LAKE WAYNEWOOD

REPORT ON LIMNOLOGICAL CONDITIONS IN 1989

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POCONO COMPARATIVE LAKES PROGRAM

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INTRODUCTION

Personnel from Lehigh University visited Lake Waynewood on 12 dates between 1 June and 31 December, 1989 as part of a routine monitoring program of three lakes. These lakes were selected to span a trophic gradient, Lake Waynewood lying at the nutrient-rich, productive ("eutrophic") end of the gradient. Similar reports will be submitted to the owners of Lake Giles, an acidic, unproductive ("oligotrophic") lake, and Lake Lacawac, a well protected lake of intermediate productivity ("mesotrophic").

The monitoring of these lakes in the Pocono region of northeastern Pennsylvania is a key component of Lehigh's Pocono Comparative Lakes Program (PCLP). This program aims to better understand the natural functioning of lakes, differences in lakes that arise through natural or man-made differences in their watersheds, and long-term trends that may be occurring in northeastern Pennsylvania. Through the cooperation of lake owners, scientists from Lehigh and other institutions are obtaining basic information that provides objective documentation of current lake conditions as well as a context for more intensive studies. Financial support from the Andrew W. Mellon Foundation has made these studies possible. Additional support from the Geraldine R. Dodge Foundation funded the summer internship program at the Lacawac Sanctuary.

The present report summarizes conditions in Lake Waynewood during 1989. Physical/chemical data are presented as tables for each date, and are summarized in figures. The following parameters were measured: temperature, light penetration, Secchi depth, dissolved oxygen, alkalinity, pH, and algal chlorophyll-a. Zooplankton data are presented as graphs that give the concentration (number of individuals per liter) averaged over the entire water column. A few notes are added on the dominant algae in midsummer. The summary discussion emphasizes the eutrophic charateristics of the lake and the possible role of the zooplankton in controlling the abundance of algae.

We wish to acknowledge the assistance of Dave Westpfahl and of the Fiene's and Bovard's at Lake Waynewood who provided boats and tolerated frequent visits at all hours of the day and night.

The Lacawac Sanctuary played a major role in this program as the field laboratory and summer residence for the investigators. We especially appreciate the interest and cheerful assistance of its curator, Sally Jones.

1989 METHODS AND RESULTS

Data included in this report are extracted from an electronic database maintained at Lehigh University by Dr. Craig Williamson. The field sampling, laboratory analysis, and computer data entry were carried out by several graduate research assistants under the supervision of Dr. Robert Moeller. John Aufderheide and Scott Carpenter carried out most of the field sampling and laboratory analyses. John counted the microzooplankton, while Scott developed and managed all aspects of the computer database including data entry and printing of zooplankton graphs. Dr. Bruce Hargreaves played a major advisory role in the development of the computerized database. Gabriella Grad assisted with field sampling. Gabriella and Karen Basehore counted the macrozooplankton from Lake Waynewood. Gabriella counted the nighttime samples and Karen the daytime samples. Paul Stutzman and Karen checked the zooplankton data entries; Robert Moeller entered and checked the physical/chemical data.

Although efforts have been made to assure the accuracy of data included in the database, and compiled in this report, we cannot guarantee complete accuracy and do not claim specific levels of accuracy or precision. The data have been collected as part of a lake characterization program and may not be suitable for uses not envisioned by the investigators. A brief description of sampling and analytical techniques is included here; a more complete description will be included with the 1990 report.

SAMPLING PROGRAM

On each sampling occasion, Lake Waynewood was visited twice, once during the day (the nominal date) and again after dark (sometimes the previous night). The night-time visit was required for zooplankton sampling. Usually, other parameters were measured, and samples were collected, during the day. Sampling was carried out at a fixed station (site "A") at the deepest part of the lake (about 12.5 meters or 41 feet). The lake was sampled twice monthly when surficial water temperature stayed above 20 °C, (June through September), then once monthly during cooler times.

TEMPERATURE AND PHYSICAL STRATIFICATION

Temperature was measured at 1-meter intervals with the thermister of a YSI™ oxygen meter. Units are degrees Celsius. Accuracy should be within 1 degree.

Figure 1 shows the thermal stratification that develops during late spring and summer, then breaks down in the autumn. On day 184 (3 July) stratification was well developed, producing an upper warm water layer circulating in contact with the atmosphere (the **EPILIMNION**, 0-2 meters, temperature 24 °C); an intermediate layer of rapid temperature decrease with depth (the **METALIMNION**, 2-5 meters); and a deep layer of cold water (the **HYPOLIMNION**, 5-12+ meters, temperature 8-11 °C).

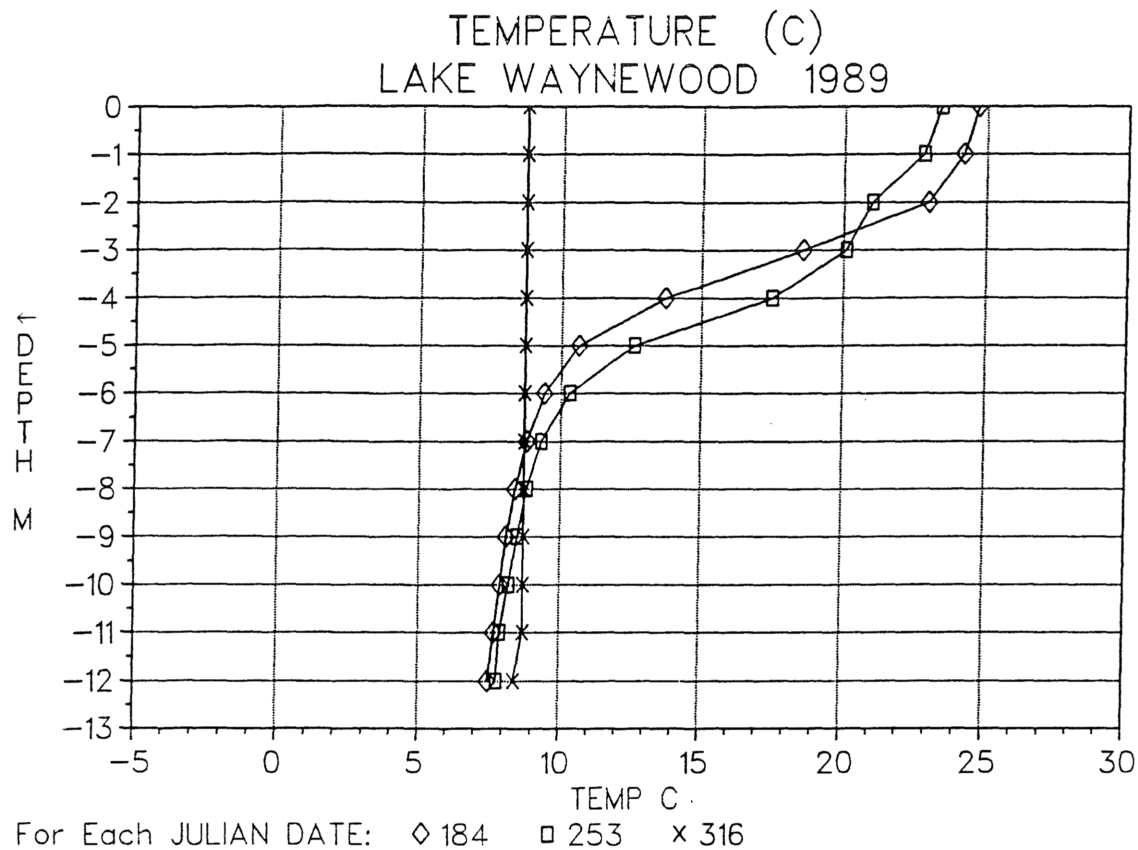


Figure 1. Temperature (degrees Celsius) in Lake Waynewood, 1989.

Values are plotted for three dates: **3 July** (day 184), **10 September** (day 253), **12 November** (day 316).

The usual course of thermal stratification is that of slow, gradual thickening of an epilimnion during the summer. By day 253 (10 September) Lake Waynewood's epilimnion extended to 3.5 meters. As the lake cooled during the autumn, the epilimnion thickened more rapidly until the lakewater was circulating from top to bottom. This period of full circulation, or "turnover", was in progress by day 316 (12 November). The lake would have cooled further, close to 4 °C, before freezing.

The thermal stratification existing on any date dictated the depths from which other samples were collected. Water samples for **pH**, **alkalinity**, **chlorophyll**, and **algae** were collected from mid-depths of the three layers when thermal stratification was well developed. During fall turnover, the lake was divided into three equal layers. Under ice-cover (e.g. 27 December), the topmost layer was 0-1m, and the remaining depths were divided at the Secchi depth (see **SECCHI DEPTH** below).

LIGHT PENETRATION

Light intensity at 1-meter intervals was calculated as a percentage of the light just below the lake surface (10 cm). Three slightly different methods were used to construct a 0-12 m profile of light penetration (method numbers correspond to codes from data tables):

Method 10. A Protomatic™ submersible selenium-cell photometer, with hemispheric diffusion dome, calibrated in foot-candles. Replicate profiles were obtained and averaged when the sky brightness varied because of clouds.

Method 11. A Licor™ submersible flat-plate sensor filtered to give a quantal response to photosynthetically available radiation ("PAR"), reading μEinsteins/m^2.sec. Profiles were obtained as in method 10.

Method 12. Two Licor quantum sensors, mounted 1-m apart on a common line, electronically computed the ratio of quantum intensities between the nominal depth and the depth above it. The percentage penetration profile was constructed from these ratios.

Light penetration is plotted on a logarithmic scale for three dates **(Figure 2)**. During the summer, depths above 3.5 m (i.e. all of the epilimnion) received at least 1% of the light penetrating the lake surface. The upper portion of the metalimnion received 0.1-1% of surface light, enough for low rates of algal growth. During autumn turnover light penetration was substantially decreased.

SECCHI DEPTH

Secchi depth is the depth, in meters, at which a white-and-black quartered disk 20 cm in diameter just ceases to be visible to an observer lowering it from a boat. It is a measure of water transparency. We observed the Secchi disk with a small glass-bottomed viewing box to reduce glare from the lake surface.

Secchi depth was typically about 2 meters (6.5 feet), and never less than 1 meter **(Figure 3)**. The lake was considerably clearer in early June (Secchi depths of 3-4 meters).

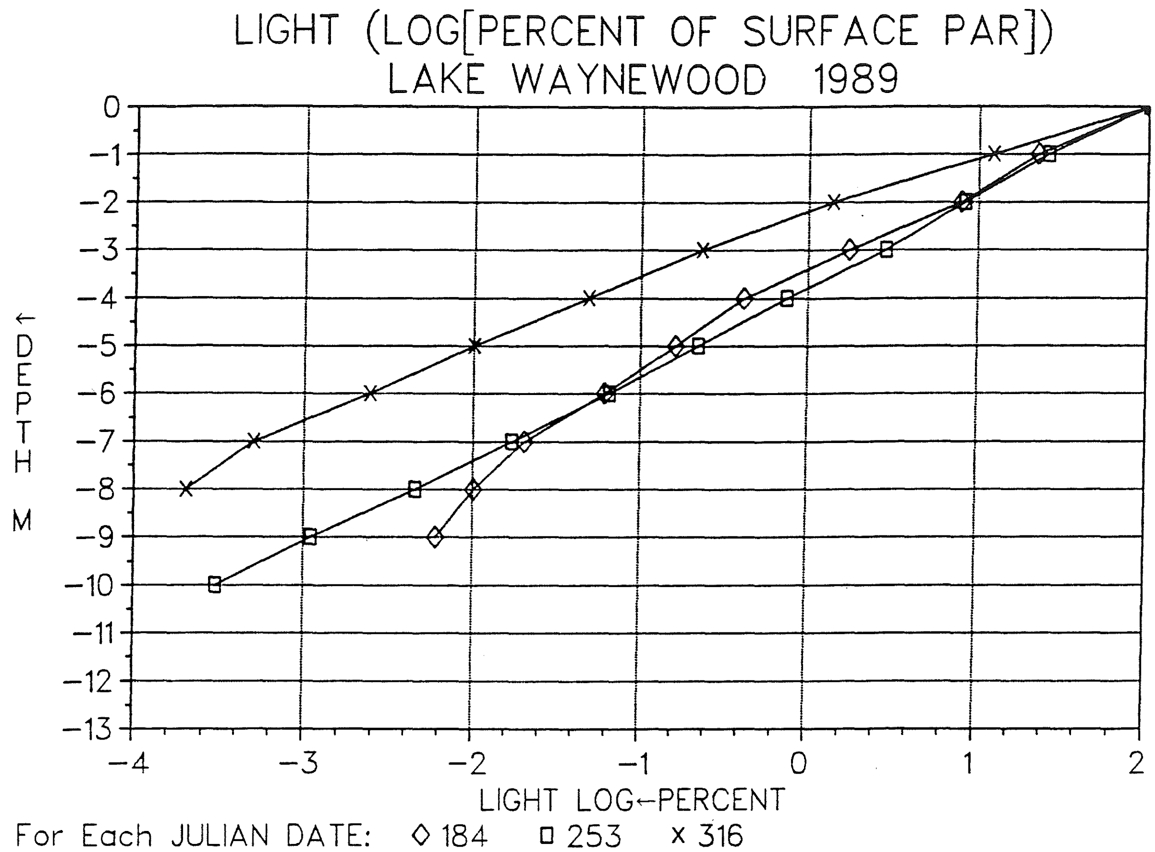


Figure 2. Light penetration in Lake Waynewood, 1989.

Values plotted for three dates: **3 July** (day 184), **10 September** (day 253), and **12 November** (day 316) are percentages of the light at 0.1 m depth and are graphed on a logarithmic scale (i.e., 100% ="3"", 10% ="2", 1% ="0", etc.)

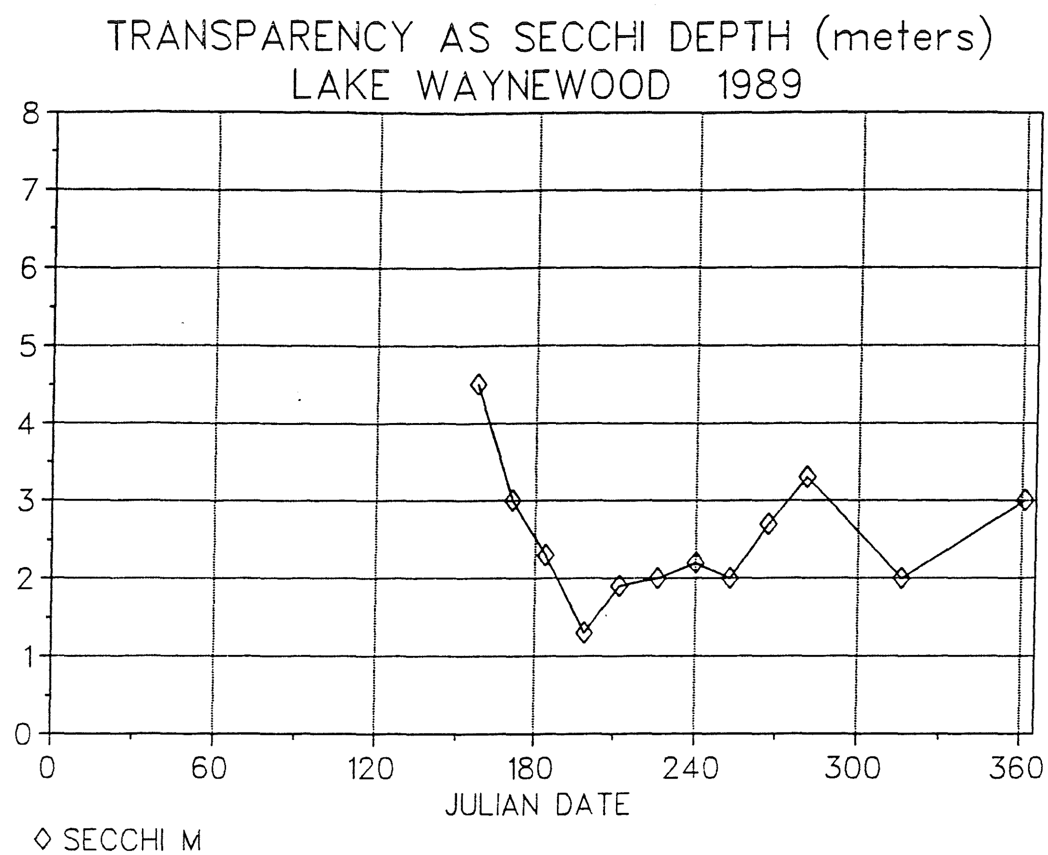


Figure 3. Transparency in Lake Waynewood, 1989.

Values plotted are the Secchi depths, in meters.

OXYGEN CONTENT OF THE LAKEWATER

Dissolved oxygen was measured polarographically using a YSI™ submersible temperature-compensating oxygen meter. The meter was calibrated in air to 100% saturation immediately before use in the lake. The effect of Lake Waynewood's elevation above sea-level (1381 feet) was not taken into account when calibrating the meter, so all compiled values are roughly 5% too high. Units are mg O_2 per liter.

Often the meter did not give a true "zero" when dropped into definitely anoxic (oxygen-free) water. Values flagged with error code "4" in the data tables, and plotted at depths greater than 7 meters for days 184 (3 July) and 253 (10 September) in **Figure 4**, should be treated as true zeros.

The onset of thermal stratification in mid-spring marked the onset of rapid depletion of oxygen within the hypolimnion. By day 184 (3 July) the hypolimnion was anoxic (**Figure 4**). By day 253 (10 September) the lower portion of the metalimnion also was anoxic. Oxygen content of the epilimnion in summer was maintained somewhat above atmospheric saturation, at least during the day, by algal photosynthesis (usually oxygen was sampled in late morning or early afternoon). During turnover the water column was progressively recharged with oxygen; on day 316 (12 November), early in the turnover period, the oxygen content of about 7 mg/L was only 64% of the saturation level for that temperature (11 mg/L at 8.7 C).

ALKALINITY AND pH

Alkalinity is a measure of the acid neutralizing, or buffering capacity. Alkalinity was determined by potentiometric titration of a 100-ml sample using 0.100 N sulfuric acid as titrant and monitoring pH change with an Orion™ model SA250 pH meter and Ross™ epoxy-body combination electrode. Titration points between pH 4.4 and 3.7 were plotted, after Gran transformation, to give alkalinity in microequivalents per liter (μeq./L).

Samples for alkalinity and pH were taken from duplicate water collections (acrylic plastic Van Dorn bottle) at three depths, designated "**E**" (epilimnion), "**M**" (metalimnion), and "**H**" (hypolimnion). Selection of these depths is described in the section **TEMPERATURE AND THERMAL STRATIFICATION**. Samples were stored in air-tight polypropylene bottles for up to 24 hr (refrigerated) before analysis. Samples were warmed to room temperature before analysis. The pH meter and electrode described above were calibrated with commercial high ionic strength buffers. Values of pH reported are averages of values in 50-ml aliquots of sample with and without mixing, which had no consistent effect on readings.

Trends of pH are plotted for each layer in **Figure 5**. In the absence of intense biological activity, the pH of Waynewood would be about 6.5 with an alkalinity of about 200 ueq/L (**Figure 6**), judging from values in late spring and late autumn. These values portray a relatively softwater lake.

Algal photosynthesis during the summer drove the epilimnial pH much higher, with a slight increasing effect on alkalinity. At the same time, intense microbial activities drove the hypolimnial alkalinity much higher, with a slight increasing effect on pH. Algal photosynthesis drove pH to 8-9, and this is a minimal estimate, since our collections are from about noon--not late afternoon--and were usually stored 24 hr before analysis. True pH

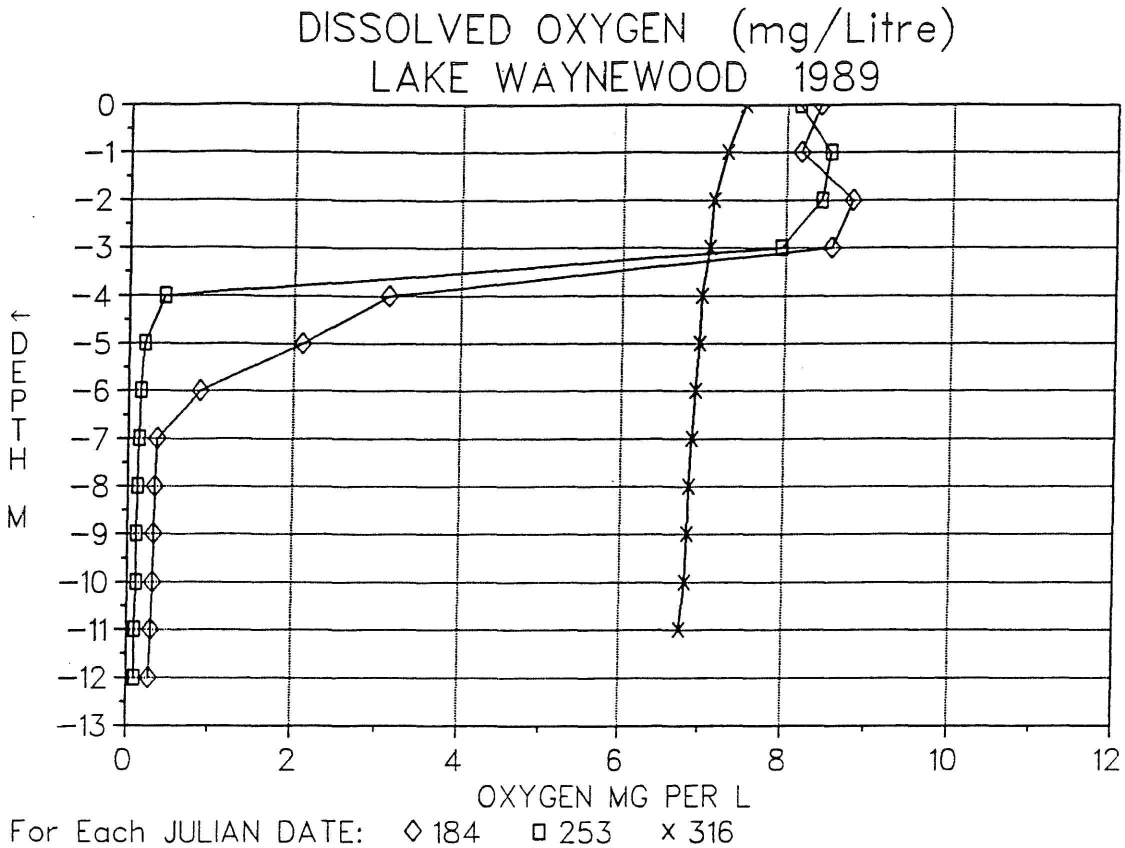


Figure 4. Dissolved oxygen in Lake Waynewood, 1989.

Values are plotted for three dates: **3 July** (day 184), **10 September** (day 253), and **12 November** (day 316). Residual hypolimnetic concentrations <0.4 mg/L on days 184 and 253 are really "0.0".

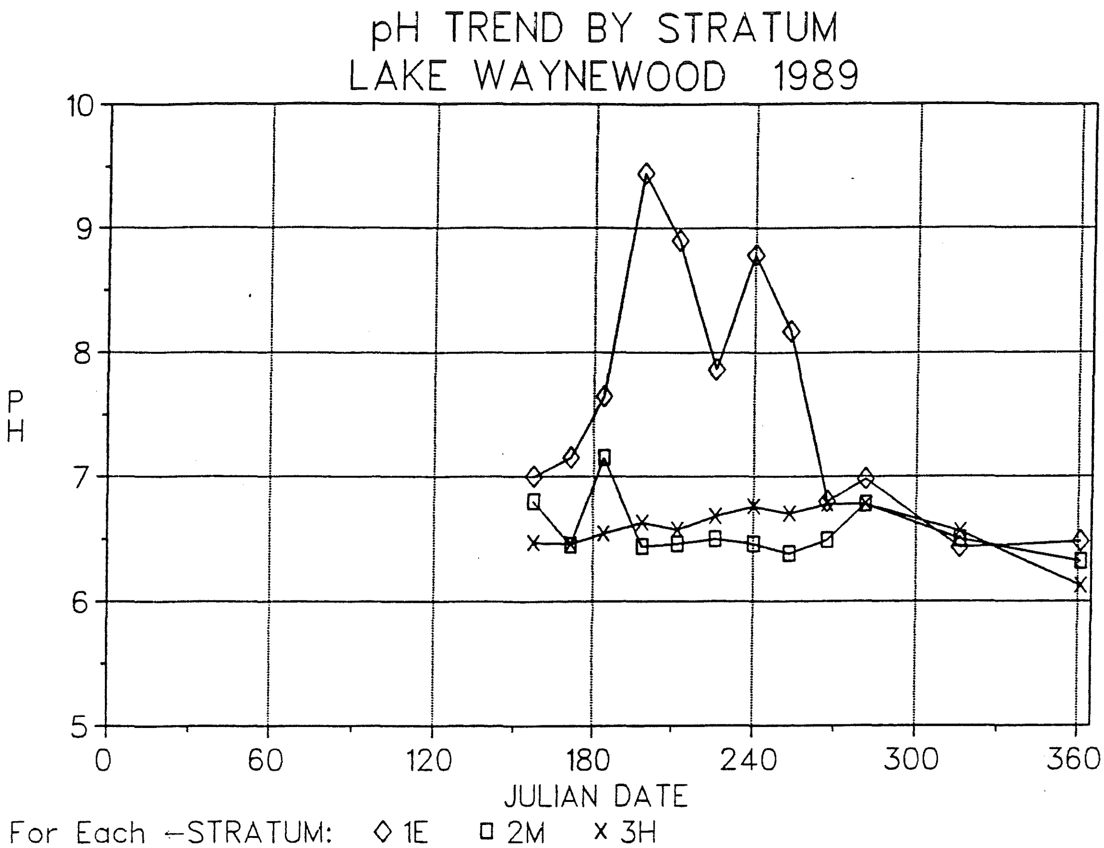


Figure 5. Trends of pH in Lake Waynewood, 1989.

Values are plotted for the mid-depths of the three layers, Epilimnion (**1E**), Metalimnion (**2M**), and Hypolimnion (**3H**). In autumn and winter, when these layers are not developed, samples are collected as described in **RESULTS AND METHODS**.

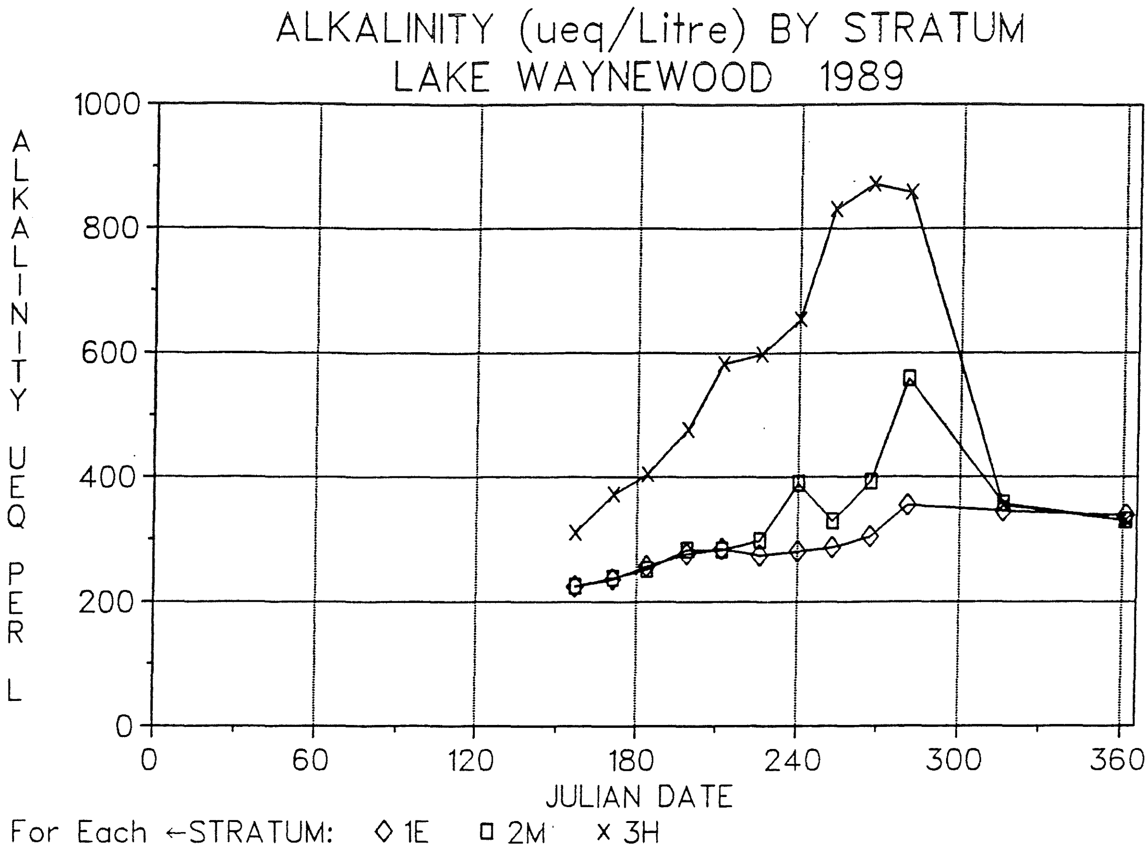


Figure 6. Trends of Alkalinity in Lake Waynewood, 1989.

Values are plotted for the mid-depths of the three layers, Epilimnion (**1E**), Metalimnion (**2M**), and Hypolimnion (**3H**). In autumn and winter, when these layers are not developed, samples are collected as described in **RESULTS AND METHODS.**

values in the lake in late afternoon probably reached 10, a level that stresses some aquatic organisms. Microbial metabolism generated substantial alkalinity in the anoxic hypolimnion (**Figure 6**), but this was lost upon reoxidation of the water column during fall turnover.

ALGAL CHLOROPHYLL-a

Chlorophyll-a is a measure of algal mass, since all algae contain this pigment. It is a widely used parameter for comparisons of lake trophic conditions.

Chlorophyll samples came from the same Van Dorn collections used for alkalinity. Samples were stored in 1-L polyethylene bottles for 2-24 hr (refrigerated in darkness) before being filtered (Gelman™ A/E filters) and frozen. Filters were ground in 90% basic acetone, extracted overnight at 2 °C in darkness, then centrifuged and read in a Sequoia-Turner™ model 112 fluorometer equipped with F4TB/B lamp, red-sensitive photomultiplier, 5-60 excitation filter and 2-64 emission filter. The meter was calibrated with dilutions of pure chlorophyll-a or chlorophyll-a,b extracts from higher plants; these were assayed first by standard spectrophotometric techniques. Each sample was reread after acidification (to 0.03 N) to allow correction for pheopigments. Two values are presented: Chlorophyll-a corrected for pheopigments (**CHLAC** in data tables and **Figure 7**) and Chlorophyll-a including pheopigments (**CHLASUM** in data tables).

Chlorophyll trends in Lake Waynewood (**Figure 7**) reveal the high summer levels characteristic of a moderately eutrophic lake (10-30 μg/L in the epilimnion and the metalimnion). Levels crashed during fall turnover, when algae spent much time circulating in deeper, dark waters.

ALGAE

Although algal samples were taken from the same Van Dorn collections used for alkalinity, and preserved with acid Lugol's solution (at ca. 2%), they have not been analyzed. Selected epilimnial samples were mounted on slides and examined to determine what algae played the largest role in the high summer chlorophyll levels.

Bluegreen algae (or "cyanobacteria") dominated the summer chlorophyll peak. These became abundant by the end of June. *Anabaena solitaria* was initially dominant, but through July and August the dominant was *Aphanizomenon flos-aquae* f. *gracile*. A third species, *Gomphosphaeria nageliana*, became codominant in the autumn. These are well known species of eutrophic lakes. *Anabaena* and *Aphanizomenon* are algal types that sometimes occur as strains toxic to invertebrates or vertebrates, including humans.

A key characteristic of these three dominant bluegreens is that they can regulate their buoyancy. If light conditions deteriorate too far in the epilimnion of a lake, they may aggregate near the surface, at least in calm weather. In Lake Waynewood they were unevenly distributed within the epilimnion and upper metalimnion (see irregular spikes in Chlorophyll-a levels in **Figure 7**), but did not accumulate massively at the surface. These algae occur as large colonies, which may inhibit grazing by zooplankton. Dominance of these algae may reflect their resistance to grazing, as well as the nutrient-rich conditions they require.

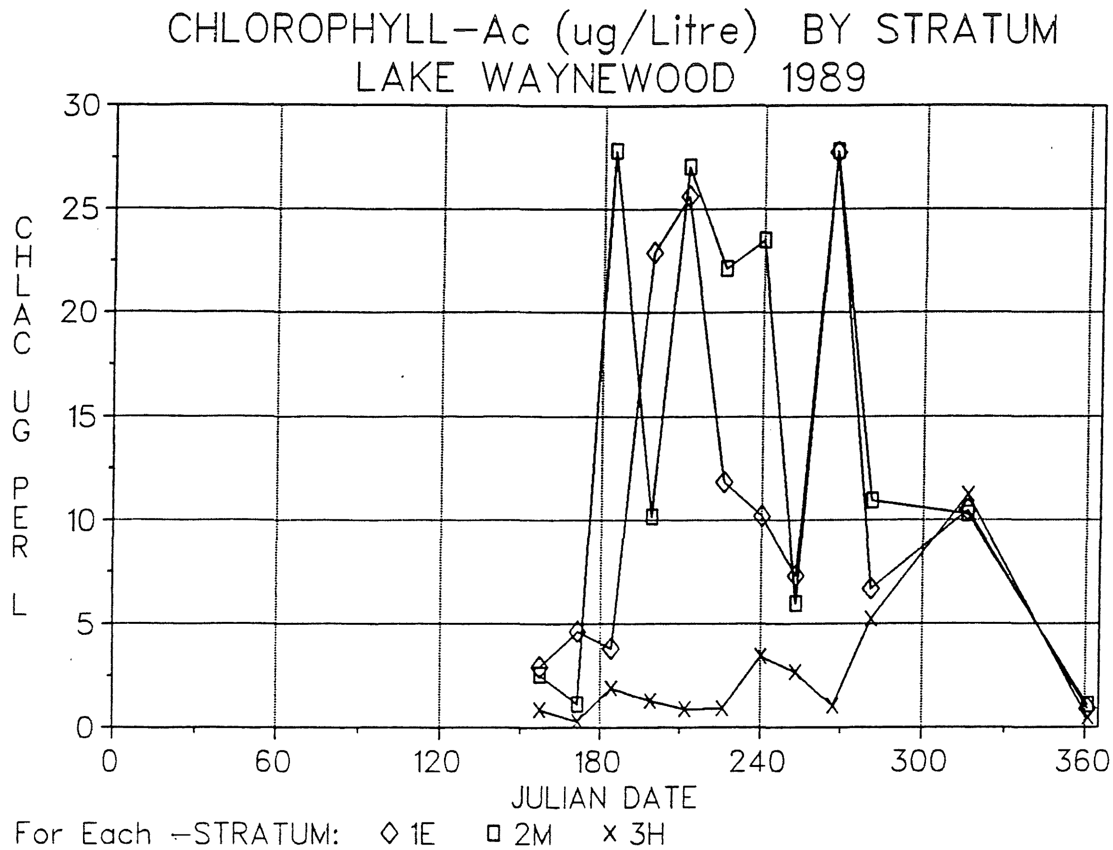


Figure 7. Trends of Chlorophyll-a in Lake Waynewood, 1989.

Values are plotted for the mid-depths of the three layers, Epilimnion (**1E**), Metalimnion (**2M**), and Hypolimnion (**3H**). In autumn and winter, when these layers are not developed, samples are collected as described in **RESULTS AND METHODS**. Chlorophyll-a values are corrected for pheopigments.

ZOOPLANKTON

Zooplankton receive a major emphasis in the PCLP program. These animals represent the key link between algal primary producers and fish populations. The intensity of grazing by herbivorous zooplankton strongly affects the kind of algae that dominate, and potentially can control (i.e. reduce) algal populations even in the face of abundant nutrient supply. Consequently the kinds and abundances of zooplankton have important implications for the perceived recreational quality of a lake.

Zooplankton were sampled at day and night, but only the nighttime data are presented here. Some species avoid the water column during the day. Zooplankton were collected with closing-style plankton nets that could be pulled through part of the water column open, collecting animals, then closed and pulled the rest of the way to the surface. In this way the water column was sampled as the three layers defined by temperature. In the present report, data are calculated as mean concentrations (numbers of individuals per liter) over the entire 12.5-m water column. Details of the depth-distributions, and daily patterns of vertical movement, are still being analyzed.

Two sizes of nets were used: a 30-cm diameter net with a mesh of 202 μm, for macrozooplankton; and a 15-cm diameter Wisconsin-style net with a 48-μm mesh for microzooplankton. These were mounted side-by-side in "bongo" configuration. Microzooplankton includes mainly rotifers, but small copepods also were counted from these samples. Collections were duplicated from each depth. Mean values are presented.

Seasonal trends in abundance are presented as a series of graphs for all of the frequently encountered zooplankton, identified to genus and sometimes to species **(Figures 8-27)**. Several points can be highlighted:

(1) Although rotifers (included in "microzooplankton") were numerically abundant, by mass the larger "macrozooplankton" predominated, especially the cladoceran *Daphnia* (in summer mainly *D. pulicaria*). In summer *Daphnia* occurred in both the epilimnion and metalimnion, but avoided the anoxic hypolimnion. In the upper layers *Daphnia* concentrations must have averaged ca. 15/L, twice the whole-water column mean.

(2) The various rotifers displayed pronounced seasonalities, which differed among species. There were also pronounced differences in distribution among the three layers. Densities were quite high: 500-1000/L in summer, which imply densities of twice this in the upper water layers where they mainly occurred.

(3) In general hard-bodied rotifers (e.g. *Keratella*) or those with swift escape reactions (e.g. *Polyarthra*) were most common, perhaps implying heavy predation pressure. Two potential predators were quite common: the large dipteran *Chaoborus* in summer (up to 0.5/L), and the cyclopoid copepod *Tropocyclops* in autumn (10-20/L). Rotifer densities were conspicuously lower after the cyclopoid became abundant.

(4) Calanoid copepods were represented by *Diaptomus oregonensis* (typically 2-4/L), but these clearly played a subordinate role in the plankton community.

(5) Populations of most zooplankton had decreased to low levels by late December, when the lake was frozen over. Chlorophyll-a similarly was sharply reduced, suggesting that light limitations may have induced a general food shortage for herbivores. The predator *Tropocyclops* maintained its autumn abundance, however.

DISCUSSION

The eutrophic character of Lake Waynewood is evident in several characteristics of the lake during the summer:

(1) the **high epilimnial chlorophyll levels** (10-30 ug/L);

(2) **dominance of colonial bluegreen algae**, especially *Aphanizomenon flos-aquae* in summer and early autumn;

(3) early--by 1 July--and complete **de-oxygenation of the hypolimnion**;

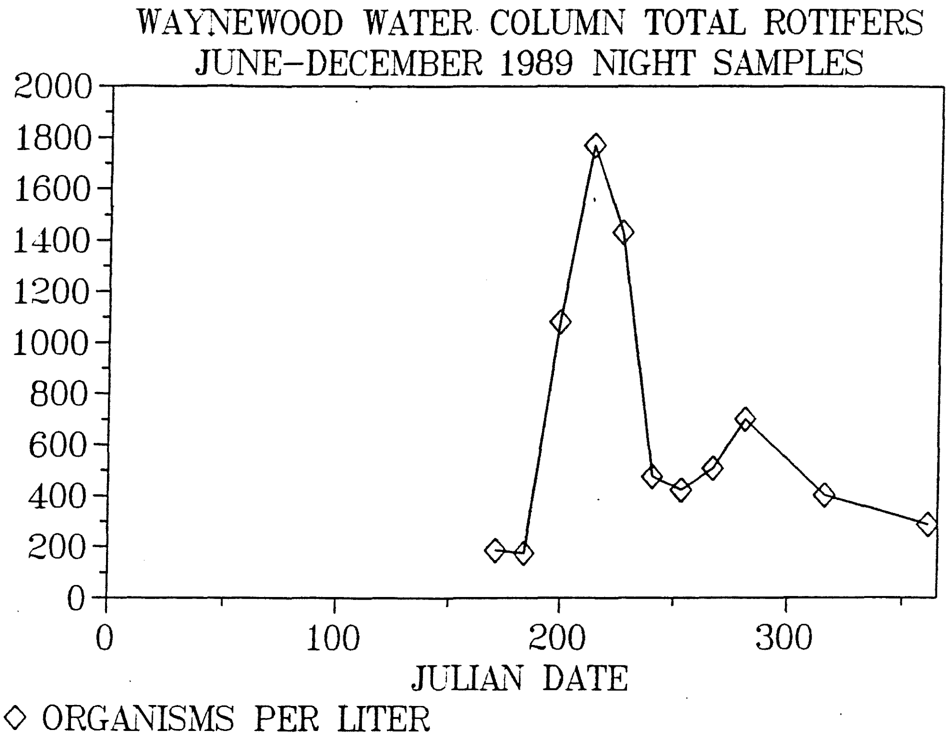
(4) **high pH in the epilimnion** (probably as high as pH 9-10 in situ).

The chlorophyll levels were those of a moderately, not severely eutrophic lake. There is substantial room for further increase in algae. In 1989, enough light reached the upper metalimnion (0.1-1 % of surface light) to permit algal growth there. Light and/or carbon dioxide were not so strongly limiting within the epilimnion to induce surficial accumulation or "blooms" of algae, as occur during calm weather in more strongly eutrophic lakes.

Zooplankton were abundant, both macrozooplankton and microzooplankton (i.e. rotifers). The abundance of large Cladocera of the genus *Daphnia* (mostly *D. pulicaria* during the summer) is significant. Evidently predation by fish was not so strong that these large zooplankton were severely reduced or eliminated. In some eutrophic lakes they virtually disappear. The role of fish in Lake Waynewood will be re-examined in the 1990 report.

The largest species of *Daphnia* potentially control even relatively large types of bluegreen algae. Experiments by Robert Moeller (unpublished data) in October 1989, however, demonstrated that the then-dominant cladoceran in Lake Waynewood, *Daphnia laevis*, did not ingest the colonial bluegreens at a significant rate. In contrast, grazing experiments by Donna Mensching and Robert Moeller in July 1990 showed substantial ingestion of *Aphanizomenon* filaments by the larger, then-dominant *Daphnia pulicaria*. The issue of grazing control by the macrozooplankton will be studied more intensively in experiments in 1991.

Further insights into the trophic conditions of Lake Waynewood, and their dependence on nutrient concentrations, will be gained from chemical analyses of samples collected in 1989 and 1990-91. These data will be summarized in the 1991 report.



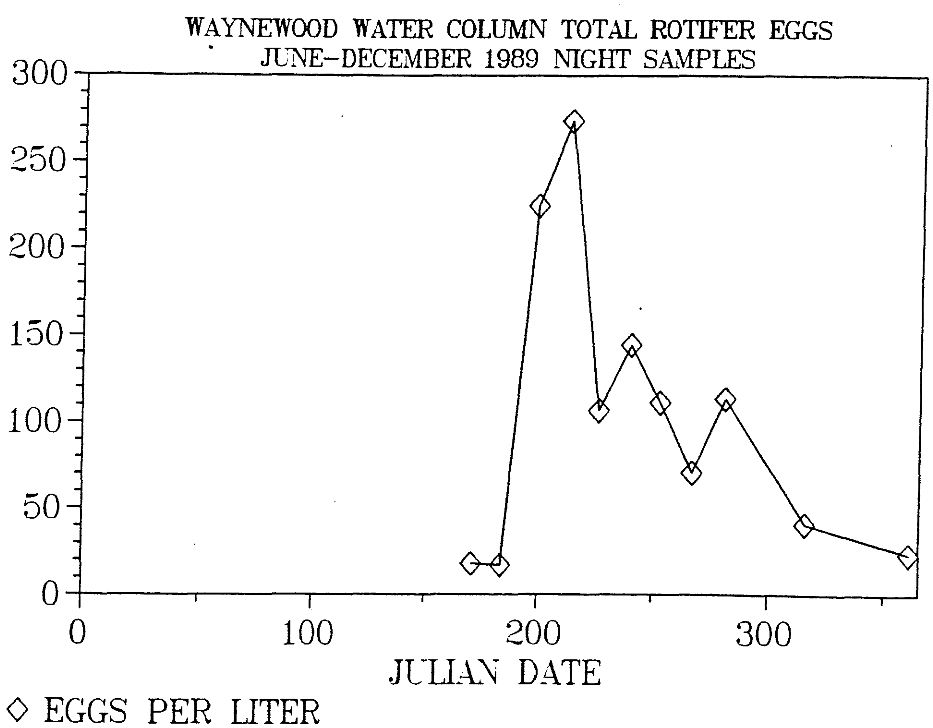


Figure 8. Rotifers in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean. (Top) Total individuals per liter. (Bottom) Rotifer eggs per liter.

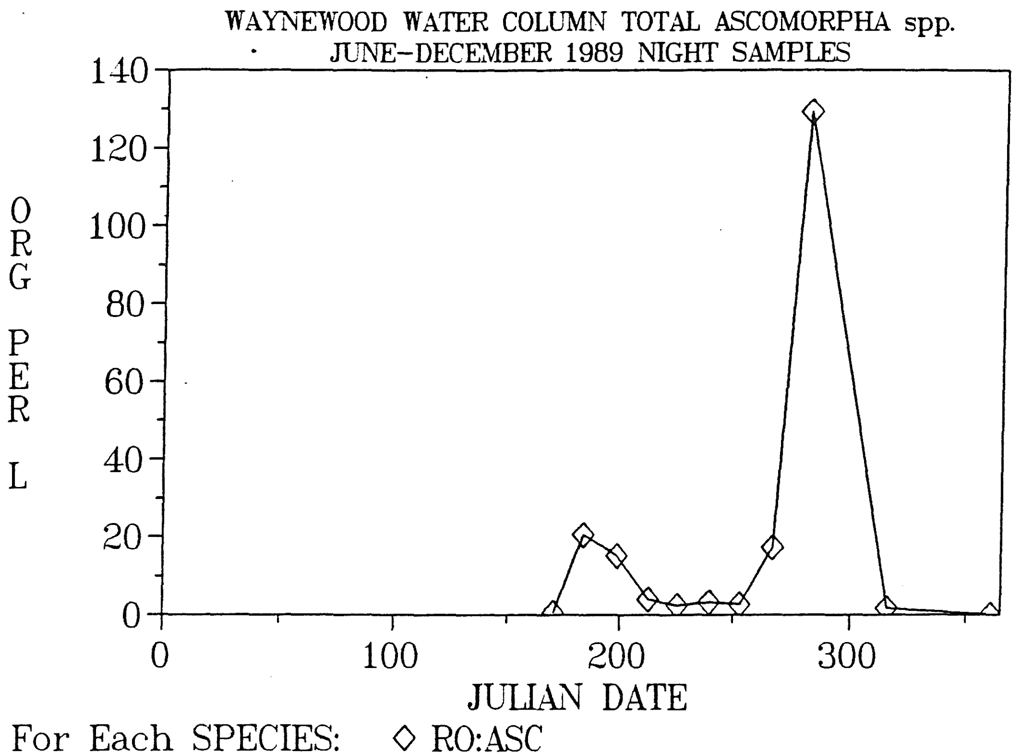


Figure 9. The rotifer *Ascomorpha* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean.

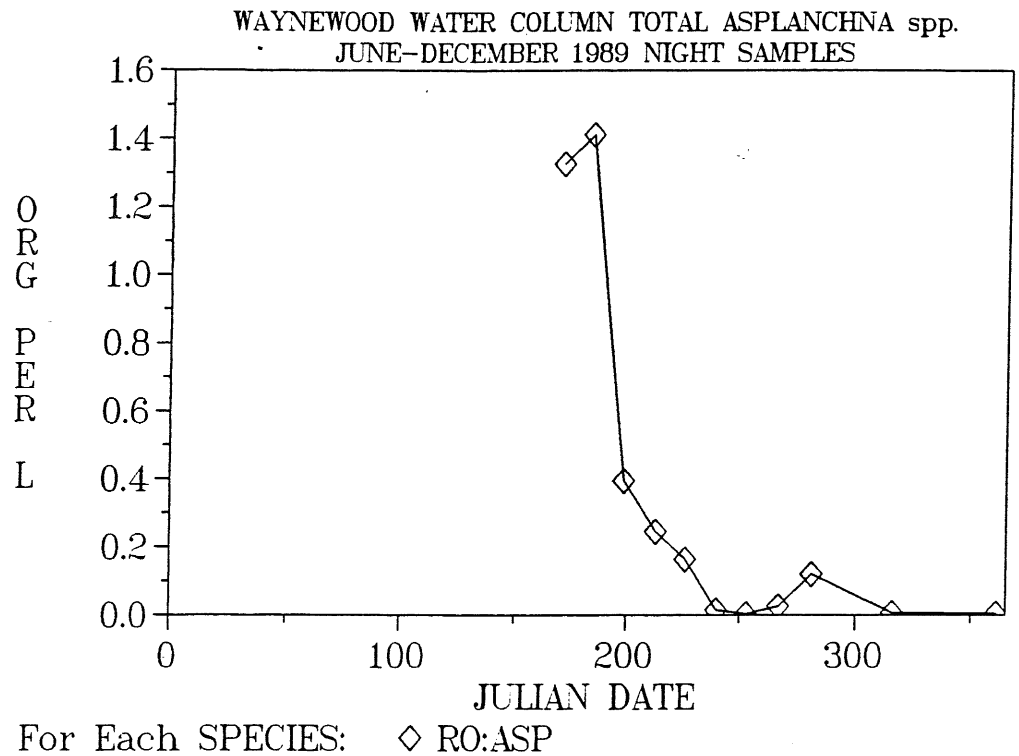


Figure 10. The rotifer *Asplanchna* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean.

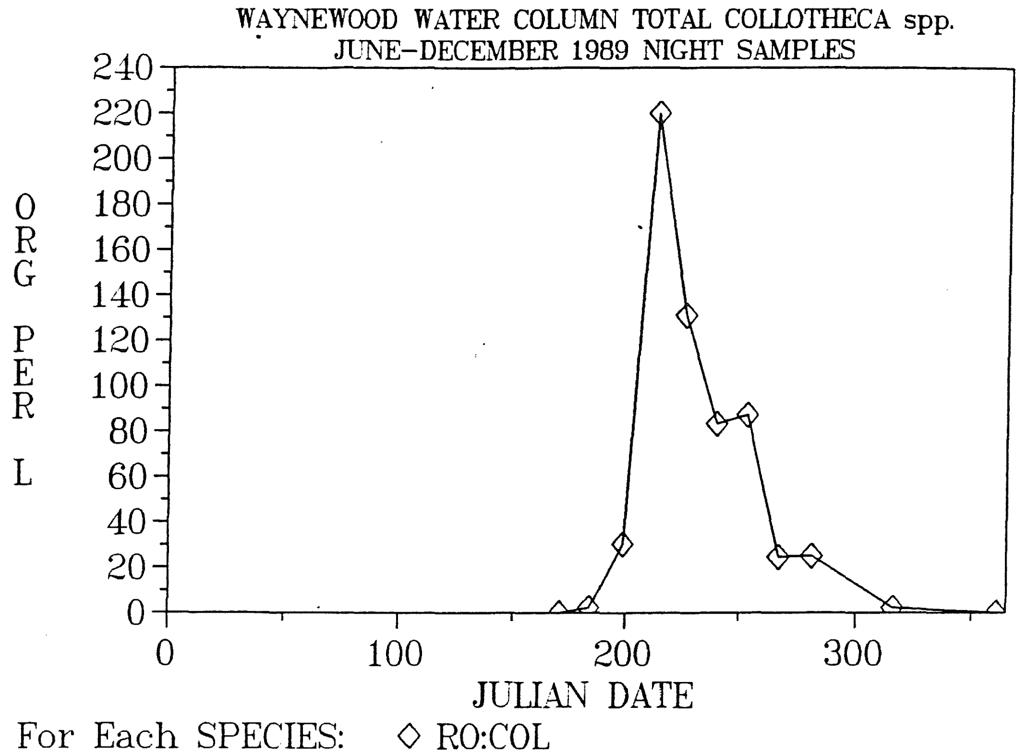


Figure 11. The rotifer *Collotheca* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean.

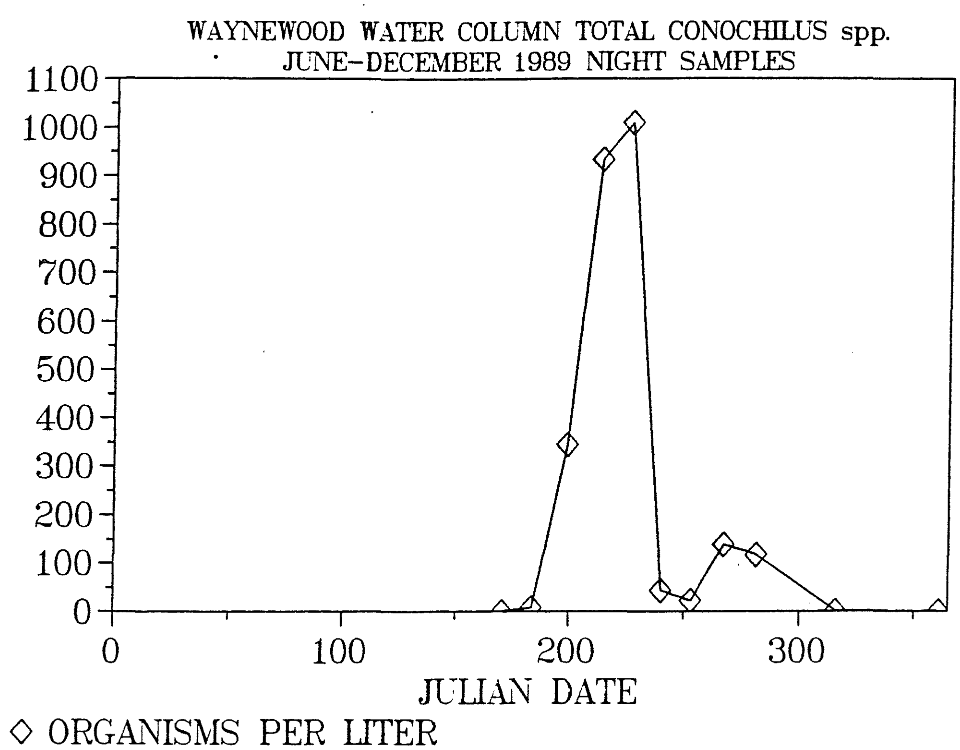


Figure 12. The rotifer *Conochilus* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean.

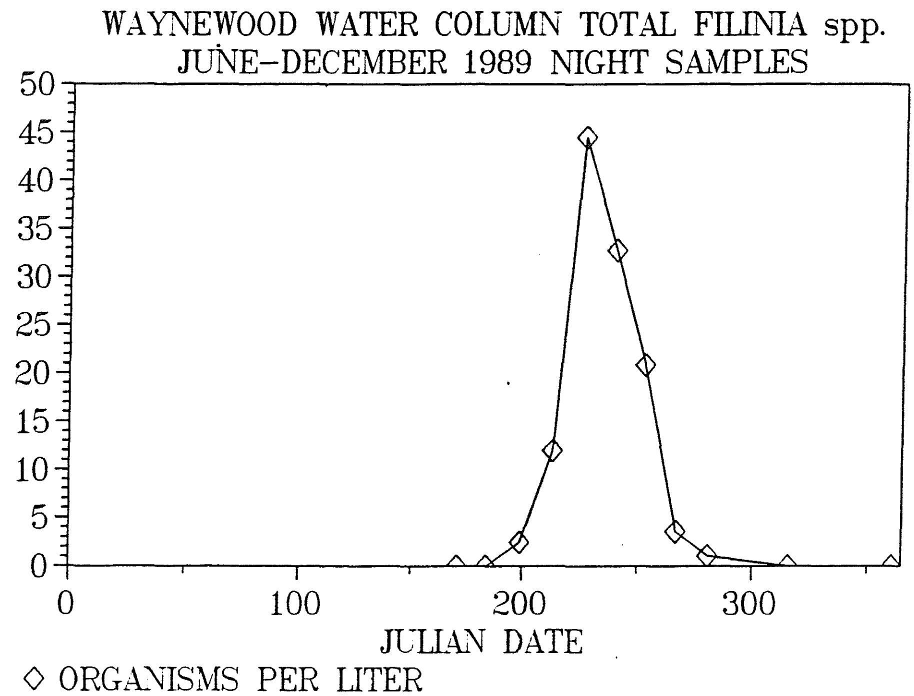


Figure 13. The rotifer *Filinia* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean.

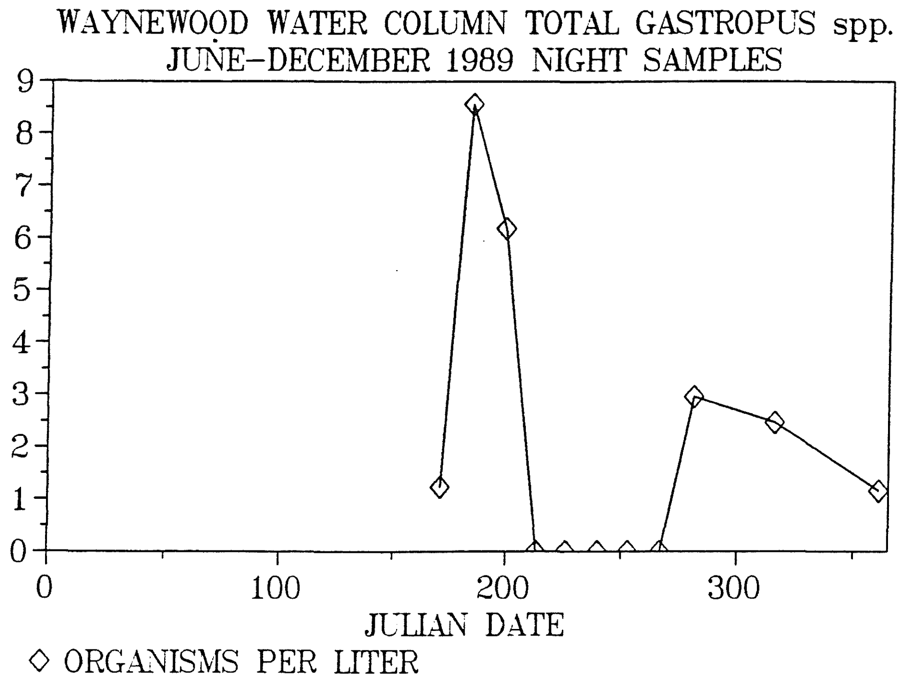
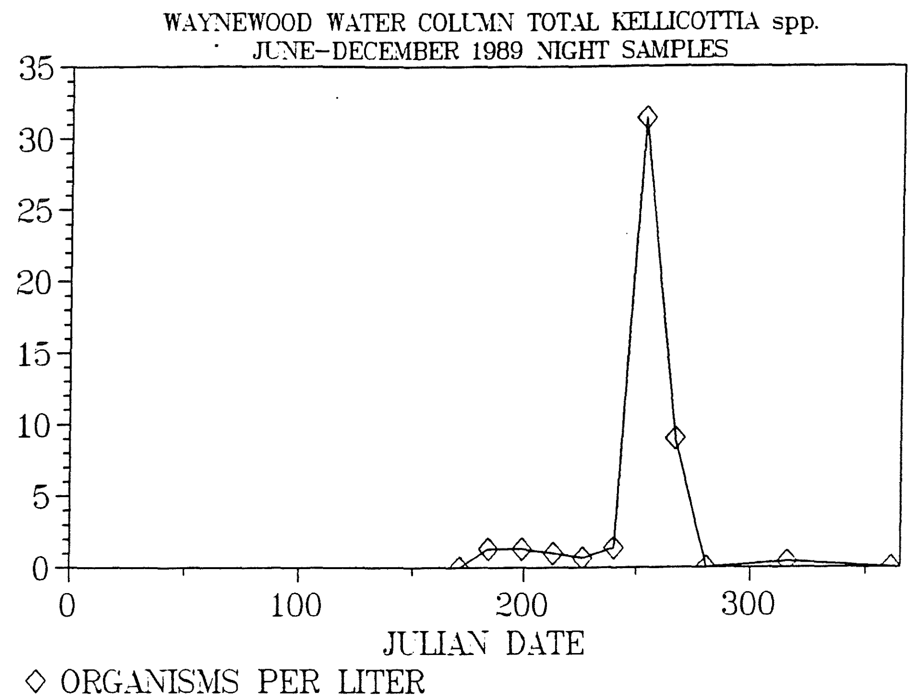


Figure 14. The rotifer *Gastropus* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean.



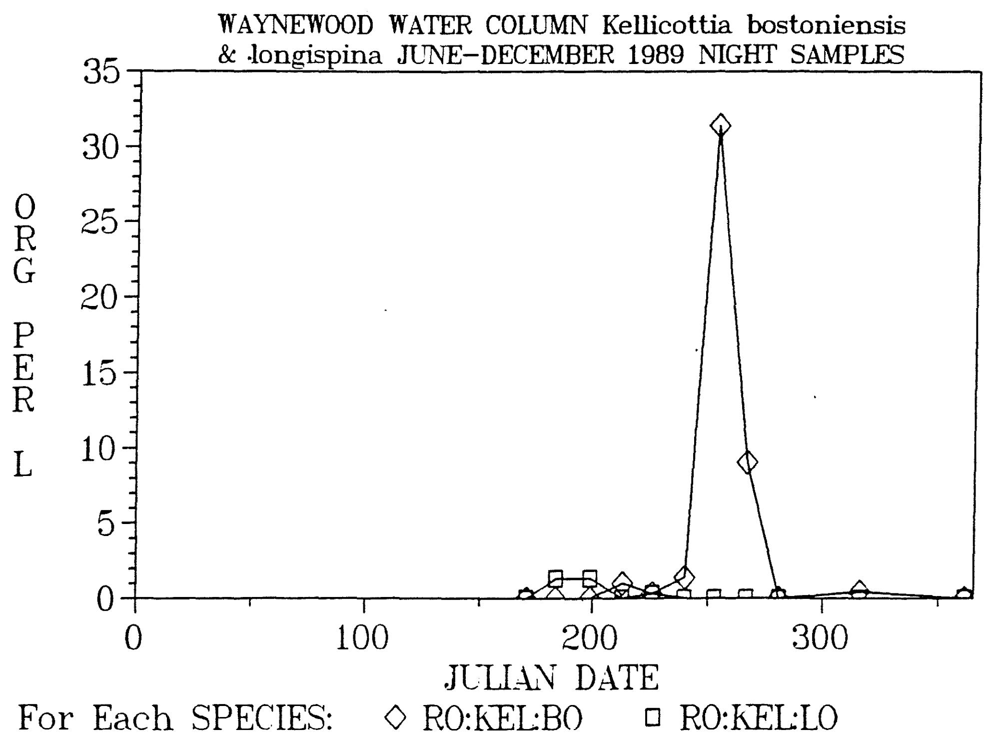
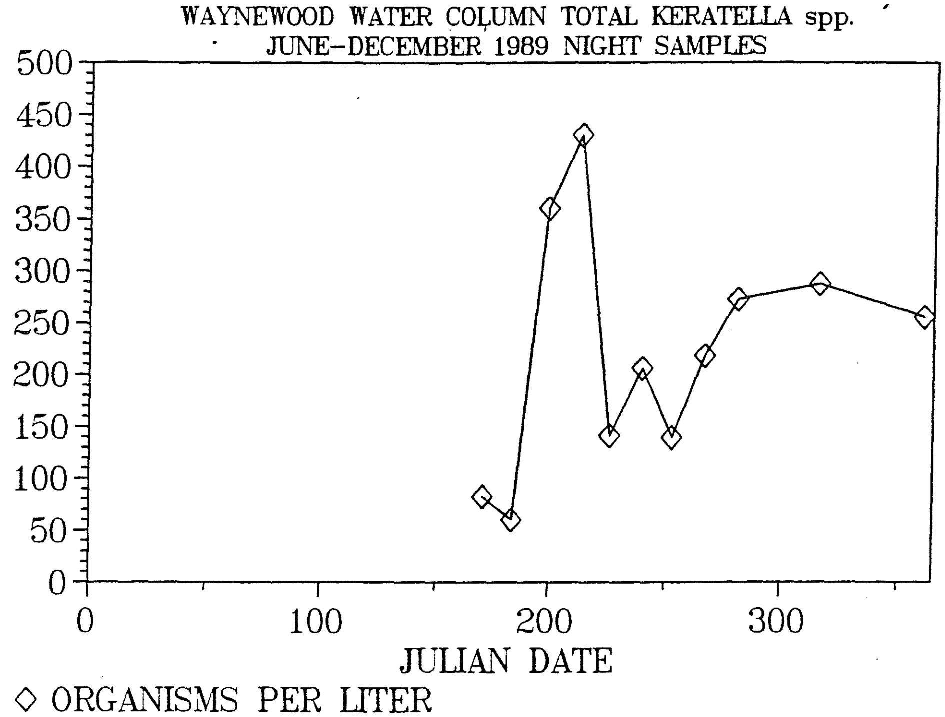


Figure 15. The rotifer *Kellicottia* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean. (Top) Total individuals per liter. (Bottom) *K. bostoniensis* and *K. longispina*.



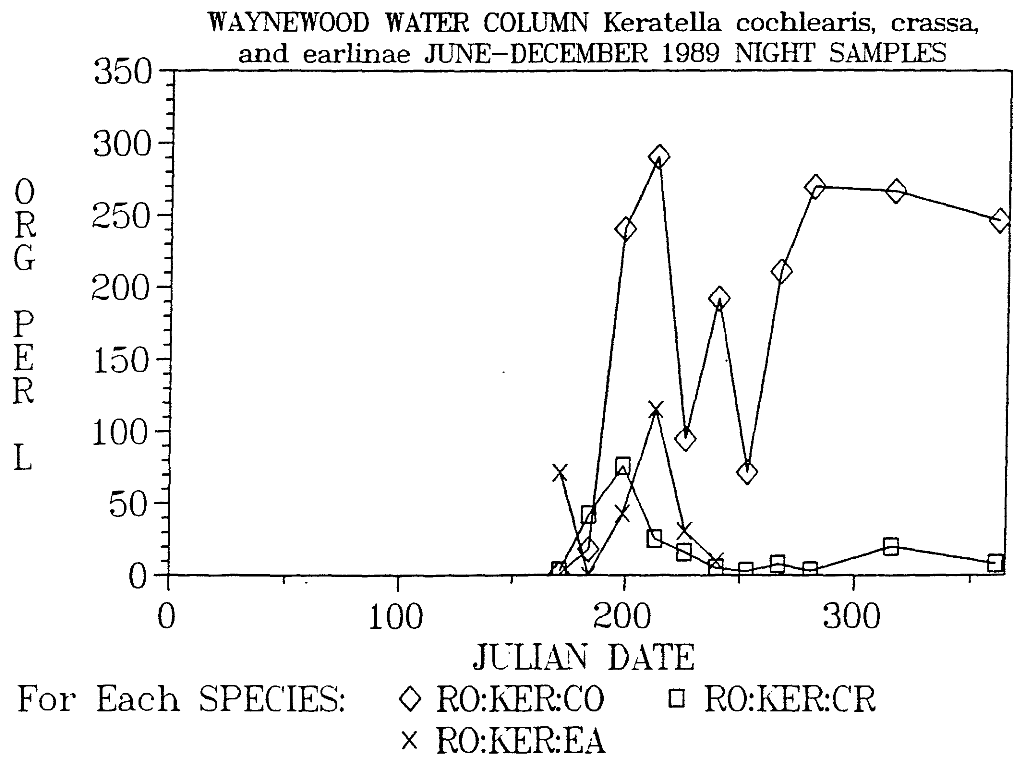
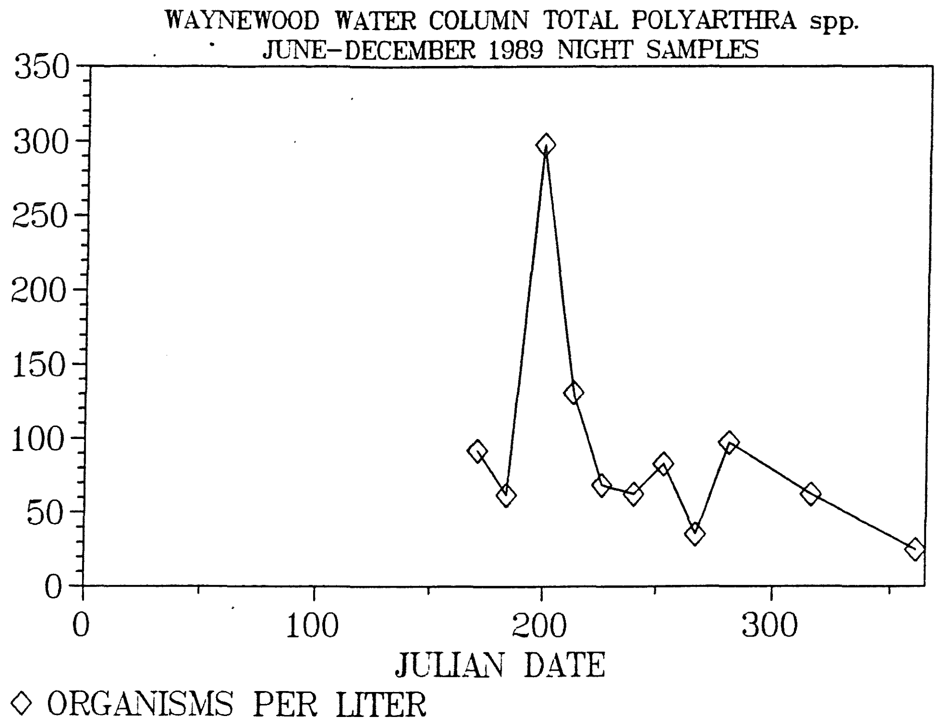


Figure 16. The rotifer *Keratella* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean. (Top) Total individuals per liter. (Bottom) *K. cochlearis, K. crassa, and K. earlinae*.



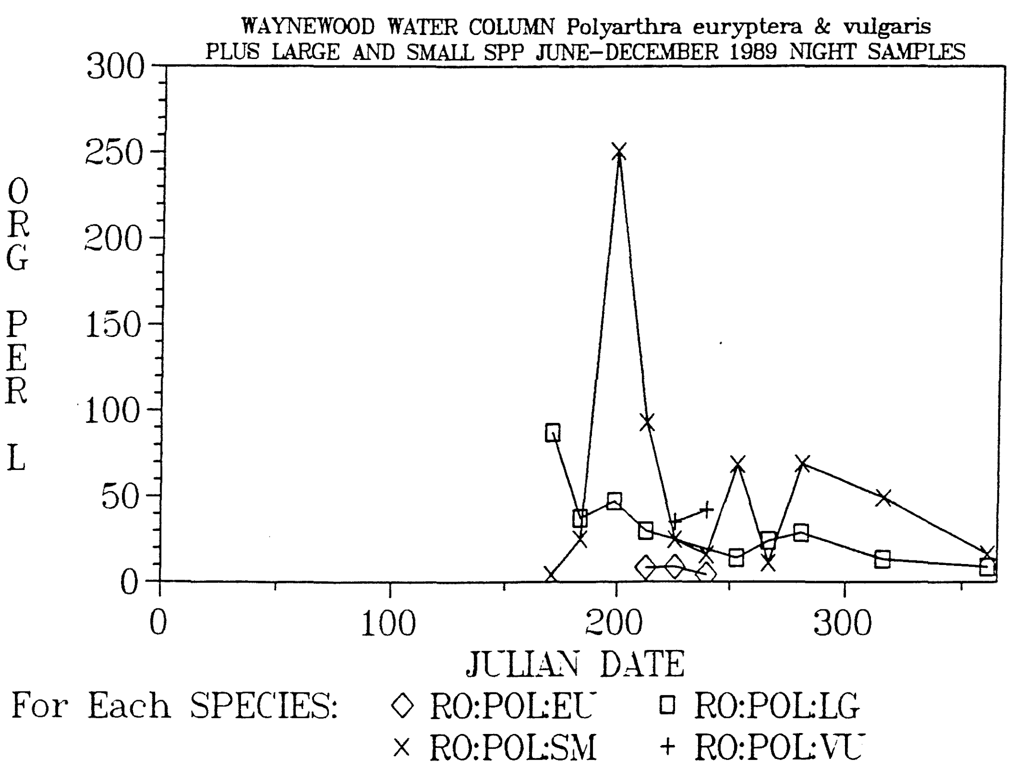


Figure 17. The rotifer *Polyarthra* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean. (Top) Total individuals per liter. (Bottom) *Polyarthra* by size classes; two species were separated out on 2-3 dates only.

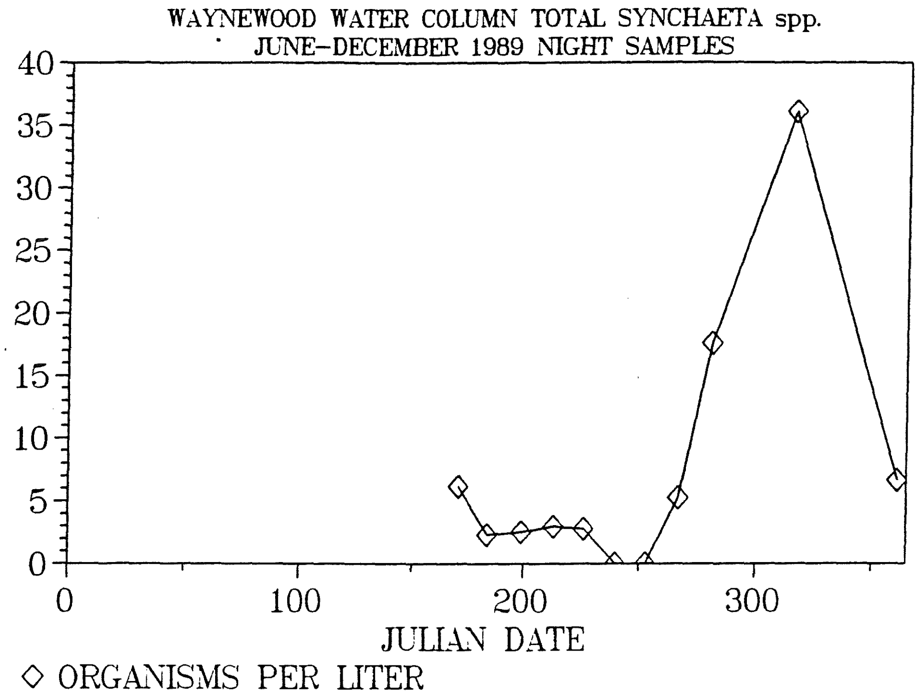
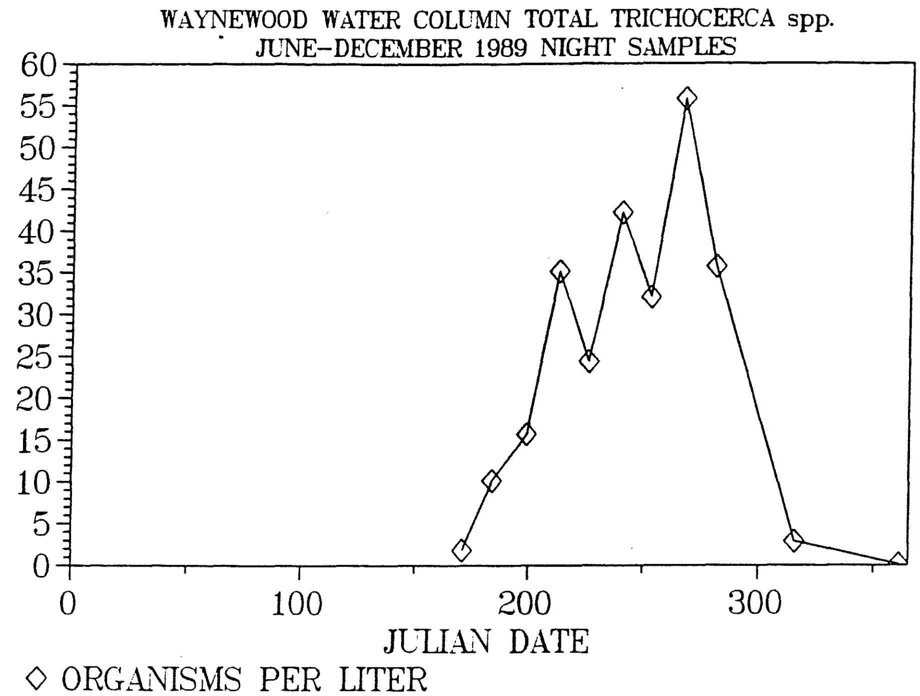


Figure 18. The rotifer *Synchaeta* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean.



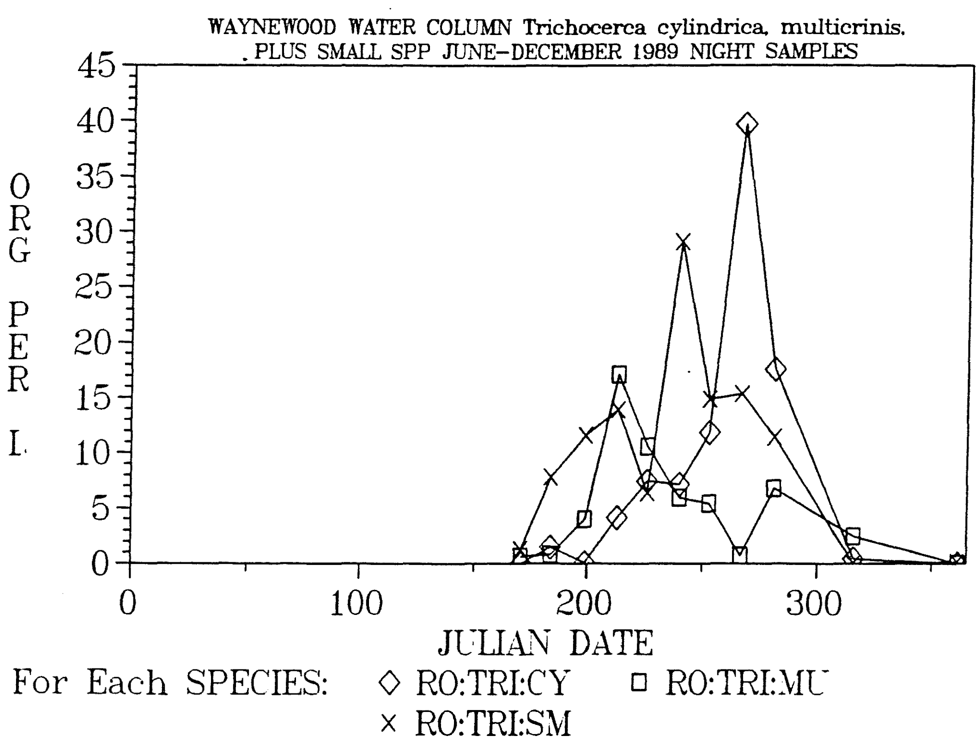
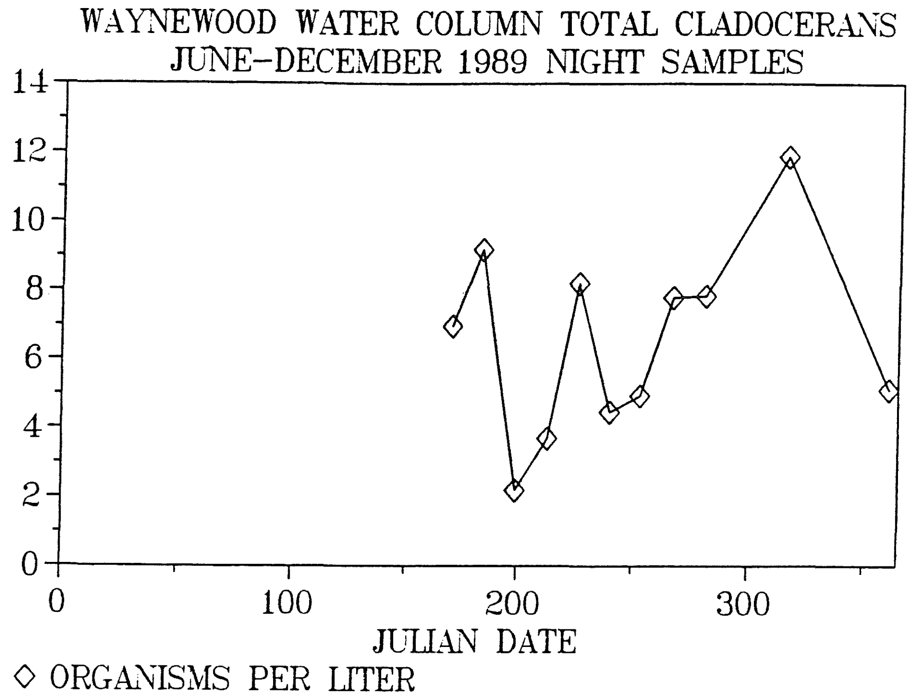


Figure 19. The rotifer *Trichocerca* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean. (Top) Total individuals per liter. (Bottom) *T. cylindrica*, *T. multicrinus*, and small spp.



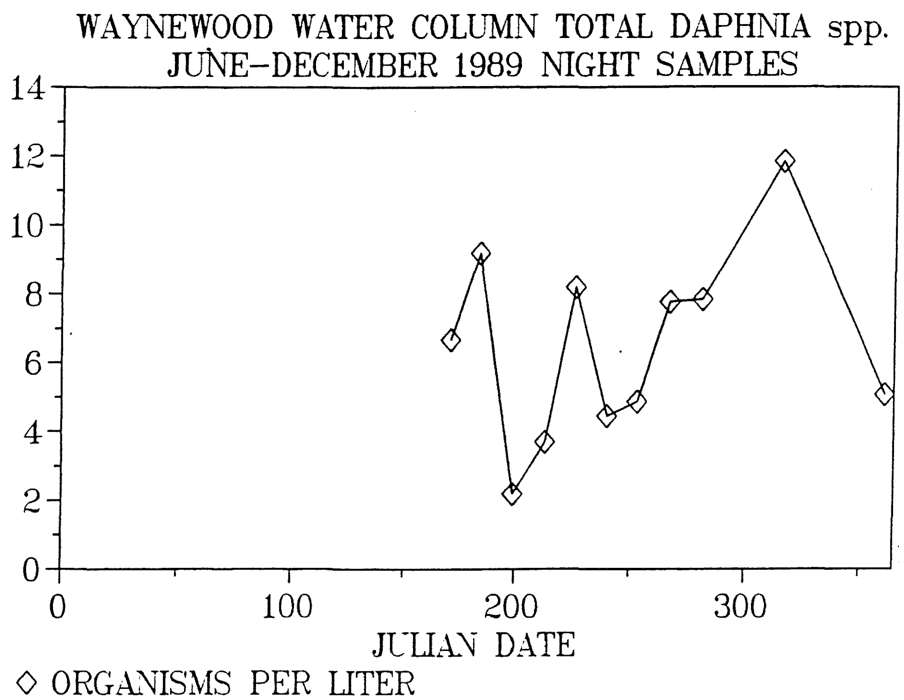


Figure 20. Cladocera in Lake Waynewood, 1989.

Nighttime net collections (202μm) from three depths have been combined to give a water column mean. (Top) Total individuals per liter. (Bottom) *Daphnia* spp.

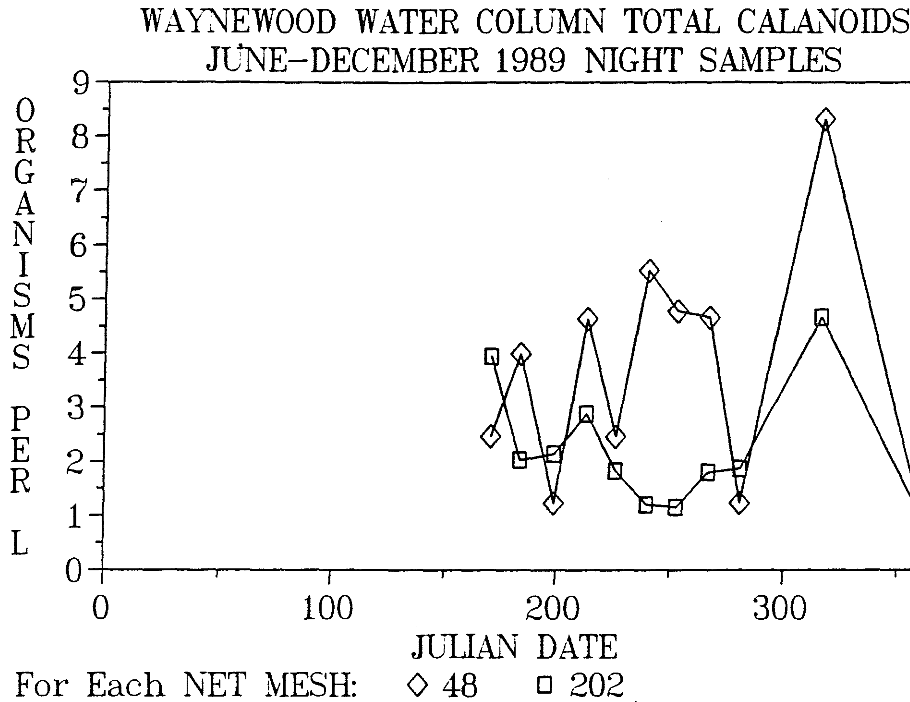
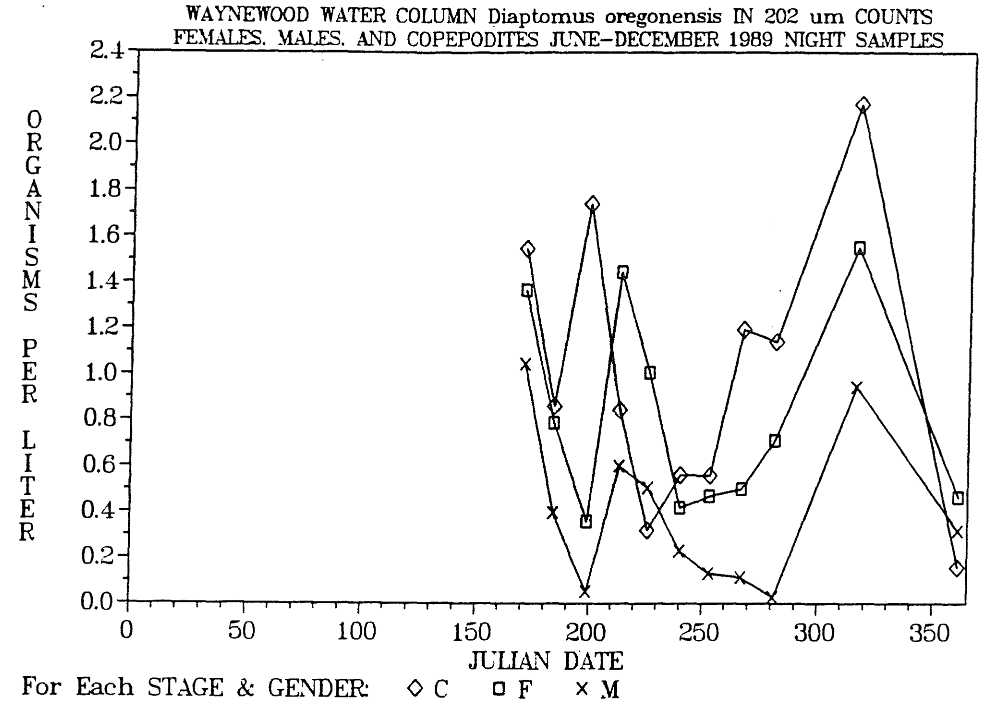


Figure 21. Calanoid copepods in Lake Waynewood, 1989.

Nighttime net collections from three depths have been combined to give a water column mean. The 48μm mesh net collects copepodites effectively, which the 202μm net does not. *Diaptomus oregonensis* was the only calanoid present.



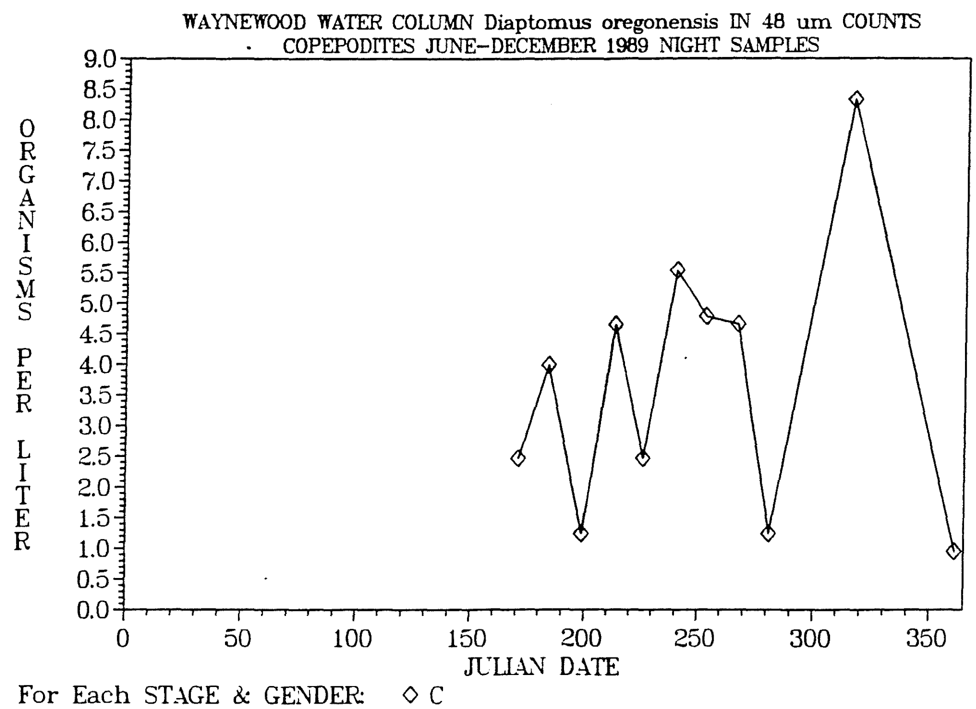


Figure 22. The calanoid copepod *Diaptomus oregonensis* in Lake Waynewood, 1989.

Nighttime net collections from three depths have been combined to give a water column mean. (Top) Adults (males and females separately) and some copepodites from the 202μm net. (Bottom) Total copepodites from the 48μm net.

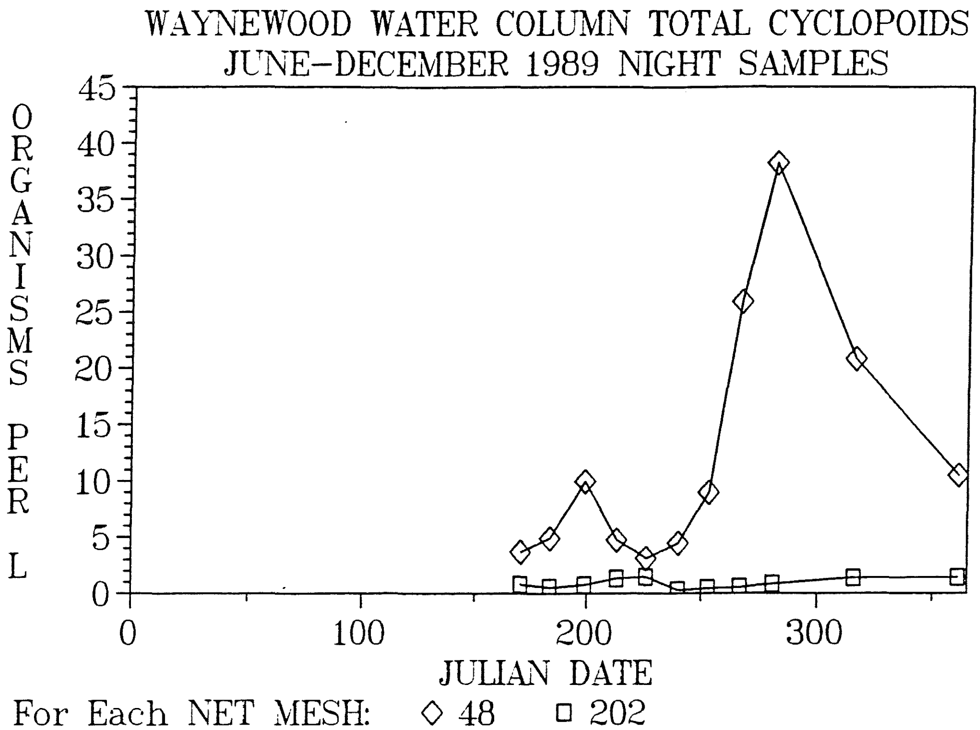
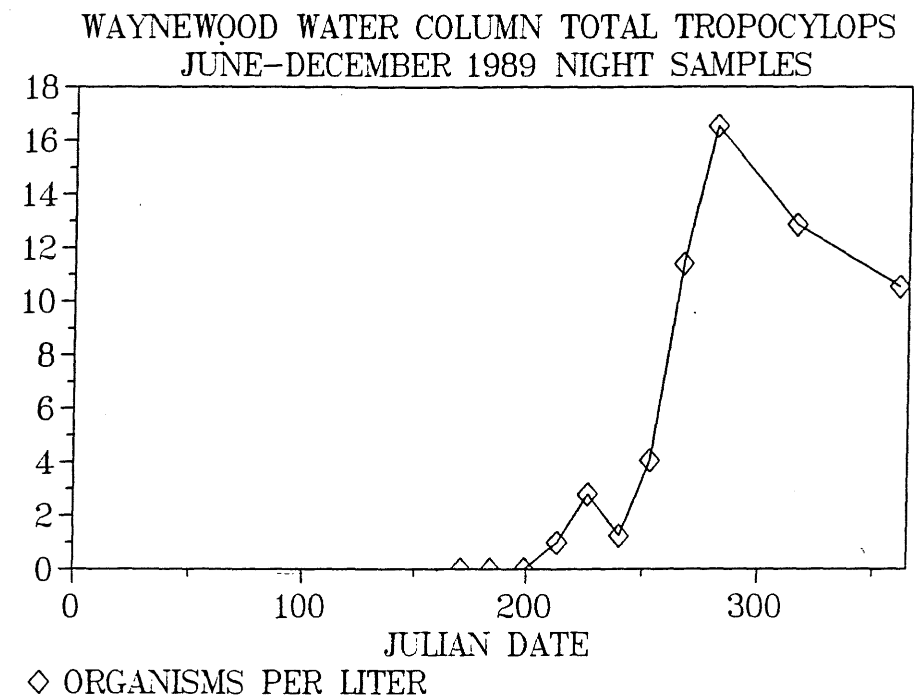


Figure 23. Cyclopoid copepods in Lake Waynewood, 1989.

Nighttime net collections from three depths have been combined to give a water column mean. The 48μm net collects *Tropocyclops* and copepodites at a higher efficiency than the 202μm net.



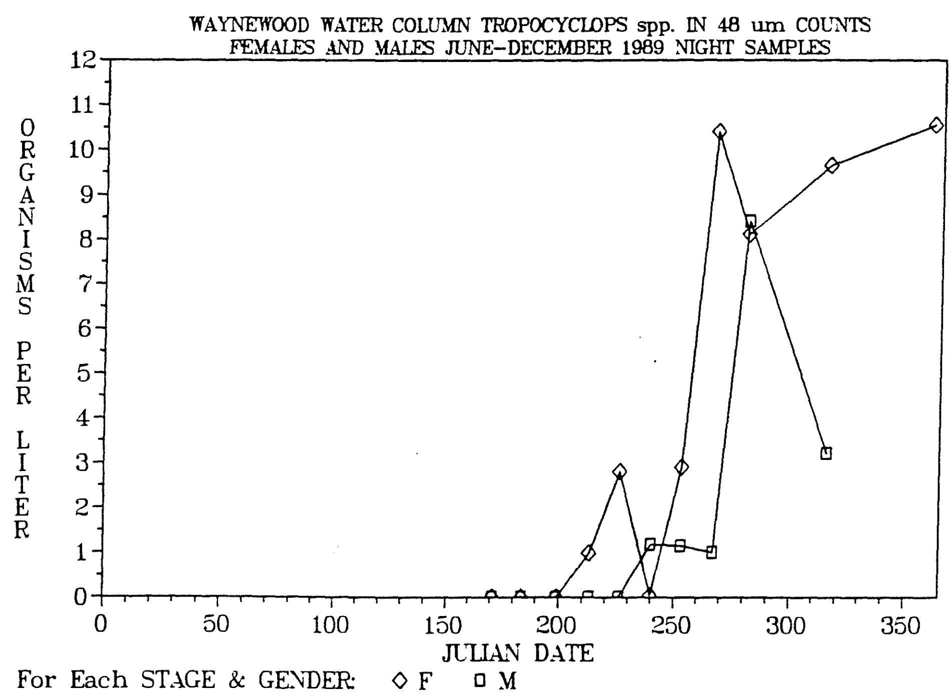
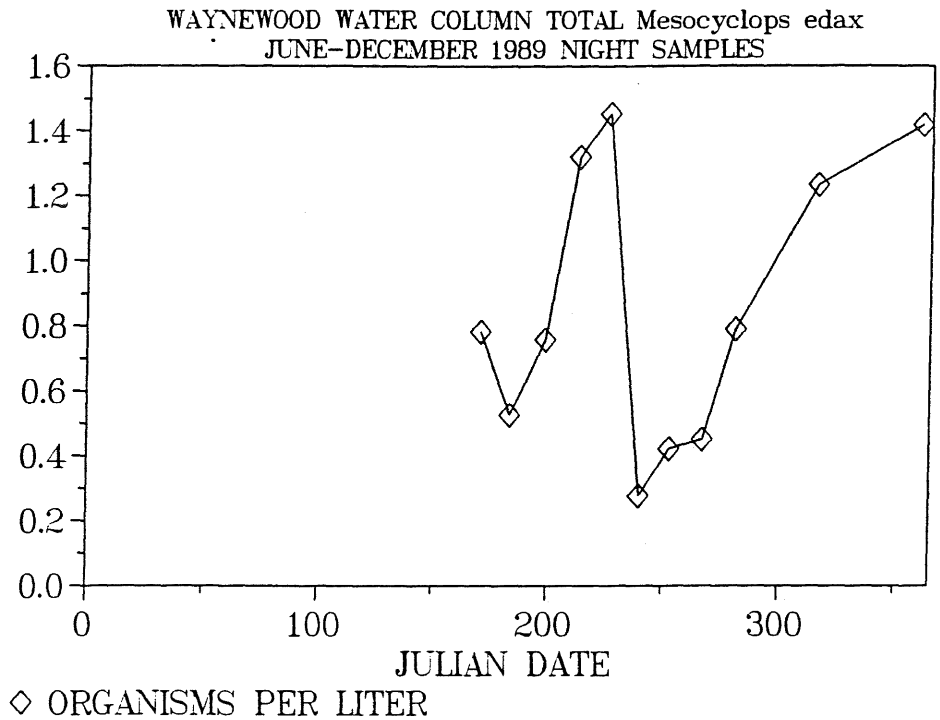


Figure 24. The cyclopoid copepod *Tropocyclops* spp. in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean. (Top) Total adults per liter. (Bottom) Males and females separately.



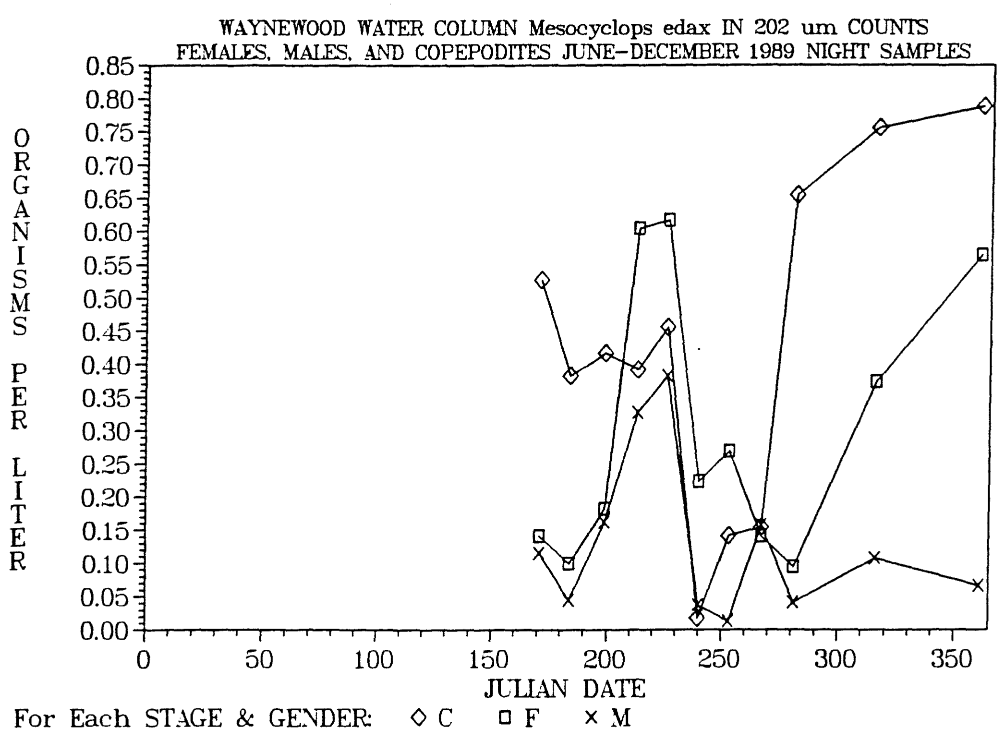


Figure 25. The cyclopoid copepod *Mesocyclops edax* in Lake Waynewood, 1989.

Nighttime net collections (202μm) from three depths have been combined to give a water column mean. (Top) Total individuals per liter. (Bottom) Separated into adults (males and females separately) and copepodites.

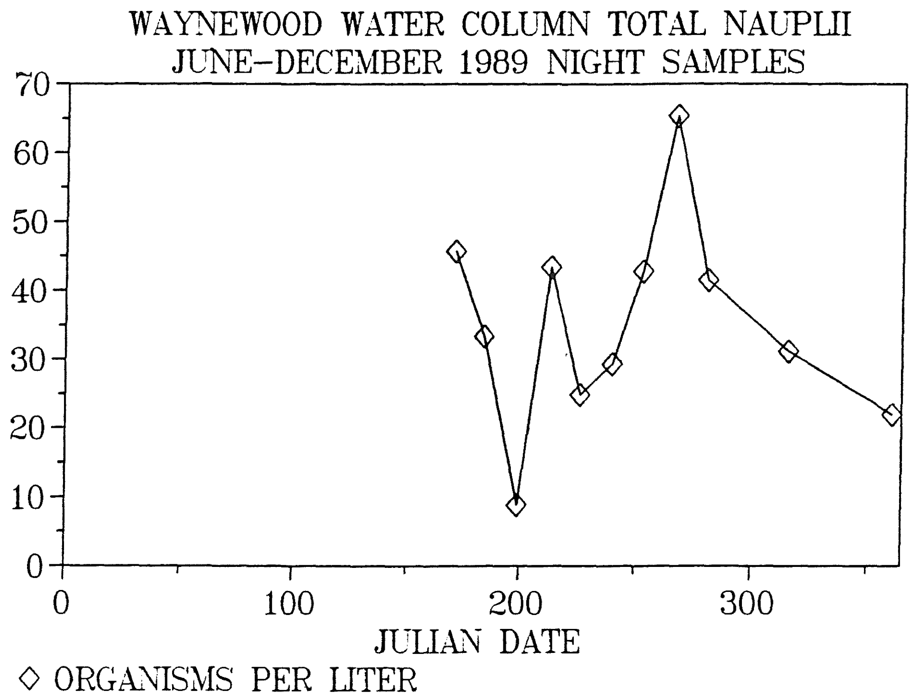


Figure 26. Copepod nauplii in Lake Waynewood, 1989.

Nighttime net collections (48μm) from three depths have been combined to give a water column mean. Nauplii of calanoid and cyclopoid species were not differentiated.

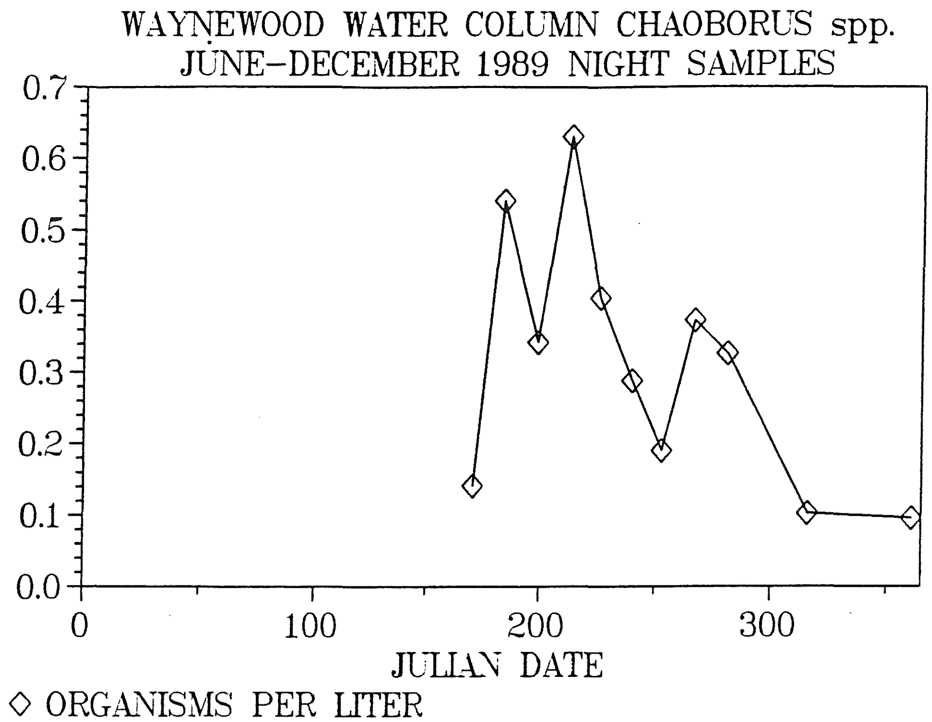


Figure 27. The dipteran *Chaoborus* spp. in Lake Waynewood, 1989.

Nighttime net collections (202μm) from three depths have been combined to give a water column mean.

EXPLANATION OF DATA TABLES

The following 12 tables present the physical/chemical information acquired on each date in 1989. The headings, abbreviations, and analytical units are explained here.

DATE OF SAMPLE: Date of the daytime visit, as month/day/year.

JULIAN DATE: Day of the year, from 1-365.

TIME: Approximate mid-time of sampling, 24-hr clock in decimal format (e.g. 1:30 PM is "13.50").

SECCHI M: Secchi depth in meters (m).

WEATHER: Brief comments on weather, especially cloudiness.

PERSONNEL: Initials of sampling crew (see names below).

TMETHOD: Temperature method #10 (see **METHODS AND RESULTS**).

LMETHOD: Light methods (#10,11,12: see **METHODS AND RESULTS**).

AMETHOD: Alkalinity method #11 (see **METHODS AND RESULTS**).

OMETHOD: Oxygen method #10 (see **METHODS AND RESULTS**).

PHMETHOD: pH method #10 (see **METHODS AND RESULTS**).

CAMETHOD: Chlorophyll-a method (see **METHODS AND RESULTS**).

COMMENTS: Notes on unusual procedures, also ice thickness.

DATE OF: Date of sample (month/day/year).

JULIAN: Julian date.

STRA: Stratum or layer: **S** (air above surface), **E** (epilimnion), **M**(metalimnion), **H** (hypolimnion).

REP: Replicate (1 or 2); Replicates were usually analyzed for pH, alkalinity--other data are merely repeated on rep 2 line for convenience in graphing.

DEPTH: Depth of sample (meters); **-1** for air above surface.

TEMP C:	Temperature in degrees Celsius (°C).
OXYGEN:	Dissolved oxygen (mg per liter).
OFLAG:	Error flag for oxygen; "**4**" means reported value should be interpreted as a true "zero".
LIGHT PC:	Light as percent of intensity at 0.1-m depth; values of "**0.000**" mean light was too low to measure.
pH:	pH.
ALKAL:	Alkalinity as microequivalents per liter (μeq/L).
CHLAC:	Chlorophyll-a, corrected for pheopigments (μg/L).
CHLASUM:	Chlorophyll-a, including pheopigments (μg/L).

Names of Sampling Personnel:

JAA	John Aufderheide
AC, ADC	Andy Chapman
SC, SRC	Scott Carpenter
JF, JMF	Janet Fischer
TH, TWH	Timothy Houck
SJ, SJJ, SN	Sally Jones
DL, DML	Donna Lesch
MS, MLS	Marc Stifelman
CEW	Craig Williamson

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 6/06/89 JULIAN DATE: 157 TIME: 12.75

SECCHI M: 4.5 WEATHER: overcast, rain PERSONNEL: CEW JAA MS

TMETHOD: 10 LMETHOD: 10 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
6/06/89	157	S	1	12.75	-1.0	17.9			223.0000				
6/06/89	157		1	12.75	0.0	21.0	8.05		100.0000				
6/06/89	157	E	1	12.75	1.0	21.0	8.00		28.0700	6.92	229	2.93	3.16
6/06/89	157	E	2	12.75	1.0	21.0	8.00		28.0700	7.07	219		
6/06/89	157		1	12.75	2.0	20.1	8.05		12.2300				
6/06/89	157	M	1	12.75	3.0	15.1	7.80		6.0100	6.78	224	2.55	3.28
6/06/89	157	M	2	12.75	3.0	15.1	7.80		6.0100	6.82	223		
6/06/89	157		1	12.75	4.0	11.5	6.60		2.4000				
6/06/89	157		1	12.75	5.0	10.6	4.95		0.7870				
6/06/89	157		1	12.75	6.0	9.5	3.50		0.3750				
6/06/89	157		1	12.75	7.0	8.8	2.90		0.1720				
6/06/89	157	H	1	12.75	8.0	8.3	2.50		0.0716	6.47	310	0.85	2.04
6/06/89	157	H	1	12.75	8.0	8.3	2.50		0.0716	6.52	332		
6/06/89	157		1	12.75	9.0	8.0	2.00		0.0264				
6/06/89	157		1	12.75	10.0	7.5	1.20		0.0061				
6/06/89	157		1	12.75	11.0	7.2	0.85		0.0000				
6/06/89	157		1	12.75	12.0	7.2	0.70		0.0000				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 6/20/89 JULIAN DATE: 171 TIME: 14.25

SECCHI M: 3.0 WEATHER: cloudy, windy PERSONNEL: JAA MS

TMETHOD: 10 LMETHOD: 11 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
6/20/89	171	S	1	14.25	-1.0	16.5							
6/20/89	171		1	14.25	0.0	21.8	8.80		100.0000				
6/20/89	171		1	14.25	1.0	20.4	9.20		19.2000				
6/20/89	171	E	1	14.25	2.0	18.7	8.60		6.4300	7.16	233	4.61	5.80
6/20/89	171	E	2	14.25	2.0	18.7	8.60		6.4300	7.14	239		
6/20/89	171		1	14.25	3.0	17.1	6.50		3.2600				
6/20/89	171	M	1	14.25	4.0	13.5	5.90		1.3230	6.44	238	1.11	2.15
6/20/89	171	M	2	14.25	4.0	13.5	5.90		1.3230	6.46	239		
6/20/89	171		1	14.25	5.0	11.9	4.10		0.6830				
6/20/89	171		1	14.25	6.0	10.0	2.30		0.3390				
6/20/89	171		1	14.25	7.0	9.5	1.60		0.1230				
6/20/89	171		1	14.25	8.0	8.9	1.20		0.0557				
6/20/89	171	H	1	14.25	9.0	8.6	0.82		0.0221	6.47	378	0.29	1.58
6/20/89	171	H	2	14.25	9.0	8.6	0.82		0.0221	6.46	366		
6/20/89	171		1	14.25	10.0	8.2	0.53		0.0099				
6/20/89	171		1	14.25	11.0	8.1	0.41	4	0.0061				
6/20/89	171		1	14.25	12.0	7.9	0.38	4	0.0047				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 7/03/89 JULIAN DATE: 184 TIME: 11.00

SECCHI M: 2.3 WEATHER: mostly sunny, breeze PERSONNEL: CEW JAA MS JF

TMETHOD: 10 LMETHOD: 10 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
7/03/89	184	S	1	11.00	-1.0								
7/03/89	184		1	11.00	0.0	24.7	8.40		100.0000				
7/03/89	184	E	1	11.00	1.0	24.2	8.18		22.8200	7.84	266	3.82	5.31
7/03/89	184	E	2	11.00	1.0	24.2	8.18		22.8200	7.44	245		
7/03/89	184		1	11.00	2.0	23.0	8.80		7.9610				
7/03/89	184	M	1	11.00	3.0	18.6	8.55		1.7570	7.08	251	27.84	30.70
7/03/89	184	M	2	11.00	3.0	18.6	8.55		1.7570	7.22	251		
7/03/89	184		1	11.00	4.0	13.7	3.13		0.4220				
7/03/89	184		1	11.00	5.0	10.6	2.10		0.1640				
7/03/89	184		1	11.00	6.0	9.4	0.87		0.0612				
7/03/89	184		1	11.00	7.0	8.8	0.35	4	0.0203				
7/03/89	184		1	11.00	8.0	8.4	0.33	4	0.0101				
7/03/89	184	H	1	11.00	9.0	8.1	0.32	4	0.0060	6.55	416	1.90	3.49
7/03/89	184	H	2	11.00	9.0	8.1	0.32	4	0.0060	6.54	393		
7/03/89	184		1	11.00	10.0	7.9	0.31	4	0.0000				
7/03/89	184		1	11.00	11.0	7.7	0.30	4	0.0000				
7/03/89	184		1	11.00	12.0	7.5	0.27	4	0.0000				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 7/18/89 JULIAN DATE: 199 TIME: 10.25

SECCHI M: 1.3 WEATHER: sunny PERSONNEL: CEW ADC MLS DML

TMETHOD: 10 LMETHOD: 11 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
7/18/89	199	S	1	10.25	-1.0	21.9							
7/18/89	199		1	10.25	0.0	23.7	9.30		100.0000				
7/18/89	199	E	1	10.25	1.0	22.5	9.60		15.2930	9.42	273	22.90	38.64
7/18/89	199	E	2	10.25	1.0	22.5	9.60		15.2930	9.45	280		
7/18/89	199		1	10.25	2.0	22.2	9.20		2.4320				
7/18/89	199		1	10.25	3.0	18.3	5.60		0.3890				
7/18/89	199	M	1	10.25	4.0	13.9	0.90		0.1543	6.44	280	10.15	17.43
7/18/89	199	M	2	10.25	4.0	13.9	0.90		0.1543	6.43	284		
7/18/89	199		1	10.25	5.0	11.0	0.70		0.0670				
7/18/89	199		1	10.25	6.0	9.4	0.20	4	0.0249				
7/18/89	199		1	10.25	7.0	8.7	0.10	4	0.0095				
7/18/89	199		1	10.25	8.0	8.4	0.10	4	0.0029				
7/18/89	199	H	1	10.25	9.0	8.1	0.10	4	0.0017	6.57	463	1.26	2.47
7/18/89	199	H	2	10.25	9.0	8.1	0.10	4	0.0017	6.69	489		
7/18/89	199		1	10.25	10.0	7.9	0.10	4	0.0003				
7/18/89	199		1	10.25	11.0	7.8	0.10	4	0.0000				
7/18/89	199		1	10.25	12.0	7.6	0.10	4	0.0000				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 7/31/89 JULIAN DATE: 212 TIME: 13.75

SECCHI M: 1.9 WEATHER: mostly cloudy, rain PERSONNEL: JAA MS DL

TMETHOD: 10 LMETHOD: 11 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
7/31/89	212	S	1	13.75	-1.0	22.6							
7/31/89	212		1	13.75	0.0	23.7	9.30		100.0000				
7/31/89	212	E	1	13.75	1.0	23.7	9.30		23.6740	8.90	283	25.63	28.62
7/31/89	212	E	2	13.75	1.0	23.7	9.30		23.6740	8.89	284		
7/31/89	212		1	13.75	2.0	23.6	9.20		5.8830				
7/31/89	212	M	1	13.75	3.0	19.6	3.90		1.4570	6.44	281	27.06	30.18
7/31/89	212	M	2	13.75	3.0	19.6	3.90		1.4570	6.48	282		
7/31/89	212		1	13.75	4.0	14.6	0.32	4	0.4880				
7/31/89	212		1	13.75	5.0	11.0	0.25	4	0.3070				
7/31/89	212		1	13.75	6.0	9.6	0.21	4	0.2430				
7/31/89	212		1	13.75	7.0	8.8	0.19	4	0.1900				
7/31/89	212		1	13.75	8.0	8.4	0.18	4	0.0414				
7/31/89	212	H	1	13.75	9.0	8.0	0.17	4	0.0288	6.56	590	0.88	5.91
7/31/89	212	H	2	13.75	9.0	8.0	0.17	4	0.0288	6.58	574		
7/31/89	212		1	13.75	10.0	7.8	0.16	4	0.0110				
7/31/89	212		1	13.75	11.0	7.6	0.15	4	0.0045				
7/31/89	212		1	13.75	12.0	7.6	0.15	4					

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 8/14/89 JULIAN DATE: 226 TIME: 10.50

SECCHI M: 2.0 WEATHER: sunny, hazy, calm PERSONNEL: JAA TH DL

TMETHOD: 10 LMETHOD: 12 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
8/14/89	226	S	1	10.50	-1.0	23.5							
8/14/89	226		1	10.50	0.0	22.9	7.80		100.0000				
8/14/89	226		1	10.50	1.0	22.2	8.30		15.7880				
8/14/89	226	E	1	10.50	2.0	21.9	8.00		3.9580	7.73	266	11.81	12.70
8/14/89	226	E	2	10.50	2.0	21.9	8.00		3.9580	7.99	282		
8/14/89	226		1	10.50	3.0	21.2	5.50		0.9320				
8/14/89	226	M	1	10.50	4.0	16.4	1.00		0.3620	6.59	275	22.12	23.88
8/14/89	226	M	2	10.50	4.0	16.4	1.00		0.3620	6.42	321		
8/14/89	226		1	10.50	5.0	13.3	0.51	4	0.1570				
8/14/89	226		1	10.50	6.0	11.2	0.45	4	0.0768				
8/14/89	226		1	10.50	7.0	10.0	0.39	4	0.0388				
8/14/89	226		1	10.50	8.0	9.4	0.38	4	0.0202				
8/14/89	226	H	1	10.50	9.0	8.9	0.37	4	0.0099	6.70	640	0.91	4.19
8/14/89	226	H	2	10.50	9.0	8.9	0.37	4	0.0099	6.65	557		
8/14/89	226		1	10.50	10.0	8.5	0.37	4	0.0037				
8/14/89	226		1	10.50	11.0	8.2	0.37	4	0.0020				
8/14/89	226		1	10.50	12.0	8.0	0.37	4	0.0006				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 8/28/89 JULIAN DATE: 240 TIME: 10.65

SECCHI M: 2.2 WEATHER: overcast, hazy PERSONNEL: SJN JMF TWH

TMETHOD: 10 LMETHOD: 11 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
8/28/89	240	S	1	10.65	-1.0	22.2							
8/28/89	240		1	10.65	0.0	22.9	9.28		100.0000				
8/28/89	240		1	10.65	1.0	22.6	9.30		29.3690				
8/28/89	240	E	1	10.65	2.0	22.2	9.38		4.0960	8.76	281	10.17	10.44
8/28/89	240	E	2	10.65	2.0	22.2	9.38		4.0960	8.80	278		
8/28/89	240		1	10.65	3.0	21.6	8.49		0.5023				
8/28/89	240		1	10.65	4.0	16.4	0.26	4	0.2500				
8/28/89	240	M	1	10.65	5.0	12.2	0.20	4	0.0756	6.46	387	23.48	38.27
8/28/89	240	M	2	10.65	5.0	12.2	0.20	4	0.0756	6.47	392		
8/28/89	240		1	10.65	6.0	10.1	0.18	4	0.0319				
8/28/89	240		1	10.65	7.0	9.1	0.16	4	0.0161				
8/28/89	240		1	10.65	8.0	8.5	0.15	4	0.0066				
8/28/89	240	H	1	10.65	9.0	8.2	0.15	4	0.0044	6.74	632	3.44	9.55
8/28/89	240	H	2	10.65	9.0	8.2	0.15	4	0.0044	6.78	676		
8/28/89	240		1	10.65	10.0	8.0	0.15	4	0.0006				
8/28/89	240		1	10.65	11.0	7.8	0.14	4	0.0000				
8/28/89	240		1	10.65	12.0				0.0000				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 9/10/89 JULIAN DATE: 253 TIME: 13.75

SECCHI M: 2.0 WEATHER: partly cloudy PERSONNEL: JAA SRC

TMETHOD: 10 LMETHOD: 12 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS:

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
9/10/89	253	S	1	13.75	-1.0	22.7							
9/10/89	253		1	13.75	0.0	23.4	8.15		100.0000				
9/10/89	253	E	1	13.75	1.0	22.8	8.53		26.0620	8.15	286	7.28	7.74
9/10/89	253	E	2	13.75	1.0	22.8	8.53		26.0620	8.19	287		
9/10/89	253		1	13.75	2.0	21.0	8.43		8.3720				
9/10/89	253		1	13.75	3.0	20.1	7.94		2.8760				
9/10/89	253	M	1	13.75	4.0	17.5	0.43	4	0.7480	6.40	325	5.97	6.09
9/10/89	253	M	2	13.75	4.0	17.5	0.43	4	0.7480	6.36	333		
9/10/89	253		1	13.75	5.0	12.6	0.19	4	0.2250				
9/10/89	253		1	13.75	6.0	10.3	0.15	4	0.0649				
9/10/89	253		1	13.75	7.0	9.3	0.13	4	0.0170				
9/10/89	253		1	13.75	8.0	8.8	0.12	4	0.0045				
9/10/89	253		1	13.75	9.0	8.5	0.11	4	0.0011				
9/10/89	253	H	1	13.75	10.0	8.2	0.11	4	0.0003	6.72	822	2.68	8.88
9/10/89	253	H	2	13.75	10.0	8.2	0.11	4	0.0003	6.67	840		
9/10/89	253		1	13.75	11.0	7.9	0.09	4	0.0000				
9/10/89	253		1	13.75	12.0	7.8	0.09	4	0.0000				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 9/24/89 JULIAN DATE: 267 TIME: 10.75

SECCHI M: 2.7 WEATHER: clear, cold, windy PERSONNEL: JAA SJJ JMF

TMETHOD: 10 LMETHOD: 12 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS: Temp and O2 at 22.75 hr

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
9/24/89	267	S	1	10.75	-1.0	8.4							
9/24/89	267		1	10.75	0.0	17.2	7.23		100.0000				
9/24/89	267		1	10.75	1.0	17.6	7.03		26.4970				
9/24/89	267	E	1	10.75	2.0	17.8	6.95		11.8500	6.79	304	27.74	29.84
9/24/89	267	E	2	10.75	2.0	17.8	6.95		11.8500	6.81	305		
9/24/89	267		1	10.75	3.0	17.9	6.80		4.2920				
9/24/89	267		1	10.75	4.0	17.9	6.64		1.5210				
9/24/89	267	M	1	10.75	5.0	14.1	0.54	4	0.4600	6.46	426	27.81	38.03
9/24/89	267	M	2	10.75	5.0	14.1	0.54	4	0.4600	6.52	360		
9/24/89	267		1	10.75	6.0	11.0	0.42	4	0.1350				
9/24/89	267		1	10.75	7.0	10.0	0.35	4	0.0300				
9/24/89	267		1	10.75	8.0	9.1	0.34	4	0.0100				
9/24/89	267		1	10.75	9.0	8.9	0.33	4	0.0000				
9/24/89	267	H	1	10.75	10.0	8.4	0.31	4	0.0000	6.77	870	1.01	18.10
9/24/89	267	H	2	10.75	10.0	8.4	0.31	4	0.0000	6.78	875		
9/24/89	267		1	10.75	11.0	8.2	0.31	4	0.0000				
9/24/89	267		1	10.75	12.0	8.0	0.29	4	0.0000				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 10/08/89 JULIAN DATE: 281 TIME: 10.75

SECCHI M: 3.3 WEATHER: overcast, slight breeze PERSONNEL: JAA SJJ

TMETHOD: 10 LMETHOD: 12 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS: Temp and O2 at 22 hr

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
10/08/89	281	S	1	10.75	-1.0	9.5							
10/08/89	281		1	10.75	0.0	13.4	7.58		100.0000				
10/08/89	281		1	10.75	1.0	13.4	7.58		33.3220				
10/08/89	281		1	10.75	2.0	13.4	7.58		11.7370				
10/08/89	281	E	1	10.75	3.0	13.4	7.53		5.2800	7.02	354	6.67	8.90
10/08/89	281	E	2	10.75	3.0	13.4	7.53		5.2800	6.94	356		
10/08/89	281		1	10.75	4.0	13.4	7.29		2.3280				
10/08/89	281		1	10.75	5.0	13.3	7.18		1.0280				
10/08/89	281		1	10.75	6.0	13.2	6.50		0.4570				
10/08/89	281	M	1	10.75	7.0	10.1	5.89		0.1620	6.77	723	10.93	30.42
10/08/89	281	M	2	10.75	7.0	10.1	5.89		0.1620	6.80	393		
10/08/89	281		1	10.75	8.0	8.9	1.53		0.0110				
10/08/89	281		1	10.75	9.0	8.5	1.03		0.0043				
10/08/89	281	H	1	10.75	10.0	8.0	0.87	4	0.0011	6.83	910	5.21	30.67
10/08/89	281	H	2	10.75	10.0	8.0	0.87	4	0.0011	6.74	805		
10/08/89	281		1	10.75	11.0	7.9	0.81	4	0.0007				
10/08/89	281		1	10.75	12.0	7.9	0.75	4	0.0004				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 11/12/89 JULIAN DATE: 316 TIME: 10.50

SECCHI M: 2.0 WEATHER: partly cloudy, cold PERSONNEL: JA SN SC AC

TMETHOD: 10 LMETHOD: 12 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS: E,M,H depths a guess

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
11/12/89	316	S	1	10.50	-1.0	7.0							
11/12/89	316		1	10.50	0.0	8.7	7.49		100.0000				
11/12/89	316	E	1	10.50	1.0	8.7	7.28		12.1240	6.54	330	10.46	11.01
11/12/89	316	E	2	10.50	1.0	8.7	7.28		12.1240	6.32	360		
11/12/89	316		1	10.50	2.0	8.7	7.12		1.3800				
11/12/89	316		1	10.50	3.0	8.7	7.08		0.2350				
11/12/89	316	M	1	10.50	4.0	8.7	6.99		0.0480	6.50	360	10.26	10.88
11/12/89	316	M	2	10.50	4.0	8.7	6.99		0.0480	6.50	355		
11/12/89	316		1	10.50	5.0	8.7	6.97		0.0100				
11/12/89	316		1	10.50	6.0	8.7	6.93		0.0024				
11/12/89	316		1	10.50	7.0	8.7	6.89		0.0005				
11/12/89	316		1	10.50	8.0	8.7	6.86		0.0002				
11/12/89	316	H	1	10.50	9.0	8.7	6.84		0.0000	6.53	350	11.20	11.77
11/12/89	316	H	2	10.50	9.0	8.7	6.84		0.0000	6.58	360		
11/12/89	316		1	10.50	10.0	8.7	6.82		0.0000				
11/12/89	316		1	10.50	11.0	8.7	6.76		0.0000				
11/12/89	316		1	10.50	12.0	8.4			0.0000				

LAKE WAYNEWOOD: SUMMARY OF PHYSICAL/CHEMICAL DATA

DATE OF SAMPLE: 12/27/89 JULIAN DATE: 361 TIME: 14.25

SECCHI M: 3.0 WEATHER: partly cloudy, cold PERSONNEL: SRC SJJ

TMETHOD: 10 LMETHOD: 12 AMETHOD: 11
OMETHOD: 10 PHMETHOD: 10 CAMETHOD: 11

COMMENTS: 30 cm ice

DATE OF	JULIAN	STRA	REP	TIME	DEPTH	TEMP C	OXYGEN	OFLAG	LIGHT PC	PH	ALKAL	CHLAC U	CHLASUM
12/27/89	361	S	1	14.25	-1.0	-1.0							
12/27/89	361		1	14.25	0.0	0.0	8.60		100.0000				
12/27/89	361	E	1	14.25	1.0	2.0	8.00		14.4700	6.52	338	0.89	1.30
12/27/89	361	E	2	14.25	1.0	2.0	8.00		14.4700	6.45	337		
12/27/89	361		1	14.25	2.0	2.5	7.70		4.0000				
12/27/89	361	M	1	14.25	3.0	3.0	7.70		1.3500	6.32	330	1.08	2.00
12/27/89	361	M	2	14.25	3.0	3.0	7.70		1.3500	6.32	330		
12/27/89	361		1	14.25	4.0	3.0	8.10		0.4540				
12/27/89	361		1	14.25	5.0	3.5	7.70		0.1610				
12/27/89	361		1	14.25	6.0	4.0	4.70		0.0570				
12/27/89	361		1	14.25	7.0	4.0	4.70		0.0280				
12/27/89	361	H	1	14.25	8.0	4.0	4.50		0.0130	6.14	330	0.47	1.72
12/27/89	361	H	2	14.25	8.0	4.0	4.50		0.0130	6.10	330		
12/27/89	361		1	14.25	9.0	4.0	4.20		0.0000				
12/27/89	361		1	14.25	10.0	4.0	3.60		0.0000				
12/27/89	361		1	14.25	11.0	4.0	2.00		0.0000				
12/27/89	361		1	14.25	12.0	4.0	0.50		0.0000				