Hydrographic, Biological, and Nutrient Properties of Tomales Bay, California, March 1985 to May 1986

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Conversion Factors.

The following conversion factors may be used to convert from International System (SI) units used in this report to inch-pound terms:

Multiply	By	To obtain
kilometer (km)	0.6214	mile (mi)
meter (m)	3.281	feet (ft)
liter (L)	1.057	quart (qt)
microgram (μg)	2.2×10^{9}	pound, avoirdupois (lb)
milligram (mg)	2.2×10^{-6}	pound, avoirdupois (lb)
degree Celsius (°C)	(1.8 x °C)+32	degree Fahrenheit (°F)

HYDROGRAPHIC, BIOLOGICAL, AND NUTRIENT PROPERTIES OF TOMALES BAY, CALIFORNIA - MARCH 1985 TO MAY 1986

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ABSTRACT

This report summarizes hydrographic, biological, and nutrient data collected from Tomales Bay, California, between March 1985 and May 1986. Spatial distributions are given for salinity, temperature, chlorophyll-a, phaeopigments, light attenuation coefficients, suspended particulate matter, dissolved nutrients, (nitrite, nitrate + nitrite, dissolved reactive phosphate, dissolved silica, ammonium), total dissolved nitrogen and phosphorus, and particulate nitrogen and carbon. The data were typically collected at monthly intervals at 10 stations located along the longitudinal axis of Tomales Bay. Also reported are: (1) nutrient data for Walker and Lagunitas Creeks; (2) the results of 28 experiments measuring rates of carbon uptake at selected sites in Tomales Bay; (3) enumeration data for phytoplankton samples collected concurrently with samples for carbon uptake; (4) bacteria and blue-green algae densities; and (5) rates of bacterial uptake of thymidine at selected sites and times over the course of the study.

INTRODUCTION

This report is a compilation of data collected from Tomales Bay, a coastal embayment in California, during 20 sampling cruises between March 1985 and May 1986. Specific sampling sites and dates are listed in table 1. Data were collected to (1) document temporal and spatial changes in the physical, biological, and nutrient conditions of Tomales Bay and its major sources of freshwater; (2) measure spatial and seasonal variations in the rate of carbon uptake by phytoplankton; (3) determine the composition of the phytoplankton community at the time of carbon uptake experiments; and (4) determine the abundance of bacteria and blue-green algae and the rates of thymidine uptake as a measure of bacteria growth rates.

Salinity and temperature were measured at one meter intervals at each sampling site to estimate variations in water column stability. Chlorophyll-*a*, phaeopigment, and nutrient (NO_2^-, $NO_3^- + NO_2^-$, NH_4^+, PO_4^{-3}, and SiO_2) data were collected at 2 kilometer intervals to characterize spatial variations within the system. Measurements of carbon uptake were made periodically on samples collected at a site in each of the three major hydrographic regions (E.H. Smith and others, 1971; S.V. Smith and others, 1987) of Tomales Bay to determine the seasonal and temporal range of primary productivity by phytoplankton. Phytoplankton samples were collected and preserved at each site where carbon uptake experiments were conducted to characterize the composition of the phytoplankton community at the time of the incubation experiments.

Samples also were collected at selected stations to characterize the abundance and growth rate of bacterioplankton. Autofluorescing cells (cyanobacteria) were enumerated in a few samples at stations selected to represent each of the three major hydrographic regions of Tomales Bay (fig. 1). Most of the bacteria samples were from surface waters, but near-bottom samples were collected regularly at stations representative of the deeper, central parts of the bay.

Nutrient samples were routinely collected on Walker and Lagunitas Creeks to determine nutrient levels in the principal sources of freshwater flowing into Tomales Bay.

METHODS

Sampling positions are shown in figure 1. Stations are identified by numbers that are equal to their distance (in kilometers) from the mouth of Tomales Bay. The data were collected from a drifting boat at sites located in the deeper regions along the longitudinal axis of the bay. Occasionally samples were collected near the shore at sites east and west of the channel stations. These lateral stations are identified in the data tables by an E (east) or W (west) following the station number. Sampling locations were based on land sitings.

Salinity and temperature were measured with a Beckman[1] portable conductivity-temperature meter. The salinity calibration of the

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[1]Use of brand names in this report is for identification purposes only and does not constitute endorsement by the U.S. Geological Survey.

instrument was frequently checked with discrete salinity samples collected at the water's surface coincidental to surface readings with the portable conductivity-temperature meter. These bottled salinity samples were returned to the laboratory for analysis with a high precision (± 0.003) Beckman salinometer. The salinities reported in Appendix A and B were calculated from linear regressions of the discrete salinity samples against the readings of the field instrument. Calibration coefficients for the field salinometer are given in table 2. Light attenuation (water clarity) was measured at each station with a Secchi disk. The depth of disappearance of the Secchi disk was related to the light extinction coefficient by the equation:

$$\text{extinction coefficient } (m^{-1}) = 0.4 + 109/\text{Secchi depth (cm)}$$

derived from light attenuation and Secchi depth data collected in San Francisco Bay (unpublished data).

Samples for all other properties were collected with handheld bottles dipped into the surface water or with a Kemmerer water sampling bottle lowered to depth. Samples for chlorophyll-*a* and phaeopigments were collected at the surface and bottom depth at each station. The samples were held in the dark for 2-6 hours; filtered at less than 130 mm Hg vacuum through a Gelman glass fiber filter; then stored frozen until analyzed. The filters were ground in 90 percent acetone. After extraction for 12 to 24 hours at -10°C, samples were centrifuged and absorbances read on a Varian 635D spectrophotometer. Samples were acidified (Riemann, 1979) to measure

to measure phaeopigments. Chlorophyll-a and phaeopigment values were calculated using Lorenzen's (1967) equations.

Nutrient samples were collected from the surface water directly into doubly rinsed 2 L high-density polyethylene bottles cleaned with acetone. Care was taken not to sample the surface microlayer. Samples were placed immediately into an opaque cooler in contact with ice. On arrival at the laboratory (2 to 7 hours later), the samples were rapidly cooled to just above freezing, and held at that temperature until processing was complete.

For dissolved nutrients, aliquots were filtered through 47 mm, 0.4 μm pore size Nuclepore filters at less than 130 mm Hg vacuum. After two rinses, filtrate was placed in 30 mL linear polyethylene bottles previously soaked with 2.5 meq/L $NaHCO_3$ solution. Samples were frozen (-20 ^{o}C) until analyzed. Prior to analysis, the samples were allowed to thaw for at least 15 hours, and were well shaken.

For total dissolved nutrients, sample water was filtered by gravity through 47 mm Gelman GF/AE filters, previously combusted for 4 hours at 450 ^{o}C. Duplicate filtrations were performed, and the filtrates placed into 120 mL quartz irradiation tubes. They were digested with hydrogen peroxide and ultra-violet light (Hager and Harmon, 1984). Total dissolved nitrogen is called DNU and total dissolved phosphorus DPU; the 'U' indicating the ultra-violet method.

Dissolved and total dissolved nutrients were analyzed on a Technicon Autoanalyzer II system, with all manifolds maintained at 37 ^{o}C. Dissolved nitrate plus nitrite and DNU were analyzed using a modification of Technicon method AII 100-70W (Technicon, 1973). The pH of the ammonium chloride

reagent was not adjusted, and 6 mg/L $CuSO_4:5H_2O$ was added to it (Connors and Beland, 1976). The cadmium column preparation followed Wood and others (1967). Dissolved nitrite was measured using the same chemistry, but bypassing the cadmium reducing column.

Dissolved ammonium was measured using an automated method based on the method of Solorzano (1969). Color development was at 37 °C.

Dissolved phosphate and total dissolved phosphorus were measured with a modification of the method of Atlas and others (1971), using ascorbic acid (70 g/L with 50 mL acetone/L) as reductant.

Dissolved silica was measured with an adaptation of Technicon method AII 105-71W (Technicon, 1976). The sample tube delivery rate was halved to give linear response to 320 μM.

For particulate carbon and nitrogen (PCC and PNC; C for the combustion method), water was filtered at less than 130 mm Hg through 13 mm GF/AE Gelman glass fiber filters, previously combusted at 450 °C for four hours. Filters were folded and placed in nickel capsules that had previously been heated to 450 °C. These were placed into loosely capped, combusted glass vials, and into a dessicator over magnesium perchlorate for at least two weeks prior to analysis. Analysis was with a Perkin-Elmer 240C Elemental Analyzer. Acetanilide was used as a standard and unused filters as blanks.

Suspended particulate material was filtered onto preweighed 47 mm, 0.4 μm pore size Nuclepore filters. Filters were air dried and reweighed to ± 0.1 mg. An empirical correction (0.023 mg/filter per ppt. salinity) was used to correct for the weight of salt crystals on the filter.

Phytoplankton productivity samples were collected from surface waters, then held in the dark until returned to shore. To test for nitrogen limitation, some samples were amended with NH_4Cl (40 µg-at in a 2 L bottle) immediately after collection. After inoculation with carbon-14 (5 µCi in a 150 mL bottle), 24 h incubations were done in incubation racks floating at the water's surface along the shore. Samples were exposed to natural sunlight of 8 intensities: 100, 55, 30, 15, 8, 3, 1, and 0 percent of ambient irradiance. Light exposure was varied by placing the bottles in nickel screen tubes of different mesh. Following incubation, 3 mL subsamples were removed from each bottle and placed in a scintillation vial. After adding 0.1 mL of 0.2 N HCl, each aliquot was shaken for 30 minutes while $^{14}CO_2$ was stripped from the sample. The residual activity of the sample was measured using a liquid scintillation spectrometer. Actual carbon uptake rates and dark bottle corrected rates are listed in Appendix C. Assimilation number is the dark bottle corrected uptake rate normalized by the initial chlorophyll-*a* concentration. Estimates of photic zone and water column depth integrated production were made by trapezoidal quadrature. When the calculated photic depth exceeded the water depth (that is, light penetrated to the bottom sediments), estimates of integrated productivity over the photic zone exceeded estimates of carbon uptake over the water depth. None of the carbon uptake data have been adjusted to account for respiration by the phytoplankton.

Samples for phytoplankton identification and enumeration (Appendix D) were collected at selected sites and preserved with Lugol's preservative.

Each enumeration sample was counted at 120X after filling a 1-mL Sedgewick-Rafter chamber. Identification and enumeration of samples was delayed until March 1987. The phytoplankton identifications and enumerations were done by Dr. Deneb Karentz.

Water samples for bacterioplankton (Appendix E) were collected in opaque, 500 mL polyethylene bottles. The samples were stored in an insulated chest until processed on shore.

Bacterial abundance was determined by epifluorescence microscopy. The sample was mixed gently, then a 100 mL subsample was poured into an acid cleaned, sample-rinsed bottle and preserved with 2 percent (final concentration) borate-buffered formaldehyde. This subsample was stored in a refrigerator for up to two weeks before counting. A 2.00 mL subsample was collected on a 0.2 μm pore size Nuclepore filter, stained with Acridine Orange and counted following the protocol given by Hobbie and others (1977). Ten fields on one slide were counted for each sample (a minimum of 400 cells). Autofluorescing particles were enumerated by collecting a 10 mL subsample on a 0.2 μm pore size Nuclepore filter, then counting the unstained sample using the FITC filter set. Ten fields were counted. However, usually fewer than 100 cells were observed.

Bacterioplankton population growth rate was estimated from the rate at which methyl-[^{3}H]-thymidine (^{3}H-TdR) was incorporated into material soluble in chilled 5 percent trichloroacetic acid (TCA). The protocol used is essentially that of Fuhrman and Azam (1982). Five 5 mL subsamples were drawn from sample bottles and placed in polystyrene test tubes. Duplicate control samples were fixed immediately with 2 percent formaldehyde. After

15-30 minutes, 1 μCi of a 20 μCi/nmole ^{3}H-TdR stock (New England Nuclear) was added to each tube (final concentration of added TdR = 10 nM). The samples were incubated in a water bath maintained in the range of temperatures encountered on a particular sampling date. The incubation was terminated after 0.5 to 1.5 hrs either by adding 5.0 mL of chilled 10 percent TCA to each sample or by filtering the samples through a 0.45 μm pore size membrane filter, then rinsing with chilled 5 percent TCA. Comparison revealed no difference in extraction efficiency between methods. Occasionally, a second set of samples was extracted for 1 hr in hot 5 percent TCA (95-100 ^{o}C) to verify that ^{3}H-TdR was not being metabolized to protein by bacterioplankton. Samples extracted in test tubes were collected on 0.45 μm pore size membrane filters and rinsed with chilled 5 percent TCA. Membrane filters were placed in scintillation vials, air dried, dissolved in ethyl acetate, then radioassayed by liquid scintillation spectrometry.

REFERENCES CITED

Atlas, E.L., Hager, S.W., Gordon, L.I., and Park, P.K., 1971, A practical manual for use of the Technicon AutoAnalyzer in seawater nutrient analyses, revised: Department of Oceanography, Oregon State University, Ref. 71-22.

Connors, J.J., and Beland, J., 1976, Analytical notes: Journal American Water Works Association, v. 68, p. 55-56.

Fuhrman, J.A., and Azam, F., 1982, Thymidine incorporation as a measure of heterotrophic bacterial production in marine surface waters: evaluation and field results: Marine Biology, v. 66, p. 109-120.

Hager, S.W., and Harmon, D.D., 1984, Chemical determination of particulate nitrogen in San Francisco Bay. A comparison of two estimates: Estuarine Coastal and Shelf Science, v. 19, p. 181-191.

Hobbie, J.E., Daley, R. J., and Jasper, S., 1977, Use of Nuclepore filters for counting bacteria by fluorescence microscopy: Applied Environmental Microbiology, v. 33, p. 1225-1228.

Lorenzen, C.J., 1967, Determination of chlorophyll and pheopigments: Spectrophotometric equations: Limnology and Oceanography, v. 12, p. 343-346.

Riemann, B., 1979, Carotenoid interference in spectrophotometric determination of chlorophyll degradation products from natural populations of phytoplankton: Limnology and Oceanography, v. 23, p. 1059-1066.

Smith, E.H., Johnson, R.G., and Obrebski, S., 1971, Physical, chemical, microbiological and hydrographic characteristics of Tomales Bay: University of the Pacific, Stockton, California, Pacific Marine Station Research Report Number 9, 70 pp.

Smith, S.V., Wiebe, W.J., Hollibaugh, J.T., Dollar, S.J., Hager, S.W., Cole, B.E., Tribble, G.W., and Wheeler, P.A., 1987, Stoichiometry of C, N, P, and Si fluxes in a temperate-climate embayment: Journal of Marine Research, v. 5, p. 427-460.

Solorzano, L., 1969, Determination of ammonium in natural waters by the phenolhypochlorite method: Limnology Oceanography, v. 14, p. 799-801.

Technicon Instruments Corporation, 1973, Nitrate and nitrite in water and wastewater: Technicon AutoAnalyzer II, Industrial Method No. 100-70W.

Technicon Instruments Corporation, 1976, Silicates in water and wastewater: Technicon AutoAnalyzer II, Industrial Method No. 105-71W.

Wood, E.D., Armstrong, F.A.J., and Richards, F.A., 1967, Determination of nitrate in seawater by cadmium copper reduction to nitrite: Journal of the Marine Biological Association of the United Kingdom, v. 47, p. 23-31.

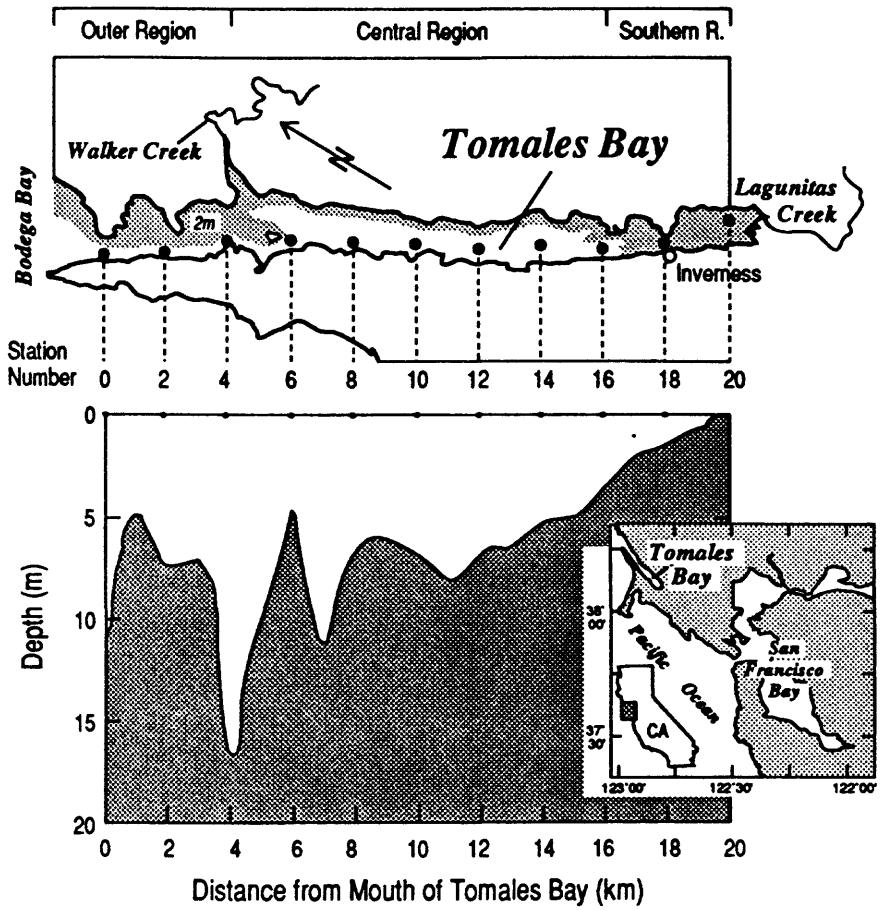

Figure 1. (a) Map of Tomales Bay, California, and environs showing locations of sampling sites. The station numbers reflect the distance, in kilometers, of the sampling site from the mouth of the bay. Shaded portions: areas where water depth (MLLW) are less than 2 m. (b) Longitudinal cross section of the bay showing water depths at the sampling sites.

Table 1. Sampling dates and locations for hydrographic (HYDRO) and nutrient (NUTR) data; and dates when measurements were made of phytoplankton productivity and cell density (PHYTO PROD), bacterial productivity (BACTER PROD), and bacterial abundance (BACTER ABUND).

DATE	STATIONS	HYDRO DATA	NUTR DATA	PHYTO PROD	BACTER PROD	BACTER ABUND
Mar 11, 1985	0 - 18	X	X		X	X
Mar 27	0 - 18	X			X	X
Apr 8	0 - 18	X	X		X	X
Apr 17	0 - 20	X	X	X	X	
May 17	0 - 16	X	X		X	X
June 11	0 - 18	X	X	X	X	
July 16	0 - 18	X	X		X	
Aug 21	0 - 18	X	X	X	X	
Sept 30	0 - 18	X	X	X		
Oct 3	0 - 18	X	X		X	X
Oct 8	0 - 18	X	X			
Nov 6	0 - 18	X	X			
Dec 4	0 - 18	X	X	X	X	
Jan 29, 1986	0 - 6	X				
Feb 5	0 - 18	X	X			
Mar 19	0 - 18	X	X	X	X	
Apr 2	2 - 18	X	X			
Apr 16	0 - 18	X	X		X	
Apr 30	0 - 17	X	X			
May 14	6 - 18	X	X			

Table 2. Salinometer calibration parameters.

Least squares regression parameters for regression of discrete salinity values measured in the laboratory against field readings with the Beckman conductivity-temperature meter. In each case the regression intercept was forced through the origin.

True salinity = SLOPE x field salinity value

DATES	SLOPE	r2	n
Mar 11, 1985 to Apr 17, 1985	1.15367	1.00	40
May 17, 1985 to Feb 5, 1986*	1.05665	0.99	56
Aug 21, 1985	1.07218	0.94	9
Mar 19, 1986 to May 14, 1986	0.91988	1.00	62

* excluding Aug 21, 1985

Abbreviations and units for hydrographic and nutrient data summaries.

Abbreviation	Parameter	Units
STA	Station	
TIME	Time	
DEPTH	Depth	m
SAL	Salinity	
TEMP	Temperature	^{o}C
DISCR SAL	Discrete salinity	
CHL	Chlorophyll-*a*	$\mu g/L$
PHEO	Phaeopigment	$\mu g/L$
EXT COEF	Extinction coefficient	m^{-1}
SPM	Suspended particulate matter	mg/L
NO2	Nitrite	μM
N+N	Nitrate plus nitrite	μM
DRP	Dissolved reactive phosphate	μM
SiO	Dissolved silica	μM
NH4	Ammonium	μM
DNU	Dissolved nitrogen (U-V method)	μM
DPU	Dissolved phosphorus (U-V method)	μM
PNC	Particulate nitrogen (combustion method)	μM
PCC	Particulate carbon (combustion method)	μM

Appendix A.

Hydrographic and Nutrient data for
Tomales Bay

TOMALES BAY DATA SUMMARY 11 March 1985 Julian Date: 85070

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	952	0	32.55	11.00	31.70	12.4	3.9	.76	5.6	0.08	0.79	0.60	13.2	0.51	6.22	0.60	8.8	56.0
	951	2	32.51	11.08														
	949	4	32.65	10.94	31.73													
	950	6	32.64	11.04		10.2	4.3											
2	1006	0	31.76	11.18	31.93	14.1	4.3	.78	4.8	0.06	0.45	0.58	13.3	0.30			9.0	57.6
	1007	2	31.73	11.16														
	1009	3	31.73	11.15	31.95	11.2	3.9		4.4	0.09	0.41	0.55	12.7	0.23				
	1008	5	31.73	11.15														
4	1023	0	31.58	11.32	31.53	9.4	3.2	.75	4.2	0.06	0.35	0.68	15.4	0.27			8.8	62.5
	1024	2	31.70	11.19														
	1025	5	31.81	11.19	31.67	9.3	3.2		4.3	0.10	0.26	0.57	14.8	0.24				
6	1035	0	31.25	11.59	31.24	5.2	2.0	.76	3.2	0.06	0.20	0.71	19.8	0.21	4.77	1.22	4.8	34.0
	1036	2	31.67	11.18														
	1037	5	31.78	11.06		12.8	4.0		5.3	0.03	0.29	0.58	13.8	0.22				
8	1058	0	30.54	11.88	30.51	2.0	0.9	.78	2.9	0.02	0.20	0.91	25.4	0.24			3.7	27.0
	1101	1	30.92	11.42														
	1059	2	31.77	11.08														
	1100	5	31.73	10.95	31.86	11.4	5.5		6.4	0.01	0.19	0.63	15.3	0.27				
10	1112	0	29.73	12.52	29.91	2.9	1.0	.84	7.3	0.04	0.20	0.93	28.2	0.23	5.75	1.10	5.5	38.6
	1113	2	30.77	11.55														
	1114	5	31.44	11.18	31.73	11.4	3.7		5.6	0.02	0.19	0.67	16.8	0.22				
12	1128	0	29.23	12.47	28.71	4.5	1.0	.92	4.9	0.06	0.39	0.96	32.0	0.28			6.3	44.2
	1129	2	30.57	11.54														
	1130	5	31.40	10.86	31.25	7.8	2.6		6.7	0.03	0.23	0.89	22.8	0.29				
14	1142	0	28.73	12.43	28.74	9.5	2.5	.97	5.6	0.06	0.42	1.04	32.4	0.28	6.78	1.12	9.2	61.9
	1143	2	30.72	11.43														
	1144	4	31.25	10.96	31.37	1.8	1.5		4.8	0.06	0.42	1.18	24.4	1.00				
16	1155	0	27.75	12.86	27.66	4.5	1.8	.97	5.9	0.10	0.58	0.95	34.6	0.27	6.11	1.06	7.1	44.0
	1157	1	30.23	11.97														
	1156	2	30.69	11.49	30.49	6.1	2.4											
18	1215	0	19.06	14.50	19.52	11.0	2.5	1.61	11.7	0.25	2.60	0.95	58.6	0.35			16.1	94.9
18	1230	0	19.70	14.76					12	0.24	2.34	0.93	56.1	0.28	10.89	1.00	17.4	103

TOMALES BAY DATA SUMMARY 27 March 1985 Julian Date: 85086

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SIO	NH4	DNU	DPU	PNC	PCC
18	1016	.0	.32	11.2	.42			5.85										
	1020	.5	17.77	10.8														
16	1035	.0	6.46	10.3	4.28	3.1	1.9	4.03										
	1040	1.0	29.88	11.8														
	1042	2.0	30.46	11.9		1.3	1.3											
14	1052	.0	28.96	11.8	28.91	13.0	2.9	1.18										
	1053	2.0	28.96	11.8														
	1054	3.3	31.03	12.0		5.0	1.3											
14 E	1102	.0	8.31	10.4	8.26			4.03										
	1105	.5	8.42	10.5														
	1103	1.0	28.03	10.9														
	1104	2.0	30.80	11.9														
12	1113	.0	28.73	11.9	28.36	4.0	1.4	1.01										
	1114	1.0	29.30	11.6														
	1115	2.0	30.57	11.6														
	1116	3.0	30.92	11.8														
	1117	4.0	31.38	11.8														
	1118	5.0	32.07	11.4		2.6	1.2											
12 E	1124	.0	15.46	11.2	15.33			3.13										
	1129	.5	14.88	10.8														
	1125	1.0	25.03	10.6														
	1126	2.0	28.96	11.2														
	1127	3.0	30.57	11.6														
	1128	4.0	31.03	11.6														
10	1135	.0	31.03	12.0	30.63	4.2	1.6	1.01										
	1136	1.0	30.69	11.9														
	1137	2.0	31.03	11.9														
	1138	3.0	31.84	11.3														
	1139	4.0	32.30	11.3														
	1140	5.0	32.30	11.0		9.7	2.0											
10 E	1147	.0	22.84	11.2	22.77			1.76										
	1148	1.0	23.19	11.2														
	1149	2.0	30.11	11.5														
	1150	3.0	30.57	11.5														
8	1155	.0	31.96	11.4	31.75	4.7	1.8	.90										
	1200	1.0	32.07	11.4														
	1201	2.0	31.84	11.3														
	1202	3.0	31.96	11.3														
	1203	5.0	32.53	10.5														
	1204	6.0	33.11	10.1		3.7	1.5											
8 E	1210	.0	30.00	11.6	29.97			1.13										
	1211	3.5	30.46	11.6														
6	1214	.0	31.50	11.8	31.31	3.7	1.1	.95										
	1216	2.5	32.07	10.7														
	1215	5.5	32.88	10.3		3.9	1.3											

TOMALES BAY DATA SUMMARY 27 March 1985 Julian Date: 85086

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
4	1225	.0	31.84	10.9	31.72	4.9	2.4	.95										
	1227	5.0	31.96	10.8														
	1226	9.5	32.07	10.8		4.4	2.5											
2	1240	.0	31.96	10.4	31.95	4.0	1.8	1.08										
	1242	4.0	31.96	10.4														
	1241	8.5	31.96	10.4		2.8	2.5											
0	1251	.0	33.46	9.2	33.48	1.0	2.4	.95										
	1253	4.0	33.46	9.2														
	1252	8.0	33.46	9.2		.9	1.6											
6 E	1307	.0	16.61	11.8	16.65													
	1310	.5	16.50	11.8														
	1309	1.0	29.30	11.3														
	1308	2.0	30.57	11.4														

TOMALES BAY DATA SUMMARY 8 April 1985 Julian Date: 85098

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	709	0	32.88	11.8	32.50	6.0	2.9	.97	5.8	.21	7.37	.77	14.3	.69	12.48	.99	9.9	58.7
	710	1	32.65	11.8														
	711	2	32.76	11.8														
	712	4	32.65	11.8														
	713	5	32.65	11.8		7.3	3.7											
2	726	0	32.53	12.0		8.8	3.9	.84	6.3	.23	6.99	.76	15.3	.64			9.9	59.3
	727	3	32.53	12.0		7.9	2.8											
4	747	0	32.19	12.2		10.4	4.1	.87	5.6	.24	6.31	.88	18.1	.78			11.3	67.1
	746	1	32.30	12.2														
	745	3	32.30	12.2														
	744	5	32.30	12.1														
	743	7	32.30	12.3		8.9	3.6		6.8	.21	6.31	.79	18.1	.65				
6	758	0	31.26	12.6	31.22	13.5	4.2	.90		.18	3.69	1.2	26.9	1.43	9.53	1.36	14.7	89.8
	757	1	31.96	12.7														
	756	2.5	32.53	12.1		8.3	2.9											
8	808	0	30.23	13.3		22.0	5.4	1.01	6.0	.07	.35	1.23	29.6	.62	15.38	1.78	23.5	154
	807	1	31.15	13.1														
	806	3	31.73	12.6														
	805	5.5	32.76	11.9		7.4	2.8		6.4	.21	7.10	.79	13.7	.82				
10	824	0	30.34	13.4	30.32	13.9	3.6	1.04	7.6	.09	.46	.98	29.7	1.03			18.6	119
	823	1	30.69	13.3														
	822	3	31.26	13.0														
	821	5	31.50	12.9		5.0	2.2											
12	835	0	30.23	13.8		8.1	2.0	.87	3.9	.07	.40	.88	30.4	1.2	8.41	1.17	12.0	79.7
	834	1	30.23	13.8														
	833	3	21.26	13.1														
	832	5	31.38	12.9		3.0	1.8		4.4	.15	3.15	1.01	28.8	1.64				
14	847	0	29.53	13.7		2.5	1.1	.87	4.1	.05	.44	1.12	29.8	.87			6.5	48.7
	846	1	30.00	13.7														
	845	3	30.69	13.5		2.7	1.4											
16	859	0	25.73	14.3	26.10	1.4	.9	1.13	6.9	.09	.49	1.19	38.0	1.05			5.5	40.6
	858	.5	27.11	14.3														
	857	1	27.46	14.1														
	856	2	29.19	13.9		1.3	.5											
18	908	0	15.00	13.8	15.06	3.2	1.8		13.0	.14	.53	.97	67.2	.65	12.19	1.17	8.8	66.3
14 W	927	0	29.19	14.0														
	925	3	30.34	13.5														
14 E	931	0	28.50	14.0														
	930	4	29.42	13.6														
12 E	936	0	29.30	13.8														
	935	5	30.46	13.2														
12 W	941	0	29.65	14.0														
	940	3.5	30.34	13.3														

TOMALES BAY DATA SUMMARY 17 April 1985 Julian Date: 85107

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	830	0	31.26	10.6	33.58	7.4	6.6	.84	3.8	.27	7.07	.66	5.1	1.32	12.53	.70	9.6	53.9
	829	2	31.15	10.6														
	828	4	31.03	10.5														
	827	6	31.15	10.7														
	826	8	31.15	10.7														
	825	10	31.26	10.8		8.1	5.9											
2	844	0	32.65	10.7		9.5	7.7	.67	4.0	.18	5.77	.50	3.4	.79				
	843	2	32.76	10.8														
	842	4	32.65	10.8														
	841	5	32.88	10.7														
	840	7	32.76	10.7		6.9	5.5											
4	859	0	32.65	11.0		9.4	6.3	.67	4.1	.18	4.11	.47	3.3	.80	9.75	.36	9.0	51.2
	858	2	32.65	10.95	31.22													
	857	4	32.65	10.9		9.1	6.8											
6	910	0	32.07	12.3		12.2	6.5	.90	7.6	.10	.96	.37	1.9	.35				
	909	2	32.07	12.1														
	908	4	32.07	12.1		9.3	5.2											
8	925	0	31.38	13.6		9.8	4.8	.95	7.0	.10	.25	.14	0.5	.22	6.5	.09	8.4	72.1
	924	2	31.38	13.3														
	923	4	31.96	12.3	30.32													
	922	5	31.96	12.2		10.2	5.9		9.2	.10	1.33	.42	2.3	.33				
10	933	0	30.92	14.2	31.65	5.4	4.1	.92	7.7	.05	.18	.08	0.4	.11				
	932	2	31.03	14.1														
	931	4	31.84	13.0														
	930	6	31.84	12.8		9.2	3.0											
12	943	0	30.11	15.1		2.5	3.1	.95	8.2	.09	.13	.12	0.4	.23	6.38	.08	6.4	85.0
	942	2	30.11	15.0														
	944	3	30.23	14.9														
	941	4	31.15	14.1														
	940	6	31.50	13.7		10.4	4.3		9.0	.10	.30	.42	0.9	.26				
14	958	0	29.76	15.6	30.50	1.9	4.9	.95	7.7	.00	.19	.13	0.5	.17	7.38	.08	7.5	88.4
	957	2	29.88	15.4														
	956	3	30.57	14.4														
	955	4	31.26	14.0		3.5	1.2											
16	1018	0	28.96	15.8		2.8	2.3	1.08	7.7	.08	.21	.38	0.7	.23				
	1017	1	29.19	15.7														
	1016	2	29.53	15.6														
	1015	3	29.76	15.6		4.4	1.8											
18	1029	0	28.03	16.3	28.73	2.1	1.3	1.24	8.0	.02	.19	.73	8.3	.25	7.21	.96	5.4	38.4
	1028	1	28.78	15.7		3.0	1.6		11.4	.10	.24	.89	29.7	.39	9.78	1.20	7.9	60.5
20.3	1045	0	23.07	16.0	23.58	5.5	2.7											

TOMALES BAY DATA SUMMARY 17 May 1985 Julian Date: 85137

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	959	.0	34.09	10.3	33.96	3.4	2.1	.65	2.8	.43	24.40	1.84	35.8	.86			4.1	25.6
	958	1.0	33.92	10.4														
	957	3.0	33.92	10.2														
	955	5.0	34.13	10.2														
	956	7.0	33.92	10.2		3.2	1.9											
2	1009	.0	33.92	10.3		3.9	1.6	.67										
	1008	1.0	33.92	10.2														
	1007	2.0	34.02	10.2														
	1006	4.0	34.02	10.3		3.5	2.1											
4	1017	.0	33.92	10.7		5.2	2.0	.71	3.8	.50	22.70	1.72	33.8	1.10			5.1	34.8
	1016	1.0	33.60	10.7														
	1015	2.0	33.50	10.7														
	1014	3.0	33.81	10.7														
	1013	4.0	33.71	10.7		4.7	.7											
6	1027	.0	33.28	13.8		14.2	2.2	.84										
	1026	1.0	33.28	13.8														
	1025	2.0	33.28	13.9														
	1024	3.0	33.18	13.7														
	1023	4.0	33.39	13.9														
	1022	5.0	33.39	13.7		10.5	3.2											
8	1036	.0	32.86	15.4	32.86	15.4	2.2	.73	3.8	.50	7.66	1.04	18.0	.63			10.3	57.5
	1035	1.0	32.97	15.1														
	1034	2.0	32.97	14.9														
	1033	3.0	33.18	14.8														
	1032	5.0	33.50	13.7														
	1031	6.0	33.50	13.8														
	1030	7.5	33.39	13.6		8.7	3.0											
10	1045	.0	32.65	15.8		15.0	2.2	.73										
	1044	1.0	32.76	15.7														
	1043	2.0	32.65	15.7														
	1042	3.0	33.18	15.1														
	1041	4.0	33.18	14.3														
	1040	5.5	33.18	14.1		8.3	2.3											
12	1052	.0	32.54	15.9		5.8	.9	.70	2.6	.50	9.20	1.47	24.4	2.61			5.8	33.7
	1051	1.0	32.65	15.9														
	1050	2.0	32.54	15.9														
	1049	3.0	32.76	15.7														
	1048	4.0	32.86	15.5														
	1047	5.5	33.18	14.3		6.8	1.9											

TOMALES BAY DATA SUMMARY 17 May 1985 Julian Date: 85137

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
14	1100	.0	32.86	15.8	32.88	9.0	1.1	.73										
	1059	1.0	32.86	15.8														
	1058	2.0	32.65	15.6														
	1057	3.0	32.97	14.8														
	1056	4.0	33.28	14.5		2.8	1.0											
16	1107	.0	32.23	16.0	32.38	2.4	.8	.82	2.8	.51	8.46	1.59	25.9	4.42			4.0	
	1106	1.0	32.02	16.0														
	1105	2.0	32.76	15.7														
	1104	3.0	32.86	15.2		3.2	.7											
18	1110	.0	32.33	16.4	32.26	2.3	.9		6.7	.51	7.91	1.67	25.9	4.82			7.0	
	1111	1.0	32.44	15.9		1.9	1.1											

TOMALES BAY DATA SUMMARY 11 June 1985 Julian Date: 85162

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	859	.0	34.02	10.8	33.88	7.6	3.0	.70	3.9	.75	20.60	1.68	26.7	1.65	25.12	1.82	8.6	49.4
	858	1.0	34.02	11.0														
	857	2.0	33.92	11.0														
	856	4.0	34.13	11.0														
	855	6.0	34.13	10.9														
2	912	.0	34.02	12.2		5.7	3.5	.73	2.7	.66	16.10	1.49	21.6	2.06				
	911	2.0	33.92	12.0														
	910	3.0	33.60	12.1														
	909	5.0	33.92	11.8														
	908	6.5	34.13	11.7		6.2	3.0											
4	927	.0	33.81	14.1		5.9	2.6	.90	4.7	.51	9.86	1.23	16.4	1.94	17.36	1.49	8.7	49.2
	926	1.0	33.81	13.9														
	925	3.0	33.81	13.8														
	924	4.5	33.81	13.8		6.3	3.4											
6	938	.0	33.81	16.8		5.7	1.3	.87	3.5	.23	1.56	.88	8.7	.58				
	937	1.0	33.92	16.0														
	936	2.0	33.81	14.8														
	935	3.0	33.81	14.2		6.5	3.3											
8	949	.0	33.81	18.4		3.7	1.3	.85	3.5	.12	.21	.91	6.1	.27	6.30	1.18	6.0	39.8
	948	1.0	33.71	17.5														
	947	2.0	33.60	15.9														
	946	4.0	33.81	14.6														
	945	6.0	33.81	14.5														
10	1010	.0	33.71	19.3		1.9	1.2	.84	2.8	.09	.11	1.05	8.1	.35				
	1009	1.0	33.81	18.5														
	1008	2.0	33.50	17.5														
	1007	4.0	33.60	16.5														
	1006	5.5	33.50	16.1		7.7	2.3											
12	1022	.0	33.50	20.0		.9	.7	.69	2.2	.09	.11	1.15	10.3	.26	7.70	1.16	2.8	21.5
	1021	1.0	33.60	19.8														
	1020	2.0	33.50	19.4														
	1019	4.0	33.50	18.8														
	1018	5.0	33.60	17.0		10.3	2.8											
14	1032	.0	33.50	20.4		1.7	.9	.67	2.2	.15	.14	1.49	17.3	.44				
	1031	1.0	33.50	20.3														
	1030	2.0	33.60	20.0														
	1029	3.0	33.50	19.8		5.8	1.3											
16	1042	.0	33.07	20.6	33.01	1.1	1.8	.95	6.4	.23	.50	1.77	28.2	.75	10.21	2.22	5.6	37.5
	1041	1.0	33.07	20.6														
	1040	2.0	33.07	20.2														
18	1056	.0	32.97	21.3	32.94	2.2	2.0	1.96	29.5	.49	2.97	1.61	32.3	4.14				
	1055	.5	32.97	21.3														

TOMALES BAY DATA SUMMARY 16 July 1985 Julian Date: 85197

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	1014	.0	34.02	12.0	33.86	38.0	18.4	.84	9.3	.11	.74	.61	6.8	.29			19.8	133.0
	1013	1.0	34.02	12.0														
	1012	4.0	34.02	11.7														
	1011	6.0	34.02	11.7														
	1010	8.0	34.02	11.7														
2	1028	.0	34.02	11.8		35.5	17.7	.95										
	1027	2.0	33.92	11.8														
	1026	4.0	33.92	11.9														
	1025	5.0	33.92	11.9		35.0	20.0											
4	1037	.0	33.92	11.9		33.0	18.3	.95	9.6	.16	1.40	.70	7.7	1.28			16.8	106.0
	1036	2.0	33.92	11.9														
	1035	4.0	34.13	12.0														
	1034	6.0	34.02	12.0		26.7	21.5											
6	1047	.0	34.02	14.4		16.7	16.0	1.13										
	1046	1.0	34.13	14.4														
	1045	2.0	34.13	14.4														
	1044	3.0	34.13	14.3														
	1043	4.0	34.02	14.3		17.0	17.0											
8	1053	.0	34.55	15.5		20.4	8.6	1.13	10.9	.08	.22	1.53	31.7	.28			16.8	112.0
	1052	2.0	33.92	15.2														
	1051	4.0	33.92	14.9														
	1050	6.0	33.92	14.8		19.8	10.6											
10	1103	.0	34.02	18.4		116.0	12.8	1.13										
	1102	1.0	34.02	18.4														
	1100	2.0	34.02	17.4														
	1101	3.0	34.02	16.6														
	1059	4.0	34.02	15.8														
	1058	6.0	34.02	15.8		19.4	4.4											
12	1112	.0	34.02	18.9		14.5	2.6	.95	4.3	.06	.09	1.76	42.9	.24			12.9	98.1
	1111	1.0	34.02	18.9														
	1110	2.0	34.02	18.9														
	1109	4.0	34.02	18.8														
	1108	6.0	34.02	16.8		8.1	2.3											
14	1123	.0	34.24	20.1		6.9	1.7	.95										
	1122	1.0	34.02	20.1														
	1121	2.0	34.02	19.9														
	1120	3.0	34.02	19.7														
	1119	4.0	34.02	19.1		3.0	1.7											
16	1131	.0	34.76	20.6	34.64	3.2	1.5	1.13	6.1	.08	.09	2.67	44.3	.26			4.4	31.5
	1130	1.0	34.76	20.6														
	1129	2.0	34.76	20.5														
	1128	3.0	34.76	20.5		2.6	1.5											
18	1138	.0	34.98	20.8	34.87	2.7	1.6	1.49	16.1	.19	.72	2.56	46.1	1.09			7.6	57.9
	1137	1.0	34.98	20.8														

TOMALES BAY DATA SUMMARY 21 Aug 1985 Julian Date: 85233

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	920	.0	33.42	14.8	33.63	8.2	3.6	.90	4.5	.24	2.92	1.45	20.2	3.20	11.83	1.73	8.8	51.9
	919	2.0	33.47	14.7														
	918	4.0	33.47	14.6														
	917	6.0	33.29	14.6														
	916	8.0	33.77	14.7		5.7	4.0											
2	938	.0	33.52	15.0	33.68	9.3	3.6	.84		.24	2.79	1.43	22.0	2.31				
	937	2.0	33.60	15.1														
	936	4.0	33.61	15.1														
	935	6.0	33.61	15.1														
	934	7.5	33.61	15.1		8.3	4.4											
4	954	.0	33.67	15.2	33.66	8.9	3.9	.90	3.7	.19	2.86	1.40	21.8	2.19	11.68	1.80	8.3	51.9
	953	2.0	33.72	15.2														
	952	4.0	33.70	15.2														
	951	6.0	33.66	15.3														
	950	8.0	33.68	15.2		8.7	3.3											
	949	11.0	33.68	15.2														
6	1011	.0	34.35	16.4	33.91	28.3	4.8	1.01		.09	.17	2.10	37.8	.22				
	1010	2.0	34.26	15.8														
	1009	4.0	34.25	15.7														
	1008	5.0	34.20	15.7		12.8	3.1											
8	1024	.0	34.57	17.5	34.16	19.9	3.9	1.18	7.5	.04	.08	2.54	50.5	.16	7.20	2.88	15.2	127.0
	1023	2.0	34.53	17.5														
	1022	4.0	34.63	17.5														
	1021	6.5	34.63	17.3		14.1	3.0											
10	1038	.0	34.57	18.2	34.37	21.2	3.8	1.04		.04	.08	3.39	56.9	.17				
	1037	2.0	34.48	18.1														
	1036	4.0	34.58	18.0														
	1035	5.5	34.57	18.0		17.0	2.6											
12	1056	.0	34.50	18.7	34.54	14.4	2.5	1.04	6.1	.01	.05	3.49	58.7	.19	9.40	3.62	12.1	111.0
	1055	2.0	34.65	18.7														
	1054	4.0	34.66	18.7														
	1053	5.5	34.64	18.7		13.1	2.2											
14	1117	.0	34.75	18.9	34.75	5.6	1.1	.70		.04	.05	3.95	57.6	.18				
	1116	2.0	34.66	18.9														
	1115	4.0	34.94	18.9		5.3	1.5											
16	1137	.0	34.99	19.1	35.14	.6	.8	1.04	5.5	.04	.09	4.21	43.0	.53	9.33	4.41	2.1	17.4
	1136	2.0	35.03	18.9														
	1135	3.0	35.27	18.9			1.2											
18	1155	.0	35.70	18.7	35.84			1.96		.14	.15	3.86	53.7	.37				
	1156	.0	35.79	18.7		.6	1.7											

TOMALES BAY DATA SUMMARY 30 September 1985 Julian Date: 85273

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	916	.0	35.32	12.4	33.43	.7	1.7	.64		.54	7.67	1.62	19.4	5.38				
	917	1.5	35.32	12.4														
	918	3.4	35.33	12.4														
	919	4.8	35.32	12.5														
	920	6.0	35.30	12.4														
	921	7.1	35.33	12.4														
	922	8.2	35.33	12.7		.4	1.3											
2	925	.0	35.45	13.7	33.43	1.9	1.5	.67	2.6	.54	6.40	1.59	18.5	5.35	16.12	1.62	2.9	18.5
	926	1.1	35.33	13.9														
	927	2.1	35.33	13.9														
	928	3.1	35.34	13.9														
	929	4.3	35.33	13.9														
	930	5.5	35.32	13.9														
	931	6.5	35.33	13.9														
	932	7.7	35.33	13.9														
	933	8.8	35.33	13.9		1.5	1.3											
4	950	.0	35.37	14.3	33.46	2.4	1.2	.78	3.4	.49	5.44	1.68	20.9	5.69			3.7	23.6
	951	1.2	35.36	14.3														
	952	3.1	35.37	14.3														
	953	4.2	35.37	14.3														
	954	5.3	35.37	14.3		1.9	.9											
6	958	.0	35.36	14.5	33.47	3.6	1.1	.81		.46	4.65	1.77	22.6	5.71				
	959	1.0	35.38	14.6														
	1000	2.1	35.38	14.6														
	1001	3.3	35.38	14.6														
	1002	4.6	35.38	14.6														
	1003	5.6	35.38	14.6														
	1004	6.8	35.39	14.6		2.9	1.7											
8	1020	.1	35.40	14.5	33.63	4.5	1.3	.92	4.3	.44	2.66	2.30	33.6	5.25	14.38	2.45	6.2	37.6
	1021	1.2	35.51	15.4														
	1022	2.3	35.51	15.3														
	1023	3.3	35.48	15.3														
	1024	4.5	35.47	15.1														
	1025	5.6	35.41	14.7														
	1026	6.7	35.42	14.7														
	1027	7.9	35.42	14.7		1.4	2.1											
10	1039	.0	35.38	14.6	33.95	10.5	1.6	1.13		.26	.67	3.36	53.3	2.79				
	1040	1.0	35.86	16.8														
	1041	2.0	35.88	16.8														
	1042	3.0	35.89	16.8														
	1043	4.0	35.89	16.8														
	1044	5.0	35.91	16.8														
	1045	6.1	35.92	16.9		7.4	1.6											

TOMALES BAY DATA SUMMARY 30 September 1985 Julian Date: 85273

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
12	1050	.0	35.40	14.8	34.27	10.2	1.3	.84	2.8	.20	.23	4.03	59.0	.63	9.38	4.09	8.6	54.8
	1051	1.1	36.19	17.8														
	1052	2.1	36.23	17.9		1.7	.7											
14	1119	.0	34.48	18.3		8.6	.5	.85		.20	.26	4.76	58.6	.82				
	1118	1.0	34.55	18.3														
	1117	2.0	34.62	18.3														
	1116	3.0	34.62	18.4														
	1115	4.5	34.70	18.4		6.3	.5											
16	1141	.0	34.70	18.2		2.0	.3	.90	3.1	.25	.84	4.73	52.1	2.55	13.88	4.96	3.4	21.4
	1140	1.0	34.70	18.2														
	1139	2.0	34.80	18.2														
	1138	3.0	34.77	18.2		1.3	.5											
18	1152	.0	34.88	17.9		1.2	.8	1.08		.22	.53	4.22	40.4	1.42				
	1153	1.0	34.87	17.8														

TOMALES BAY DATA SUMMARY 3 October 1985 Julian Date: 85276

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	956	0	33.43	13.5		1.3	1.0	.60		.61	8.86	1.58	17.6	5.42	17.05	1.43		
2	1011	0	33.42	13.7		1.4	.8	.60		.63	8.22	1.66	18.5	5.77				
4	1025	0	33.46	13.8		2.7	1.3	.64		.60	8.00	1.88	22.0	5.90	18.71	1.87		
6	1035	0	33.49	14.6		5.0	1.4	.87		.55	6.25	1.95	24.6	5.66				
8	1046	0	33.58	16.8		.9	.7	.82		.47	3.70	2.08	31.0	4.97	14.64	2.23		
10	1057	0	33.91	17.7		1.1	.5	1.01		.29	1.15	3.19	50.4	3.49				
12	1108	0	34.34	18.7		.8	.2	.90		.19	.34	4.17	59.4	.31	8.07	4.30		
14	1121	0	34.45	19.1		.5	.3	.74		.18	.26	4.33	61.6	.19				
16	1132	0	34.69	19.5		.7	.4	.70		.25	.24	4.44	51.8	.20	11.18	4.86		
18	1143	0	34.81	18.8		1.7	.5	1.13		.22	.27	4.11	36.8	.38				
14 W	1201	0	34.82	19.5		.8	.1	.80		.14	.25	4.49	62.6	.16				
14 E	1208	0	34.62	19.3		14.2	1.5	49.95		.17	.26	4.58	59.1	.10				
12 E	1228	0	34.26	19.2		1.3	.6	.74		.19	.27	4.08	56.6	1.03				
12 W	1236	0	34.12	18.7		.7	.5	.95		.21	.61	3.83	56.2	2.71				
5 E	1255	0	32.61	18.4		1.1	.5	1.24		.23	.64	1.99	21.2	1.30				
5	1300	0	33.55	14.3		1.8	1.0	.71		.63	6.96	1.89	21.1	5.94				
5 W	1306	0	33.46	14.0		.7	2.3	.60		.60	7.96	1.75	20.1	5.55				

TOMALES BAY DATA SUMMARY 8 October 1985 Julian Date: 85281

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0		0	33.35						2.8	.78	2.72	.84	7.4	2.56	9.37	.93	4.4	28.6
2		0	33.34						3.2	.28	2.18	.84	7.7	2.50	8.41	1.00	4.0	25.6
4		0	33.37						3.6	.31	2.44	1.28	11.8	4.44	11.88	1.39	4.6	28.5
6		0	33.52						5.2	.31	2.29	1.90	23.3	4.91	14.23	2.18	5.5	34.6
8		0	33.51						9.0	.41	3.14	2.16	26.6	5.01	13.69	2.34	7.0	44.2
10		0	34.10						6.7	.22	1.01	3.77	57.6	1.28	11.59	4.05	10.2	63.2
12		0	34.43						4.7	.14	.57	4.55	62.4	.76	8.81	4.72	9.2	61.8
14		0	34.65						5.3	.14	.36	5.05	58.4	2.55	12.47	5.35	6.0	37.4
16		0	34.82						4.6	.29	.49	4.79	45.4	2.34	14.83	5.08	3.6	23.6
18		0	34.57						6.8	.20	.21	4.81	53.2	1.06	14.06	5.11	6.6	45.9

TOMALES BAY DATA SUMMARY 4 December 1985 Julian Date: 85338

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	956	.0	32.94	10.7	33.03	.9	3.0	1.18	7.9	.37	11.21	1.25	15.5		18.76	1.51	4.10	32.2
	955	1.0	32.97	10.7														
	954	3.0	33.00	10.7														
	953	5.0	33.07	10.8														
	952	7.0	32.95	10.7		.8	3.8											
2	1007	.0	31.74	10.9	31.82	.8	2.2	1.18		.48	13.49	1.84	25.3	3.97				
	1006	1.0	32.14	10.7														
	1005	3.0	32.90	10.7														
	1004	4.5	32.95	10.6		.7	3.4											
4	1027	.0	31.57	10.9	31.54	1.1	1.5	1.08	3.6	.58	14.55	2.19	31.7	5.08			3.21	21.5
	1026	2.0	31.65	10.8														
	1025	4.0	32.50	10.8														
	1024	6.0	32.80	10.7														
	1023	8.0	32.86	10.7		.8	2.6											
6	1042	.0	31.47	10.8	31.43	1.7	1.0	.90		.45	13.12	2.22	31.1	4.66				
	1041	2.0	31.69	10.8														
	1040	4.0	32.52	10.6														
	1039	6.0	32.58	10.7		.6	2.0											
8	1101	.0	30.99	10.8	31.02	.9	1.0	.87	3.3	.48	14.18	2.43	35.9	5.05	24.04	2.64	2.36	16.0
	1100	2.0	31.49	10.6														
	1059	4.0	31.78	10.6														
	1058	6.0	31.62	10.6		.2	1.6											
10	1116	.0	30.47	10.9	30.51	.9	.7	.92		.46	14.64	2.82	41.2	5.64				
	1115	2.0	31.87	10.6														
	1114	4.0	32.33	10.5														
	1113	6.0	32.29	10.5		.4	1.0											
12	1131	.0	31.29	10.8	31.20	1.3	.8	.87	2.6	.40	12.49	2.67	36.4	5.32			3.57	22.5
	1130	2.0	32.01	10.5														
	1129	4.0	32.25	10.5														
	1128	6.0	32.34	10.4		.2	1.1											
14	1143	.0	31.93	10.7	31.84	1.2	.7	.82		.29	9.82	2.34	28.1	4.40				
	1142	2.0	32.18	10.5														
	1141	4.0	32.20	10.4	32.23	.2	.9											
16	1156	.0	31.98	10.6	31.82	1.1	.8	.87	3.9	.31	9.94	2.60	31.4	5.17	19.78	2.96	2.73	19.3
	1155	1.0	31.86	10.7														
	1154	3.0	32.09	10.4		.3	.6											
18	1208	.0	30.10	10.8	30.12	2.0	.9	1.49		.47	15.04	2.99	44.9	6.39				
	1207	1.0	31.25	10.7														

TOMALES BAY DATA SUMMARY 6 November 1985 Julian Date: 85310

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
18	1025	.0	33.26	15.0	33.38	1.6	.7	1.04	5.0	.33	2.38	3.50	26.0	2.01				
	1024	1.5	33.19	14.8														
16	1053	.0	33.63	15.2	33.72	.3	.5	.84	3.5	.38	3.95	3.80	33.0	3.39			3.14	19.2
	1052	1.0	33.76	15.0														
	1051	2.0	33.72	15.0														
	1050	3.0	33.73	15.0		.8	.7		3.7								3.46	20.4
14	1104	.0	33.86	15.3	33.94	.6	.6	.87	2.5	.45	5.81	4.16	43.5	4.00			2.50	15.5
	1103	1.0	33.81	15.1														
	1102	2.0	33.81	14.9														
	1101	3.0	34.13	14.9														
	1100	4.0	34.02	14.9		.9	.8		4.1								3.99	25.6
12	1118	.0	33.96	14.8	33.98	2.6	1.0	.69	1.4	.57	5.03	3.90	52.9	6.62			4.07	27.2
	1117	2.0	33.98	14.5														
	1116	4.0	33.98	14.5														
	1115	6.0	33.83	14.4		1.1	.6		4.0								3.71	23.6
10	1136	.0	33.77	14.6	33.82	4.4	1.1	.79	3.6	.58	5.96	3.23	44.6	5.04			4.21	27.0
	1135	2.0	33.73	13.6														
	1134	4.0	33.73	13.4														
	1133	6.5	32.76	13.5		4.1	1.4		4.2								3.97	24.9
8	1152	.0	33.58	13.4	33.64	3.2	1.1	.70	2.5	.68	11.17	2.47	38.0	2.18			3.75	23.6
	1151	2.0	33.50	12.5														
	1150	4.0	33.50	12.2														
	1149	5.0	33.43	12.2		2.4	1.1		2.7								3.36	21.0
6	1218	.0	33.47	12.8	33.60	2.6	.8	.69	2.5	.66	12.90	2.19	32.9	1.20			2.57	16.8
	1217	2.0	33.50	12.2														
	1216	4.0	33.50	12.2														
	1215	6.0	33.28	12.0														
	1214	8.0	33.28	11.9														
	1213	10.0	33.20	12.0		1.5	1.0		2.6								2.04	13.4
4	1228	.0	33.59	11.8	33.58				2.2	.59	15.33	1.96	31.2	1.00			2.68	17.4
	1227	2.0	33.61	11.8														
	1226	4.0	33.60	11.6														
	1225	6.0	33.45	11.6		1.4	.9		2.2								2.49	15.6
2	1239	.0	33.34	11.5	33.58	1.1	.7	.58	2.0	.60	16.64	1.89	30.5	1.04			1.51	10.3
	1238	2.0	33.28	11.3														
	1237	4.0	33.28	11.2														
	1236	7.0	33.31	11.2		.7	.7		1.9								2.04	14.2
0	1251	.0	33.53	12.1	33.56	.9	.6	.59	2.6	.62	17.43	1.82	27.6	.88			1.74	11.6
	1250	2.0	33.49	11.8														
	1249	4.0	33.60	11.4														
	1248	6.0	33.58	11.3					1.7								2.18	15.0

TOMALES BAY DATA SUMMARY 29 January 1986 Julian Date: 86029

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	900	0	32.86	12.0	32.84	5.4	2.2	.70										
2	922	0	32.60	11.9	32.45	3.3	1.8	.75										
	921	5	32.44	12.0														
	920	7	32.54	12.0														
4	1001	0	32.23	11.9	32.23	2.8	1.7	.78										
	1000	4	32.23	11.9		2.5	1.8											
6	1041	0	30.96	11.9	31.74	2.6	1.8	.80										
	1040	5	30.96	11.9		2.2	2.2											

TOMALES BAY DATA SUMMARY 5 February 1986 Julian Date: 86036

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	921	.0	32.70	12.4	32.66	1.3	1.7	.80	8.9	.16	3.24	.77	8.5	.95	8.26	.85	3.3	27.8
	922	8.0	32.70	12.3														
2	934	.0	32.58	12.3	32.61	1.0	2.0	1.01		.19	3.22	.83	9.0	1.09				
	933	4.0	32.76	12.4														
	932	8.0	32.76	12.4														
4	944	.0	32.51	12.4	32.42	1.2	1.9	1.01	6.9	.16	3.56	.84	10.9	1.39	10.02	.95	3.5	28.8
	943	4.0	32.65	12.4														
	942	7.0	32.59	12.3		.9	2.3											
6	954	.0	29.85	12.3	29.86	1.5	1.0	1.01		.28	6.99	1.27	27.7	4.16				
	953	2.0	31.27	12.3														
	952	4.0	31.82	12.3		1.1	1.2											
8	1005	.0	28.79	12.2	28.70	1.9	.9	1.01	4.0	.36	9.14	1.47	36.1	5.38	21.20	1.64	2.9	18.5
	1004	3.0	29.10	12.2														
	1003	5.0	30.51	12.4														
	1002	7.0	30.99	12.3		.9	1.1											
10	1015	.0	28.39	12.2	28.25	1.5	.8	1.04		.41	10.27	1.62	39.8	5.98				
	1014	2.0	28.32	12.2														
	1013	4.0	28.41	12.3														
	1012	6.0	29.05	12.3		.6	.9											
12	1028	.0	28.25	12.1	28.13	1.8	1.0	.92	3.5	.39	10.39	1.61	39.7	5.87	22.19	1.76	3.3	19.8
	1027	2.0	28.29	12.1														
	1026	4.0	28.24	12.1														
	1025	6.0	28.32	12.1		.6	.7											
14	1036	.0	27.23	12.2	27.25	1.3	.8	.97		.40	11.54	1.67	47.1	6.12				
	1035	2.0	27.36	12.2														
	1034	4.5	28.12	12.0		.5	.7											
16	1046	.0	23.46	12.0	23.57	.9	.7	1.31	5.9	.41	13.54	1.69	65.6	6.94	29.84	1.96	3.2	22.3
	1045	2.0	24.46	11.9														
	1044	3.5	27.26	12.2		.4	.9											
18	1055	.0	15.41	11.7	14.40	1.1	1.3	1.76		.47	20.76	1.99	115.0	7.62				
	1054	1.0	15.55	11.8														

TOMALES BAY DATA SUMMARY 19 March 1986 Julian Date: 86078

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	847	.0	21.93	13.1		1.2	.2	1.13	7.3	.32	10.00	1.09	75.9	4.36	19.93	1.05	3.0	21.6
	846	2.0	22.09	13.1														
	844	4.0	22.01	13.0														
	840	6.0	22.29	13.0		.9	.4											
2	900	.0	16.04	13.6	16.10	.7	.2	1.24	6.3	.41	11.77	1.20	98.7	5.37				
	859	1.0	16.65	13.4														
	858	2.0	16.66	13.3														
	857	3.0	17.21	13.2														
	856	4.0	26.14	12.9														
	855	5.0	28.93	12.8		1.2	.6											
4	914	.0	14.65	13.7	14.44	.8	.1	1.39	7.0	.37	11.68	1.08	109.0	4.73	24.48	1.17	3.5	22.5
	913	1.0	15.22	13.5														
	912	3.0	17.01	13.2														
	911	5.0	25.42	13.0														
	910	7.0	28.06	13.0		.9	.9											
6	926	.0	14.29	13.9	12.13	1.6	.4	1.55	7.4	.39	13.20	1.11	125.0	4.24				
	925	1.0	15.34	13.1														
	924	2.0	24.47	13.3														
	923	3.0	27.50	13.3														
	922	4.0	28.28	13.3														
	921	5.0	28.53	13.3		1.0	.3											
8	939	.0	12.14	14.1	12.36	.7	.3	1.61	9.5	.49	14.49	1.14	125.0	4.45	24.31	1.08	3.4	21.5
	938	1.0	18.58	13.8														
	937	2.0	21.49	13.4														
	936	4.0	26.83	13.3														
	935	6.0	28.09	13.3		.9	.5		6.8	.28	6.21	.99	36.0	3.33			3.1	20.4
10	1009	.0	9.36	14.8	9.21	1.0	.3	1.76	9.2	.46	13.74	1.13	140.0	4.15				
	1008	1.0	16.98	13.9														
	1007	2.0	22.27	13.5														
	1006	4.0	25.13	13.3														
	1005	6.0	26.74	13.4		.6	.5											
12	1021	.0	13.29	14.9	12.67	1.3	.2	1.76	11.4	.46	12.79	1.01	127.0	4.21	23.20	1.09	4.0	24.3
	1020	1.0	17.11	13.6														
	1019	2.0	21.96	13.5														
	1018	4.0	24.44	13.3														
	1017	5.5	24.79	13.3		.2	.7		8.2	.53	8.90	1.40	58.0	6.99			4.7	28.8
14	1043	.0	12.60	14.8	12.35	5.8	.2	1.96	18.2	.57	12.51	1.13	120.0	3.93				
	1042	1.0	17.85	13.8														
	1041	2.0	22.49	13.5														
	1040	4.0	23.89	13.5		.5	.6											
16	1053	.0	5.76	15.0	5.91	8.1	.9	4.03	32.2	.53	14.09	1.27	160.0	2.38	21.75	.97	11.7	74.6
	1052	1.0	20.77	13.7														
	1051	2.0	22.86	13.6		.5	.6		14.5	.64	11.23	1.67	72.1	8.78			4.4	31.4
18	1114	.0	5.31	15.6	5.25	3.9	.6	3.13	37.0	.45	13.99	.95	167.0	2.24				
	1113	.5	6.51	15.7														

TOMALES BAY DATA SUMMARY 2 April 1986 Julian Date: 86092

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
18.0	851	.0	18.27	13.0	18.76	7.4	2.9	1.96	14.1	.08	.12	.71	67.0	.55				
	850	.5	24.38	14.4														
16.0	918	.0	19.68	13.2	20.17	7.1	2.8	1.76	14.4	.03	.12	.74	64.3	.27	9.66	1.01	9.2	53.9
	917	1.0	24.99	14.3														
	916	2.5	25.80	14.4		7.4	1.8											
14.0	934	.0	26.08	14.8	25.92	10.5	2.8	1.24	9.7	.01	.12	.59	34.6	.20				
	933	1.0	26.01	14.7														
	932	2.0	27.20	14.7														
	931	4.0	28.23	14.3		4.0	1.4											
12.0	1002	.0	26.44	15.1	26.34	11.4	3.0	1.39	9.5	.01	.13	.65	33.5	.25	8.39	.83	9.4	55.8
	1001	1.0	26.67	14.9														
	1000	3.0	28.63	14.6														
	959	5.0	29.08	14.4		2.2	1.8		18.2	.10	1.67	.84	22.2	2.86			10.2	60.6
10.0	1030	.0	26.41	15.1	26.58	11.5	3.4	1.39	10.8	.02	.17	.62	31.5	.32				
	1029	1.0	26.65	15.0														
	1028	2.0	28.06	14.4														
	1027	4.0	28.79	14.6														
	1026	6.0	29.22	14.1		4.2	2.5											
8.0	1058	.0	27.44	14.9	27.38	10.6	2.7	1.24	9.7	.04	.39	.61	27.5	.29	8.43	.82	10.3	59.0
	1057	1.0	27.47	14.9														
	1056	2.0	27.83	14.6														
	1055	4.0	29.37	14.1														
	1054	5.5	29.44	13.9		4.8	2.4		14.0	.10	1.53	.84	21.8	2.91			9.2	55.0
6.0	1119	.0	29.13	14.6	29.19	6.5	2.2	1.31	11.9	.14	1.84	.81	22.4	1.90				
	1118	1.0	29.19	14.5														
	1117	3.0	30.03	14.1														
	1116	5.0	29.79	13.9														
	1115	7.0	30.21	14.1		3.1												
4.0	1133	.0	29.58	14.1	29.62	4.3	3.7	1.61	17.2	.04	1.18	.67	17.8	2.21	9.10	.88	8.5	52.4
	1132	2.0	29.49	14.0			2.7											
	1131	4.0	29.53	14.1														
	1130	6.0	29.53	14.1														
2.0	1146	.0	29.69	14.3	29.70	5.2	2.9	1.61	16.4	.02	1.19	.70	18.6	2.43			7.5	47.9
	1145	3.0	29.73	14.2														
	1144	5.0	29.69	14.3														
	1143	7.0	29.60	14.2														
6 E	1201	.0	27.71	15.0														

TOMALES BAY DATA SUMMARY 16 April 1986 Julian Date: 86106

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	904	.0	32.01	12.6	31.92	9.7	3.0	1.13	12.4		7.29	.82	13.5	.51	11.11	.93	6.6	40.4
	903	2.0	32.10	12.5														
	902	4.0	32.10	12.5														
	901	6.0	32.01	12.5														
	900	8.0	32.10	12.5		8.8	2.9											
2	933	.0	31.31	12.9	32.12	10.3	2.8	1.24	16.3		3.38	.56	9.2	2.47				
	932	1.0	31.92	12.7														
	931	3.0	31.92	12.8														
	930	5.0	32.01	12.6														
	929	7.0	31.83	12.6		8.1	2.8											
4	949	.0	30.23	14.4	30.33	9.0	3.7	1.85	25.3		.71	.38	2.2	.13	6.25	.63	11.4	77.6
	948	2.0	30.26	14.3														
	947	4.0	30.63	14.0														
	946	6.0	31.09	13.7														
	945	8.0	31.28	13.4		10.6	2.9											
6	1004	.0	29.90	14.7	29.85	10.6	3.1	1.13	9.2		.24	.46	4.2	.00			7.4	46.9
	1003	2.0	29.95	14.6														
	1002	4.0	32.33	12.4														
	1001	6.0	33.07	11.5														
	1000	8.0	33.10	11.3		6.6	2.1											
8	1013	.0	29.53	15.1	32.50	11.3	2.2	1.61	8.5		.16	.53	8.1	.02	5.68	.77	8.8	55.4
	1012	1.0	29.71	14.9														
	1011	3.0	32.41	12.3														
	1010	5.0	32.88	11.7		6.8	2.0		6.4		11.00	1.06	18.0	1.02			6.6	37.5
10	1023	.0	29.40	15.2	29.37	10.2	2.3	1.18	7.9		.15	.56	8.5	.00				
	1022	2.0	30.12	14.5														
	1021	4.0	32.33	12.5														
	1020	6.0	32.52	12.3		4.5	3.0											
12	1043	.0	29.04	15.3	28.80	8.0	1.7	1.21	7.1		.15	.68	18.7	.12	4.89	.90	8.4	48.9
	1042	2.0	29.34	15.0														
	1041	3.0	30.82	14.1														
	1040	5.0	32.05	13.0		3.4	1.4		6.4		8.19	1.22	21.7	3.02			4.3	24.9
14	1103	.0	26.46	15.4	26.33	4.4	1.3	1.44	6.7		1.40	.96	37.3	2.18				
	1102	2.0	31.14	14.4														
	1101	3.5	31.92	13.4		1.8	2.1											
16	1117	.0	23.57	15.7	23.51	5.5	1.3	1.44	8.6		1.29	.96	49.2	1.63	10.47	1.15	7.3	44.6
	1116	1.0	29.59	14.9														
	1115	2.0	30.82	13.9		2.1	1.6											
18	1130	.0	22.99	16.5	22.04	9.1	2.7	2.22	14.3		1.36	.87	56.2	1.29				

TOMALES BAY DATA SUMMARY 30 April 1986 Julian Date: 86120

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
0	922	.0	33.33	11.4	33.39	15.4	6.0	1.13	17.3	.26	8.75	.90	16.2	.90	15.00	1.02	10.5	64.3
	921	2.0	33.30	11.4														
	920	4.0	33.35	11.4														
	919	6.0	33.34	11.4														
	918	8.0	33.30	11.2														
2	938	.0	33.30	11.8	33.21	16.8	5.8	1.24	14.9	.19	5.07	.63	10.3	.52				
	937	2.0	33.12	11.8														
	936	4.0	33.26	11.8														
	935	6.0	33.28	11.9		15.2	7.1											
4	951	.0	32.75	12.3	33.05	16.1	5.9	1.24	14.5	.19	4.43	.67	9.5	.60	11.80	.88	11.5	69.4
	950	2.0	32.76	12.2														
	949	4.0	33.01	12.3														
	948	5.0	32.86	12.2		16.3	5.0											
6	1012	.0	31.73	14.4	31.87	5.3	3.5	1.24	9.9	.13	.40	.62	.9	.43				
	1011	2.0	32.25	13.3														
	1010	4.0	32.59	13.0														
	1009	6.0	33.33	11.1														
	1008	7.0	33.35	11.0		10.6	3.7											
8	1035	.0	30.71	15.0	30.83	2.6	1.5	1.08	8.0	.11	.27	.86	.6	.55	8.75	1.23	4.7	33.5
	1034	2.0	31.62	14.0														
	1033	4.0	32.47	13.1		17.6	7.0											
10	1059	.0	30.59	15.0	30.58	2.7	1.6	1.18	7.7	.11	.23	.93	.8	.42				
	1058	2.0	30.66	14.4														
	1057	4.0	31.59	14.0														
	1056	6.0	32.70	12.7		16.8	6.7											
12	1116	.0	30.44	14.9	30.33	2.9	1.5	1.13	9.5	.11	.22	1.06	.9	.58	8.12	1.34	5.3	36.2
	1115	2.0	30.91	14.8														
	1114	4.0	31.58	14.4		5.1	2.3		11.7	.09	.28	.80	1.9	.63			6.9	45.6
14	1155	.0	29.61	15.5	29.63	3.3	1.5	1.31	11.6	.11	.25	.99	2.1	.41				
	1154	2.0	30.18	14.4														
	1153	4.0	31.20	14.7		2.9	1.7											
16	1208	.0	26.83	15.5	26.67	4.1	1.9	1.61	16.0	.09	.21	.82	8.5	.25	11.30	1.43	8.0	56.7
	1207	2.0	30.30	15.1		2.9	1.9		16.6	.07	.49	1.07	3.2	1.01			7.4	53.8
17	1240	.0	25.61	17.1					16.9	.11	.50	.94	24.0	.60				

TOMALES BAY DATA SUMMARY 14 May 1986 Julian Date: 86134

STA	TIME	DEPTH	SAL	TEMP	DISCR SAL	CHL	PHEO	EXT COEF	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
18	745	.5	29.03	14.7	29.01	12.0	4.7	4.03	53.1	.15	.25	1.05	24.0	.69				
16	757	.0	30.36	15.5	30.49	9.1	3.0	2.82	24.5	.16	.29	1.07	19.9	.91	10.70	1.10	12.2	87.7
	756	3.0	30.65	15.6		6.3	3.5		30.3	.13	.29	1.04	17.7	.89			14.0	111.0
14	824	.0	31.26	15.8	31.46	5.1	1.6	1.31	9.5	.16	.36	1.04	15.9	.77				
	826	1.0	31.37	15.8														
	825	2.0	31.55	15.8														
	823	3.5	32.07	15.4														
12	845	.0	31.88	15.5	32.16	3.5	1.9	1.31	8.8	.13	.37	.89	14.2	.67	8.03	1.10	6.1	40.0
	844	1.0	31.98	15.5														
	843	3.0	32.05	15.5														
	842	5.0	33.59	15.0		2.2	1.3		7.5	.16	.94	.93	16.3	1.14			5.3	38.1
10	933	.0	32.39	15.3	32.44	4.9	2.0	1.01	5.3	.18	.89	.90	15.7	.89				
	932	2.0	32.49	15.1														
	931	4.0	32.53	14.9														
	930	6.0	32.62	14.5		3.2	2.6											
8	949	.0	32.44	15.0	32.51	6.2	2.0	1.13	6.1	.16	1.51	.84	16.0	.75	10.80	1.13	7.2	44.7
	948	1.0	32.62	15.0														
	947	3.0	32.32	14.9														
	946	5.0	33.04	13.8		6.6	3.9		12.9	.22	4.25	1.04	19.6	1.29				
6	1011	.0	32.99	13.9	33.04	11.1	3.8	1.49	12.3	.21	5.29	.87	19.9	.80	12.90	.93	9.3	62.7
	1010	2.0	33.12	13.7														

Appendix B.

Hydrographic and Nutrient Data for
Walker and Lagunitas Creeks

WALKER CREEK DATA SUMMARY

DATE	TIME	DISCR SAL	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
11 MAR 85			69.3	1.23	27.00	3.79	139.0	10.50			16.5	177.0
8 APR 85			9.4	.43	31.20	2.46	156.0	1.90			4.9	38.5
17 APR 85			7.8	.70	47.80	6.04	122.0	1.40	78.30	7.63	3.4	31.2
17 MAY 85			5.0	.22	1.00	6.07	80.3	2.40			2.3	22.6
11 JUN 85		.70	4.6	.20	2.10	2.63	140.0	2.00	23.40	3.02	1.8	19.1
16 JUL 85		4.50	6.7	.23	1.10	2.28	129.0	1.80			3.2	28.3
21 AUG 85		.60	3.7	.23	.90	2.00	139.0	1.70	22.80	2.49	1.5	15.6
30 SEP 85		14.40	7.1	.16	.80	1.48	58.0	1.40	16.20	1.77	5.5	34.3
4 DEC 85	1430		13.2	1.08	71.40	2.24	162.0	3.60	64.50	2.60	2.6	21.9
29 JAN 86			13.9								4.7	54.4
5 FEB 86			87.8	.93	49.90	3.41	173.0	6.00	53.20	3.76	14.1	162.0
20 FEB 86	1710		960.0	1.52	32.50	5.84	160.0	17.20			82.2	999.0
19 MAR 86			140.0		38.20	4.28	187.0	5.70	53.80	5.19	17.3	161.0
2 APR 86	1445		18.9		17.50	4.26	152.0	.80	39.40	5.20	3.7	25.6
16 APR 86			20.6		22.40	5.04	73.6	.60	57.60	8.33	14.5	105.0
30 APR 86	1500	.50	17.6	.92	11.20	4.83	118.0	1.30	53.20	7.49	14.0	102.0
14 MAY 86		.40	9.7	.16	1.60	1.87	111.0	3.30	33.50	2.97	6.9	46.9
1 JUL 86		1.00	7.0	.11	.70	1.19	112.0	1.70				
27 AUG 86		1.00	14.6	.10	.70	1.44	149.0	1.70				
1 OCT 86		14.60	11.0	.07	.80	.96	82.2	.80				

LAGUNITAS CREEK DATA SUMMARY

DATE	TIME	DISCR SAL	SPM	NO2	N+N	DRP	SiO	NH4	DNU	DPU	PNC	PCC
11 MAR 85			**********		**********		NOT SAMPLED		**********		**********	
8 APR 85			5.4	.20	17.70	.67	185.0	1.36	27.70	.87	2.0	23.7
17 APR 85			3.3	.30	13.60	.66	196.0	1.38	21.80	.75	1.6	18.2
17 MAY 85			5.7	.24	9.70	.97	207.0	2.57			2.9	38.9
11 JUN 85		.20	8.4	.16	.30	.31	215.0	.65	10.20	.67	13.9	105.0
16 JUL 85		.10	10.4	.17	1.97	.74	234.0	1.26			5.9	46.4
21 AUG 85	750	.00	7.9	.14	.37	.49	238.0	.69	9.60	.50	9.3	72.7
30 SEP 85			6.9	.13	.32	.45	233.0	1.07	8.20	.49	7.7	56.2
4 DEC 85	830		10.0	.35	83.50	.76	230.0	.65	84.20	1.08	3.0	30.4
29 JAN 86			8.9								5.7	64.5
5 FEB 86	758		19.4	.18	44.20	.97	252.0	3.68	38.00	1.21	4.6	59.4
20 FEB 86	1630		218.0	.54	19.90	.89	174.0	2.64			28.9	320.0
19 MAR 86			71.8		16.10	1.18	202.0	1.08	26.50	.89	10.0	89.1
2 APR 86	728		30.5		19.80	.77	222.0	.87	31.80	1.18	2.7	22.0
16 APR 86			16.1		11.30	.31	188.0	.68	21.00	.62	4.1	42.9
30 APR 86	719	.80	6.0	.06	3.60	.24	162.0	.69	12.80	.37	4.0	42.9
14 MAY 86		.70	6.2	.07	5.20	.28	169.0	1.22	13.50	.54	2.2	23.8
1 JUL 86			9.9	.08	2.90	.19	207.0	1.40				
27 AUG 86	740		6.5	.08	2.00	.37	212.0	1.02				
1 OCT 86			4.1	.05	2.00	.41	217.0	1.02				

Appendix C.

Phytoplankton Productivity Data

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	2
DATE .....:	17 Apr 85	JULIAN DATE .....:	85107
SALINITY .....:	28.3 ppt	CHLOROPHYLL .....:	8.48 mg/m^3
TEMPERATURE .....:	10.7 oC	SURFACE IRRAD ...:	46.63 E /m^2/d
ATTEN COEFF .....:	.66 m^-1	PHOTIC DEPTH ....:	6.98 m
DURATION .....:	24 hr	INITIAL TIME ....:	1340 hr
TOTAL CO2 .....:	27696 ug C/l	FINAL TIME .....:	1340 hr
DPM ADDED .....:	22000000 dpm	WATER DEPTH .....:	3.6 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	46.63	26.69	26.84	3.15
.93	54.2	25.27	27.53	27.68	3.25
1.76	31.3	14.59	29.81	29.95	3.51
2.93	14.5	6.76	12.85	13.00	1.51
3.83	7.97	3.72	6.30	6.44	.74
4.75	4.35	2.03	2.43	2.58	.29
6.06	1.83	.85	.84	.99	.10
6.98	DARK BOTTLE	.05	.00	.15	.00

Uptake over	photic zone	89.08 mg C/m^2/h
	water depth	80.00
	photic zone	2138 mg C/m^2/d
	water depth	1920

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	8
DATE .....:	17 Apr 85	JULIAN DATE .....:	85107
SALINITY .....:	27.2 ppt	CHLOROPHYLL .....:	8.98 mg/m^3
TEMPERATURE .....:	13.6 oC	SURFACE IRRAD ...:	46.63 E /m^2/d
ATTEN COEFF .....:	.95 m^-1	PHOTIC DEPTH ....:	4.87 m
DURATION .....:	24 hr	INITIAL TIME ....:	1340 hr
TOTAL CO2 .....:	27780 ug C/l	FINAL TIME .....:	1340 hr
DPM ADDED .....:	22000000 dpm	WATER DEPTH .....:	6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	46.63	29.10	29.24	3.24
.60	56.8	26.49	30.68	30.82	3.42
1.20	32.3	15.06	29.84	29.98	3.32
1.89	16.7	7.79	19.17	19.31	2.14
2.50	9.38	4.37	11.25	11.39	1.25
3.23	4.73	2.21	4.79	4.93	.53
3.91	2.48	1.16	3.09	3.23	.34
4.87	DARK BOTTLE	.05	.00	.14	.00

Uptake over	photic zone	72.35 mg C/m^2/h
	water depth	72.35
	photic zone	1736 mg C/m^2/d
	water depth	1736

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	18
DATE	17 Apr 85	JULIAN DATE	85107
SALINITY	24.3 ppt	CHLOROPHYLL	1.94 mg/m^3
TEMPERATURE	16.3 oC	SURFACE IRRAD ...	46.63 E /m^2/d
ATTEN COEFF	1.24 m^-1	PHOTIC DEPTH	3.71 m
DURATION	24 hr	INITIAL TIME	1340 hr
TOTAL CO2	27132 ug C/l	FINAL TIME	1340 hr
DPM ADDED	22000000 dpm	WATER DEPTH	1 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	46.63	5.91	5.98	3.05
.49	54.8	25.55	7.10	7.17	3.66
.94	31.3	14.59	7.00	7.08	3.61
1.50	15.5	7.23	4.65	4.73	2.40
1.99	8.5	3.96	2.50	2.57	1.29
2.47	4.65	2.17	1.62	1.69	.83
3.22	1.85	.86	1.47	1.54	.76
3.71	DARK BOTTLE	.05	.00	.08	.00

Uptake over photic zone	13.88	mg C/m^2/h
water depth	6.63	
photic zone	333	mg C/m^2/d
water depth	159	

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	2
DATE	11 Jun 85	JULIAN DATE	85162
SALINITY	33.88 ppt	CHLOROPHYLL	5.7 mg/m^3
TEMPERATURE	12.2 oC	SURFACE IRRAD ...	50.36 E /m^2/d
ATTEN COEFF	.73 m^-1	PHOTIC DEPTH	6.31 m
DURATION	24.25 hr	INITIAL TIME	1430 hr
TOTAL CO2	31597 ug C/l	FINAL TIME	1445 hr
DPM ADDED	11100000 dpm	WATER DEPTH	3.6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	50.36	182.25	182.68	31.97
.82	54.8	27.60	166.59	167.02	29.23
1.59	31.3	15.76	135.93	136.36	23.85
2.55	15.5	7.81	40.33	40.75	7.07
3.38	8.5	4.28	15.90	16.33	2.79
4.20	4.65	2.34	8.75	9.18	1.53
5.47	1.85	.93	2.77	3.20	.49
6.31	DARK BOTTLE	.05	.00	.43	.00

Uptake over	photic zone	386.38 mg C/m^2/h
	water depth	370.18
	photic zone	9273 mg C/m^2/d
	water depth	8884

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	8
DATE	11 Jun 85	JULIAN DATE	85162
SALINITY	33.68 ppt	CHLOROPHYLL	3.7 mg/m^3
TEMPERATURE	18.4 oC	SURFACE IRRAD ...	50.36 E /m^2/d
ATTEN COEFF	.85 m^-1	PHOTIC DEPTH	5.42 m
DURATION	24.25 hr	INITIAL TIME	1430 hr
TOTAL CO2	31135 ug C/l	FINAL TIME	1445 hr
DPM ADDED	11100000 dpm	WATER DEPTH	6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	50.36	39.00	39.36	10.54
.74	53.5	26.94	38.92	39.28	10.52
1.39	30.7	15.46	36.61	36.97	9.89
2.34	13.7	6.90	20.46	20.82	5.53
3.00	7.83	3.94	9.19	9.55	2.48
3.73	4.21	2.12	5.20	5.56	1.41
4.84	1.64	.83	1.48	1.84	.40
5.42	DARK BOTTLE	.05	.00	.36	.00

Uptake over photic zone	99.58	mg C/m^2/h
water depth	99.58	
photic zone	2390	mg C/m^2/d
water depth	2390	

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	8 w/ NH4 spike
DATE	11 Jun 85	JULIAN DATE	85162
SALINITY	33.68 ppt	CHLOROPHYLL	3.7 mg/m^3
TEMPERATURE	18.4 oC	SURFACE IRRAD ...	50.36 E /m^2/d
ATTEN COEFF	.85 m^-1	PHOTIC DEPTH	5.42 m
DURATION	24.25 hr	INITIAL TIME	1430 hr
TOTAL CO2	31135 ug C/l	FINAL TIME	1445 hr
DPM ADDED	11100000 dpm	WATER DEPTH	6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	50.36	109.23	109.58	29.52
.72	54.2	27.30	118.04	118.39	31.90
1.37	31.3	15.76	98.82	99.17	26.71
2.27	14.5	7.30	37.85	38.21	10.23
2.98	7.97	4.01	15.14	15.50	4.09
3.69	4.35	2.19	5.92	6.28	1.60
4.71	1.83	.92	1.72	2.08	.47
5.42	DARK BOTTLE	.05	.00	.36	.00

Uptake over photic zone	244.44	mg C/m^2/h
water depth	244.44	
photic zone	5866	mg C/m^2/d
water depth	5866	

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	16
DATE .....:	11 Jun 85	JULIAN DATE .....:	85162
SALINITY .....:	33.02 ppt	CHLOROPHYLL .....:	1.1 mg/m^3
TEMPERATURE .....:	20.6 oC	SURFACE IRRAD ...:	50.36 E /m^2/d
ATTEN COEFF .....:	.95 m^-1	PHOTIC DEPTH ....:	4.85 m
DURATION .....:	24.25 hr	INITIAL TIME ....:	1430 hr
TOTAL CO2 .....:	31123 ug C/l	FINAL TIME .....:	1445 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	2 m

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DEPTH m	LIGHT #	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	50.36	10.30	10.48	9.36
.00	100	50.36	9.90	10.09	9.00
.68	52.5	26.44	10.24	10.43	9.31
2.15	13	6.55	4.62	4.81	4.20
3.00	5.8	2.92	1.18	1.37	1.08
3.76	2.8	1.41	.91	1.09	.82
4.33	1.64	.83	.30	.49	.28
4.85	DARK BOTTLE	.05	.00	.19	.00

Uptake over photic zone	21.44	mg C/m^2/h
water depth	16.26	
photic zone	514	mg C/m^2/d
water depth	390	

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	16 w NH4 spike
DATE	11Jun 85	JULIAN DATE	85162
SALINITY	33.02 ppt	CHLOROPHYLL	1.1 mg/m^3
TEMPERATURE	20.6 oC	SURFACE IRRAD ...	50.36 E /m^2/d
ATTEN COEFF	.95 m^-1	PHOTIC DEPTH	4.85 m
DURATION	24.25 hr	INITIAL TIME	1430 hr
TOTAL CO2	31123 ug C/l	FINAL TIME	1445 hr
DPM ADDED	11100000 dpm	WATER DEPTH	2 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	50.36	9.80	10.02	8.91
.00	100	50.36	12.08	12.30	10.98
.69	51.8	26.09	12.16	12.38	11.06
2.15	13	6.55	5.23	5.44	4.75
3.08	5.37	2.70	1.74	1.96	1.58
3.82	2.65	1.33	.51	.73	.46
4.77	1.08	.54	.19	.41	.18
4.85	DARK BOTTLE	.05	.00	.22	.00

Uptake over photic zone	25.46	mg C/m^2/h
water depth	19.40	
photic zone	611	mg C/m^2/d
water depth	466	

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	2
DATE .....:	21 Aug 85	JULIAN DATE .....:	85233
SALINITY .....:	33.51 ppt	CHLOROPHYLL .....:	9.3 mg/m^3
TEMPERATURE .....:	15.0 oC	SURFACE IRRAD ...:	42.26 E /m^2/d
ATTEN COEFF .....:	.84 m^-1	PHOTIC DEPTH ....:	5.48 m
DURATION .....:	24 hr	INITIAL TIME ....:	1507 hr
TOTAL CO2 .....:	30728 ug C/l	FINAL TIME .....:	1505 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	3.6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	42.26	41.89	42.47	4.50
.74	53.5	22.61	43.34	43.92	4.66
1.41	30.7	12.98	36.77	37.35	3.95
2.37	13.7	5.79	18.46	19.04	1.99
3.03	7.83	3.31	7.66	8.24	.82
3.77	4.21	1.78	4.09	4.66	.44
4.89	1.64	.69	1.25	1.83	.13
5.48	DARK BOTTLE	.04	.00	.58	.00

Uptake over photic zone	101.15	mg C/m^2/h
water depth	96.65	
photic zone	2427	mg C/m^2/d
water depth	2320	

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	8
DATE	21 Aug 85	JULIAN DATE	85233
SALINITY	34.53 ppt	CHLOROPHYLL	19.9 mg/m^3
TEMPERATURE	17.5 oC	SURFACE IRRAD ...	42.26 E /m^2/d
ATTEN COEFF	1.18 m^-1	PHOTIC DEPTH	3.90 m
DURATION	24 hr	INITIAL TIME	1507 hr
TOTAL CO2	29468 ug C/l	FINAL TIME	1505 hr
DPM ADDED	11100000 dpm	WATER DEPTH	6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	42.26	38.53	39.42	1.94
.56	51.8	21.89	37.71	38.60	1.89
1.07	28.3	11.96	38.87	39.76	1.95
1.73	13	5.49	26.57	27.47	1.34
2.48	5.37	2.27	12.83	13.73	.64
3.08	2.65	1.12	5.18	6.08	.26
3.84	1.08	.46	.84	1.73	.04
3.90	DARK BOTTLE	.04	.00	.89	.00

Uptake over photic zone	84.90	mg C/m^2/h
water depth	84.90	
photic zone	2038	mg C/m^2/d
water depth	2038	

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	8 w NH4 spike
DATE	21 Aug 85	JULIAN DATE	85233
SALINITY	34.53 ppt	CHLOROPHYLL	19.9 mg/m^3
TEMPERATURE	17.5 oC	SURFACE IRRAD ...	42.26 E /m^2/d
ATTEN COEFF	1.18 m^-1	PHOTIC DEPTH	3.90 m
DURATION	24 hr	INITIAL TIME	1507 hr
TOTAL CO2	29468 ug C/L	FINAL TIME	1505 hr
DPM ADDED	11100000 dpm	WATER DEPTH	6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	42.26	59.04	60.70	2.97
.52	54.2	22.91	60.34	62.01	3.03
.98	31.3	13.23	60.60	62.26	3.05
1.64	14.5	6.13	39.42	41.08	1.98
2.14	7.97	3.37	18.91	20.57	.95
2.66	4.35	1.84	10.37	12.03	.52
3.39	1.83	.77	2.24	3.91	.11
3.90	DARK BOTTLE	.04	.00	1.66	.00

Uptake over	photic zone	121.43 mg C/m^2/h
	water depth	121.43
	photic zone	2914 mg C/m^2/d
	water depth	2914

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	16
DATE .....:	21 AUG 85	JULIAN DATE .....:	85233
SALINITY .....:	34.93 ppt	CHLOROPHYLL .....:	.6 mg/m^3
TEMPERATURE .....:	19.1 oC	SURFACE IRRAD ...:	42.26 E /m^2/d
ATTEN COEFF .....:	1.04 m^-1	PHOTIC DEPTH ....:	4.43 m
DURATION .....:	24 hr	INITIAL TIME ....:	1507 hr
TOTAL CO2 .....:	32976 ug C/L	FINAL TIME .....:	1505 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	2 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	42.26	2.92	3.13	4.86
.54	56.8	24.01	2.26	2.48	3.77
1.09	32.3	13.65	2.77	2.98	4.61
1.72	16.7	7.06	1.36	1.58	2.26
2.28	9.38	3.96	.80	1.02	1.34
2.93	4.73	2.00	.34	.56	.57
3.55	2.48	1.05	.20	.42	.34
4.43	DARK BOTTLE	.04	.00	.22	.00

Uptake over photic zone	5.32	mg C/m^2/h
water depth	4.36	
photic zone	128	mg C/m^2/d
water depth	105	

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	16 w NH4 spike
DATE .....:	21 Aug 85	JULIAN DATE .....:	85233
SALINITY .....:	34.93 ppt	CHLOROPHYLL .....:	.6 mg/m^3
TEMPERATURE .....:	19.1 oC	SURFACE IRRAD ...:	42.26 E /m^2/d
ATTEN COEFF .....:	1.04 m^-1	PHOTIC DEPTH ....:	4.43 m
DURATION .....:	24 hr	INITIAL TIME ....:	1507 hr
TOTAL CO2 .....:	32976 ug C/L	FINAL TIME .....:	1505 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	2 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	42.26	2.08	2.47	3.46
.62	52.5	22.19	2.83	3.22	4.72
1.14	30.4	12.85	2.51	2.90	4.18
1.96	13	5.49	2.19	2.58	3.64
2.74	5.8	2.45	.21	.60	.35
3.44	2.8	1.18	.26	.65	.43
3.95	1.64	.69	.06	.45	.10
4.43	DARK BOTTLE	.04	.00	.39	.00

Uptake over	photic zone	6.03 mg C/m^2/h
	water depth	4.89
	photic zone	145 mg C/m^2/d
	water depth	117

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	2
DATE	30 Sep 85	JULIAN DATE	85273
SALINITY	33.53 ppt	CHLOROPHYLL	1.92 mg/m^3
TEMPERATURE	13.7 oC	SURFACE IRRAD ...	21.62 E /m^2/d
ATTEN COEFF	.67 m^-1	PHOTIC DEPTH	6.87 m
DURATION	24 hr	INITIAL TIME	1425 hr
TOTAL CO2	30769 ug C/L	FINAL TIME	1430 hr
DPM ADDED	11100000 dpm	WATER DEPTH	3.6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	21.62	6.71	7.30	3.49
.91	54.2	11.72	6.11	6.70	3.18
1.73	31.3	6.77	4.07	4.65	2.12
2.88	14.5	3.14	.91	1.50	.47
3.78	7.97	1.72	.41	1.00	.22
4.68	4.35	.94	.22	.80	.11
5.97	1.83	.40	-.08	.51	-.04
6.87	DARK BOTTLE	.02	.00	.59	.00

Uptake over photic zone	13.82	mg C/m^2/h
water depth	13.35	
photic zone	332	mg C/m^2/d
water depth	320	

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	8
DATE .....:	30 SEP 85	JULIAN DATE .....:	85273
SALINITY .....:	33.5 ppt	CHLOROPHYLL .....:	4.47 mg/m^3
TEMPERATURE .....:	14.5 oC	SURFACE IRRAD ...:	21.62 E /m^2/d
ATTEN COEFF .....:	.92 m^-1	PHOTIC DEPTH ....:	5.01 m
DURATION .....:	24 hr	INITIAL TIME ....:	1425 hr
TOTAL CO2 .....:	30913 ug C/L	FINAL TIME .....:	1430 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	21.62	19.22	19.65	4.30
.61	56.8	12.28	17.60	18.02	3.94
1.23	32.3	6.98	12.33	12.75	2.76
1.95	16.7	3.61	5.01	5.43	1.12
2.57	9.38	2.03	2.94	3.37	.66
3.32	4.73	1.02	1.56	1.98	.35
4.02	2.48	.54	.63	1.06	.14
5.01	DARK BOTTLE	.02	.00	.42	.00

Uptake over	photic zone	31.96 mg C/m^2/h
	water depth	31.96
	photic zone	767 mg C/m^2/d
	water depth	767

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	8 w NH4 spike
DATE .....:	30 Sep 85	JULIAN DATE .....:	85273
SALINITY .....:	33.5 ppt	CHLOROPHYLL .....:	4.47 mg/m^3
TEMPERATURE .....:	14.5 oC	SURFACE IRRAD ...:	21.62 E /m^2/d
ATTEN COEFF .....:	.92 m^-1	PHOTIC DEPTH ....:	5.01 m
DURATION .....:	24 hr	INITIAL TIME ....:	1425 hr
TOTAL CO2 .....:	30913 ug C/L	FINAL TIME .....:	1430 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	6 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	21.62	8.21	19.92	1.84
.71	51.8	11.20	18.25	29.96	4.08
1.37	28.3	6.12	10.38	22.10	2.32
2.22	13	2.81	3.44	15.15	.77
3.18	5.37	1.16	.01	11.72	.00
3.95	2.65	.57	1.09	12.81	.24
4.92	1.08	.23	1.17	12.89	.26
5.01	DARK BOTTLE	.02	.00	11.71	.00

Uptake over	photic zone	27.94 mg C/m^2/h
	water depth	27.94
	photic zone	671 mg C/m^2/d
	water depth	671

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	16
DATE	30 Sep 85	JULIAN DATE	85273
SALINITY	34.67 ppt	CHLOROPHYLL	2.02 mg/m^3
TEMPERATURE	18.2 oC	SURFACE IRRAD ...	21.62 E /m^2/d
ATTEN COEFF	.89 m^-1	PHOTIC DEPTH	5.17 m
DURATION	24 hr	INITIAL TIME	1425 hr
TOTAL CO2	32984 ug C/L	FINAL TIME	1430 hr
DPM ADDED	11100000 dpm	WATER DEPTH	2 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	21.62	5.70	5.97	2.82
.72	52.5	11.35	5.80	6.07	2.87
1.34	30.4	6.57	5.36	5.64	2.65
2.29	13	2.81	1.99	2.26	.98
3.20	5.8	1.25	.21	.49	.11
4.02	2.8	.61	.32	.60	.16
4.62	1.64	.35	.39	.67	.19
5.17	DARK BOTTLE	.02	.00	.27	.00

Uptake over	photic zone	12.63 mg C/m^2/h
	water depth	9.83
	photic zone	303 mg C/m^2/d
	water depth	236

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	16 w NH4 spike
DATE	30 SEP 85	JULIAN DATE	85273
SALINITY	34.67 ppt	CHLOROPHYLL	2.02 mg/m^3
TEMPERATURE	18.2 oC	SURFACE IRRAD ...	21.62 E /m^2/d
ATTEN COEFF	.89 m^-1	PHOTIC DEPTH	5.17 m
DURATION	24 hr	INITIAL TIME	1425 hr
TOTAL CO2	32984 ug C/L	FINAL TIME	1430 hr
DPM ADDED	11100000 dpm	WATER DEPTH	2 m

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DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	21.62	8.59	9.33	4.25
.70	53.5	11.57	10.36	11.10	5.13
1.33	30.7	6.64	6.87	7.61	3.40
2.23	13.7	2.96	5.97	6.72	2.96
2.86	7.83	1.69	2.54	3.28	1.26
3.56	4.21	.91	3.29	4.04	1.63
4.62	1.64	.35	2.78	3.53	1.38
5.17	DARK BOTTLE	.02	.00	.74	.00

Uptake over	photic zone	26.56 mg C/m^2/h
	water depth	15.93
	photic zone	637 mg C/m^2/d
	water depth	382

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	4
DATE .....:	4 Dec 85	JULIAN DATE .....:	85338
SALINITY .....:	29.88 ppt	CHLOROPHYLL .....:	1.1 mg/m^3
TEMPERATURE .....:	10.9 oC	SURFACE IRRAD ...:	11.21 E /m^2/d
ATTEN COEFF .....:	1.08 m^-1	PHOTIC DEPTH ....:	4.26 m
DURATION .....:	23.1 hr	INITIAL TIME ....:	1535 hr
TOTAL CO2 .....:	29414 ug C/L	FINAL TIME .....:	1442 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	8 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	11.21	3.58	3.82	3.26
.61	51.8	5.81	3.12	3.35	2.84
1.17	28.3	3.17	2.02	2.26	1.84
1.89	13	1.46	.66	.89	.60
2.71	5.37	.60	.21	.45	.19
3.36	2.65	.30	.06	.29	.05
4.19	1.08	.12	.01	.25	.01
4.26	DARK BOTTLE	.01	.00	.23	.00

Uptake over photic zone	4.92	mg C/m^2/h
water depth	4.92	
photic zone	118	mg C/m^2/d
water depth	118	

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	8
DATE	4 Dec 85	JULIAN DATE	85338
SALINITY	29.33 ppt	CHLOROPHYLL	.9 mg/m^3
TEMPERATURE	10.8 oC	SURFACE IRRAD ...	11.21 E /m^2/d
ATTEN COEFF	.87 m^-1	PHOTIC DEPTH	5.29 m
DURATION	23.1 hr	INITIAL TIME	1535 hr
TOTAL CO2	29439 ug C/L	FINAL TIME	1442 hr
DPM ADDED	11100000 dpm	WATER DEPTH	6 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	11.21	2.83	3.22	3.14
.72	53.5	6.00	2.43	2.82	2.70
1.36	30.7	3.44	1.79	2.19	1.99
2.28	13.7	1.54	.40	.79	.44
2.93	7.83	.88	.10	.50	.12
3.64	4.21	.47	-.01	.38	-.01
4.72	1.64	.18	-.10	.29	-.11
5.29	DARK BOTTLE	.01	.00	.40	.00

Uptake over photic zone	4.36	mg C/m^2/h
water depth	4.36	
photic zone	105	mg C/m^2/d
water depth	105	

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	8 w NH4 spike
DATE .....:	4 Dec 85	JULIAN DATE .....:	85338
SALINITY .....:	29.33 ppt	CHLOROPHYLL .....:	.9 mg/m^3
TEMPERATURE .....:	10.8 oC	SURFACE IRRAD ...:	11.21 E /m^2/d
ATTEN COEFF .....:	.87 m^-1	PHOTIC DEPTH ....:	5.29 m
DURATION .....:	23.1 hr	INITIAL TIME ....:	1535 hr
TOTAL CO2 .....:	29439 ug C/L	FINAL TIME .....:	1442 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	6 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	11.21	3.25	3.60	3.61
.70	54.2	6.08	3.14	3.49	3.48
1.34	31.3	3.51	2.02	2.37	2.25
2.22	14.5	1.63	.73	1.08	.81
2.91	7.97	.89	.25	.60	.28
3.60	4.35	.49	.11	.46	.13
4.60	1.83	.21	.05	.40	.06
5.29	DARK BOTTLE	.01	.00	.35	.00

Uptake over	photic zone	5.66 mg C/m^2/h
	water depth	5.66
	photic zone	136 mg C/m^2/d
	water depth	136

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	16
DATE	4 Dec 85	JULIAN DATE	85338
SALINITY	30.27 ppt	CHLOROPHYLL	1.1 mg/m^3
TEMPERATURE	10.6 oC	SURFACE IRRAD ...	11.21 E /m^2/d
ATTEN COEFF	.87 m^-1	PHOTIC DEPTH	5.29 m
DURATION	23.1 hr	INITIAL TIME	1535 hr
TOTAL CO2	30001 ug C/L	FINAL TIME	1442 hr
DPM ADDED	11100000 dpm	WATER DEPTH	2 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	11.21	3.87	4.11	3.52
.74	52.5	5.89	3.43	3.68	3.12
1.37	30.4	3.41	2.54	2.78	2.31
2.35	13	1.46	1.27	1.52	1.15
3.27	5.8	.65	.13	.38	.12
4.11	2.8	.31	.13	.38	.12
4.72	1.64	.18	.05	.29	.04
5.29	DARK BOTTLE	.01	.00	.25	.00

Uptake over	photic zone	7.26 mg C/m^2/h
	water depth	5.64
	photic zone	174 mg C/m^2/d
	water depth	135

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	16 w NH4 spike
DATE	4 Dec 85	JULIAN DATE	85338
SALINITY	30.27 ppt	CHLOROPHYLL	1.1 mg/m^3
TEMPERATURE	10.6 oC	SURFACE IRRAD ...	11.21 E /m^2/d
ATTEN COEFF	.87 m^-1	PHOTIC DEPTH	5.29 m
DURATION	23.1 hr	INITIAL TIME	1535 hr
TOTAL CO2	30001 ug C/L	FINAL TIME	1442 hr
DPM ADDED	11100000 dpm	WATER DEPTH	2 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	11.21	3.98	4.18	3.62
.65	56.8	6.37	3.81	4.01	3.46
1.30	32.3	3.62	2.71	2.91	2.46
2.06	16.7	1.87	1.00	1.20	.91
2.72	9.38	1.05	.53	.72	.48
3.51	4.73	.53	.24	.44	.22
4.25	2.48	.28	.14	.34	.13
5.29	DARK BOTTLE	.01	.00	.20	.00

Uptake over	photic zone	7.08 mg C/m^2/h
	water depth	5.93
	photic zone	170 mg C/m^2/d
	water depth	142

CARBON UPTAKE DATA SUMMARY

LOCATION ..... :	Tomales Bay	STATION ..... :	2
DATE ..... :	19 Mar 86	JULIAN DATE ..... :	86078
SALINITY ..... :	17.44 ppt	CHLOROPHYLL ..... :	.7 mg/m^3
TEMPERATURE ..... :	13.6 oC	SURFACE IRRAD ... :	40.22 E /m^2/d
ATTEN COEFF ..... :	1.24 m^-1	PHOTIC DEPTH .... :	3.71 m
DURATION ..... :	24 hr	INITIAL TIME .... :	1350 hr
TOTAL CO2 ..... :	20395 ug C/L	FINAL TIME ..... :	1350 hr
DPM ADDED ..... :	11100000 dpm	WATER DEPTH ..... :	3.6 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	40.22	46.98	47.44	67.12
.52	52.5	21.11	50.05	50.51	71.50
.96	30.4	12.23	37.41	37.87	53.45
1.65	13	5.23	18.28	18.74	26.12
2.30	5.8	2.33	4.53	4.98	6.47
2.88	2.8	1.13	2.84	3.30	4.06
3.31	1.64	.66	.71	1.16	1.01
3.71	DARK BOTTLE	.04	.00	.45	.00

Uptake over photic zone	74.05	mg C/m^2/h
water depth	74.01	
photic zone	1777	mg C/m^2/d
water depth	1776	

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	8
DATE .....:	19 Mar 86	JULIAN DATE .....:	86078
SALINITY .....:	13.2 ppt	CHLOROPHYLL .....:	.7 mg/m^3
TEMPERATURE .....:	14.1 oC	SURFACE IRRAD ...:	40.22 E /m^2/d
ATTEN COEFF .....:	1.61 m^-1	PHOTIC DEPTH ....:	2.86 m
DURATION .....:	24 hr	INITIAL TIME ....:	1350 hr
TOTAL CO2 .....:	19060 ug C/L	FINAL TIME .....:	1350 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	6 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	40.22	4.46	4.58	6.36
.38	54.2	21.80	4.88	5.00	6.97
.72	31.3	12.59	3.47	3.59	4.96
1.20	14.5	5.83	2.45	2.57	3.49
1.57	7.97	3.21	.28	.40	.40
1.95	4.35	1.75	.36	.48	.51
2.49	1.83	.74	.12	.24	.17
2.86	DARK BOTTLE	.04	.00	.12	.00

Uptake over photic zone	5.39	mg C/m^2/h
water depth	5.39	
photic zone	129	mg C/m^2/d
water depth	129	

CARBON UPTAKE DATA SUMMARY

LOCATION .....:	Tomales Bay	STATION .....:	8 w NH4 spike
DATE .....:	19 Mar 86	JULIAN DATE .....:	86078
SALINITY .....:	13.2 ppt	CHLOROPHYLL .....:	.7 mg/m^3
TEMPERATURE .....:	14.1 oC	SURFACE IRRAD ...:	40.22 E /m^2/d
ATTEN COEFF .....:	1.61 m^-1	PHOTIC DEPTH ....:	2.86 m
DURATION .....:	24 hr	INITIAL TIME ....:	1350 hr
TOTAL CO2 .....:	19060 ug C/L	FINAL TIME .....:	1350 hr
DPM ADDED .....:	11100000 dpm	WATER DEPTH .....:	6 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	40.22	33.97	36.09	48.52
.41	51.8	20.83	36.80	38.93	52.57
.78	28.3	11.38	27.62	29.75	39.46
1.27	13	5.23	14.42	16.55	20.60
1.82	5.37	2.16	5.70	7.83	8.14
2.26	2.65	1.07	3.04	5.17	4.35
2.81	1.08	.43	1.47	3.60	2.10
2.86	DARK BOTTLE	.04	.00	2.13	.00

Uptake over photic zone	45.44	mg C/m^2/h
water depth	45.44	
photic zone	1091	mg C/m^2/d
water depth	1091	

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	16
DATE	19 Mar 86	JULIAN DATE	86078
SALINITY	6.26 ppt	CHLOROPHYLL	8.1 mg/m^3
TEMPERATURE	15.0 oC	SURFACE IRRAD ...	40.22 E /m^2/d
ATTEN COEFF	4.03 m^-1	PHOTIC DEPTH	1.14 m
DURATION	24 hr	INITIAL TIME	1350 hr
TOTAL CO2	17225 ug C/L	FINAL TIME	1350 hr
DPM ADDED	11100000 dpm	WATER DEPTH	2 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	40.22	5.98	6.47	.74
.14	56.8	22.84	6.29	6.78	.78
.28	32.3	12.99	4.95	5.44	.61
.44	16.7	6.72	2.36	2.85	.29
.59	9.38	3.77	.34	.83	.04
.76	4.73	1.90	-.15	.33	-.02
.92	2.48	1.00	-.27	.21	-.03
1.14	DARK BOTTLE	.04	.00	.49	.00

Uptake over	photic zone	2.39 mg C/m^2/h
	water depth	2.39
	photic zone	57 mg C/m^2/d
	water depth	57

CARBON UPTAKE DATA SUMMARY

LOCATION	Tomales Bay	STATION	16 w NH4
DATE	19 Mar 86	JULIAN DATE	86078
SALINITY	6.26 ppt	CHLOROPHYLL	8.1 mg/m^3
TEMPERATURE	15.0 oC	SURFACE IRRAD ...	40.22 E /m^2/d
ATTEN COEFF	4.03 m^-1	PHOTIC DEPTH	1.14 m
DURATION	24 hr	INITIAL TIME	1350 hr
TOTAL CO2	17225 ug C/L	FINAL TIME	1350 hr
DPM ADDED	11100000 dpm	WATER DEPTH	2 m

****

DEPTH m	LIGHT %	LIGHT E/m^2/d	CARBON UPTAKE corrected mg C/L/h	CARBON UPTAKE measured mg C/L/h	ASSIMILATION #
.00	100	40.22	6.25	6.37	.77
.16	53.5	21.52	5.44	5.56	.67
.29	30.7	12.35	5.20	5.32	.64
.49	13.7	5.51	2.51	2.63	.31
.63	7.83	3.15	.85	.97	.11
.79	4.21	1.69	.37	.48	.05
1.02	1.64	.66	.13	.25	.02
1.14	DARK BOTTLE	.04	.00	.12	.00

Uptake over photic zone	2.81	mg C/m^2/h
water depth	2.81	
photic zone	67	mg C/m^2/d
water depth	67	

Appendix D.

Phytoplankton Identifications and Enumerations

Species list for Tomales Bay phytoplankton samples

dinoflagellates:

?Cachonina niei
Ceratium lineatum
Dinophysis #1
Gymnodinium splendens
Gyrodinium #1
?Katodinium #1
Prorocentrum micans
Prorocentrum redfieldii
Prorocentrum #1
Protoperidinium #1
Protoperidinium #2
Protoperidinium #4
Protoperidinium #5
Protoperidinium #6
Protoperidinium #7
dinoflagellate #3
dinoflagellate #4
dinoflagellate #5
dinoflagellate #6
dinoflagellate #7

diatoms:

Amphiprora spp.
Asterionella japonica
Bacteriastrum #1
Chaetoceros curvisetus
Chaetoceros didymus
Chaetoceros socialis
Chaetoceros #1
Chaetoceros #2
Chaetoceros #3
Chaetoceros #4
Chaetoceros #5
Chaetoceros #8
Cocconeis spp.
Corethron hystrix
Coscinodiscus #1
Ditylum brightwelli
Eucampia zoodiacus
Leptocylindrus danicus
Licmophora spp.
Navicula spp.
Nitzschia closterium
Nitzschia longissima
Nitzchia seriata
Nitzschia spp.
Pleurosigma spp.
Rhizosolenia stolterfothii
Rhizosolenia ?styliformis
Skeletonema costatum
Thalassionema nitzchioides
Thalassiosira #1
Thalassiosira #2
centric #1
centric #2
centric #3
pennate C
pennate F
pennate G
pennate H

silicoflagellates:

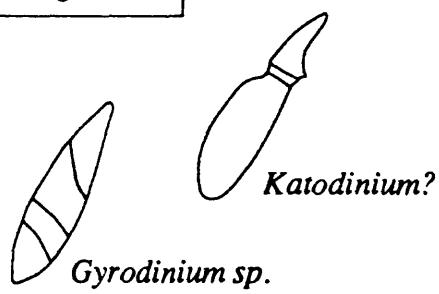
Distephanus speculum
Ebria tripartita
Mesocema #1

miscellaneous:

?Chlamydomonas #1
chlorophyte
flagellate #1
flagellate #2
flagellate #3
flagellate #4
?coccolithophorid
unknown (this could be a dinoflagellate or a ppt from the Lugols?)

Illustrations of some phytoplankton not identifiable

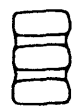
Dinoflagellates



Katodinium?

Gyrodinium sp.

dinoflagellate #3



dinoflagellate #4

dinoflagellate #5

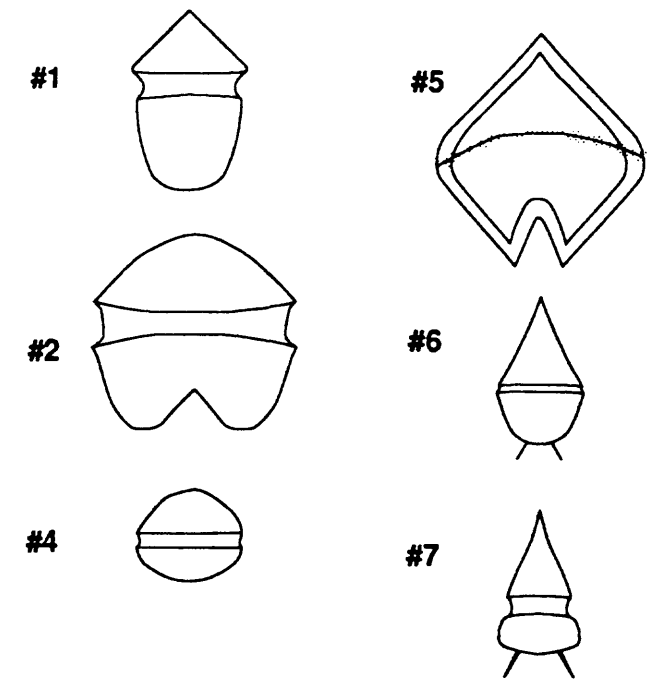
chloroplasts like
Gymnodinum splendens

dinoflagellate #6

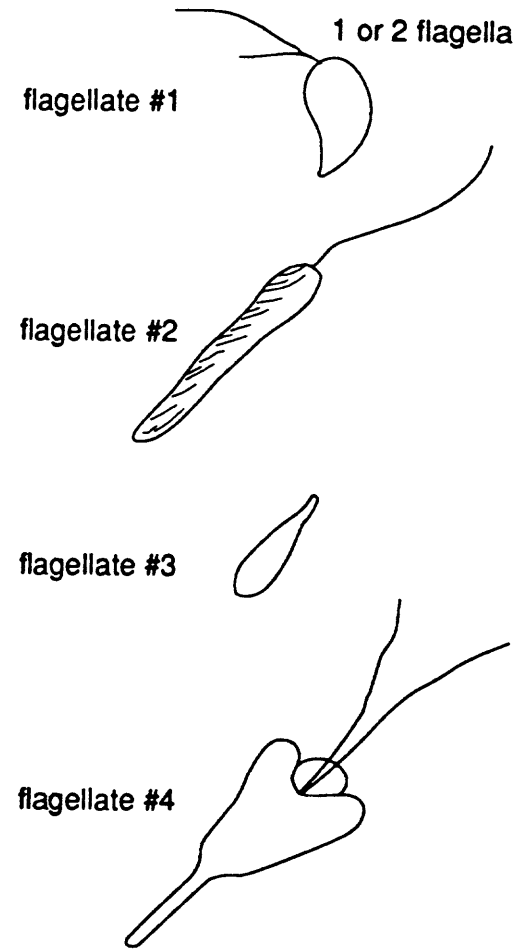
dinoflagellate #7

Dinophysis sp. (acuta?)

Protoperidinium

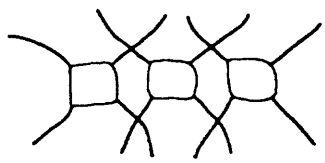


Flagellates



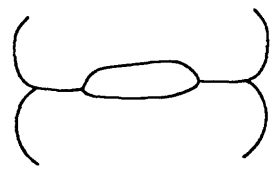
Chaetoceros

#1

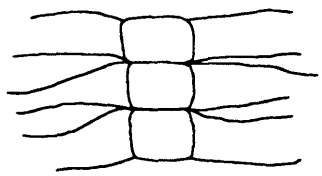


(ends may have stronger spines)

#2



#4



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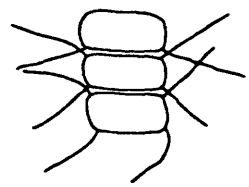
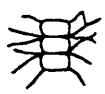


warped spines and chains

#8



very small

Pennate diatoms

C

F

March 11, 1985

	cells/ml		
	station number		
species	4	8	18
?Cachonina niei	-	44	161
Gymnodinium splendens	23	2	36
Protoperidinium #1	41	-	-
Protoperidinium #2	9	-	-
dinoflagellate #6	-	3	6
Asterionella japonica	9	5	-
Chaetoceros #1	602	111	11
Chaetoceros #2	109	26	-
Chaetoceros #4	9	-	-
Cocconeis sp.	1	-	1
Coscinodiscus #1	15	-	-
Ditylum brightwelli	2	1	-
Eucampia zoodiacus	-	4	-
Leptocylindrus danicus	-	43	24
Licmophora spp.	8	-	-
Navicula spp.	2	4	3
Nitzschia closterium	8	-	11
Nitzchia seriata	58	20	-
Pleurosigma spp.	-	4	8
Rhizosolenia stolterfothii	2	-	-
Skeletonema costatum	208	16	-
Thalassionema nitzchioides	-	4	-
Thalassiosira #1	105	45	3
Thalassiosira #2	17	3	-
centric #1	-	2	-
centric #3	-	-	3
pennate C	24	52	-
chlorophyte	64	-	-
flagellate #1	2	5	2443
flagellate #3	-	5	-
unknown	67	68	64

Note: The samples from stations #8 and #18 contained many aggregates of unidentifiable (uncountable) green particles which may be μ-flagellates or possibly chloroplasts. Cells of flagellate #1 also tended to clump together.

April 17, 1985

	cells/ml		
	station number		
species	2	8	18
Gymnodinium splendens	-	-	3
Protoperidinium #1	1	-	-
Amphiprora sp.	1	-	-
Asterionella japonica	150	476	35
Chaetoceros #1	543	324	39
Chaetoceros #2	26	58	-
Chaetoceros #4	129	29	-
Leptocylindrus danicus	-	-	10
Navicula spp.	8	12	-
Nitzschia closterium	58	6	6
Nitzchia seriata	79	64	-
Nitzschia spp.	-	-	6
Rhizosolenia ?styliformis	1	-	-
Skeletonema costatum	886	5210	1846
Thalassionema nitzchioides	40	23	-
Thalassiosira #1	13	12	-
Thalassiosira #2	8	-	-
centric #1	5	29	-
pennate C	24	46	19
pennate F	16	29	-
Distephanus speculum	1	-	-
flagellate #1	21	-	-
unknown	108	145	36

Note: Skeletonema from station # 18 at small end of size range and did not look very healthy.

June 11, 1985

	cells/ml		
	station number		
species	2	8	16
Gymnodinium splendens	-	3	2
Gyrodinium #1	-	3	-
Prorocentrum redfieldii	-	6	-
Prorocentrum #1	-	131	-
Protoperidinium #1	12	6	-
Protoperidinium #2	1	-	-
Protoperidinium #7	-	4	-
Asterionella japonica	95	11	-
Chaetoceros socialis	932	-	-
Chaetoceros #1	408	29	-
Chaetoceros #2	58	4	-
Chaetoceros #4	89	10	-
Corethron hystrix	-	1	-
Navicula spp.	6	4	4
Nitzschia closterium	21	10	-
Nitzschia longissima	-	-	1
Nitzchia seriata	19	-	-
Rhizosolenia ?styliformis	-	1	-
Skeletonema costatum	429	2173	-
Thalassiosira #1	54	9	-
centric #1	91	96	-
pennate C	-	7	-
pennate F	8	-	1
flagellate #1	31	-	187
flagellate #3	-	2	1
unknown	100	84	68

August 21, 1985

	cells/ml		
	station number		
species	2	8	16
Ceratium lineatum	13	1	-
Dinophysis #1	5	5	-
Gymnodinium splendens	64	409	-
?Katodinium #1	6	3	-
Prorocentrum redfieldii	9	3	-
Prorocentrum #1	8	5	-
Protoperidinium #1	4	-	-
Protoperidinium #4	13	2	-
Protoperidinium #5	4	-	-
Amphiprora sp.	1	-	-
Asterionella japonica	2	-	-
Chaetoceros #1	67	-	-
Chaetoceros #4	3	-	-
Chaetoceros #5	115	19	-
Eucampia zoodiacus	2	-	-
Leptocylindrus danicus	12	-	-
Navicula spp.	5	2	1
Nitzschia closterium	12	4	-
Nitzchia seriata	16	-	-
Pleurosigma spp.	1	4	-
Rhizosolenia stolterfothii	13	7	-
Thalassiosira #1	5	2	-
centric #1	-	1	-
centric #2	-	4	-
pennate C	23	3	-
pennate F	1	2	-
pennate G	-	3	-
Mesocema #1	-	2	-
flagellate #1	1	7	224
unknown	82	59	72

September 30, 1985

	cells/ml		
	station number		
species	2	8	16
Ceratium lineatum	2	-	-
Dinophysis #1	1	1	-
Gymnodinium splendens	2	25	16
Gyrodinium #1	-	1	-
Prorocentrum micans	-	1	-
Prorocentrum redfieldii	-	4	1
Protoperidinium #1	-	1	1
Protoperidinium #4	1	-	1
Protoperidinium #5	1	-	-
Protoperidinium #6	1	-	-
dinoflagellate #3	15	131	-
dinoflagellate #6	-	16	-
Chaetoceros #2	2	-	-
Navicula sp.	1	-	-
Nitzschia closterium	10	26	1
Nitzchia seriata	2	-	-
Pleurosigma sp.	1	-	-
centric #1	2	1	-
pennate C	2	9	-
pennate F	1	1	-
Mesocema #1	1	1	-
flagellate #1	26	58	42
flagellate #4	-	10	-
unknown	53	76	64

December 4, 1985

	cells/ml		
	station number		
species	2	8	18
Ceratium lineatum	-	1	-
Dinophysis #1	-	1	-
Gymnodinium splendens	-	3	-
Gyrodinium #1	5	-	-
Prorocentrum redfieldii	-	1	1
Prorocentrum #1	1	-	-
Protoperidinium #1	1	1	-
Protoperidinium #4	1	-	-
Protoperidinium #6	-	1	-
Protoperidinium #7	1	-	-
dinoflagellate #4	5	14	-
dinoflagellate #5	11	21	-
Chaetoceros #1	2	-	-
Eucampia zoodiacus	1	-	-
Navicula sp.	1	-	-
Nitzschia closterium	2	3	-
Skeletonema costatum	3	-	-
Thalassiosira #2	1	-	-
pennate H	-	1	-
?Chlamydomonas #1	14	30	-
flagellate #1	43	215	998
flagellate #2	1	-	-
flagellate #4	3	1	-
?coccolithophorid	-	3	-
unknown	57	52	33

March 19, 1986

	cells/ml		
	station number		
species	2	8	16
Licmophora spp.	2	-	-
Navicula spp.	4	2	-
Nitzchia seriata	2	-	-
Skeletonema costatum	7	-	-
centric #1	5	-	-
pennate F	1	-	-
Ebria tripartita	3	-	-
flagellate #1	24	160	1653
flagellate #2	1	60	17
flagellate #4	1	-	-
unknown	35	11	87

Note: Sample from station #16 contained a high concentration of particulate material.

April 16, 1986

	cells/ml		
	station number		
species	2	8	16
Gymnodinium splendens	-	-	1
Prorocentrum #1	-	54	-
Protoperidinium #5	3	-	-
Protoperidinium #6	-	-	4
Protoperidinium #7	-	-	1
dinoflagellate #5	-	4	4
dinoflagellate #6	-	-	13
dinoflagellate #7	-	-	116
Asterionella japonica	93	113	1
Bacteriastrum #1	-	-	3
Chaetoceros curvisetus	1351	2668	137
Chaetoceros didymus	806	2886	-
Chaetoceros #1	9	-	-
Chaetoceros #5	-	-	9
Chaetoceros #8	-	-	12
Navicula spp.	10	-	1
Nitzschia longissima	-	-	9
Nitzchia seriata	-	1	-
Rhizosolenia ?styliformis	1	-	-
Skeletonema costatum	22	145	6
Thalassionema nitzchioides	4	-	-
Thalassiosira #1	-	-	1
centric #1	-	-	3
Ebria tripartita	-	1	-
flagellate #1	16	10	309
flagellate #2	-	-	11
unknown	63	79	42

Note: Sample from station #16 contained a large amount of particulate material - especially difficult to distinguish organisms.

Appendix E.

Bacterioplankton Abundance and Productivity

BACTERIA ABUNDANCE AND PRODUCTIVITY

DATE	STA	DEPTH m	THYMIDINE UPTAKE p Mole/h	LABEL IN DNA + RNA %	BACTERIA DENSITY 10^6 / mL	BLUE-GREEN DENSITY 10^5 / mL
11 MAR 85	0	0	52.8		1.5	9.4
	2	0			1.4	.0
	4	0			1.4	9.4
	6	0			1.1	2.4
	8	0			1.2	.0
	10	0			1.2	.0
	12	0			1.8	.0
	12	5			1.0	.0
	14	0	47.8		1.6	2.4
	16	0			2.4	.0
	18	0			2.7	.0
27 MAR 85	2	0	23.7	73	1.3	4.7
	8	0	17.9		1.2	.0
	8	8	5.9		2.2	4.7
	10	0	24.6		1.5	.0
	12	0	18.9		2.1	2.4
	14	0	15.1		2.3	.0
	14	3.3	13.2		2.1	.0
	16	0	30.1	42	3.5	.0
	16	2	4.3		1.7	.0
	18	0	8.9		3.4	2.4
8 APR 85	0	0			3.0	9.0
	2	0			2.9	12.5
	4	0	83.7	75	3.4	3.9
	6	0			4.8	4.7
	8	0			18.2	.0
	8	5.5			2.8	7.4
	10	0	161.5	70	4.8	.0
	12	0			6.1	2.4
	12	5			4.6	2.4
	14	0	124.0	54	6.0	.0
	16	0	127.5	48.4	6.2	.0
	18	0	95.9	36.5	5.3	.0
17 APR 85	0	0	112.0			
	4	0	106.4			
	6	0	71.6			
	8	0	37.5			
	8	5	22.6			
	14	0	18.2			
	14	4	13.5			
	18	0	34.2			

BACTERIA ABUNDANCE AND PRODUCTIVITY

DATE	STA	DEPTH m	THYMIDINE UPTAKE p Mole/h	LABEL IN DNA + RNA %	BACTERIA DENSITY 10^6 / mL	BLUE-GREEN DENSITY 10^5 / mL
17 MAY 85	0	0	23.9	81	2.9	
	2	0			5.6	
	4	0			2.2	
	6	0			5.9	
	8	0			7.0	
	8	7.5	8.2	83	4.8	
	12	0			11.6	
	16	0			7.6	
	18	0	9.8	83	9.2	
11 JUN 85	0	0	88.6	95		
	8	0	63.0	91		
	8	6	2.0			
	12	0	74.7	94		
	12	5	4.0	114		
	14	0	42.9	88		
	18	0	41.8	88		
16 JUL 85	0	0	119.0	91		
	6	0	122.0	85		
	8	0	121.0	94		
	8	6	19.0			
	10	0	97.0	96		
	10	6	35.0	84		
	12	0	117.0	93		
	12	6	37.0	88		
	14	0	152.0	92		
	14	4	31.0	85		
	18	0	131.0	85		
21 AUG 85	2	0	91.6	92		
	8	0	134.0	102		
	12	0	60.2	96		
	12	5.5	85.7	99		
	14	0	151.0	91		
	16	0	86.0	87		

BACTERIA ABUNDANCE AND PRODUCTIVITY

DATE	STA	DEPTH m	THYMIDINE UPTAKE p Mole/h	LABEL IN DNA + RNA %	BACTERIA DENSITY 10^6 / mL	STANDARD ERROR (n = 3)
3 OCT 85	0	0	46.0	95	1.3	.055
	2	0	60.0	95	1.6	.046
	4	0	59.0	95	2.2	.091
	6	0	62.0	94	2.3	.080
	8	0	51.0	94	3.3	.104
	10	0	50.0	91	5.6	.084
	12	0	58.0	93	5.3	.213
	14	0	64.0	93	6.2	.23
	16	0	58.0	93	8.5	.38
	18	0	74.0	93	7.0	.38
4 DEC 85	0	0	44.3	66		
	2	0	45.5	59		
	4	0	54.1	64		
	6	0	50.3	66		
	8	0	51.8	61		
	8		35.0	63		
	10	0	48.2	64		
	12	0	42.6	63		
	12		32.1	63		
	14	0	37.6	64		
	16	0	34.4	63		
	18	0	56.8	72		

BACTERIA PRODUCTIVITY

DATE	STA	DEPTH m	THYMIDINE UPTAKE p Mole/h	STANDARD ERROR (n = 3)
19 MAR 86	0	0	112.0	2.7
	2	0	161.0	2.3
	4	0	159.0	1.6
	6	0	138.0	1.2
	8	0	130.0	5.6
	10	0	138.0	7.8
	10	6	7.2	.3
	12	0	153.0	2.5
	14	0	124.0	1.5
	14	4	76.0	10.1
	16	0	89.0	2.6
	18	0	59.1	1.9
16 APR 86	0	0	64.7	7.5
	2	0	71.3	1.2
	4	0	79.7	3.1
	6	0	63.3	2.9
	8	0	69.0	1.7
	10	0	53.3	.6
	10	6	50.0	3.6
	12	0	56.0	5.2
	14	0	55.0	1.7
	14	3.5	52.0	2.0
	16	0	60.0	1.0
	18	0	84.3	2.1