Report To

Central Davis Sewer Improvement District

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Phytoplankton and Zooplankton in Farmington Bay and the Great Salt Lake, Utah (2003)

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Summary

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Phytoplankton, zooplankton, and other related limnological parameters were sampled at three or more sites in Farmington Bay and at three similarly shallow sites in Gilbert Bay from the summer of 2002, through late fall of 2003 in order to assess eutrophication. Salinities in Farmington Bay ranged from 4% during spring runoff (April) to 10% in September 2003, whereas salinities in Gilbert Bay ranged from 12% to 16% over this period. Temperatures were relatively similar in the two bays, ranging from 1-2°C in January to 29°C in July.

The macro-zooplankton community in both bays was dominated by brine shrimp, representing >97% of the biomass. In Farmington Bay, there was a large bloom of brine shrimp from May through late June, and high numbers of ovoviviparous eggs and nauplii were produced. Cyst production reached 7,000 m^{-2} d^{-1} in June. The population largely collapsed after June. In contrast, densities of brine shrimp in Gilbert Bay were high from May through October, with peaks in cyst production of over 22,000 m^{-2} d^{-1} in May and September. In Farmington Bay, the predacious corixids had densities of 0.28 L^{-1} in August of 2002, but peak density during the higher-salinity summer of 2003 was only 0.06 L^{-1}. Predation rate estimates suggest that corixid densities in Farmington Bay during 2002 may have been sufficient to control brine shrimp populations in 2002, but not in 2003. The abundance of a reportedly predaceous copepod was also inversely correlated with brine shrimp abundance, and it may also help limit *Artemia* in Farmington Bay. Low oxygen levels and high hydrogen sulfide concentrations during summer also need to be examined as possible control factors on the population.

Phytoplankton cell density, biomass, and chlorophyll levels were very high in Farmington Bay. Cell densities reached 3 x 10^6/ml, biomass reached 1.3 x 108 μm^3 /ml, and chlorophyll levels peaked at 320 µg/L, indicating that Farmington Bay is hypereutrophic. In contrast, these metrics of peak algal abundance in Gilbert Bay were 19%, 16%, and 23% of those in Farmington Bay. However, in May and June, when the large population of brine shrimp developed in Farmington Bay, algal abundance decreased markedly under grazing pressure that was over 200% of the water column each day. In Farmington Bay chrysophytes, green algae and diatoms were co-dominants, and cyanobacteria were rare. In Gilbert Bay, the green algae *Dunelliela* spp. was dominant, but chrysophytes and diatoms sometimes contributed significantly to density or biomass estimates. Chlorophyll levels in both bays were inversely correlated with the biomass of brine shrimp grazers, suggesting that grazing (top-down control) is one of the factors regulating algal biomass in the lake. However, the data suggest that in the absence of brine shrimp, algal biomass is approximately four times higher in Farmington Bay than in Gilbert Bay.

Future work on plankton populations in the dynamic Great Salt Lake should include: (1) monitoring in years when salinity is lower in Farmington Bay; (2) analyses of stress factors (low oxygen, H_2S, other) that may control the brine shrimp population in Farmington Bay; (3) field experiments of corixid and copepod predation on brine shrimp; (4) analyses of benthic communities.

Introduction

Farmington Bay, lying in the SW corner of the Great Salt Lake, receives high nutrient loading from agricultural, industry and sewage effluents. Agricultural sources of nutrients are thought to be the leading factor degrading stream water quality in the basin (NAWQA; Baskin et al. 2002), but the secondary-treated wastes of the Salt Lake metropolitan area also flow into the Great Salt Lake. Because of the proximity of Farmington Bay to Salt Lake City, it receives a large portion of this nutrient loading. In a preliminary assessment, Gross (2001) estimated that nutrient loading to the bay was sufficient to cause hypereutrophic conditions, and various short-term studies have indicated that it is (Carter 1971; Sorensen et al. 1988; Wurtsbaugh 1995; Wurtsbaugh et al. 2002; Marcarelli et al. 2003). However, none of these studies have provided a long-term analysis of conditions in the bay, nor attempted to understand if beneficial uses are impacted by eutrophication. In 2002, the Utah Division of Water Quality (DWQ) convened a working group to study the ecological health of Farmington Bay with the goal of understanding whether beneficial uses there are impaired. The analyses of plankton reported here are an outgrowth of the DWQ's efforts.

The hydrology and salinity in Farmington Bay are unique for the Great Salt Lake, and have important consequences for its function. The Jordan River and the Salt Lake City Sewage Canal enter the south end of the bay, bringing both fresh water and nutrients. During summer low flows, sewage effluents from Davis County and Salt Lake City contribute significantly to the flow into the bay. At low surface elevations of the Great Salt Lake, such as those during the current drought, Farmington Bay functions more as a lake than as a bay because a land bridge forms between the southern end of Antelope Island and the mainland, and an automobile causeway to the northern tip of the island largely encloses the northern end of the bay. A breach at the western end of the causeway allows water exchange between Farmington Bay and the Great Salt Lake, which is aided at high lake levels by a culvert midway along the causeway. Because much of the freshwater enters the bay at the south end, there is sometimes a salinity gradient along the north-south axis of the bay. Concurrently, the dense, hypersaline water from the Great Salt Lake enters Farmington Bay as an underflow from the north end and forms a salt wedge (deep-brine layer) that can underlay a considerable portion of the bay. Droughts and wet cycles undoubtedly have a large impact on the salinity of the bay, although this has not been studied in detail. In a 1970 study, Carter (1971) described a salinity gradient during from the south to north, even before the causeway was constructed. In contrast, during the 2003-2004 drought year reported here, a strong gradient was seldom found.

However, there were seasonal changes in salinity in the bay, from 4% during spring runoff to over 10% in the fall. Studies on plankton and other limnological features of the bay will be needed at a variety of runoff conditions in order to thoroughly understand this dynamic system.

Very little work has been conducted on the phytoplankton in Farmington Bay. Felix and Rushforth (1979) described some phytoplankton taxa present in the bay, but provided no quantitative data. Carter (1971) found abundant populations of the cyanobacteria, *Nodularia* sp. in the bay during the summer. This organism may contribute to eutrophication by fixing nitrogen, thus relieving nitrogen limitation of the phytoplankton community. In 1986 when lake levels were high and salinities ranged from 4-5% in the bay, Sorensen (1988) reported that the dominant algae were *Nodularia,* the diatoms *Chaetoceros* sp. and *Nitzschia* sp., and the green algae *Oocystis*. They also reported high chlorophyll levels of over 150 µg/L at the south end of the bay, but these usually decreased to less than 50 µg/L at the north end where the breached causeway allowed mixing with the Great Salt Lake. Several studies by Utah State University students and personnel have shown that chlorophyll levels in the bay are extremely high at times (over 100 µg/L), but those studies have not followed seasonal trends (Wurtsbaugh et al. 2002; Marcarelli et al. 2003).

As with the phytoplankton, little is known about seasonal trends in densities of brine shrimp and other zooplankton in the bay. Carter (1971) studied the abundances of brine shrimp during the summer in Farmington Bay prior to causeway construction and found that they were abundant in north end of the estuary, and less abundant near the southern end where salinities were lower. Brine shrimp abundances were inversely correlated with densities of the predaceous water boatman (corixids; *Trichocorixa verticalis*). Wurtsbaugh (1988) and Marcarelli et al. (2003) suggest that predation by this predator may control the brine shrimp. Recent analyses of Farmington Bay water in the fall have indicated that brine shrimp densities are lower there than in Gilbert Bay of the Great Salt Lake (Wurtsbaugh and Marcarelli 2002, Marcarelli and Wurtsbaugh 2003). The reasons for this are unknown, but hypotheses include: (1) anoxia due to heavy nutrient loading and algal blooms; (2) low salinity; (3) predation by corixids, and (4) algal taxa that are inadequate food for (or toxic to) *Artemia*.

It is important that we understand plankton cycles in Farmington Bay for several reasons. First, the high production of phytoplankton, and subsequent decomposition of this organic matter may contribute to anoxia that has been observed in the bay (Wurtsbaugh et al. 2002, Wurtsbaugh and Marcarelli 2004). Since previous plankton studies have focused on short-term characterizations of phytoplankton, it is consequently important that seasonal changes in biomass are documented. Secondly, we need to know what species of phytoplankton are present in the bay, as this may help us determine if there are toxic forms present that could interfere with brine shrimp production and if nitrogen-fixing cyanobacteria are present that could alleviate nutrient limitation of the algal community. Thirdly, we need to understand the seasonal cycles of brine shrimp in the bay because they are important prey for migrating water birds and because brine shrimp cysts are an important commercial resource. Finally, we need to know the seasonality and distribution of potential predators (i.e. corixids) and competitors of brine shrimp to help us understand why brine shrimp densities are lower in Farmington Bay than Gilbert Bay.

The objectives of our study were to document the abundance of phytoplankton and zooplankton in Farmington Bay, and compare this to the abundances in Gilbert Bay. The work was funded for sampling from June through November 2003, but additional data are presented from research funded by Utah State University. Physical and chemical parameters were conducted concurrently to help understand potential driving factors that might control the plankton populations in the two bays. Finally, correlation analyses were done to help understand relationships between the measured parameters and the plankton abundances.

Methods:

Phytoplankton and zooplankton samples were collected in Farmington and Gilbert Bay in two sequential studies. In the first, as part of a larger synoptic survey conducted Aug – Nov 2002 on GSL, samples were collected at five stations in Farmington Bay (Stations 1 – 5, Figure 1) and at three stations in Gilbert Bay (Stations 14, 15, 18; Figure 1). GPS locations and descriptions of all sites samples are shown in Table 1. In the second routine monitoring part of the study, samples were collected monthly from Dec 2002 – Dec 2003 at three stations in Farmington Bay and three in Gilbert Bay. Routine monitoring stations in Farmington Bay were initially 1, 3 and 5 (Figure 1, Table 1). However, shallow water conditions beginning in Sept 2003 limited sampling to the north end of Farmington Bay (Stations 1, 2 and 3) through Dec 2003. Routine sampling stations in Gilbert Bay were 14, 15 and 18 (Figure 1, Table 1). The stations in Gilbert Bay were selected to be approximately the same depth (<2 m) of those in Farmington Bay. The responses of plankton in Gilbert Bay provide a reference for those in Farmington Bay. However, since salinities vary considerably between the two bays, and because salinity exerts primary control on plankton species composition, Gilbert Bay should not be considered a non-polluted control site.

On each sampling date, routine limnological characteristics were measured. Profiles of dissolved oxygen and temperature were taken at each study site with a YSI model 58 DO/temperature meter. Oxygen measurements were corrected for temperature and salinity (Sensorex 2004). Salinity profiles were measured with a refractometer. Water clarity was determined with a Secchi disk, and water depth was determined with a weighted line or hand-held depth finder.

Phytoplankton were collected with an integrated tube sampler lowered to 10-cm above the bottom of the bay and preserved with Bouin's solution (80% Formaldehyde, saturated with picric acid; 20% glacial acetic acid). Phytoplankton cell density was determined by settling and counting samples in Utermöhl chambers on an inverted microscope at 400 or 1000X (Wetzel and Likens 2000). Phytoplankton were identified to the lowest taxonomic group possible using Felix and Rushforth (1979)–usually genus or species. Because algal volumes can vary immensely between species, and because many ecological processes are more dependent on biovolumes than on densities, we also estimated the volume of each taxon. Length and width measurements were made on 10 individuals of each taxa and biovolumes were calculated using equations in Hillebrand et al. (1999).

At each sampling station in each sampling date, overall algal biomass was estimated using chlorophyll *a* analyses. Water was collected from 0.5-m using an 8-L horizontal Van Dorn bottle. An aliquot (usually 25-mL) of water was collected from the bottle and filtered through a GF/F filter. The filter was wrapped in tin foil and immediately placed on dry ice to prevent sample degradation. Samples were transferred to a freezer upon return to USU and remained there until analysis (less than 30 days). To measure chlorophyll *a,* filters were extracted in 95% ethanol and chlorophyll *a* concentration was measured fluorometrically using a non-acidification technique (Welschmeyer 1994).

Two replicate zooplankton samples were taken at each station, with the replicates separated by at least 100 m to account for small-scale patchiness. The zooplankton were collected with vertical hauls with a 50-cm diameter net with 250-µm mesh from 10-cm above the bottom to the surface. Zooplankton were preserved with 3% formalin and counted using a dissecting microscope at 10-30X. Entire samples were counted unless zooplankton were dense, where 10-50% of the sample was counted to give counts of 100-200 organisms. Zooplankton were identified to species and divided by sex and life stage (e.g. *Artemia* nauplii, juvenile and adults). Lengths for 10 – 20 individuals were measured and converted to biomass using length-weight equations for each taxa (Wurtsbaugh and Hawkins 1990, Wurtsbaugh 1992, Wetzel and Likens 2000). Additionally, the number of cysts and eggs were counted on up to 20 females in each sample, if available. Cysts production was estimated by dividing the density of cysts attached to females in the water column by the inter-brood interval (Dana et al. 1990; Wurtsbaugh and Gliwicz 2001). Inter-brood intervals (IBI; days) were estimated based on lake temperatures using an equation modified from Wurtsbaugh and Gliwicz (2001):

$$\text{Log (IBI)} = 1.675 - 0.043\ (\text{Temperature}) \qquad p < 0.00000 \quad r^2 = 0.75$$

Results:

Physical-chemical conditions — As expected, salinity was consistently higher in Gilbert Bay than in Farmington Bay for the duration of the study period, and ranged from 13% in Aug 2002 to 16% in November 2003 (Figure 2c). Salinity in Farmington Bay was more seasonally variable, as would be expected because of the large freshwater inputs to Farmington Bay, and ranged from a low of 4% in April 2003 to a high of 10% in September 2003 (Figure 2c). Rarely were there pronounced changes in the salinity of Farmington Bay from the north to the south: the maximum salinity difference was found during June, when salinity varied from 5% at Station 5, to 6.7% at Station 1. Temperatures at our sampling stations were very similar between the two bays for the duration of the study period, and ranged from a maximum of 29°C in both bays in July 2003 to a minimum of 0°C in Farmington Bay in November 2003 (Figure 2b). Water clarity was almost always lower in Farmington Bay than in Gilbert Bay, except for a single sampling date (May 15, 2003), when water clarity in Farmington Bay was far greater than at any other time (Figure 2a). With the exception of this water-clearing event, Secchi depths in Farmington Bay ranged from 0.1 – 0.3 m, while Secchi depths in Gilbert Bay ranged from 0.3 – 5.6 m (Figure 2a).

Phytoplankton — Twenty-eight different species or genera of algae were identified in Farmington Bay and Gilbert Bay, most of which occurred in both bays (Table 2; Appendix 2). All of these species had previously been observed in the Great Salt Lake. For convenience and clarity in analyses, these species were grouped by division into four groups: green algae (division Chlorophyta), chrysophytes (division Pyrrophyta or Dinophyta), diatoms (division Bacillariophyta) and cyanobacteria (division Cyanophyta; Sze 1998). Phytoplankton cell densities were generally 4-5 times greater in Farmington Bay than in Gilbert Bay for the total of all taxa (Figure 3). In both bays, chrysophytes and green algae were the most important divisions of algae throughout the entire sampling period. In Farmington Bay, cell densities were greatest in October 2002, followed by September 2003, indicating that the greatest phytoplankton densities occur in late fall in this bay (Figure 3a). This also coincides with the timing of highest salinity in Farmington Bay and warmest water temperatures (Figure 2b, c). The dominant taxa during the late fall were an unidentified chrysophyte, the green algae *Dunaliella viridis*, and an unidentified green biflagellate. In September and October, the water in Farmington Bay was a distinct pink-orange color. Cyanobacteria were rare in Farmington Bay, and densities of nitrogen-fixing *Nodularia* were insignificant. The lowest algal densities in this bay occurred on 15 May, which coincided with the timing of the deepest Secchi depth transparency (Figure 2a). In contrast, in Gilbert Bay, phytoplankton cell densities were highest in April 2003 and lowest in October 2002 and August 2003, which is almost the opposite pattern observed in Farmington Bay (Figure 3b). The flora in Gilbert Bay was nearly always dominated by *Dunaliella viridis,* an unidentified chrysophyte and an unidentified green biflagellate.

Phytoplankton biovolume was also generally 4-5 times greater in Farmington Bay than in Gilbert Bay (Figure 4a). Because of their small cell sizes, chrysophytes contributed a relatively small portion of the biomass in both bays. In contrast, the relative importance of the larger green algae and diatoms increased. In the spring and late fall, diatoms sometimes constituted more than 75% of the biovolume in Farmington Bay. Diatoms were 91% of the biovolume in Gilbert Bay on one sampling date in late September, but more commonly contributed 1 - 31% of the biovolume in Gilbert Bay (Figure 4b). Biovolume estimates showed the same general trends in high and low periods of algal production in the two bays as the phytoplankton density data (c.f. Figures 3, 4). Algal biovolume also closely agreed with chlorophyll measurements that were made in both bays (Figure 5), with better agreement in Gilbert Bay than in Farmington Bay. Analysis of the relationship between algal biovolume and chlorophyll a concentrations showed a weak relationship between the two variables (Chl *a* = 22.2 (Algal biovolume); $r^2 = 0.44$; Figure 5). This relationship is weak because of the scatter observed in Farmington Bay; the relationship is much tighter in Gilbert Bay (Figure 5). In part, the poorer relationship in Farmington Bay may be due to the fact that chlorophyll samples were taken at 0.5-m, whereas integrated samples were taken throughout the water column for algal analyses. Farmington Bay was frequently stratified with a salt wedge, whereas Gilbert Bay was always mixed at the shallow stations we sampled near Antelope Island.

Zooplankton — Six zooplankton taxa were identified in Farmington and Gilbert Bays (Table 3). Of these taxa, the dominant taxa found in each bay were different life stages of brine shrimp (*Artemia franciscana*), followed by harpacticoid copepods (*Cletocampus albuquerquensis*), *Bosmina*, and corixids in Farmington Bay and brine flies (*Ephydra* sp.) in Gilbert Bay. Harpacticoid copepods were abundant in Farmington Bay on 5 June, reaching mean densities of 85/L, and on 26 June 2003. In Gilbert Bay we found very low densities of any macrozooplankton other than *Artemia*, with *Ephydra* larve the most commonly non-*Artemia* taxa observed. Because of their large size, *Artemia* dominated the biomass of the zooplankton assemblage in both bays (Figure 6).

In both bays, *Artemia* densities were highly seasonal, with very low densities from November through March or April. Adult and juvenile brine shrimp densities were greater in Gilbert Bay than in Farmington Bay, except for sampling dates in early April and May, when densities were high in Farmington Bay (Figure 7). This May peak in Farmington Bay occurred when salinities were near 5%. The brine shrimp bloom coincided with decreased phytoplankton densities and increased water clarity (Figures 2a, 3a). In Farmington Bay, *Artemia* declined precipitously after June, with only a small recovery of the population in October (Figure 7a). *Artemia* densities in Gilbert Bay peaked in early June and remained around 2 organisms/L through mid-October (Figure 7b). Trends in brine shrimp nauplii densities followed similar patterns, with a large peak in Farmington Bay on 15 May, and peaks in Gilbert Bay occurring in early June and September (Figure 8). *Artemia* biomass trends showed the same general trends as density trends (Figure 9). In Farmington Bay, the short-lived population explosion in May had *Artemia* biomasses close to 5000 µg/L, whereas the spring bloom in Gilbert Bay yielded biomasses of only 2300 µg/L (Figures 9a, b). In both bays, brine shrimp adults made up most of the *Artemia* biomass on the sampling dates, with juveniles contributing slightly more overall biomass in Gilbert Bay than in Farmington Bay (Figure 9). In both bays, nauplii contributed <5% to the *Artemia* biomass and are not included in Figure 9.

We found little consistent spatial variation in *Artemia* densities in Farmington Bay (Figure 10). For example, brine shrimp density was greatest at Station 3 on 26 June 2003, but lowest at that station on 15 May 2003. Notably, brine shrimp densities were much higher at Station 1 on 5 June 2003. Salinity at that station on this date was very similar to salinity at Stations 3 and 5, and it is unclear what other factors could have caused this high density. It is possible that brine shrimp that had hatched in the more favorable Great Salt Lake water may be introduced to this Farmington Bay site by mixing through the causeway breach, and so this density may not reflect equilibrium conditions at Station 1.

In Farmington Bay, densities of invertebrate predators, corixids (*Trichocorixa verticalis*) and harpacticoid copepods (*Cletocampus albuquerquensis*), rose during late June as the brine shrimp population fell. Corixid densities were high in the summer of 2002 (ca. 0.3/L), but in 2003 mean densities never exceeded 0.06/L (Figure 11). The inverse relationship between the predators and brine shrimp is evident when the 2003 data is plotted alone (Figure 12).

There was also a negative relationship observed between *Artemia* biomass and chlorophyll *a* concentrations in both bays (Figure 13). Brine shrimp are efficient filter feeders that can control phytoplankton populations in the Great Salt Lake (Wurtsbaugh and Gliwicz 2001). We found negative exponential relationships between chlorophyll *a* concentrations and *Artemia* biomass in both Farmington (Chl a = 200.6*(*Artemia* Biomass)$^{-0.30}$, r^2 = 0.44) and Gilbert Bays (Chl a = 53.4*(*Artemia* Biomass)$^{-0.37}$, r^2 = 0.36, Figure 11). The intercepts of these relationships indicate that the ungrazed chlorophyll condition in almost four times higher in Farmington Bay compared to Gilbert Bay (200 vs. 53 µg/L), indicating that algal biomass in the absence of *Artemia* is much greater in Farmington Bay than in Gilbert Bay. There is a considerable amount of scatter in the data, and an alternative interpretation is that chlorophyll levels were independent of grazing intensity until an *Artemia* biomass of approximately 100 µg/L (one 5-mm *Artemia*) was reached.

Egg and cyst production was highly variable in both bays. Egg densities (on females) peaked in May in both Farmington Bay and Gilbert Bay, although densities were much higher in Farmington Bay (200 eggs/L vs. 6.6 eggs/L; Figure 14a). In both bays, egg production was low for the remainder of the year except for a brief period in October. Cyst density (on females) showed an initial peak in late May/early June 2003 in both bays, and a subsequent peak of equal magnitude in Gilbert Bay in late September (Figure 14b). Cyst production was always higher in Gilbert Bay than in Farmington Bay, with highest rates observed in Aug 2002, late May 2003 and Sept – Oct 2003 (Figure 15). Much of this difference, however, was due to the greater depth of the water column in Gilbert Bay than in Farmington Bay. Since the number of eggs or cysts produced per female depends on the food resources available, we examined the relationship between brood size and algal biomass (Figure 16). Brood size was positively related to chlorophyll concentrations in Gilbert Bay (r^2 = 0.41; Figure 16b), but there was no relationship observed in Farmington Bay (r^2 = 0.0004; Figure 16a).

Although we did not sample the benthic sediments, the brine fly (*Ephedra* spp.) larvae that we captured coincidentally in our zooplankton netting were almost always more abundant in Gilbert Bay than in Farmington Bay (Appendix 4). The peak *Ephedra* abundance in the zooplankton tows from Farmington Bay occurred in early June when brine shrimp grazing had cleared the water column. The apparent low abundance of *Ephedra* in Farmington Bay is likely a consequence of limited by the growth of periphyton mats there. During most of the year, extremely high phytoplankton populations limit light penetration, and most likely, periphyton photosynthesis in the sediments. Because brine fly larvae are dependent on these mats (Collins 1980), periphyton growth may control the distribution of benthic invertebrates in the lake. A brief student project in 2002 found that periphyton and brine fly abundances were much lower in Farmington Bay than in Ogden Bay, where transparency was greater (Marcarelli and Wurtsbaugh 2003). Only a limited amount of research has been done on the benthic invertebrates in the lake (Collins 1980) despite their importance for the bird community.

Discussion:

The plankton sampling in late 2002 and throughout 2003 indicated that Farmington Bay is hypereutrophic, a conclusion reached by several previous investigators (Carter 1971; Sorensen et al. 1988; Wurtsbaugh 1995; Wurtsbaugh et al. 2002; Marcarelli et al. 2003). The highest chlorophyll level found during the study (320 µg/L) is near the theoretical maximum attainable for algae in shallow, unstratified water bodies (Kalff 2002). Algal populations in Gilbert Bay during the winter were also high (65 µg/L) but still less than 20% of those in Farmington Bay.

What factors likely control phytoplankton in Farmington Bay? Very high nutrient loading to the bay supports the high algal populations (Gross 2002). It is likely that nutrients are high enough that they do not limit the populations, and consequently, the phytoplankton approach the theoretical limit where algal biomass limits light penetration, and hence the mean light level in the water column controls growth. Secchi depths were usually less than 0.2 m, and the photic zone where algae can grow is usually taken to extend to 2-3 Secchi depths, or 0.4-0.6 m. The mean depth of the bay is near 0.9 m, so phytoplankton circulating in the water column are frequently below a depth where they can grow. Cyanobacteria were relatively unimportant in either bay, and insignificant numbers of nitrogen-fixing taxa were found. This is likely a consequence of high available nitrate levels. The Utah Division of Water Quality collected nutrient samples concurrently with our study, and that data will shed light on this assumption.

Although the high nutrient loading supports strong algal growth in the lake, it is clear that when brine shrimp are abundant, they have the capacity to greatly reduce algal populations in both bays. When grazing by brine shrimp was negligible, phytoplankton was about five times more abundant in Farmington Bay than in Gilbert Bay, likely reflecting higher nutrient levels in the confined bay. Nevertheless, in Farmington Bay, algal biomass and chlorophyll concentrations declined to <1% of peak levels when brine shrimp biomass reached nearly 5,000 µg/L (8 adults & juveniles per liter) in early June. An adult brine shrimp can filter >250 ml of water/day (Reeve 1963), so that at this high population density, the water would have been cleared of susceptible phytoplankton over twice each day—a rate the phytoplankton population can not withstand. High grazing by brine shrimp in Gilbert Bay also appeared to reduce phytoplankton populations in the summer, as has been previously reported (Wurtsbaugh 1988).

Brine shrimp can establish high densities in Farmington Bay, but the population there was not stable. In 2003, brine shrimp reached high densities in Farmington Bay during the spring when salinities were near their lowest level (5-6%). The high phytoplankton allowed the female brine shrimp to produce very large broods, and high numbers of nauplii were produced. This occurred when diatoms were abundant, although this group has been suggested to cause feeding problems for the smallest brine shrimp (G. Belovsky, personal communication). High brine shrimp populations in Farmington Bay persisted until early June, even though they had grazed the algal populations to low levels. The brine shrimp population collapsed in the bay in early-late June and never recovered, even though phytoplankton was abundant and salinities were increasing towards the optima for the species.

The loss of the brine shrimp population in Farmington Bay by mid-summer limited cyst production there. In Gilbert Bay, cyst production occurs primarily after August (Wurtsbaugh and Gliwicz (2001), and by that time the brine shrimp population in Farmington Bay was very low. The shallow water column, and hence limited volume of Farmington Bay also limits Farmington

Bay from high cyst production rates, although large brood sizes in the hypereutrophic water allowed the brine shrimp to produce substantial numbers of cysts during the brief population explosion in the spring.

What factors may control the brine shrimp in Farmington Bay in mid-summer and latter in the fall? Although we now have only one full year of sampling, our data from 2002 also indicated low densities in the mid-summer and fall, and low densities in the fall have been reported for two other years (Wurtsbaugh et al. 2002; Marcarelli et al. 2003). Three factors have been hypothesized to be important: (1) Predation by corixids and other invertebrate predators; (2) poor food quality, and; (3) stressful conditions.

Corixids prey effectively on brine shrimp and could be an important control mechanism for brine shrimp if their densities are high enough. A student project (M. Hadley, reported in Marcarelli et al. 2003) found that an adult corixids in the laboratory could clear 9 liters of water per day of juvenile brine shrimp, and they also exerted appreciable mortality on nauplii (Table 4). In August 2002, mean corixid densities were 0.28/L. Applying the laboratory-derived clearance rate to the field suggests that the corixid population at that time could have cleared the water of juvenile brine shrimp 2.7-times per day (270%/day), and eaten nauplii at 0.78 (78%/day) per day. Consequently, the low brine shrimp densities observed in 2002 could have been due to this predator. However, in 2003, corixid densities never reach high levels, perhaps the result of the increased salinities in the bay. Applying the laboratory-derived clearance rate to the 2003 populations suggests that corixids could have eaten only 44% of the juvenile brine shrimp during June-August, and only 18%/day latter in the summer. This would likely impart partial control on the population, but with large brood sizes and high reproduction, brine shrimp would likely be able to withstand this predation pressure. The harpacticoid copepod, *C. albuquerquensis,* is also reportedly an invertebrate predator (Hammer and Hurlbert 1990). Because the copepods are small (ca. 1 mm), it is likely that they would exert predation pressure on the smaller size classes of brine shrimp (nauplii, early juvenile instars). However, the importance of this predator in controlling brine shrimp in the Great Salt Lake has not been explored.

The importance of corixid predation in the Great Salt Lake is controversial. Wurtsbaugh (1988) suggested that corixids might have been responsible for the demise of the brine shrimp population in Gilbert Bay during the low-salinity years of 1985-86. Mellison (2000), in contrast, argued that corixids could not control brine shrimp, but he tested predation only on nauplii and adults, and subsequent experiments have shown that predation is highest on intermediate stages of brine shrimp (Marcarelli et al. 2003; A. Marcarelli, unpublished data). More work is clearly needed to fully understand the importance of corixids under varying salinity regimes.

Poor food quality may also control the reproduction of zooplankton (DeMott 1998; Cole et al. 2002), and researchers working on the Great Salt Lake have suggested that nauplii of brine shrimp may starve when the phytoplankton community switches from dominance by *Dunelliela* spp. to dominance by diatoms (G. Belovsky, personal communication). Diatoms were abundant in Farmington Bay for much of the year, and it is possible that they interfered with feeding by juvenile brine shrimp. However, small chrysophytes, and a variety of green algae (including *Dunelliela viridis*, a staple of brine shrimp) were also present in high densities during the summer when brine shrimp declined. Although biomasses of *Dunelliela viridis* declined markedly in Farmington Bay in April of 2002, the densities in the hypereutrophic Farmington Bay nevertheless remained higher throughout the summer than in Gilbert Bay (Appendix 2). Another factor suggests that food quality if Farmington Bay does not limit brine shrimp growth. We have conducted seven brine shrimp survival and growth experiments in the laboratory using water collected from Farmington and Gilbert Bays from August 2002 until early July 2003. In nearly all of these experiments, nauplii in Farmington Bay water survived, grew, and reproduced better or equally well than nauplii reared in water from Gilbert Bay (Wurtsbaugh and Gross, unpublished data). These experiments suggest the food quantity and quality of phytoplankton from Farmington Bay is equal or better than that from Gilbert Bay, at least during the period studied.

The final hypothesis for low densities of brine shrimp in Farmington Bay during mid- and late summer is stressful conditions. Little work has been done to address this possibility. However, oxygen recording equipment deployed near the north end of Farmington Bay on two occasions indicates that the whole water column may become anoxic during wind events. In October 2001, the water column became anoxic overnight during severe winds, and remained anoxic until at least 0800 when the sensor was removed (Wurtsbaugh et al. 2002). In July 2003, an oxygen buoy measured large diel swings in oxygen, with near anoxia throughout the water column. However, during a wind that appears to have mixed the bay to the bottom, the entire water column went anoxic and remained so for 2 ½ days (Wurtsbaugh, unpublished data). A possible explanation for these events is that windstorms may entrain the deep-brine layer into the water column. This layer contains appreciable quantities of hydrogen sulfide that can react with oxygen and remove it from the water column (Wurtsbaugh and Marcarelli 2004). Hydrogen sulfide production and subsequent mixing has been linked to anoxic events in a freshwater lake (Effler et al. 1988) and the Salton Sea (Watts et al. 2001). The Salton Sea study linked the combined effects of hydrogen sulfide toxicity and anoxia caused by hydrogen sulfide oxidation to mass die-offs of phytoplankton, zooplankton, and fish.

Our study provides an initial assessment of plankton populations in Farmington Bay, and examines some possible control mechanisms. More research is needed to determine if the trends found in 2002 and 2003 are similar in other years, particularly in non-drought periods when freshwater runoff to the bay may be higher. Additional experiments are also needed to help understand the mechanisms controlling the phytoplankton, zooplankton and benthic populations in the bay.

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Figures and Tables:

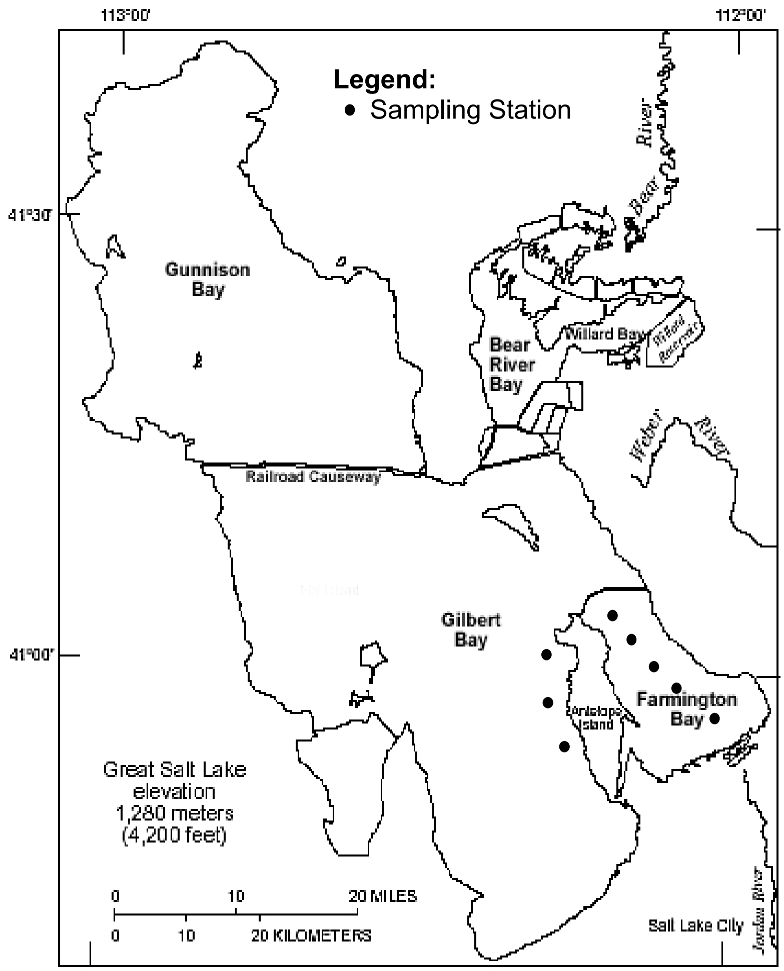

Figure 1: Map of Great Salt Lake, showing the locations of the Farmington Bay and railroad causeways and the routine sampling stations used in this study.

Table 1: Station numbers and GPS coordinates of sampling stations in Farmington and Gilbert Bays used in this study.

Station Name	GPS Coordinates (lat long)	Location and notes
1	N 41 02.985 W 112 11.321	N end of Farmington Bay, 3 km from causeway
2	N 41 01.823 W 112 09.547	SSE of station P1A
3	N 40 59.803 W 112 08.442	SSE of station P2A
4	N 40 57.849 W 112 06.548	SSE of station P3A; too shallow to sample after June 03
5	N 40 55.692 W 112 05.373	Southernmost end Farmington Bay; too shallow to sample after June 03
14	N 41 00.829 W 112 15.397	West side of Antelope Island, North Site
15	N 40 55.518 W 112 15.387	West side of Antelope Island, South Site
18	N 40 57.572 W 112 15.832	West side of Antelope Island, between stations 14 and 15

Table 2: Phytoplankton observed in Farmington and Gilbert Bays during the 2002-2003 sampling period. Divisions are shown in bold.

Name	Farmington Bay	Gilbert Bay
CHLOROPHYTA		
Dunaliella viridis	X	X
Dunaliella salina	X	X
Unidentified biflagellate (1-6 µm)	X	X
Carteria sp.	X	X
Oocystis sp.	X	X
Treubaria triappendiculata	X	X
Sphaerellopsis sp.	X	
Spermatozopsis sp.	X	
PYRROPHYTA		
Glenodinium sp.	X	X
Unidentified chrysophyte	X	X
BACILLARIOPHYTA		
Amphora sp.*	X	X
Amphora delicatissima	X	X
Amphora coffeaeformis	X	X
Chaetocerous sp.	X	X
Cyclotella sp.	X	X
Nitzschia accicularis	X	X
Nitzschia epithemoides	X	X
Nitzschia fonticola	X	X
Nitzschia palea	X	X
Navicula graciloides	X	X
Navicula lanceolata	X	X
Navicula tripuctata	X	X
Navicula sp. (45 – 100 µm)	X	X
Phaedactylum sp.	X	
Rhopalodia musculus		X
CYANOPHYTA		
Nodularia sp.	X	
Microcoleus sp.	X	X
Pseudoanabaena sp.	X	X
Spirulina sp.	X	X

Table 3: Names and occurrence of zooplankton taxa observed in Farmington and Gilbert Bays during the 2002-2003 sampling period. X indicates that a taxa was found in that bay during the study period.

Name	**Stage**	**Farmington Bay**	**Gilbert Bay**
Artemia franciscana	Adult	X	X
	Juvenile	X	X
	Nauplii	X	X
Trichocorixa verticalis		X	X
Ephydra sp.	Adult	X	X
	Pupae	X	X
	Larvae	X	X
Cletocampus albuquerquensis		X	X
Calanoid copepod (rare)			X
Bosmina sp. (rare)		X	

Table 4. Estimated predation rates of adult corixids on different stages of brine shrimp. The clearance rates (% of water column cleared of prey each day) are based on the laboratory experiments of M. Hadley (in Marcarelli et al. 2003), and extrapolated to densities of corixids found in Farmington Bay in 2002 and 2003. Alternative prey, or other factors slowing predation might lower the actual clearance rates.

		Estimated Clearance Rates at Field Densities of Corixids (% of water cleared each day)		
Artemia stage	Clearance Rate Liters day^{-1} $corixid^{-1}$	Aug 2002 0.28 Corixids/L	June - Aug 2003 0.05 Corixids/L	Sept - Oct 2003 0.02 Corixids/L
Nauplii	2.9	78%	14%	6%
Juvenile	8.8	247%	44%	18%
Adult	0.3	9%	2%	1%

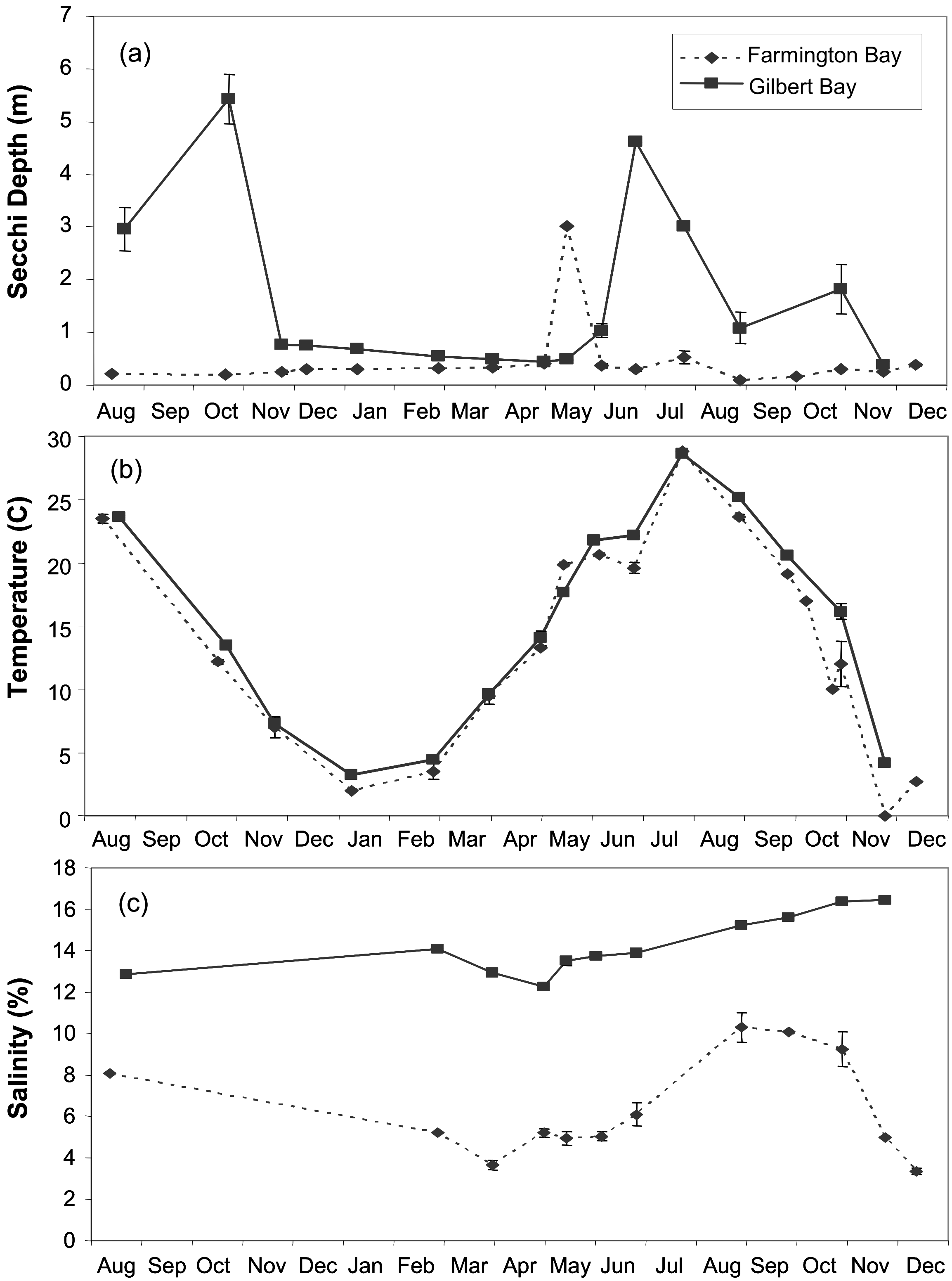

Figure 2: Trend in (a) Secchi depth (index of water clarity), (b) temperature, and (c) salinity (measured at the bottom of the mixed layer) in Farmington and Gilbert Bays during the study.

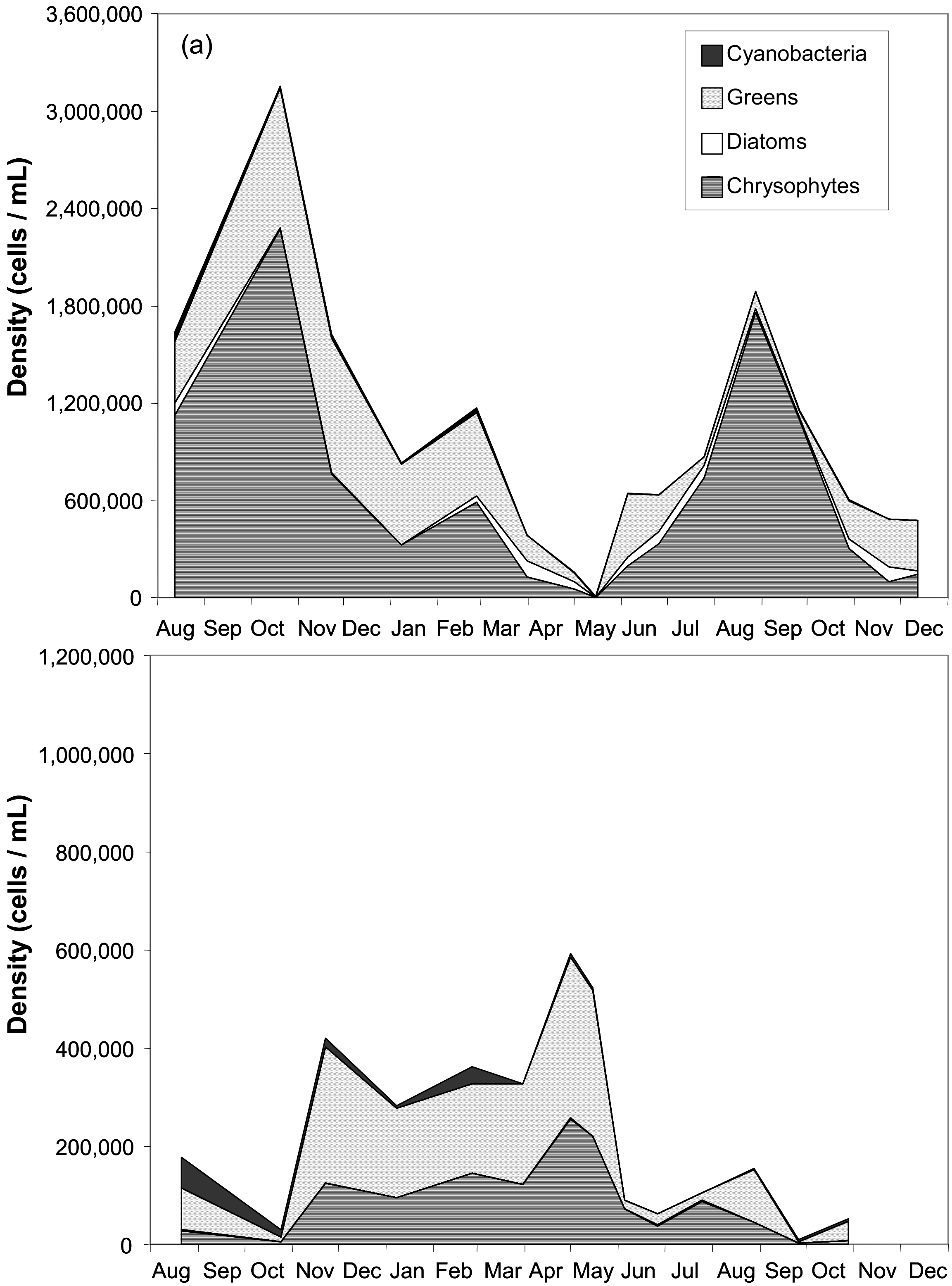

Figure 3: Phytoplankton densities in (a) Farmington and (b) Gilbert Bays from August 2002 to December 2003. Note x-axis on (a) is 3x greater than on (b).

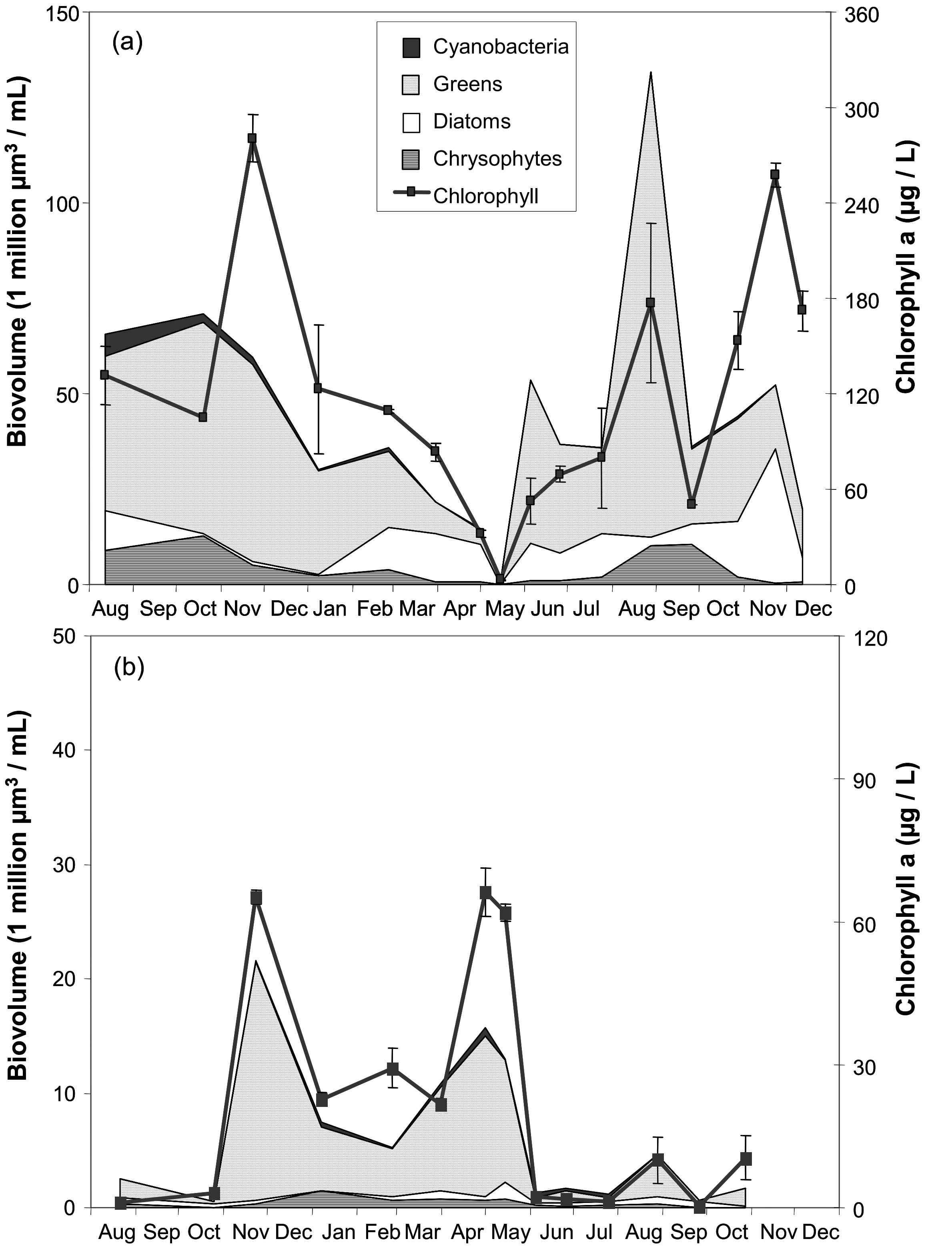

Figure 4: Phytoplankton biovolumes and chlorophyll *a* concentrations in (a) Farmington and (b) Gilbert Bays. Note x-axis on (a) is 3x greater than on (b). Density is expressed as 1 million μm^3 / mL for ease of presentation; 1 million μm^3 / mL = 10^{-6} μm^3 / mL.

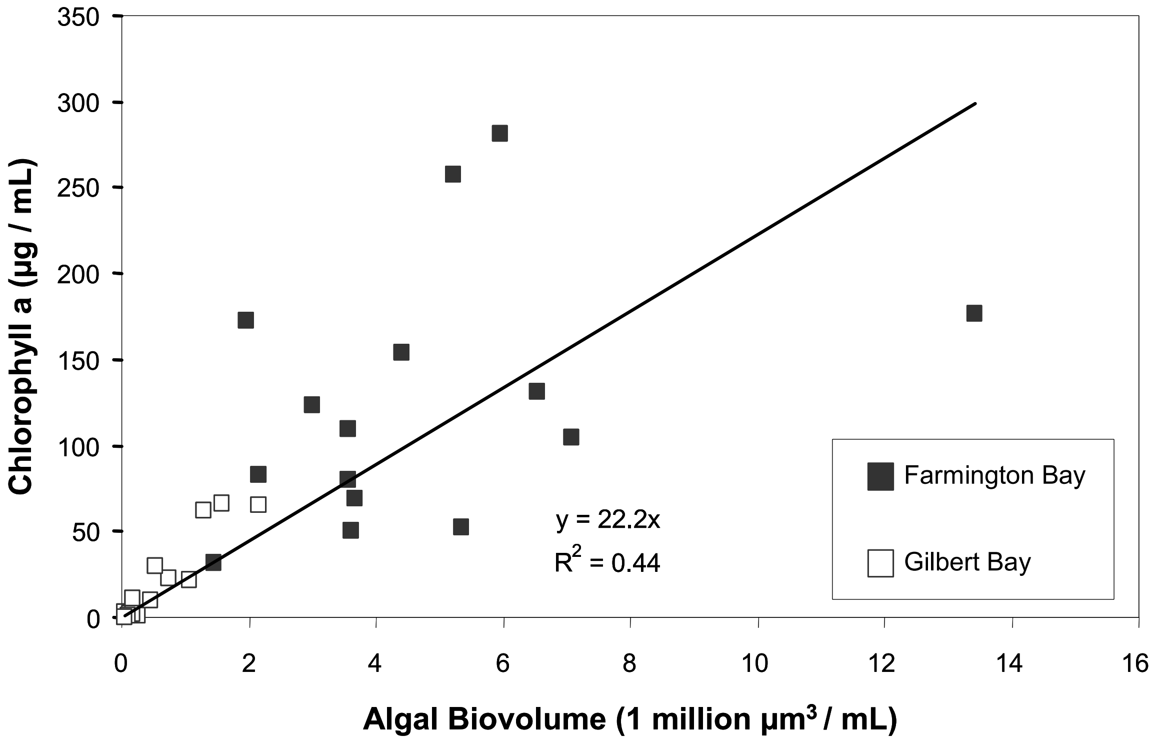

Figure 5: Relationship between algal biovolume and chlorophyll *a* concentrations measured on the same date in Farmington Bay and Gilbert Bay. Note that regression was forced through zero. $P < 0.01$.

Figure 6: Annual mean biomass of zooplankton taxa in Farmington and Gilbert Bays. Note how brine shrimp dominate the zooplankton assemblage in both bays. The "other zooplankton" category includes corixids, brine flies, copepods and *Bosmina* sp.

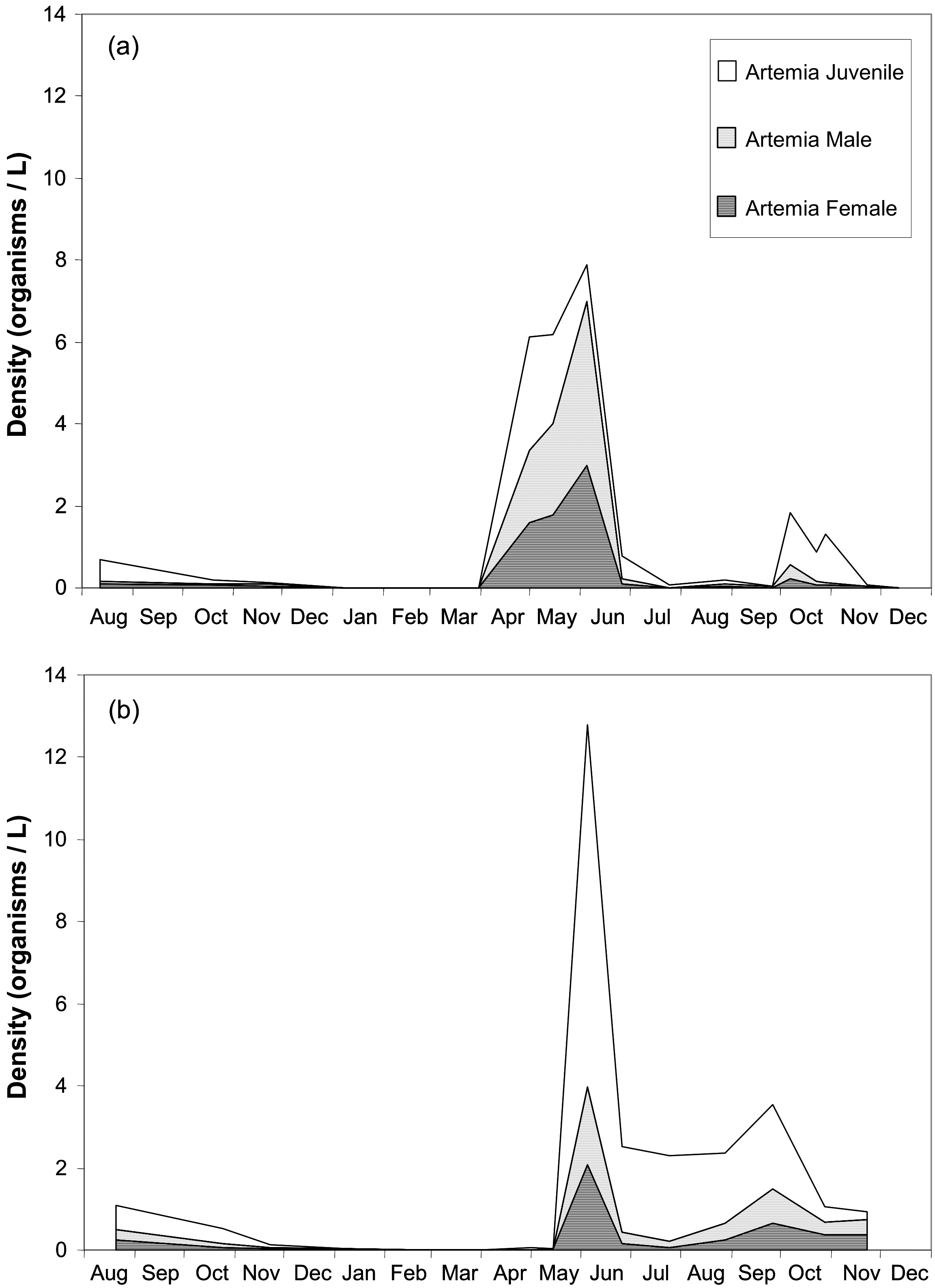

Figure 7: Densities of different life stages of *Artemia* in (a) Farmington and (b) Gilbert Bays from August 2002 until December 2003.

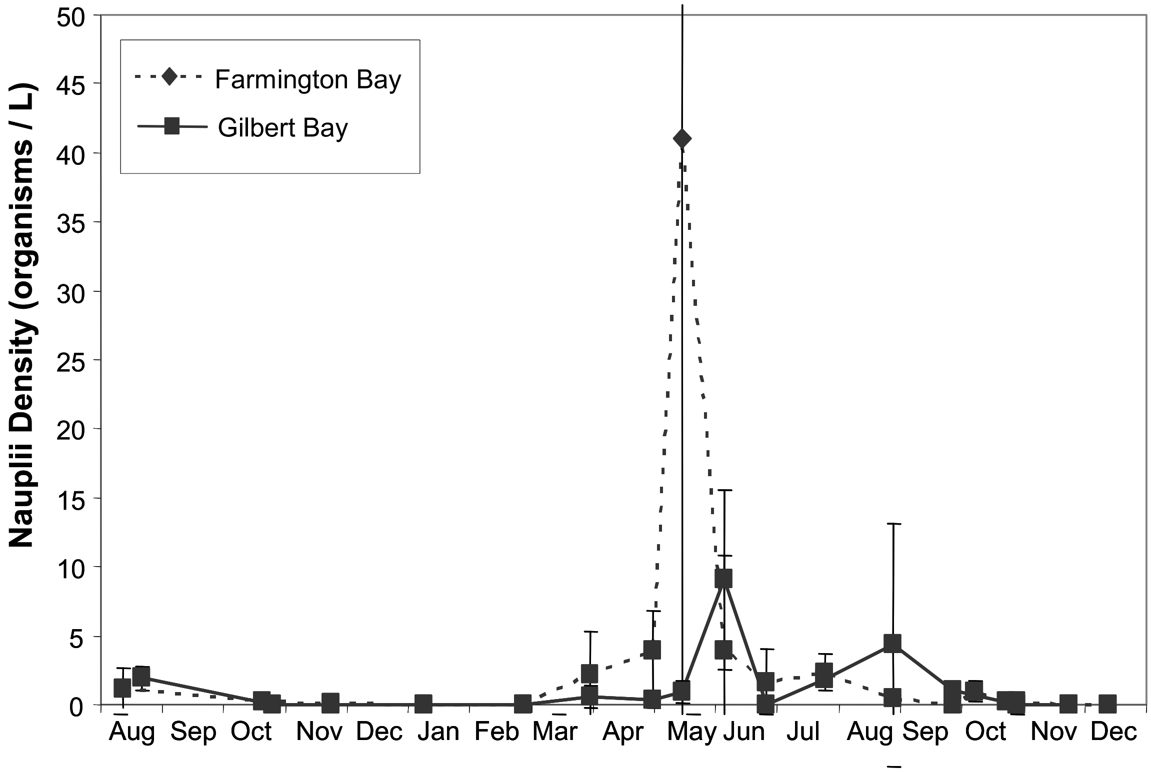

Figure 8: Trends of *Artemia* nauplii density from August 2002 – December 2003) in Farmington and Gilbert Bays.

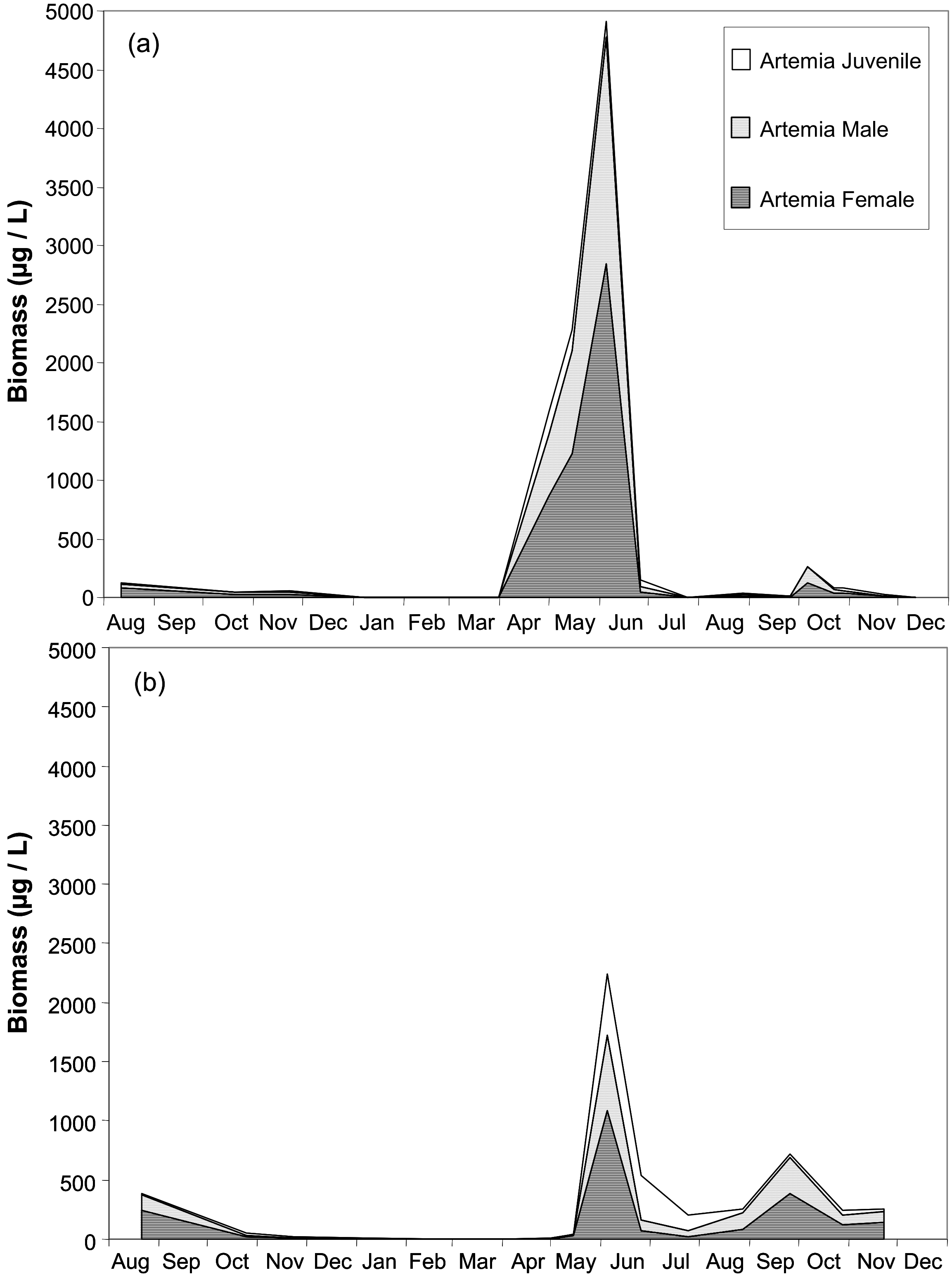

Figure 9: Changes in *Artemia* biomass during 2002 and 2003 in (a) Farmington and (b) Gilbert Bays.

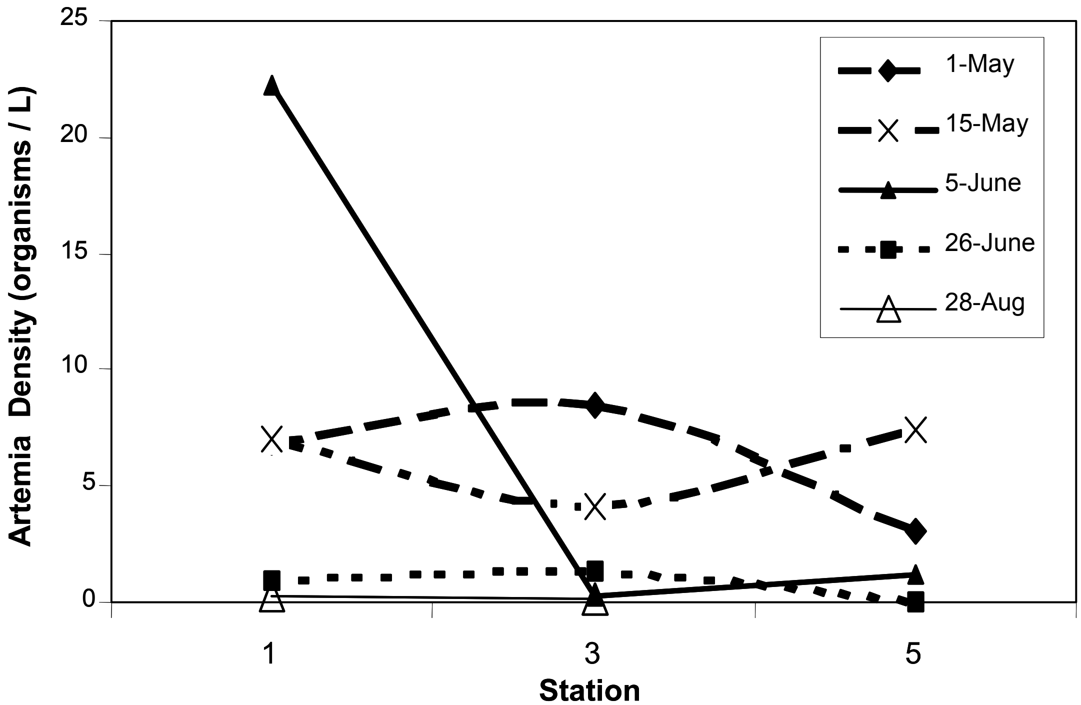

Figure 10: Densities of adult and juvenile (excluding nauplii) *Artemia* in Farmington Bay (2003) at the three sampling stations. Station 1 is the northern-most, and Station 5 is the southern-most area sampled.

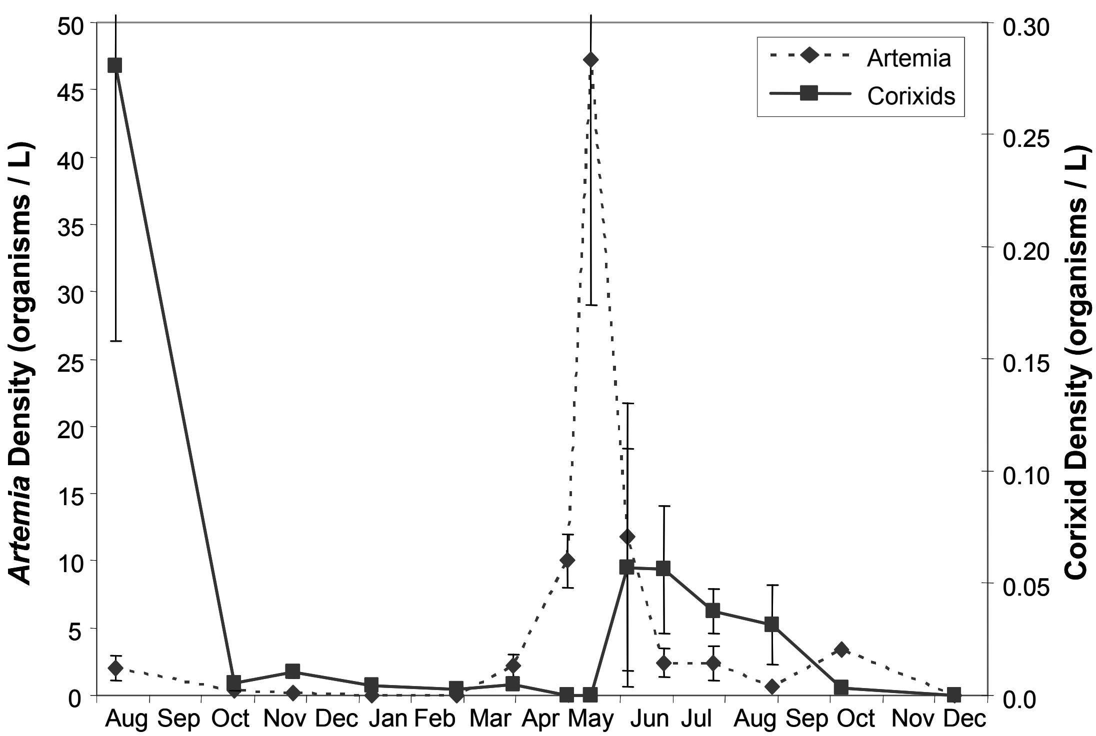

Figure 11: Trends of *Artemia* and corixid density through time (August 2002 – October 2003) in Farmington Bay. Note the crash in *Artemia* populations concurrent with increased corixid densities in June.

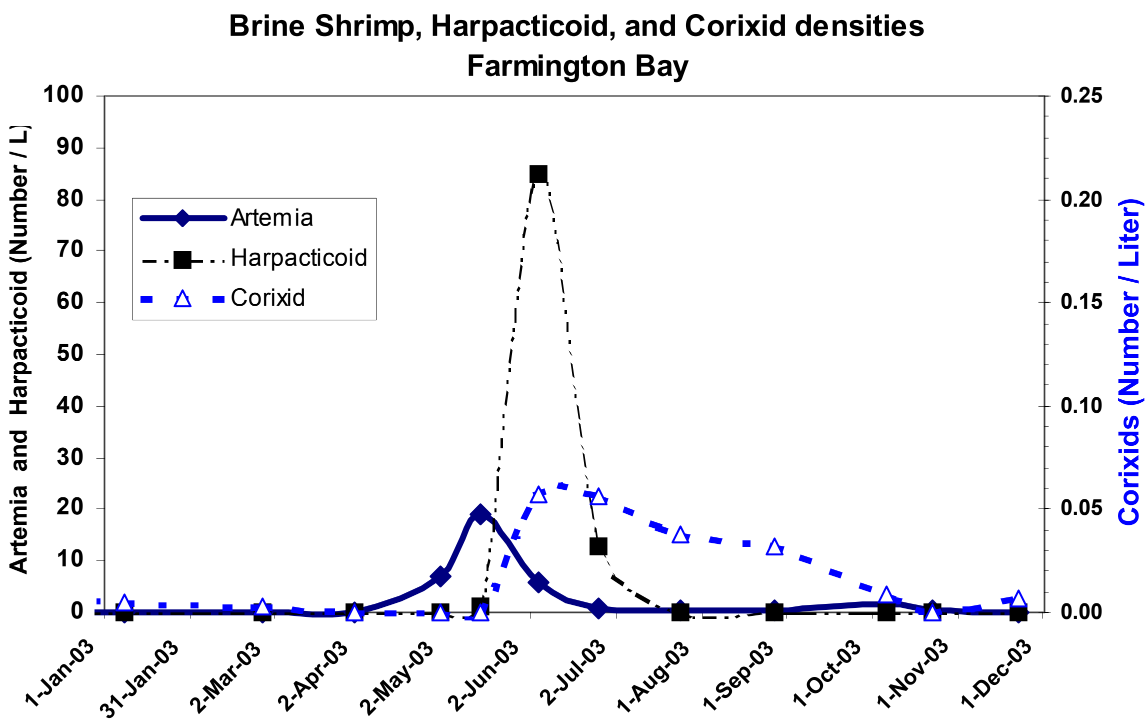

Figure 12: Relationship between brine shrimp, and the predacious corixids and harpacticoid copepods in Farmington Bay during 2003. Note that densities of corixids are much lower than the other species (right scale).

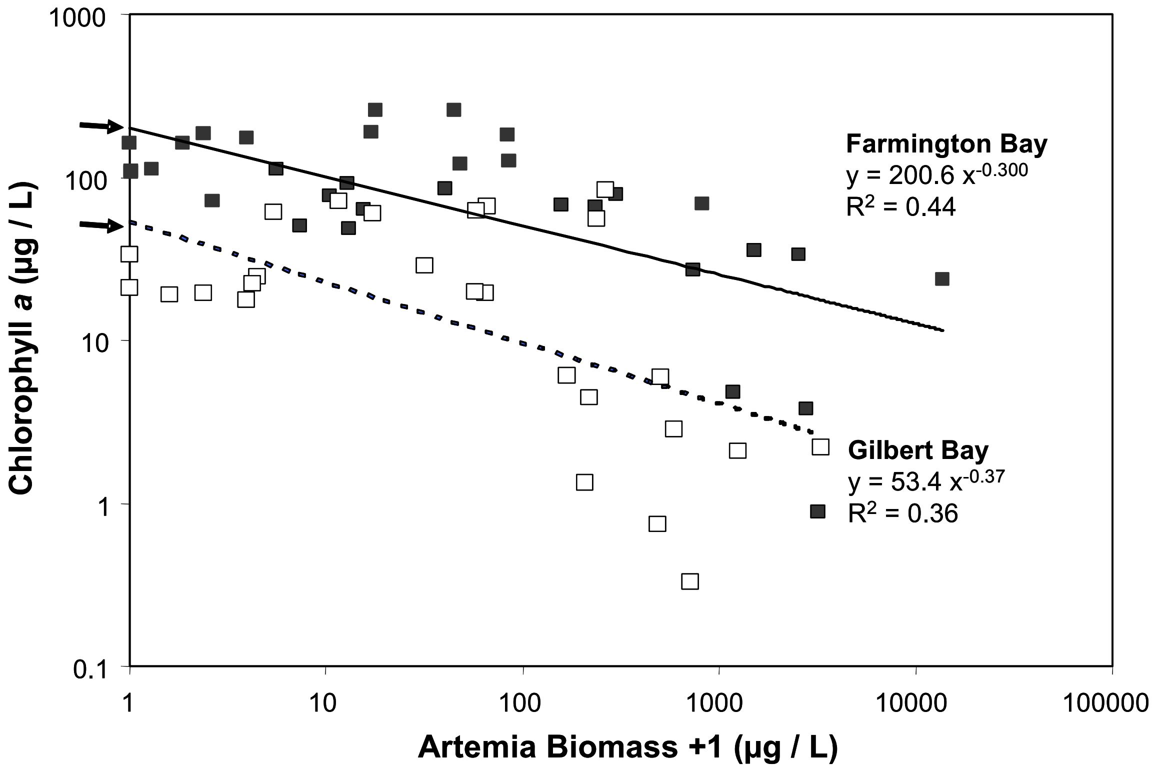

Figure 13: Log-log relationship between *Artemia* biomass and chlorophyll *a* in Farmington (solid squares) and Gilbert Bays (open squares) during the sampling period. Equations of the lines are shown on the figure. The intercept on each line indicates the ungrazed chlorophyll conditions in each bay (53 vs. 200 µg/L). Data from each station sampled are shown.

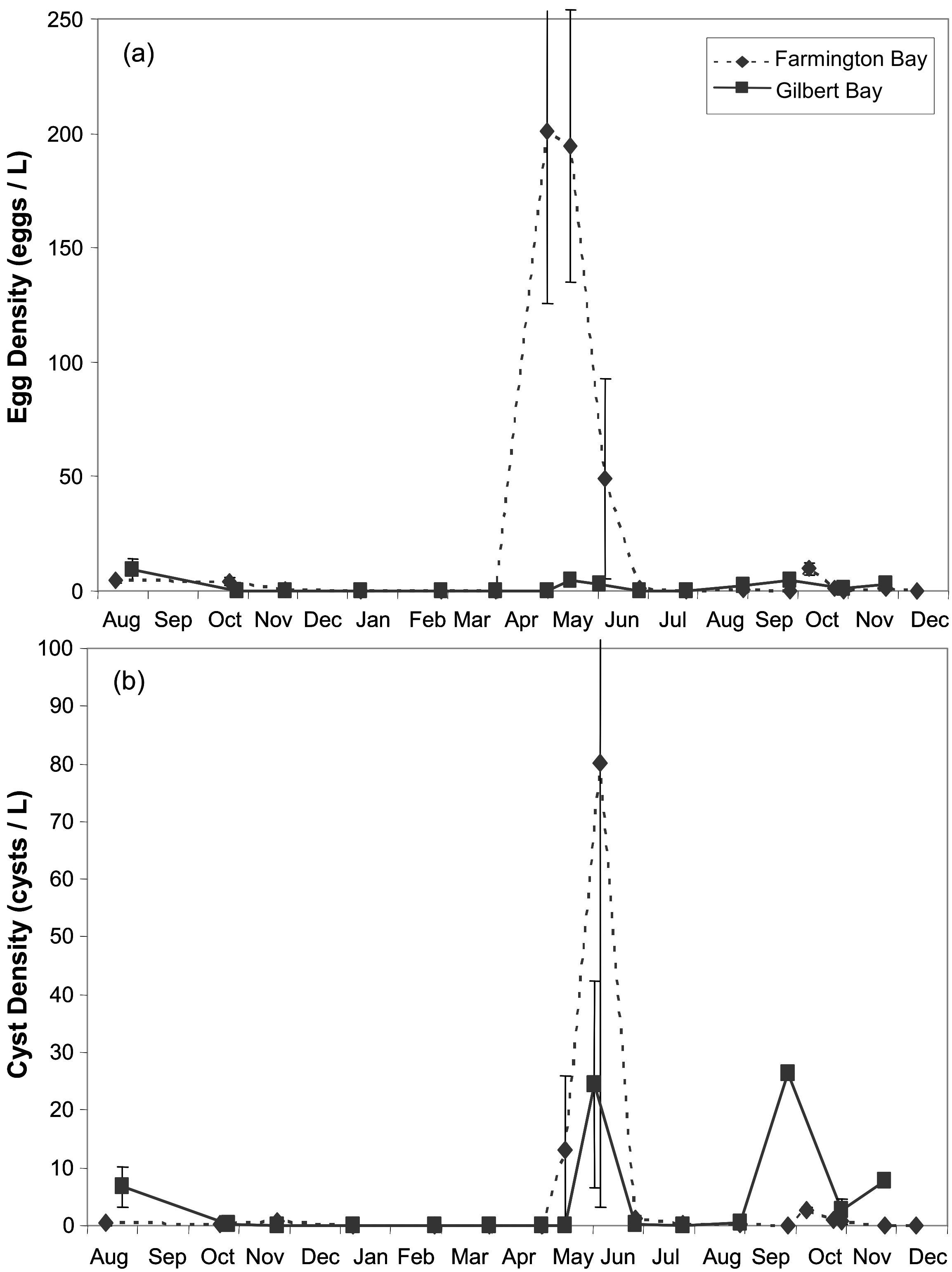

Figure 14: *Artemia* (a) egg and (b) cyst densities in Farmington Bay and Gilbert Bay during the period of study, August 2002 – December 2003. Only eggs or cysts that were in the brood chambers of female shrimp were used in the estimate.

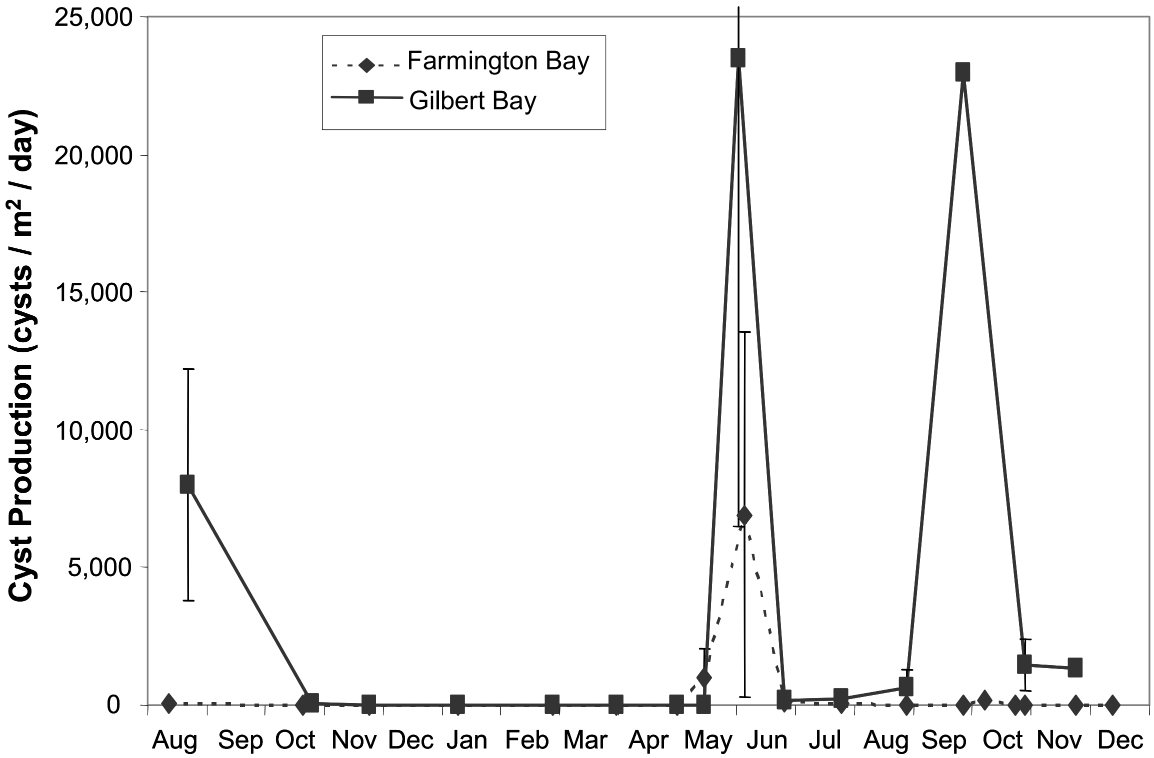

Figure 15: Estimated *Artemia* cyst production in Farmington Bay and Gilbert Bay from August 2002 – December 2003. Note that the mean water column depths in each bay (0.9 m-FB; 4.8 m—Gilbert Bay) were used to estimate areal production rates.

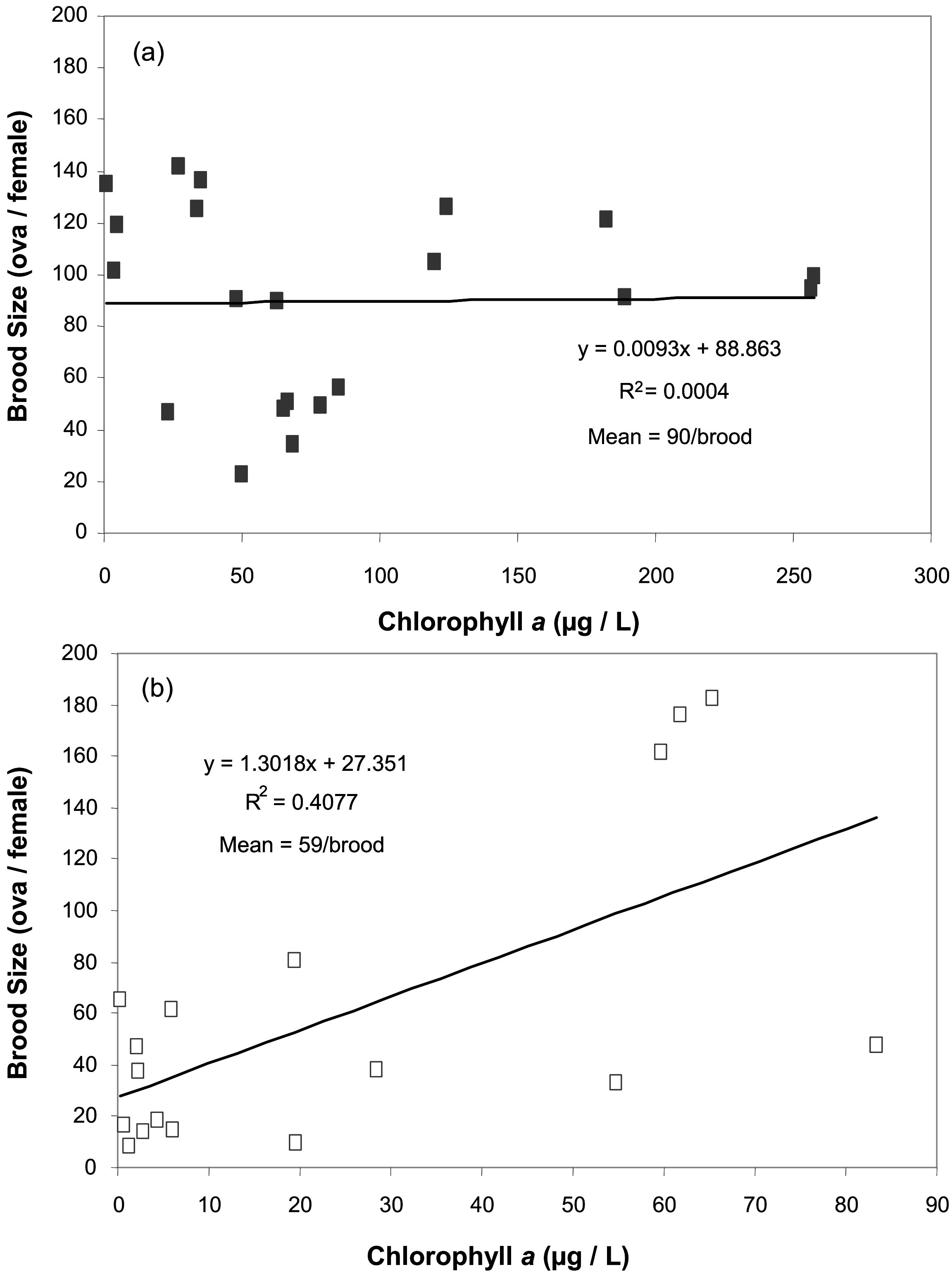

Figure 16: Relationship between brood size and chlorophyll *a*, a surrogate for algal biomass, in (a) Farmington and (b) Gilbert Bays

Appendix I: Physical data, including temperature measured at the bottom of the mixed layer, salinity measured at the bottom of the mixed layer, and Secchi depth. * indicates that Secchi depth was deeper than the station depth on the sampling date (e.g. water column was clear, bottom was visible). Dashes indicate missing data.

Farmington Bay					Gilbert Bay				
Date Sampled	Station	Temperature ©	Salinity (%)	Secchi Depth (m)	Date Sampled	Station	Temperature ©	Salinity (%)	Secchi Depth (m)
12-Aug-02	1	22.8	8.2	0.25	22-Aug-02	14	23.5	12.8	2.3
12-Aug-02	2	22.8	8.1	0.22	22-Aug-02	15	23.8	12.8	2.9
12-Aug-02	3	23.0	8.1	0.19	25-Oct-02	14	13.0	13.6	5.5
12-Aug-02	4	23.6	8.1	0.21	25-Oct-02	15	14.0	-	6.7
12-Aug-02	5	25.1	8.0	0.20	23-Nov-02	14	6.8	-	0.7
20-Oct-02	1	11.4	8.4	0.16	23-Nov-02	15	7.7	-	0.8
20-Oct-02	2	12.1	8.2	0.18	23-Nov-02	18	7.4	-	0.8
20-Oct-02	3	12.0	8.0	0.17	8-Jan-03	15	3.6	-	0.7
20-Oct-02	4	12.4	-	0.21	8-Jan-03	18	2.7	-	0.7
20-Oct-02	5	13.0	-	0.24	26-Feb-03	14	4.5	14.1	0.5
23-Nov-02	1	6.0	-	0.19	26-Feb-03	15	4.6	14.0	-
23-Nov-02	3	6.4	-	0.21	26-Feb-03	18	4.3	14.1	0.6
23-Nov-02	5	8.6	-	0.32	31-Mar-03	14	9.6	12.9	0.5
8-Jan-03	1	1.9	-	0.30	31-Mar-03	15	9.6	12.9	-
8-Jan-03	3	2.1	-	0.29	31-Mar-03	18	9.6	13.0	0.5
8-Jan-03	5	3.5	-	-	1-May-03	14	13.5	12.2	0.4
26-Feb-03	1	2.8	5.2	0.32	1-May-03	18	14.6	12.3	0.5
26-Feb-03	3	3.1	5.2	0.32	15-May-03	14	17.3	13.9	0.5
26-Feb-03	5	4.7	5.2	0.32	15-May-03	15	18.1	13.4	0.5
31-Mar-03	1	8.3	3.9	0.32	15-May-03	18	17.5	13.2	0.5
31-Mar-03	3	9.7	3.9	0.37	5-Jun-03	14	21.6	13.7	0.9
31-Mar-03	5	10.4	3.2	0.28	5-Jun-03	18	22.0	13.8	1.2
1-May-03	1	13.1	5.4	-	26-Jun-03	14	22.2	13.9	-
1-May-03	3	13.5	5.4	0.39	26-Jun-03	15	22.1	-	4.6
1-May-03	5	13.3	4.8	0.39	25-Jul-03	14	28.6	-	3.0
15-May-03	1	19.9	5.4	*	28-Aug-03	14	25.0	15.4	1.0
15-May-03	3	20.1	5.1	*	28-Aug-03	15	25.2	15.0	1.7
15-May-03	5	19.6	4.3	*	28-Aug-03	18	25.3	15.3	0.6
5-Jun-03	1	20.5	5.2	0.40	26-Sep-03	14	20.6	15.6	*
5-Jun-03	3	20.7	5.3	-	28-Oct-03	14	15.5	16.5	0.9
5-Jun-03	5	20.8	4.6	0.33	28-Oct-03	15	15.5	16.5	2.1
26-Jun-03	1	18.8	6.7	0.22	28-Oct-03	18	16.8	16.2	2.5
26-Jun-03	3	20.3	6.6	0.34	23-Nov-03	14	4.4	16.4	0.3
26-Jun-03	5	19.7	5.0	0.32	23-Nov-03	18	4.0	16.5	0.5
25-Jul-03	1	28.6	-	0.64					
25-Jul-03	3	29.0	-	0.40					
28-Aug-03	1	23.3	11.0	-					
28-Aug-03	2	24.0	-	0.08					
28-Aug-03	3	23.6	9.6	0.09					
26-Sep-03	Causeway	19.1	10.1	0.15					
7-Oct-03	1	17.0	-	0.15					
28-Oct-03	1	10.2	8.4	0.28					
28-Oct-03	2	10.2	8.4	0.30					
28-Oct-03	3	13.8	10.1	0.30					
23-Nov-03	Causeway	0.0	5.0	0.24					
12-Dec-03	1	2.7	3.2	0.37					
12-Dec-03	H2S	2.8	3.5	0.38					

Appendix II: Phytoplankton density data for Gilbert and Farmington Bays. All data are reported as cells / mL. All data are results of single samples so variance estimates were not possible.

Date Sampled	Station	Region	*Amphora coffeaeformis*	*Amphora delicatissima*	*Amphora* sp.	*Carteira* sp.	*Chaetocerous* sp.	*Cyclotella* sp.	*Dunaliella salina*	*Dunaliella virdis*	*Glenodinium* sp.	*Microcoleus* sp.
21-Aug-02	14	Gilbert	148	0	186	0	0	0	0	2653	74	186
21-Aug-02	15	Gilbert	0	0	74	0	464	0	74	28283	0	0
25-Oct-02	14	Gilbert	31	31	0	0	0	0	0	3808	0	0
25-Oct-02	15	Gilbert	4	0	0	2	0	0	0	961	5	5
23-Nov-02	14	Gilbert	298	0	0	0	298	1786	52673	196707	0	298
23-Nov-02	15	Gilbert	0	0	0	0	0	1190	57137	269022	0	595
23-Nov-02	18	Gilbert	0	0	0	0	0	0	73782	66478	0	0
8-Jan-03	14	Gilbert	0	0	0	0	0	0	0	31542	0	147880
8-Jan-03	15	Gilbert	0	0	0	0	0	0	298	116655	0	2678
8-Jan-03	18	Gilbert	0	0	0	0	0	0	0	175022	13837	3884
26-Feb-03	14	Gilbert	0	0	0	0	0	331	4960	235758	6613	7605
26-Feb-03	15	Gilbert	0	0	0	0	0	0	0	47614	0	13888
26-Feb-03	18	Gilbert	0	0	0	0	0	0	3337	29792	8103	715
31-Mar-03	14	Gilbert	437	0	0	0	1311	0	0	45880	0	0
31-Mar-03	15	Gilbert	0	397	0	0	0	0	0	145224	0	74596
31-Mar-03	18	Gilbert	331	0	0	0	0	0	22815	197732	7605	9920
1-May-03	14	Gilbert	0	0	0	0	0	0	0	197898	0	98949
1-May-03	18	Gilbert	0	0	1190	0	0	0	0	244619	0	0
15-May-03	14	Gilbert	0	0	0	0	0	0	0	236584	0	3968
15-May-03	15	Gilbert	0	0	0	0	0	0	0	163675	0	992
15-May-03	18	Gilbert	0	0	0	0	0	0	0	224383	0	1190
5-Jun-03	14	Gilbert	0	0	50	0	0	0	0	2926	0	22319
5-Jun-03	18	Gilbert	0	0	198	0	0	0	0	10912	0	47416
26-Jun-03	14	Gilbert	0	54	433	0	0	0	0	6601	0	23374
26-Jun-03	15	Gilbert	0	0	4910	0	149	0	595	16367	0	32140
25-Jul-03	14	Gilbert	0	0	1701	0	510	340	0	8673	170	26358
28-Aug-03	14	Gilbert	0	99	198	0	0	0	0	33033	0	99
28-Aug-03	15	Gilbert	0	0	868	496	0	124	124	39803	0	0
28-Aug-03	18	Gilbert	0	0	213	0	213	213	0	204487	0	0
26-Sep-03	14	Gilbert	594	0	0	0	0	0	0	492	0	0
28-Oct-03	14	Gilbert	68	0	0	0	0	0	0	33112	68	205
28-Oct-03	15	Gilbert	0	0	0	0	0	0	0	10850	0	0
28-Oct-03	18	Gilbert	0	0	0	0	0	0	0	14235	0	0

Date Sampled	Station	Region	*Navicula graciloides*	*Navicula lanceolata*	*Navicula sp.*	*Navicula tripuctata*	*Nitzschia accicularis*	*Nitzschia epithemoides*	*Nitzschia fonticola*	*Nitzschia palea*	*Nodularia sp.*	*Oocystis sp.*
21-Aug-02	14	Gilbert	0	0	74	0	0	221	0	0	0	0
21-Aug-02	15	Gilbert	0	0	0	0	0	0	0	0	0	0
25-Oct-02	14	Gilbert	31	0	31	0	0	94	0	0	0	0
25-Oct-02	15	Gilbert	16	0	5	0	0	5	5	0	0	0
23-Nov-02	14	Gilbert	0	0	0	0	298	0	0	0	0	0
23-Nov-02	15	Gilbert	0	0	0	0	0	0	0	0	0	0
23-Nov-02	18	Gilbert	0	0	0	0	0	0	0	0	0	0
8-Jan-03	14	Gilbert	0	0	0	0	0	0	0	0	0	0
8-Jan-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
8-Jan-03	18	Gilbert	0	0	0	0	0	0	0	485	0	0
26-Feb-03	14	Gilbert	0	0	0	0	0	0	0	0	0	0
26-Feb-03	15	Gilbert	0	0	0	0	0	0	0	397	0	0
26-Feb-03	18	Gilbert	0	0	238	0	0	238	238	0	0	0
31-Mar-03	14	Gilbert	0	0	0	0	0	218	218	437	0	0
31-Mar-03	15	Gilbert	0	0	0	0	0	0	397	0	0	0
31-Mar-03	18	Gilbert	0	0	0	0	0	0	0	331	0	0
1-May-03	14	Gilbert	0	0	0	0	744	0	0	0	0	0
1-May-03	18	Gilbert	595	0	0	0	1190	0	0	0	0	0
15-May-03	14	Gilbert	992	0	496	0	0	0	496	0	0	0
15-May-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
15-May-03	18	Gilbert	0	0	0	0	0	0	0	0	0	0
5-Jun-03	14	Gilbert	0	0	50	0	50	0	0	0	0	595
5-Jun-03	18	Gilbert	0	198	0	0	198	0	198	0	0	0
26-Jun-03	14	Gilbert	0	0	0	0	54	0	54	0	0	3679
26-Jun-03	15	Gilbert	0	0	0	149	149	0	0	0	0	2381
25-Jul-03	14	Gilbert	0	0	0	0	0	0	0	0	0	170
28-Aug-03	14	Gilbert	0	0	99	0	0	99	0	0	0	0
28-Aug-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
28-Aug-03	18	Gilbert	0	0	0	0	0	0	0	0	0	0
26-Sep-03	14	Gilbert	0	0	0	0	0	0	20	0	0	82
28-Oct-03	14	Gilbert	0	0	0	0	0	0	137	0	0	0
28-Oct-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
28-Oct-03	18	Gilbert	0	0	0	0	376	0	0	0	0	0

Date Sampled	Station	Region	*Phaedactylum* sp.	*Pseudoanabaena* sp.	*Rhopalodia musculus*	*Spermato-zopsis* sp.	*Sphaerell-opsis* sp.	*Spirulina* sp.	*Treubaria* sp.	UNID Biflagellate	UNID Chrysophyte	ALL TAXA
21-Aug-02	14	Gilbert	0	0	0	0	0	0	0	53034	22256	78834
21-Aug-02	15	Gilbert	0	1148	0	0	0	74	0	89812	34311	154241
25-Oct-02	14	Gilbert	0	0	0	0	0	0	0	14919	10050	28995
25-Oct-02	15	Gilbert	0	0	0	0	0	0	0	4129	1584	6724
23-Nov-02	14	Gilbert	0	4464	0	0	0	0	0	30354	64577	351752
23-Nov-02	15	Gilbert	0	20831	0	0	0	0	0	52971	264855	666602
23-Nov-02	18	Gilbert	0	0	0	0	0	0	0	33895	42509	216664
8-Jan-03	14	Gilbert	0	0	0	0	0	0	0	163855	54892	398169
8-Jan-03	15	Gilbert	0	0	0	0	0	0	0	56840	145819	322290
8-Jan-03	18	Gilbert	0	0	0	0	0	243	0	0	71854	265324
26-Feb-03	14	Gilbert	0	0	0	0	0	0	0	0	133916	389182
26-Feb-03	15	Gilbert	0	0	0	0	0	0	0	176173	123401	361473
26-Feb-03	18	Gilbert	0	0	0	0	0	0	0	52434	161115	256210
31-Mar-03	14	Gilbert	0	0	0	0	0	218	0	77340	95255	221314
31-Mar-03	15	Gilbert	0	0	0	0	0	0	0	121417	134511	476541
31-Mar-03	18	Gilbert	0	0	0	0	0	0	0	0	126972	365705
1-May-03	14	Gilbert	0	0	0	0	0	0	0	137636	280479	715705
1-May-03	18	Gilbert	0	0	0	0	0	0	595	74398	229145	551733
15-May-03	14	Gilbert	0	0	0	0	0	0	0	81837	270807	595181
15-May-03	15	Gilbert	0	0	0	0	0	0	0	102669	127964	395299
15-May-03	18	Gilbert	0	0	0	0	0	0	1190	85111	259499	571373
5-Jun-03	14	Gilbert	0	0	0	0	0	0	0	6249	18153	50392
5-Jun-03	18	Gilbert	0	0	0	0	0	0	0	13491	127369	199981
26-Jun-03	14	Gilbert	0	0	0	0	0	0	0	5248	14988	54486
26-Jun-03	15	Gilbert	0	0	0	0	0	0	0	11011	60411	128261
25-Jul-03	14	Gilbert	0	0	0	0	0	510	0	5952	87747	132130
28-Aug-03	14	Gilbert	0	99	0	0	0	0	0	23708	38191	95626
28-Aug-03	15	Gilbert	0	0	0	0	0	0	0	22815	62122	126352
28-Aug-03	18	Gilbert	0	0	0	0	0	0	0	0	31034	236159
26-Sep-03	14	Gilbert	0	0	0	0	0	0	0	1485	1977	4649
28-Oct-03	14	Gilbert	0	0	0	0	0	0	0	17819	4028	55438
28-Oct-03	15	Gilbert	0	0	0	0	0	0	0	25666	17239	53756
28-Oct-03	18	Gilbert	0	0	0	0	0	0	0	14337	3277	32225

Date Sampled	Station	Region	*Amphora coffeaeformis*	*Amphora delicatissima*	*Amphora* sp.	*Carteira* sp.	*Chaetocerous* sp.	*Cyclotella* sp.	*Dunaliella salina*	*Dunaliella virdis*	*Glenodinium* sp.	*Microcoleus* sp.
12-Aug-02	1	Farmington	0	0	47667	3972	0	0	43695	231715	52963	38398
12-Aug-02	2	Farmington	0	0	39183	0	3968	0	40175	207321	496	37695
12-Aug-02	3	Farmington	0	1323	41663	0	744	661	52905	258242	2521	41001
12-Aug-02	4	Farmington	0	0	50342	0	0	0	28023	146067	496	55054
12-Aug-02	5	Farmington	0	0	69686	0	0	1736	77621	434978	744	100189
20-Oct-02	1	Farmington	0	0	7936	0	0	992	17855	390835	992	23807
20-Oct-02	2	Farmington	0	1488	0	1488	0	0	0	1714120	0	20831
20-Oct-02	3	Farmington	0	1639	3277	3277	0	0	0	904482	1639	13108
20-Oct-02	4	Farmington	0	0	0	468	468	0	936	8895	468	9519
20-Oct-02	5	Farmington	0	0	0	4682	0	0	3277	479862	0	6554
23-Nov-02	1	Farmington	0	0	1082	0	0	0	1623	367346	541	7865
23-Nov-02	3	Farmington	0	0	0	0	0	0	6311	355384	485	4855
23-Nov-02	5	Farmington	0	0	17855	0	0	1488	2976	1324277	2976	19343
8-Jan-03	1	Farmington	0	0	2809	0	0	0	0	528083	0	0
8-Jan-03	3	Farmington	992	0	496	0	0	0	14384	407203	1488	9424
26-Feb-03	1	Farmington	1984	0	3968	0	27775	9920	3968	620972	0	26783
26-Feb-03	3	Farmington	0	0	19464	0	29792	6753	0	1192	0	15492
26-Feb-03	5	Farmington	0	2976	1488	0	0	20831	8928	721657	0	19343
31-Mar-03	1	Farmington	728	0	0	0	123074	0	0	203181	0	0
31-Mar-03	3	Farmington	546	0	1092	0	57349	1639	3277	115791	0	1912
31-Mar-03	5	Farmington	228	0	683	0	80335	0	0	1821	0	228
1-May-03	1	Farmington	357	0	0	119	11785	0	0	9999	0	9761
1-May-03	3	Farmington	0	237	3800	0	33958	0	0	12823	0	13536
1-May-03	5	Farmington	661	265	0	0	11110	0	0	3968	529	0
15-May-03	1	Farmington	0	19	0	2	0	2	3	132	0	0
15-May-03	3	Farmington	28	55	0	0	0	0	28	609	0	8637
15-May-03	5	Farmington	55	11	44	0	0	5	11	929	0	0
5-Jun-03	1	Farmington	0	7575	16773	0	0	0	541	48697	0	0
5-Jun-03	3	Farmington	546	546	57896	546	0	0	1092	52434	0	0
5-Jun-03	5	Farmington	0	1456	26945	0	0	0	728	66270	0	0
26-Jun-03	1	Farmington	0	6554	103931	936	0	0	936	1873	0	0
26-Jun-03	3	Farmington	0	0	1190	0	0	0	1190	108323	0	0
26-Jun-03	5	Farmington	0	0	74993	0	7440	0	0	298	0	0
25-Jul-03	1	Farmington	0	0	10316	0	86500	0	2381	22220	794	0
25-Jul-03	3	Farmington	0	0	21823	8928	13888	0	7936	24799	0	0
28-Aug-03	1	Farmington	0	0	0	17855	0	0	104157	35711	0	0
28-Aug-03	2	Farmington	0	0	11904	49102	0	0	0	31247	2976	0
28-Aug-03	3	Farmington	0	0	31247	25295	1488	0	1488	38687	0	4464
26-Sep-03	Causeway	Farmington	0	0	0	8739	0	0	2185	26217	0	4369
28-Oct-03	1	Farmington	0	0	0	1311	0	0	1966	266101	1311	3933
28-Oct-03	2	Farmington	0	0	0	0	546	0	4916	257253	0	6554
28-Oct-03	3	Farmington	0	0	0	546	546	0	546	181333	546	3823
23-Nov-03	Causeway	Farmington	86609	0	0	0	0	0	0	297281	0	0
12-Dec-03	1	Farmington	0	0	0	0	0	0	0	252701	0	0
12-Dec-03	H2S	Farmington	0	0	0	0	0	0	0	357205	0	0

Date Sampled	Station	Region	*Navicula graciloides*	*Navicula lanceolata*	*Navicula* sp.	*Navicula tripuctata*	*Nitzschia accicularis*	*Nitzschia epithemoides*	*Nitzschia fonticola*	*Nitzschia palea*	*Nodularia* sp.	*Oocystis* sp.
12-Aug-02	1	Farmington	0	0	0	0	34426	0	0	0	0	137705
12-Aug-02	2	Farmington	0	0	0	0	30751	0	6448	0	992	75390
12-Aug-02	3	Farmington	0	0	0	0	16987	0	4381	0	0	50632
12-Aug-02	4	Farmington	0	0	0	0	8432	0	1984	0	496	49102
12-Aug-02	5	Farmington	0	0	0	0	12152	0	1488	0	0	54806
20-Oct-02	1	Farmington	0	0	0	0	1984	0	0	0	0	16863
20-Oct-02	2	Farmington	0	0	0	0	0	0	0	0	0	2976
20-Oct-02	3	Farmington	1639	0	0	0	0	0	1639	0	0	13108
20-Oct-02	4	Farmington	0	0	0	0	4057	0	0	0	0	4682
20-Oct-02	5	Farmington	0	0	0	0	0	0	0	0	0	0
23-Nov-02	1	Farmington	0	0	0	0	1311	0	0	0	0	21581
23-Nov-02	3	Farmington	0	0	0	0	0	0	0	0	0	6311
23-Nov-02	5	Farmington	0	0	0	0	2976	0	0	0	0	10416
8-Jan-03	1	Farmington	0	0	0	0	0	0	0	0	0	13108
8-Jan-03	3	Farmington	0	0	0	0	496	0	0	0	1984	0
26-Feb-03	1	Farmington	0	0	0	0	0	0	992	0	0	0
26-Feb-03	3	Farmington	0	0	794	0	0	0	2383	0	0	0
26-Feb-03	5	Farmington	0	0	0	0	0	0	0	4464	0	2976
31-Mar-03	1	Farmington	0	0	0	0	2185	0	728	0	0	2913
31-Mar-03	3	Farmington	0	0	0	0	0	0	0	0	819	0
31-Mar-03	5	Farmington	228	0	0	0	0	228	0	0	0	111740
1-May-03	1	Farmington	0	119	119	238	13689	357	0	0	0	476
1-May-03	3	Farmington	0	0	237	0	18760	0	237	0	0	34908
1-May-03	5	Farmington	529	0	265	265	27907	0	132	132	0	0
15-May-03	1	Farmington	2	0	5	0	0	0	0	0	0	42
15-May-03	3	Farmington	28	0	0	0	55	0	0	0	0	664
15-May-03	5	Farmington	0	0	5	0	5	0	5	5	0	1884
5-Jun-03	1	Farmington	0	0	0	0	3246	0	1623	0	0	268913
5-Jun-03	3	Farmington	546	0	0	1092	14747	0	0	0	0	346281
5-Jun-03	5	Farmington	0	0	0	728	21847	0	2185	0	0	385971
26-Jun-03	1	Farmington	0	0	0	936	0	0	0	0	0	312730
26-Jun-03	3	Farmington	0	0	0	0	4761	0	23807	0	0	228549
26-Jun-03	5	Farmington	0	0	0	0	4761	0	0	0	0	38687
25-Jul-03	1	Farmington	0	0	794	0	794	0	0	0	0	10316
25-Jul-03	3	Farmington	0	0	0	992	6944	992	0	0	0	0
28-Aug-03	1	Farmington	0	0	0	0	0	0	0	0	0	0
28-Aug-03	2	Farmington	0	0	0	0	0	0	1488	0	0	0
28-Aug-03	3	Farmington	0	0	0	0	1488	0	0	0	0	26783
26-Sep-03	Causeway	Farmington	0	0	0	0	20755	0	0	0	0	0
28-Oct-03	1	Farmington	0	0	0	0	55711	0	0	0	0	0
28-Oct-03	2	Farmington	0	0	0	0	75373	0	0	0	0	0
28-Oct-03	3	Farmington	0	0	0	0	41510	0	0	0	0	0
23-Nov-03	Causeway	Farmington	0	0	0	0	0	0	0	0	0	0
12-Dec-03	1	Farmington	0	1456	0	0	23304	0	0	0	0	0
12-Dec-03	H2S	Farmington	0	0	0	0	26217	0	0	0	0	0

Date Sampled	Station	Region	*Phaedactylum* sp.	*Pseudo-anabaena* sp.	*Rhopalodia musculus*	*Spermato-zopsis* sp.	*Sphaere-llopsis* sp.	*Spirulina* sp.	*Treubaria* sp.	UNID Biflagellate	UNID Chyrsophyte	ALL TAXA
12-Aug-02	1	Farmington	0	0	0	0	0	0	0	0	1437955	2028497
12-Aug-02	2	Farmington	0	5952	0	0	0	0	0	496	1353540	1802406
12-Aug-02	3	Farmington	0	7522	0	0	0	0	0	4464	622253	1105300
12-Aug-02	4	Farmington	0	496	0	0	0	0	0	992	1128611	1470096
12-Aug-02	5	Farmington	0	5704	0	0	0	0	0	0	1206233	1965336
20-Oct-02	1	Farmington	0	0	0	0	0	0	0	20831	2096028	2578124
20-Oct-02	2	Farmington	0	0	0	0	0	0	0	0	2944657	4685560
20-Oct-02	3	Farmington	0	0	0	0	0	0	0	3277	2937928	3885012
20-Oct-02	4	Farmington	0	0	0	0	0	0	0	548369	1065997	1643860
20-Oct-02	5	Farmington	0	0	0	0	0	0	0	169941	2311766	2976083
23-Nov-02	1	Farmington	0	0	0	0	0	0	0	0	434725	836074
23-Nov-02	3	Farmington	0	0	0	0	0	0	0	0	273821	647168
23-Nov-02	5	Farmington	0	14880	0	0	0	0	0	4464	1139771	2541422
8-Jan-03	1	Farmington	0	0	0	0	0	0	0	42134	349246	935380
8-Jan-03	3	Farmington	0	0	0	0	0	0	0	0	291143	727608
26-Feb-03	1	Farmington	0	0	0	0	0	0	0	9920	310486	1016767
26-Feb-03	3	Farmington	0	0	0	0	0	0	0	0	343600	419470
26-Feb-03	5	Farmington	0	40175	0	0	0	0	0	156235	1102572	2081645
31-Mar-03	1	Farmington	0	0	0	0	0	0	16750	0	309505	659063
31-Mar-03	3	Farmington	19116	0	0	0	0	0	0	5735	58169	265446
31-Mar-03	5	Farmington	0	0	0	0	0	0	18434	0	23440	237363
1-May-03	1	Farmington	0	0	0	0	0	0	16070	14284	40948	118322
1-May-03	3	Farmington	0	0	0	0	0	0	52244	10686	57706	239134
1-May-03	5	Farmington	0	0	0	0	0	0	15475	0	64280	125517
15-May-03	1	Farmington	0	0	0	0	0	0	0	186	248	640
15-May-03	3	Farmington	0	0	0	0	0	0	0	498	0	10603
15-May-03	5	Farmington	0	0	0	0	0	0	0	38	1677	4675
5-Jun-03	1	Farmington	0	0	0	0	0	0	0	541	235908	583818
5-Jun-03	3	Farmington	0	0	0	0	0	0	0	0	234859	710586
5-Jun-03	5	Farmington	0	0	0	0	0	0	0	0	120161	626292
26-Jun-03	1	Farmington	0	0	0	0	0	0	0	0	421343	849239
26-Jun-03	3	Farmington	0	0	0	1190	0	0	0	0	507094	876106
26-Jun-03	5	Farmington	0	0	0	0	0	0	0	0	56840	183018
25-Jul-03	1	Farmington	0	0	0	0	0	794	0	0	671364	806271
25-Jul-03	3	Farmington	0	0	0	0	0	0	0	34719	810438	931458
28-Aug-03	1	Farmington	0	0	0	0	0	0	0	0	2645578	2803301
28-Aug-03	2	Farmington	0	0	0	0	1488	0	0	0	1465633	1563837
28-Aug-03	3	Farmington	0	0	0	0	0	0	0	0	1171018	1301958
26-Sep-03	Causeway	Farmington	0	0	0	0	0	0	0	0	1091277	1153542
28-Oct-03	1	Farmington	0	0	0	0	0	0	0	0	340819	671152
28-Oct-03	2	Farmington	0	0	0	0	0	0	0	0	247422	592064
28-Oct-03	3	Farmington	0	0	0	0	0	0	0	0	316787	545639
23-Nov-03	Causeway	Farmington	0	0	0	0	0	0	0	0	98313	482203
12-Dec-03	1	Farmington	0	0	0	0	0	0	0	0	115063	392525
12-Dec-03	H2S	Farmington	0	0	0	0	0	0	0	0	172048	555470

Appendix III: Phytoplankton biovolume data for Gilbert and Farmington Bays. All data are reported as μm^3 / mL. All data are results of single samples so variance estimates were not possible.

Date Sampled	Station	Region	*Amphora coffeaeformis*	*Amphora delicatissima*	*Amphora* sp.	*Carteria* sp.	*Chaetocerous* sp.	*Cyclotella* sp.	*Dunaliella salina*	*Dunaliella virdis*	*Glenodinium* sp.	*Microcoleus* sp.
21-Aug-02	14	Gilbert	249729	0	12525	0	0	0	0	414116	25426	5694
21-Aug-02	15	Gilbert	0	0	6665	0	43138	0	14930	1411771	0	0
25-Oct-02	14	Gilbert	25668	2684	0	0	0	0	0	368409	0	0
25-Oct-02	15	Gilbert	2630	0	0	2175	0	0	0	71508	17398	189
23-Nov-02	14	Gilbert	211149	0	0	0	57586	365778	8684206	6518877	0	19551
23-Nov-02	15	Gilbert	0	0	0	0	0	243852	15522992	12373900	0	10664
23-Nov-02	18	Gilbert	0	0	0	0	0	0	15303784	2522635	0	0
8-Jan-03	14	Gilbert	0	0	0	0	0	0	0	3880593	0	1201159
8-Jan-03	15	Gilbert	0	0	0	0	0	0	172758	6019662	0	88867
8-Jan-03	18	Gilbert	0	0	0	0	0	0	0	4419995	2056324	68199
26-Feb-03	14	Gilbert	0	0	0	0	0	67737	533113	7359429	690253	140805
26-Feb-03	15	Gilbert	0	0	0	0	0	0	0	3094006	0	272053
26-Feb-03	18	Gilbert	0	0	0	0	0	0	0	0	0	27330
31-Mar-03	14	Gilbert	341799	0	0	0	181124	0	0	3942728	0	0
31-Mar-03	15	Gilbert	0	60667	0	0	0	0	0	9322576	0	454432
31-Mar-03	18	Gilbert	669072	0	0	0	0	0	3874383	8009035	654064	524910
1-May-03	14	Gilbert	0	0	0	0	0	0	0	9708421	0	1524697
1-May-03	18	Gilbert	0	0	240297	0	0	0	0	16518807	0	0
15-May-03	14	Gilbert	0	0	0	0	0	0	0	13330346	0	113158
15-May-03	15	Gilbert	0	0	0	0	0	0	0	8142916	0	8294
15-May-03	18	Gilbert	0	0	0	0	0	0	0	9145513	0	42656
5-Jun-03	14	Gilbert	0	0	10664	0	0	0	0	258523	0	191953
5-Jun-03	18	Gilbert	0	0	38391	0	0	0	0	480481	0	577709
26-Jun-03	14	Gilbert	0	3102	43844	0	0	0	0	504637	0	122850
26-Jun-03	15	Gilbert	0	0	531209	0	13330	0	157369	651329	0	326321
25-Jul-03	14	Gilbert	0	0	198047	0	84094	69672	0	221203	14625	295954
28-Aug-03	14	Gilbert	0	45500	15596	0	0	0	0	1400675	0	948
28-Aug-03	15	Gilbert	0	0	97106	1101363	0	203210	167268	1312215	0	0
28-Aug-03	18	Gilbert	0	0	25391	0	31992	65000	0	6885478	0	0
26-Sep-03	14	Gilbert	537652	0	0	0	0	0	0	27866	0	0
28-Oct-03	14	Gilbert	43956	0	0	0	0	0	0	2960853	63937	15739
28-Oct-03	15	Gilbert	0	0	0	0	0	0	0	746839	0	0
28-Oct-03	18	Gilbert	0	0	0	0	0	0	0	806965	0	0

Date Sampled	Station	Region	*Navicula graciloides*	*Navicula lanceolata*	*Navicula* sp.	*Navicula tripuctata*	*Nitzschia accicularis*	*Nitzschia epithemoides*	*Nitzschia fonticola*	*Nitzschia palea*	*Nodularia* sp.	*Oocystis* sp.
21-Aug-02	14	Gilbert	0	0	57550	0	0	771252	0	0	0	0
21-Aug-02	15	Gilbert	0	0	0	0	0	0	0	0	0	0
25-Oct-02	14	Gilbert	4772	0	403751	0	0	286555	0	0	0	0
25-Oct-02	15	Gilbert	7116	0	102452	0	0	10101	399	0	0	0
23-Nov-02	14	Gilbert	0	0	0	0	78413	0	0	0	0	0
23-Nov-02	15	Gilbert	0	0	0	0	0	0	0	0	0	0
23-Nov-02	18	Gilbert	0	0	0	0	0	0	0	0	0	0
8-Jan-03	14	Gilbert	0	0	0	0	0	0	0	0	0	0
8-Jan-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
8-Jan-03	18	Gilbert	0	0	0	0	0	0	0	164728	0	0
26-Feb-03	14	Gilbert	0	0	0	0	0	0	0	0	0	0
26-Feb-03	15	Gilbert	0	0	0	0	0	0	0	82976	0	0
26-Feb-03	18	Gilbert	0	0	236862	0	0	690792	15496	0	0	0
31-Mar-03	14	Gilbert	0	0	0	0	0	552817	59809	167465	0	0
31-Mar-03	15	Gilbert	0	0	0	0	0	0	9052	0	0	0
31-Mar-03	18	Gilbert	0	0	0	0	0	0	0	197131	0	0
1-May-03	14	Gilbert	0	0	0	0	82599	0	0	0	0	0
1-May-03	18	Gilbert	19195	0	0	0	331980	0	0	0	0	0
15-May-03	14	Gilbert	244385	0	3948081	0	0	0	48277	0	0	0
15-May-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
15-May-03	18	Gilbert	0	0	0	0	0	0	0	0	0	0
5-Jun-03	14	Gilbert	0	0	278688	0	10523	0	0	0	0	88867
5-Jun-03	18	Gilbert	0	2370	0	0	21121	0	7468	0	0	0
26-Jun-03	14	Gilbert	0	0	0	0	37545	0	1296	0	0	311979
26-Jun-03	15	Gilbert	0	0	0	52254	37170	0	0	0	0	245913
25-Jul-03	14	Gilbert	0	0	0	0	0	0	0	0	0	30469
28-Aug-03	14	Gilbert	0	0	1167836	0	0	406584	0	0	0	0
28-Aug-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
28-Aug-03	18	Gilbert	0	0	0	0	0	0	0	0	0	0
26-Sep-03	14	Gilbert	0	0	0	0	0	0	2196	0	0	6000
28-Oct-03	14	Gilbert	0	0	0	0	0	0	7632	0	0	0
28-Oct-03	15	Gilbert	0	0	0	0	0	0	0	0	0	0
28-Oct-03	18	Gilbert	0	0	0	0	86092	0	0	0	0	0

Date Sampled	Station	Region	*Phaedactylum* sp.	*Pseudo-anabaena* sp.	*Rhopalodia musculus*	*Spermato-zopsis* sp.	*Sphaerell-opsis* sp.	*Spirulina* sp.	*Treubaria* sp.	UNID Biflagellate	UNID Chyrsophyte	ALL TAXA
21-Aug-02	14	Gilbert	0	0	0	0	0	0	0	166138	331774	1536292
21-Aug-02	15	Gilbert	0	6157	0	0	0	1244	0	1419145	172621	1483906
25-Oct-02	14	Gilbert	0	0	0	0	0	0	0	50312	39318	1091838
25-Oct-02	15	Gilbert	0	0	0	0	0	0	0	20553	6349	213967
23-Nov-02	14	Gilbert	0	123170	0	0	0	0	0	490352	299908	16058730
23-Nov-02	15	Gilbert	0	398126	0	0	0	0	0	560351	578742	28549534
23-Nov-02	18	Gilbert	0	0	0	0	0	0	0	442657	92887	17826419
8-Jan-03	14	Gilbert	0	0	0	0	0	0	0	1783829	96035	5081752
8-Jan-03	15	Gilbert	0	0	0	0	0	0	0	382383	1412832	6281287
8-Jan-03	18	Gilbert	0	0	0	0	0	6379	0	0	696185	6715625
26-Feb-03	14	Gilbert	0	0	0	0	0	0	0	0	853127	8791337
26-Feb-03	15	Gilbert	0	0	0	0	0	0	0	1318183	331653	3449035
26-Feb-03	18	Gilbert	0	0	0	0	0	0	0	0	0	970480
31-Mar-03	14	Gilbert	0	0	0	0	0	25575	0	924064	0	5271317
31-Mar-03	15	Gilbert	0	0	0	0	0	0	0	838282	526255	9846726
31-Mar-03	18	Gilbert	0	0	0	0	0	0	0	0	1076633	13928596
1-May-03	14	Gilbert	0	0	0	0	0	0	0	1402919	385954	11315718
1-May-03	18	Gilbert	0	0	0	0	0	0	39813	383196	896496	17150093
15-May-03	14	Gilbert	0	0	0	0	0	0	0	319395	473786	17684246
15-May-03	15	Gilbert	0	0	0	0	0	0	0	826982	343917	8151210
15-May-03	18	Gilbert	0	0	0	0	0	0	71094	366534	1417387	9259264
5-Jun-03	14	Gilbert	0	0	0	0	0	0	0	43316	99152	839219
5-Jun-03	18	Gilbert	0	0	0	0	0	0	0	111771	278316	1127539
26-Jun-03	14	Gilbert	0	0	0	0	0	0	0	30092	95481	1025254
26-Jun-03	15	Gilbert	0	0	0	0	0	0	0	116477	68496	2014895
25-Jul-03	14	Gilbert	0	0	0	0	0	16453	0	42467	153516	930517
28-Aug-03	14	Gilbert	0	4266	0	0	0	0	0	111672	281649	3041404
28-Aug-03	15	Gilbert	0	0	0	0	0	0	0	110537	458137	2881162
28-Aug-03	18	Gilbert	0	0	0	0	0	0	0	0	83408	7007861
26-Sep-03	14	Gilbert	0	0	0	0	0	0	0	6595	14576	573715
28-Oct-03	14	Gilbert	0	0	0	0	0	0	0	83934	22002	3092117
28-Oct-03	15	Gilbert	0	0	0	0	0	0	0	93977	46332	746839
28-Oct-03	18	Gilbert	0	0	0	0	0	0	0	42244	20877	893056

Date Sampled	Station	Region	*Amphora coffeaeformis*	*Amphora delicatissima*	*Amphora* sp.	*Carteria* sp.	*Chaetocerous* sp.	*Cyclotella* sp.	*Dunaliella salina*	*Dunaliella virdis*	*Glenodinium* sp.	*Microcoleus* sp.
12-Aug-02	1	Farmington	0	0	11228896	18846565	0	0	52919437	36002261	10797115	2334612
12-Aug-02	2	Farmington	0	0	3077877	0	270157	0	16108270	15175543	799016	3755298
12-Aug-02	3	Farmington	0	483833	2502640	0	35380	394966	19823963	11543820	4384931	3845705
12-Aug-02	4	Farmington	0	0	4329157	0	0	0	6944700	13501383	970234	2823671
12-Aug-02	5	Farmington	0	0	4324159	0	0	747671	9952647	15107413	2251306	11112804
20-Oct-02	1	Farmington	0	0	930030	0	0	127969	8384495	21734804	1006373	2104142
20-Oct-02	2	Farmington	0	21328	0	2150590	0	0	0	134030376	0	4477138
20-Oct-02	3	Farmington	0	36698	366983	2959348	0	0	0	47402219	1212837	1358325
20-Oct-02	4	Farmington	0	0	0	966318	123306	0	1456280	737026	401887	1472628
20-Oct-02	5	Farmington	0	0	0	11973515	0	0	3392550	21984844	0	919120
23-Nov-02	1	Farmington	0	0	94496	0	0	0	411573	19810792	400751	1258897
23-Nov-02	3	Farmington	0	0	0	0	0	0	1383929	33294960	53087	479017
23-Nov-02	5	Farmington	0	0	1317281	0	0	111084	385092	74453997	3019120	2442253
8-Jan-03	1	Farmington	0	0	671054	0	0	0	0	34638399	0	0
8-Jan-03	3	Farmington	15700	0	53320	0	0	0	4699960	12873729	203210	306178
26-Feb-03	1	Farmington	917111	0	519726	0	3579549	3387547	572701	34812623	0	790209
26-Feb-03	3	Farmington	0	0	3051516	0	3220764	2843212	0	281175	0	523686
26-Feb-03	5	Farmington	0	1306350	191953	0	0	2304066	983762	21184841	0	362757
31-Mar-03	1	Farmington	584563	0	0	0	17911394	0	0	6792951	0	0
31-Mar-03	3	Farmington	1011241	0	118250	0	6567697	1554013	1073967	6831490	0	57412
31-Mar-03	5	Farmington	146793	0	81189	0	8378242	0	0	1054189	0	6524
1-May-03	1	Farmington	222429	0	0	353005	2478066	0	0	611521	0	239018
1-May-03	3	Farmington	0	14041	641437	0	5724265	0	0	550410	0	792257
1-May-03	5	Farmington	701081	34125	0	0	1911004	0	0	157064	353824	0
15-May-03	1	Farmington	0	14971	0	14371	0	2277	1946	15753	0	0
15-May-03	3	Farmington	83329	47798	0	0	0	0	112868	17023	0	132056
15-May-03	5	Farmington	33003	2180	7373	0	0	11009	29359	91993	0	0
5-Jun-03	1	Farmington	0	174325	2475342	0	0	0	1165078	1937838	0	0
5-Jun-03	3	Farmington	203879	6524	10385408	1190002	0	0	2352168	2455163	0	0
5-Jun-03	5	Farmington	0	50888	3540431	0	0	0	1957241	2053503	0	0
26-Jun-03	1	Farmington	0	69342	9733959	858949	0	0	1932635	53684	0	0
26-Jun-03	3	Farmington	0	0	91000	0	0	0	4265633	3851449	0	0
26-Jun-03	5	Farmington	0	0	8668313	0	855153	0	0	18958	0	0
25-Jul-03	1	Farmington	0	0	1390607	0	9428234	0	10957938	1114292	230344	0
25-Jul-03	3	Farmington	0	0	3192571	2415514	1794220	0	24635567	3883109	0	0
28-Aug-03	1	Farmington	0	0	0	4350946	0	0	218081351	5032509	0	0
28-Aug-03	2	Farmington	0	0	2115487	67244807	0	0	0	1796543	606668	0
28-Aug-03	3	Farmington	0	0	3986533	40052632	133301	0	18514033	4887925	0	662950
26-Sep-03	Causeway	Farmington	0	0	0	0	0	0	18946089	883107	0	559771
28-Oct-03	1	Farmington	0	0	0	3343619	0	0	9722296	16315439	1227581	667028
28-Oct-03	2	Farmington	0	0	0	0	57086	0	25006630	16185204	0	911291
28-Oct-03	3	Farmington	0	0	0	1002107	48931	0	1781524	7485741	554117	547114
23-Nov-03	Causeway	Farmington	34896222	0	0	0	0	0	0	16923326	0	0
12-Dec-03	1	Farmington	0	0	0	0	0	0	0	9327952	0	0
12-Dec-03	H2S	Farmington	0	0	0	0	0	0	0	15608467	0	0

Date Sampled	Station	Region	*Navicula graciloides*	*Navicula lanceolata*	*Navicula* sp.	*Navicula tripuctata*	*Nitzschia accicularis*	*Nitzschia epithetmoides*	*Nitzschia fonticola*	*Nitzschia palea*	*Nodularia* sp.	*Oocystis* sp.
12-Aug-02	1	Farmington	0	0	0	0	6823357	0	0	0	0	8124356
12-Aug-02	2	Farmington	0	0	0	0	6669410	0	109800	0	1099585	4126192
12-Aug-02	3	Farmington	0	0	0	0	3749284	0	73054	0	0	3263074
12-Aug-02	4	Farmington	0	0	0	0	1919668	0	40734	0	1036786	3563780
12-Aug-02	5	Farmington	0	0	0	0	8744896	0	24751	0	0	4933398
20-Oct-02	1	Farmington	0	0	0	0	565747	0	0	0	0	1268982
20-Oct-02	2	Farmington	0	0	0	0	0	0	0	0	0	85313
20-Oct-02	3	Farmington	775067	0	0	0	0	0	31150	0	0	907620
20-Oct-02	4	Farmington	0	0	0	0	609169	0	0	0	0	456496
20-Oct-02	5	Farmington	0	0	0	0	0	0	0	0	0	0
23-Nov-02	1	Farmington	0	0	0	0	354368	0	0	0	0	2319231
23-Nov-02	3	Farmington	0	0	0	0	0	0	0	0	0	147940
23-Nov-02	5	Farmington	0	0	0	0	526852	0	0	0	0	487501
8-Jan-03	1	Farmington	0	0	0	0	0	0	0	0	0	2261836
8-Jan-03	3	Farmington	0	0	0	0	5846	0	0	0	15996	0
26-Feb-03	1	Farmington	0	0	0	0	0	0	13578	0	0	0
26-Feb-03	3	Farmington	0	0	3768815	0	0	0	160963	0	0	0
26-Feb-03	5	Farmington	0	0	0	0	0	0	0	7138975	0	358432
31-Mar-03	1	Farmington	0	0	0	0	585628	0	57594	0	0	351651
31-Mar-03	3	Farmington	0	0	0	0	0	0	0	0	20225	0
31-Mar-03	5	Farmington	61164	0	0	0	0	635469	0	0	0	3283434
1-May-03	1	Farmington	0	230344	284376	403102	2219782	689216	0	0	0	66354
1-May-03	3	Farmington	0	0	1084141	0	3894769	0	14627	0	0	4099054
1-May-03	5	Farmington	185066	0	999758	497657	7305606	0	10410	61604	0	0
15-May-03	1	Farmington	672	0	26712	0	0	0	0	0	0	10852
15-May-03	3	Farmington	8680	0	0	0	12504	0	0	0	0	113018
15-May-03	5	Farmington	0	0	35804	0	972	0	1420	2951	0	532789
5-Jun-03	1	Farmington	0	0	0	0	1055919	0	32185	0	0	32486411
5-Jun-03	3	Farmington	99167	0	0	620201	3187715	0	0	0	0	57180236
5-Jun-03	5	Farmington	0	0	0	3914481	3492838	0	52056	0	0	25712139
26-Jun-03	1	Farmington	0	0	0	293586	0	0	0	0	0	45109805
26-Jun-03	3	Farmington	0	0	0	0	266976	0	521393	0	0	26019809
26-Jun-03	5	Farmington	0	0	0	0	1264824	0	0	0	0	3695403
25-Jul-03	1	Farmington	0	0	4095008	0	391044	0	0	0	0	2081106
25-Jul-03	3	Farmington	0	0	0	469220	880372	868988	0	0	0	0
28-Aug-03	1	Farmington	0	0	0	0	0	0	0	0	0	0
28-Aug-03	2	Farmington	0	0	0	0	0	0	45826	0	0	0
28-Aug-03	3	Farmington	0	0	0	0	386971	0	0	0	0	3519147
26-Sep-03	Causeway	Farmington	0	0	0	0	5177579	0	0	0	0	0
28-Oct-03	1	Farmington	0	0	0	0	14164609	0	0	0	0	0
28-Oct-03	2	Farmington	0	0	0	0	19189675	0	0	0	0	0
28-Oct-03	3	Farmington	0	0	0	0	10099475	0	0	0	0	0
23-Nov-03	Causeway	Farmington	0	0	0	0	0	0	0	0	0	0
12-Dec-03	1	Farmington	0	0	0	0	5998608	0	0	332271	0	0
12-Dec-03	H2S	Farmington	0	0	0	0	6351702	0	0	0	0	0

Date Sampled	Station	Region	*Phaedact-ylum* sp.	*Pseudo-anabaena* sp.	*Rhopalodia musculus*	*Spermato-zopsis* sp.	*Sphaerell-opsis* sp.	*Spirulina* sp.	*Treubaria* sp.	UNID Biflagellate	UNID Chyrsophyte	ALL TAXA
12-Aug-02	1	Farmington	0	0	0	0	0	0	0	0	9160677	147076599
12-Aug-02	2	Farmington	0	321700	0	0	0	0	0	28438	8622899	51512848
12-Aug-02	3	Farmington	0	304025	0	0	0	0	0	88043	2307081	50404676
12-Aug-02	4	Farmington	0	9479	0	0	0	0	0	27154	6045959	35139592
12-Aug-02	5	Farmington	0	236683	0	0	0	0	0	0	4852875	57435728
20-Oct-02	1	Farmington	0	0	0	0	0	0	0	454552	26453191	36122543
20-Oct-02	2	Farmington	0	0	0	0	0	0	0	0	9089513	140764744
20-Oct-02	3	Farmington	0	0	0	0	0	0	0	36535	13166423	55050247
20-Oct-02	4	Farmington	0	0	0	0	0	0	0	13676888	6986162	6223110
20-Oct-02	5	Farmington	0	0	0	0	0	0	0	3156960	4585039	38270029
23-Nov-02	1	Farmington	0	0	0	0	0	0	0	0	894464	24650107
23-Nov-02	3	Farmington	0	0	0	0	0	0	0	0	2019371	35358934
23-Nov-02	5	Farmington	0	136856	0	0	0	0	0	42788	7261056	82880036
8-Jan-03	1	Farmington	0	0	0	0	0	0	0	380488	1139157	37571289
8-Jan-03	3	Farmington	0	0	0	0	0	0	0	0	2820859	18173939
26-Feb-03	1	Farmington	0	0	0	0	0	0	0	183865	678451	44593042
26-Feb-03	3	Farmington	0	0	0	0	0	0	0	0	8151362	13850131
26-Feb-03	5	Farmington	0	508677	0	0	0	0	0	2189692	2963282	34339812
31-Mar-03	1	Farmington	0	0	0	0	0	0	2070761	0	1437398	28354541
31-Mar-03	3	Farmington	340131	0	0	0	0	0	0	1704584	723771	17574426
31-Mar-03	5	Farmington	0	0	0	0	0	0	1065718	0	128032	14712721
1-May-03	1	Farmington	0	0	0	0	0	0	1013514	96096	347214	8810728
1-May-03	3	Farmington	0	0	0	0	0	0	2970467	58377	489303	19785469
1-May-03	5	Farmington	0	0	0	0	0	0	983371	0	899673	13200568
15-May-03	1	Farmington	0	0	0	0	0	0	0	2581	809	87552
15-May-03	3	Farmington	0	0	0	0	0	0	0	4500	0	527277
15-May-03	5	Farmington	0	0	0	0	0	0	0	487	10682	748853
5-Jun-03	1	Farmington	0	0	0	0	0	0	0	6894	515488	39327098
5-Jun-03	3	Farmington	0	0	0	0	0	0	0	0	1496202	77680464
5-Jun-03	5	Farmington	0	0	0	0	0	0	0	0	656319	40773577
26-Jun-03	1	Farmington	0	0	0	0	0	0	0	0	737153	58051961
26-Jun-03	3	Farmington	0	0	0	42656	0	0	0	0	1654019	35058916
26-Jun-03	5	Farmington	0	0	0	0	0	0	0	0	185398	14502651
25-Jul-03	1	Farmington	0	0	0	0	0	53083	0	0	923834	29741657
25-Jul-03	3	Farmington	0	0	0	0	0	0	0	82943	2643454	38139560
28-Aug-03	1	Farmington	0	0	0	0	0	0	0	0	3640462	227464806
28-Aug-03	2	Farmington	0	0	0	0	1658857	0	0	0	16134331	73468188
28-Aug-03	3	Farmington	0	0	0	0	0	0	0	0	9929418	72143493
26-Sep-03	Causeway	Farmington	0	0	0	0	0	0	0	0	10573303	25566546
28-Oct-03	1	Farmington	0	0	0	0	0	0	0	0	1111671	45440572
28-Oct-03	2	Farmington	0	0	0	0	0	0	0	0	540647	61349887
28-Oct-03	3	Farmington	0	0	0	0	0	0	0	0	2018133	21519008
23-Nov-03	Causeway	Farmington	0	0	0	0	0	0	0	0	456585	51819547
12-Dec-03	1	Farmington	0	0	0	0	0	0	0	0	733023	15658831
12-Dec-03	H2S	Farmington	0	0	0	0	0	0	0	0	799024	21960168

Appendix IV: Zooplankton density by taxa for each sampling date at each station. Densities are the top number and are reported as organisms / L. Followed in parentheses are (1) the standard error of the station replications and (2) the number of samples collected at each station.

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. adult	*Ephydra* sp. larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calenoid Copepod	*Bosmina*
21-Aug-02	14	Gilbert	0.24 (0.04, 2)	0.11 (0.03, 2)	0.59 (0.11, 2)	1.79 (0.41, 2)	0 (0, 2)	0 (0, 2)	0.11 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)
21-Aug-02	15	Gilbert	0.28 (0.06, 3)	0.32 (0.05, 3)	0.44 (0.15, 3)	2.26 (1.23, 3)	0 (0, 3)	0.05 (0.02, 3)	0 (0, 3)	0.01 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)
25-Oct-02	14	Gilbert	0.05 (0.05, 2)	0.04 (0.04, 2)	0.24 (0.07, 2)	0.02 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
25-Oct-02	15	Gilbert	0.10 (0, 2)	0.09 (0, 2)	0.50 (0.06, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-02	14	Gilbert	0.03 (0, 3)	0.02 (0, 3)	0.02 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)
23-Nov-02	15	Gilbert	0.05 (0.01, 2)	0.04 (0.01, 2)	0.11 (0.03, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.03 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-02	18	Gilbert	0.01 (-, 1)	0.01 (-, 1)	0.02 (-, 1)	0.01 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
8-Jan-03	14	Gilbert	0.02 (0, 2)	0.02 (0.01, 2)	0.05 (0.03, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
8-Jan-03	15	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (-, 1)	0 (0, 2)
8-Jan-03	18	Gilbert	0 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	14	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	15	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	18	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (-, 1)	0 (0, 2)
31-Mar-03	14	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.17 (0.08, 2)	0 (0, 2)	0 (0, 2)	0.04 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	15	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.72 (0.34, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	18	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.88 (0.02, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
1-May-03	14	Gilbert	0 (0, 2)	0 (0, 2)	0.03 (0, 2)	0.19 (0.02, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
1-May-03	18	Gilbert	0 (-, 1)	0.01 (-, 1)	0.04 (-, 1)	0.44 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
15-May-03	14	Gilbert	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0.35 (0.04, 2)	0 (0, 2)	0 (0, 2)	0.02 (0.02, 2)	0 (0, 2)	0.10 (0.08, 2)	0 (0, 2)	0 (0, 2)
15-May-03	15	Gilbert	0.01 (0, 2)	0.03 (0, 2)	0 (0, 2)	1.21 (0.30, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
15-May-03	18	Gilbert	0.01 (0, 2)	0.03 (0, 2)	0 (0, 2)	1.11 (0.22, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.01 (0.01, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	14	Gilbert	3.29 (1.88, 2)	3.58 (2.26, 2)	8.04 (0.75, 2)	7.22 (0.70, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.20 (0.10, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	18	Gilbert	0.53 (0.12, 2)	0.56 (0, 2)	9.59 (0.78, 2)	10.9 (2.35, 2)	0 (0, 2)	0 (0, 2)	0.09 (0.09, 2)	0 (0, 2)	0.10 (0.01, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	14	Gilbert	0.25 (0.13, 2)	0.19 (0.10, 2)	1.81 (0.93, 2)	0.04 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.18 (0.09, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	15	Gilbert	0.26 (0, 2)	0.13 (0, 2)	2.37 (0.06, 2)	0.01 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	1.33 (0.54, 2)	0 (0, 2)	0 (0, 2)

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. adult	*Ephydra* sp. larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calanoid Copepod	*Bosmina*
25-Jul-03	14	Gilbert	0.16 (0.07, 2)	0.06 (0.02, 2)	2.05 (1.04, 2)	1.81 (0.80, 2)	0.01 (0, 2)	0.01 (0, 2)	0.06 (0.02, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	14	Gilbert	0.78 (0.38, 2)	0.50 (0.34, 2)	0.91 (0.24, 2)	9.91 (1.54, 2)	0 (0, 2)	0 (0, 2)	0.15 (0.14, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	15	Gilbert	0.37 (0.28, 2)	0.18 (0.12, 2)	0.81 (0, 2)	1.64 (0.07, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	18	Gilbert	0.05 (0.03, 2)	0.02 (0.01, 2)	3.44 (0.23, 2)	1.46 (0.18, 2)	0 (0, 2)	0 (0, 2)	0.01 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Sep-03	14	Gilbert	0.84 (0.18, 2)	0.63 (0.06, 2)	2.06 (0.27, 2)	0.98 (0.09, 2)	0 (0, 2)	0.01 (0.01, 2)	0.02 (0, 2)	0.01 (0.01, 2)	0 (0, 2)	0 (-, 1)	0 (-, 1)
28-Oct-03	14	Gilbert	0.07 (0.04, 2)	0.10 (0.01, 2)	0.48 (0.09, 2)	0.08 (0.03, 2)	0 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	15	Gilbert	0.68 (0.19, 2)	0.81 (0.14, 2)	0.36 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	18	Gilbert	0.19 (0.07, 2)	0.16 (0.05, 2)	0.26 (0.06, 2)	0.04 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-03	14	Gilbert	0.38 (0.08, 2)	0.41 (0.13, 2)	0.23 (0.09, 2)	0.03 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-03	18	Gilbert	0.36 (-, 1)	0.34 (-, 1)	0.09 (-, 1)	0.05 (-, 1)	0 (-, 1)	0 (-, 1)	0.01 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
12-Aug-02	1	Farmington	0.09 (0.01, 3)	0.16 (0.01, 3)	1.93 (0.89, 3)	3.22 (0.72, 3)	0.03 (0.01, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)	0.04 (0.02, 3)	0 (0, 3)	0 (0, 3)
12-Aug-02	2	Farmington	0.05 (-, 1)	0.10 (-, 1)	0.45 (-, 1)	2.08 (-, 1)	0.06 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0.04 (-, 1)	0 (-, 1)	0 (-, 1)
12-Aug-02	3	Farmington	0.04 (0, 2)	0.05 (0.02, 2)	0 (0, 2)	0.26 (0.02, 2)	0.48 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.13 (0, 2)	0 (0, 2)	0 (0, 2)
12-Aug-02	4	Farmington	0.09 (0, 2)	0.12 (0, 2)	0 (0, 2)	0.88 (0.20, 2)	0.16 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.18 (0.09, 2)	0 (0, 2)	0 (0, 2)
12-Aug-02	5	Farmington	0.05 (0.01, 2)	0.06 (0.01, 2)	0 (0, 2)	0.33 (0.10, 2)	0.65 (0.19, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	1	Farmington	0.01 (0.01, 2)	0.01 (0, 2)	0.11 (0.03, 2)	0.19 (0.09, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	2	Farmington	0.11 (0.01, 2)	0.10 (0, 2)	0.11 (0.05, 2)	0.29 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	3	Farmington	0.02 (0, 2)	0.01 (0, 2)	0.01 (0, 2)	0.11 (0.06, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	4	Farmington	0.08 (0, 2)	0.06 (0.03, 2)	0.11 (0.08, 2)	0.15 (0.02, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.03 (0.02, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	5	Farmington	0.03 (0, 2)	0.05 (0, 2)	0.01 (0, 2)	0.25 (0.02, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-02	1	Farmington	0.04 (-, 1)	0.02 (-, 1)	0.03 (-, 1)	0.03 (-, 1)	0.01 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
23-Nov-02	3	Farmington	0.06 (0.01, 2)	0.08 (0.01, 2)	0.06 (0, 2)	0.14 (0.03, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-02	5	Farmington	0.03 (0.01, 2)	0.03 (0.01, 2)	0.02 (0, 2)	0.07 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (-, 1)	0 (-, 1)
8-Jan-03	1	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
8-Jan-03	3	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	1	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. adult	*Ephydra* sp. larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calanoid Copepod	*Bosmina*
26-Feb-03	3	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	5	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	1	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	3.23 (1.17, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	3	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	2.75 (0.10, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.02 (0.01, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	5	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.52 (0.21, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.19 (0.07, 2)	0 (0, 2)	0 (0, 2)
1-May-03	1	Farmington	1.73 (0.59, 2)	1.56 (0.86, 2)	3.54 (0.70, 2)	2.23 (1.32, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
1-May-03	3	Farmington	2.76 (1.59, 2)	2.48 (1.89, 2)	3.19 (0.13, 2)	5.39 (1.81, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.01 (0.01, 2)	0 (0, 2)	0 (0, 2)
1-May-03	5	Farmington	0.82 (0.39, 2)	0.66 (0.28, 2)	1.59 (0.29, 2)	4.03 (2.12, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.02 (0.02, 2)	0 (0, 2)	0 (0, 2)
15-May-03	1	Farmington	3.15 (1.14, 2)	2.54 (0.53, 2)	1.33 (0.40, 2)	9.85 (3.73, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	2.61 (0.46, 2)	0 (0, 2)	0 (0, 2)
15-May-03	3	Farmington	1.24 (0.06, 2)	1.01 (0.08, 2)	1.78 (0.37, 2)	40.9 (2.16, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.39 (0.09, 2)	0 (0, 2)	0 (0, 2)
15-May-03	5	Farmington	2.24 (1.21, 2)	1.77 (1.08, 2)	3.40 (2.19, 2)	72.3 (42.2, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.15 (0.15, 2)	0.91 (-, 1)	0 (0, 2)
5-Jun-03	1	Farmington	11.3 (1.31, 2)	8.36 (0.03, 2)	2.47 (0.72, 2)	9.40 (1.12, 2)	0 (0, 2)	0.03 (0.03, 2)	0 (0, 2)	0 (0, 2)	3.38 (2.31, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	3	Farmington	0.10 (0, 2)	0.16 (0.02, 2)	0.02 (0.01, 2)	0.63 (0.10, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	29.7 (12.9, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	5	Farmington	0.58 (0.23, 2)	0.39 (0.11, 2)	0.16 (0.06, 2)	1.71 (0.24, 2)	0.16 (0.10, 2)	0 (0, 2)	0.14 (0.14, 2)	0.26 (0.26, 2)	221 (1.46, 2)	0 (0, 2)	0.16 (0, 2)
26-Jun-03	1	Farmington	0.17 (0, 2)	0.12 (0.01, 2)	0.67 (0.21, 2)	1.83 (0.30, 2)	0 (0, 2)	0 (0, 2)	0.04 (0, 2)	0 (0, 2)	6.88 (2.24, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	3	Farmington	0.23 (0.07, 2)	0.12 (0.05, 2)	0.97 (0.36, 2)	2.69 (0.48, 2)	0.05 (0, 2)	0 (0, 2)	0.02 (0, 2)	0 (0, 2)	18.2 (8.03, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	5	Farmington	0.01 (0.01, 2)	0 (0, 2)	0 (0, 2)	0.42 (0.39, 2)	0.10 (0.09, 2)	0 (0, 2)	0.01 (0.01, 2)	0 (0, 2)	13.1 (12.9, 2)	0 (0, 2)	0 (0, 2)
25-Jul-03	1	Farmington	0 (0, 2)	0 (0, 2)	0.07 (0.07, 2)	3.63 (0.62, 2)	0.02 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.11 (0.05, 2)	0 (0, 2)	0 (0, 2)
25-Jul-03	3	Farmington	0 (0, 2)	0 (0, 2)	0.02 (0, 2)	1.06 (0.13, 2)	0.04 (0.01, 2)	0.02 (0.01, 2)	0 (0, 2)	0 (0, 2)	0.11 (0.07, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	1	Farmington	0.04 (0.01, 2)	0.03 (0.01, 2)	0.20 (0.02, 2)	0.34 (0.22, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	2	Farmington	0.03 (0.01, 2)	0.01 (0.01, 2)	0.04 (0.03, 2)	0.48 (0.38, 2)	0.01 (0, 2)	0 (0, 2)	0 (0, 2)	0.09 (0.09, 2)	0.05 (0.05, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	3	Farmington	0.09 (0.01, 2)	0.05 (0.02, 2)	0.05 (0.01, 2)	0.60 (0.17, 2)	0.06 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.08 (0.03, 2)	0 (0, 2)	0 (0, 2)
26-Sep-03	Cause-way	Farmington	0.01 (-, 1)	0 (-, 1)	0.01 (-, 1)	0.02 (-, 1)	0.01 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
7-Oct-03	1	Farmington	0.23 (0.08, 2)	0.16 (0.09, 2)	1.64 (0.03, 2)	1.40 (0.07, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
7-Oct-03	Oxygen Buoy	Farmington	0.40 (0.03, 2)	0.28 (0.01, 2)	0.92 (0.13, 2)	0.48 (0.17, 2)	0.01 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
7-Oct-03	Oxygen Buoy	Farmington	0.08 (0.05, 2)	0.06 (0.04, 2)	0.72 (0, 2)	0.18 (0.04, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. adult	*Ephydra* sp. larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calanoid Copepod	*Bosmina*
28-Oct-03	1	Farmington	0.02 (0.01, 2)	0.02 (0.01, 2)	0.15 (0.12, 2)	0.05 (0.05, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	2	Farmington	0.09 (0, 2)	0.09 (0.01, 2)	1.03 (0.13, 2)	0.27 (0.18, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.04 (0.03, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	3	Farmington	0.08 (0.04, 2)	0.07 (0.02, 2)	2.29 (0.63, 2)	0.36 (0.20, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.05 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-03	Cause way	Farmington	0.02 (0.01, 2)	0.01 (0, 2)	0.02 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
12-Dec-03	1	Farmington	0.01 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
12-Dec-03	H2S	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)

Appendix V: Zooplankton biomass by taxa for each sampling date at each station. Biomass is the top number and is reported as µg / L. Followed in parentheses are (1) the standard error of the station replications and (2) the number of samples collected at each station.

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. Adult	*Ephydra* sp. Larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calanoid Copepod	*Bosmina*
21-Aug-02	14	Gilbert	102.0 (35.2, 2)	105.1 (22.7, 2)	18.57 (6.82, 2)	4.927 (1.14, 2)	0 (0, 2)	0.257 (0.12, 2)	0.535 (0.22, 2)	0 (0, 2)	0.034 (0.02, 2)	0 (0, 2)	0 (0, 2)
21-Aug-02	15	Gilbert	160.5 (37.5, 3)	356.7 (71.6, 3)	6.085 (2.58, 3)	6.644 (3.39, 3)	0.595 (0.38, 3)	1.193 (0.64, 3)	0.028 (0.01, 3)	0.450 (0.02, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)
25-Oct-02	14	Gilbert	8.88 (8.87, 2)	13.75 (13.7, 2)	14.28 (6.08, 2)	0.096 (0, 2)	0 (0, 2)	0 (0, 2)	0.013 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
25-Oct-02	15	Gilbert	17.45 (1.87, 2)	23.74 (1.33, 2)	28.53 (3.39, 2)	0.024 (0, 2)	0 (0, 2)	0 (0, 2)	0.027 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-02	14	Gilbert	5.67 (0.92, 3)	4.987 (0.82, 3)	1.761 (0.66, 3)	0.011 (0, 3)	0 (0, 3)	0 (0, 3)	0.896 (0.86, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)	0 (0, 3)
23-Nov-02	15	Gilbert	10.09 (2.33, 2)	12.07 (5.54, 2)	8.510 (1.82, 2)	0.039 (0.01, 2)	0 (0, 2)	0 (0, 2)	2.508 (0.14, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-02	18	Gilbert	2.106 (-, 1)	4.579 (-, 1)	1.208 (-, 1)	0.062 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
8-Jan-03	14	Gilbert	5.685 (1.85, 2)	8.227 (4.22, 2)	17.08 (12.6, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.466 (0.46, 2)	0.230 (0.23, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
8-Jan-03	15	Gilbert	0.219 (0.21, 2)	0.270 (0.27, 2)	0.884 (0.88, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.421 (0.42, 2)	0 (0, 2)	0 (0, 2)	0.005 (-, 1)	0 (0, 2)
8-Jan-03	18	Gilbert	0.703 (0.70, 2)	0 (0, 2)	2.752 (1.55, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	14	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.003 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	15	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.004 (0, 2)	0 (0, 2)	0 (0, 2)	0.003 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	18	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.003 (0, 2)	0 (0, 2)	0 (0, 2)	0.009 (0, 2)	0 (0, 2)	0 (0, 2)	0.016 (-, 1)	0 (0, 2)
31-Mar-03	14	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.597 (0.27, 2)	0.103 (0.10, 2)	0.060 (0.03, 2)	1.843 (0.52, 2)	1.870 (0.41, 2)	0.017 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	15	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	2.930 (1.45, 2)	0 (0, 2)	0.002 (0, 2)	0.123 (0.12, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	18	Gilbert	0 (0, 2)	0 (0, 2)	0 (0, 2)	3.224 (0, 2)	0 (0, 2)	0 (0, 2)	0.430 (0.19, 2)	0.285 (0.28, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
1-May-03	14	Gilbert	0.454 (0.45, 2)	0.882 (0.31, 2)	2.203 (0.74, 2)	0.861 (0.23, 2)	0 (0, 2)	0 (0, 2)	0.372 (0.26, 2)	0 (0, 2)	0 (0, 3)	0 (0, 2)	0 (0, 2)
1-May-03	18	Gilbert	2.434 (-, 1)	2.923 (-, 1)	3.284 (-, 1)	1.918 (-, 1)	0 (-, 1)	0 (-, 1)	0.177 (-, 1)	0 (-, 1)	0 (-,)	0 (-, 1)	0 (-, 1)
15-May-03	14	Gilbert	4.785 (0.38, 2)	10.31 (8.33, 2)	0.270 (0.20, 2)	0.956 (0.07, 2)	0 (0, 2)	0 (0, 2)	8.300 (8.30, 2)	0 (0, 2)	0.317 (0.24, 2)	0 (0, 2)	0 (0, 2)
15-May-03	15	Gilbert	11.05 (3.29, 2)	50.32 (2.18, 2)	0.839 (0.09, 2)	3.425 (0.94, 2)	0 (0, 2)	0 (0, 2)	0.226 (0.22, 2)	0 (0, 2)	0.024 (-, 1)	0 (0, 2)	0 (0, 2)
15-May-03	18	Gilbert	11.00 (5.82, 2)	42.52 (5.85, 2)	0.671 (0.67, 2)	3.314 (0.60, 2)	0 (0, 2)	0 (0, 2)	2.339 (2.33, 2)	0 (0, 2)	0.099 (0, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	14	Gilbert	1112 (687., 2)	1764 (1190, 2)	401.9 (17.5, 2)	25.28 (1.49, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.638 (0.27, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	18	Gilbert	172.0 (22.4, 2)	400.9 (23.9, 2)	637.0 (41.5, 2)	38.37 (9.30, 2)	0 (0, 2)	0 (0, 2)	18.54 (18.5, 2)	0 (0, 2)	0.285 (0, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	14	Gilbert	86.61 (47.1, 2)	83.80 (47.2, 2)	314.0 (175, 2)	0.132 (0.02, 2)	0 (0, 2)	0 (0, 2)	0.025 (0, 2)	0 (0, 2)	0.436 (0.22, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	15	Gilbert	92.64 (8.29, 2)	61.50 (9.74, 2)	431.6 (32.2, 2)	0.025 (0.02, 2)	0.854 (0.85, 2)	0.098 (0.07, 2)	0.01 (0, 2)	0 (0, 2)	3.413 (1.48, 2)	0 (0, 2)	0 (0, 2)

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. adult	*Ephydra* sp. larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calanoid Copepod	*Bosmina*
25-Jul-03	14	Gilbert	50.86 (15.9, 2)	21.73 (7.64, 2)	127.0 (47.2, 2)	6.461 (3.06, 2)	2.170 (0.64, 2)	0.502 (0.10, 2)	0.539 (0.14, 2)	0 (0, 2)	0.021 (0.01, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	14	Gilbert	279.1 (163, 2)	144.6 (67.2, 2)	47.58 (18.0, 2)	29.65 (4.00, 2)	0 (0, 2)	0.070 (0.07, 2)	0.333 (0.28, 2)	0.065 (0.06, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	15	Gilbert	111.1 (79.6, 2)	99.49 (80.2, 2)	6.900 (4.65, 2)	2.436 (2.43, 2)	0 (0, 2)	0.071 (0.07, 2)	0.254 (0.21, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	18	Gilbert	25.15 (17.3, 2)	13.89 (11.0, 2)	20.46 (2.39, 2)	4.257 (0.57, 2)	0 (0, 2)	0.100 (0.10, 2)	0.077 (0.07, 2)	0 (0, 2)	0 (0, 3)	0 (0, 2)	0 (0, 2)
26-Sep-03	14	Gilbert	309.0 (43.5, 2)	380.6 (52.0, 2)	26.25 (26.2, 2)	2.092 (-, 1)	0 (0, 2)	0.147 (0.14, 2)	0.612 (0.61, 2)	0 (0, 2)	0 (0, 2)	0 (-, 1)	0 (-, 1)
28-Oct-03	14	Gilbert	19.16 (10.0, 2)	28.11 (3.30, 2)	72.29 (49.4, 2)	0.273 (0.11, 2)	0 (0, 2)	0 (0, 2)	0.055 (0.05, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	15	Gilbert	184.2 (49.1, 2)	276.5 (78.0, 2)	31.90 (31.9, 2)	0 (0, 2)	0 (0, 2)	0.014 (0.01, 2)	0.029 (0.02, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	18	Gilbert	41.64 (15.2, 2)	51.28 (19.7, 2)	32.75 (8.23, 2)	0.131 (0.05, 2)	0 (0, 2)	0.075 (0.07, 2)	0.768 (0.76, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-03	14	Gilbert	97.87 (26.9, 2)	126.5 (23.7, 2)	14.59 (8.64, 2)	0.099 (0.05, 2)	0 (0, 2)	0 (0, 2)	1.115 (1.11, 2)	0 (0, 2)	0.008 (-, 1)	0 (0, 2)	0 (0, 2)
23-Nov-03	18	Gilbert	88.37 (-, 1)	162.5 (-, 1)	13.13 (-, 1)	0.148 (-, 1)	0 (-, 1)	0 (-, 1)	0.625 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
12-Aug-02	1	Farmington	51.64 (5.16, 3)	134.9 (21.4, 3)	11.94 (5.31, 3)	10.92 (2.68, 3)	7.298 (3.08, 3)	0.081 (0.04, 3)	1.320 (1.32, 3)	1.032 (0.76, 3)	0.181 (0.07, 2)	0 (0, 3)	0 (0, 3)
12-Aug-02	2	Farmington	27.18 (-, 1)	95.40 (-, 1)	1.500 (-, 1)	6.704 (-, 1)	9.479 (-, 1)	0.165 (-, 1)	0 (-, 1)	0 (-, 1)	0.113 (-, 1)	0 (-, 1)	0 (-, 1)
12-Aug-02	3	Farmington	18.65 (1.15, 2)	38.74 (19.3, 2)	0.054 (0.05, 2)	0.638 (0.09, 2)	88.23 (1.73, 2)	0.127 (0.12, 2)	0 (0, 2)	0 (0, 2)	0.321 (0.01, 2)	0 (0, 2)	0 (0, 2)
12-Aug-02	4	Farmington	42.50 (9.27, 2)	90.90 (7.14, 2)	0.024 (0.02, 2)	2.479 (0.62, 2)	28.27 (3.35, 2)	0.089 (0.08, 2)	0 (0, 2)	0 (0, 2)	0.446 (0.23, 2)	0 (0, 2)	0 (0, 2)
12-Aug-02	5	Farmington	40.94 (25.9, 2)	37.49 (10.3, 2)	0.025 (0.02, 2)	0.808 (0.16, 2)	103.8 (45.6, 2)	0 (0, 2)	0 (0, 2)	0.243 (0.05, 2)	0.033 (0.02, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	1	Farmington	3.896 (3.89, 2)	8.679 (1.35, 2)	2.699 (1.00, 2)	0.580 (0.27, 2)	0.306 (0.30, 2)	0 (0, 2)	0.084 (0.08, 2)	0 (0, 2)	0.012 (0, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	2	Farmington	29.20 (6.68, 2)	44.03 (2.18, 2)	4.882 (2.90, 2)	0.934 (0.05, 2)	0.373 (0.37, 2)	0 (0, 2)	0.589 (0.58, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	3	Farmington	5.103 (1.01, 2)	5.368 (2.43, 2)	0.444 (0.22, 2)	0.428 (0.23, 2)	0.041 (0.04, 2)	0 (0, 2)	0.107 (0.10, 2)	0 (0, 2)	0.186 (0.10, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	4	Farmington	30.68 (3.47, 2)	33.98 (14.6, 2)	2.175 (0.99, 2)	0.426 (0.04, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.080 (0.05, 2)	0 (0, 2)	0 (0, 2)
20-Oct-02	5	Farmington	11.97 (2.76, 2)	33.80 (1.19, 2)	0.700 (0.03, 2)	0.828 (0.09, 2)	2.323 (0.77, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.024 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-02	1	Farmington	12.85 (-, 1)	10.42 (-, 1)	2.639 (-, 1)	0.123 (-, 1)	1.689 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
23-Nov-02	3	Farmington	19.46 (4.94, 2)	27.87 (3.22, 2)	5.455 (0.81, 2)	0.514 (0.10, 2)	2.283 (1.20, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.008 (-, 1)	0 (0, 2)	0 (0, 2)
23-Nov-02	5	Farmington	26.32 (12.1, 2)	42.29 (38.6, 2)	4.464 (1.18, 2)	0.236 (0.02, 2)	1.714 (0.68, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.053 (0.02, 2)	0 (-, 1)	0.002 (-, 1)
8-Jan-03	1	Farmington	0.856 (0.85, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	1.170 (0.11, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
8-Jan-03	3	Farmington	0.513 (0.51, 2)	2.451 (0.18, 2)	0 (0, 2)	0 (0, 2)	0.718 (0.02, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
26-Feb-03	1	Farmington	0.287 (0.28, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.532 (0.01, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. adult	*Ephydra* sp. larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calanoid Copepod	*Bosmina*
26-Feb-03	3	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.015 (0, 2)	0.701 (0.08, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.011 (-, 1)	0 (0, 2)	0 (0, 2)
26-Feb-03	5	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.013 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	1	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	11.97 (3.67, 2)	0.324 (0.32, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	3	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	9.477 (0.79, 2)	1.274 (0.30, 2)	0 (0, 2)	0 (0, 2)	0.717 (0.71, 2)	0.047 (0.03, 2)	0 (0, 2)	0 (0, 2)
31-Mar-03	5	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	1.640 (0.65, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	2.098 (2.09, 2)	0.451 (0.21, 2)	0 (0, 2)	0 (0, 2)
1-May-03	1	Farmington	460.3 (124, 2)	788.2 (364, 2)	258.0 (88.2, 2)	9.714 (6.04, 2)	0 (0, 2)	0 (0, 2)	3.719 (3.71, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
1-May-03	3	Farmington	883.5 (575, 2)	1438 (1164, 2)	200.7 (70.1, 2)	19.61 (6.88, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.042 (-, 1)	0 (0, 2)	0 (0, 2)
1-May-03	5	Farmington	222.8 (222, 2)	376.4 (258, 2)	123.5 (59.3, 2)	16.15 (7.70, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.099 (-, 1)	0 (0, 2)	0 (0, 2)
15-May-03	1	Farmington	1236 (149, 2)	1759 (430, 2)	163.5 (69.1, 2)	31.91 (13.3, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	6.030 (0.71, 2)	0 (0, 2)	0 (0, 2)
15-May-03	3	Farmington	412.7 (80.6, 2)	653.9 (45.5, 2)	54.05 (54.0, 2)	56.13 (56.1, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.700 (-, 1)	0 (0, 2)	0 (0, 2)
15-May-03	5	Farmington	969.7 (479, 2)	1271 (788, 2)	307.5 (180, 2)	242.3 (142, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.748 (-, 1)	0.553 (-, 1)	0 (0, 2)
5-Jun-03	1	Farmington	5341 (493, 2)	7959 (1512, 2)	374.4 (228, 2)	23.17 (0.89, 2)	0 (0, 2)	1.681 (1.68, 2)	0 (0, 2)	0 (0, 2)	8.366 (5.76, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	3	Farmington	63.68 (1.79, 2)	166.6 (66.5, 2)	3.748 (3.74, 2)	1.859 (0.27, 2)	1.110 (0.36, 2)	0 (0, 2)	0.049 (0.04, 2)	0 (0, 2)	71.17 (35.4, 2)	0 (0, 2)	0 (0, 2)
5-Jun-03	5	Farmington	386.0 (136., 2)	404.0 (87.4, 2)	29.98 (4.99, 2)	2.773 (2.77, 2)	30.22 (17.7, 2)	0 (0, 2)	9.176 (9.17, 2)	6.720 (6.72, 2)	506.3 (8.69, 2)	0 (0, 2)	0.006 (0, 2)
26-Jun-03	1	Farmington	40.27 (6.81, 2)	47.36 (8.05, 2)	63.52 (30.3, 2)	6.470 (1.21, 2)	1.525 (0.13, 2)	0.041 (0.04, 2)	4.885 (2.20, 2)	0 (0, 2)	13.49 (6.11, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	3	Farmington	85.45 (20.6, 2)	81.57 (34.3, 2)	123.0 (71.7, 2)	9.523 (1.38, 2)	12.98 (0.67, 2)	0.238 (0.23, 2)	7.755 (2.40, 2)	0 (0, 2)	37.34 (18.8, 2)	0 (0, 2)	0 (0, 2)
26-Jun-03	5	Farmington	7.090 (7.09, 2)	5.427 (5.42, 2)	0.679 (0.67, 2)	1.312 (1.21, 2)	12.04 (11.0, 2)	0.003 (0, 2)	0.561 (0.56, 2)	0 (0, 2)	23.02 (22.5, 2)	0 (0, 2)	0 (0, 2)
25-Jul-03	1	Farmington	0.689 (0.68, 2)	2.895 (2.89, 2)	2.665 (2.66, 2)	5.887 (5.88, 2)	5.357 (2.32, 2)	0.030 (0.03, 2)	0 (0, 2)	0 (0, 2)	0.216 (0.07, 2)	0 (0, 2)	0 (0, 2)
25-Jul-03	3	Farmington	0 (0, 2)	0.286 (0.28, 2)	1.056 (0.55, 2)	3.227 (0.40, 2)	6.535 (2.57, 2)	0.643 (0.37, 2)	0 (0, 2)	0 (0, 2)	0.186 (0.12, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	1	Farmington	12.01 (3.93, 2)	15.49 (4.49, 2)	10.62 (1.86, 2)	1.175 (0.67, 2)	1.177 (0.60, 2)	0.045 (0.04, 2)	0.708 (0.70, 2)	0 (0, 2)	0.030 (0.01, 2)	0 (0, 2)	0 (0, 2)
28-Aug-03	2	Farmington	10.04 (3.45, 2)	4.417 (4.41, 2)	0.548 (0.41, 2)	1.018 (0.69, 2)	3.282 (0.50, 2)	0.025 (0.02, 2)	0.165 (0.16, 2)	0.035 (0.03, 2)	0.238 (-, 1)	0 (0, 2)	0 (0, 2)
28-Aug-03	3	Farmington	25.16 (4.02, 2)	15.56 (0.26, 2)	1.794 (0.01, 2)	1.839 (0.47, 2)	11.77 (0.17, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.122 (0.04, 2)	0 (0, 2)	0 (0, 2)
26-Sep-03	Cause way	Farmington	3.751 (-, 1)	2.294 (-, 1)	0.303 (-, 1)	0.088 (-, 1)	2.090 (-, 1)	0.043 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)	0 (-, 1)
7-Oct-03	1	Farmington	83.62 (26.6, 2)	97.34 (66.2, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
7-Oct-03	Oxygen Buoy	Farmington	168.5 (6.27, 2)	158.3 (1.08, 2)	16.35 (0.69, 2)	1.527 (0.31, 2)	2.144 (2.14, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
7-Oct-03	Oxygen Buoy	Farmington	28.56 (22.9, 2)	34.41 (24.4, 2)	20.94 (7.92, 2)	0.572 (0.12, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)

Date Sampled	Station	Region	*Artemia franciscana* male	*Artemia franciscana* female	*Artemia franciscana* juvenile	*Artemia franciscana* nauplii	*Tricho-corixa verticalis*	*Ephydra* sp. adult	*Ephydra* sp. larvae	*Ephydra* sp. Pupae	*Cletocampus albuquer-quensis*	Calanoid Copepod	*Bosmina*
28-Oct-03	1	Farmington	11.83 (7.47, 2)	14.76 (13.4, 2)	0.125 (0.12, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	2	Farmington	31.72 (3.53, 2)	38.26 (7.76, 2)	22.14 (5.52, 2)	0.924 (0.51, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	1.911 (1.85, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
28-Oct-03	3	Farmington	27.86 (14.5, 2)	40.72 (11.5, 2)	31.70 (8.78, 2)	1.249 (0.70, 2)	0 (0, 2)	0.033 (0.03, 2)	0 (0, 2)	0.023 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
23-Nov-03	Cause way	Farmington	7.981 (5.03, 2)	7.606 (2.94, 2)	1.411 (1.41, 2)	0.007 (0, 2)	0.773 (0.77, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
12-Dec-03	1	Farmington	0 (0, 2)	1.387 (1.38, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0.001 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)
12-Dec-03	H2S	Farmington	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)	0 (0, 2)

Appendix VI: Egg, cyst, and production data, and parameters used to estimate production. Average brood size is the average number of eggs and/or cysts carried by a single female (average of 20 females when available). Mean brood sizes were calculated just for females that had clutches. Egg and cyst density is reported as numbers per liter of ova attached to female brine shrimp, that is, it does not include free-floating cysts. Following in parentheses, where available, is standard error followed by number of samples collected. * indicates that female densities were zero, so brood size could not be calculated. – indicates missing data. IBI = estimated interbrood interval in days

Date Sampled	Station	Region	Mean Brood Size (# / female)	Cyst Density (cysts / L)	Egg Density (eggs / L)	Chlorophyll *a* (µg / L)	IBI (days)	Cyst Production (# / m^2 / day)
21-Aug-02	14	Gilbert	65	0.97 (0.70, 2)	3.79 (2.08, 2)	-	4.7	1126
21-Aug-02	15	Gilbert	90	13.4 (3.15, 3)	13.0 (4.55, 3)	-	4.5	14851
25-Oct-02	14	Gilbert	*	0 (0, 2)	0 (0, 2)	-	13.1	0
25-Oct-02	15	Gilbert	8	0.37 (0.17, 2)	0.02 (0.02, 2)	-	11.9	168
23-Nov-02	14	Gilbert	138	0.13 (0.13, 3)	0 (0, 3)	-	24.2	29
23-Nov-02	15	Gilbert	38	0.09 (0.09, 2)	0.11 (0.06, 2)	-	22.2	24
23-Nov-02	18	Gilbert	*	0 (-, 1)	0 (-, 1)	-	22.8	0
8-Jan-03	14	Gilbert	38	0.05 (0.05, 2)	0.11 (0.11, 2)	28.4	33.5	8
8-Jan-03	15	Gilbert	*	0 (0, 2)	0 (0, 2)	19.4	33.2	0
8-Jan-03	18	Gilbert	*	0 (0, 2)	0 (0, 2)	24.5	36.3	0
26-Feb-03	14	Gilbert	*	0 (0, 2)	0 (0, 2)	33.7	30.4	0
26-Feb-03	15	Gilbert	*	0 (0, 2)	0 (0, 2)	20.8	30.1	0
26-Feb-03	18	Gilbert	*	0 (0, 2)	0 (0, 2)	33.4	31.0	0
31-Mar-03	14	Gilbert	*	0 (0, 2)	0 (0, 2)	19.0	18.4	0
31-Mar-03	15	Gilbert	*	0 (0, 2)	0 (0, 2)	17.5	18.4	0
31-Mar-03	18	Gilbert	*	0 (0, 2)	0 (0, 2)	22.1	18.4	0
1-May-03	14	Gilbert	*	0 (0, 2)	0 (0, 2)	61.1	12.5	0
1-May-03	18	Gilbert	*	0 (-, 1)	0 (-, 1)	71.2	11.2	0
15-May-03	14	Gilbert	161	0 (0, 2)	1.66 (1.15, 2)	59.8	8.6	0
15-May-03	15	Gilbert	182	0 (0, 2)	6.60 (0.46, 2)	65.4	8.0	0
15-May-03	18	Gilbert	176	0 (0, 2)	6.07 (0.93, 2)	61.8	8.4	0
5-Jun-03	14	Gilbert	37	42.2 (36.0, 2)	0.85 (0.85, 2)	2.2	5.6	40447
5-Jun-03	18	Gilbert	47	6.51 (5.82, 2)	4.73 (0.09, 2)	2.1	5.4	6487
26-Jun-03	14	Gilbert	17	0.31 (0.25, 2)	0.11 (0.11, 2)	0.7	5.3	324
26-Jun-03	15	Gilbert	14	0.02 (0.02, 2)	0.22 (0, 2)	2.8	5.4	28
25-Jul-03	14	Gilbert	8	0.11 (0.09, 2)	0.09 (0.07, 2)	1.3	2.8	226
28-Aug-03	14	Gilbert	61	0 (0, 2)	5.64 (2.94, 2)	5.9	4.0	11
28-Aug-03	15	Gilbert	18	1.44 (0.99, 2)	0.80 (0.68, 2)	4.4	4.0	1967
28-Aug-03	18	Gilbert	80	0 (0, 2)	1.16 (0.74, 2)	19.5	3.9	0
26-Sep-03	14	Gilbert	65	26.4 (4.84, 2)	4.65 (0.57, 2)	0.3	6.2	22970
28-Oct-03	14	Gilbert	10	0.34 (0.34, 2)	0.09 (0.07, 2)	19.6	10.3	179

1Date Sampled	Station	Region	Average Brood Size (# / female)	Cyst Density (cysts / L)	Egg Density (eggs / L)	Chlorophyll *a* (µg / L)	IBI (days)	Cyst Production (# / m^2 / day)
28-Oct-03	15	Gilbert	15	6.28 (0.88, 2)	2.65 (0.37, 2)	6.1	10.3	3296
28-Oct-03	18	Gilbert	15	1.56 (0.21, 2)	0.19 (0.10, 2)	-	9.0	936
23-Nov-03	14	Gilbert	33	7.23 (2.96, 2)	3.03 (0.63, 2)	54.8	30.7	1271
23-Nov-03	18	Gilbert	47	8.37 (-, 1)	3.05 (-, 1)	83.4	31.9	1415
12-Aug-02	1	Farmington	65	1.14 (1.14, 3)	6.96 (1.12, 3)	-	5.0	185
12-Aug-02	2	Farmington	73	0 (-, 1)	6.54 (-, 1)	-	5.0	0
12-Aug-02	3	Farmington	51	0.20 (0.20, 2)	1.57 (0.35, 2)	-	4.9	22
12-Aug-02	4	Farmington	62	0 (0, 2)	5.35 (0.53, 2)	-	4.6	0
12-Aug-02	5	Farmington	58	0.17 (0.17, 2)	3.55 (2.65, 2)	-	4.0	24
20-Oct-02	1	Farmington	63	0.46 (0.28, 2)	0.26 (0.02, 2)	-	15.4	16
20-Oct-02	2	Farmington	77	0.19 (0.19, 2)	11.7 (7.59, 2)	-	14.4	7
20-Oct-02	3	Farmington	85	0 (0, 2)	0.66 (0.26, 2)	-	14.5	0
20-Oct-02	4	Farmington	95	0.71 (0.32, 2)	3.12 (1.18, 2)	-	14.0	28
20-Oct-02	5	Farmington	116	0 (0, 2)	4.94 (0.66, 2)	-	13.1	0
23-Nov-02	1	Farmington	68	0.49 (-, 1)	0 (-, 1)	-	26.2	10
23-Nov-02	3	Farmington	75	1.16 (0.70, 2)	0.55 (0.47, 2)	-	25.2	25
23-Nov-02	5	Farmington	114	0.82 (0.51, 2)	0.82 (0.01, 2)	-	20.3	22
8-Jan-03	1	Farmington	*	0 (0, 2)	0 (0, 2)	160.2	39.3	0
8-Jan-03	3	Farmington	*	0 (0, 2)	0 (0, 2)	172.8	38.5	0
26-Feb-03	1	Farmington	*	0 (0, 2)	0 (0, 2)	110.4	35.9	0
26-Feb-03	3	Farmington	*	0 (0, 2)	0 (0, 2)	107.4	34.9	0
26-Feb-03	5	Farmington	*	0 (0, 2)	0 (0, 2)	109.2	29.8	0
31-Mar-03	1	Farmington	*	0 (0, 2)	0 (0, 2)	91.8	20.9	0
31-Mar-03	3	Farmington	*	0 (0, 2)	0 (0, 2)	76.8	18.2	0
31-Mar-03	5	Farmington	*	0 (0, 2)	0 (0, 2)	70.8	17.0	0
1-May-03	1	Farmington	136	0 (0, 2)	299 (227, 2)	35.1	13.0	0
1-May-03	3	Farmington	125	0 (0, 2)	248 (211, 2)	33.6	12.5	0
1-May-03	5	Farmington	141	0 (0, 2)	53.7 (42.5, 2)	27.2	12.8	0
15-May-03	1	Farmington	135	0 (0, 2)	307 (64.3, 2)	0.9	6.7	0
15-May-03	3	Farmington	119	0 (0, 2)	105 (20.3, 2)	4.7	6.5	0
15-May-03	5	Farmington	101	38.9 (38.9, 2)	170 (123, 2)	3.8	6.9	3064
5-Jun-03	1	Farmington	46	234 (34.8, 2)	136 (100, 2)	23.4	6.3	20157
5-Jun-03	3	Farmington	48	2.60 (0.13, 2)	2.80 (2.28, 2)	65.4	6.2	229
5-Jun-03	5	Farmington	34	3.70 (2.38, 2)	7.58 (0.74, 2)	68.4	6.1	328

Date Sampled	Station	Region	Average Brood Size (# / female)	Cyst Density (cysts / L)	Egg Density (eggs / L)	Chlorophyll *a* (µg / L)	IBI (days)	Cyst Production (# / m^2 / day)
26-Jun-03	1	Farmington	51	1.78 (0.14, 2)	0.85 (0.37, 2)	66.6	7.4	130
26-Jun-03	3	Farmington	49	1.78 (1.00, 2)	1.43 (0.40, 2)	78.6	6.4	150
26-Jun-03	5	Farmington	90	0.21 (0.21, 2)	0.35 (0.35, 2)	63.0	6.8	17
25-Jul-03	1	Farmington	91	0.41 (0.41, 2)	0 (0, 2)	48.0	2.8	80
25-Jul-03	3	Farmington	*	0 (0, 2)	0 (0, 2)	110.8	2.7	0
28-Aug-03	1	Farmington	56	0.10 (0.10, 2)	0.89 (0.23, 2)	85.2	4.8	12
28-Aug-03	2	Farmington	91	0 (0, 2)	0.66 (0.66, 2)	189.0	4.4	0
28-Aug-03	3	Farmington	95	0.48 (0.48, 2)	0.95 (0.95, 2)	256.5	4.6	57
26-Sep-03	Causeway	Farmington	23	0.07 (-, 1)	0 (-, 1)	49.8	7.2	6
7-Oct-03	1	Farmington	-	2.46 (1.55, 2)	6.83 (6.03, 2)	-	8.9	150
7-Oct-03	Oxygen Buoy	Farmington	-	3.07 (0.85, 2)	12.5 (3.93, 2)	-	8.9	187
23-Oct-03	Oxygen Buoy	Farmington	126	0.94 (0.94, 2)	0.88 (0.88, 2)	124.5	17.7	29
28-Oct-03	1	Farmington	105	1.15 (1.15, 2)	0.07 (0.07, 2)	120.0	17.3	36
28-Oct-03	2	Farmington	*	0 (0, 2)	0 (0, 2)	-	17.3	0
28-Oct-03	3	Farmington	121	0.77 (0.77, 2)	0 (0, 2)	182.4	12.2	34
23-Nov-03	Causeway	Farmington	100	0.04 (0.04, 2)	0.95 (0.42, 2)	257.4	47.3	1
12-Dec-03	1	Farmington	*	0 (0, 2)	0 (0, 2)	184.8	36.3	0
12-Dec-03	H2S	Farmington	*	0 (0, 2)	0 (0, 2)	159.6	35.9	0