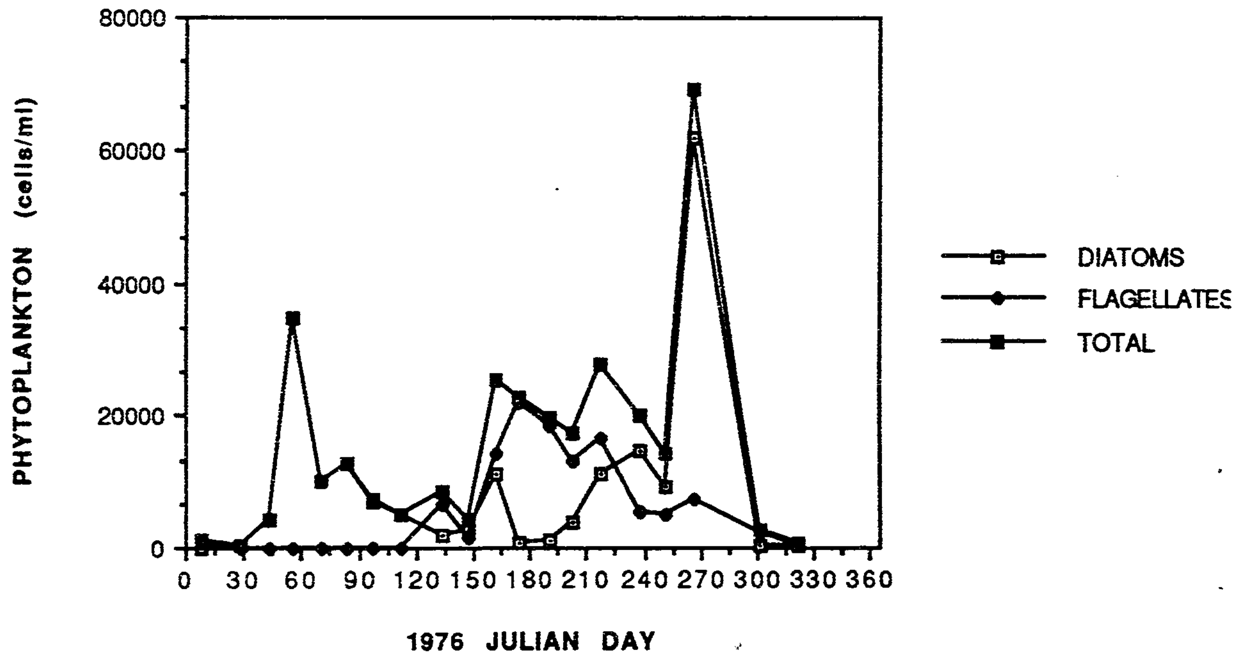
DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
2/2/82	33	640	3340	3980
2/24/82	55	750	1020	1770
3/24/82	83	3050	1310	4360
4/26/82	116	2200	2670	4870
5/19/82	139	3250	5020	8270
6/16/82	167	2310	1950	4260
7/25/82	206	870	12670	13540
8/26/82	238	5320	1370	6690
9/30/82	273	520	1440	1960
10/20/82	293	140	2510	2650
11/17/82	321	130	2350	2480
12/15/82	349	1370	1370	2740

DATE	JULIAN DAY	DIATOMS	FLAGELLATES	TOTAL
1/12/83	12	3080	2150	5230
2/16/83	47	4160	12780	16940
3/24/83	83	8070	21160	29230
4/21/83	111	12240	16230	28470
5/23/83	143	47880	10280	58160
6/24/83	175	11980	23210	35190
7/27/83	208	49750	28150	77900
8/15/83	227	99470	17340	116810
9/21/83	264	22430	17340	39770
10/19/83	292	11310	16900	28210

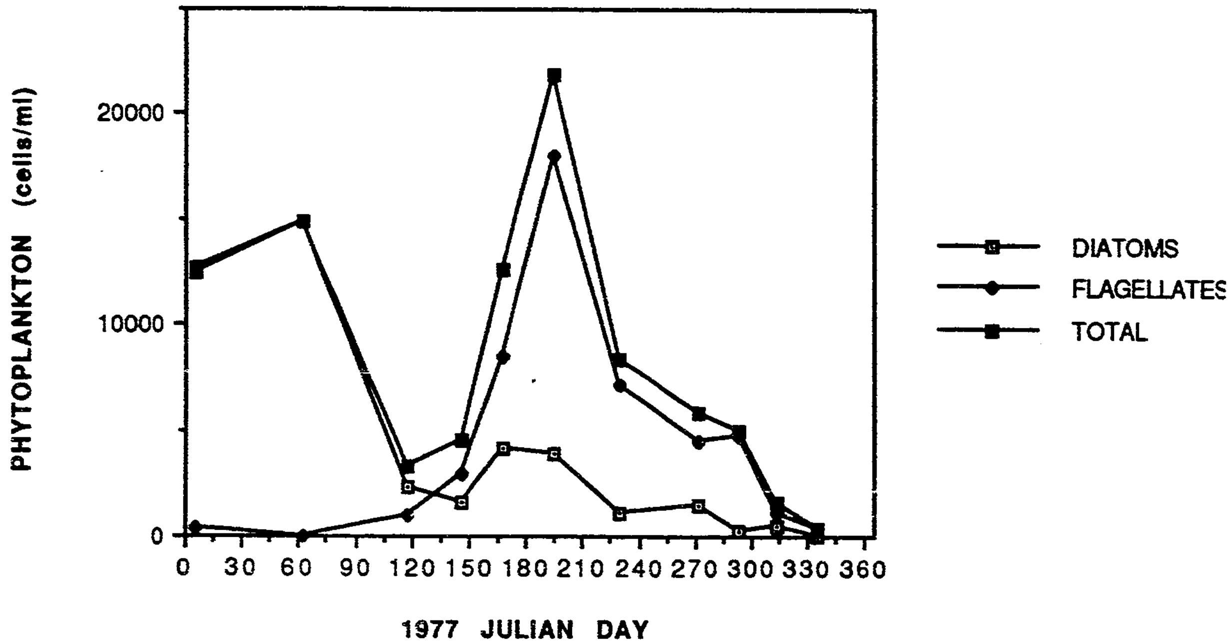
Data from "Spar Island, Mt. Hope Bay"



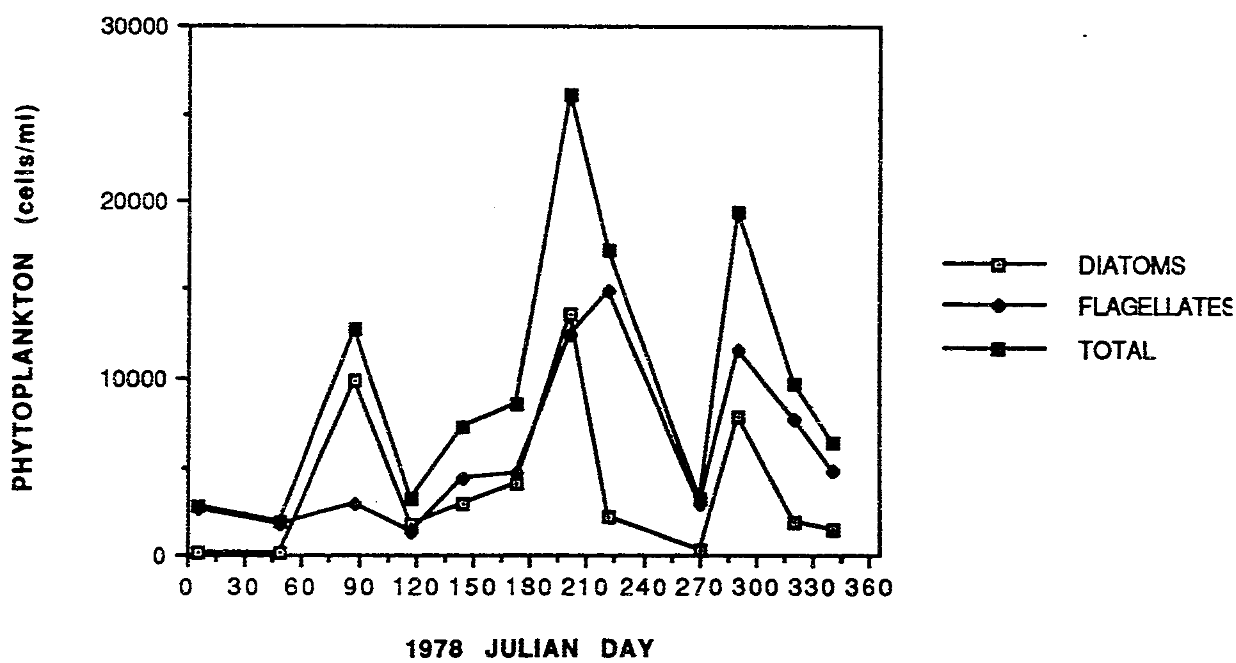
Data from "Spar Island, Mt. Hope Bay"



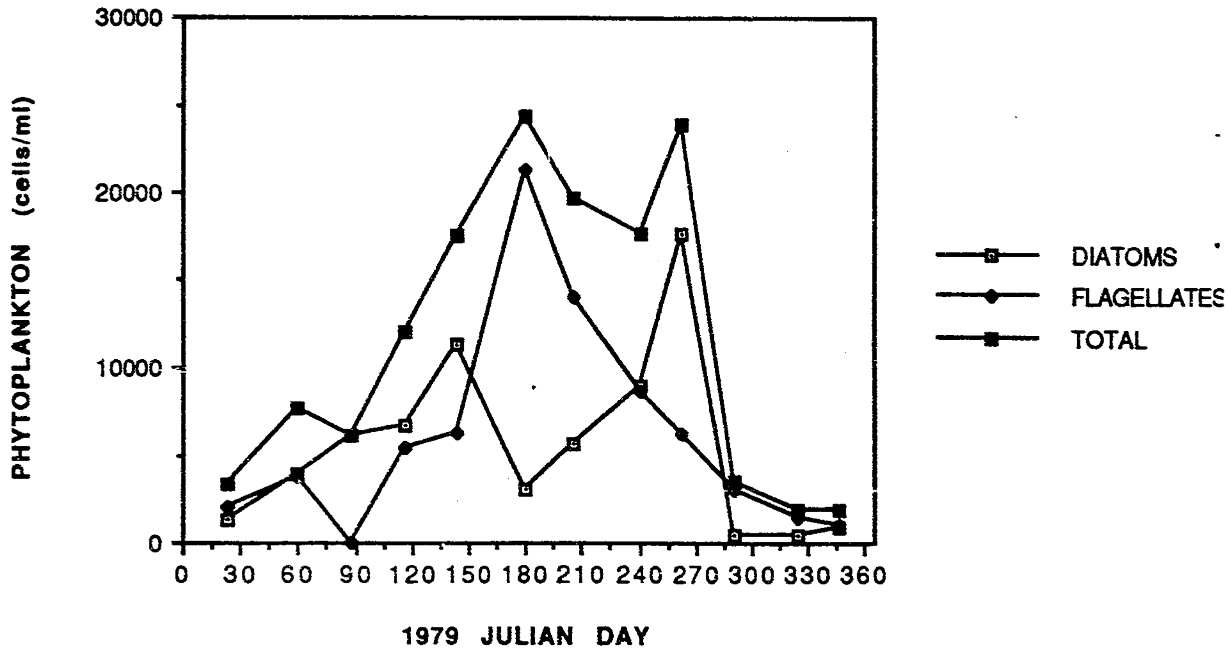
Data from "Spar Island, Mt. Hope Bay"



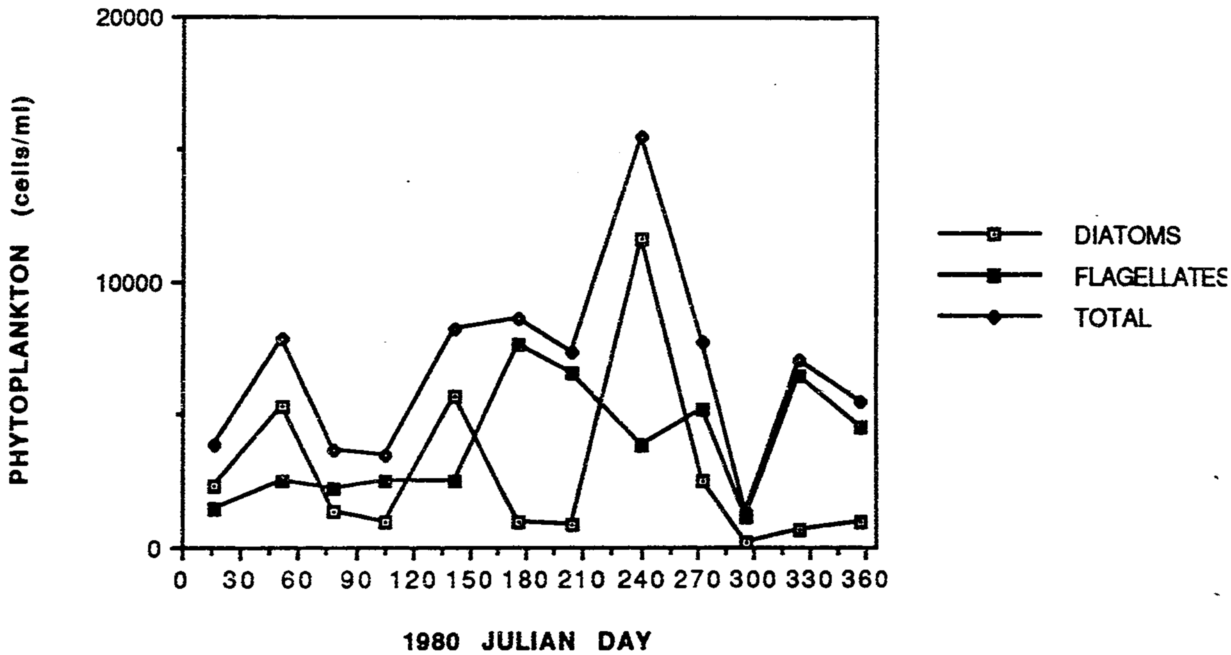
Data from "Spar Island, Mt. Hope Bay"

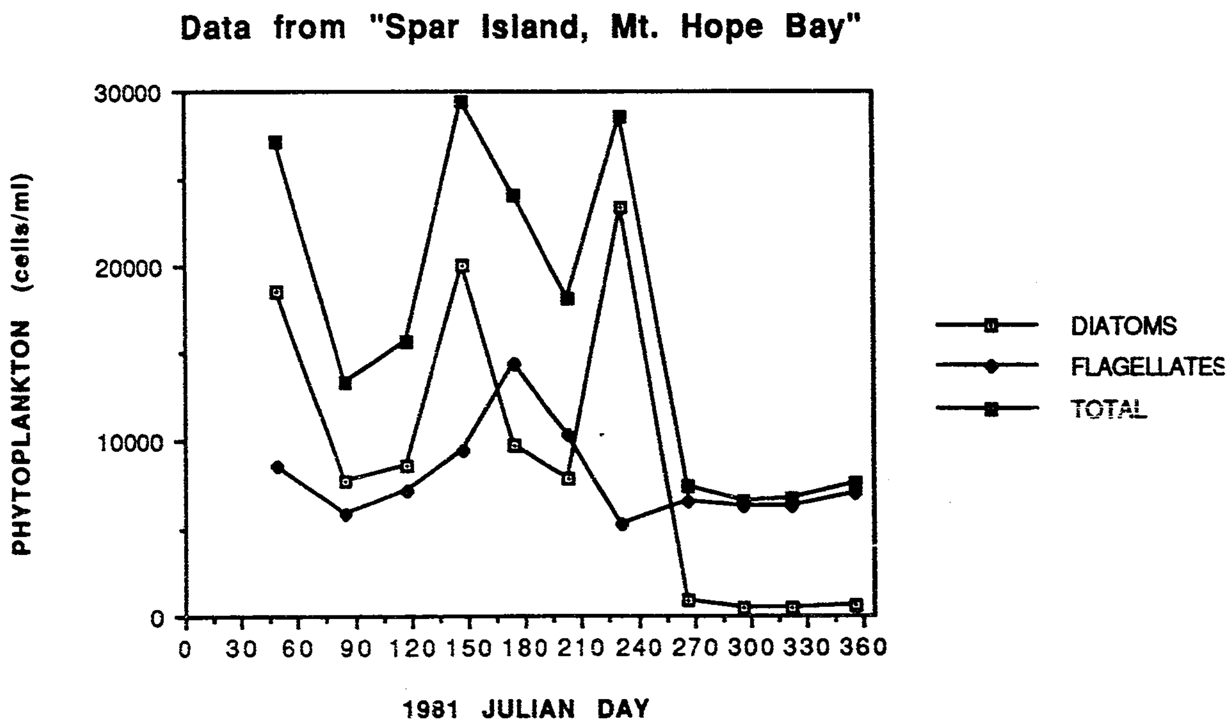


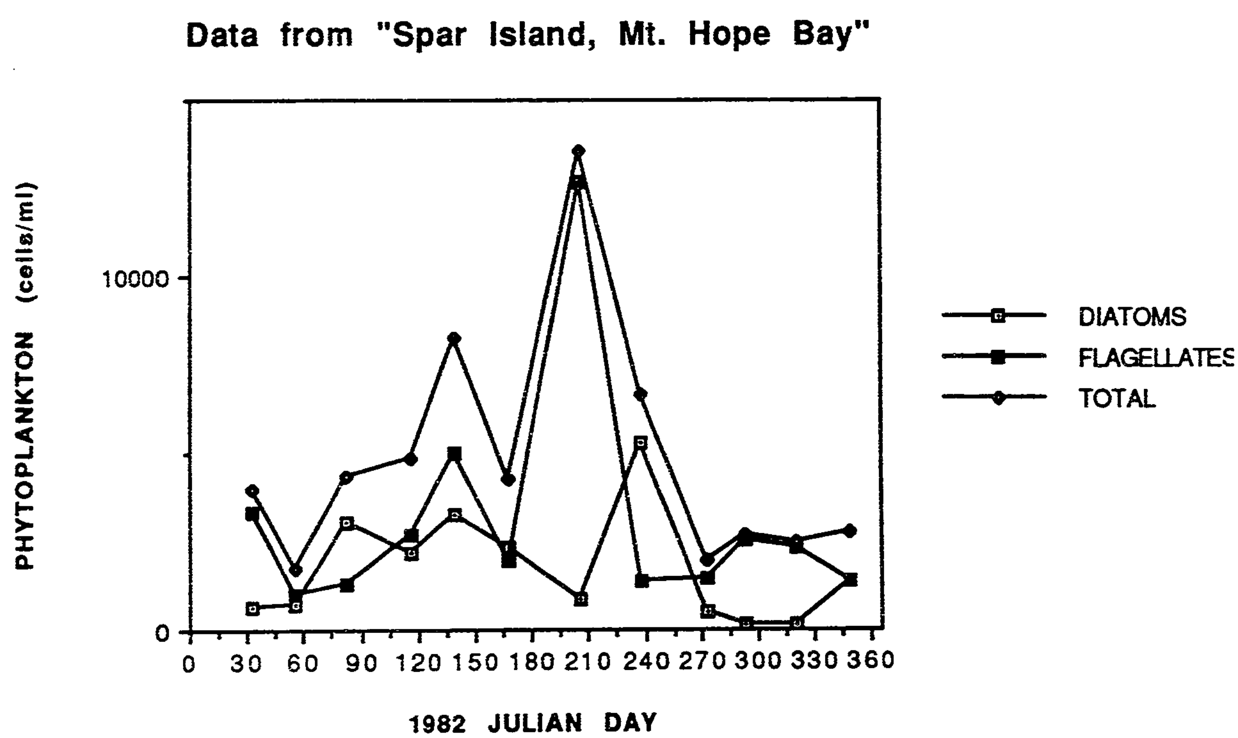
Data from "Spar Island, Mt. Hope Bay"



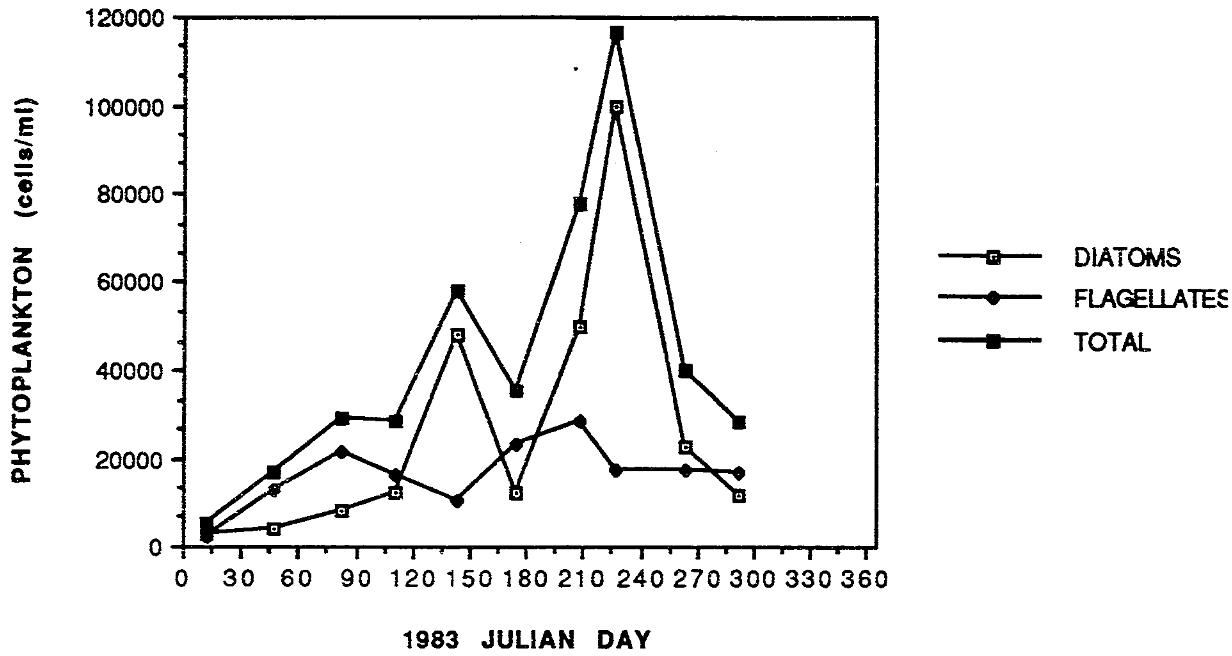
Data from "Spar Island, Mt. Hope Bay"




Data from "Spar Island, Mt. Hope Bay"
PHYTOPLANKTON (cells/ml)
30000
20000
10000
0
0 30 60 90 120 150 180 210 240 270 300 330 360
1981 JULIAN DAY
DIATOMS
FLAGELLATES
TOTAL


Data from "Spar Island, Mt. Hope Bay"
PHYTOPLANKTON (cells/ml)
10000
0
0 30 60 90 120 150 180 210 240 270 300 330 360
1982 JULIAN DAY
DIATOMS
FLAGELLATES
TOTAL

Data from "Spar Island, Mt. Hope Bay"



Pratt DM., 1959, The phytoplankton of Narragansett Bay, Limn. & Oceanogr. 4: 425-440.

ORIGINAL STATION ID	LOCATION	MAP ID
E1	41 42' N 71 19.3' W (est.) mouth of Providence River	
E6	41 27' N 71 22.6' W (est.) mouth of East Passage	

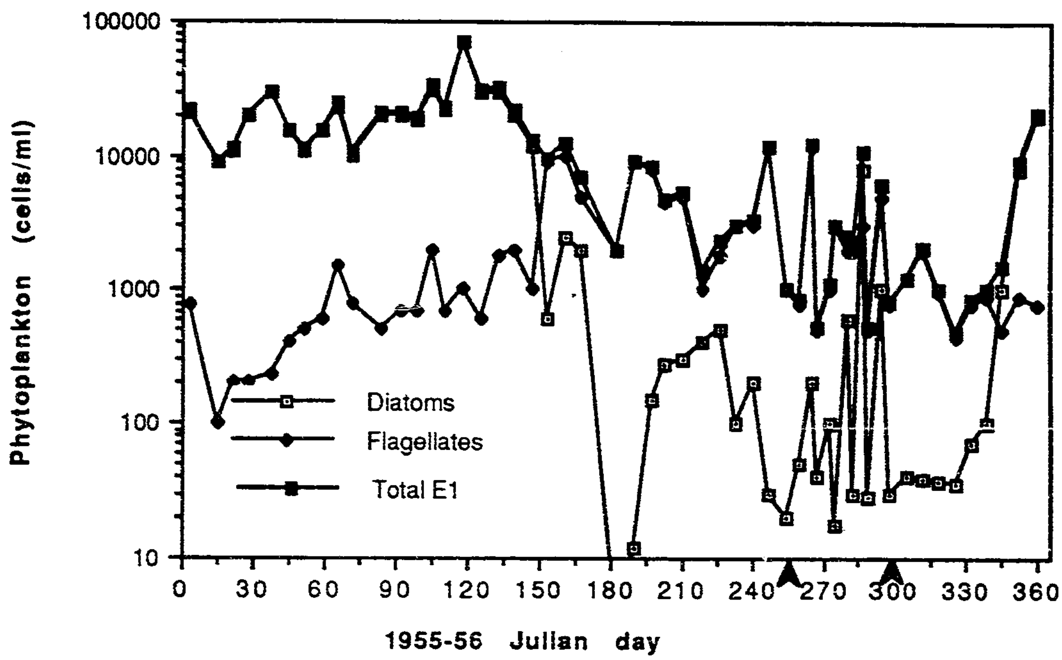
Dates and data were digitized from a graph, both are approximate

UNITS: cells/ml

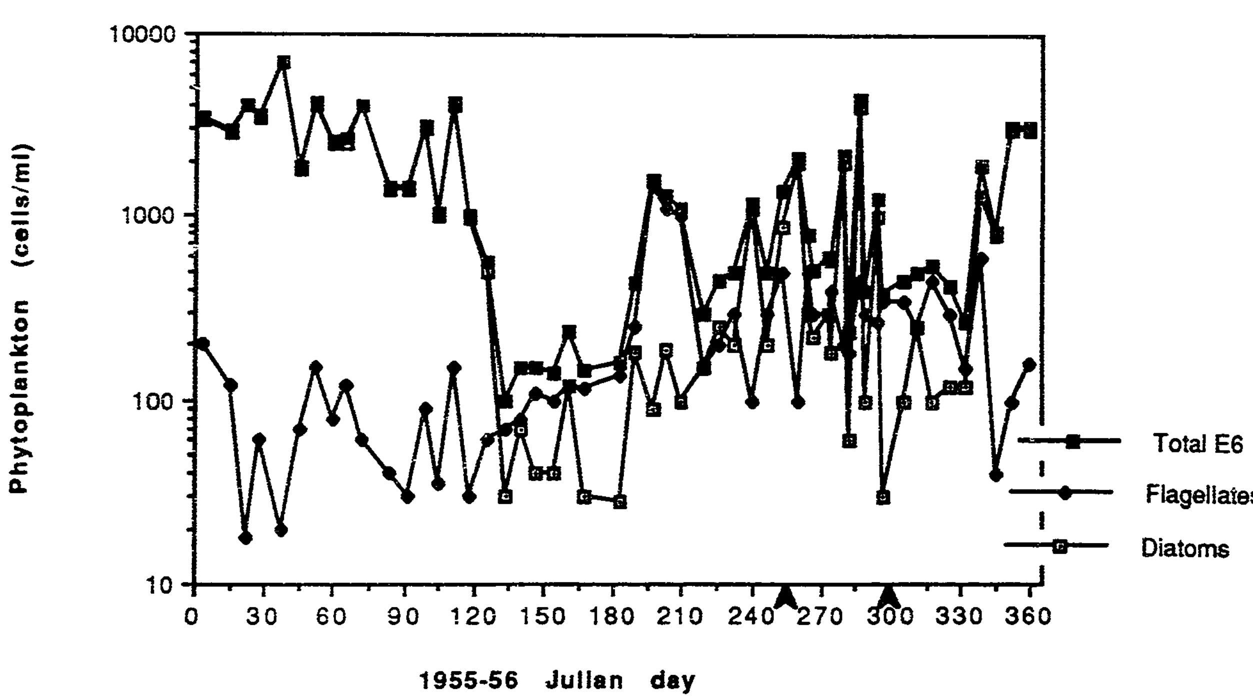
Station E1					Station E6		
Date	Julian day	Diatoms	Flagellates	Total	Diatoms	Flagellates	Total
9/22/55	265	200	12000	12200	300	500	800
10/2	275	18	3000	3018	180	400	580
10/9	282	30	2000	2030	60	180	240
10/16	289	28	500	528	100	300	400
10/24	297	30	800	830	30	350	380
11/1	305	40	1200	1240	100	350	450
11/7	311	38	2000	2038	250	250	500
11/14	318	37	980	1017	100	450	550
11/21	325	36	450	486	120	300	420
11/28	332	70	800	870	120	150	270
12/4	338	100	900	1000	1300	600	1900
12/11	345	1000	500	1500	800	40	840
12/18	352	8000	900	8900	3000	100	3100
12/26	360	20000	800	20800	3000	160	3160
1/3/56	3	21000	800	21800	3300	200	3500
1/15	15	9000	100	9100	2800	120	2920
1/22	22	11000	200	11200	4000	18	4018
1/28	28	20000	200	20200	3500	60	3560
2/7	38	29000	230	29230	7000	20	7020
2/14	45	15000	400	15400	1800	70	1870
2/21	52	11000	500	11500	4000	150	4150
2/28	59	15000	600	15600	2500	80	2580
3/6	65	23000	1500	24500	2500	120	2620
3/13	72	10000	800	10800	4000	60	4060
3/25	84	20000	500	20500	1400	40	1440
4/2	92	19800	700	20500	1400	30	1430
4/9	99	18000	700	18700	3000	90	3090
4/15	105	31000	2000	33000	1000	35	1035
4/21	111	22000	700	22700	4000	150	4150
4/28	118	70000	1000	71000	980	30	1010
5/6	126	30000	600	30600	500	60	560
5/13	133	30000	1800	31800	30	70	100
5/20	140	20000	2000	22000	70	80	150
5/27	147	12000	1000	13000	40	110	150
6/3	154	600	9000	9600	40	100	140

6/10	161	2500	10000	12500	120	120	240
6/17	168	2000	5000	7000	30	118	148
7/2	183	5	2000	2005	28	135	163
7/9	190	12	9000	9012	180	250	430
7/16	197	150	8000	8150	90	1500	1590
7/22	203	280	4500	4780	190	1100	1290
7/29	210	300	5000	5300	100	1000	1100
8/7	219	400	1000	1400	150	150	300
8/14	226	500	1800	2300	250	200	450
8/21	233	100	3000	3100	200	300	500
8/28	240	200	3100	3300	1100	100	1200
9/4	247	30	12000	12030	200	300	500
9/11	254	20	1000	1020	900	500	1400
9/17	260	50	800	850	2000	100	2100
9/24	267	40	500	540	220	300	520
9/30	273	100	1000	1100	300	300	600
10/7	280	600	2000	2600	2000	200	2200
10/14	287	8000	3000	11000	4000	450	4450
10/21	294	1000	5000	6000	1000	270	1270

Data from "Pratt, 1959 St. E1"



Data from "Pratt,1959 St. E6"



Pratt DM., 1965, The winter-spring diatom flowering in Narragansett Bay, Limn. & Oceanogr. 10:173-184.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 38'8" N 781 22'17"W: mouth of Prov. R.	6-A
Station 3	41 26'47" N 71 25'9" W: Bay mouth	6-C

Dates and data were digitized from a graph, both are approximate.

UNITS: cells/ml

	STATION 1	
Date	Julian day	Diatoms
11/5/59	309	20
11/10	314	1
11/22	326	18
11/30	334	16
12/5	339	17
12/13	347	20
12/20	354	26
12/27	361	25

	STATION 1	
Date	Julian day	Diatoms
1/3/60	3	16
1/10	10	45
1/17	17	42
1/30	30	700
2/8	39	100
2/13	44	7000
2/20	51	6200
2/28	59	8000
3/6	65	4000
3/13	72	3000
3/21	80	4500
3/28	87	3700
4/3	93	7500
4/11	101	8000
4/19	109	5000
5/2	122	3500
5/10	130	5000
5/18	138	2000
5/23	143	4000
5/30	150	500
6/7	158	1200
6/17	168	500
11/2/60	306	100
11/6	310	100
11/12	315	300
11/20	324	3100
11/27	331	2000
12/3	337	1800
12/11	345	1500
12/18	352	900
12/24	358	1800
12/30	364	1900

STATION 1

Date	Julian day	Diatoms
1/8/61	8	6100
1/13	13	5300
1/21	21	11900
1/30	30	9000
2/11	42	8500
2/28	59	11000
3/7	66	7000
3/13	72	6000
3/20	79	4000
4/2	92	1000
4/11	101	2500
4/23	113	6000
5/2	122	9500
5/9	129	5500
5/15	135	800
5/22	142	1000
5/28	148	1100
6/6	157	2400
6/12	163	1
11/7/61	311	50
11/13	317	70
11/21	325	40
11/28	332	10
12/4	338	100
12/11	345	75
12/19	353	100
12/24	358	200
12/30	364	1800

Date	Julian day	Diatoms
1/2/63	2	38000
1/9	9	49000
1/16	16	51000
1/22	22	48000
1/28	28	12000
2/5	36	5800
2/11	42	2500
2/19	50	2700
2/25	56	8000
3/4	63	9000
3/11	70	2700
3/18	77	2500
3/24	83	2100
4/1	91	5500
4/8	98	2100
4/15	105	7000
4/22	112	6000
4/29	119	7000
5/12	132	5700
5/20	140	1000
5/25	145	5000
6/2	153	200
6/10	161	100

Date	Julian day	Diatoms
1/9/62	9	8200
1/14	14	8500
1/22	22	19000
1/30	30	23000
2/7	38	21000
2/12	43	17000
2/20	51	9000
2/27	58	6000
3/11	70	10000
3/20	79	9500
3/28	87	8000
4/2	92	4000
4/11	101	16000
4/18	108	7500
4/25	115	5000
5/1	121	7000
5/9	129	8000
5/15	135	2400
5/21	141	1500
5/28	148	2500
6/4	155	300
6/10	161	10
11/8/62	312	1000
11/13	317	2000
11/20	324	400
11/25	329	100
11/30	334	100
12/10	344	200
12/18	352	1100
12/23	357	600

Date	STATION 3 Julian day	Diatoms
11/3/59	307	15
11/10	314	10
11/16	320	25
11/23	327	55
11/30	334	25
12/8	342	85
12/13	347	70
12/21	355	100
12/28	362	65

Date	STATION 3 Julian day	Diatoms
1/4/60	4	100
1/11	11	100
1/19	19	100
1/24	24	101
2/9	40	1600
2/14	45	1900
2/22	53	3500
3/1	60	2500
3/8	67	2500
3/15	74	3000
3/21	80	2700
3/28	87	2700
4/11	101	2600
4/25	115	500
5/3	123	500
5/17	137	1
5/23	143	100
5/30	150	1
6/7	158	1
6/12	163	100
11/2	306	1000
11/8	312	2000
11/13	317	3700
11/21	325	3600
11/29	333	3500
12/6	340	1000
12/12	346	1000
12/19	353	700
12/27	361	800

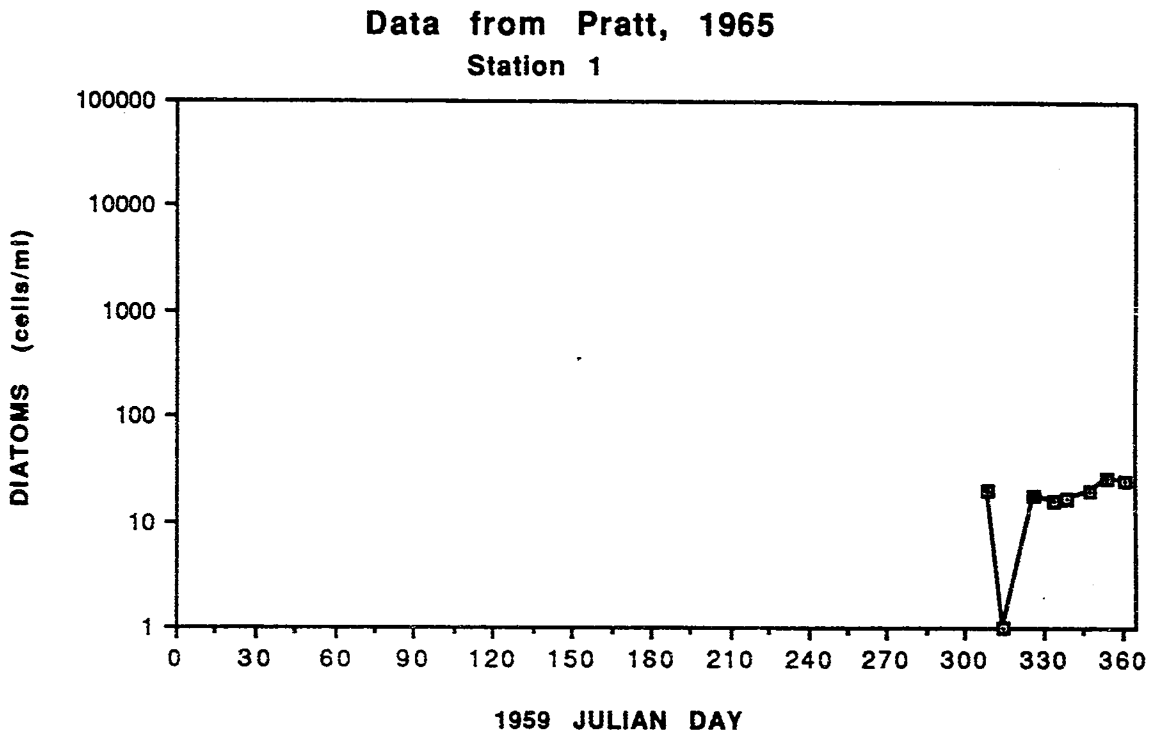
STATION 3

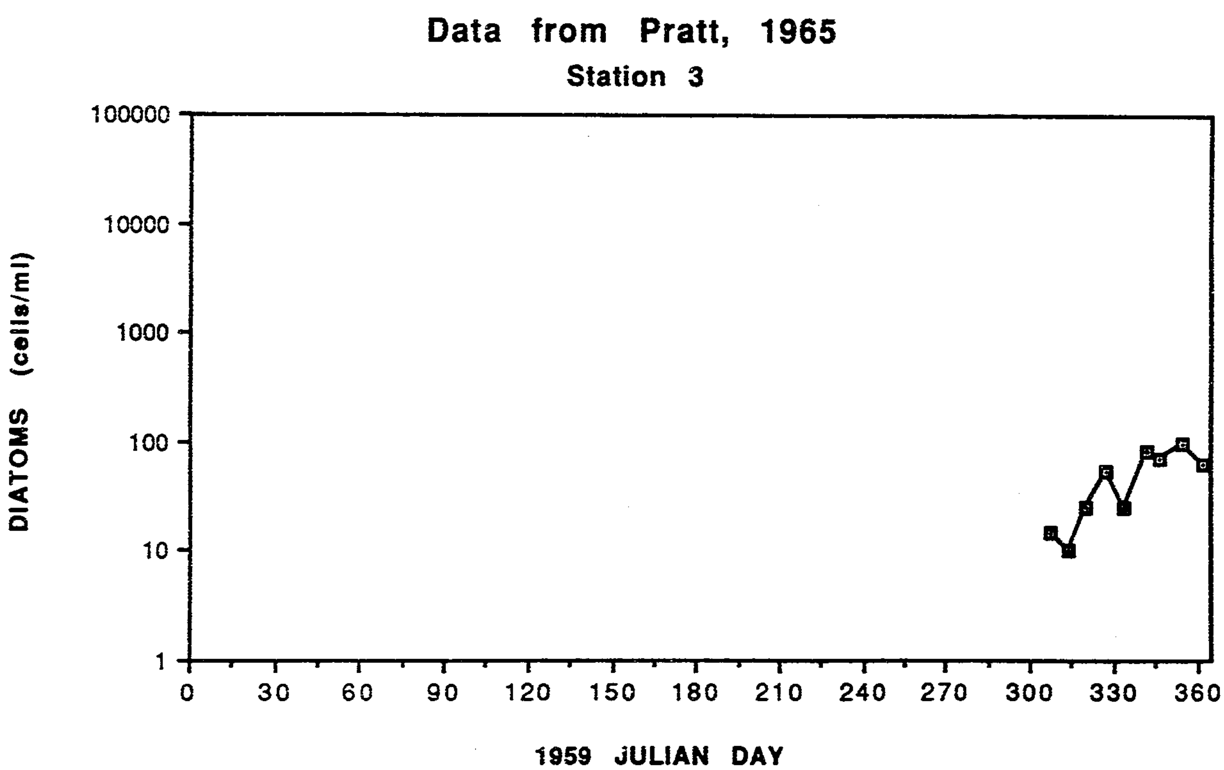
Date	Julian day	Diatoms
1/3/61	3	2800
1/18	18	6400
1/23	23	6700
1/30	30	5500
2/5	36	5200
2/12	43	7400
2/27	58	2000
3/5	64	2800
3/12	71	4900
3/19	78	1300
3/26	85	1200
4/2	92	800
4/10	100	2500
4/24	114	200
5/10	130	100
5/21	141	200
5/29	149	100
6/9	160	1
11/7	311	25
11/13	317	100
11/21	325	50
11/27	331	100
12/4	338	105
12/11	345	95
12/19	353	105
12/24	358	70

STATION 3

Date	Julian day	
1/2/62	2	Diatoms
1/9	9	700
1/14	14	700
1/30	30	2800
2/7	38	5000
2/12	43	4000
2/20	51	3000
2/27	58	1000
3/11	70	200
3/18	77	2500
3/24	83	5200
3/30	89	3500
4/8	98	2500
4/14	104	66000
4/22	112	2500
4/30	120	1
5/10	100	500
11/7	311	1
11/13	317	4000
11/20	324	1200
11/27	331	1000
12/4	338	1
12/8	342	900
12/19	353	1
12/24	358	1
		2500

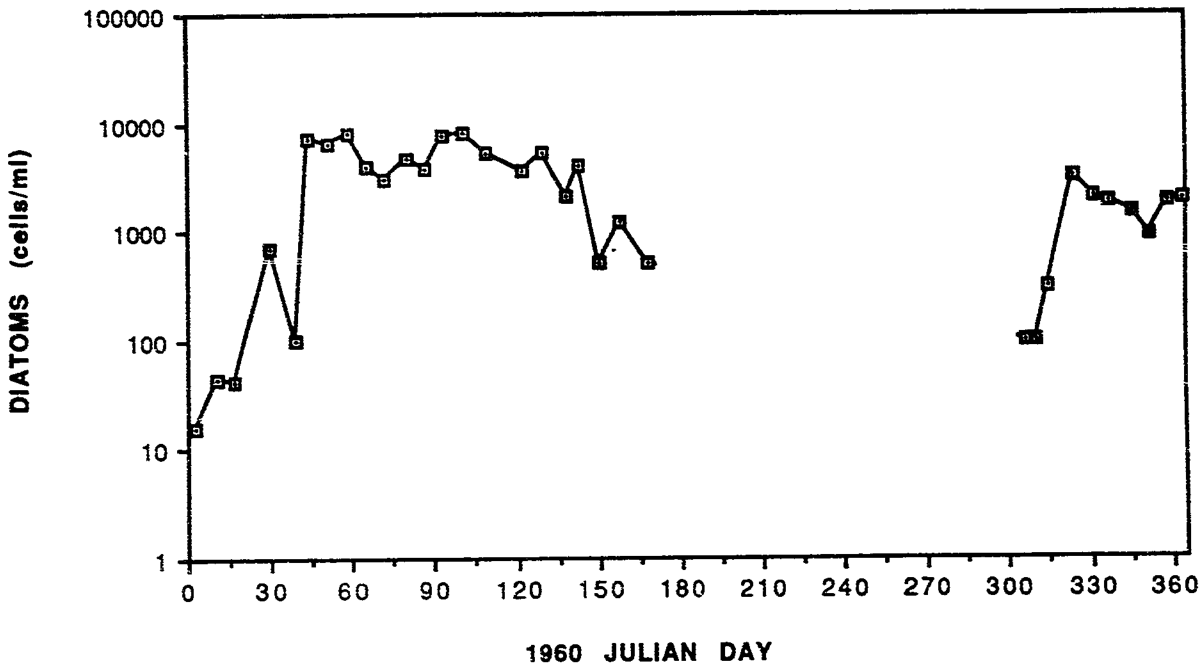
Date	Julian day	Diatoms
1/9/63	9	11000
1/16	16	25000
1/22	22	18000
1/30	30	11500
2/5	36	1000
2/12	43	1200
2/20	51	1
2/26	57	1200
3/3	62	3500
3/10	69	3500
3/18	77	4000
4/1	91	900
4/9	99	1000
4/22	112	1100
5/1	121	1000
5/8	128	700
5/20	140	1
5/27	147	300
6/7	158	200
6/10	161	1


Data from Pratt, 1965
Station 1
100000
10000
1000
100
10
1
DIATOMS (cells/ml)
0
30
60
90
120
150
180
210
240
270
300
330
360
1959 JULIAN DAY


Data from Pratt, 1965
Station 3
100000
10000
1000
100
10
1
DIATOMS (cells/ml)
0
30
60
90
120
150
180
210
240
270
300
330
360
1959 JULIAN DAY

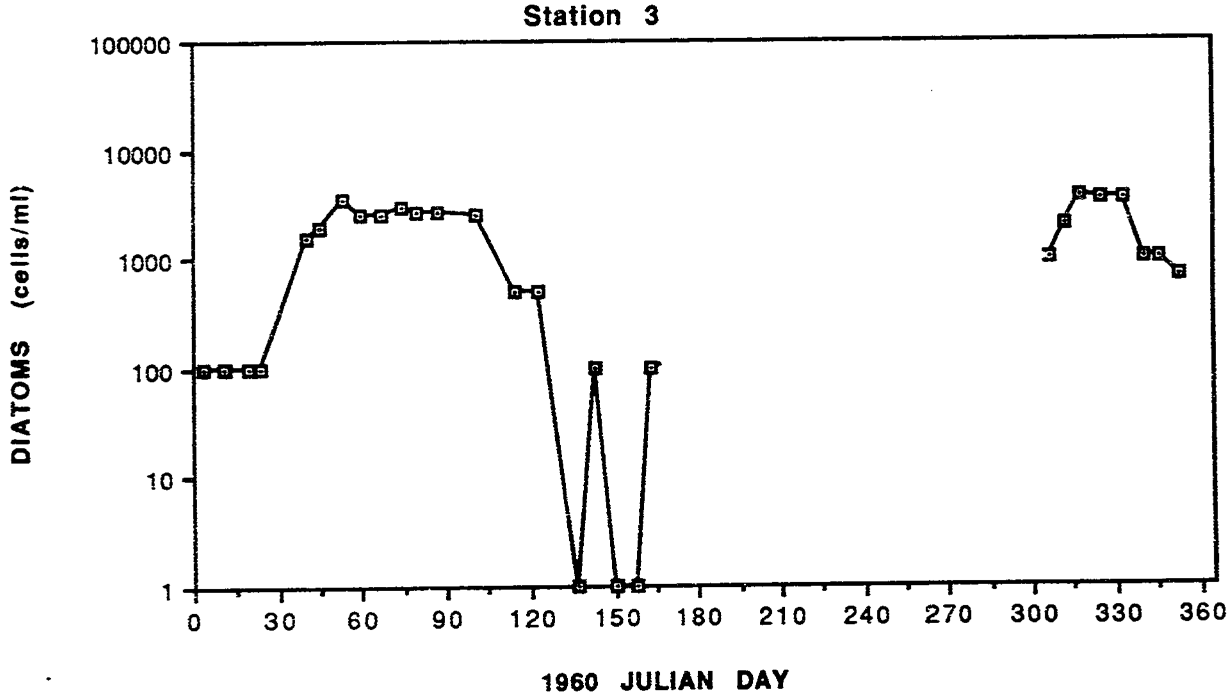
Data from Pratt, 1965

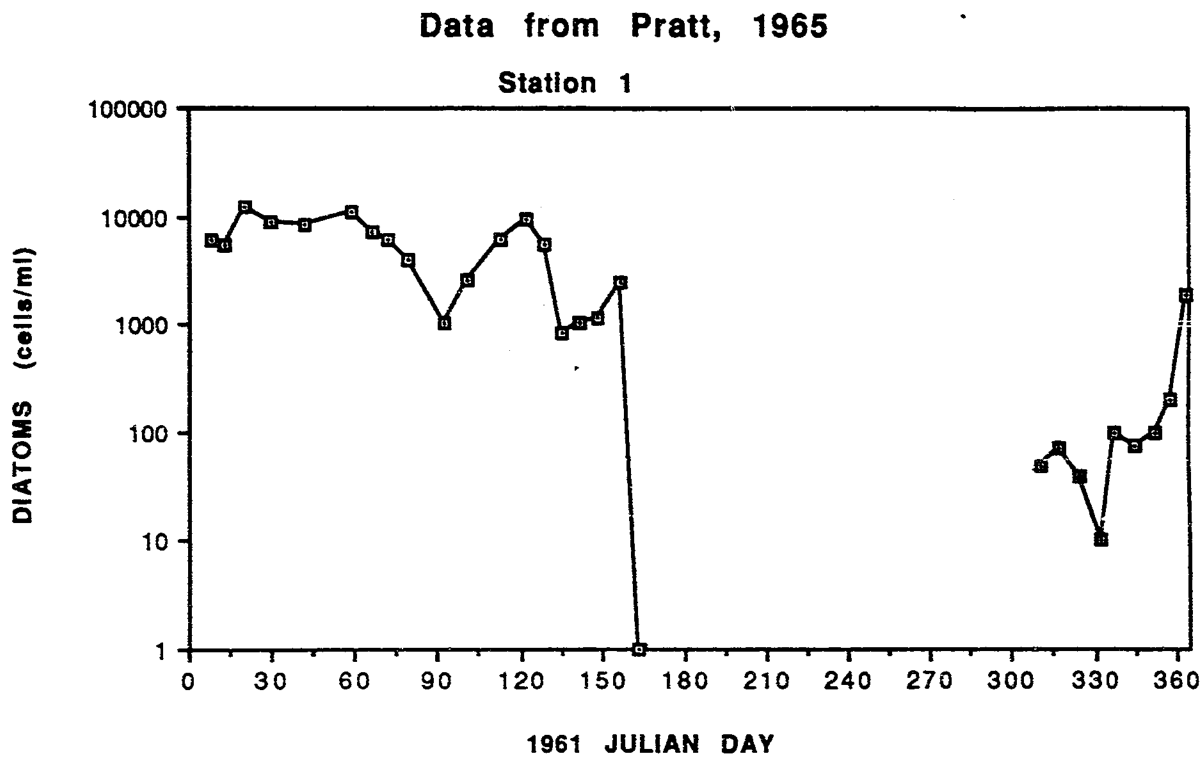
Station 1

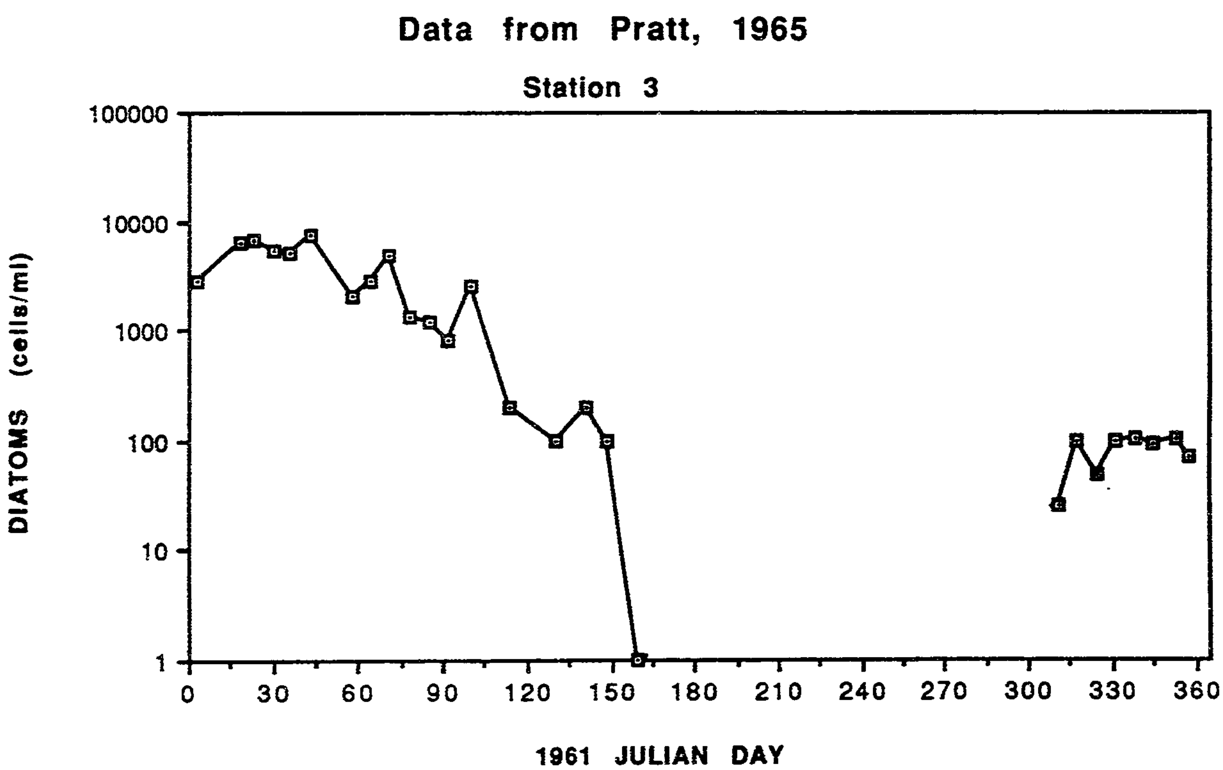


Data from Pratt, 1965

Station 3

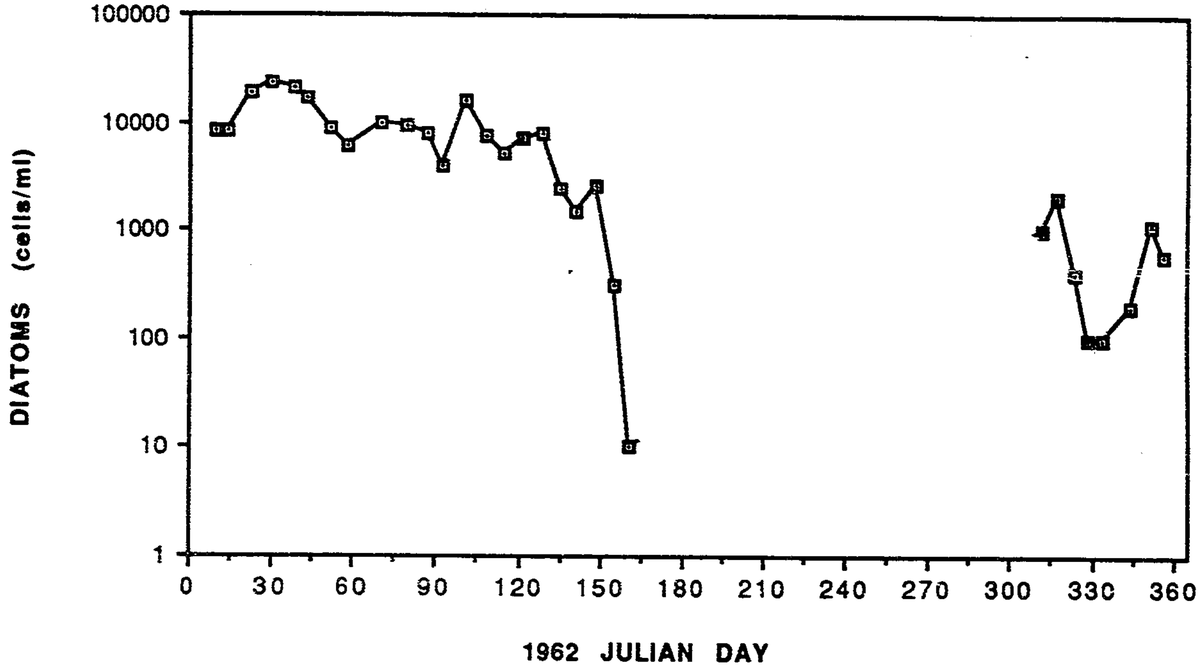



Data from Pratt, 1965
Station 1
DIATOMS (cells/ml)
100000
10000
1000
100
10
1
0
30
60
90
120
150
180
210
240
270
300
330
360
1961 JULIAN DAY


Data from Pratt, 1965
Station 3
DIATOMS (cells/ml)
100000
10000
1000
100
10
1
0
30
60
90
120
150
180
210
240
270
300
330
360
1961 JULIAN DAY

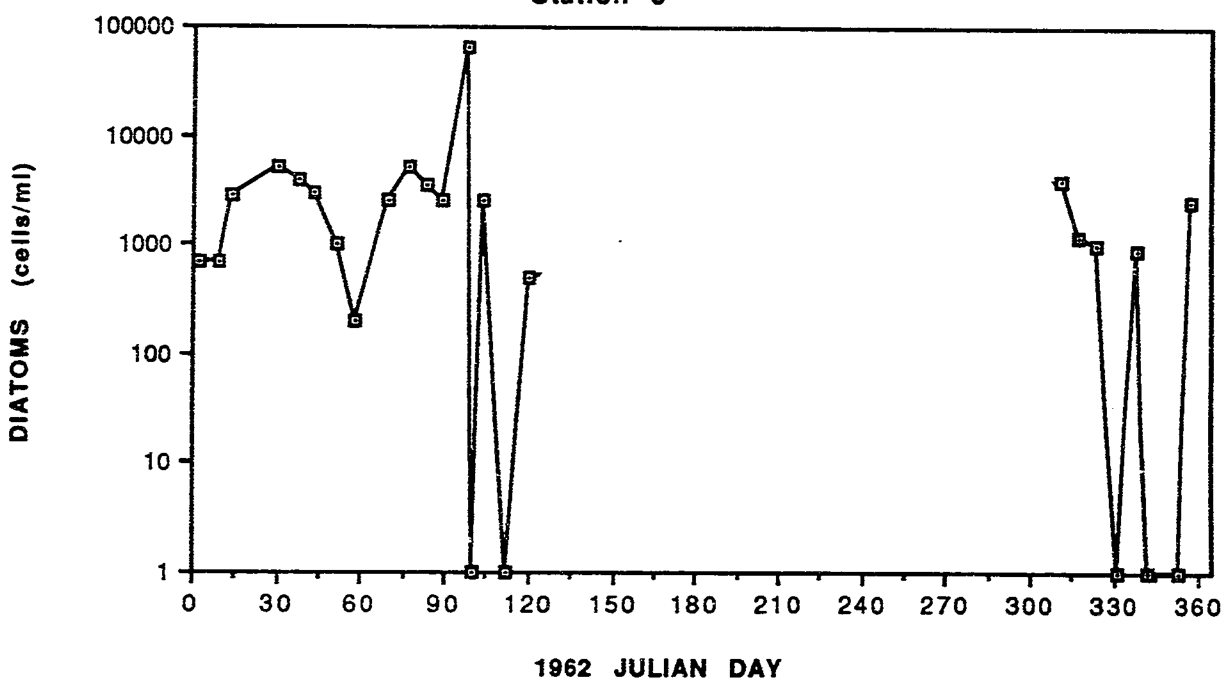
Data from Pratt, 1965

Station 1



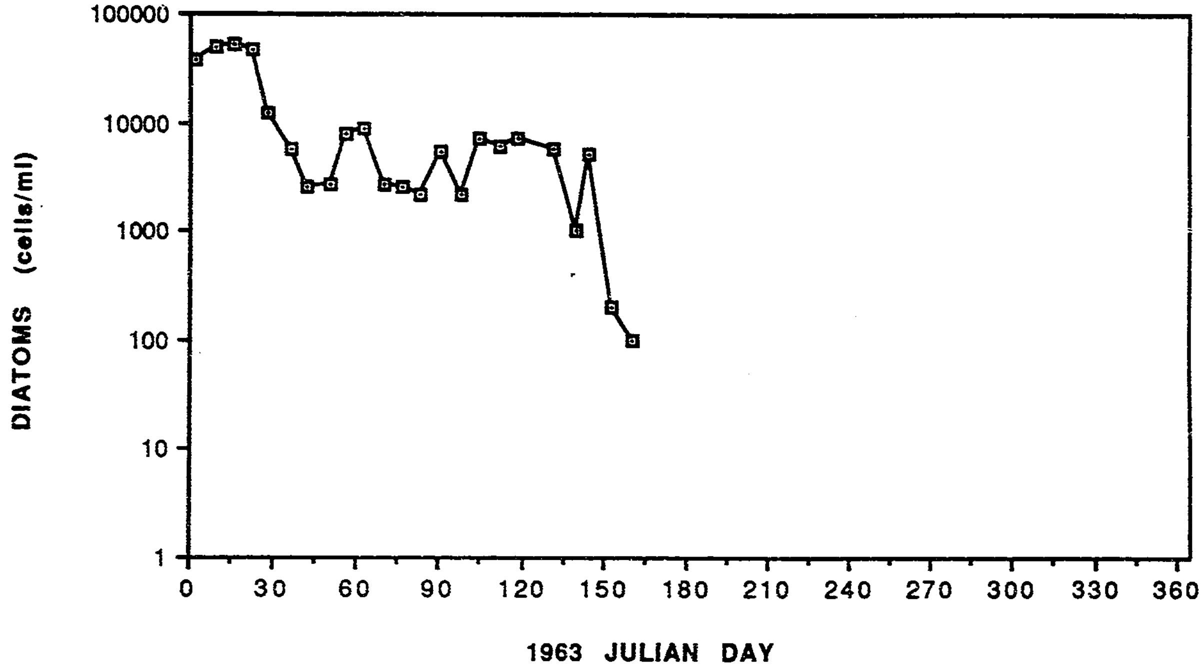
Data from Pratt, 1965

Station 3



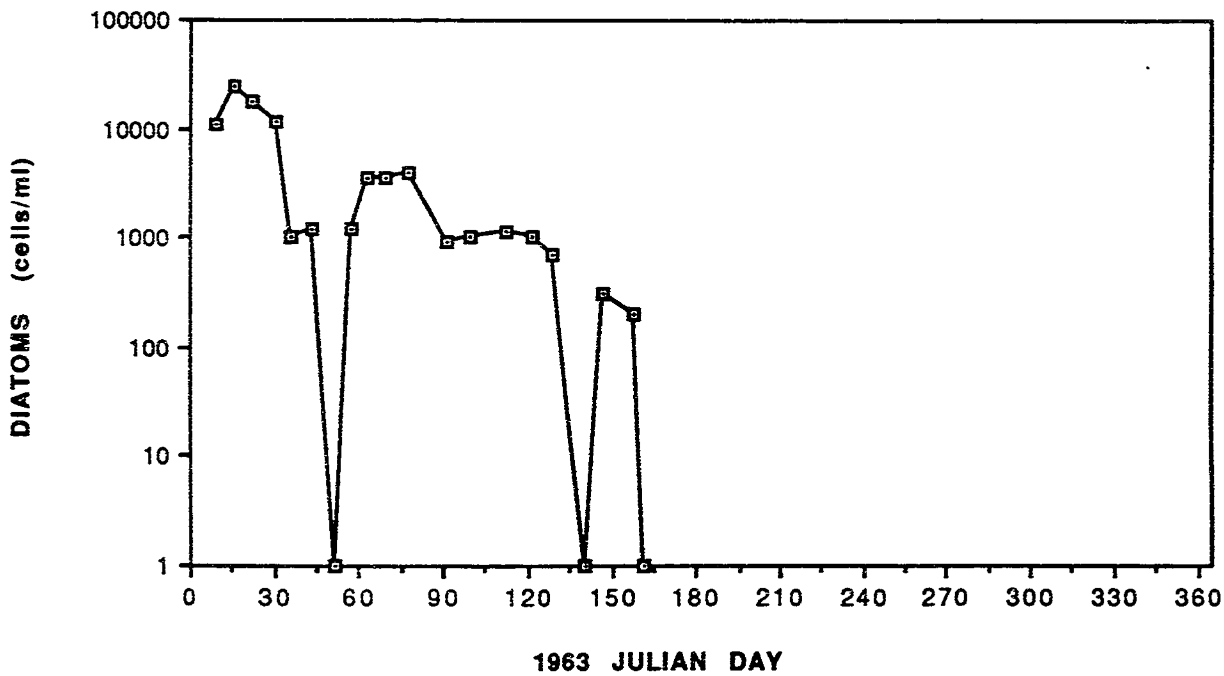
Data from Pratt, 1965

Station 1



Data from Pratt, 1965

Station 3



Pratt DM, 1966, Competition between Skeletonema costratum and Olisthodiscus lutues in Narragansett Bay in culture, Limn. & Oceanogr. 11:447-455.

Data for 1963 from mouth of W. Passage
Data for other years from middle of W. Passage

Data taken from a figure

UNITS:cells/ml

Middle of West Passage

Date	Julian day	Skeletonema
5/5/59	125	300000
5/12	132	100000
5/21	141	5000
5/27	147	90000
6/2	153	2000000
6/10	161	150000
6/18	169	1000
6/22	173	1000
6/30	1841	1000
7/7	181	800000
7/14	195	1000
7/20	201	1000
7/30	211	1000
8/4	216	1000
8/12	223	1000
8/19	231	100000
8/24	236	160000
9/1	244	1000
9/12	254	1200000
9/21	264	8000000
10/1	274	6000000
10/5	278	1000000
10/13	286	500000
10/20	293	50000
10/27	300	180000
10/30	303	40000

Middle of West Passage

date	Julian day	Skeletonema
5/3/60	123	1000000
5/16	136	2500000
5/21	141	6000000
6/1	152	800000
6/7	158	1000000
6/12	163	350000
6/19	170	70000
6/28	179	60000
7/5	186	8000
7/12	193	1000
7/18	199	60000
7/23	204	2000000
8/2	214	8000000
8/7	219	1500000
8/15	227	1000000
8/21	233	1100000
9/1	244	2300000
9/8	251	15000
9/13	256	40000
9/20	263	50000
9/27	270	1200000
10/4	277	1000000
10/11	284	100000
10/17	290	6000000
10/24	297	1000000
10/30	303	100000

Middle of West Passage

date	Julian day	Skeletonema
5/2/61	122	4000000
5/8	128	15000
5/21	141	10000
6/1	152	60000
6/13	164	1000
6/18	169	1000
6/26	177	1000
7/3	184	1000
7/12	193	600000

Middle of West Passage

date	Julian day	Skeletonema
5/2/62	122	8000000
5/8	128	3000000
5/14	134	70000
5/22	142	7000
5/30	150	3000000
6/5	156	150000
6/11	162	1000
6/19	170	1000
6/26	177	1000

Date	Julian day	Skeletonema
7/17	198	500000
7/24	205	6000000
8/1	213	800000
8/8	220	400000
8/15	227	8000000
8/26	268	15000000
9/1	244	6000000
9/12	255	150000
9/17	260	1000
9/27	270	230000
10/5	278	10000000
10/11	284	700000
10/19	292	100000
10/24	297	15000
10/30	303	1000

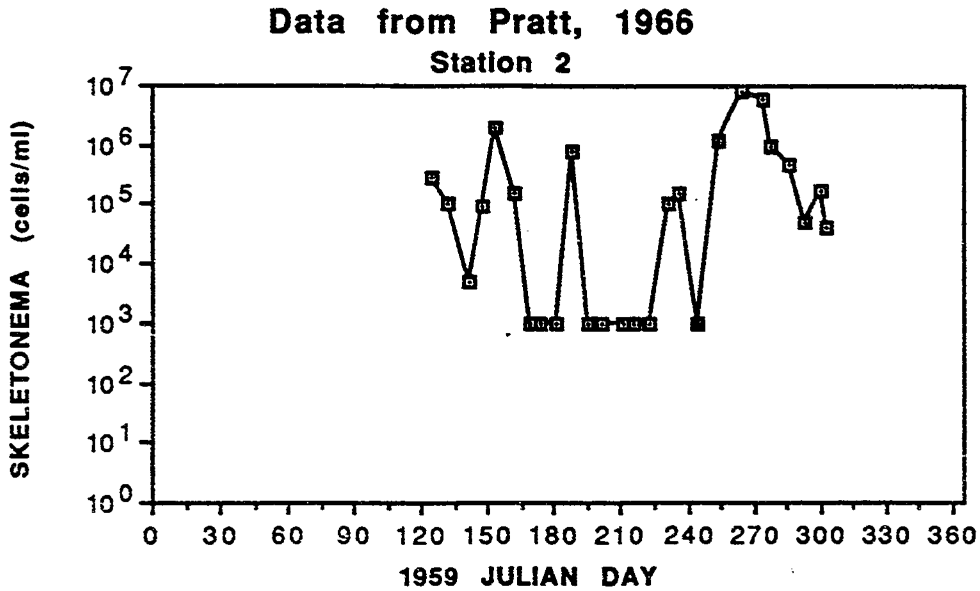
date	Julian day	Skeletonema
7/15	196	1000
7/22	203	1000
8/1	213	1000
8/6	218	7000
8/20	232	2000000
8/29	241	8000
9/4	247	70000
9/10	253	8500000
9/15	258	8000000
9/22	265	9000000
10/2	275	150000
10/11	284	400000
10/16	289	40000
10/22	295	300000
10/30	303	200000

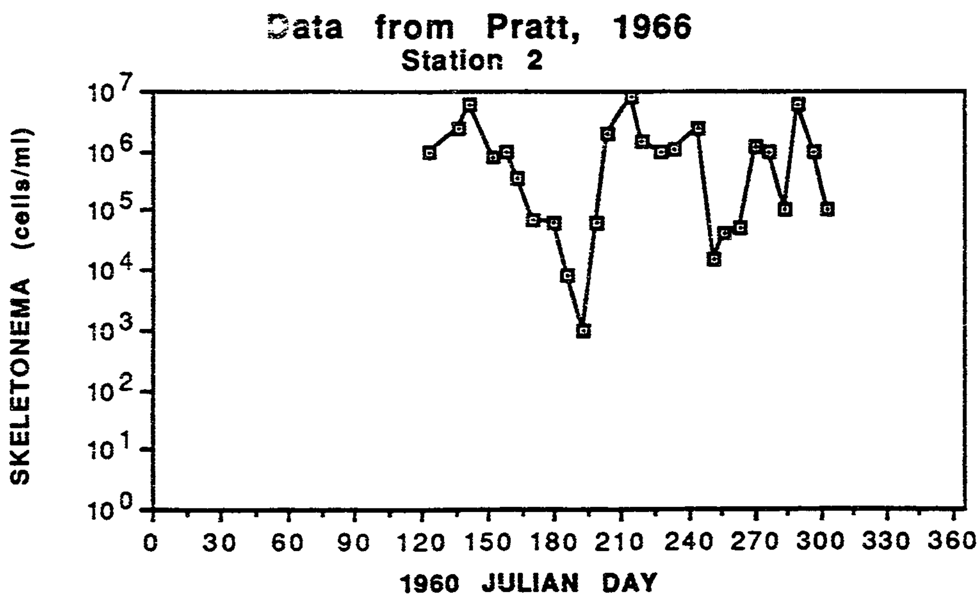
Middle of West Passage

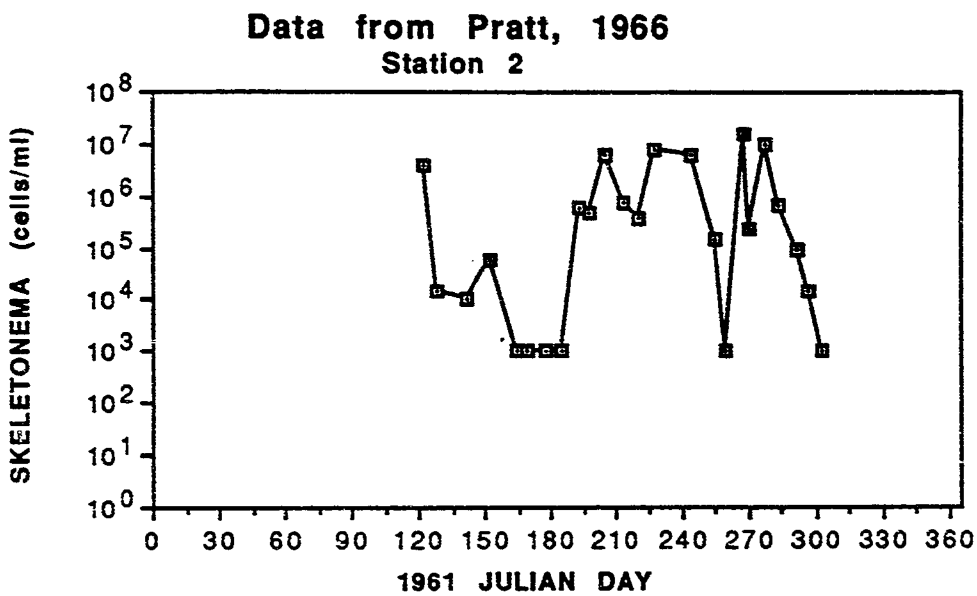
date	Julian day	Skeletonema
5/1/64	121	10000000
5/6	126	100000
5/13	132	40000
5/21	141	1000
5/27	147	37000
6/4	155	1000
6/12	163	40000
6/18	169	1000
6/25	176	1000
7/3	184	600000
7/10	191	500000
7/16	197	400000
7/21	202	7000000
8/1	213	200000
8/5	217	10000000
8/11	223	210000
8/17	229	800000
8/24	236	1000
9/3	246	10000000
9/14	257	100000
9/20	263	200000
9/29	272	70000
10/6	279	7000
10/12	285	1000
10/17	290	4000
10/26	299	4000
10/30	303	2000

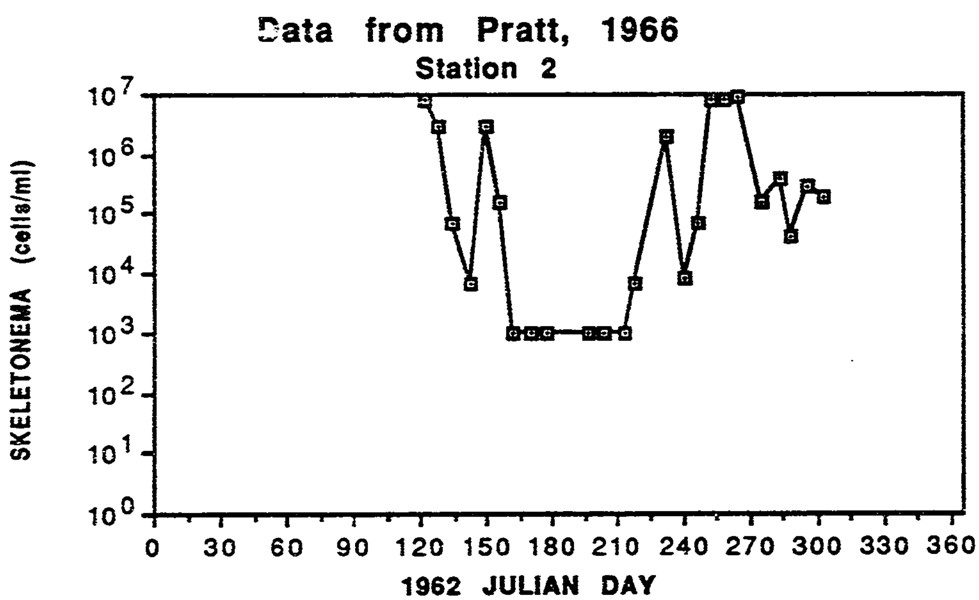
Mouth of West Passage

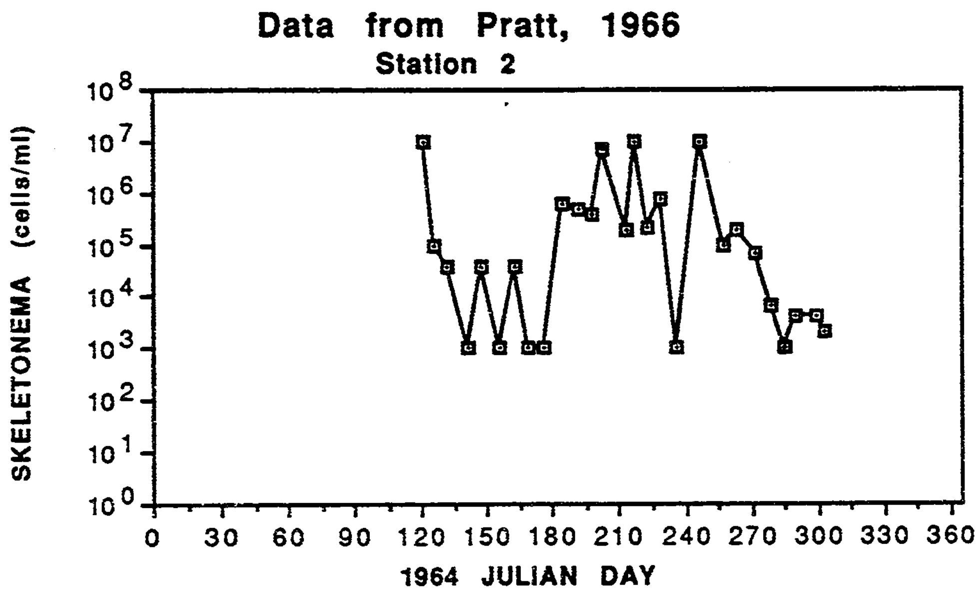
date	Julian day	Skeletonema
5/6/63	126	500000
5/13	133	70000
5/21	141	400000
5/28	148	350000
6/4	155	100000
6/12	162	90000
6/19	170	7000
6/23	174	30000
6/30	181	1000
7/3	184	1000
7/12	193	1000
7/19	200	1000
7/24	205	1000
8/2	214	1000
8/10	222	12000
8/20	232	400000
8/28	240	120000
9/6	249	1000
9/13	256	1000
9/19	262	8000
9/27	270	1000
10/3	276	1000
10/12	285	20000
10/17	290	450000
10/24	297	25000
10/30	303	1000

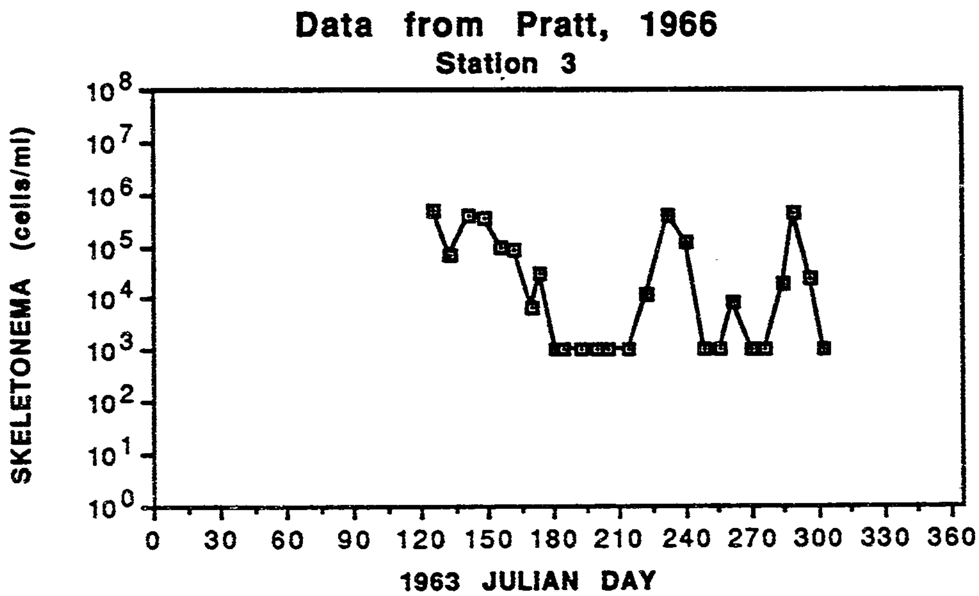

Data from Pratt, 1966
Station 2
SKELETONEMA (cells/ml)
10⁷
10⁶
10⁵
10⁴
10³
10²
10¹
10⁰
0 30 60 90 120 150 180 210 240 270 300 330 360
1959 JULIAN DAY


Data from Pratt, 1966
Station 2
SKELETONEMA (cells/ml)
10⁷
10⁶
10⁵
10⁴
10³
10²
10¹
10⁰
0 30 60 90 120 150 180 210 240 270 300 330 360
1960 JULIAN DAY


Data from Pratt, 1966
Station 2
SKELETONEMA (cells/ml)
10^8
10^7
10^6
10^5
10^4
10^3
10^2
10^1
10^0
0 30 60 90 120 150 180 210 240 270 300 330 360
1961 JULIAN DAY


Data from Pratt, 1966
Station 2
SKELETONEMA (cells/ml)
10^7
10^6
10^5
10^4
10^3
10^2
10^1
10^0
0 30 60 90 120 150 180 210 240 270 300 330 360
1962 JULIAN DAY


Data from Pratt, 1966
Station 2
SKELETONEMA (cells/ml)
10 8
10 7
10 6
10 5
10 4
10 3
10 2
10 1
10 0
0
30
60
90
120
150
180
210
240
270
300
330
360
1964 JULIAN DAY


Data from Pratt, 1966
Station 3
SKELETONEMA (cells/ml)
10^8
10^7
10^6
10^5
10^4
10^3
10^2
10^1
10^0
0 30 60 90 120 150 180 210 240 270 300 330 360
1963 JULIAN DAY

Smayda TJ., 1955, Phytoplankton Studies in lower Narragansett Bay, MS Thesis, University of Rhode Island, Kingston, RI, 114p.

Smayda TJ., 1957, Phytoplankton studies in lower Narragansett Bay, Limn. & Oceanogr. 2:342-358.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	rbor: Mill Creed/Cove	2A
Station 2	ck near S. boundary of Dutch Island Harbor	2B
Station 3	n E. shore of S.end of Conanicut Island	2C

Dates and data were digitized from a graph in original paper, both are approximate

Data sets have been combined

UNITS:cells/ml

Weekly Values

	MONTH	WEEK	JULIAN DAY	FLAGELLATES	DIATOMS	TOTAL
STATION I	6/54	1	155	850	1	850
		3	169	2200	11.4	2210
		4	177	2200	240	2440
	7/54	1	185	740	11.4	751
		2	195	1700	330	2030
		3	199	2400	220	2620
		4	206	1700	1	1700
	8/54	1	216	400	420	820
		2	223	580	420	1000
		3	231	400	5800	6200
		4	238	130	5800	5930
	9/54	1	247	340	100000	100340
		2	254	150	3600	3750
		3	262	490	8500	8990
		4	268	340	35000	35340
		5	272	2500	2900	5400
	10/54	1	277	340	490	830
		2	283	750	350	1100
		3	290	570	370	940
		4	298	1200	120	1320
	11/54	1	308	100	59	160
		2	314	850	49	900
	12/54	2	344	420	3100	3520
	1/55	1	4	230	17000	17230
		2	11	340	35000	35340
		3	19	130	34000	34130
	2/55	3	50	710	7100	7810

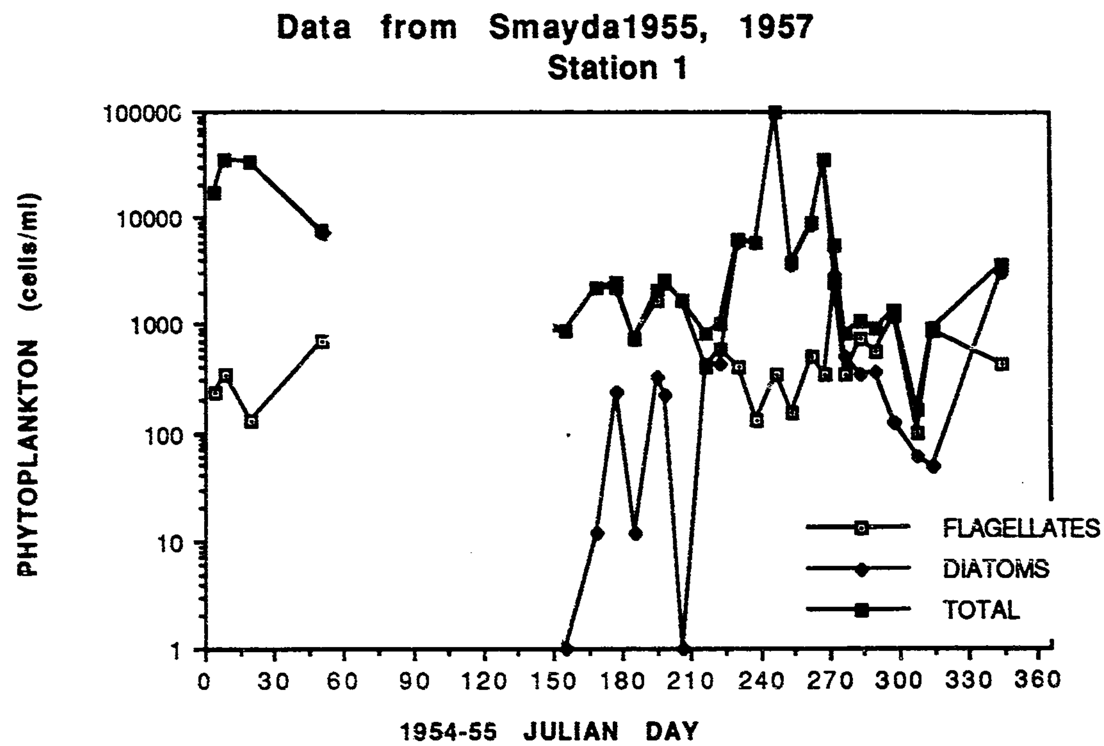
STATION 2

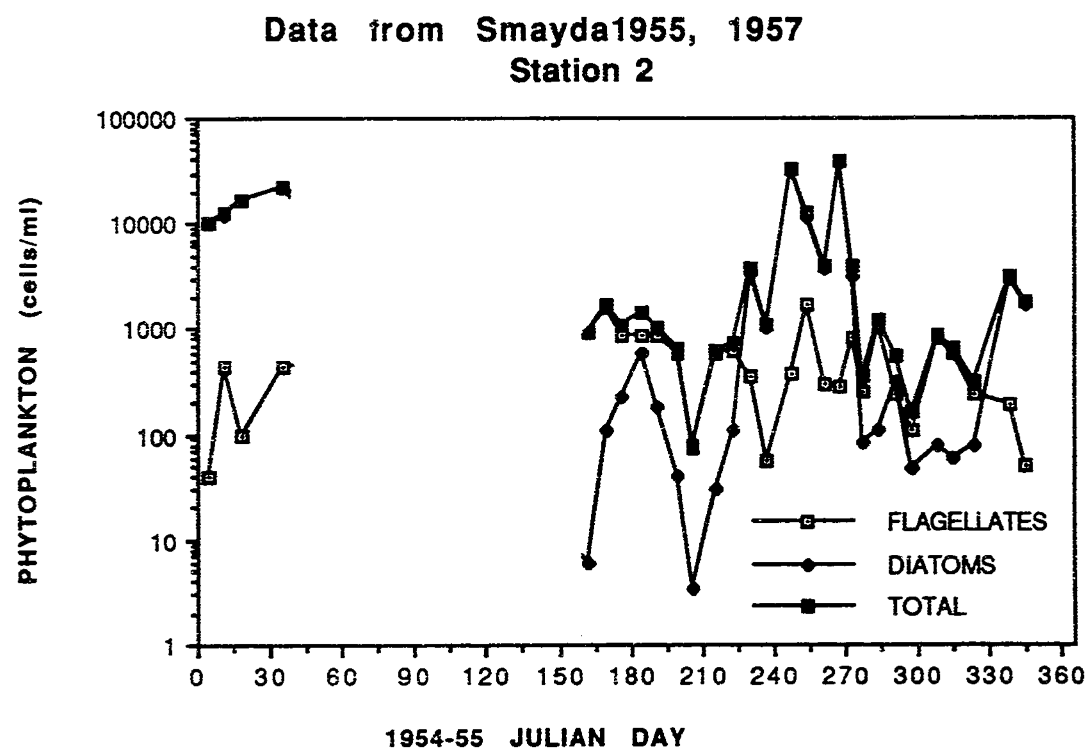
MONTH	WEEK	JULIAN DAY	FLAGELLATES	DIATOMS	TOTAL
6/54	2	162	900	6	906
	3	170	1600	110	1710
	4	176	880	230	1110
7/54	1	185	860	580	1440
	2	191	850	180	1030
	3	200	600	39	640
	4	206	75	3.4	78
8/54	1	216	600	30	630
	2	223	620	110	730
	3	231	360	3400	3760
	4	237	57	1000	1057
9/54	1	248	370	33000	33370
	2	254	1700	11000	12700
	3	261	300	3700	4000
	4	268	290	39000	39290
	5	8273	800	3100	3900
10/54	1	277	260	85	345
	2	284	1100	110	1210
	3	291	240	320	560
	4	298	110	48	158
11/54	1	308	800	77	877
	2	315	600	58	658
	3	323	240	79	320
12/54	1	338	190	2900	3090
	2	345	50	1700	1750
1/55	1	4	40	10000	10040
	2	11	450	12000	12450
	3	19	100	17000	17100
2/55	3	49	450	22000	22450

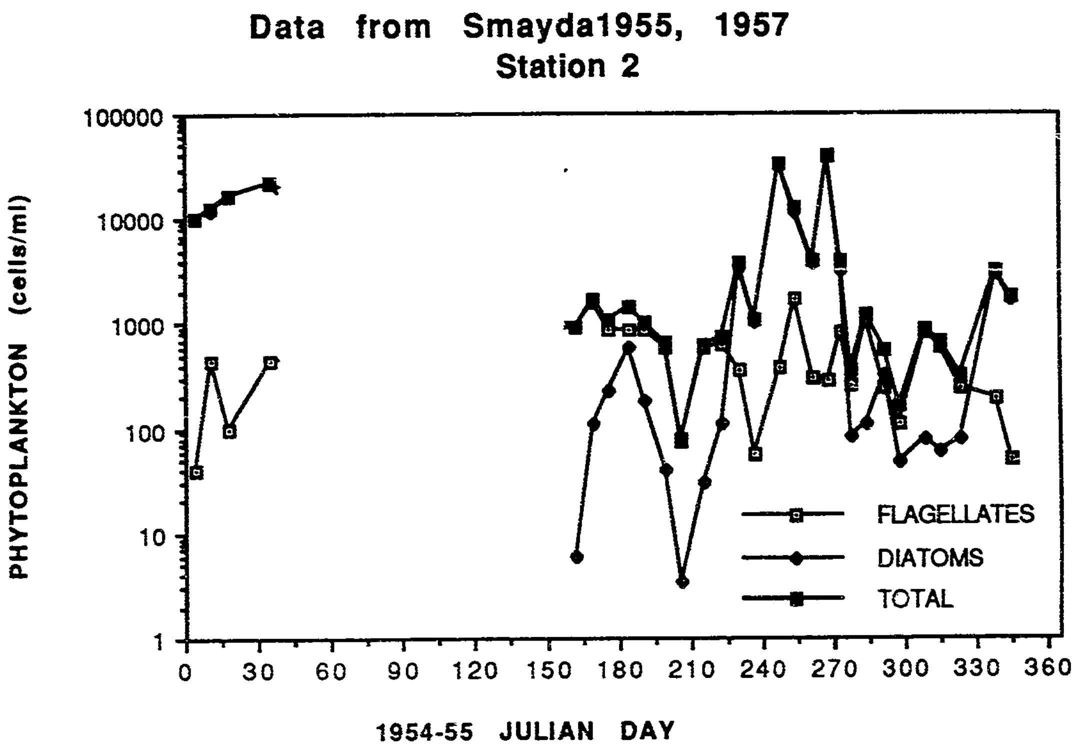
STATION 3

MONTH	WEEK	JULIAN DAY	FLAGELLATES	DIATOMS	TOTAL
6/54	3	169	600	340	940
	4	176	2800	250	3050
7/54	2	192	700	900	1600
	4	206	1000	20	1020
8/54	1	217	190	50	240
	2	223	800	7000	7800
	3	231	330	2000	2530
	4	237	330	5000	5330
9/54	2	254	600	3300	3900
	3	262	560	7500	8060
	4	268	320	50000	50320
	5	273	340	6500	6840
10/54	1	278	70	400	470
	2	284	1100	55	1155
	3	292	500	270	770

11/54	1	508	900	55	955
	2	515	340	72	422
	3	523	400	70	470
12/54	1	538	340	1300	1640
	2	545	90	3400	3490
1/55	1	504	40	8000	8040
	2	510	100	7200	7300
	3	519	33	19000	19000
2/55	3	550	330	2000	2330


Data from Smayda1955, 1957
Station 1
100000
10000
1000
100
10
1
PHYTOPLANKTON (cells/ml)
0 30 60 90 120 150 180 210 240 270 300 330 360
1954-55 JULIAN DAY
FLAGELLATES
DIATOMS
TOTAL


Data from Smayda1955, 1957
Station 2
100000
10000
1000
100
10
1
PHYTOPLANKTON (cells/ml)
0 30 60 90 120 150 180 210 240 270 300 330 360
1954-55 JULIAN DAY
FLAGELLATES
DIATOMS
TOTAL


Data from Smayda1955, 1957
Station 2
PHYTOPLANKTON (cells/ml)
100000
10000
1000
100
10
1
0
30
60
90
120
150
180
210
240
270
300
330
360
FLAGELLATES
DIATOMS
TOTAL
1954-55 JULIAN DAY

Smayda TJ, 1976, Plankton processes in Mid-Atlantic nearshore and shelf waters and energy-releted activities. NTIS, Effects of energy-related activities on the Atlantic continental shelf, Springfield, VA. p. 70-95.

ORIGINAL STATION ID	LOCATION	MAP ID
none specific	41 34'7" N 71 23'31" W	18A

Digitized data

Maximum monthly abundances of diatoms and flagellates

UNITS:cells/ml

1960	Julian day	DIA+FLAG
1/60	15	270
2/60	46	9600
3/60	74	6100
4/60	105	7000
5/60	135	4800
6/60	166	1100
7/60	196	3100
8/60	227	9000
9/60	258	4000
10/60	288	12000
11/60	319	9900
12/60	349	3300

1961	Julian day	DIAT+FLAG
1/61	15	12500
2/61	46	9950
3/61	74	10050
4/61	105	4000
5/61	135	2900
6/61	166	1500
8/61	227	12500
9/61	258	1050
10/61	288	11000
11/61	319	600
12/61	349	600

1962	Julian day	DIAT+FLAG
1/62	15	30000
2/62	46	11000
3/62	74	9600
4/62	105	6400
5/62	135	8800
6/62	166	300
7/62	196	1200
8/62	227	2800
9/62	258	10050
10/62	288	2050
11/62	319	3800
12/62	349	2050

1963	Julian day	DIAT + FLAG
1/63	15	41000
2/63	46	4200
3/63	74	8000
4/63	105	6300
5/63	135	5300
6/63	166	5500
12/63	349	33

1964	Julian day	DIAT + FLAG
1/64	15	15000
2/64	46	16000
3/64	74	25000
4/64	105	9500
5/64	135	640
6/64	166	330
7/64	196	6400
8/64	227	12500
9/64	258	12000
10/64	288	104
11/64	319	430
12/64	349	1950

1965	Julian day	DIAT + FLAG
1/65	15	60
2/65	46	12500
3/65	74	6000
4/65	105	5400
5/65	135	700
6/65	166	1600
7/65	196	5600
8/65	227	9900
9/65	258	3200
10/65	288	1400
11/65	319	170
12/65	349	1500

1966	Julian day	DIAT + FLAG
1/66	15	15000
2/66	46	5800
3/66	74	4900
4/66	105	17000
5/66	135	9700
6/66	166	5300
7/66	196	1800
8/66	227	4900
9/66	258	2900
10/66	288	2500
11/66	319	170
12/66	349	1250

1967	Julian day	DIAT + FLAG
1/67	15	26000
2/67	46	9750
3/67	74	1950
4/67	105	4700
5/67	135	5500
6/67	166	1100
7/67	196	2050
8/67	227	5600
9/67	258	1150
10/67	288	2600
11/67	319	800
12/67	349	8000

1968	Julian day	DIAT + FLAG
1/68	15	10500
2/68	46	10400
3/68	74	6400
4/68	105	9200
5/68	135	5400
6/68	166	7000
7/68	196	9200
8/68	227	6400
9/68	258	4600
10/68	288	750
11/68	319	1300
12/68	349	12500

1969	Julian day	DIAT +FLAG
1/69	15	19000
2/69	46	9100
3/69	74	31000
4/69	105	24000
5/69	135	5500
6/69	166	18000
7/69	196	1500
8/69	227	12600
9/69	258	5000
10/69	288	410
11/69	319	430
12/69	349	2700

1970	Julian day	DIAT + FLAG
1/70	15	420
2/70	46	2500
3/70	74	4400
4/70	105	3200
6/70	166	2300
7/70	196	8800
8/70	227	52000
9/70	258	5200
10/70	288	4100
11/70	319	165
12/70	349	1200

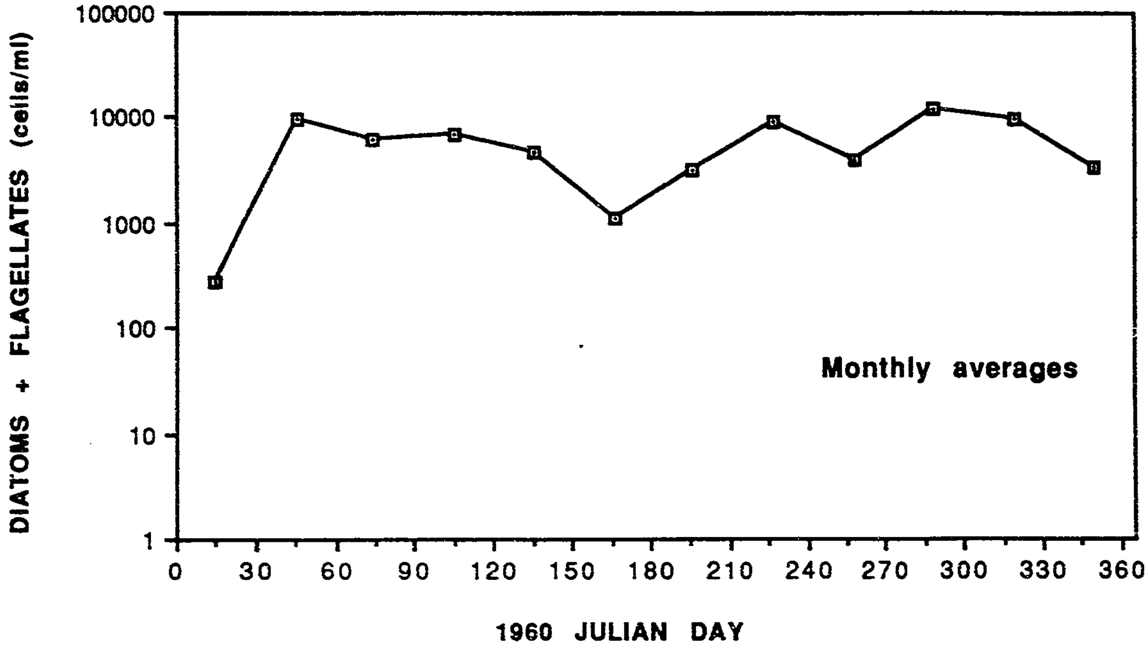
1971	Julian day	DIAT + FLAG
1/71	15	5900
2/71	46	10500
3/71	74	7000
4/71	105	5400
5/71	135	4900
6/71	166	7400
7/71	196	12500
8/71	227	4400
9/71	258	1800
11/71	319	600
12/71	349	1050

1972	Julian day	DIAT + FLAG
1/72	15	12500
2/72	46	4300
3/72	74	4400
4/72	105	2700
5/72	135	9100
6/72	166	1950
7/72	196	5950
8/72	227	10000
9/72	258	1500
10/72	288	3300
11/72	319	3300
12/72	349	610

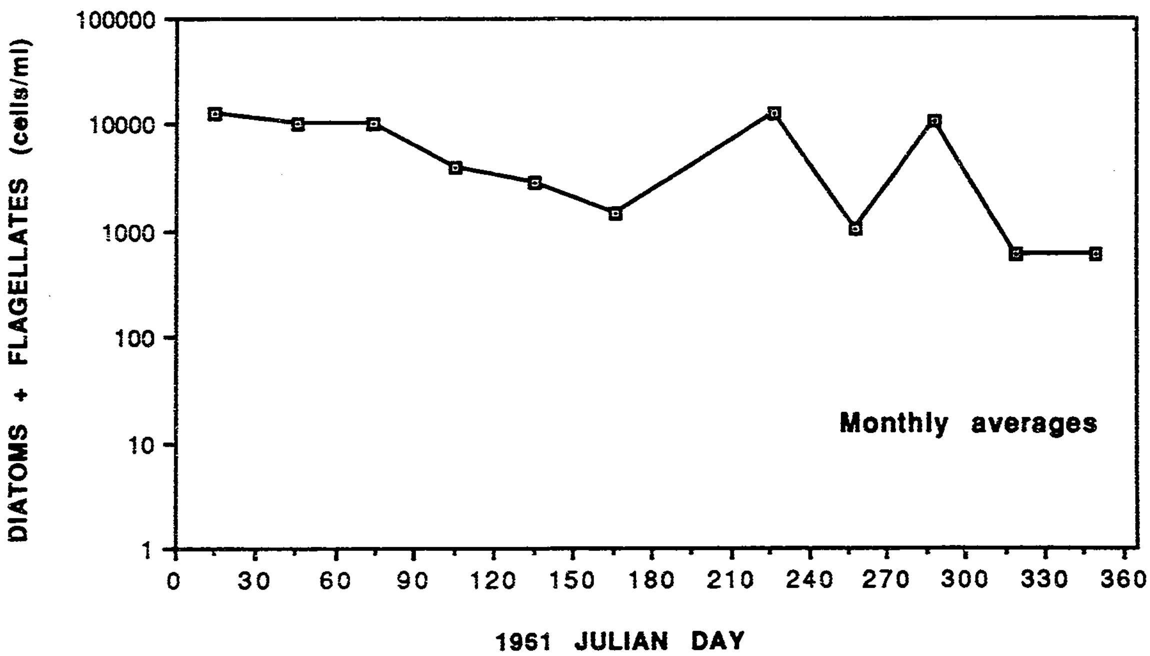
1973	Julian day	DIAT + FLAG
1/73	15	620
2/73	46	8000
3/73	74	8000
4/73	105	3100
5/73	135	3200
6/73	166	170
7/73	196	150
8/73	227	24000
9/73	258	5400
10/73	288	8200
11/73	319	4800
12/73	349	270

1974	Julian day	DIAT + FLAG
1/74	15	300
2/74	46	11000
3/74	74	11000
4/74	105	3500
5/74	135	4800
6/74	166	9100
7/74	196	17000
8/74	227	13000
9/74	258	30000
10/74	288	105
11/74	319	700
12/74	349	1400

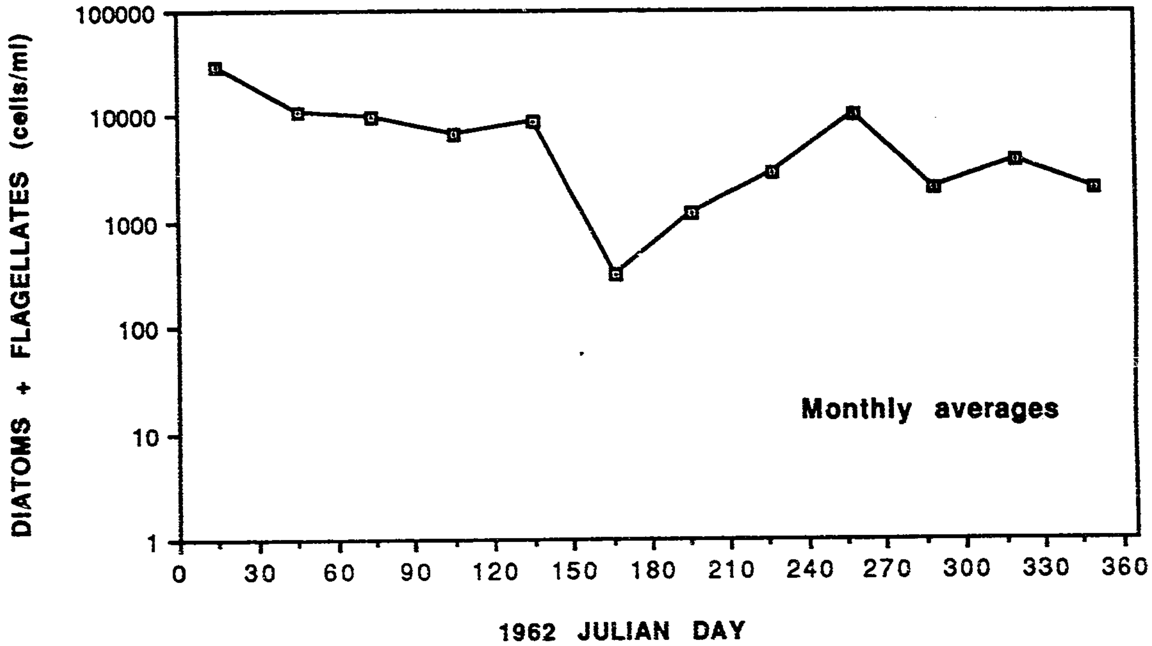
Data from Smayda,1976



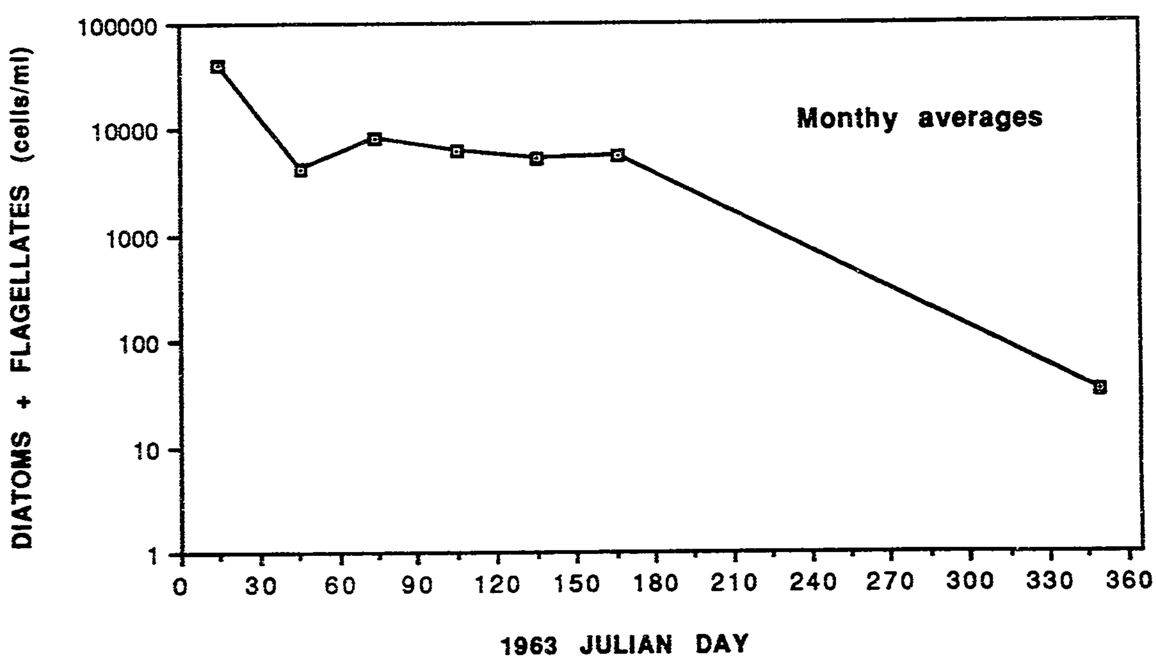
Data from Smayda,1976

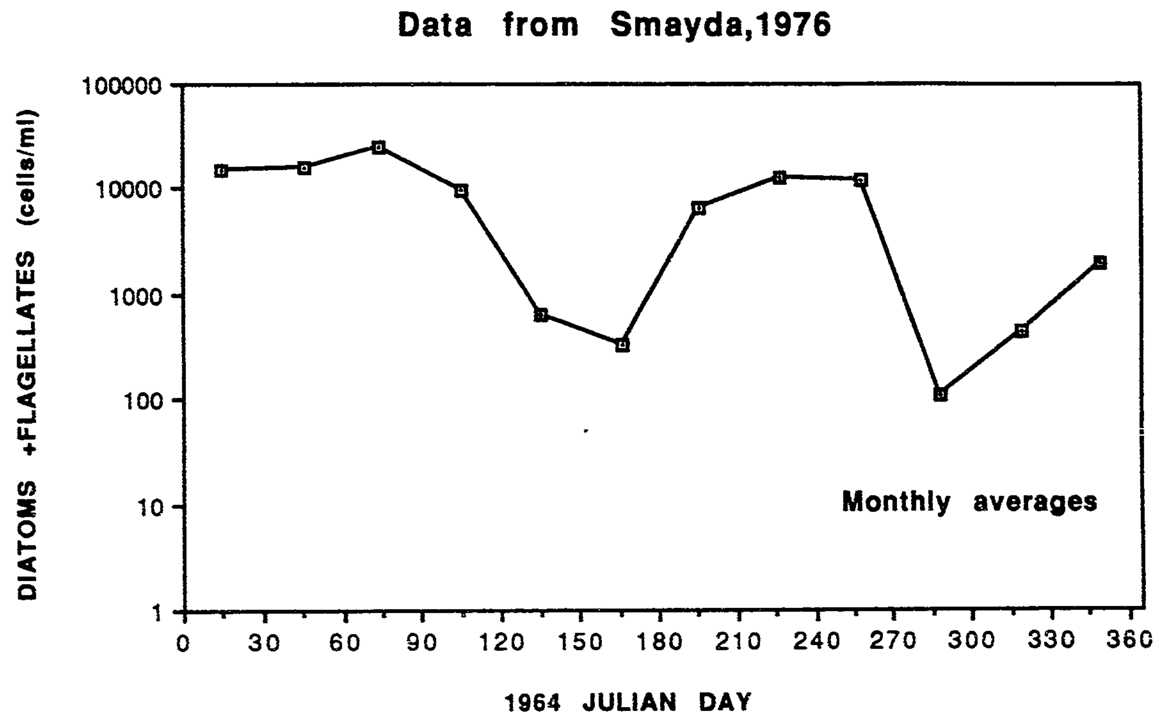


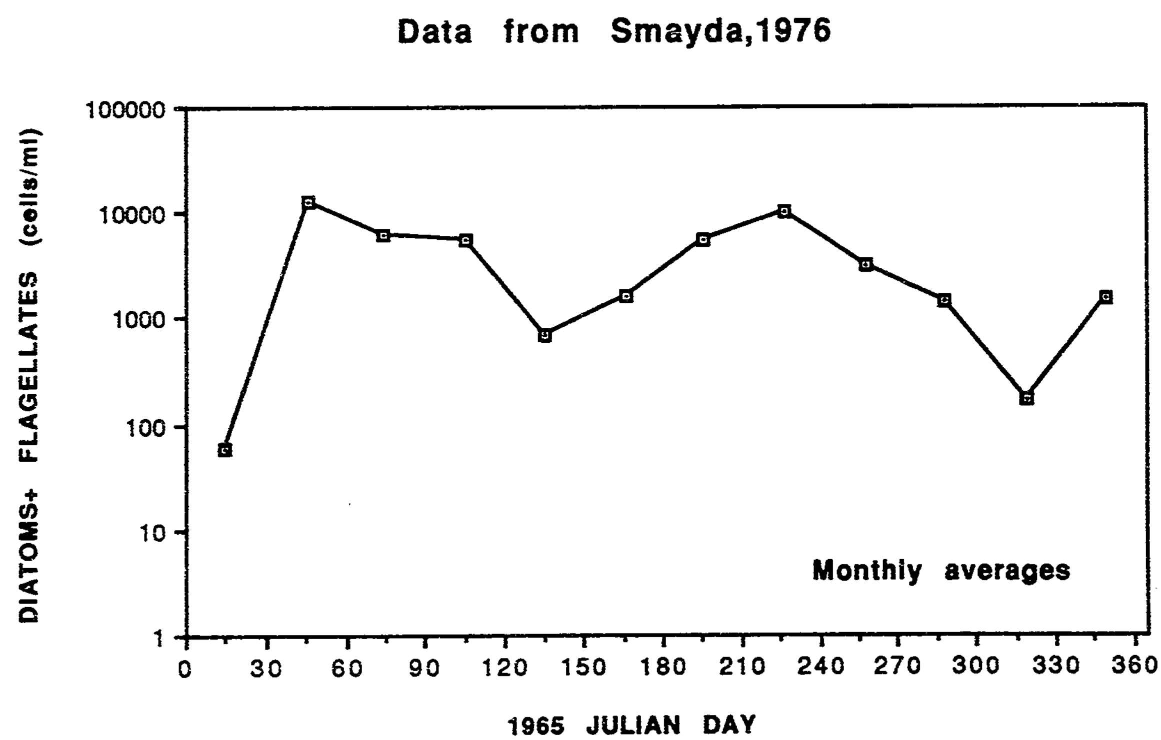
Data from Smayda,1976



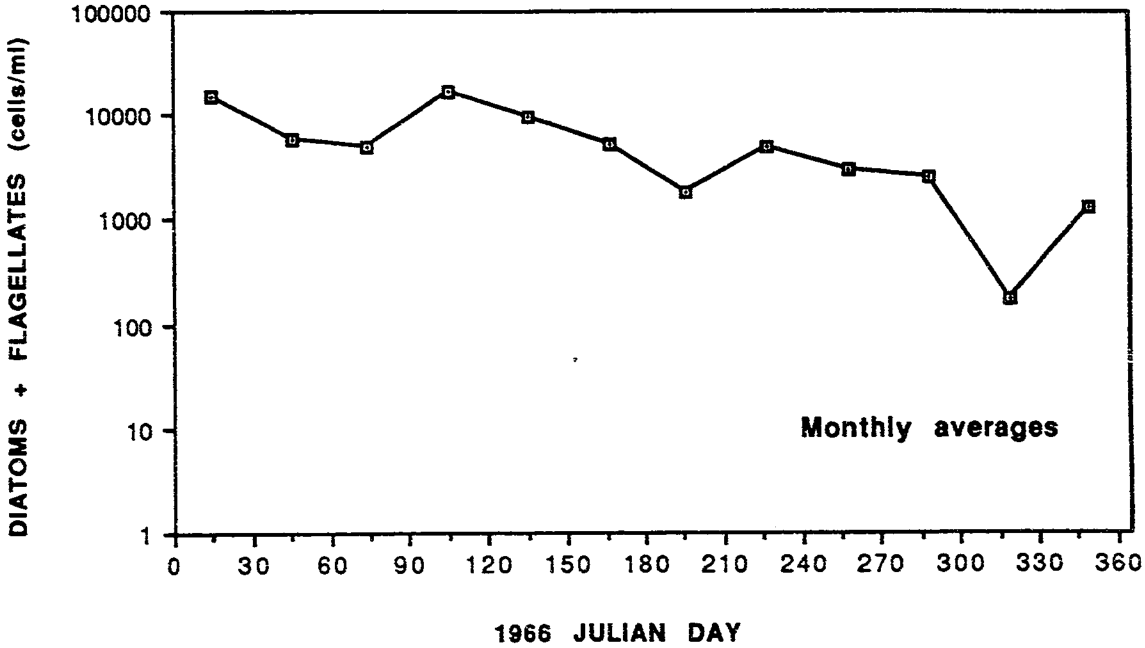
Data from Smayda,1976



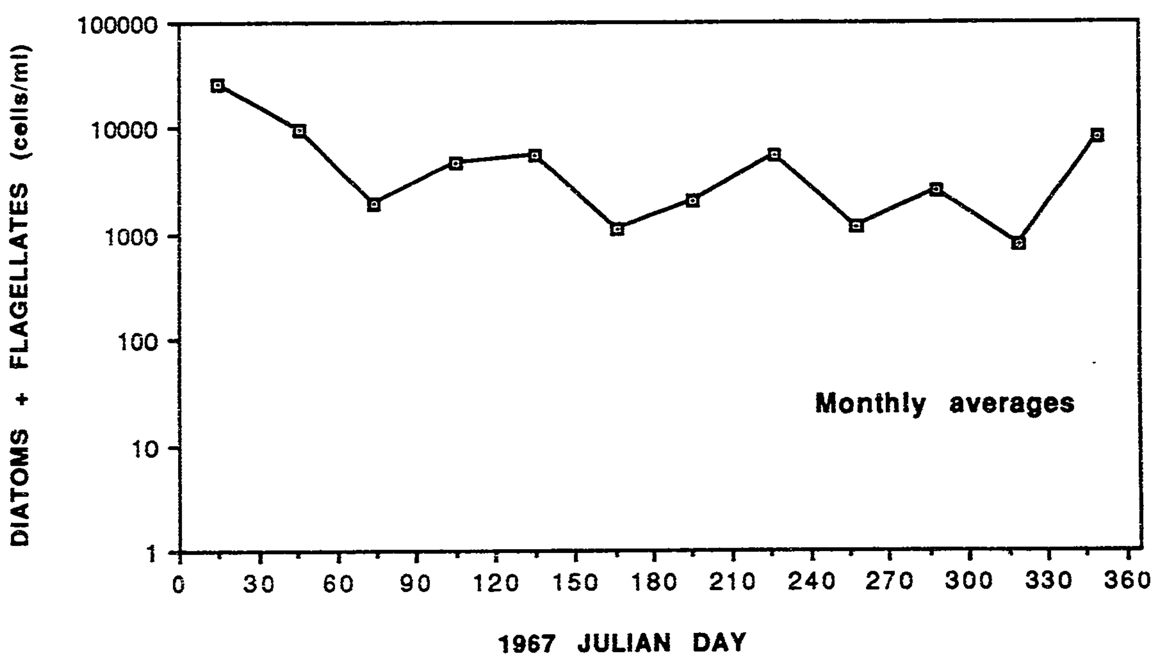

Data from Smayda,1976
DIATOMS +FLAGELLATES (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1964 JULIAN DAY
Monthly averages

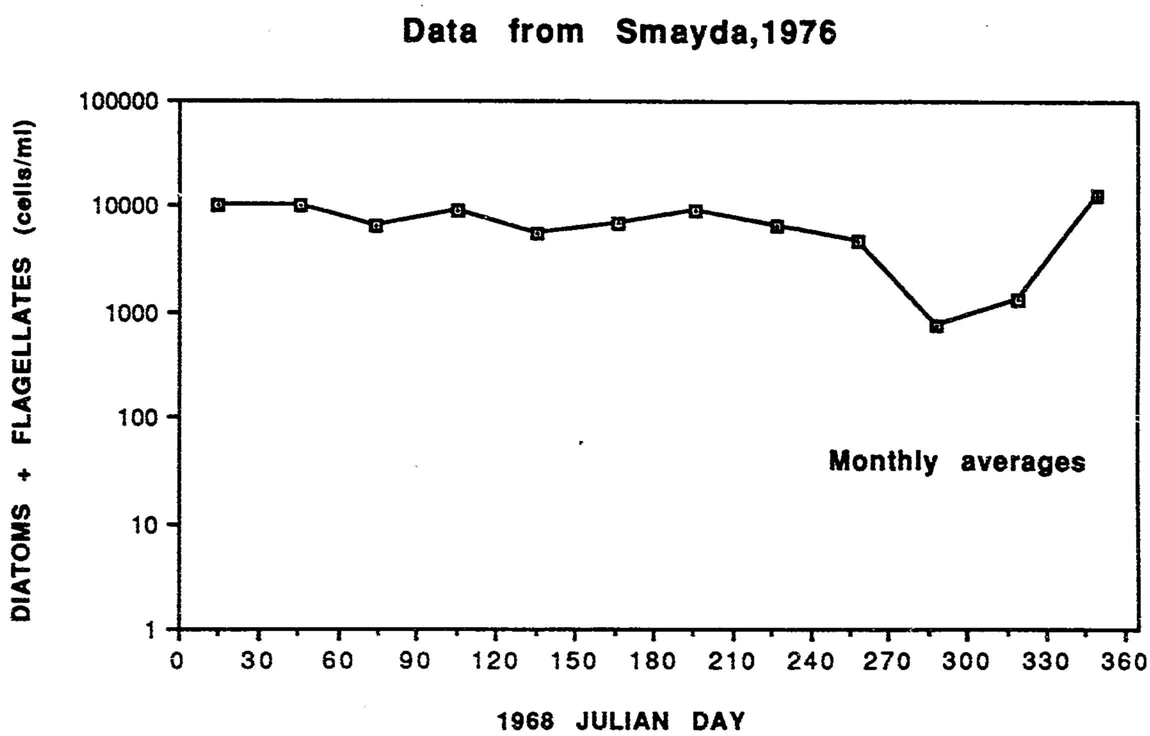

Data from Smayda,1976
DIATOMS+ FLAGELLATES (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1965 JULIAN DAY
Monthly averages

Data from Smayda,1976

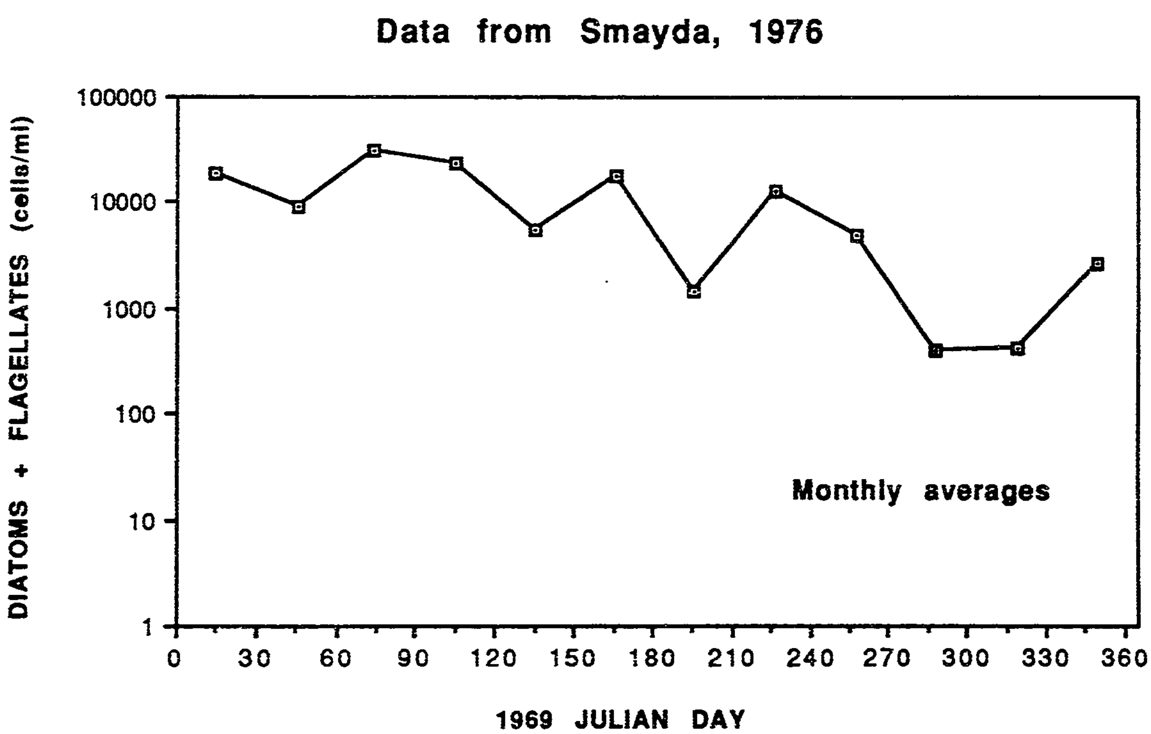


Data from Smayda,1976

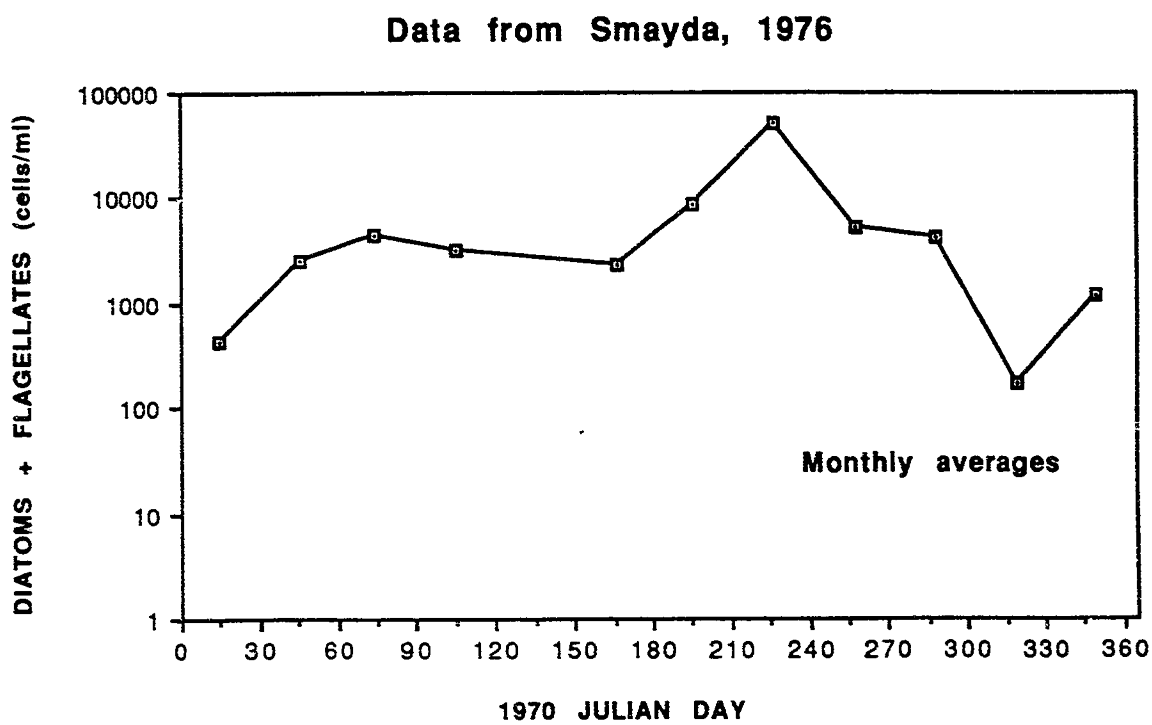


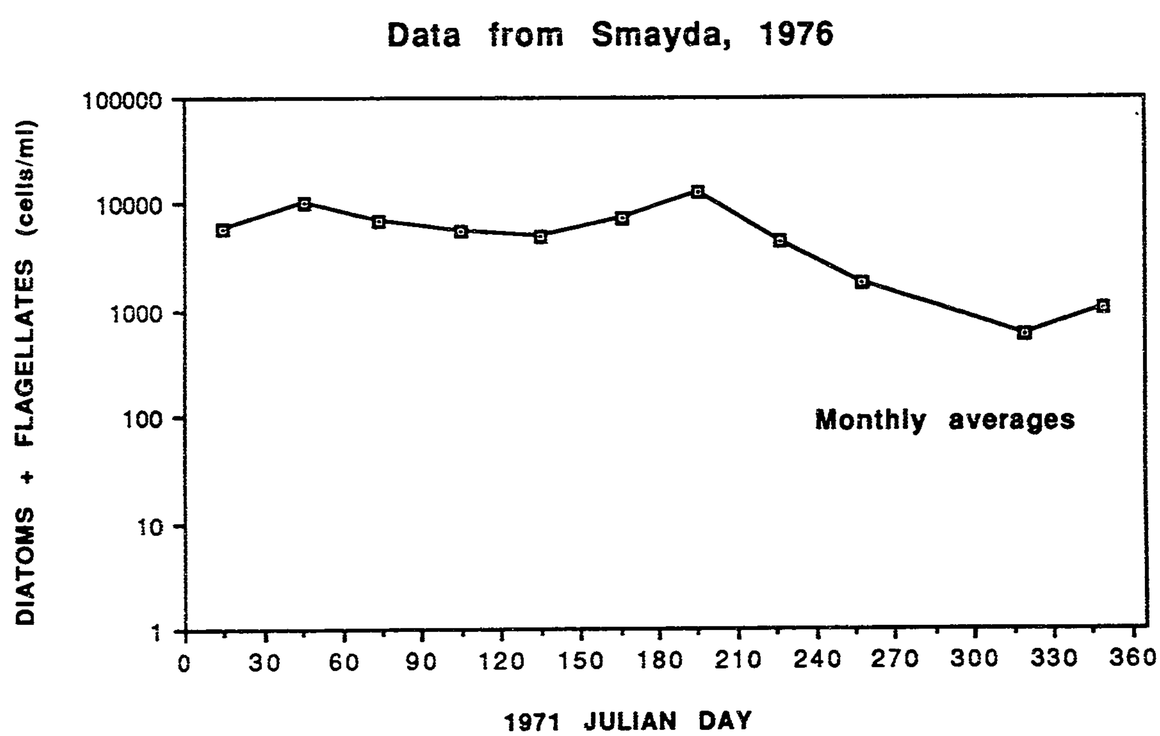


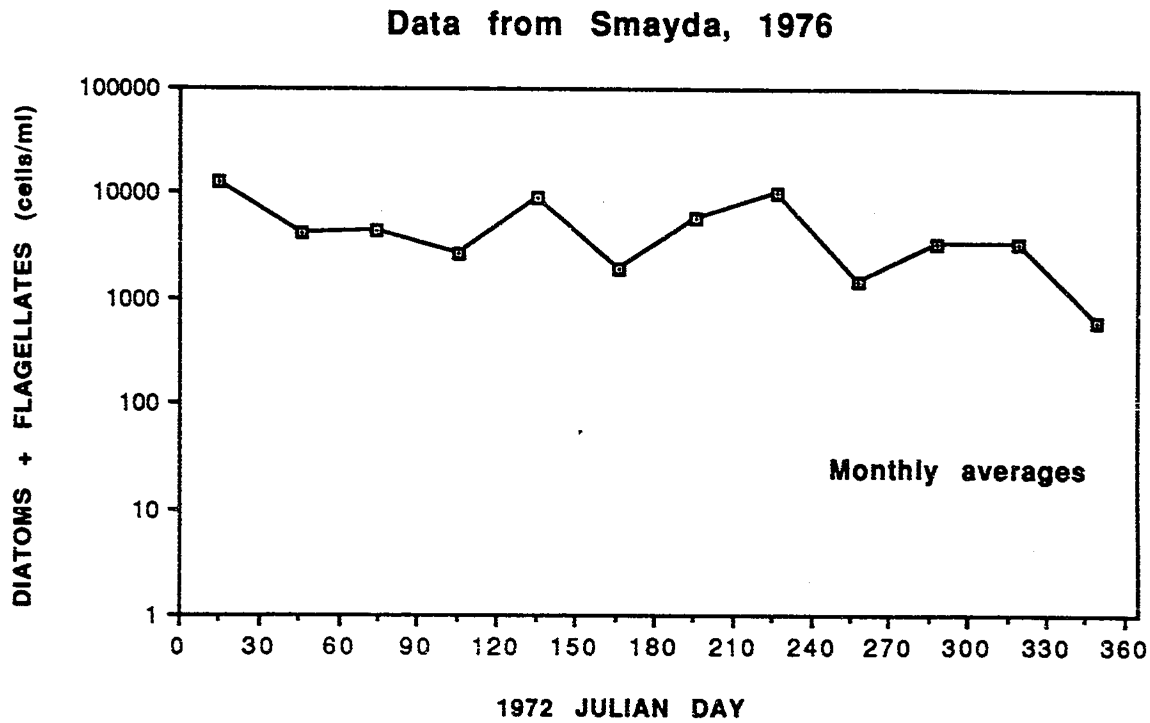
Data from Smayda,1976
DIATOMS + FLAGELLATES (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1968 JULIAN DAY
Monthly averages

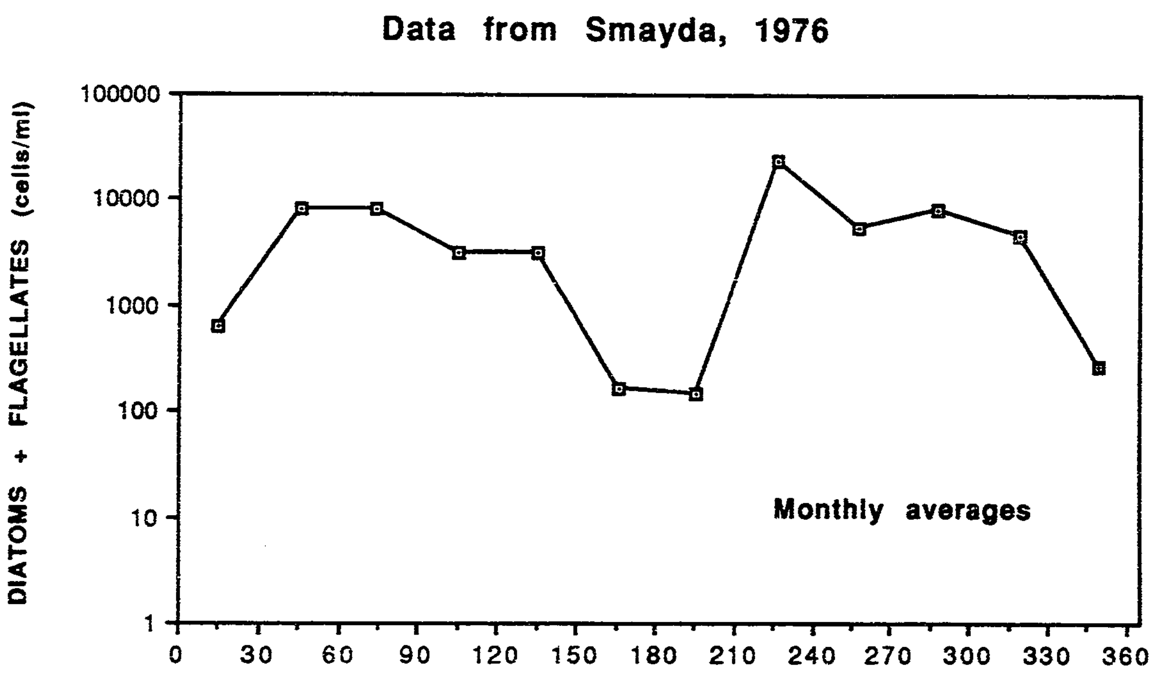


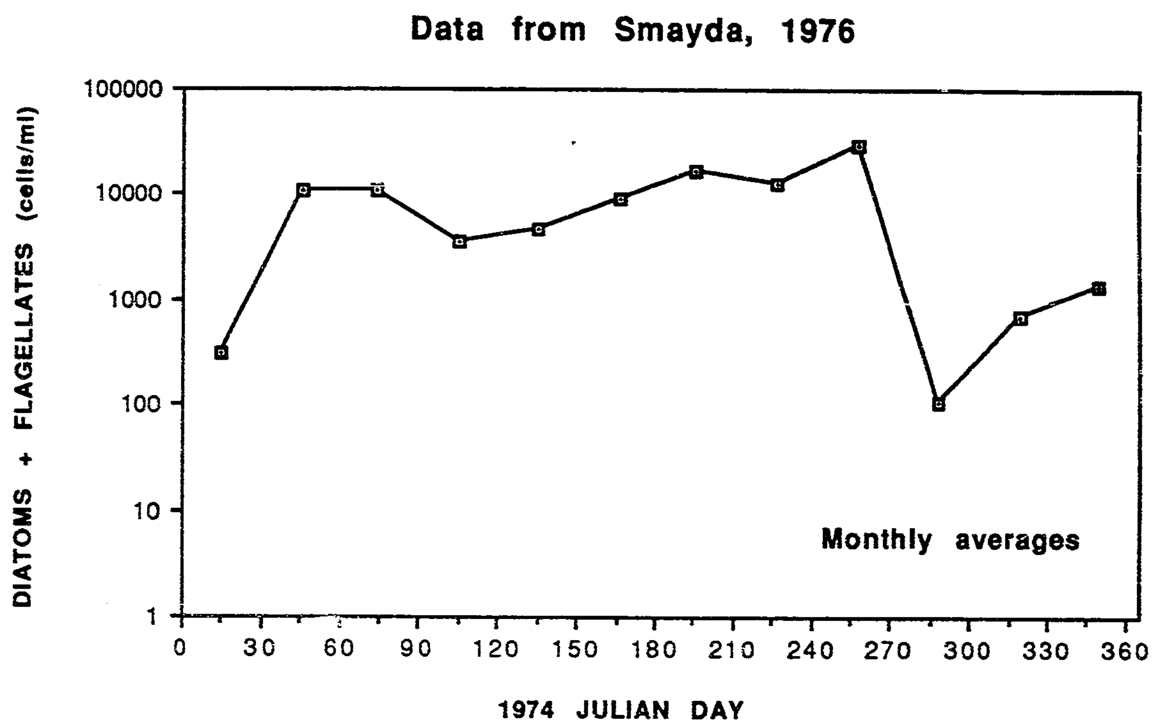
Data from Smayda, 1976
DIATOMS + FLAGELLATES (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1969 JULIAN DAY
Monthly averages


Data from Smayda, 1976
DIATOMS + FLAGELLATES (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1970 JULIAN DAY
Monthly averages


Data from Smayda, 1976
DIATOMS + FLAGELLATES (cells/ml)
100000
10000
1000
100
10
1
0 30 60 90 120 150 180 210 240 270 300 330 360
1971 JULIAN DAY
Monthly averages


Data from Smayda, 1976
100000
10000
1000
100
10
1
DIATOMS + FLAGELLATES (cells/ml)
Monthly averages
0 30 60 90 120 150 180 210 240 270 300 330 360
1972 JULIAN DAY


Data from Smayda, 1976
100000
10000
1000
100
10
1
DIATOMS + FLAGELLATES (cells/ml)
Monthly averages
0 30 60 90 120 150 180 210 240 270 300 330 360
1973 JULIAN DAY


Data from Smayda, 1976
DIATOMS + FLAGELLATES (cells/ml)
100000
10000
1000
100
10
1
Monthly averages
0
30
60
90
120
150
180
210
240
270
300
330
360
1974 JULIAN DAY

Smayda TJ., 1987, Environmental Conditions and Plankton Dynamics in Narragansett Bay during an Annual Cycle Characterized by a Brown-Tide, Narragansett Bay Project Report Narragansett, RI., Draft.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 40.4 N 71 25' W (est)	14A
Station 2	41 47.5 N 71 24' W (est.)	14B
Station 3	41 45' N 71 23.5' W (est.)	14C
Station 4	41 43.5' N 71 21' W (est.)	14D
Station 5	41 40.5' N 71 22' W (est.)	14E
Station 6	41 37.8' N 71 23' W (est.)	14F
Station 7	41 34' N 71 25.4' W (est.)	14G

Original data in tabular form
UNITS: 10-6 cells/ml phytoplankton

STATION	DATE	JULIAN DAY	BR.TIDE TOP	BR. TIDE MID	BR. TIDE BOT
1	7/25	206	1304	1228	1225
	8/2	214	629	669	724
	8/9	221	945	1008	610
	8/15	227	403	386	240
	8/22	234	1521	1005	880
	8/28	240	377	464	439
	9/11	254	277	208	34
	10/2	275	34	39	14

	DATE	JULIAN DAY	BR TIDE TOP	BR TIDE MID	BR TIDE BOT
2	7/25	206	1000	689	402
	8/2	214	83	70	112
	8/15	227	168	123	83
	8/22	234	37	37	18
	8/28	240	98	56	51
	9/11	254	36	54	36
	10/2	275	17	10	9

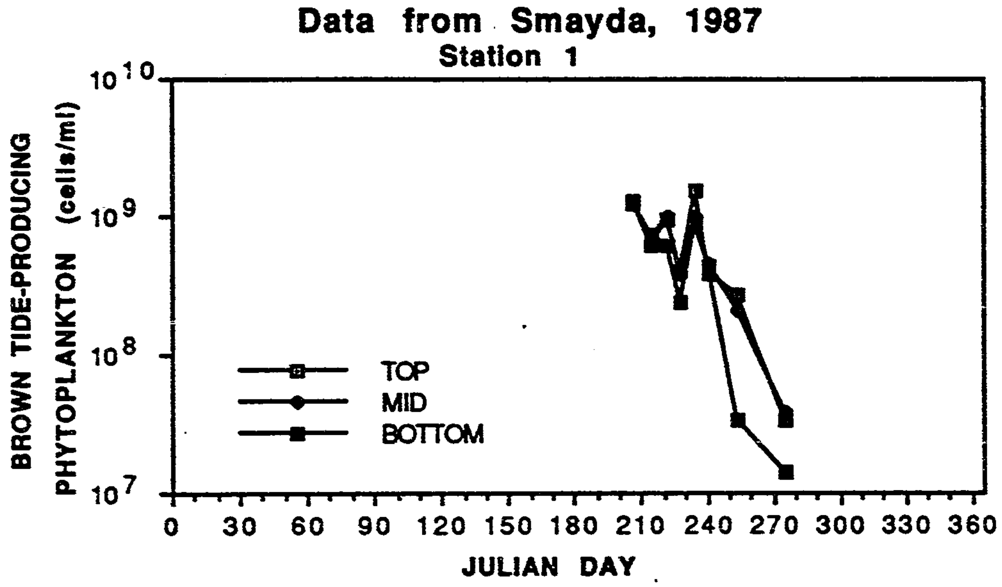
	DATE	JULIAN DAY	BR TIDE TOP	BR TIDE MID	BR TIDE BOT
3	7/25	206	950	752	506
	8/2	214	56	81	160
	8/15	227	199	142	119
	8/22	234	84	68	73
	8/28	240	52	44	48
	9/11	254	19	22	16
	10/2	275	1	7	2

STATION	DATE	JULIAN DAY	BR TIDE TOP	BR TIDE MID	BR TIDE BOT
4	7/25	206	662	685	811
	8/2	214	121	72	110
	8/15	227	169	47	68
	8/22	234	306	284	210
	8/28	240	100	108	108
	9/11	254	30	20	4
	10/2	275	6	12	9

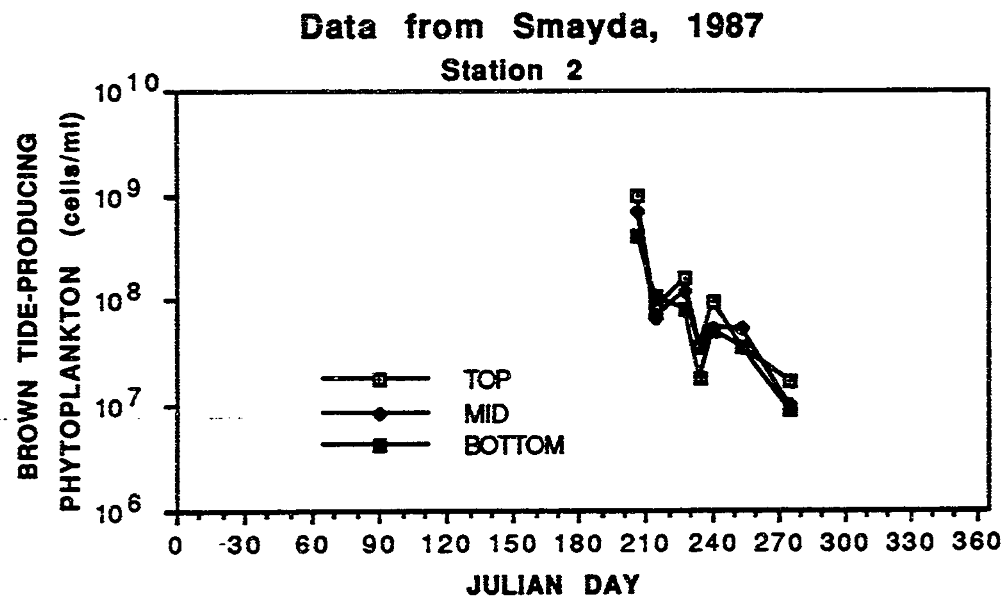
	DATE	JULIAN DAY	BR TIDE TOP	BR TIDE MID	BR TIDE BOT
5	7/25	206	717	708	925
	8/2	214	82	182	140
	8/9	221	153	401	358
	8/15	227	276	397	292
	8/22	234	411	291	384
	8/28	240	149	178	204
	9/11	254	32	20	6
	10/2	275	6	8	2

	DATE	JULIAN DAY	BR TIDE TOP	BR TIDE MID	BR TIDE BOT
6	7/25	206	908	948	810
	8/2	214	226	270	351
	8/15	227	366	362	330
	8/22	234	520	434	526
	8/28	240	273	196	420
	9/11	254	23	24	30
	10/2	275	16	22	17

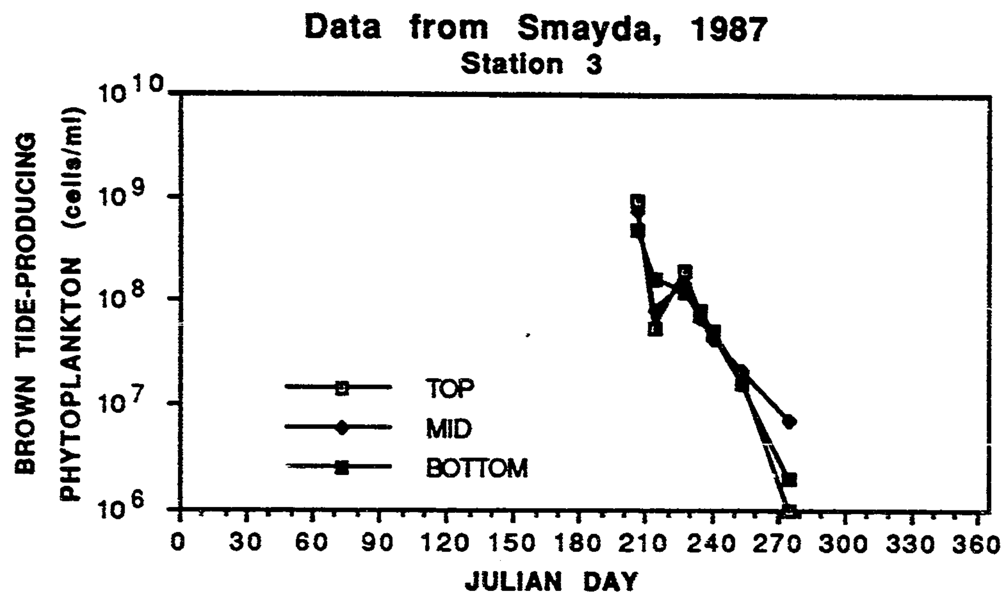
	DATE	JULIAN DAY	BR TIDE TOP	BR TIDE MID	BR TIDE BOT
7	7/25	206	842	854	771
	8/2	214	423	511	458
	8/15	227	398	427	425
	8/22	234	480	507	303
	8/28	240	253	228	97
	9/11	254	90	101	94
	10/2	275	7	13	14

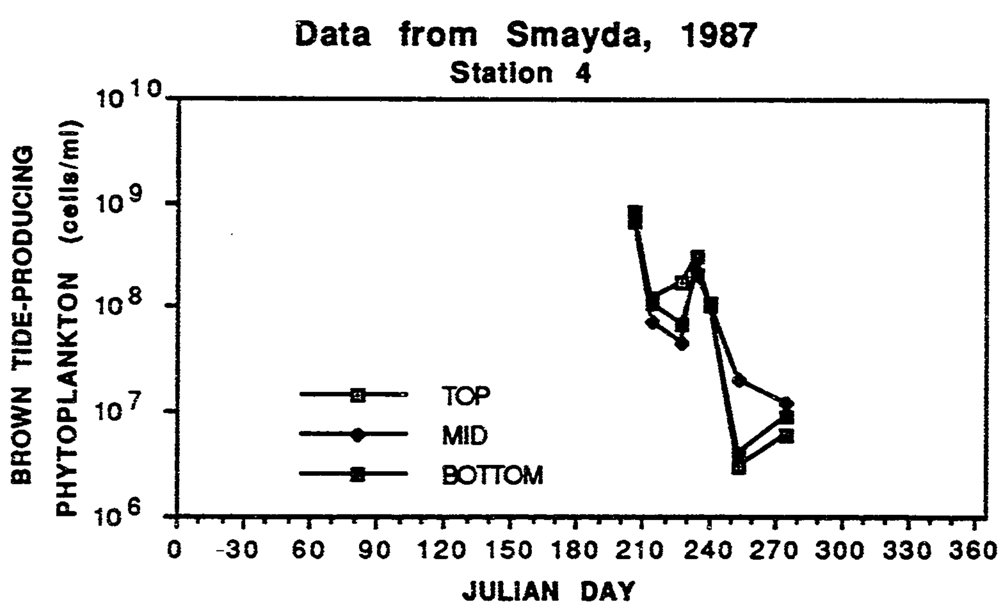


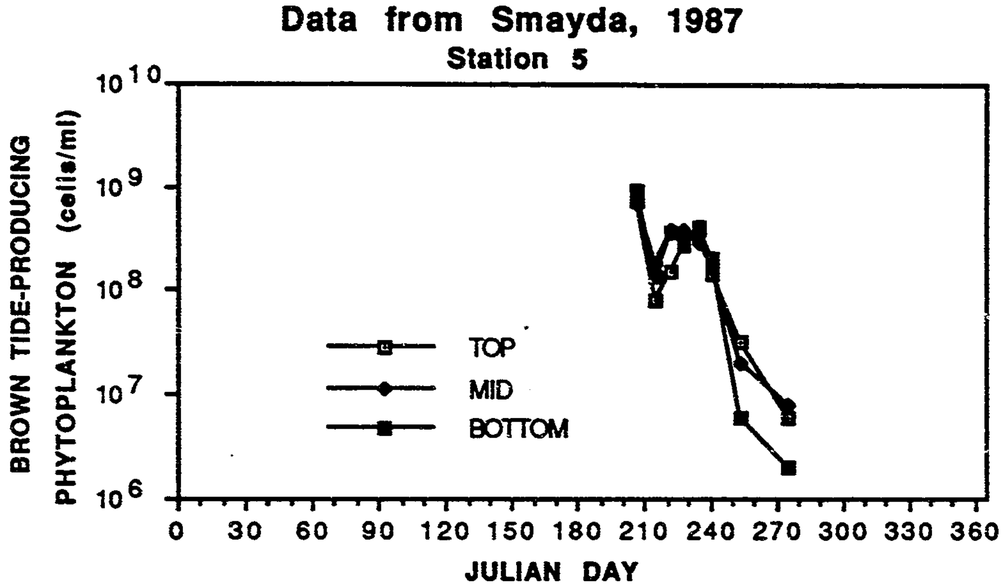
Data from Smayda, 1987
Station 1
BROWN TIDE-PRODUCING PHYTOPLANKTON (cells/ml)
10^{10}
10^{9}
10^{8}
10^{7}
TOP
MID
BOTTOM
0 30 60 90 120 150 180 210 240 270 300 330 360
JULIAN DAY

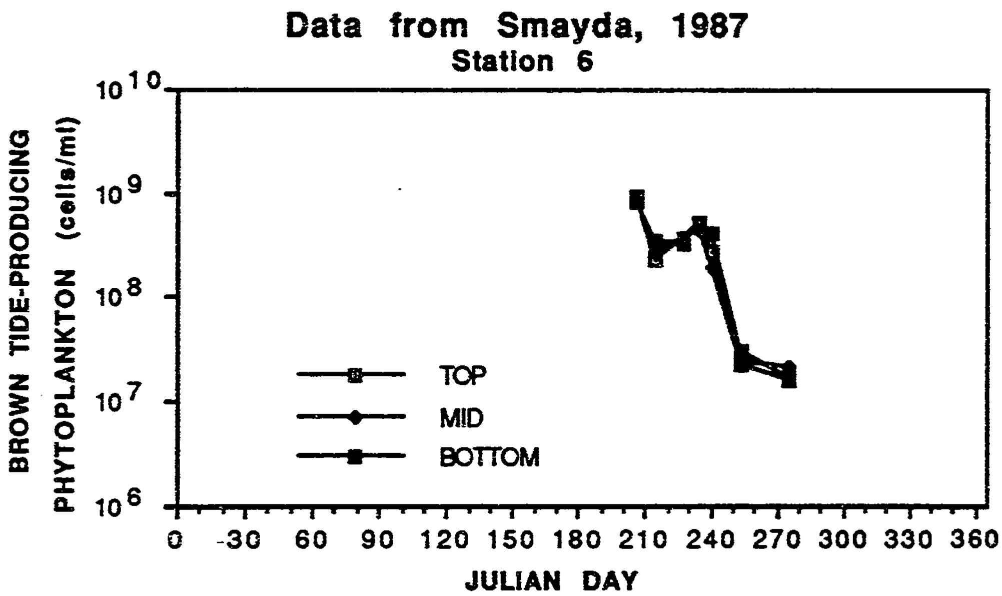


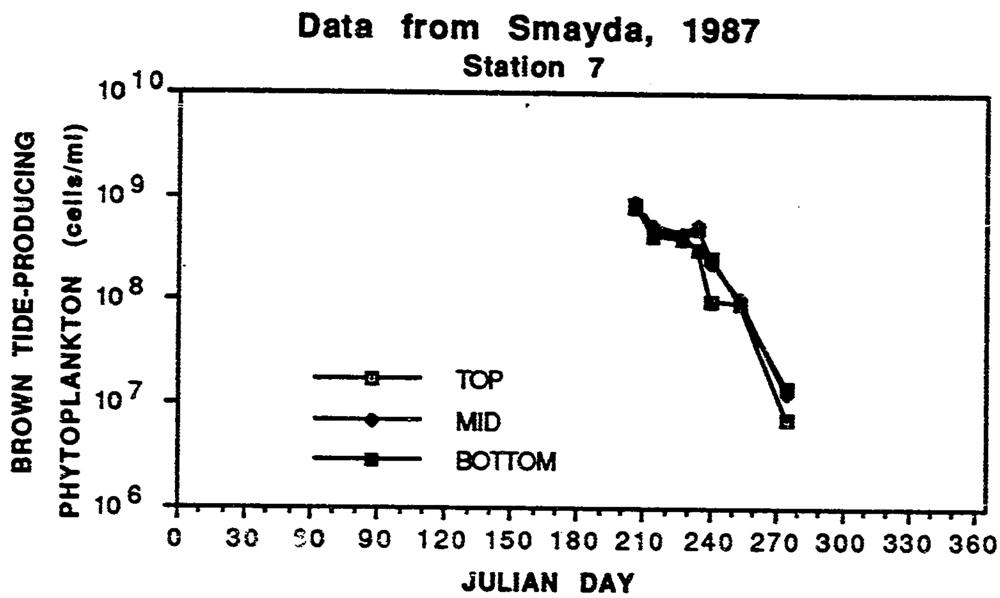
Data from Smayda, 1987
Station 2
BROWN TIDE-PRODUCING PHYTOPLANKTON (cells/ml)
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
TOP
MID
BOTTOM
0 30 60 90 120 150 180 210 240 270 300 330 360
JULIAN DAY


Data from Smayda, 1987
Station 3
BROWN TIDE-PRODUCING PHYTOPLANKTON (cells/ml)
10 10
10 9
10 8
10 7
10 6
TOP
MID
BOTTOM
0 30 60 90 120 150 180 210 240 270 300 330 360
JULIAN DAY


Data from Smayda, 1987
Station 4
BROWN TIDE-PRODUCING PHYTOPLANKTON (cells/ml)
10 10
10 9
10 8
10 7
10 6
TOP
MID
BOTTOM
0 -30 60 90 120 150 180 210 240 270 300 330 360
JULIAN DAY


Data from Smayda, 1987
Station 5
BROWN TIDE-PRODUCING PHYTOPLANKTON (cells/ml)
10 10
10 9
10 8
10 7
10 6
TOP
MID
BOTTOM
0 30 60 90 120 150 180 210 240 270 300 330 360
JULIAN DAY


Data from Smayda, 1987
Station 6
BROWN TIDE-PRODUCING PHYTOPLANKTON (cells/ml)
10 10
10 9
10 8
10 7
10 6
TOP
MID
BOTTOM
0 -30 60 90 120 150 180 210 240 270 300 330 360
JULIAN DAY


Data from Smayda, 1987
Station 7
BROWN TIDE-PRODUCING PHYTOPLANKTON (cells/ml)
10^{10}
10^{9}
10^{8}
10^{7}
10^{6}
TOP
MID
BOTTOM
0
30
60
90
120
150
180
210
240
270
300
330
360
JULIAN DAY

Appendix C:

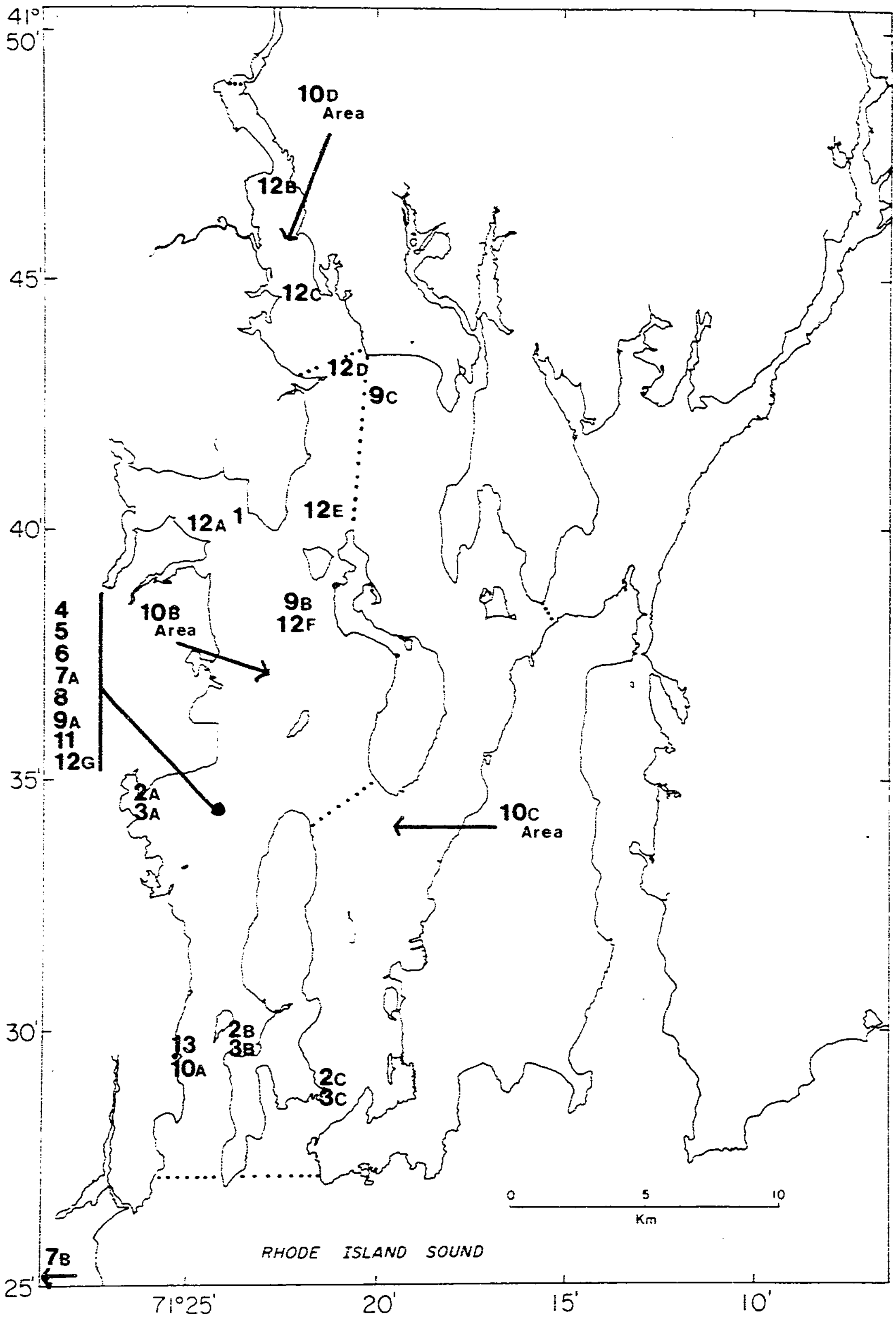
Summary of studies which contain:

Primary production data

and

lists and graphs of data;
map of stations

Map of stations, primary production data.



MAP I.D.	REFERENCE	ORIGINAL STATION ID	LOCATION	DATA TYPE	DATA PRESENTATION	DATA DURATION
1	Ferarra, 1953	Station 1	From pier in Greenwich Bay, 10 yards from SW tip of Warwick Neck (41 40.0 N 71 23.0 W, est)	Gross and net production rates; respiration rates in ml oxygen/l/day	Table	7/25/52 - 3/18/53
				Gross and net production rates; respiratory rates in mg C fixed/l/day	Figure	
2-A	Smayda, 1955	Station I	Wickford Harbor: Mill Creek/Cove (41 34.8 N 71 27.4 W, est)	Min, max and mean rates of net and gross	Table	Weekly sampling dates,
2-B		Station II	End of dock near S. boundary of Dutch Island Habor (41 29.7 N 71 23.8 W, est)	photosynthesis and respiration rate for each station, as ml oxygen/l/day		June 1954 - Feb 1955
2-C		Station III	150 ft. from E. shore of S. end of Conanicut Island (41 28.8 N 71 20.5 W, est)	Monthly photosynthesis and respiration rates for each station as mg C/l/day	Figure	
3-A 3-B 3-C	Smayda, 1957	Station I Station II Station III	same as 2-A same as 2-B same 2-C	Mean values of productivity for each station, as ml oxygen/l/day	Table	Weekly sampling dates, June 1954 - Feb 1955
4	Smayda, 1973	None specified	41 34'7" N 71 23'31"W	Mean annual productivity	Table	
5	Durbin et al., 1975	Pratt's Station 2	41 34'7" N 71 23'31" W	Productivity for each size fraction (>100um, 60-100um, 20-60um, <20um) and total phytoplankton at each station for each sampling date, as mg C/m3/hr	Table	Biweekly from 11/27/72-10/15/73
				% total productivity for each size fraction	Table	
				Daily productivity as mg C/m3/day	Table	
6	Furnas et al., 1976	Station 2	41 34'7" N 71 23'31" W	Primary productivity versus time, as g C/m2/day	Figure	Weekly, from May 1974 - Sept 74
				Production estimates for sampling dates 7/15/74 - 9/24/74	Table	
7-A 7-B	Smayda, 1976	None specified	41 34'7" N 71 23'31" W (probably) Charlestown Pond	Mean annual carbon production for Lower Narragansett Bay, presumeably based on Station 7-A	Table	None specified (from Smayda, unpublished data)
				Mean annual gross and net C production, Lower Narr. Bay and Charlestown Pond	Figure	
8	Vargo, 1979	Station 2	41 34' N 71 23.5' W	Gross primary productivity on pooled (surface and bottom) samples versus time, as mg C/m3/day	Figure	Weekly, from Sept 1972-Sept 1973
				Net C production of Skeletonema costatum	Figure	
				Seasonal and yearly gross primary productivity (pre-, post-, summer-bloom and bloom)	Table	
				Seasonal and yearly net production of Skeletonema costatum, mg C/m3/day	Table	

9-A 9-B 9-C	Durbin and Durbin, 1981	Station1 Station 2 Station 5	41 34'7" N 71 23'31" W 41 38' N 71 23' W (est.) 41 42' N 71 20.5' W (est.)	Estimated phytoplankton production, as g C.m2.day, for each station	Figure	Weekly, from 3/1/76 - 10/8/76
10-A 10-B 10-C 10-D	Oviatt et al., 1981	None specified	G.S.O. dock (41 29.5 N 71 25.2 W) West Passage (average of stations) East Passage (average of stations) Providence R. (average of stations)	Mean daytime net production, as g oxygen/m2/day, for Sts. 10-B, 10-C, 10-D; 24 sampling dates	Table	6/15/71 - 6/13/73
				Yearly integrated production, respiration and net carbon, g C/m2/yr (all stations)	Table	
				Daily net production versus time at Station 10-A, as g oxygen/m2/day	Figure	
11	Furnas, 1982	None specified	41 34'7" N 71 23'31" W (probably)	Primary productivity as mg C/l/day for total phytoplankton, <10um, <8um, <5um size fractions versus time	Figure	Weekly, from 5/29/79 - 9/25/79
				Percentage of total phytoplankton productivity for >10um, 8-10um, 5-8um. <5um size fractions versus time	Figure	
				Data from primary productivity experiments with size-fractionated populations	Table (in appendix)	
12-A 12-B 12-C 12-D 12-E 12-F 12-G	Smayda, 1987	Station 1 Station 2 Station 3 Station 4 Station 5 Station 6 Station 7	41 40.4' N 71 25' W (est.) 41 47.5' N 71 24' W (est.) 41 45' N 71 24' W (est.) 41 43.5' N 71 21' W (est.) 41 40.5' N 71 22' W (est.) 41 37.8' N 71 23' W (est.) 41 34'N 71 24' W (est.)	Surface primary productivity, as mg C/m3/day	Table	8/28/85 - 6/18/86
13	Keller, 1988	GSO dock	41.29.5 N 71 25.2 W	Carbon-14 primary productions	table	biweekly 2/21/78 - 3/30/81

Durbin AG. and Durbin EG., 1981, Standing stock and estimated production rates of phytoplankton and zooplankton in Narragansett Bay, Rhode Island, Estuaries 4:24-41.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 34'7" N 71 23'31" W	9-A
Station 2	41 38' N 71 23' W (est.)	9-B
Station 5	41 42' N 71 20.5' W (est.)	9-C

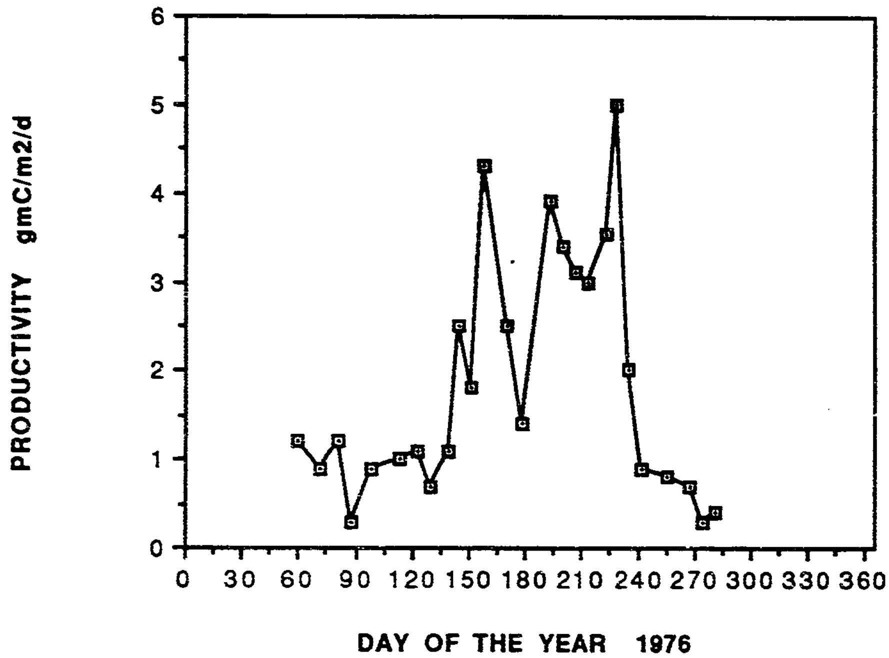
TECHNIQUE: An equation was used which relates light intensity (measured), assimilation number (determined in previous studies), and average chlorophyll-a at each station.

Sampling dates were given in paper, data points were inflection points on a line

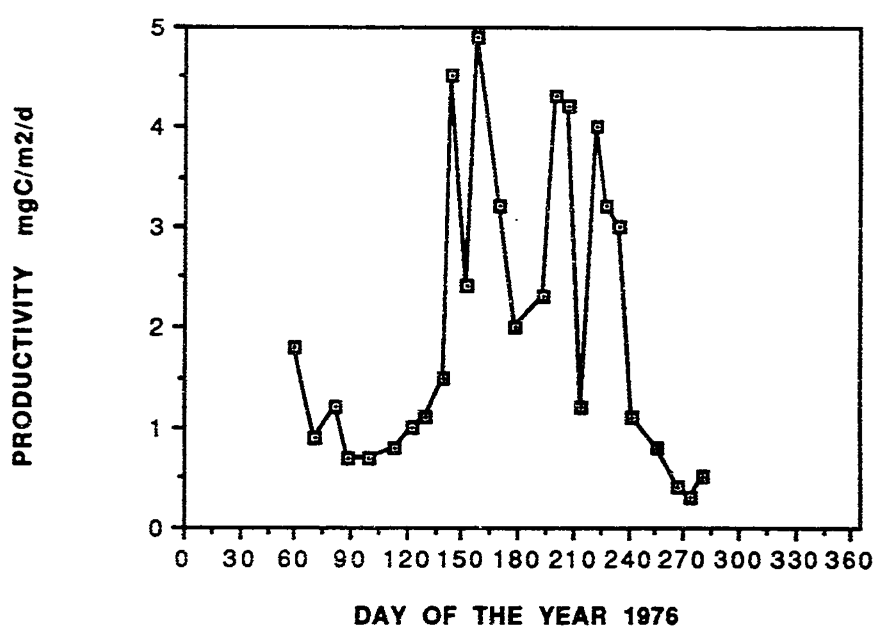
UNITS: gmC/m2/d

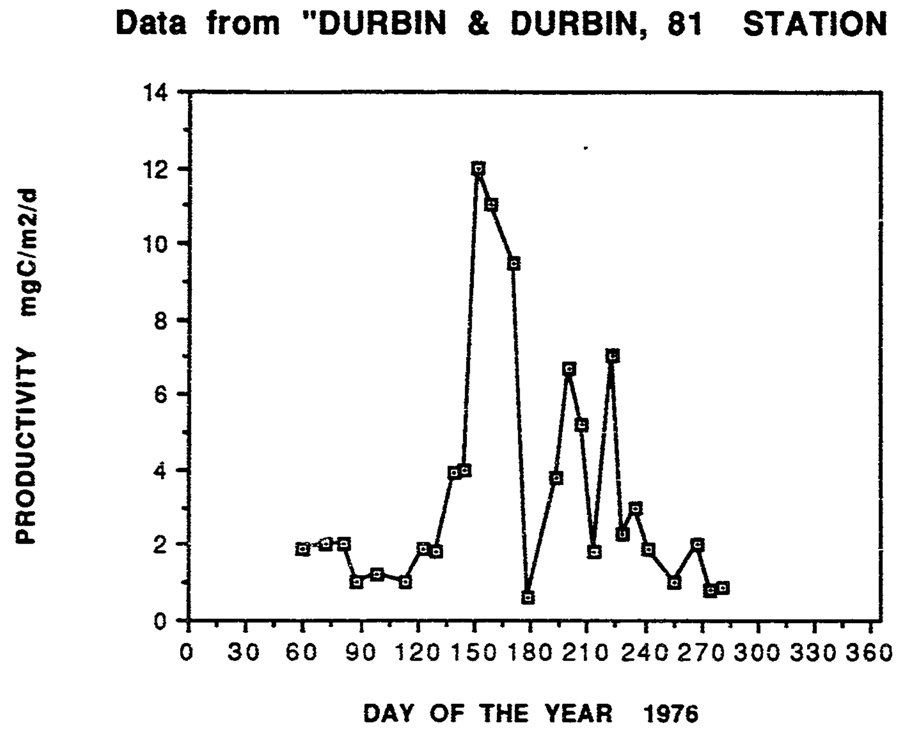
DATE	DAY	ST1	ST2	ST5
3/7/76	60	1.3	1.7	1.7
3/12	73	0.7	0.8	2
3/22	80	1.3	1.2	1.9
3/29	91	0.3	0.9	1
4/9	104	0.5	1	1.2
4/23	111	0.8	1.1	1
5/3	121	0.8	1.1	1.8
5/10	134	0.5	1.2	1.6
5/19	141	0.9	4.5	3.5
5/24	152	2.7	2	4
6/1	165	1.5	4.7	12
6/7	172	4.1	3	9.5
6/19	182	1.2	1.9	0.5
6/28	195	4.2	4	6.5
7/12	202	3.5	3.6	5.2
7/19	213	3	1.1	1.8
7/26	226	3.9	3.9	5.1
8/2	233	4.8	3	2.6
8/11	244	1	1	3.1
8/16	257	0.9	0.5	1.1
8/23	264	0.2	0.6	1.8
8/30	274	0.2	0.4	0.5
9/13	287	0.3	0.5	0.9
9/24	294	0.4	0.4	1.3

Data from "DURBIN & DURBIN, 81 STATION 1"



Data from "DURBIN & DURBIN, 81 STATION 2"





Data from "DURBIN & DURBIN, 81   STATION 5"
PRODUCTIVITY mgC/m2/d
14
12
10
8
6
4
2
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF THE YEAR 1976

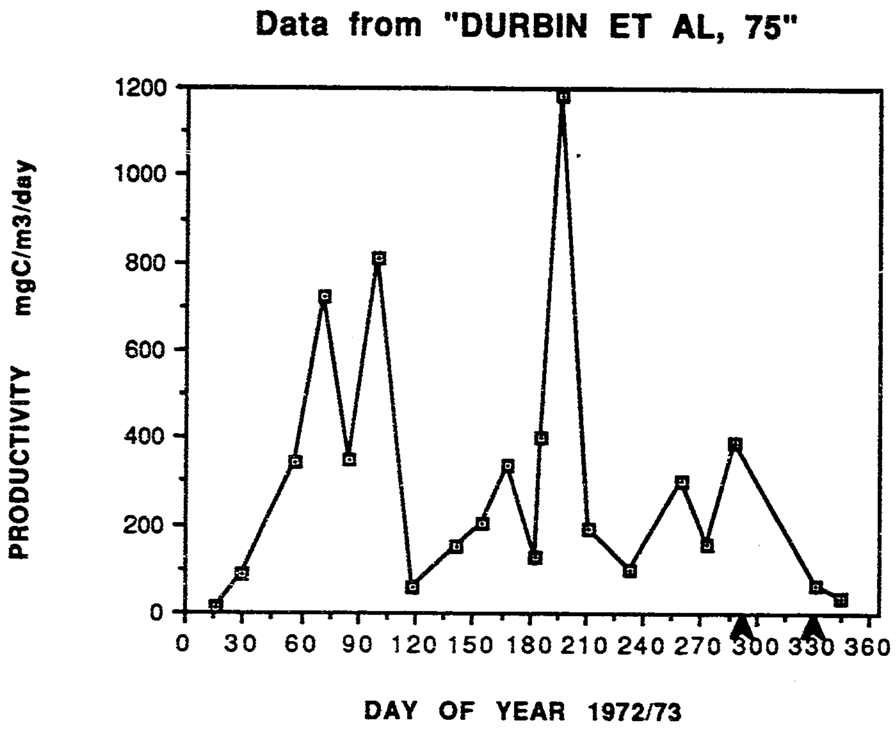
Durbin EG., Krawiec RW. and Smayda TJ., 1975, Seasonal studies on the relative importance of different size fractions of phytoplankton in Narragansett Bay, USA, Marine Biology 32:271-287.

ORIGINAL STATION ID	LOCATION	MAP ID
Pratt St. 2	41 34'7" N 71 23'31" W	5

TECHNIQUE: Carbon-14 method on samples pooled from three depths; noon to sundown incubations in tank of seawater on GSO dock.

Original data in tabular form
UNITS: mgC/m3/d

DATE	DAY	mgC/m3/day
11/27/72	331	65.2
12/11/72	345	33.5
1/2/73	2	
1/16/73	16	14.3
1/29/73	29	89.1
2/26/73	57	343
3/12/73	71	720
3/26/73	85	352
4/9/73	99	812
4/23/73	119	56.2
5/7/73	186	400
5/21/73	141	151
6/4/73	155	204
6/18/73	169	336
7/2/73	183	131
7/16/73	197	1184
7/30/73	211	190
8/21/73	233	99
9/17/73	260	304
10/1/73	274	159
10/15/73	288	388



Data from "DURBIN ET AL, 75"
PRODUCTIVITY mgC/m3/day
1200
1000
800
600
400
200
0
0 30 60 90 120 150 180 210 240 270 300 330 360
DAY OF YEAR 1972/73

Ferrara RN., 1953, Phytoplankton studies in upper Narragansett Bay, MS Thesis, URI, Kingston, RI, 62p.

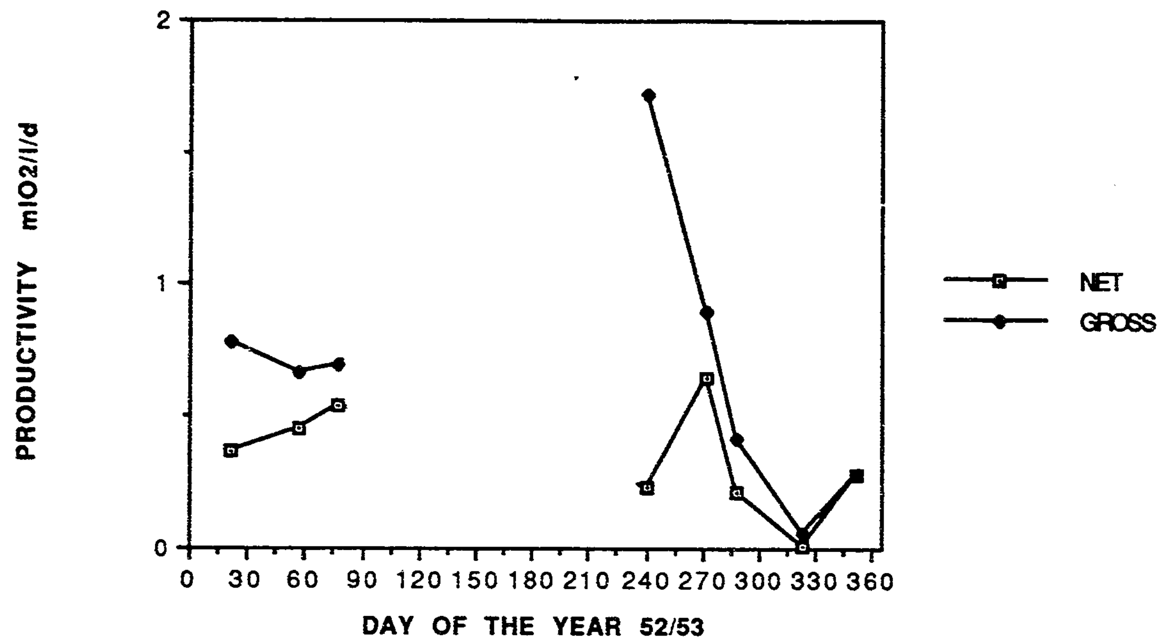
ORIGINAL STATION	LOCATION	MAP ID
Station 1	From pier in Greenwich Bay, 100 yards from SW tip of Warwick Neck	1

Original data was in tabular form
UNITS: ml O2/l/d

TECHNIQUE: Nearsurface samples (depths of two feet); light-dark bottles incubated in-situ for 48 hours.

DATE	DAY	NET	GROSS
8/29/52	241	0.23	1.72
9/29/52	272	0.65	0.9
10/15/52	288	0.21	0.42
11/19/52	323	0.01	0.06
12/17/52	351	0.28	0.28
1/21/53	21	0.37	0.78
2/26/53	57	0.45	0.67
3/18/53	77	0.54	0.7

Data from "FERARRA, 1953"



Furnas MJ, 1982, The dynamics of summer phytoplankton populations in Narragansett Bay, PhD Dissertation, URI, Kingston, RI, 340p.

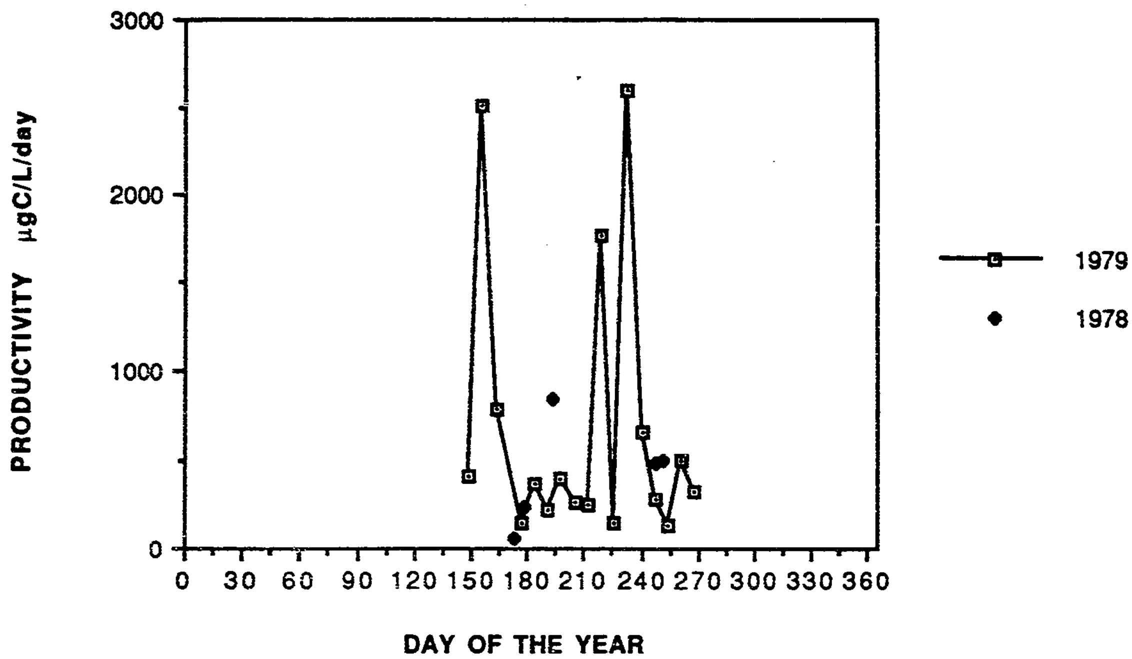
ORIGINAL STATION ID	LOCATION	MAP ID
non specified	41 34'7" N 71 23'31" W (probably)	11

TECHNIQUE: Carbon-14 method; 24 hour incubations at 60% of ambient light; surface samples.

Original data in tabular form (Appendix 7 in Dissertation)
UNITS: µgC/L/day

DATE	DAY	µgC/L/day
6/22/78	173	57.6
6/28	179	225.9
7/12	193	845.4
9/5	248	472.3
9/9	252	491.9
5/29/79	149	402.1
6/5	156	2509
6/12	163	782.8
6/26	177	144.8
7/3	184	360.5
7/10	191	212.1
7/17	198	388.4
7/24	205	262.8
7/31	212	246.9
8/7	219	1768
8/14	226	144
8/21	233	2595
8/28	240	658
9/4	247	279
9/11	254	137
9/18	261	499
9/25	268	319

Data from "FURNAS 82"



Furnas MJ., Hitchcock GL. and Smayda TJ, 1976, Nutrient-phytoplankton relationships in Narragansett Bay during the 1974 summer bloom, Estuarine Processes, Wiley M, Academic Press, New York, NY, 118-133.

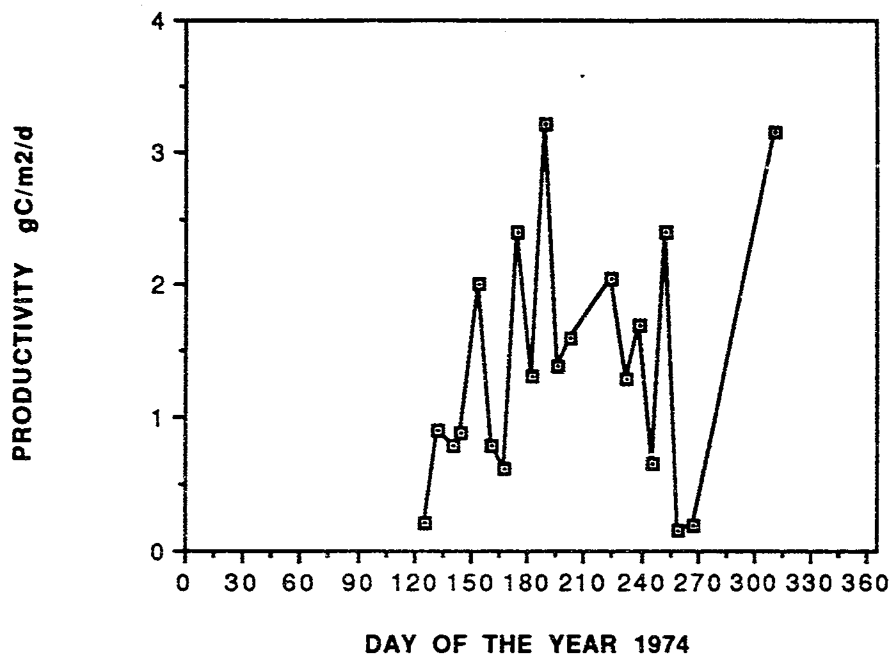
ORIGINAL STATION ID	LOCATION	MAP ID
Station 2	41 34'7" N 71 23'31" W	6

TECHNIQUE: Pooled 3 depth sample; Carbon-14 method; incubated 24 hours at 5 light intensities in tank on GSO dock.

Data was digitized from a graph in original paper, dates were given in paper
UNITS: gC/m2/d

DATE	DAY	ST 2
5/6/74	126	0.22
5/13/74	133	0.9
5/20/74	140	0.8
5/28/74	145	0.89
6/3/74	154	2
6/10/74	161	0.8
6/17/74	168	0.61
6/24/74	175	2.4
7/1/74	182	1.31
7/8/74	189	3.2
7/15/74	196	1.4
7/22/74	203	1.6
7/30/74	311	3.15
8/13/74	225	2.05
8/20/74	232	1.3
8/27/74	239	1.7
9/3/74	246	0.65
9/10/74	253	2.4
9/17/74	260	0.15
9/24/74	267	0.2

Data from "FURNAS ET AL., 76 STATION 2"



Keller, A.A., 1988, Estimating phytoplankton productivity from light availability and biomass in the MERL mesocosms and Narragansett Bay. Mar. Ecol. Prog. Ser. (in press).

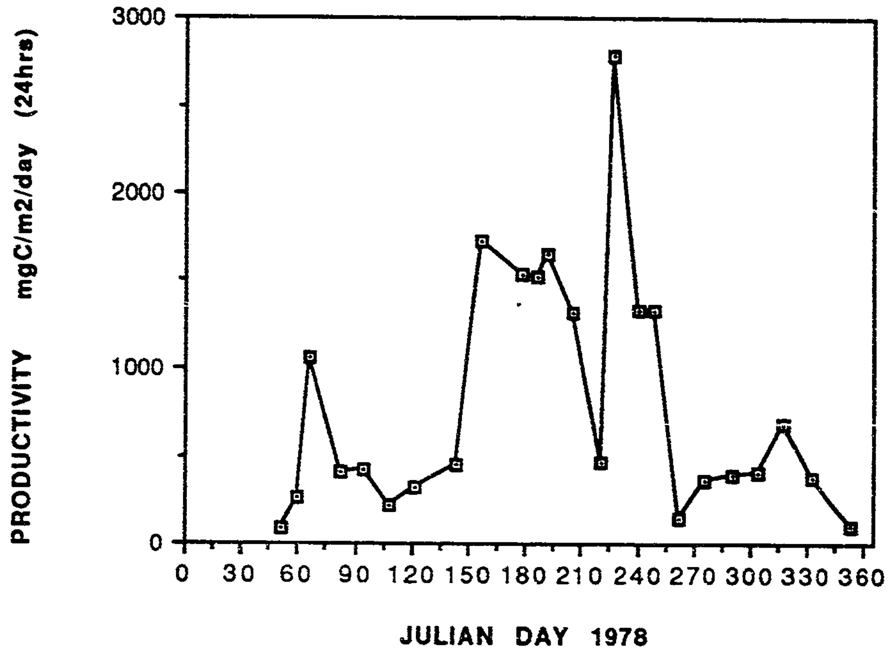
Original data make available in electronic form by the author

LOCATION	MAP ID
GSODOCK	13

DATE	JULIAN DAY	mg C/m2/day	DATE	JULIAN DAY	mg C/m2/day
78052	52	88.88	79003	3	251.32
78059	59	258.88	79016	16	156.11
78066	66	1064.84	79030	30	155.55
78082	82	409.34	79044	44	84.51
78094	94	414.8	79058	58	307.42
78108	108	211.7	79072	72	1101.77
78122	122	321.82	79086	86	591.81
78143	143	446.06	79100	100	531.71
78157	157	1729.06	79120	120	1709.38
78178	178	1541.2	79135	135	378.51
78186	186	1527.16	79155	155	361.34
78192	192	1653.85	79169	169	1204.72
78206	206	1315.7	79180	180	644.92
78220	220	468.23	79197	197	403.23
78227	227	2779.99	79247	247	764.71
78241	241	1329.92	79253	253	286.33
78249	249	1332.85	79274	274	107.91
78262	262	145.49	79282	282	32.13
78276	276	368.03	79288	288	82.06
78290	290	396	79295	295	115.96
78304	304	409.59	79309	309	1143.9
78318	318	676.72	79317	317	40.06
78332	332	372.6	79323	323	42.24
78353	353	104.44	79330	330	43.17
			79337	337	94.21
			79344	344	340.66

DATE	JULIAN DAY	mg C/m2/day
80007	7	1244.57
80014	14	404.04
80035	35	548.44
80042	42	277.56
80056	56	105.73
80063	63	146.09
80077	77	102.92
80098	98	115.72
80112	112	496.46
80126	126	626.35
80140	140	511.23
80161	161	427.41
80175	175	714.31
80190	190	1368.83
80196	196	556.7
80203	203	2300.43
80210	210	751.38
80231	231	560.04
80246	246	211.17
80259	259	195.67
80266	266	318.7
80294	294	109.49
80315	315	68.75
80336	336	163.48
80365	365	1926.13
81026	26	220.92
81040	40	247.1
81054	54	370.33
81068	68	558.39
81082	82	837.91
81089	89	329.52

Data from "GSO DOCK"



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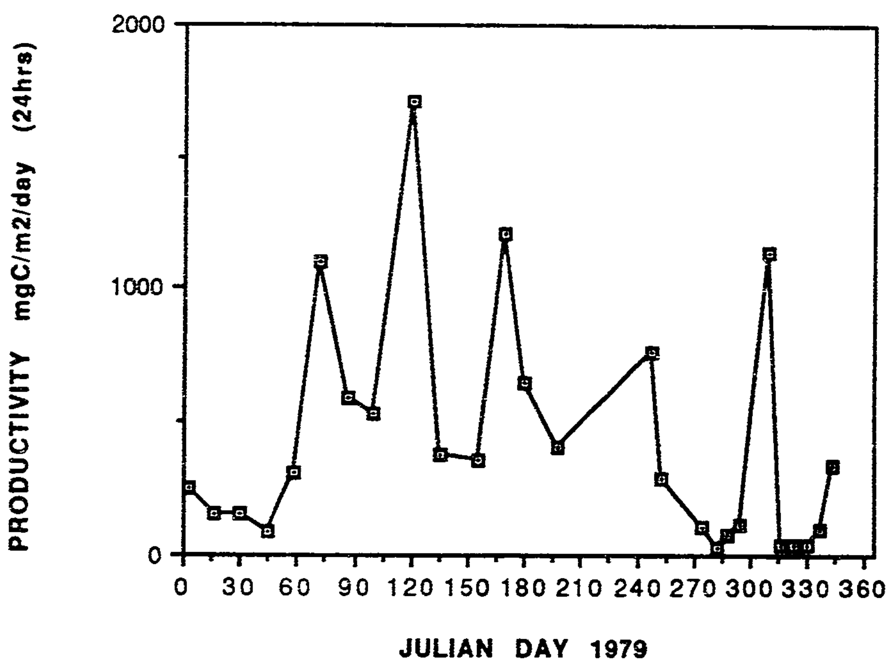

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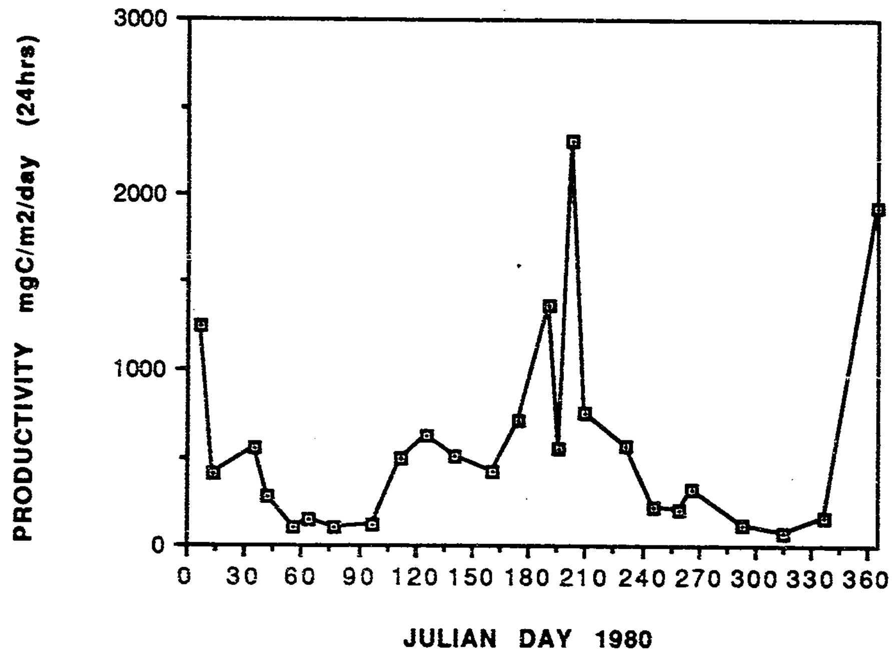
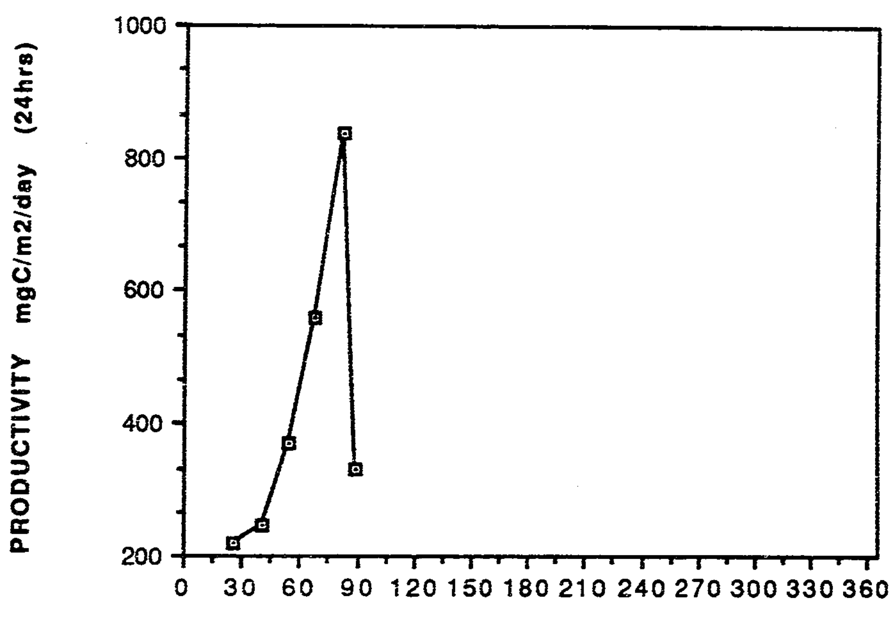


Data from "GSO DOCK"



Oviatt CA., Buckley B., and Nixon SW, 1981, Annual phytoplankton metabolism in Narragansett Bay calculated from survey field measurements and microcosm observations. Estuaries 4:167-175.

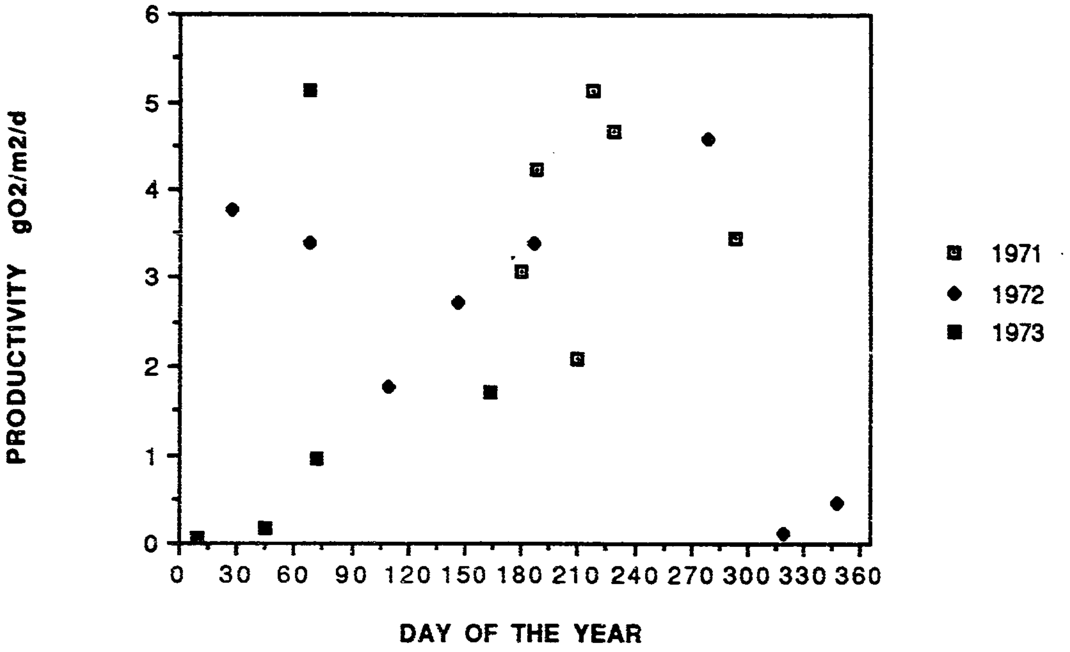
ORIGINAL STATION ID	LOCATION	MAP ID
nonspecific	West Passage (average of stations)	10-B
	East Passage (average of stations)	10-C
	Providence River (average of stations	10-D

TECHNIQUE: Light-dark bottles, 3-5 hour midday in-situ incubations; mix of multiple depth profiles ('72 and '73), top and bottom (1971) and top ('72 and '73) incubations.

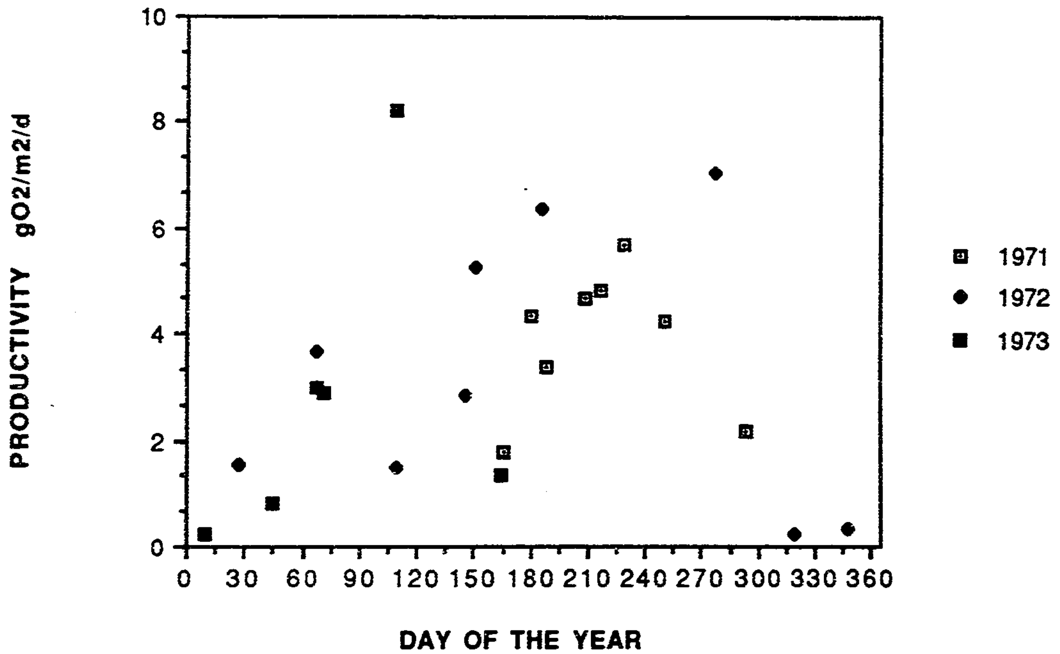
Original data in tabular form
UNITS: gO2/m2/d net production

DATE	DAY	WEST PASSAGE NET	EAST PASSAGE NET	PROVIDENCE RIVER NET
6/15/71	166	1.78		
6/29/71	180	4.36	3.08	
7/7/71	188	3.36	4.22	1.33
7/28/71	209	4.7	2.08	11.6
8/5/71	217	4.84	5.12	
8/17/71	229	5.69	4.66	
8/25/71	237			17.8
9/8/71	251	4.27		
10/20/71	293	2.15	3.46	0
1/27/72	27	1.54	3.79	2.34
3/9/72	68	3.69	3.4	2.67
4/19/72	109	1.48	1.78	1.33
5/26/72	146	2.85	2.73	1.29
5/31/72	151	5.26		
7/5/72	186	6.36	3.39	4.78
10/5/72	278	7.04	4.58	1.23
11/15/72	319	0.24	0.12	0.05
12/14/72	348	0.35	0.47	0
1/10/73	10	0.23	0.07	0.08
2/13/73	44	0.82	0.18	0.1
3/8/73	67	2.98	5.14	2.4
3/13/73	72	2.9	0.96	
4/19/73	109	8.2		5.03
6/13/73	164	1.33	1.71	5.73

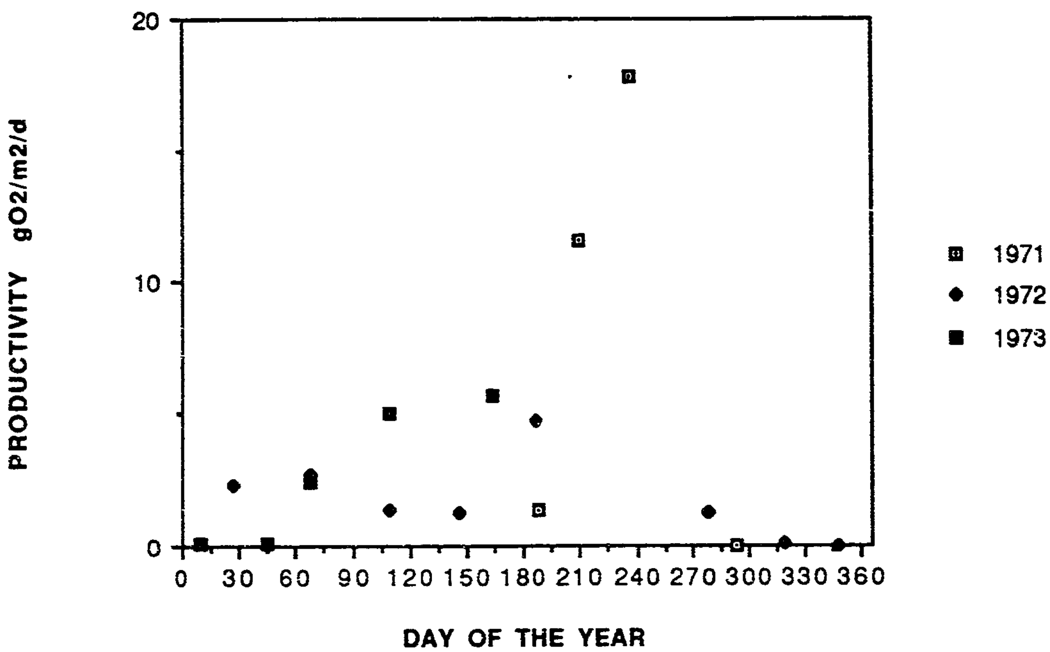
Data from "OVIATT ET AL., 81"
EAST PASSAGE



Data from "Oviatt et al., 81"
WEST PASSAGE



Data from "OVIATT ET AL., 81"
PROVIDENCE RIVER



Smayda TJ., 1955, Phytoplankton studies in lower Narragansett Bay, MS Thesis, URI, Kingston, RI, 114p.

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	Wickford Harbor: Mill Creek/Cove	2-A
Station 2	End of dock near S. boundary of Dutch Island Harbor	2-B
Station 3	150 ft. from E. shore of S. end of Conanicut Island	2-C

Original data in tabular form
UNITS: mlO2/l/d

MEAN VALUES FOR JUNE 54-FEB 55

	NET	GROSS
Station 1	0.033	0.456
Station 2	0.353	0.531
Station 3	0.052	0.311

Smayda TJ., 1987, Environmental Conditions and Plankton Dynamics in Narragansett Bay During an Annual Cycle Characterized by a Brown-tide, Narragansett Bay Project, Narragansett RI., Draft Report, January '87.

Smayda TJ., 1988, Survey of environmental conditions and plankton dynamics along a euthrophication gradient in Narragansett Bay during an annual cycle. Unpublished contract report to the Narragansett Bay Project. Narragansett Bay Project, Providence RI.

Data from 7/2/86-6/29/87 taken from Smayda (1988)

ORIGINAL STATION ID	LOCATION	MAP ID
Station 1	41 40.4 N 71 25' W (est)	12-A
Station 2	41 47.5 N 71 24' W (est.)	12-B
Station 3	41 45' N 71 24' W (est.)	12-C
Station 4	41 43.5' N 71 21' W (est.)	12-D
Station 5	41 40.5' N 71 22' W (est.)	12-E
Station 6	41 37.8' N 71 23' W (est.)	12-F
Station 7	41 34' N 71 24' W (est.)	12-G

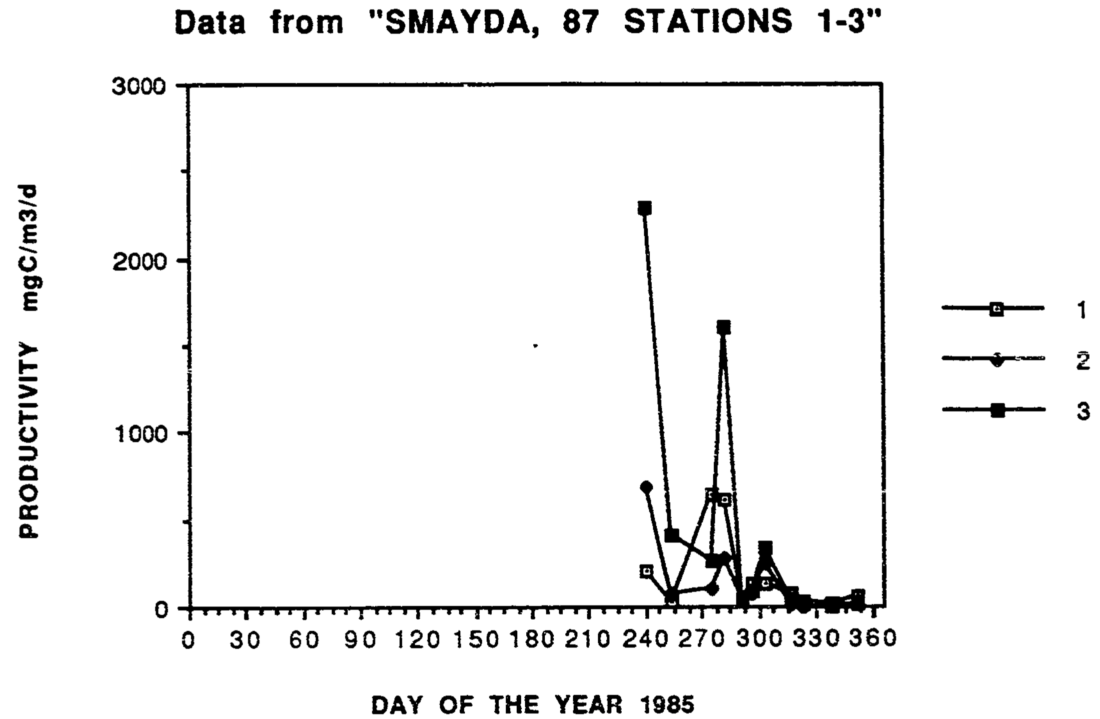
TECHNIQUE: Carbon-14 technique; pooled sample from three depths;
24 hour incubations at 5 light depths.
Original data in tabular form
UNITS: mgC/m3/d

DATE	DAY	ST1	ST2	ST3	ST4	ST5	ST6	ST 7
8/28/85	240	203	686	2288	2709	1109	589	343
9/11/85	254	33	78	410	122	23	22	40
10/2/85	275	644	103	263	641	299	573	421
10/9/85	282	610	279	1605	773	681	795	716
10/18/85	291	48	41	47	84	97	310	210
10/23/85	296	134	70	84	143	278	232	251
10/30/85	303	134	251	339	452	489	170	153
11/13/85	317	68	21	38	65	100	65	91
11/20/85	324	33	6	17	22	64	115	76
12/4/85	338	11	2	6	6	7	9	5
12/18/85	352	60	9	11	17	47	43	61
1/8/86	8	643	85	311	421	420	671	620
1/15/86	15	847	432	492	709	785	692	382
1/22/86	22	831	742	817	983	898	751	524
1/29/86	29	691	852	839	913	608	351	273
2/12/86	43	481	345	306	395	549	567	303
3/5/86	64	228	1008	914	740	546	100	32
3/12/86	71	202	485	434	516	438	172	31
3/26/86	85	372	51	1075	768	414	252	127
4/2/86	92	563	987	1646	961	470	287	107
4/9/86	99	21	239	347	402	697	185	9
4/16/86	106	229	1258	1578	1324	141	144	84
5/8/86	128	177	62	108	83	114	149	191
5/14/86	134	205	123	567	350	208	237	211
5/21/86	141	205	1290	1411	386	196	195	206

5/28/86		148	1075	1007	1660	1517	625	330	405
6/4/86		155	281	1621	1791	1326	146	268	79
6/11/86		162	371	62	747	830	651	405	25
6/18/86		169	172	441	611	701	937	276	102
	% light								
7/2/86	100	184	325	109	577	412	796	144	33
	60		298	125	536	369	65	279	45
	25		197	85	397	191	713	301	46
	10		131	58	252	144	496	233	37
	3		59	17	56	83	265	358	25
7/10/89	100	191	217	377	1271	910	1008	396	192
	60		283	374	1289	846	1009	398	210
	25		265	227	1008	747	1015	403	213
	10		213	104	647	375	580	279	113
	3		138	72	237	317	470	210	112
7/16/86	100	197	422	461	2903	1993	2109	872	348
	60		485	638	2800	2095	2074	892	343
	25		439	465	2260	1454	1777	812	303
	10		330	310	1536	1046	1513	648	286
	3		185	149	840	532	1112	482	192
7/23/86	100	204	437	860	834	396	412	696	169
	60		434	961	880	376	502	717	202
	25		390	792	693	319	412	644	172
	10		293	402	484	192	280	474	134
	3		194	287	227	104	167	255	90
7/30/86	100	211	216	425	1418	823	985	691	104
	60		161	319	1002	641	817	508	90
	25		73	143	535	306	338	267	70
	10		48	77	244	163	180	120	41
	3		25	45	125	100	91	77	30
8/20/86	100	232	396	148	907	373	2685	274	33
	60		360	151	700	308	2396	234	45
	25		227	91	421	206	1282	134	39
	10		120	40	266	108	800	60	33
	3		47	15	105	62	418	22	17
9/3/86	100	246	576	666	1490	1566	830	314	119
	60		478	485	1390	1308	770	290	91
	25		346	376	1043	1062	636	268	66
	10		206	227	737	703	513	200	46
	3		149	127	454	431	332	122	31
9/10/86	100	253	804	432	2345	1631	350	796	253
	60		658	396	1930	1506	410	659	310
	25		533	269	1205	1109	300	507	259
	10		409	184	673	742	228	326	210
	3		250	109	286	443	125	150	139
9/17/86	100	260	220	85	254	155	110	141	58
	60		232	88	263	193	78	148	70
	25		210	95	233	167	88	149	68

	10		148	63	144	124	90	111	58
	3		92	36	60	66	40	54	31
10/1/86	100	274	288	174	735	495	671	588	78
	60		238	156	528	427	530	431	92
	25		190	114	305	308	328	287	74
	10		133	96	182	229	202	144	56
	3		87	61	91	149	103	87	39
10/22/86	100	295	82	50	43	77	66	183	160
	60		77	40	34	61	75	158	157
	25		60	36	27	55	55	116	106
	10		30	25	17	30	28	58	58
	3		17	8	11	11	9	19	24
11/5/86	100	309	40	8	9	10	11	18	11
	60		35	6	7	8	8	14	12
	25		22	3	5	5	4	11	8
	10		12	1	2	2	4	6	3
	3		6		2	1	1	2	2
11/24/86	100	328	27	4	5	9	12	16	19
	60		20	4	5	8	14	18	17
	25		19	4	7	8	15	19	15
	10		20	4	7	8	14	17	12
	3		13	2	5	6	11	11	9
12/8/86	100	342	39	5	9	12	18	27	35
	60		29	8	8	9	14	22	29
	25		17	2	6	7	10	14	14
	10		10	2	3	3	5	5	9
	3		5	1	2	1	2	3	5
12/17/86	100	351	6		3	5	5	7	8
	60		6	1	3	4	6	6	5
	25		4		4	3	4	5	7
	10		2		2	2	3	3	4
	3		13		1	1	2	2	3
1/5/87	100	5	13	7	7	8	8	9	9
	60		20	11	9	10	13	13	14
	25		18	11	9	10	11	13	13
	10		14	10	9	10	10	11	10
	3		11	6	6	8	9	9	9
1/12/87	100	12	73	8	14	14	17	21	16
	60		76	9	12	15	17	20	19
	25		66	9	13	12	19	26	18
	10		42	8	12	11	13	16	14
	3		27	6	9	8	9	10	8
2/2/87	100	33	138	24	52	47	71	67	83
	60		141	30	43	47	68	71	80
	25		112	26	44	42	62	55	65
	10		76	17	27	28	41	43	42
	3		46	12	20	20	18	29	35
2/24/87	100	55	249	497	511	501	516	352	165
	60		348	493	538	505	574	511	145

	25		309	535	472	612	546	547	204
	10		369	382	475	472	484	463	169
	3		298	347	384	462	414	447	148
3/2/87	100	61	50		177	252	118	30	15
	60		62		223	251	112	36	16
	25		70		217	258	143	42	16
	10		59		170	238	134	25	13
	3		50		119	211	113	40	13
3/16/87	100	75	460	159	141	238	373	312	396
	60		449	230	229	259	275	414	326
	25		444	199	212	348	414	300	186
	10		266	164	204	328	324	189	188
	3		257	108	138	242	198	155	115
3/30/87	100	89	252	402	589	469	87	127	72
	60		163	299	510	359	126	98	55
	25		114	207	315	241	74	73	33
	10		69	92	151	108	42	34	23
	3		32	57	113	80	21	22	7
4/15/87	100	105	504	91	94	318	627	562	564
	60		654	147	80	292	593	785	522
	25		532	106	60	191	328	524	386
	10		345	69	45	109	211	212	226
	3		192	39	21	54	148	196	120
4/27/87	100	117	558	306	442	675	721	555	603
	60		511	295	439	565	541	523	453
	25		372	210	341	440	410	358	345
	10		311	157	200	289	305	313	270
	3		212	109	161	202	207	170	187
5/12/87	100	132	765	411	529	684	436	468	180
	60		743	454	571	588	435	571	177
	25		636	349	474	440	408	542	171
	10		595	302	404	476	329	439	144
	3		422	169	299	304	262	269	101
5/26/87	100	146	555	30	424	518	523	572	358
	60		567	29	461	555	521	442	497
	25		451	33	400	482	373	516	372
	10		421	27	274	389	301	370	313
	3		245	18	171	246	228	193	268
6/15/87	100	166	571	1142	3333	1762	1303	732	343
	60		622	1231	3297	1650	1381	707	424
	25		587	1042	2947	1768	1570	871	361
	10		510	638	2209	1370	1132	754	380
	3		437	436	1410	1007	821	477	246
6/29/87	100	180	1123	3017	4007	1577	913	816	526
	60		959	2782	3766	1593	945	952	568
	25		1156	2168	3417	1440	653	791	586
	10		870	1428	2556	1115	486	540	536
	3		542	842	1988		318	444	383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2000
1000
0
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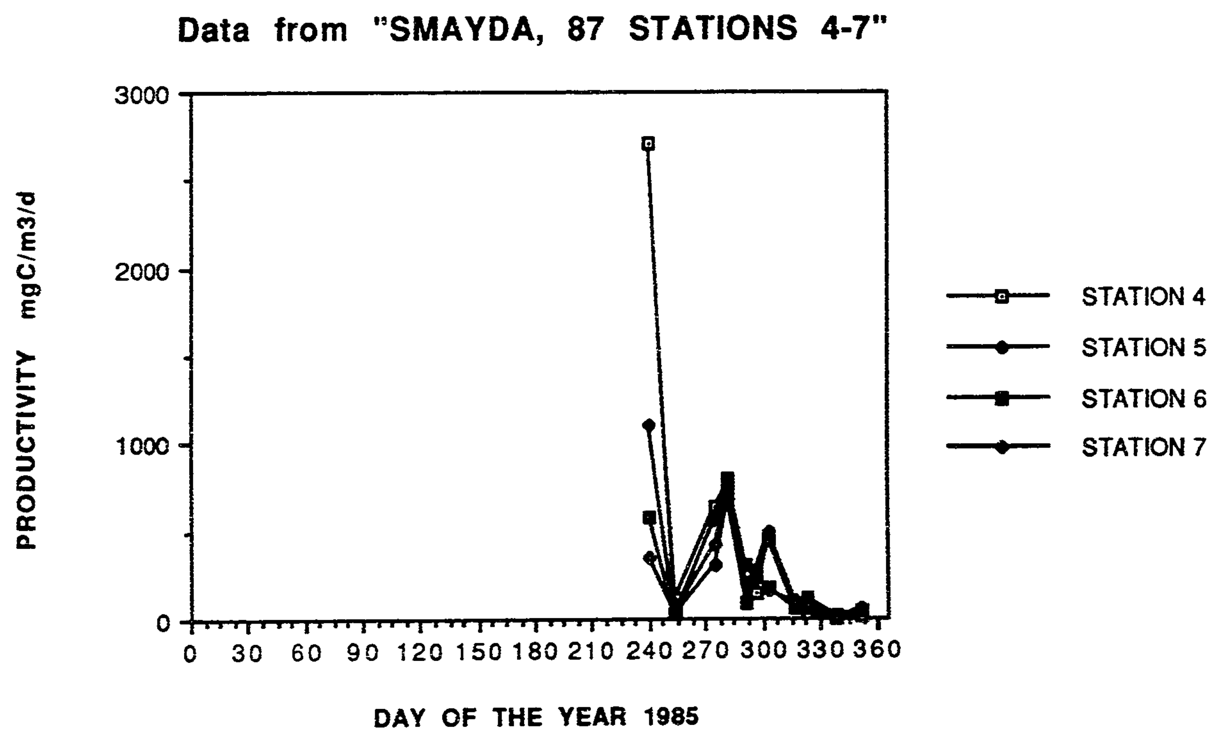
DAY OF THE YEAR 1985
1
2
3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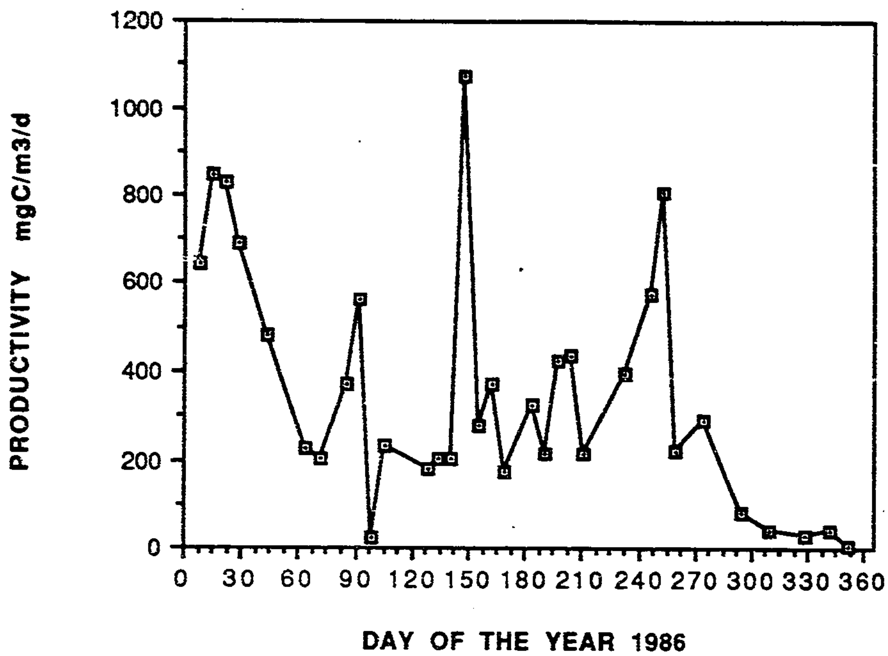
DAY OF THE YEAR 1985
STATION 4
STATION 5
STATION 6
STATION 7

Data from "SMAYDA, 87, 88 STATION 1"



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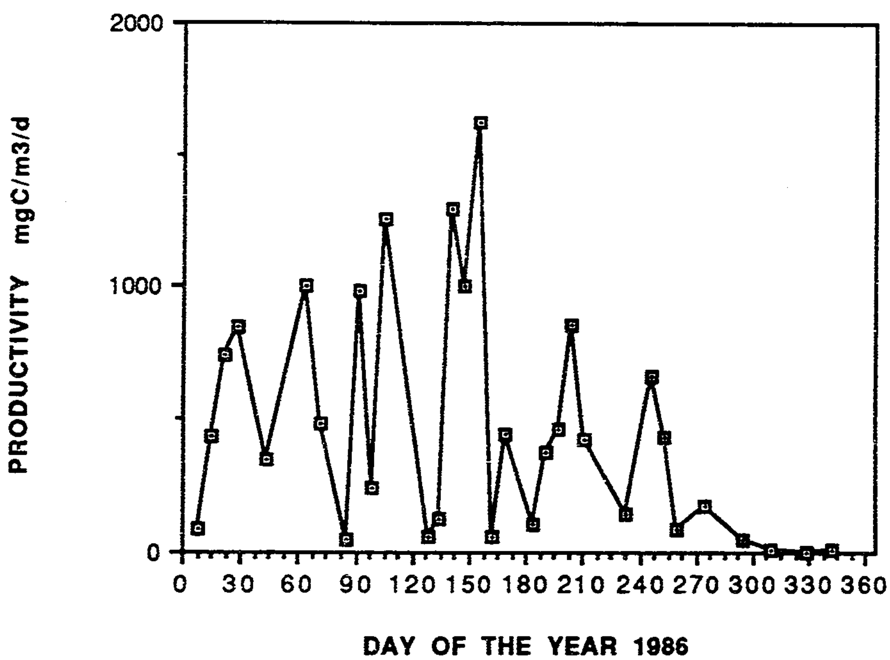

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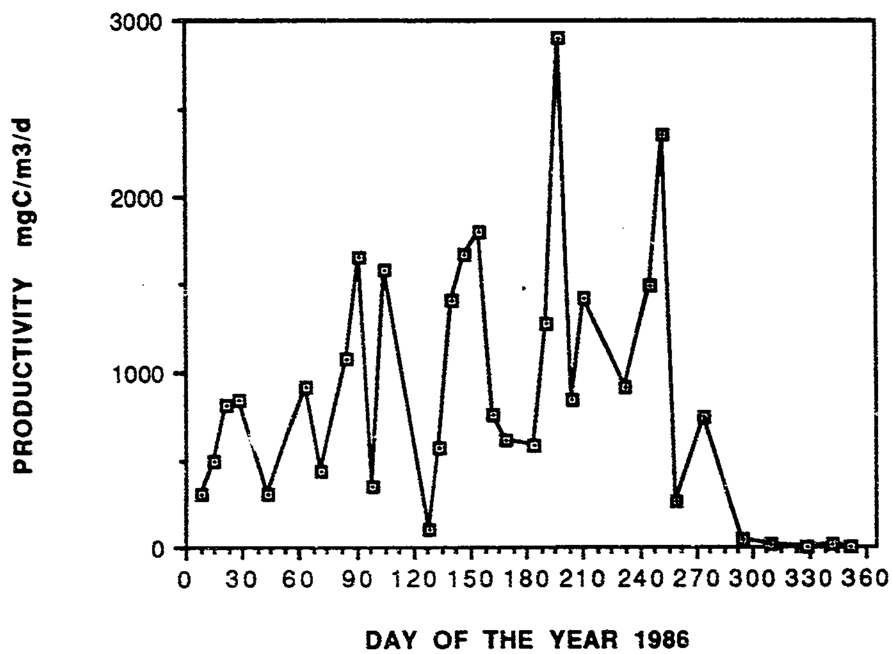

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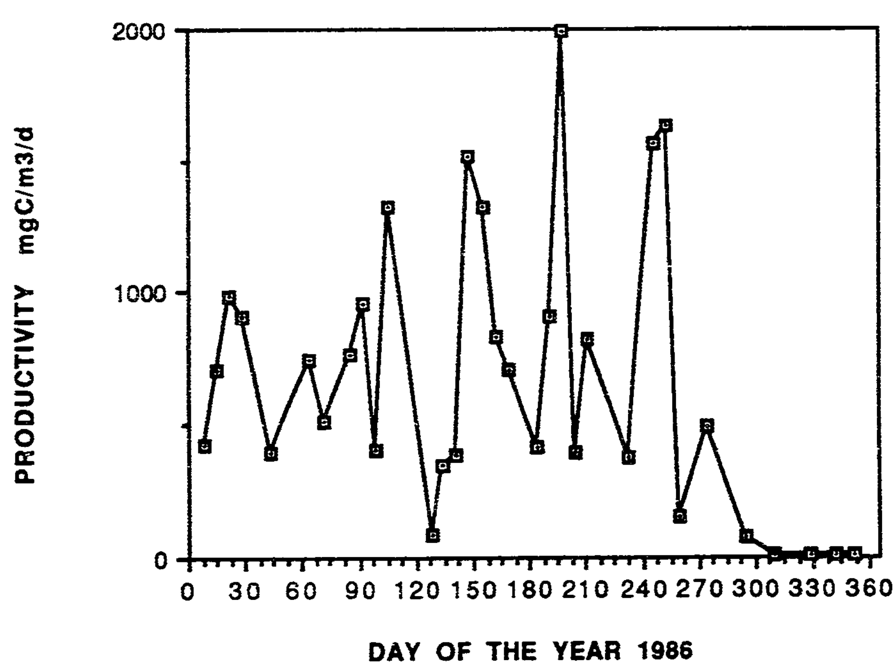

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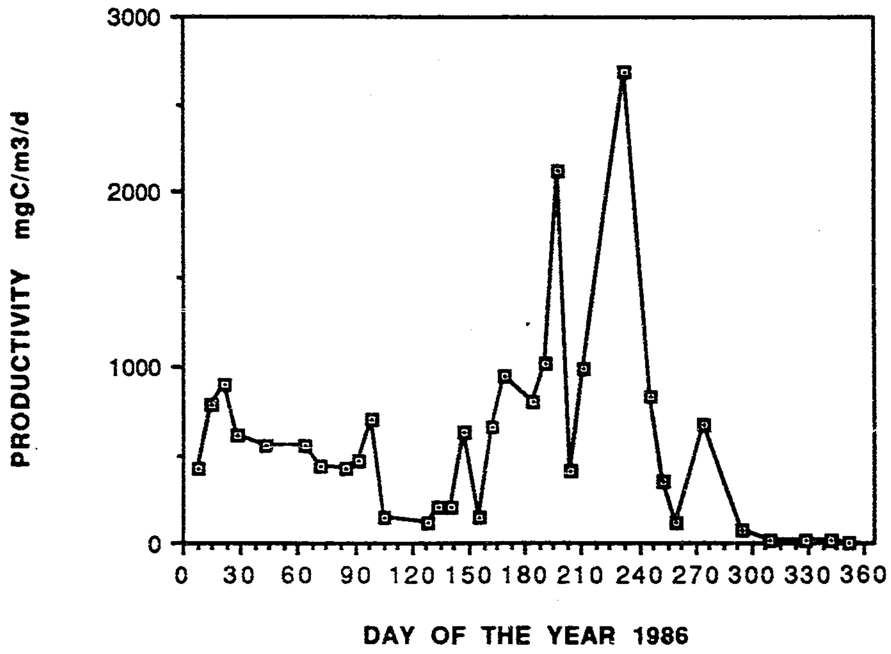

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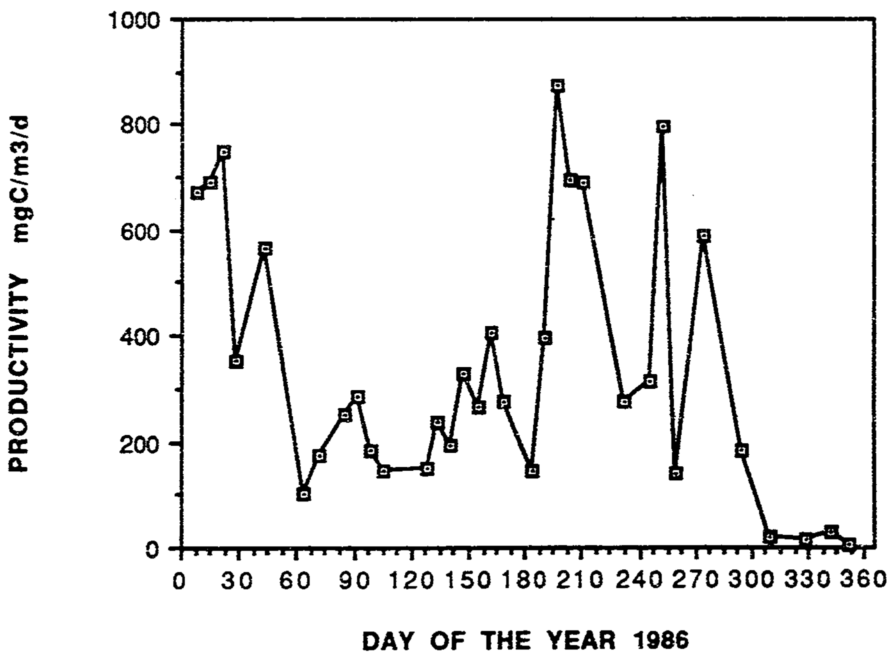

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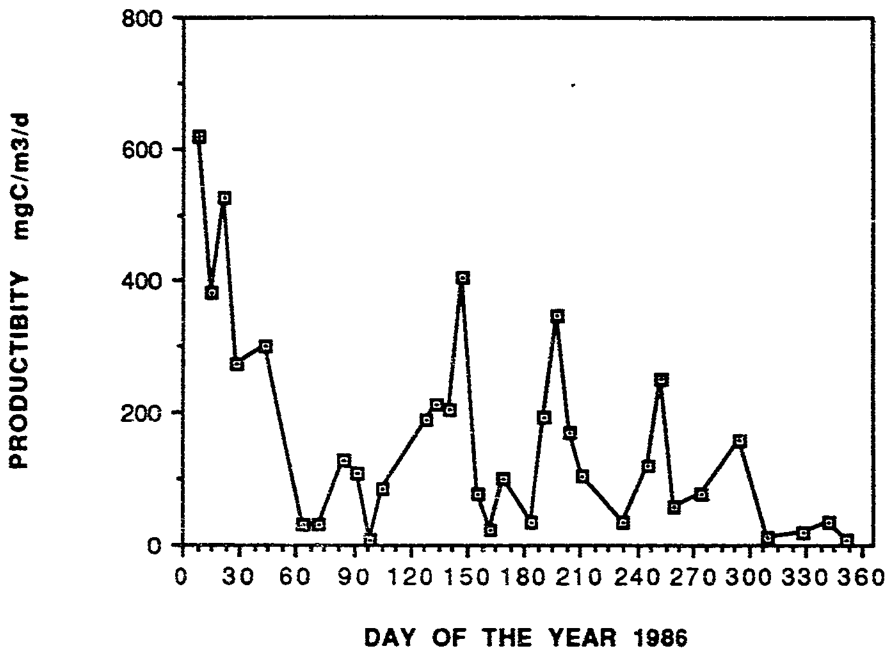

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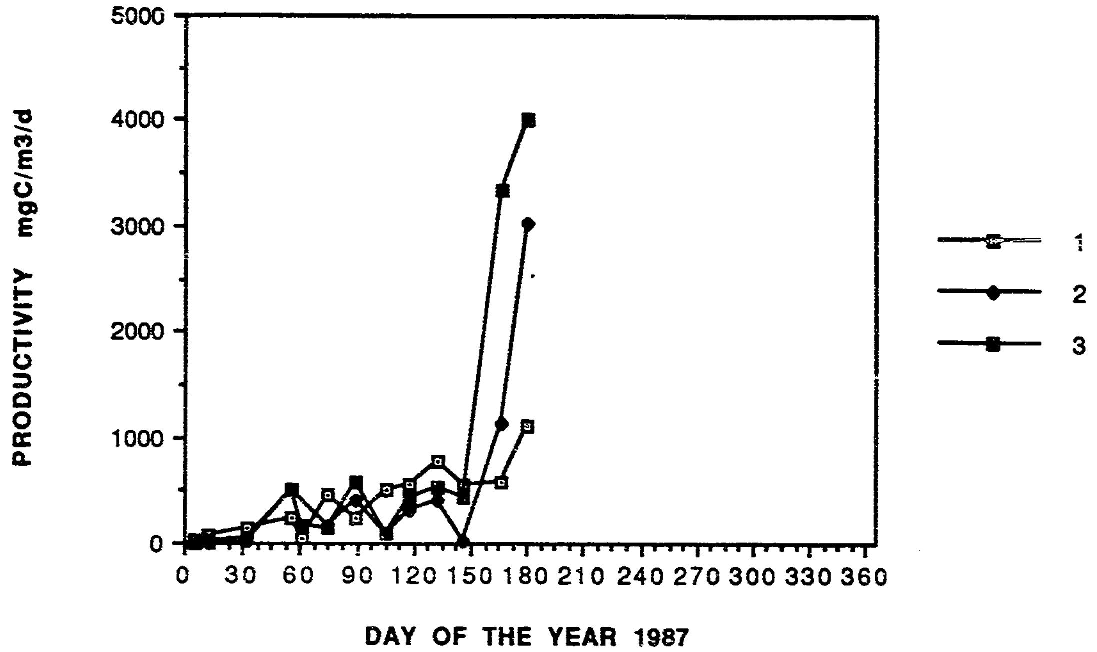

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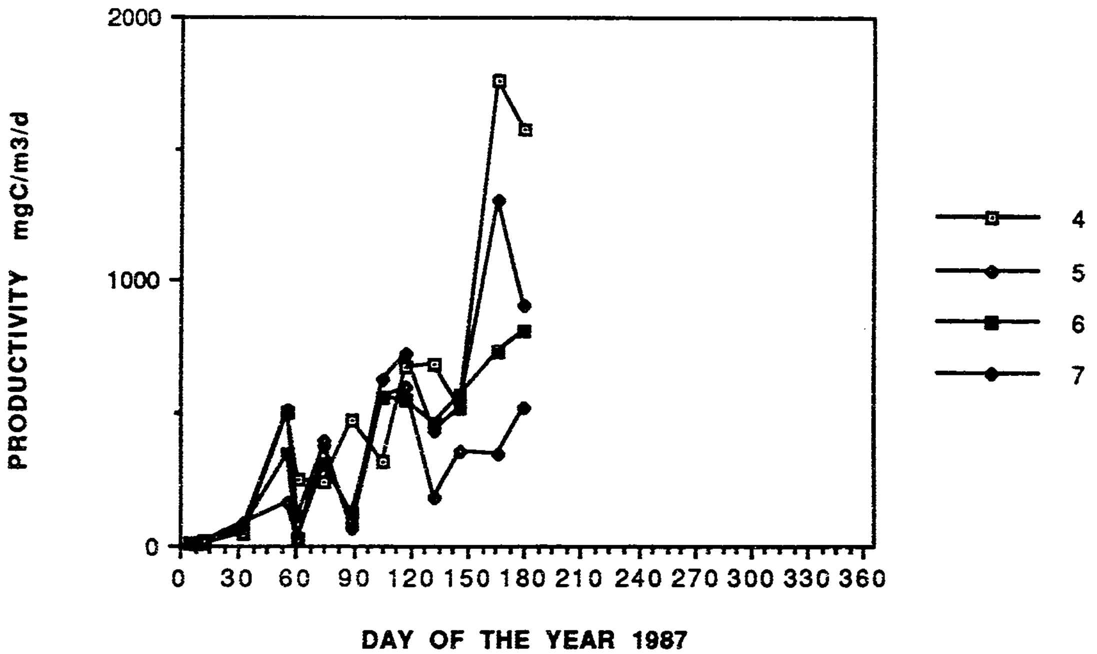


Vargo G.A, 1979, The contribution of ammonia excreted by zooplankton to phytoplankton production in Narragansett Bay, J. Plankton Research 1:75-84.

See also Vargo, G. A., 1976, The influence of grazing and nutrient excretion by zooplankton on the growth and production of marine diatom, Sketetonema coastum (Greville) Cleve in Narragansett Bay. PH.D Dissertation, URI, 216p.

TECHNIQUE: Light-dark bottles; incubation at 5 light depths.

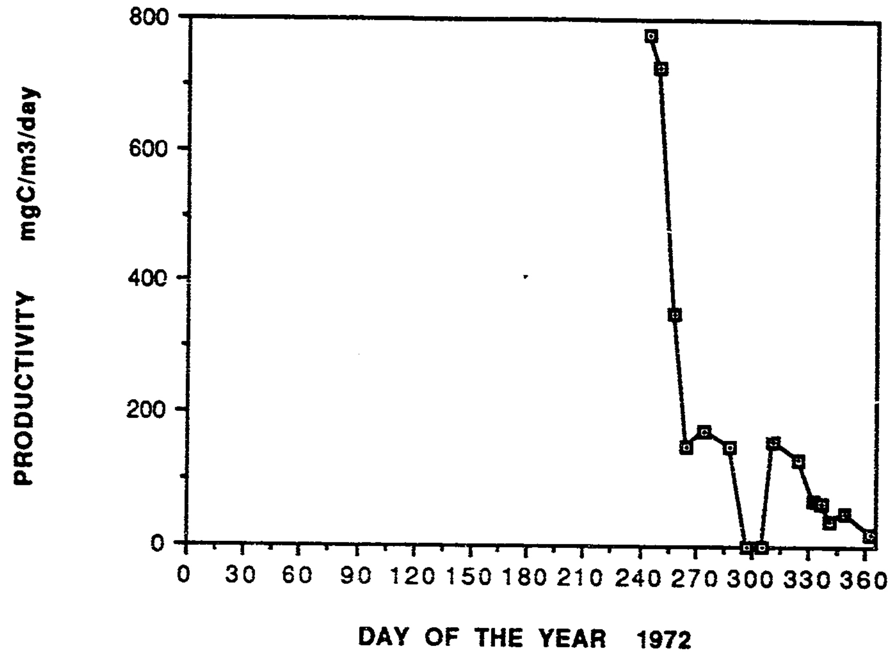
ORIGINAL STATION ID	LOCATION	MAP ID
Station 2	41 34' N 71 23.5' W	8

Data was digitized from graph in original paper, dates were estimated
UNITS: mgC/m3/day

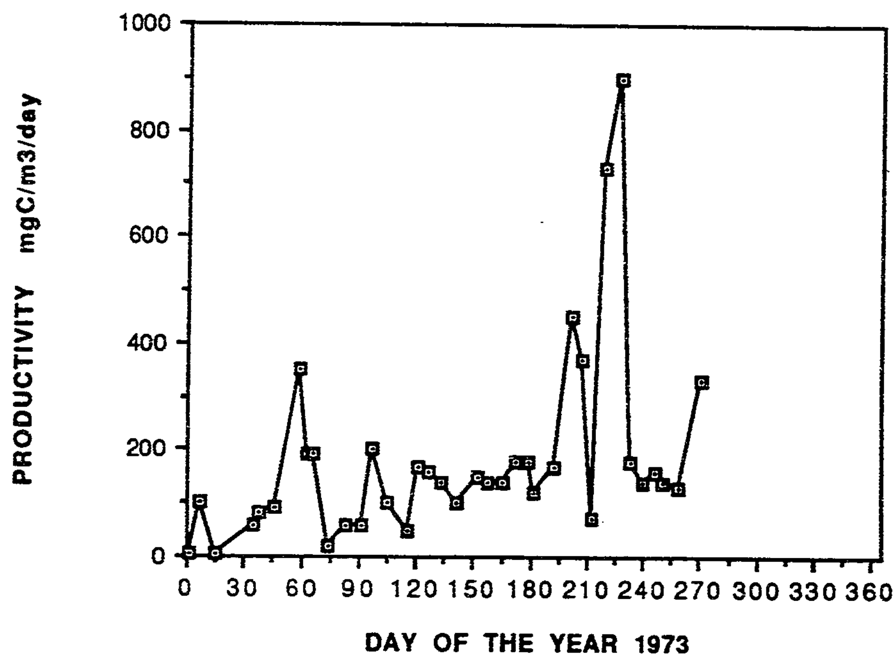
DATE	DAY	GROSS
9/2/72	245	775
9/7/72	250	725
9/15/72	258	350
9/22/72	265	150
10/2/72	275	175
10/15/72	288	150
10/24/72	297	0
11/1/72	305	0
11/7/72	311	160
10/20/72	324	130
10/28/72	332	70
12/2/72	336	64
12/7/72	341	40
12/15/72	349	50
12/28/72	362	20
1/2/73	2	5
1/7/73	7	100
1/15/73	15	5
2/4/73	35	60
2/7/73	38	80
2/15/73	46	90
2/28/73	59	350
3/4/73	63	190
3/7/73	66	190
3/15/73	74	20
3/25/73	84	60
4/2/73	92	60
4/7/73	97	200
4/15/73	105	100
4/26/73	116	50
5/1/73	121	170
5/7/73	127	160

DATE	DAY	GROSS
5/14/73	134	140
5/21/73	141	100
6/1/73	152	150
6/7/73	158	140
6/14/73	165	140
6/21/73	172	180
6/28/73	179	180
7/1/73	182	120
7/14/73	192	170
7/21/73	202	450
7/27/73	208	370
8/1/73	213	70
8/7/73	219	730
8/15/73	227	900
8/21/73	233	180
8/28/73	240	140
9/3/73	246	160
9/7/73	250	140
9/15/73	258	130
9/28/73	271	330

Data from "VARGO, 79"



Data from "VARGO, 79"



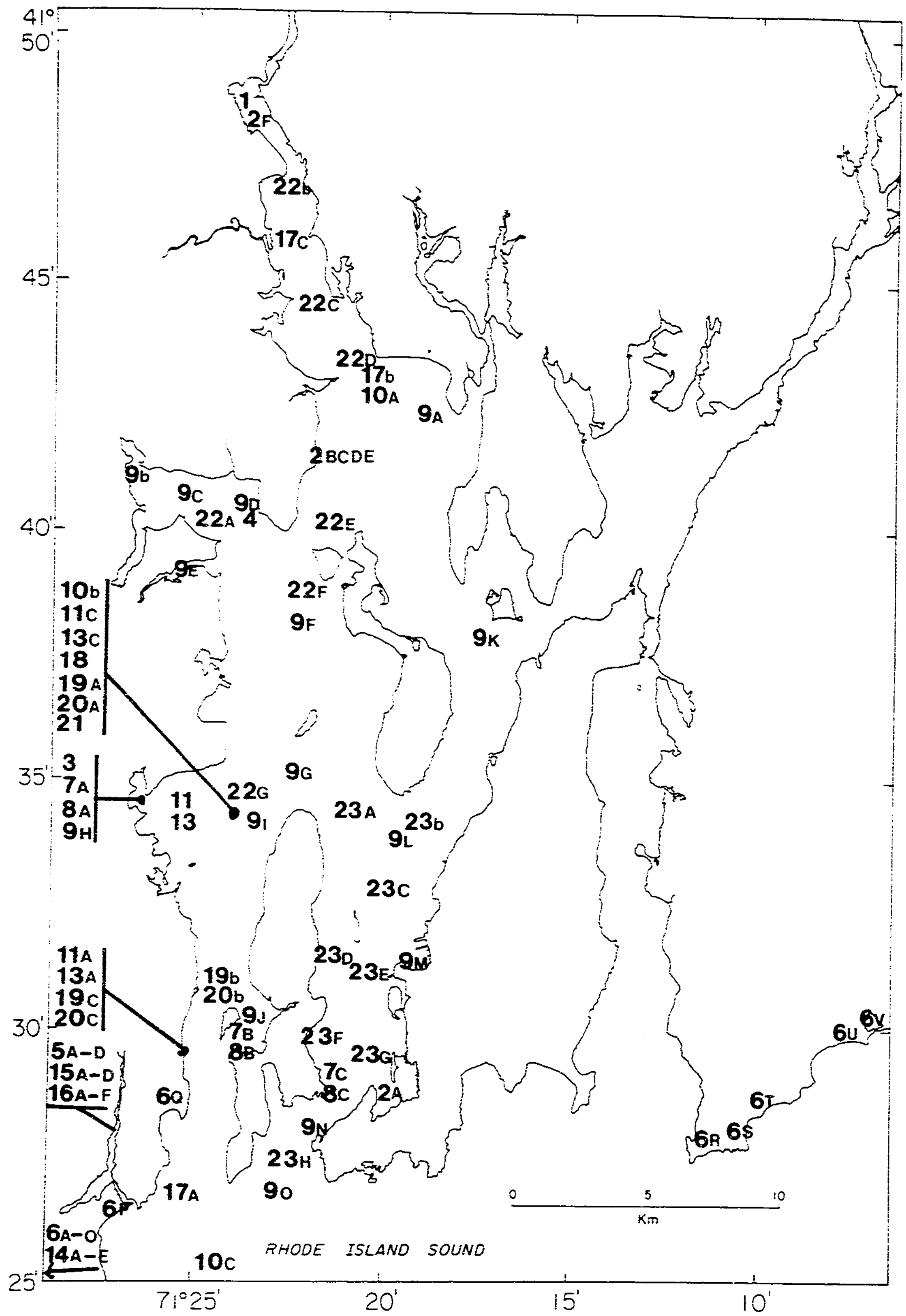
Appendix D:

Summary of studies which contain:

Species lists

and map of stations

Map of stations, species lists.



MAP I.D.	REFERENCE	ORIGINAL STATION ID	LOCATION	DATA TYPE	DATA PRESENTATION	DATA DURATION	COMMENTS
1	Olney, 1872	None specified	Providence (no specific location)	RI algae species: Melanospermae, Rhodospermae, Chlorospermae, Zynemaceae, Desmidiaceae, Diatomaceae	List	None specified	
2-A	Briggs, 1873	128(?)	Newport Harbor, near Long Wharf	RI Diatomaceae species	List	August, 1872	
2-B		110(?)	Rocky Point, N. of Bathing Houses				
2-C		127(?)	Rocky Pt., swamp near Forest Circle				
2-D		129(?)	Mark Rock				
2-E		131(?)	Rocky Point, beach				
2-F		STO(?)	Providence				St. 2-F probably same station as Olney, 1872
3	Anonymous, 1900	None specified	Wickford Harbor	Diatom species from "skimmings" of oyster beds in Wickford Harbor	List	July, 1899	
4	Ferrara, 1953	Station 1	Pier in Greenwich Bay, 100 yds. from shore SW tip of Warwick Neck (41 40.0 N 71 23.0 W, est)	Monthly means Dominant phytoplankton,frequency, counts, max./collection, etc. Phytoplankton species identified in samples	Figures Table Table	32 sampling dates, approx. weekly, 7/25/52-3/18/53	Other data includes Chlorophyll and total diatom and flagellate counts
5-A	Smayda and Jefferies, 1954	Station I	41 30.8' N 71 26.85' W (est.): Lewark's Pond	Phytoplankton species and abundances	In text	3/9/54 (?)	
5-B		Station II	41 30' N 71 27.1' W (est.): "Flats" leading to Lewark's Pond				
5-C		Station III	41 29' N 71 26.85' W (est.): Channel-like narrows north of Middlebridge				
5-D		Station IV	41 27.2' N 71 27.15' W (est.): near Middlebridge				
6-A through 6-V	Wood and Palmatier, 1954	see map in reference	Stations in RI coastal salt ponds from Ct. border to Ma. border	Algal species and location	List in text	August, 1952 (?)	
7-A	Smayda, 1955	Station I	Wickford Harbor: Mill Creek/ Cove (41 34.75 N 71 27.4 W, est)	Diatom and flagellate species occurrences at each station Monthly means of dominant species	Table Figure and Table	160 sampling dates, approx. weekly, 7/54 - 2/55 (7-A: 55 samples, 7-B: 56 samples, 7-C: 49 samples)	Other data includes total phyto-plankton, diatom and flagellate abundances by season and station, mean productivity values
7-B		Station II	end of dock near S boundary of Dutch Island Harbor (41 29.7 N 71 23.8 W, est)				
7-C		Station III	150 ft. from E. shore of S. end of Conanicut Island (41 28.8 N 71 20.5 W, est)				
8-A	Smayda, 1957	Station I	same as 7-A	Diatom and flagellate species Monthly means of dominant species	Table Figure	same as 7-A, 7-B, 7-C	as above
8-B		Station II	same as 7-B				
8-C		Station III	same as 7-C				

9-A	Pratt, 1959	E1	41 42' N 71 19.3' W (est.): Providence River mouth	Monthly occurrences of diatom, flagellates and other algal species	Table	Several series of weekly collections, 1952-1956	Other data includes seasonal abundances for each station
9-B		W1	41 41.2 'N 71 26.9' W (est.): Greenwich Bay	Dominant species in Upper W. Passage, Lower West Passage, Upper East Passage, Lower East Passage	Table	(Table in reference lists sampling dates for each station)	
9-C		W2	41 40.6' N 71 25.3 'W (est.): Greenwich Bay				
9-D		W3	41 40.3' N 71 23.8 'W (est.): SE tip of Warwick Neck				
9-E		W4	41 39.4' N 71 25.4' W (est.): Greenwich Bay				
9-F		W5	41 37.8' N 71 23.2' W (est.): W of Prudence Island				
9-G		W6	41 35.1' N 71 22.5 'W (est.): N of Beaverhead				
9-H		W7	41 34.8 'N 71 27.3 'W (est.): Wickford Harbor				
9-I		W8	41 33.3' N 71 24' W (est.): SE of Wickford Harbor				
9-J		W9	41 29.9' N 71 23.8' W (est.): E of S end of Dutch Island				
9-K		E2	41 38' N 71 18 'W (est.): E of Prudence Island				
9-L		E3	41 33.2' N 71 19.8' W (est.): middle of East Passage				
9-M		E4	41 31.2' N 71 19' W (est.): Newport Harbor				
9-N		E5	41 28' N 71 21.5' W (est.): W. of Castle Hill light				
9-O		E6	41 27' N 71 22.6' W (est.): mouth of East Passage				
10-A	Martin, 1966	Station 1	41 42.5' N 71 20' W	Abundances of significant diatom and flagellate species at each station	Table	St. 10-A: 28 sampling dates, 4/27 - 1/18	Same stations as Martin, 1968 no year specified
10-B		Station 2	41 34'7" N 71 23'31" W			St. 10-B: 20 sampling dates, 6/22 - 1/18	
10-C		Station 3	41 25' N 71 24' W			St. 10-C: 18 sampling dates, 6/29 - 1/18	
11-A	McAlice, 1969	Series IV	Seven sampling locations parallel to ebb current from GSO dock (41 29.6 N 71 25.2 W)	Common species abundances, St. 11-A List of species: diatoms, flagellates	Figure Table	St. 11-A: 2/14/67 St. 11-B: 4/4/67 and 4/10/67 St. 11-C: 6/28/67	Same as McAlice, 1070
11-B		Series VA and VB	2 series of 15 sampling locations parallel and perpendicular to current direction, near Wickford (41 35.5N 71 26.0 W)				
11-C		Series VI	Stations from drifting boat between Wickford Harbor and Conanicut Point (411 35.5 N 71 25.5 W)				
12	Smayda, 1969	None specified	41 34'7" N 71 23'31" W (probable)	Max. weekly abundances Detonula confervacea	Table	1959-1967 (Dec. - May)	Station presumed from length of record, no location specified

13-A 13-B 13-C	McAlice, 1970	same as McAlice,1969	same as 11-A same as 11-B same as 11-C	same as McAlice, 1969		same as McAlice, 1969	
14-A	Tomas, 1971	Station 1	41 25'41" N 71 29'58" W: S. of Spring Brook Cove	Occurrence of various species	Table	3/24/68 - 5/10/69	
				Max. abundances of dominant species	Tables		
14-B		Station 2	41 24'48" N 71 30'26" W: opposite mouth of Smelt Brook Cove	Seasonal distributions of species	Table		
				Species abundances	Table		
14-C		Station 3	41 23'12" N 71 30'46" W: opposite S. Jerry Cove				
14-D		Station 4	41 22'14" N 71 30'54" W: near nun buoy N°2				
14-E		Station 5	41 21'48" N 71 30.5' W: at nun buoy near outer Pt. Judith breakwater				
15-A	Miller, 1972	Station A	41 30.25' N 71 27'5" W: 7.2 km above mouth of Pettaquamscutt R.	St. 15-A: abundances of phytoplankton species	Table	15-A: Biweekly or more frequently (except Nov and Dec) Oct 69 to Sep-70	
15-B		Station B	41 29.25' N 71 26'35" W (est.): Bridgetown	St. 15-A: seasonal and depth variations	Table		
				St. 15-A: location and time of monthly maximums for individual species	Figure	Sts. 15-B,C,D: surface samples 8/31/70	
15-C		Station C	41 27.25' N 71 26'56" W (est.): Middlebridge				
15-D		Station D	in Narragansett Bay, approx. 0.8 km S. of mouth of Pettaquamscutt R.				
16-A	Hanisak, 1973	Station 1	41 26.5' N 71 25'56" W: Pettaquamscutt R. mouth	Major phytoplankton species and "relevant information"	in text	April 72 - March 73	
16-B		Station 2	41 26'55" N 71 26'46" W: at Governor Sprague Bridge				
16-C		Station 3	41 27'14" N 71 26' 56" W: Middlebridge				
16-D		Station 4	41 29'14" N 71 26'35" W: Bridgetown				
16-E		Station 5	41 31'2" N 71 26'36" W: near inlet of Gilbert Stuart Brook				
16-F		Station 6	41 31.25' N 71 26'38" W: near fish ladder in Gilbert Stuart Brook				
17-A	Mitchell-Innes, 1973	Station 1	41 26'47" N 71 25'9" W: Whale Rock	Dominant species	Table	Sts. 17-A, C, D: July 1968-June 1969	Other data include diatom, flagellate and total phytoplankton abundances
				Mean annual abundances and % of total population at each station	Table	St. 17-B: Feb-May 70, Dec 1970-May 1971	
17-B		Station 2	41 34'7" N 71 23'31" W	Abundances of species for each sampling date	Table		
17-C		Station 3	41 42'48" N 71 20' W: near Nayatt Point (Providence R.)				
17-D		Station 4	41 45'51" N 71 22'48" W: Sabin Point in Providence R.				
18	Durbin et al., 1975	Pratt's Station 2	41 34'07" N 71 23'31" W	Species in each size fraction (>100um, 60-100um, 20-60 um, <20 um)	Table	Biweekly from 11/27/72-10/15/73	

19-A	Furnas, 1982a	None specified	41 34' N 71 24' W	Species abundances	Table and Figure	28 sampling dates June 78 to Sept 79	
19-B			From bridge 4 km S. of St. 19-A (Jamestown Bridge)				
19-C			GSO dock (41 29.5 N 71 25.2 W)				
20-A	Furnas, 1982b	None specified	same as 19-A	Bay phytoplankton species: diatoms, flagellates, monads	Table	same as Furnas, 1982a (?)	No sampling dates specified
20-B			same as 19-B				
20-C			same as 19-C				
21	arentz and Smayda, 19€	Station II	41 34' N 71 23' W	Species abundances, frequency in 1000 samples and max cells/ml observed	Table	Weekly 1/59 - 12/80 excluding 7-12/63,	
22-A	Smayda, 1987	Station 1	41 40.4'N 71 25' W (est.)	Abundances of various diatom and flagellate species at each station	Tables	Various dates, 7/85 - 8/86	
22-B		Station 2	41 47.5' N 71 24' W (est.)				
22-C		Station 3	41 45' N 71 23.5' W (est.)	Surface and bottom concentrations of species	Table	6/18/86	
22-D		Station 4	41 43.5' N 71 21' W (est.)				
22-E		Station 5	41 40.5' N 71 22' W (est.)				
22-F		Station 6	41 37.8' N 71 23' W (est.)				
22-G		Station 7	41 34' N 71 24' W (est.)				
16-A	Metcalf & Eddy, 1985	Station 1	41 34'18"N 71 21' 86"W	Near surface and deep species counts	Table	30 April 1984	
16-B		Station 2	41 33' 53"N 71 19' 03"W				
16-C		Station 9	41 32' 53"N 71 20'10"W				
16-D		Station 8	41 31' 20"N 71 21' 05"W				
16-E		Station 3	41 31' 08"N 71 19' 59"W				
16-F		Station 7	41 29' 35"N 71 21' 12"W				
16-G		Station 6	41 27' 47"N 71 22' 13"W				