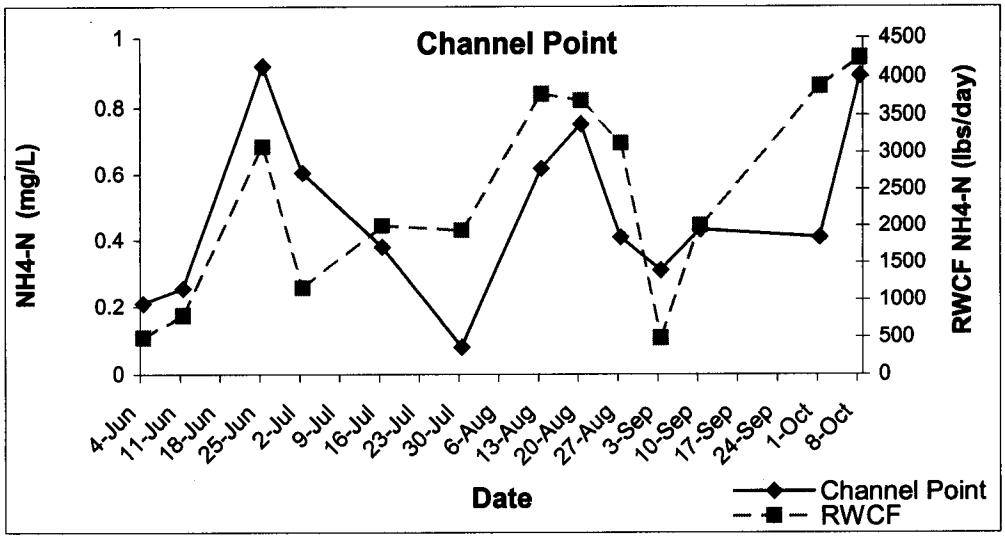
Fig. III-7. Comparison of ammonia load from the RWCF and ammonia concentration at Channel Point and Rough and Ready Island in 2001.



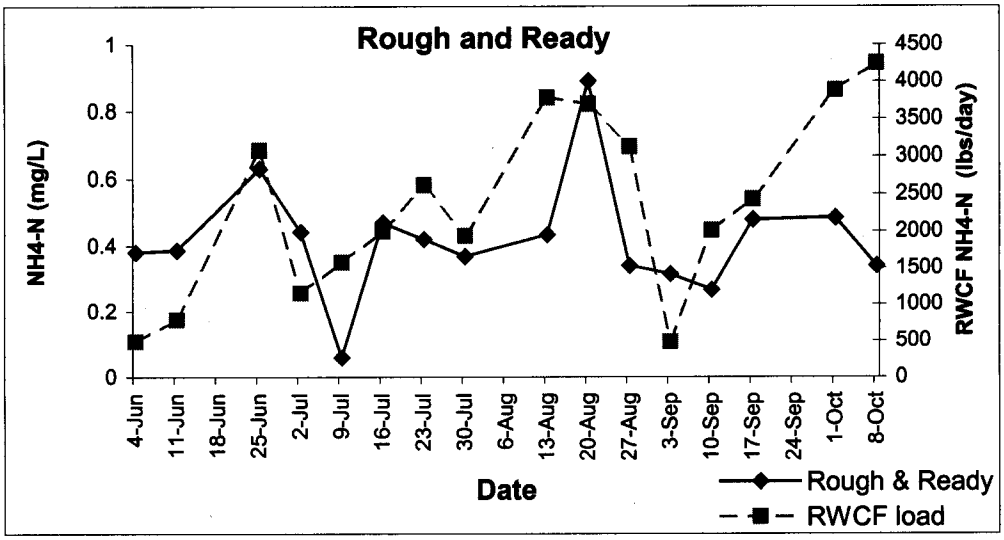


Fig. III-8. Comparison of ammonia load from the Regional Water Treatment Control Facility and NBOD at Rough and Ready Island.

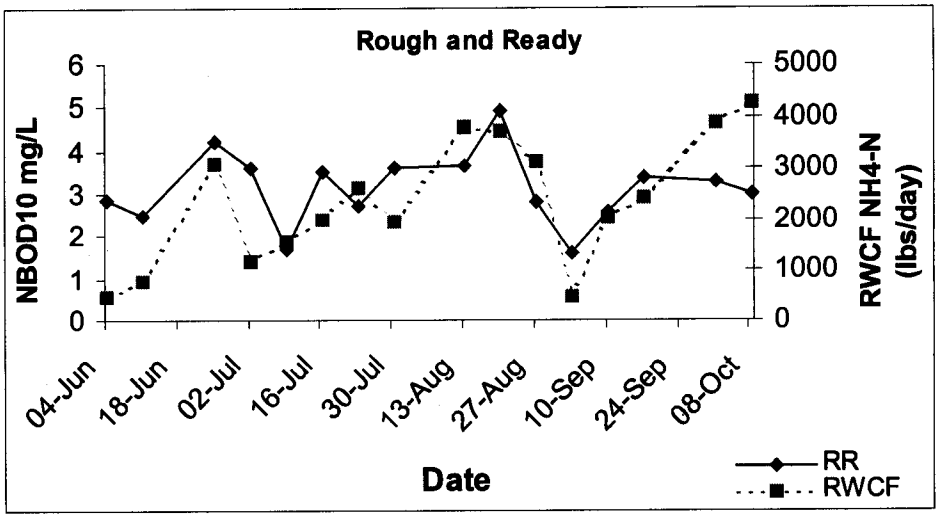
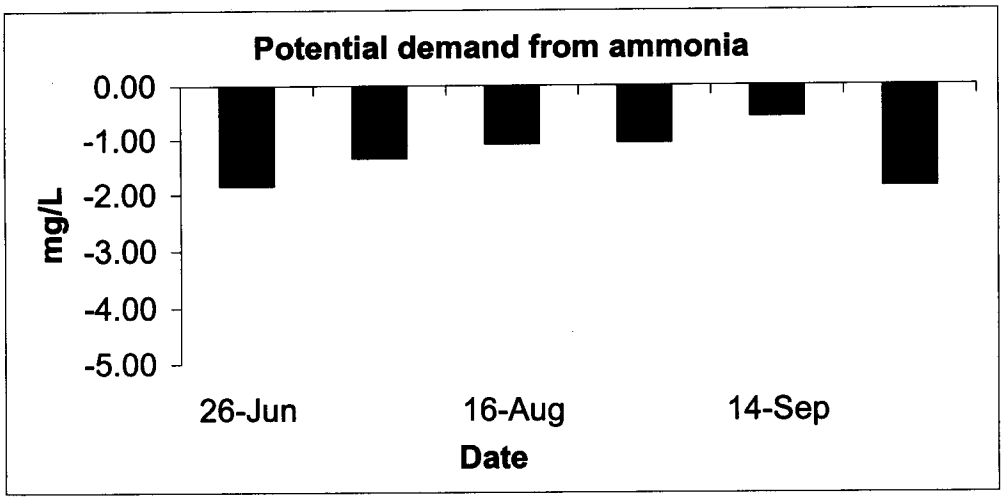


Fig. III-9. Comparison of the potential oxygen demand from nitrification of ammonia and organic nitrogen concentration in the Deep Water Channel.



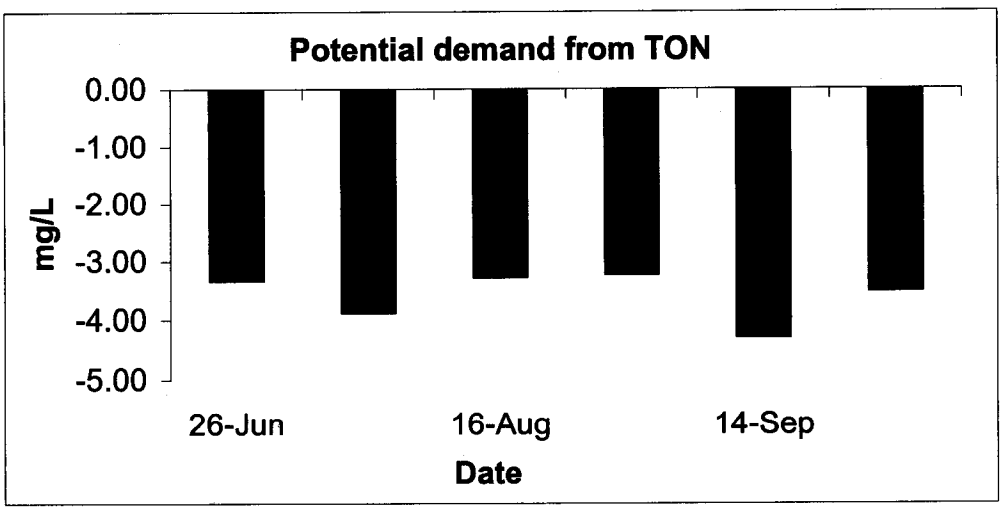
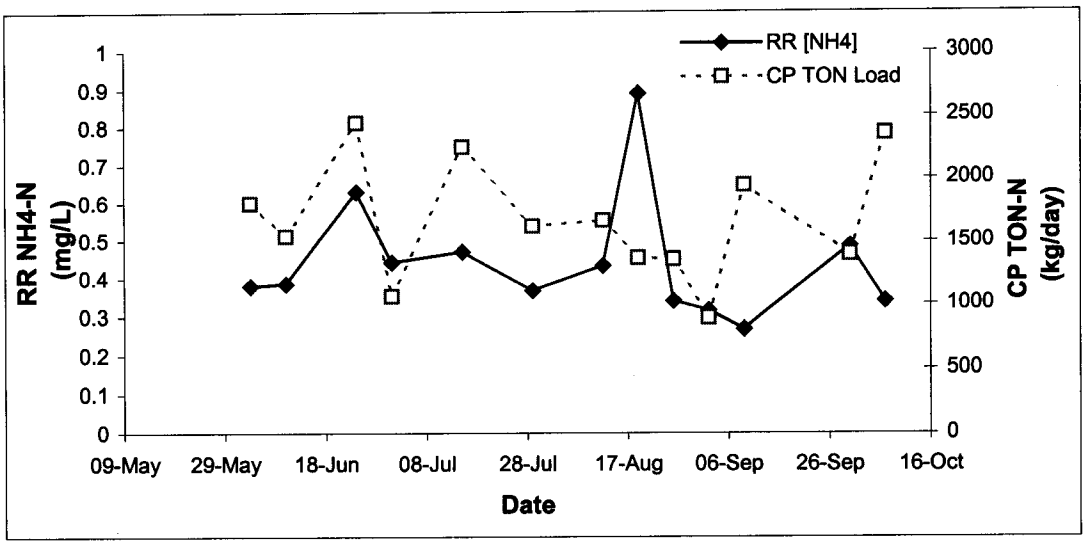


Fig. III-10. Comparison of ammonia concentration (a) and nitrogenous BOD (b) in the Deep Water Channel at Rough and Ready Island with organic nitrogen load from upstream at Channel Point.

a)



b)

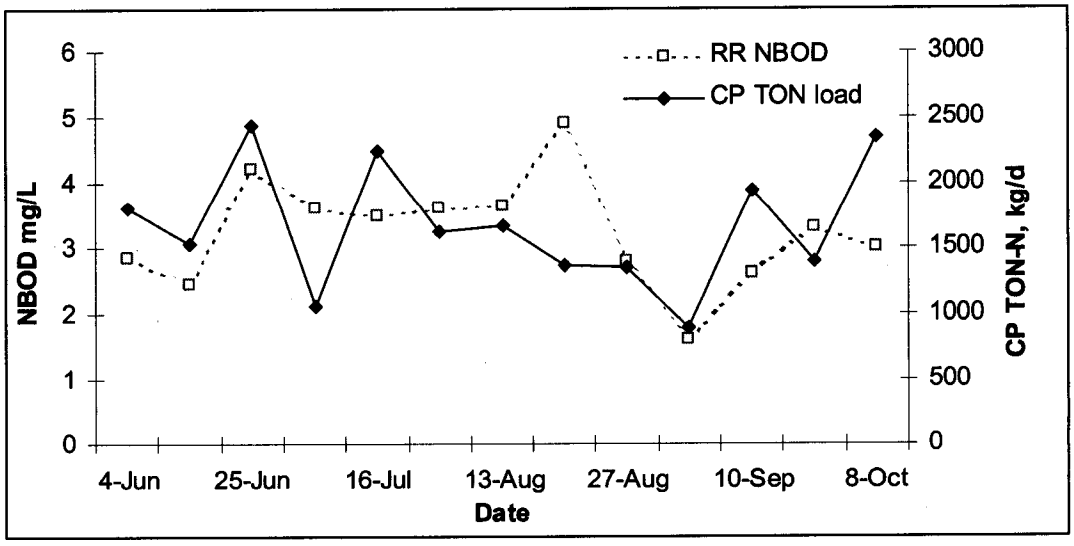
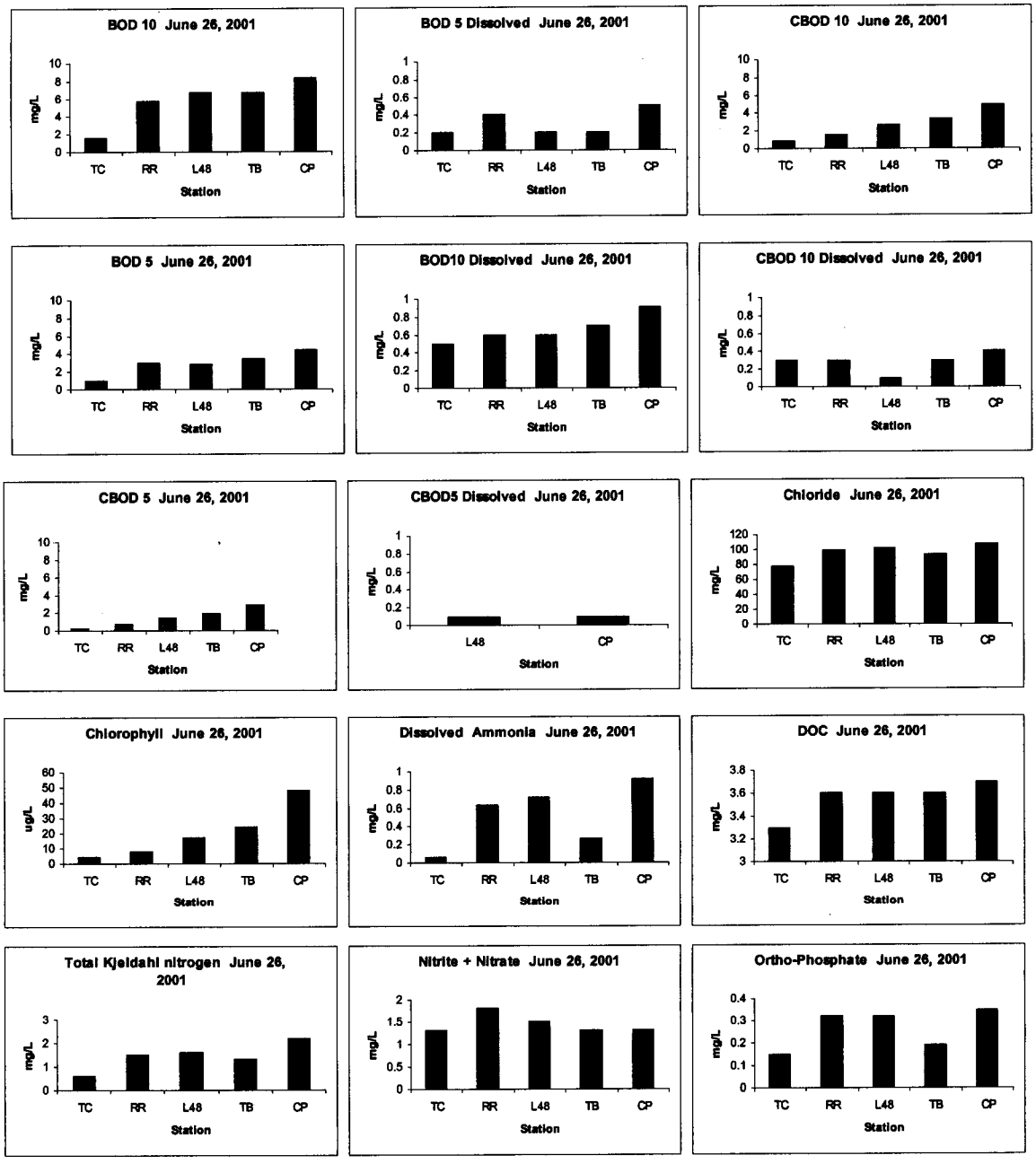


Fig. III-11 a. Concentration of water quality variables measured at stations in the San Joaquin River on June 26, 2001. Turner Cut (TC), Rough and Ready Island (RR), Light 48 (L48), Turning Basin (TB) and Channel Point (CP).



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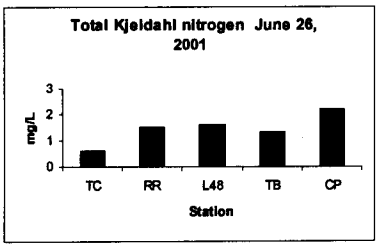
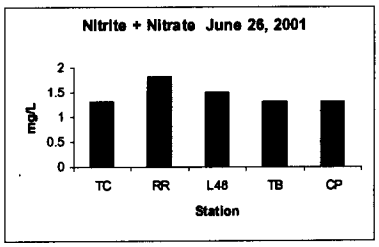
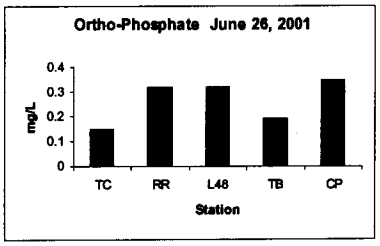
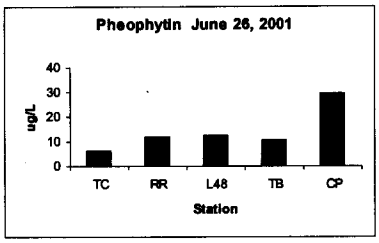
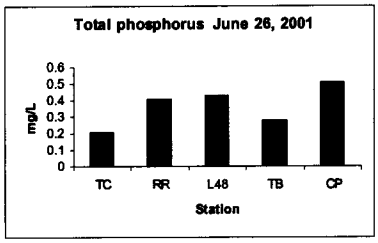
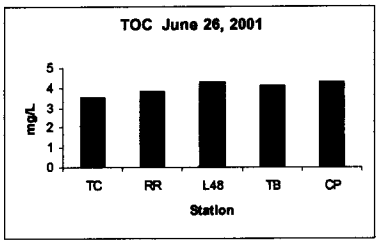


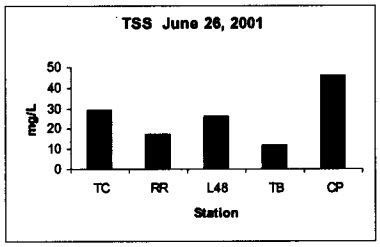












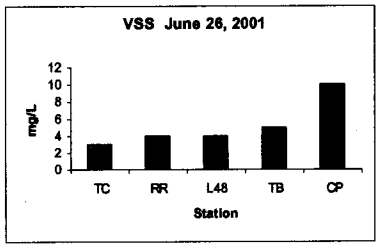
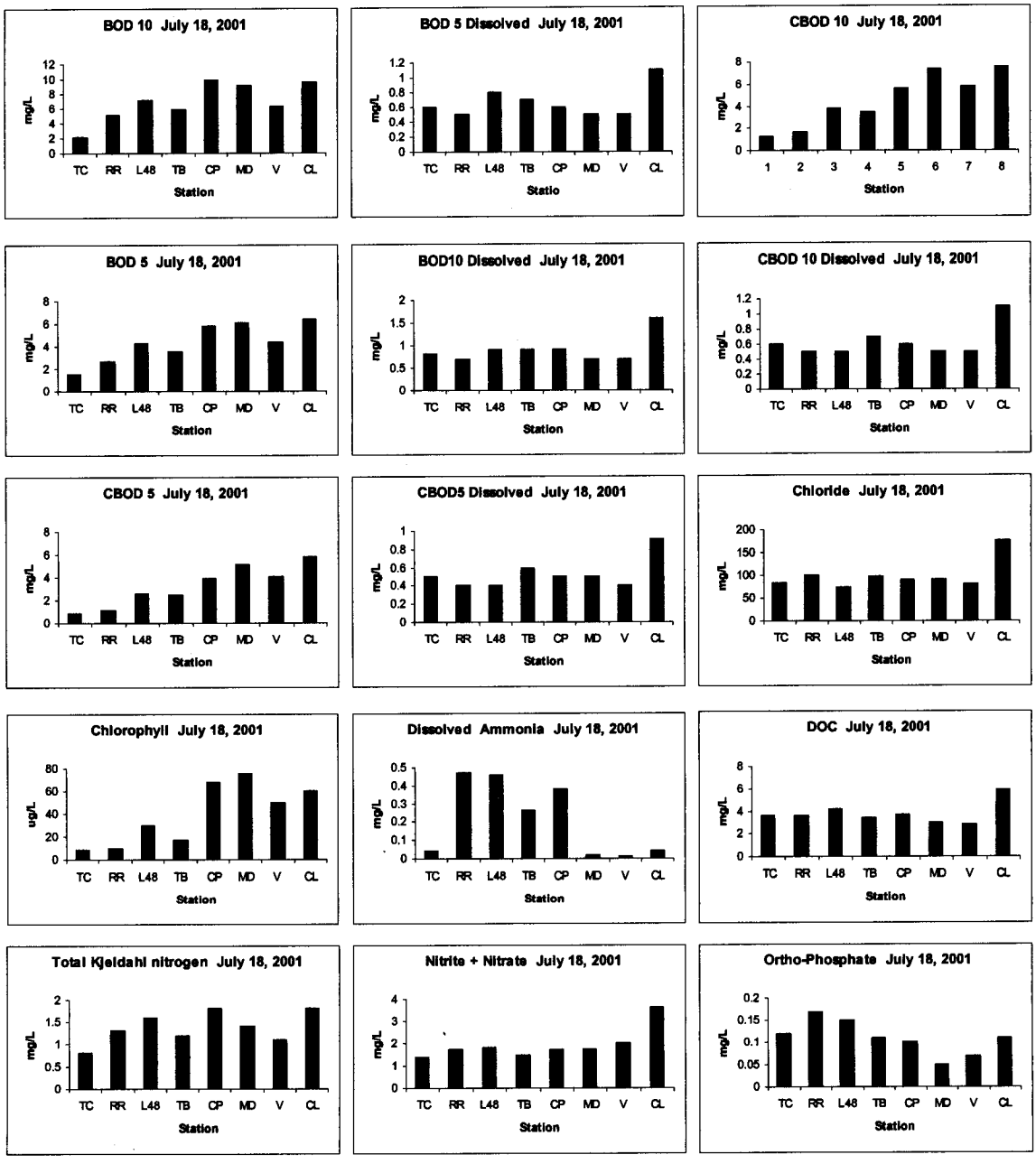


Fig. III-11 b. Concentration of water quality variables measured at stations in the San Joaquin River on July 18, 2001.



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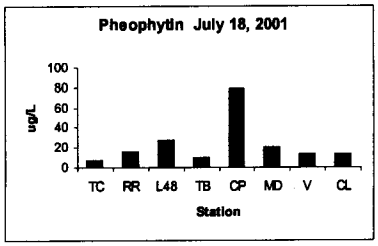
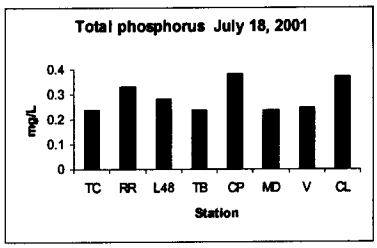
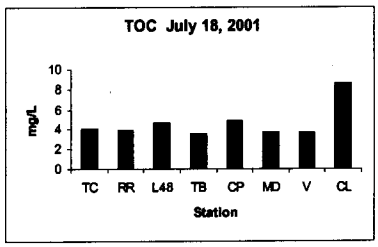
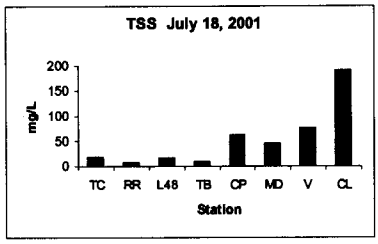








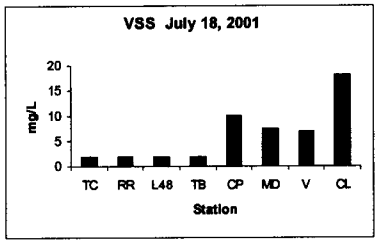
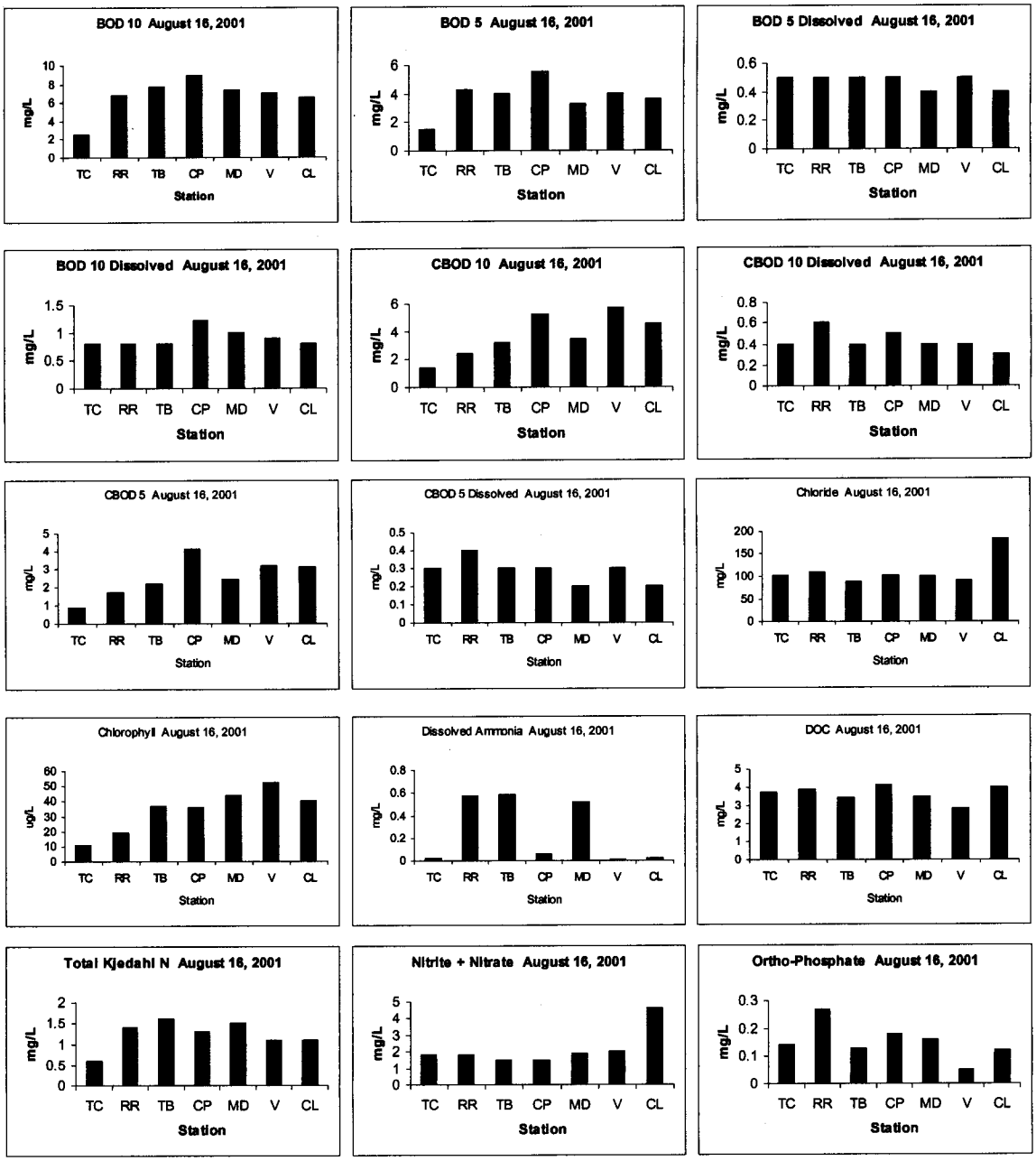


Fig. III-11 c. Concentration of water quality variables measured at stations in the San Joaquin River on August 18, 2001.



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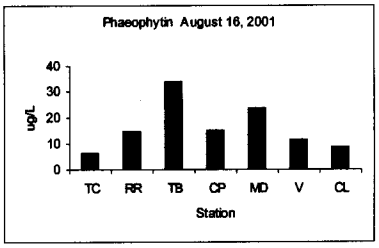
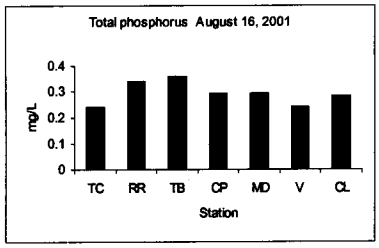
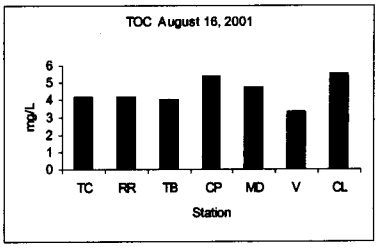
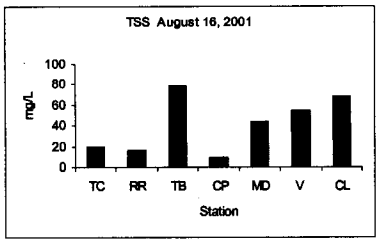








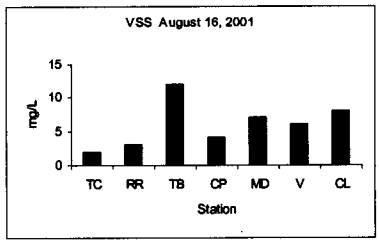
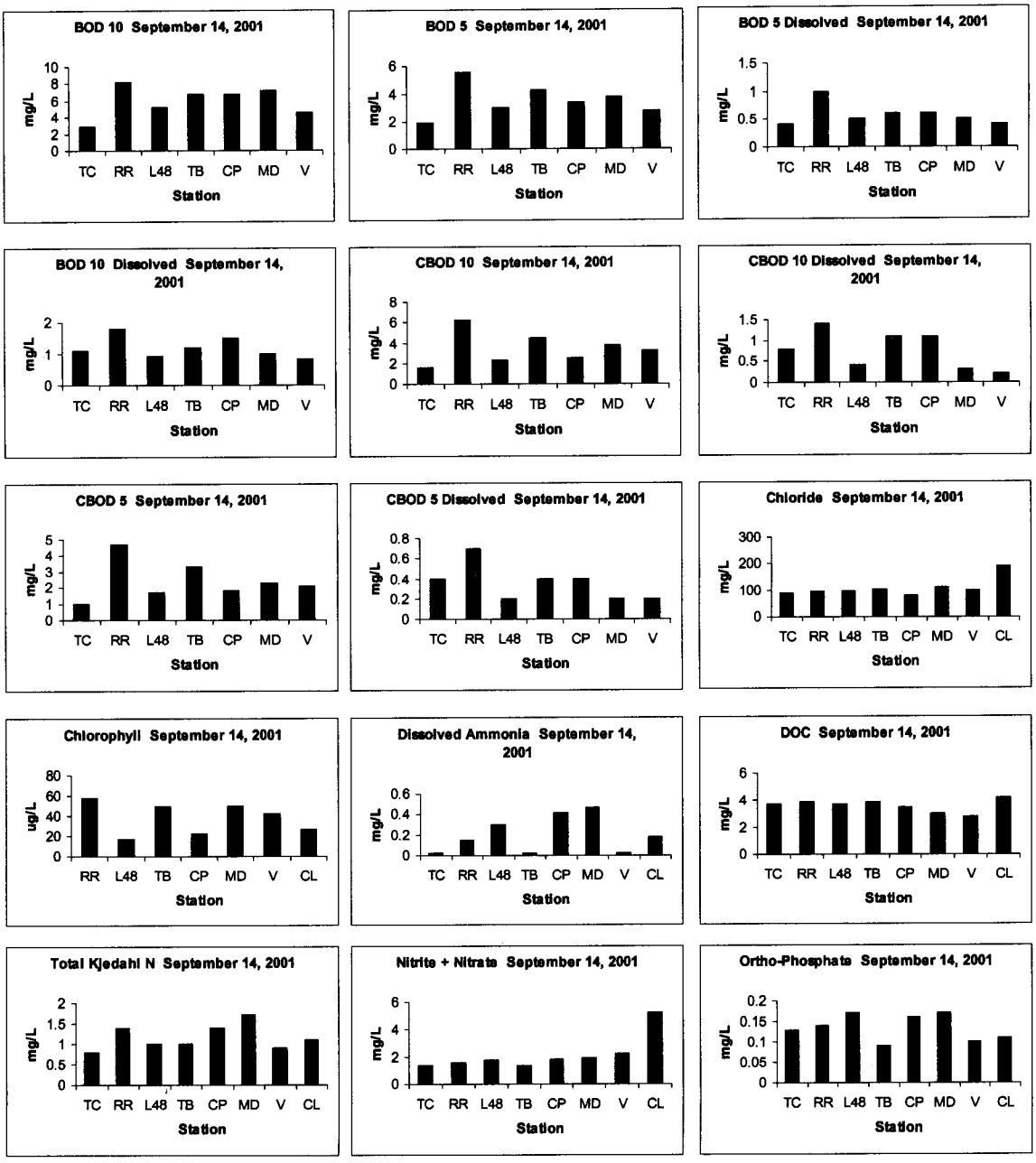


Fig. III-11 d. Concentration of water quality variables measured at stations in the San Joaquin River on September 14, 2001.



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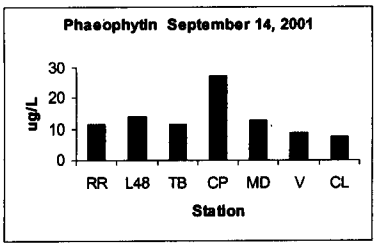
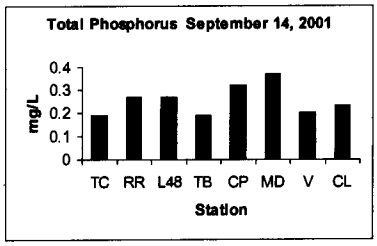
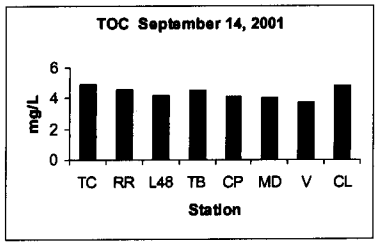
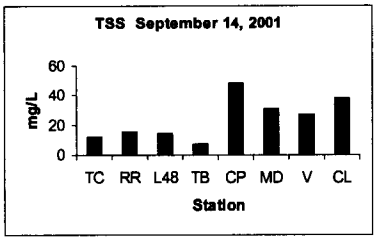








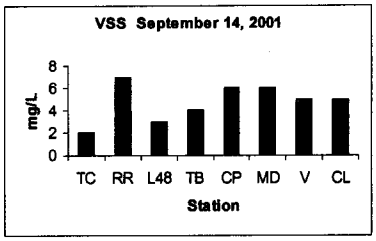
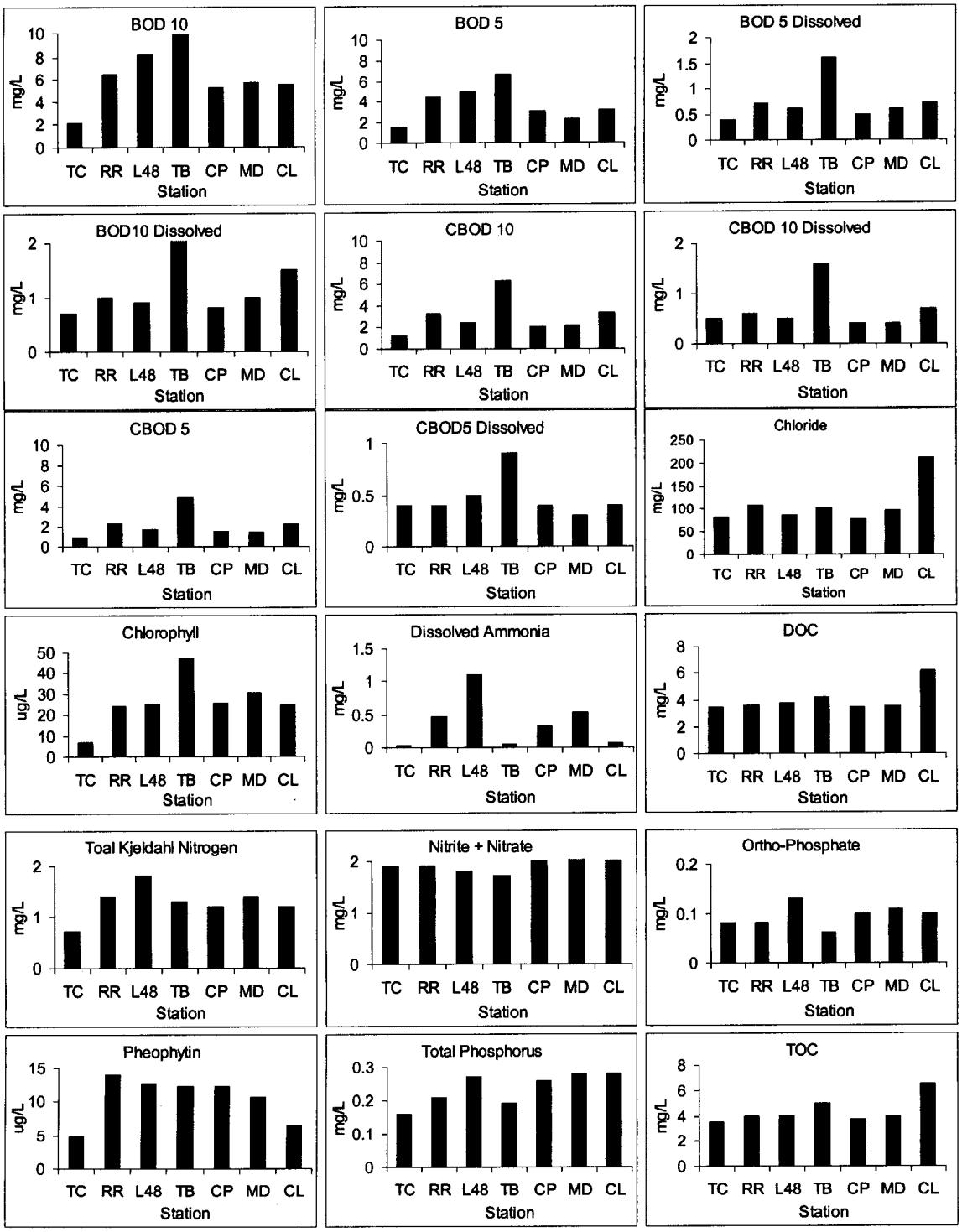
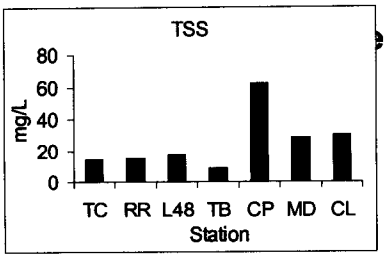
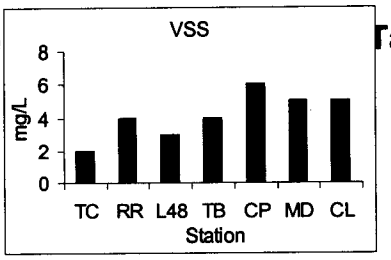


Fig. III-11 e. Concentration of water quality variables measured at stations in the San Joaquin River on October 3, 2001.




TSS
80
60
40
20
0
mg/L
TC RR L48 TB CP MD CL
Station


VSS
8
6
4
2
0
mg/L
TC RR L48 TB CP MD CL
Station

Tables

Fig. III-12. Total organic carbon to total organic nitrogen molar ratios by station and date.

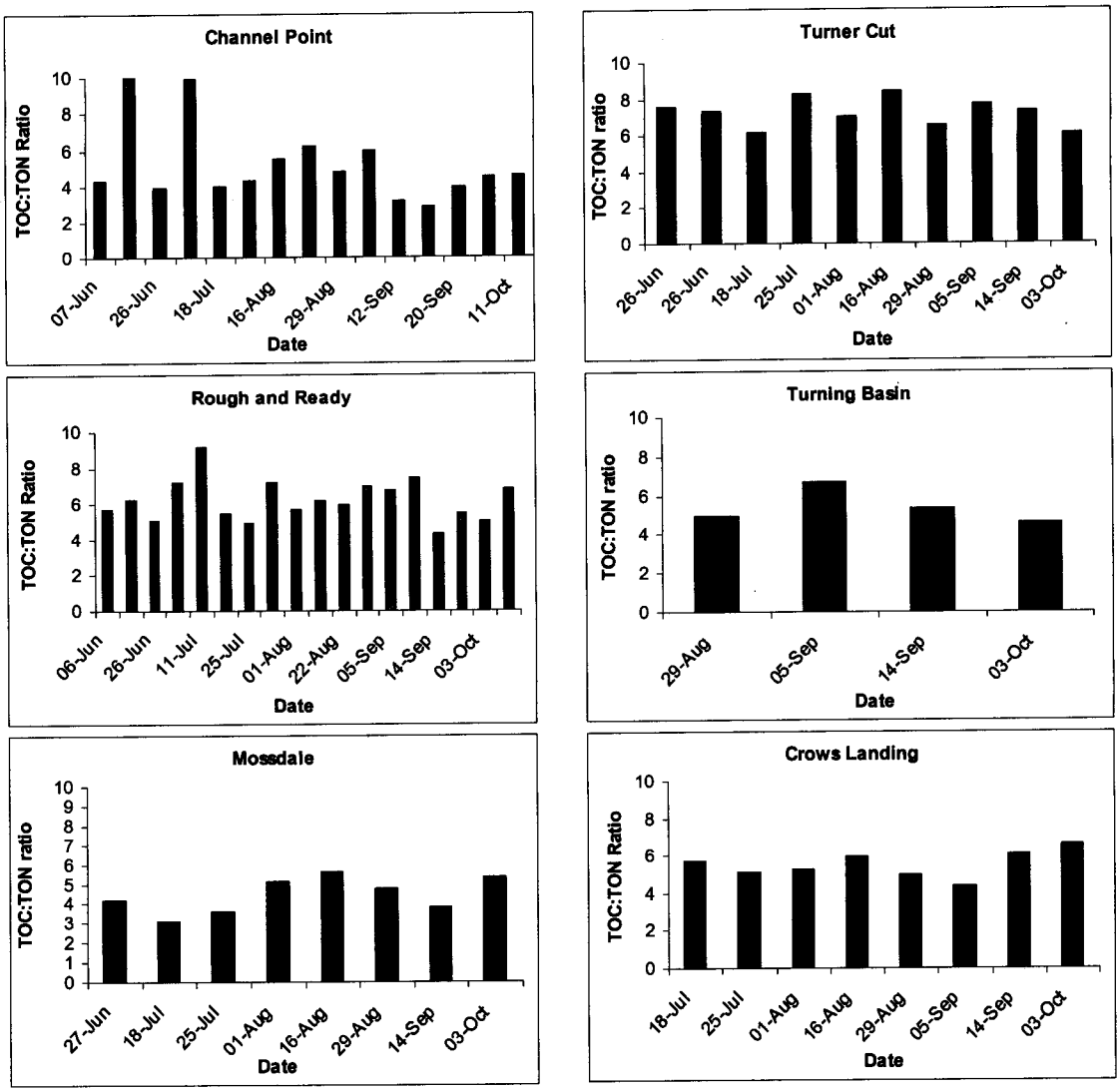
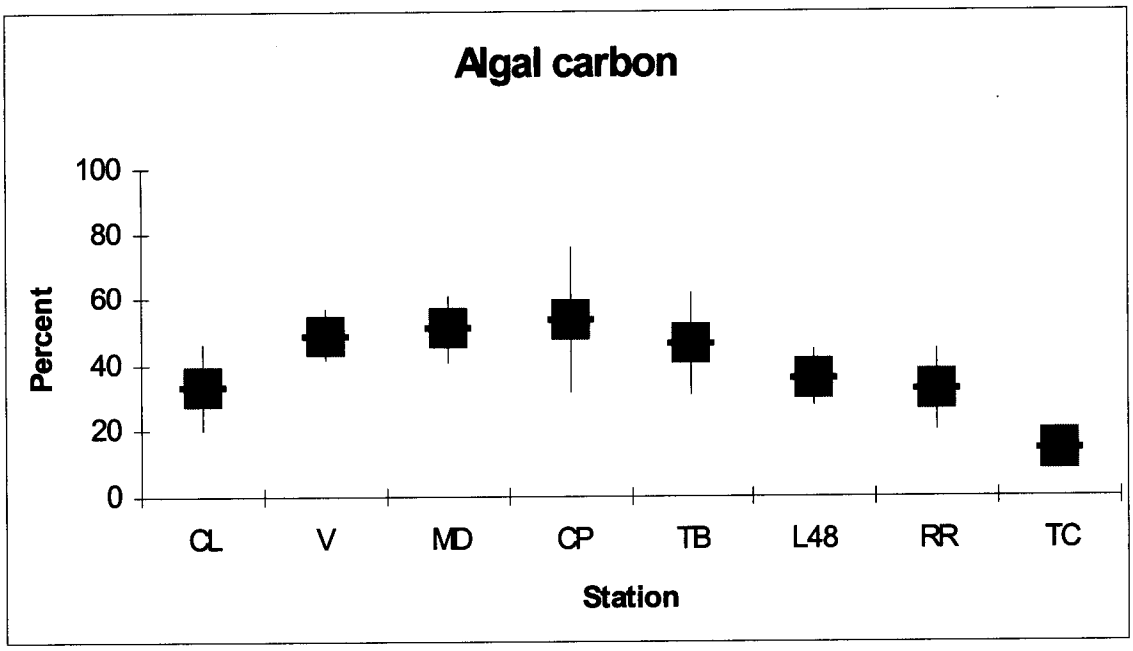


Fig. III-13. Percent contribution of algal biomass to total carbon and organic nitrogen measured in the Deep Water Channel.



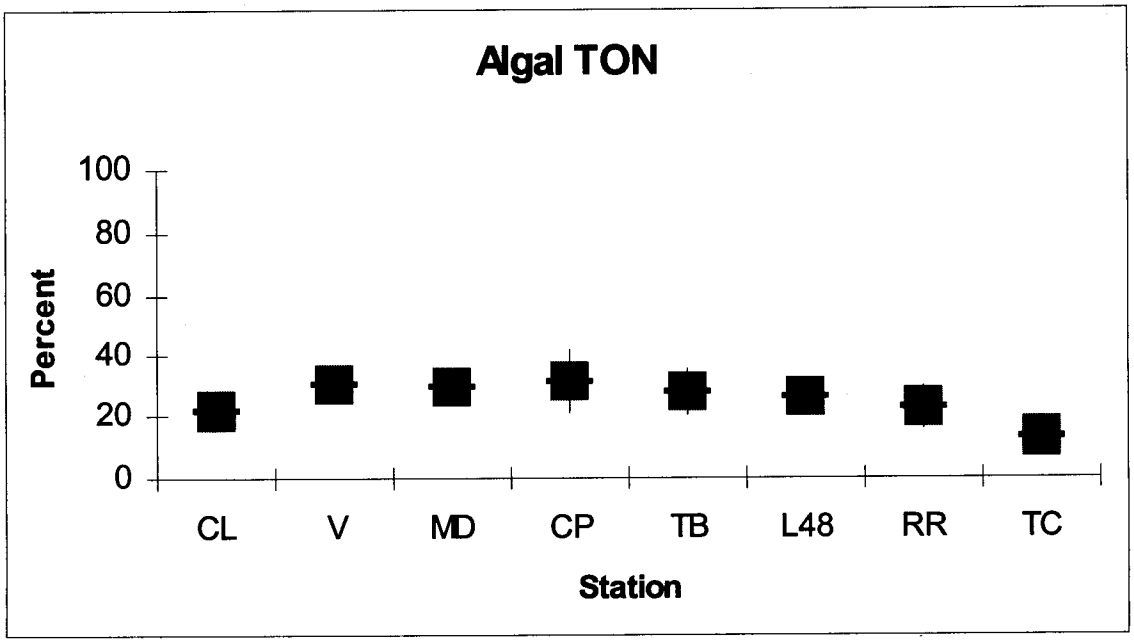


Fig. IV-1. Oxidation of chlorophyll *a* concentration and the associated increase in ammonia concentration measured at 5-day intervals for 30 days. Measurements were made at 20°C.

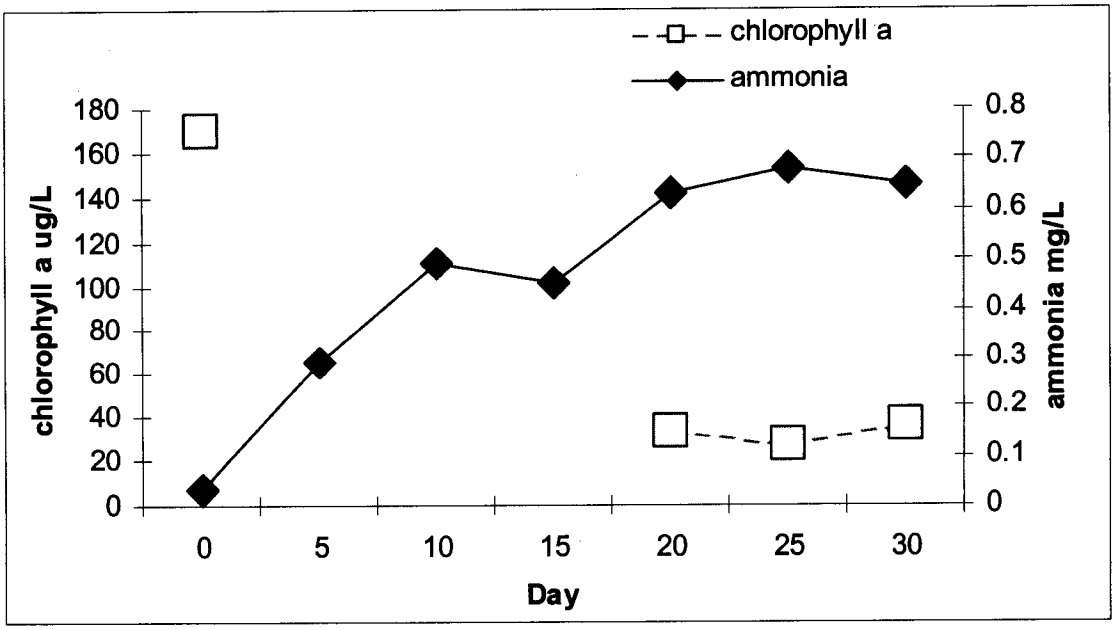


Fig. IV-2. Percentage of the organic nitrogen load from upstream at Mossdale comprised of chlorophyll *a* concentration in 2001.

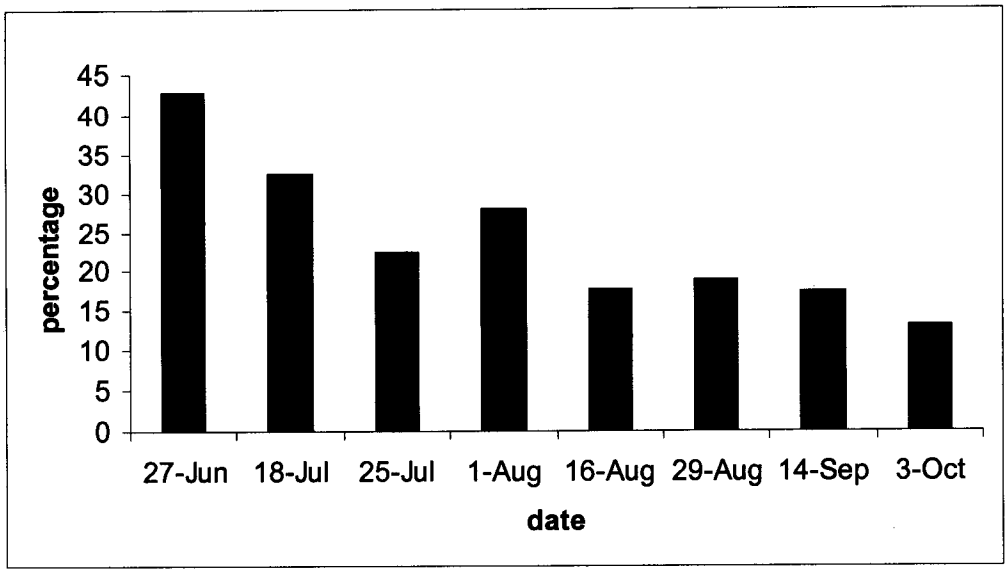


Fig. IV-3. Average percent surface irradiance and depth of the photic zone at sampling stations in the San Joaquin River.

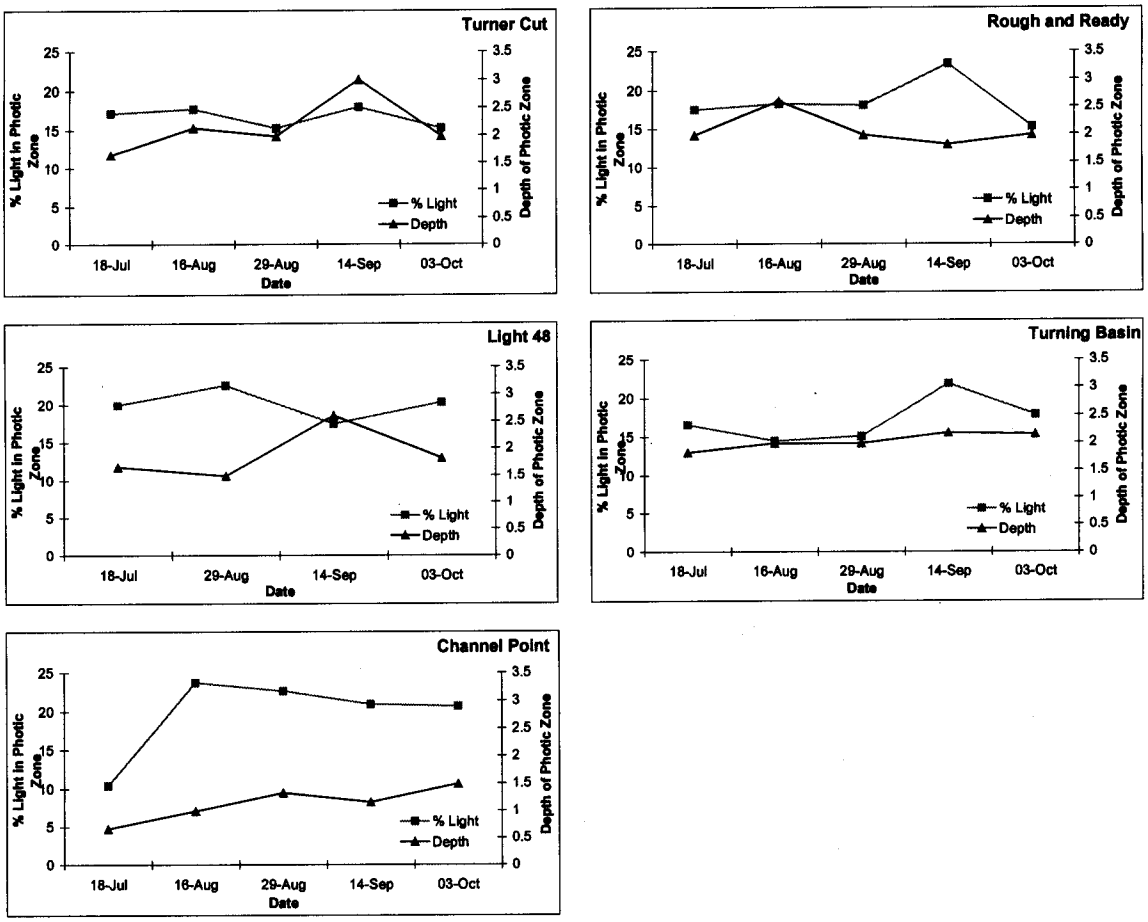
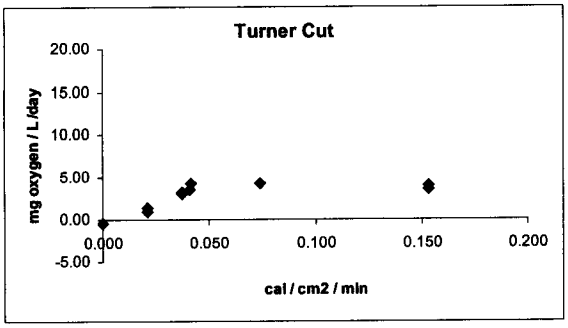
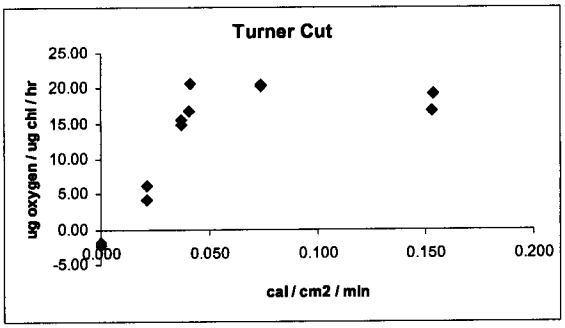
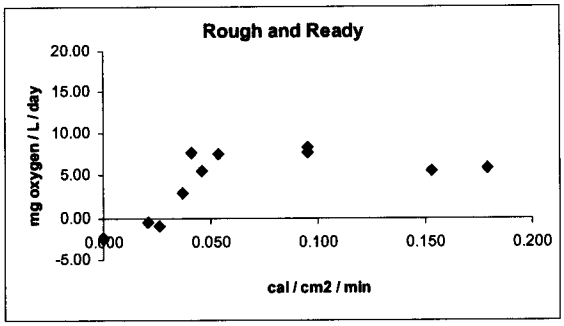
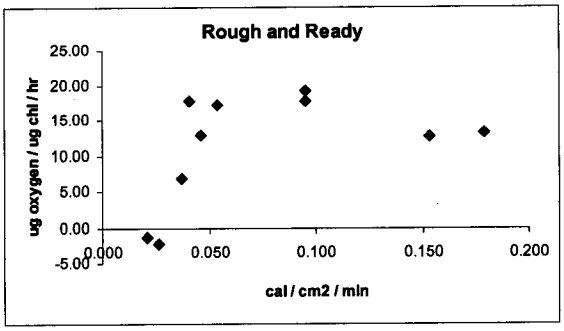


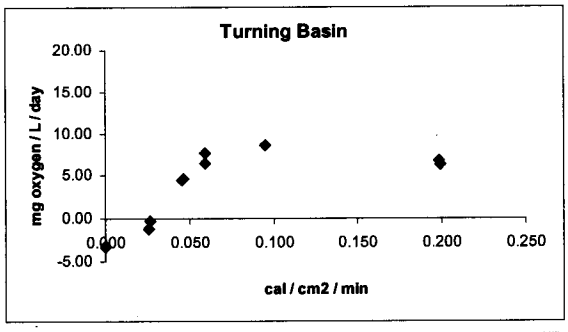
Fig. IV-4. Net plankton production rate measured at different daily average light intensity by station on September 5, 2001.

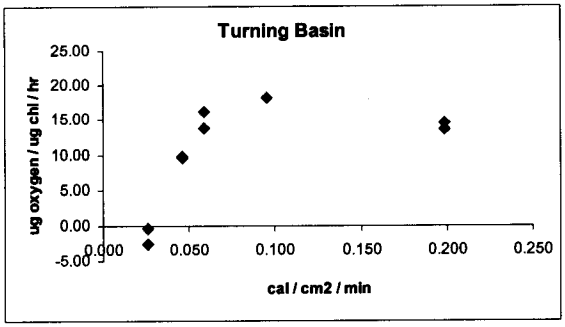


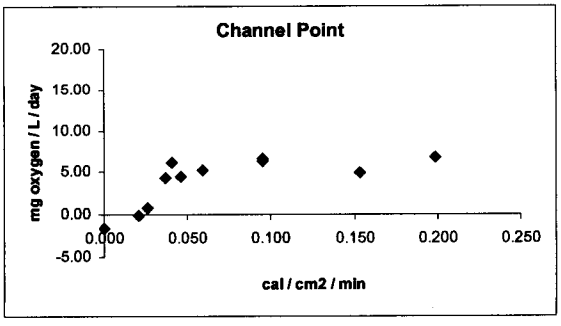


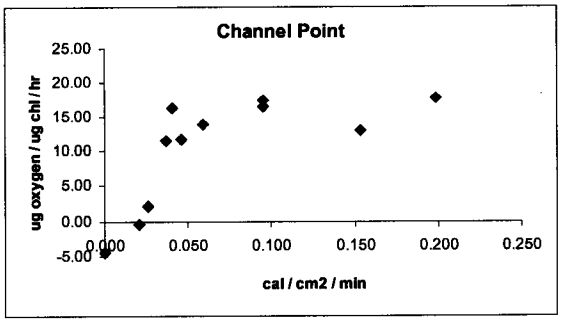


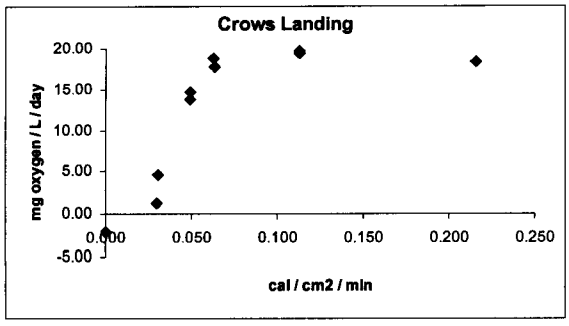












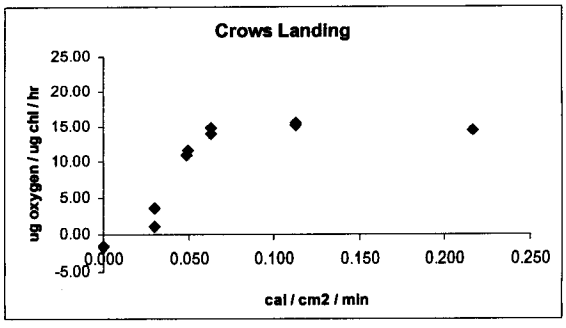


Fig. IV-5. Median plus 25 and 75 percent quartiles of dissolved inorganic nitrogen and orthophosphate concentration at each sampling station in the San Joaquin River.

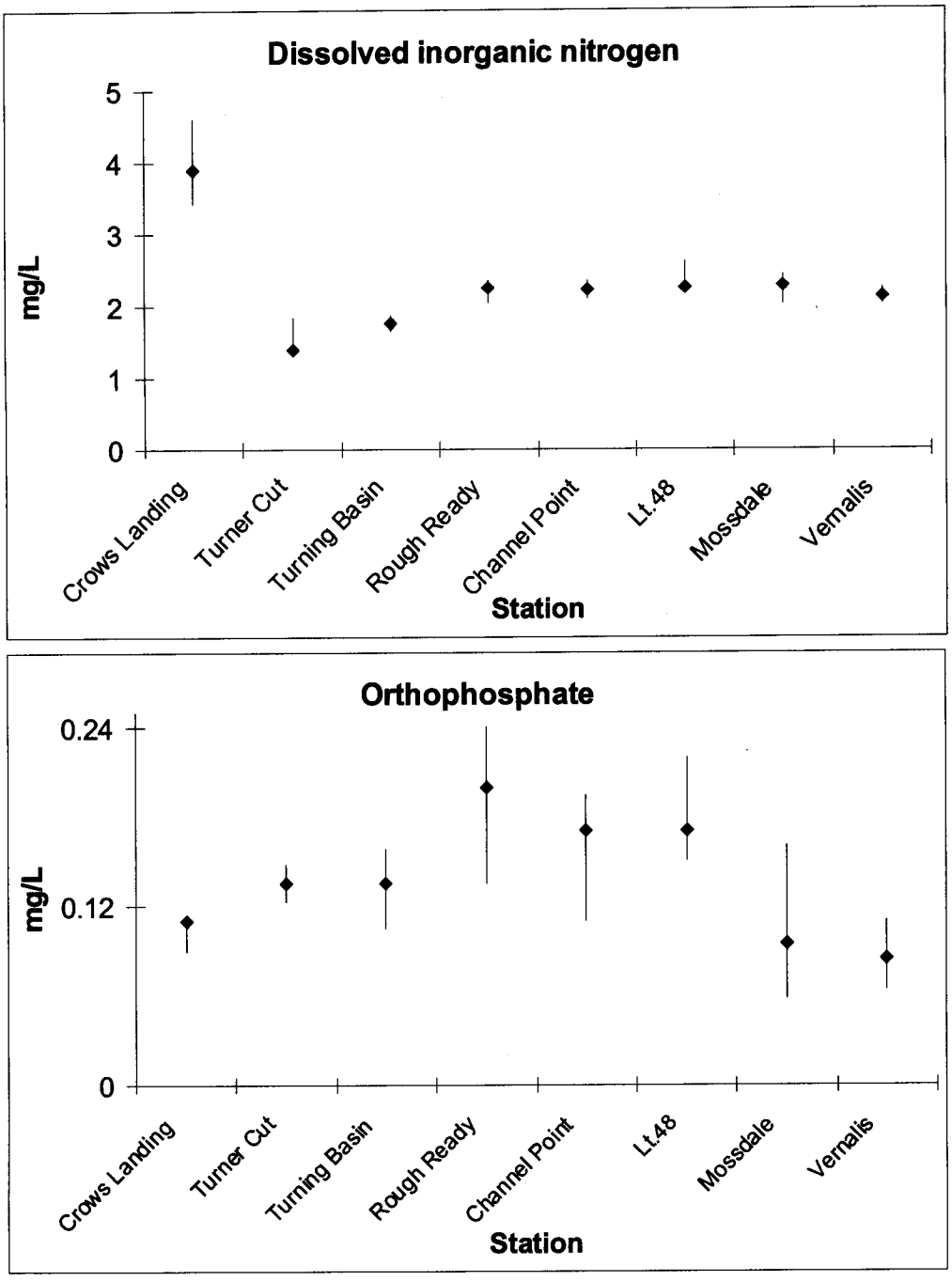
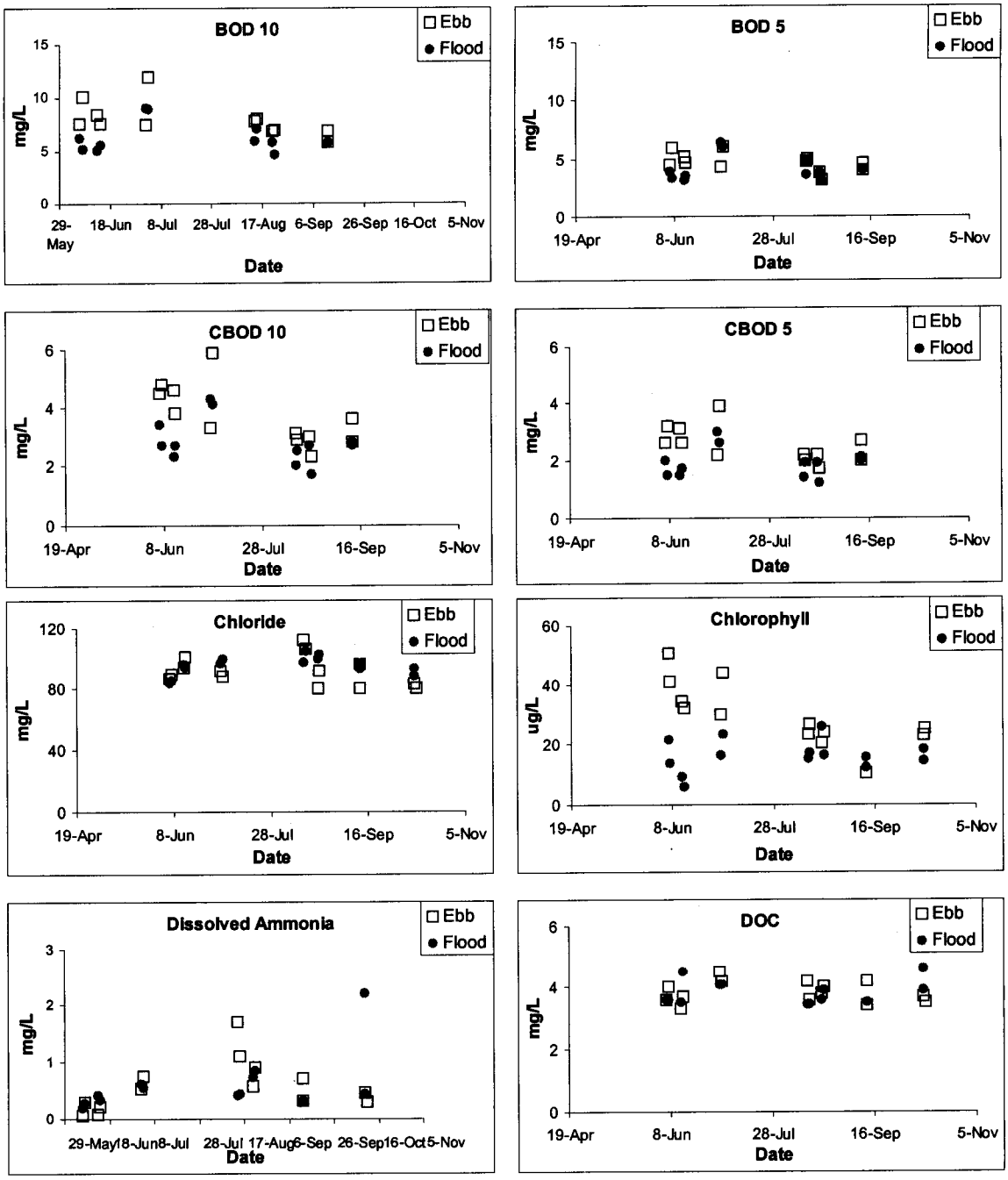


Fig. IV-6. Water quality variables measured on ebb and flood tide near mid-depth at Channel Point.



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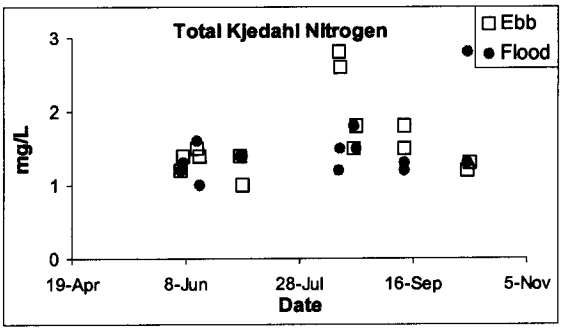

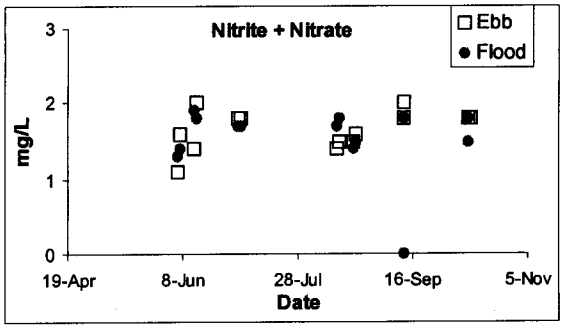

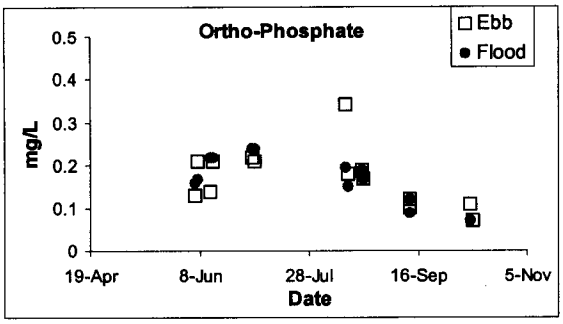

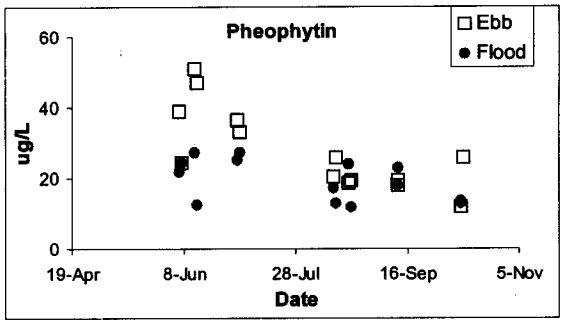

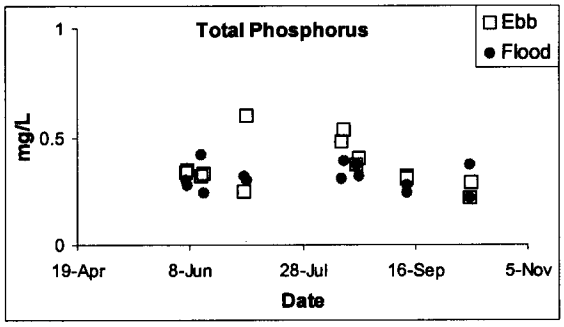

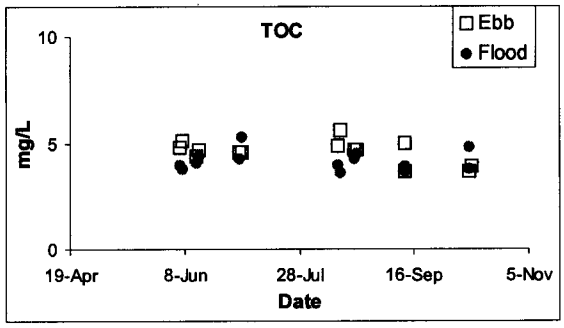

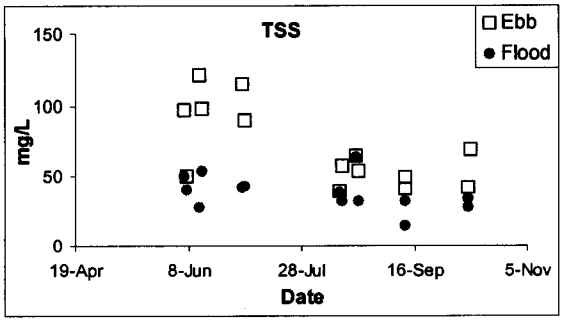

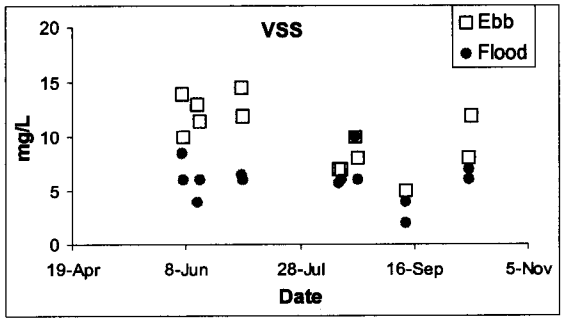

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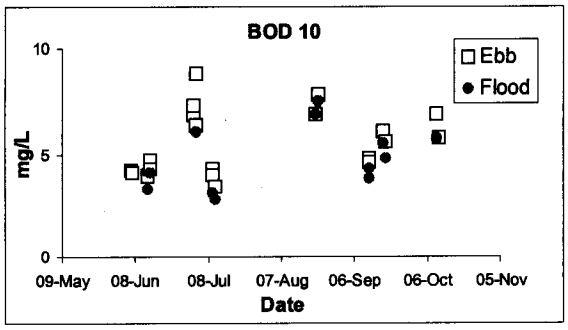
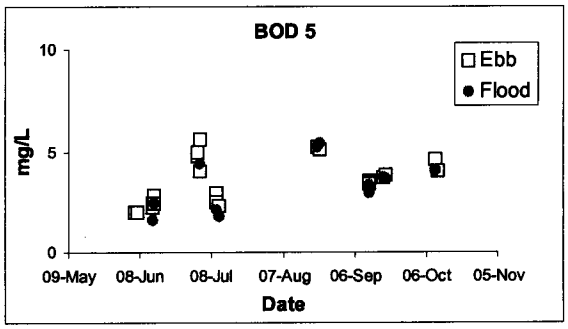
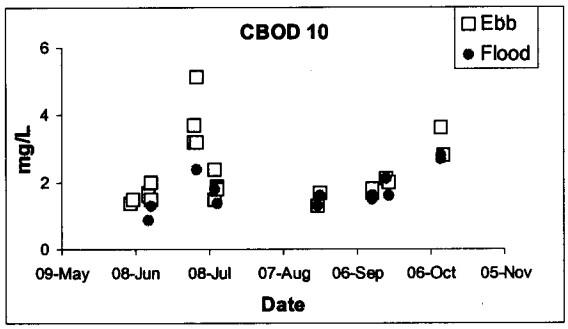
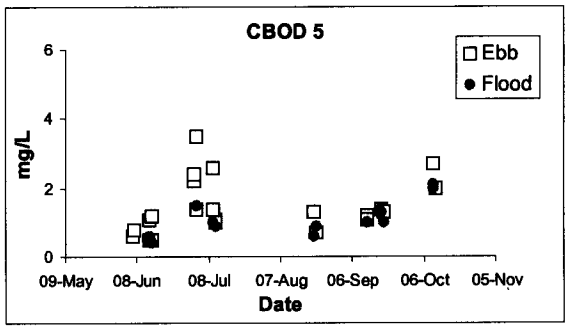
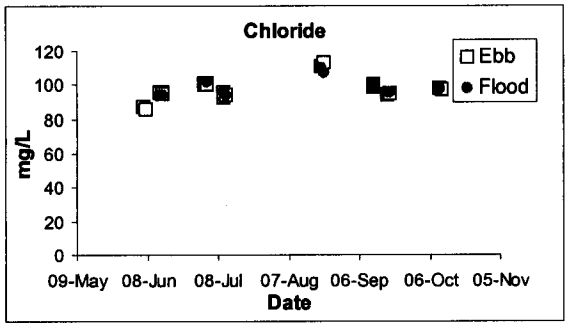
Fig. IV-7 a. Water quality variables measured on ebb and flood tide at 1 m depth for Rough and Ready Island.

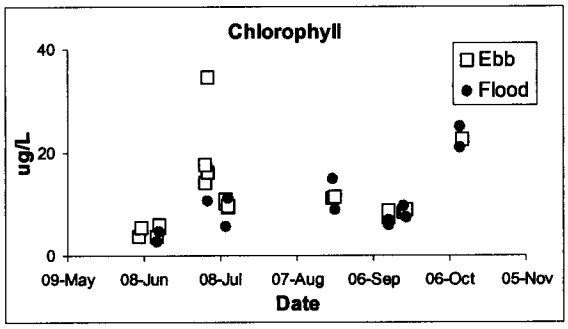


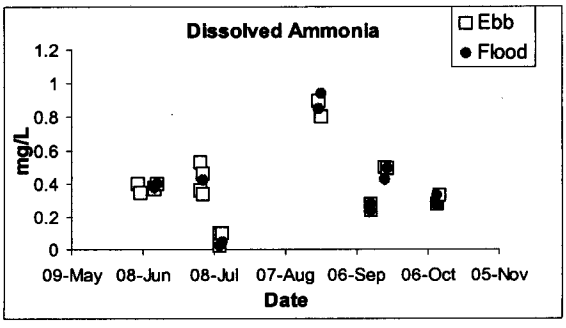


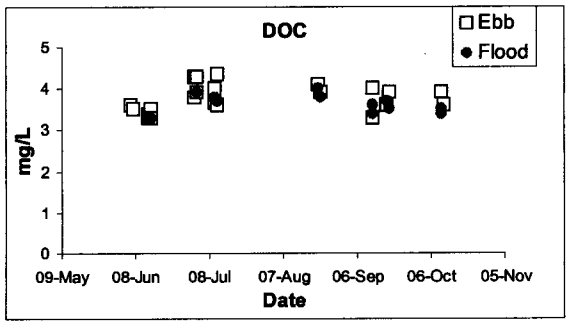












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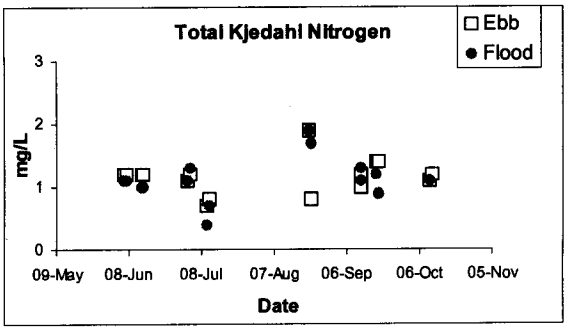
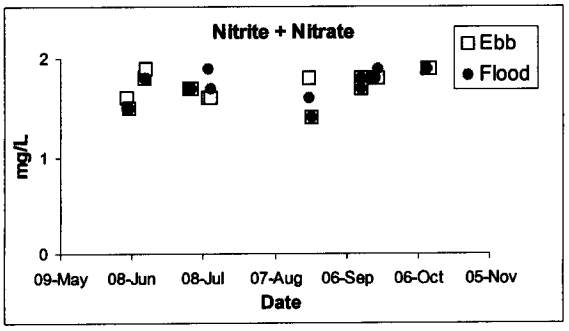
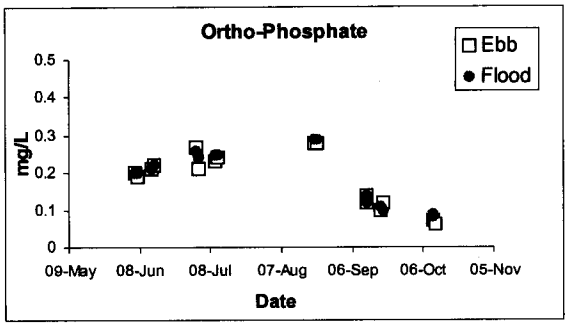
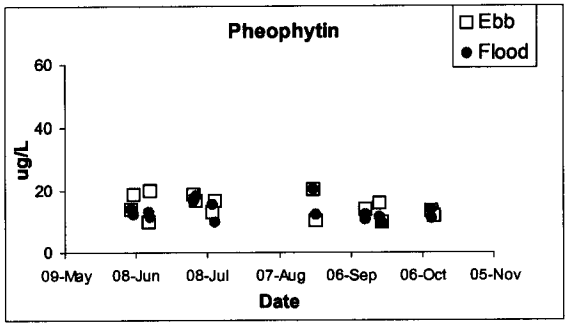
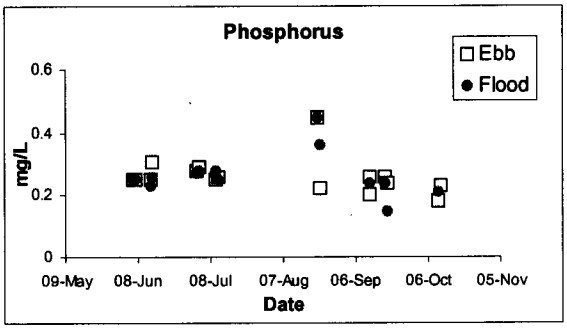
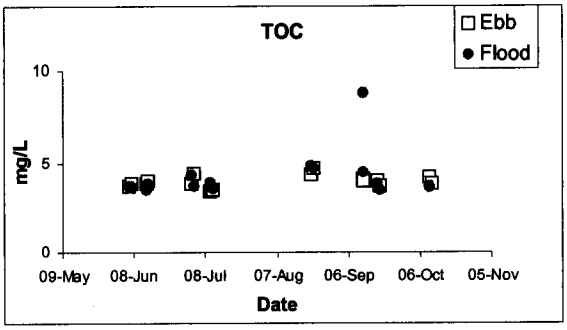


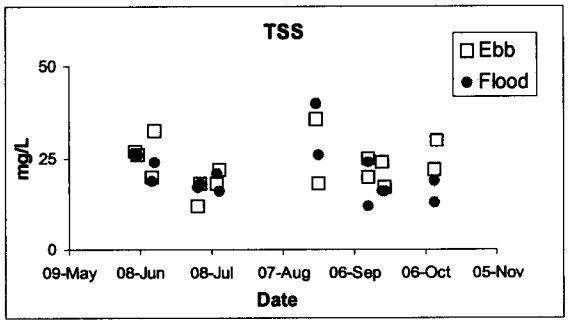












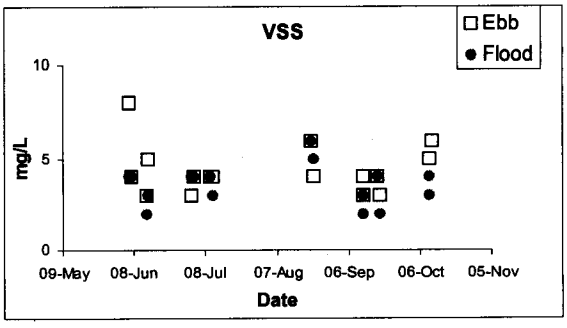
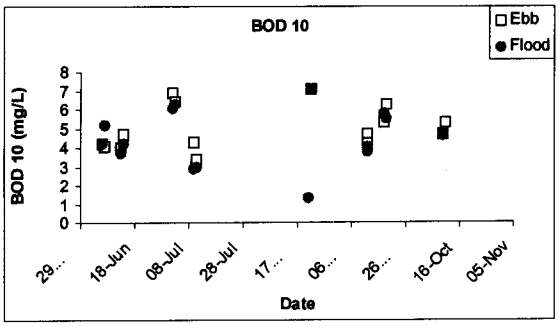
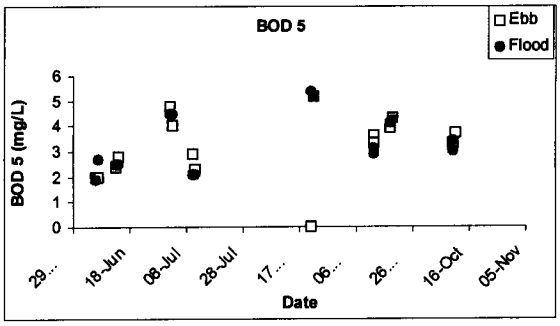
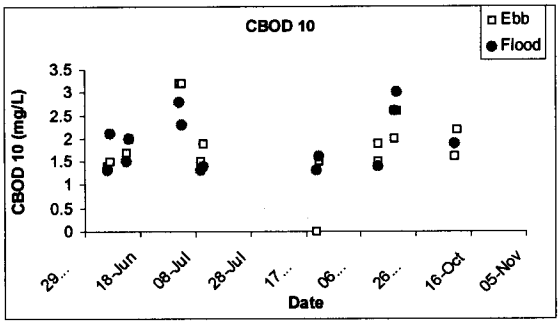
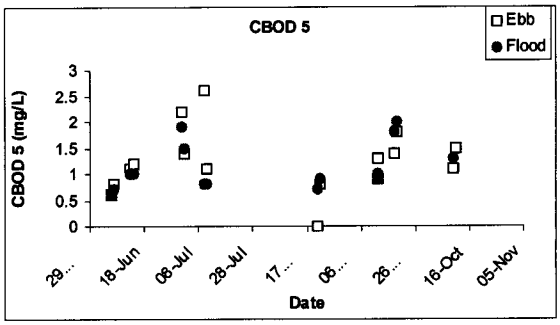


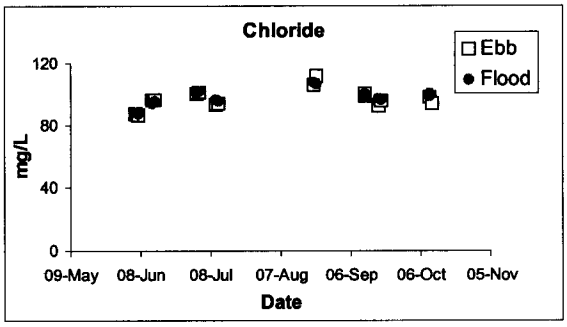
Fig. IV-7 b. Water quality variables measured on ebb and flood tide at 1 m from the bottom for Rough and Ready Island.

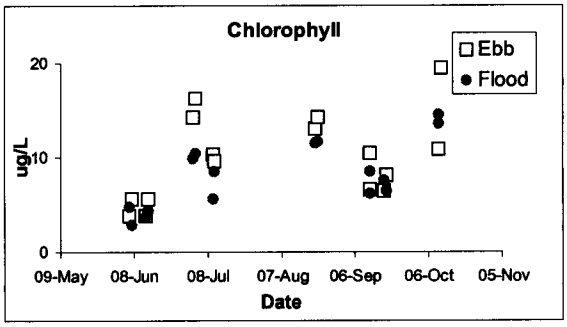


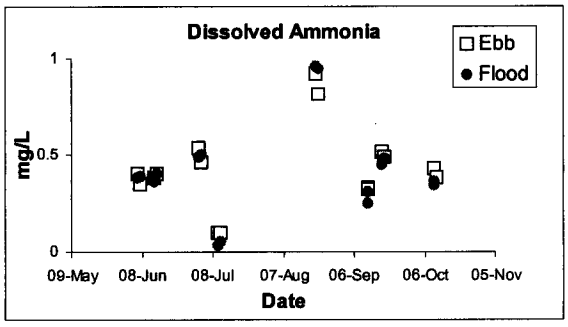


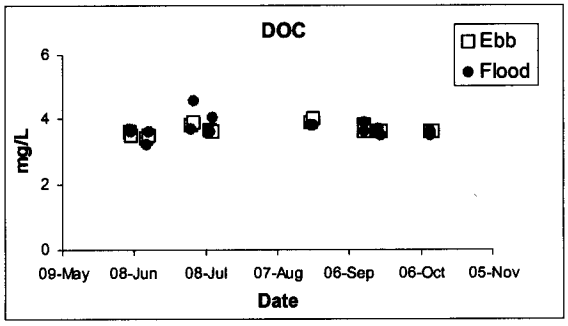












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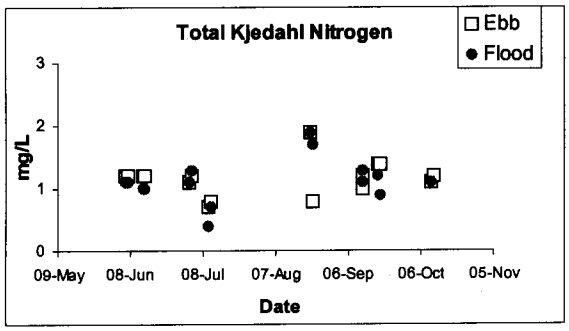
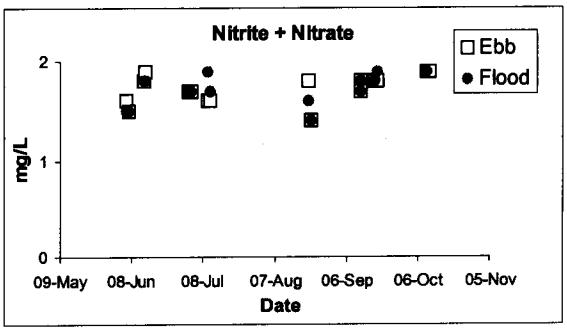
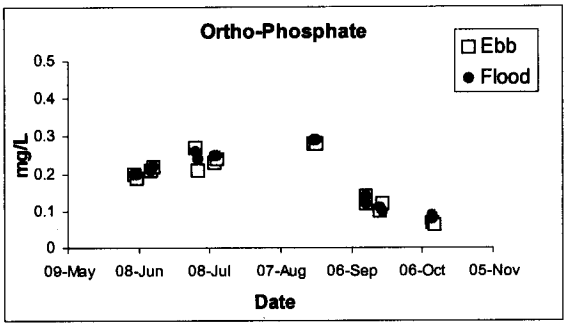
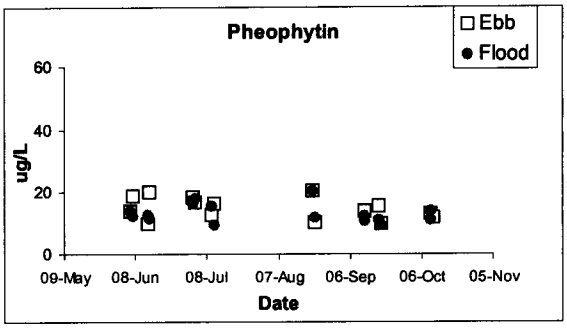
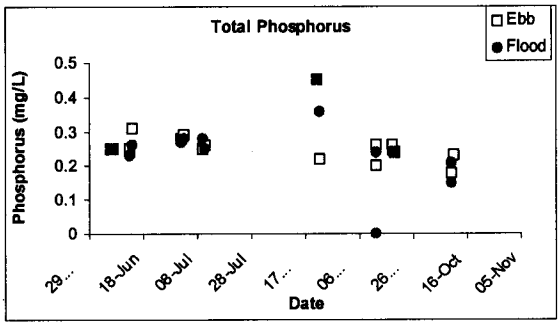
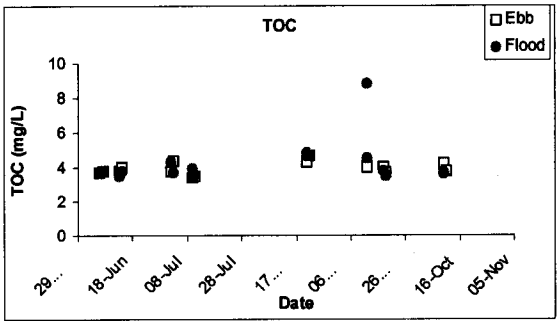


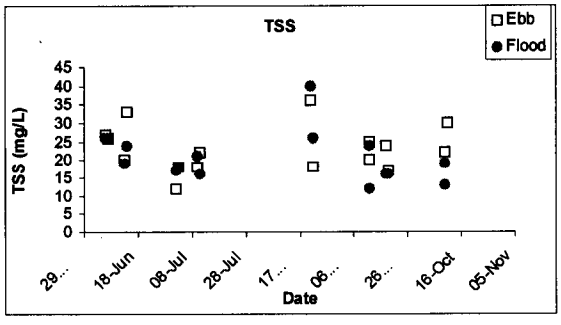












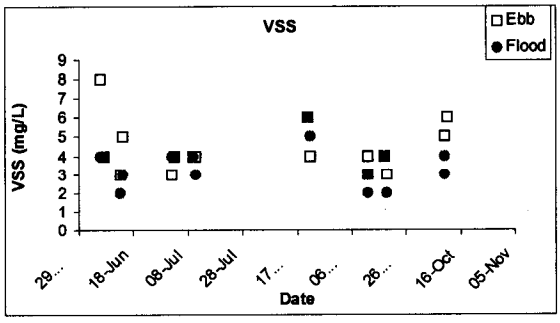
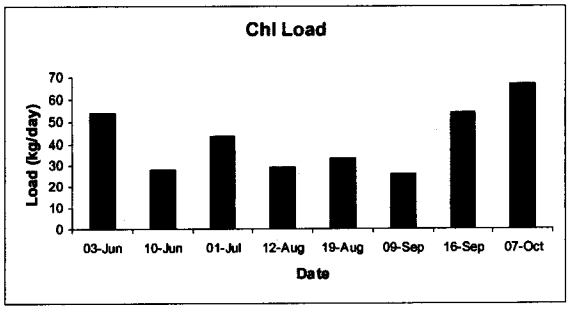
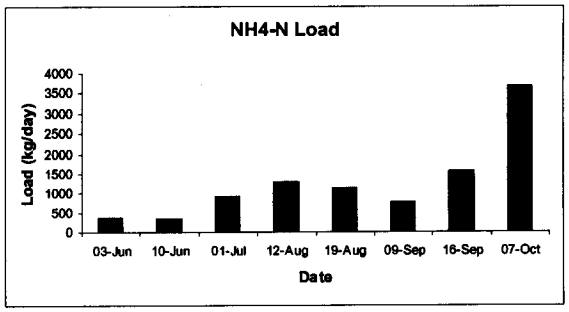
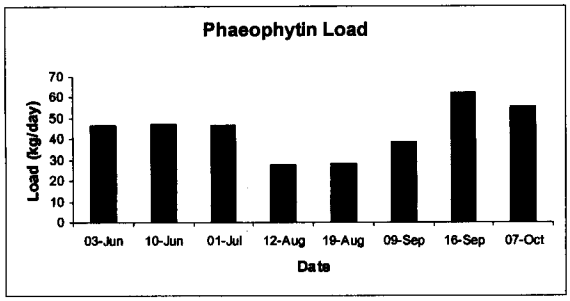
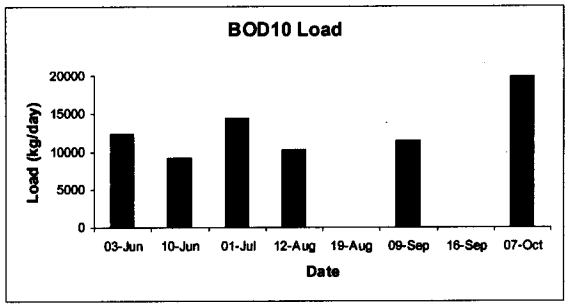


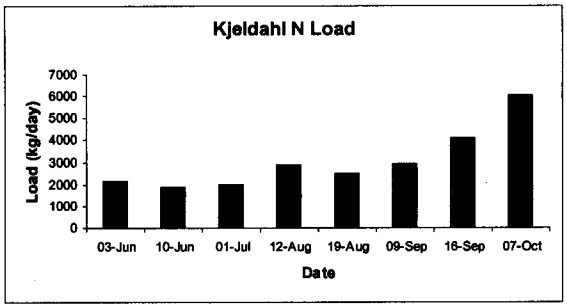
Fig. IV-8. Tidal day load measured at Channel Point near mid-depth by date.

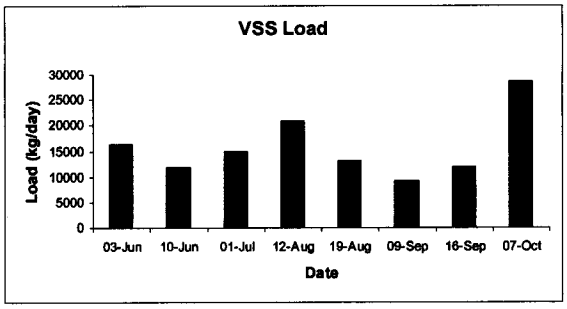












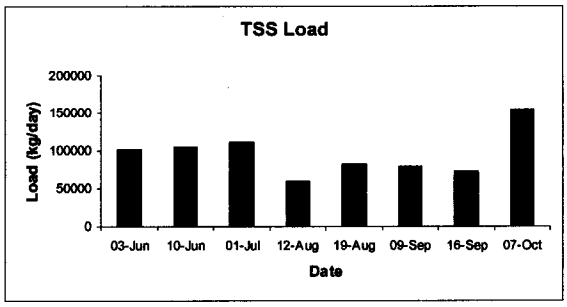


Fig. IV-9. Net tidal day flow at Rough and Ready Island.

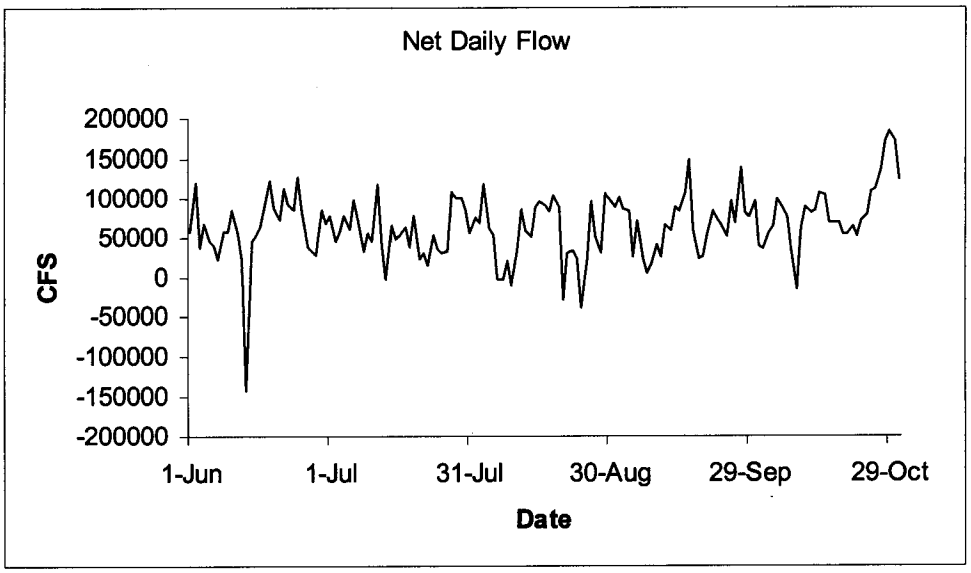


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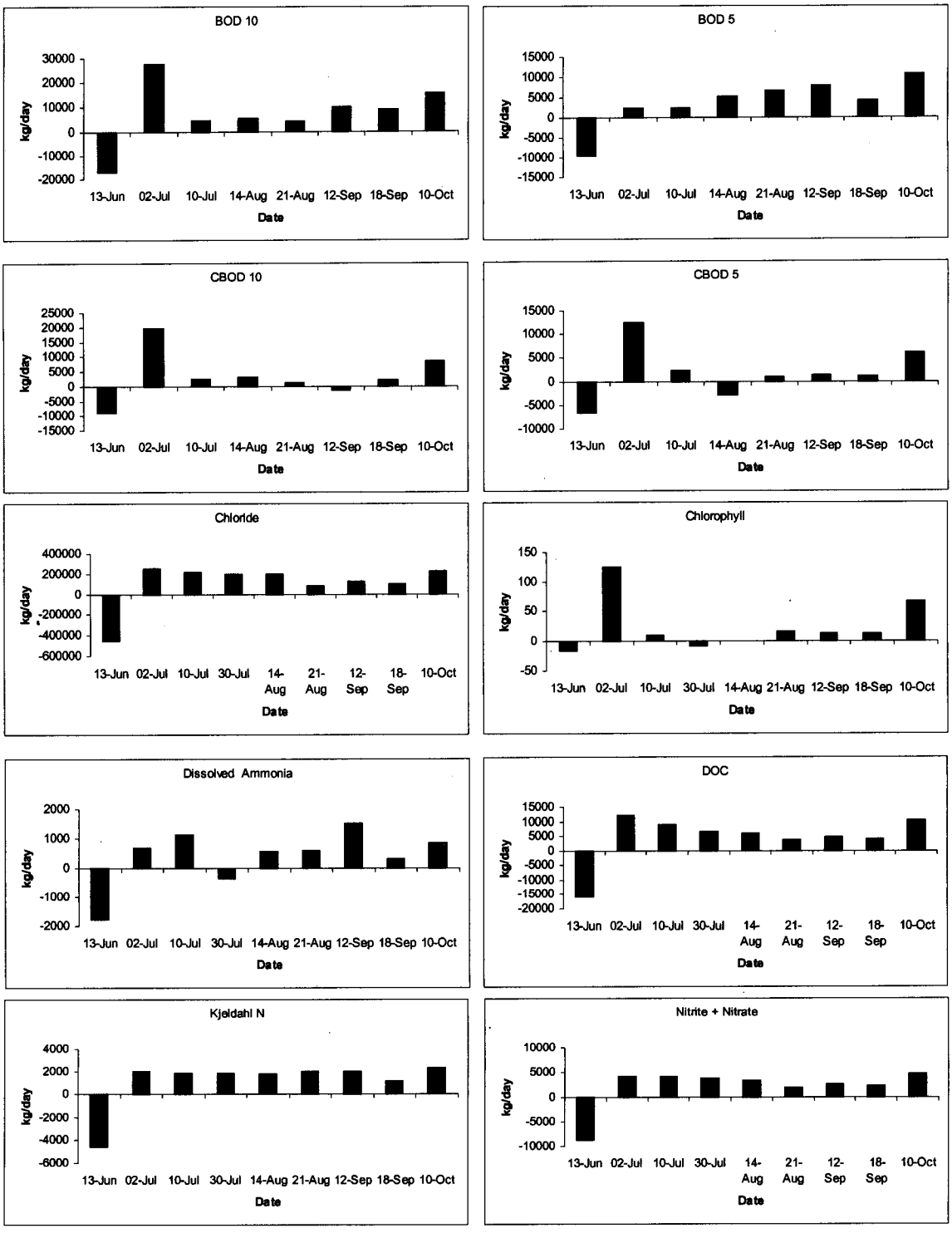
Fig. IV-10 a. Tidal day load of water quality variables at 1 m depth for Rough and Ready Island.



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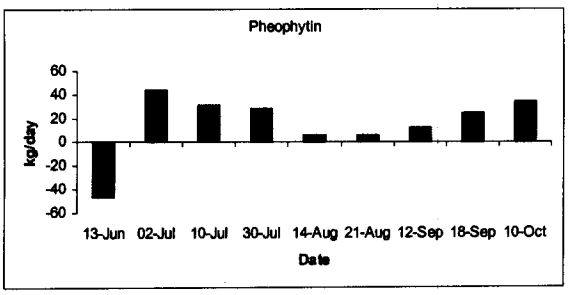

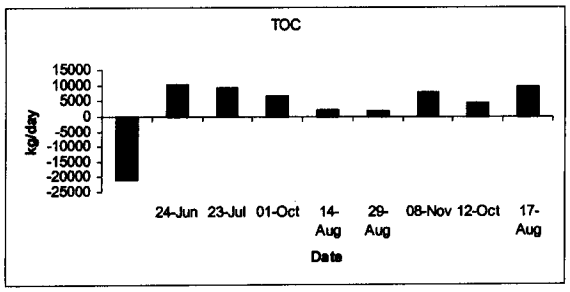

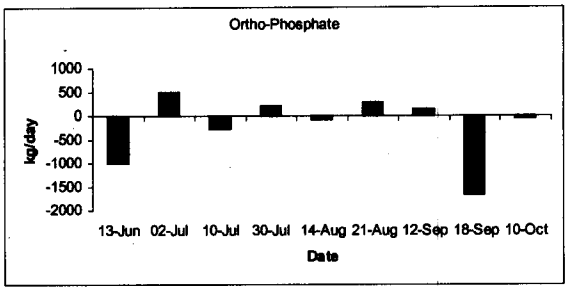

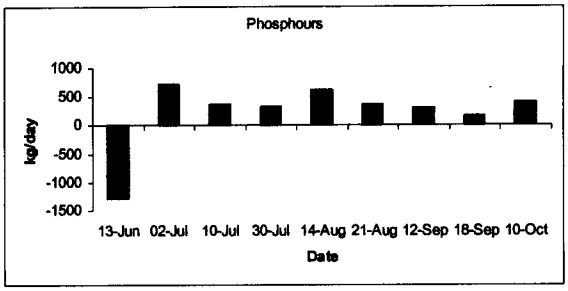

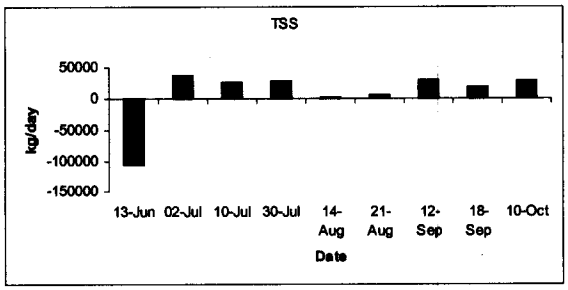

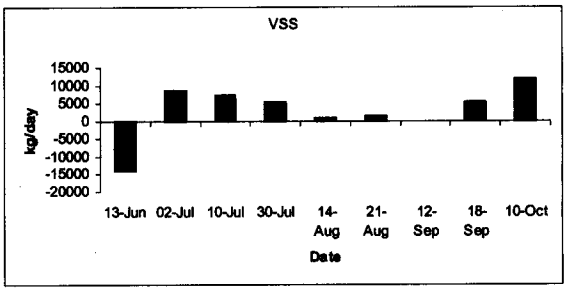

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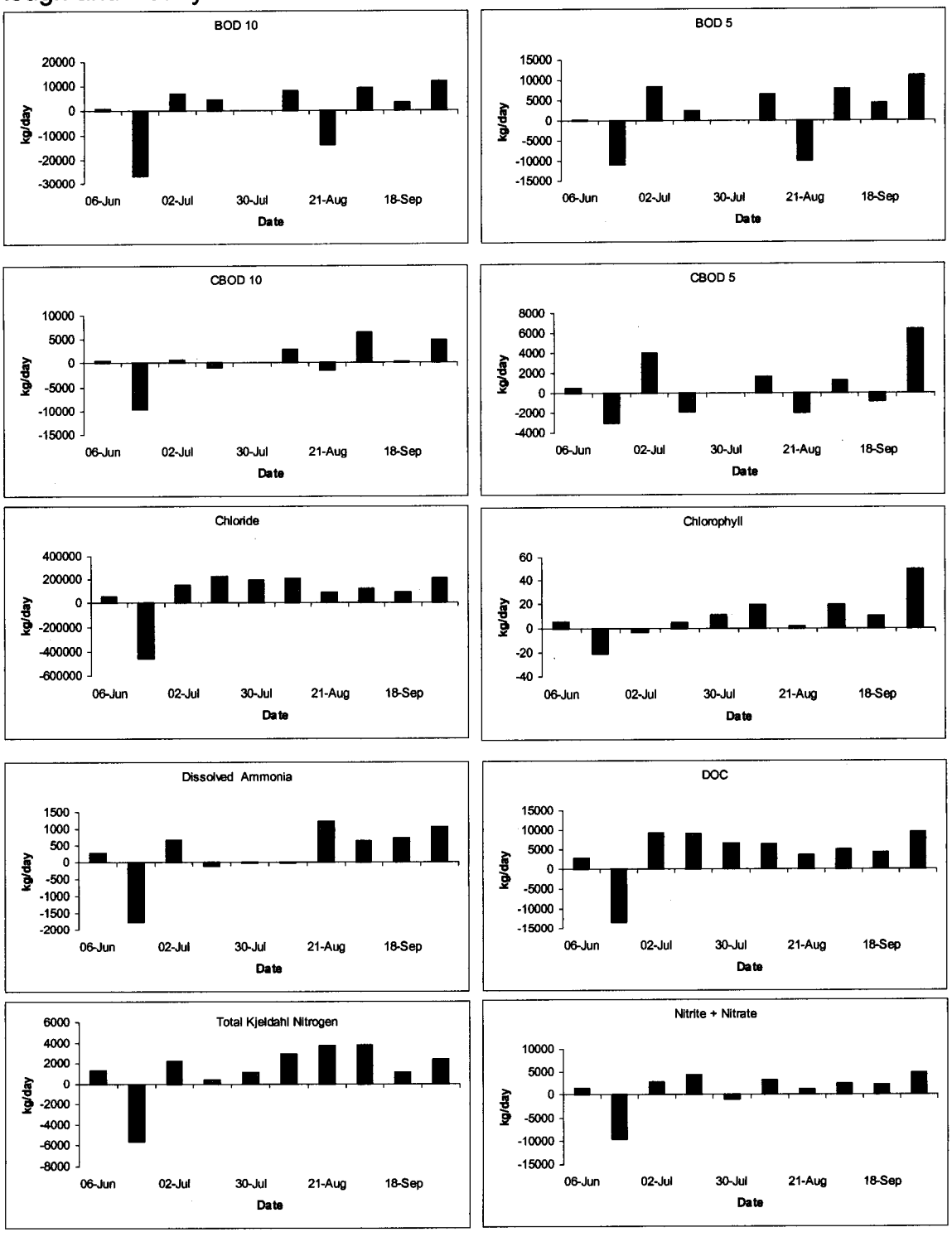
Fig. IV-10 b. Tidal day load of water quality variables at 1 m from the bottom for Rough and Ready Island.



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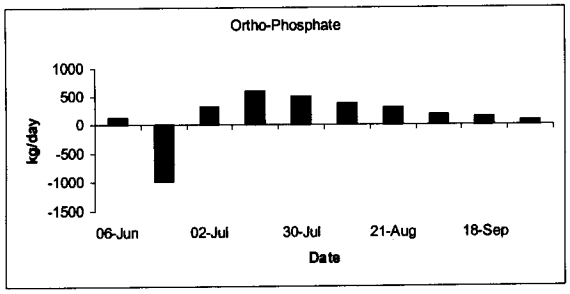
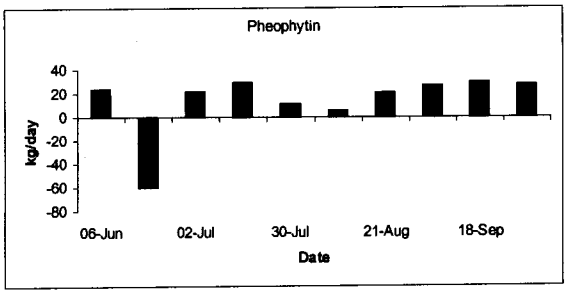
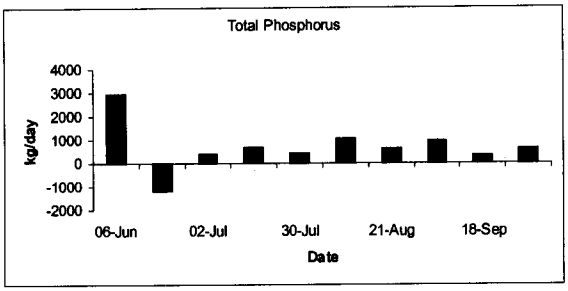
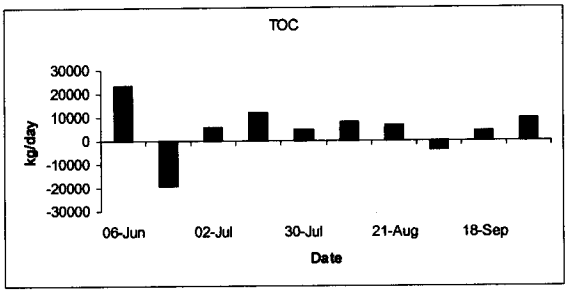
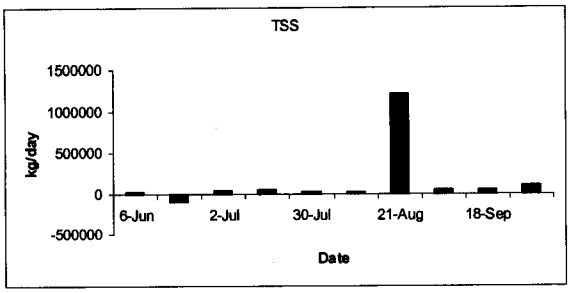










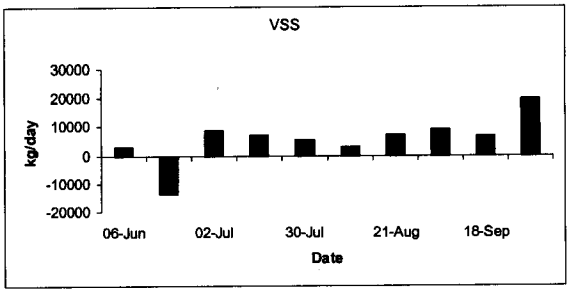


Fig. IV-11. Comparison of chlorophyll *a* concentration measured at Mossdale and Channel Point in 2001.

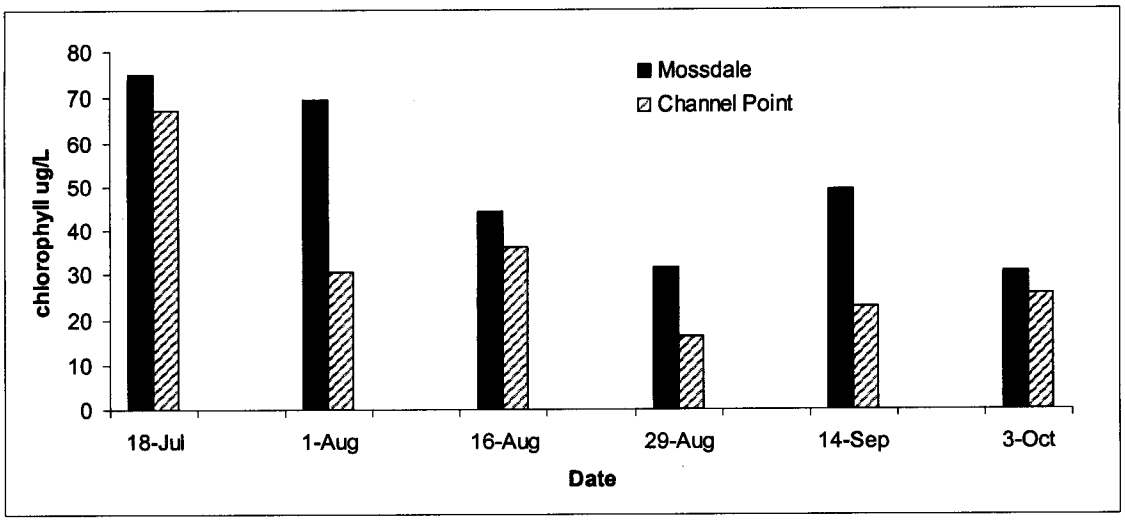


Fig. IV-12 a. Algal species carbon among stations on July 18 for Turner Cut (TC), Rough and Ready Is. (TC), Light 48 (L48), Turning Basin (TB), Channel Point (CP), Mossdale (MD), Vernalis (V) and Crows Landing (CL).

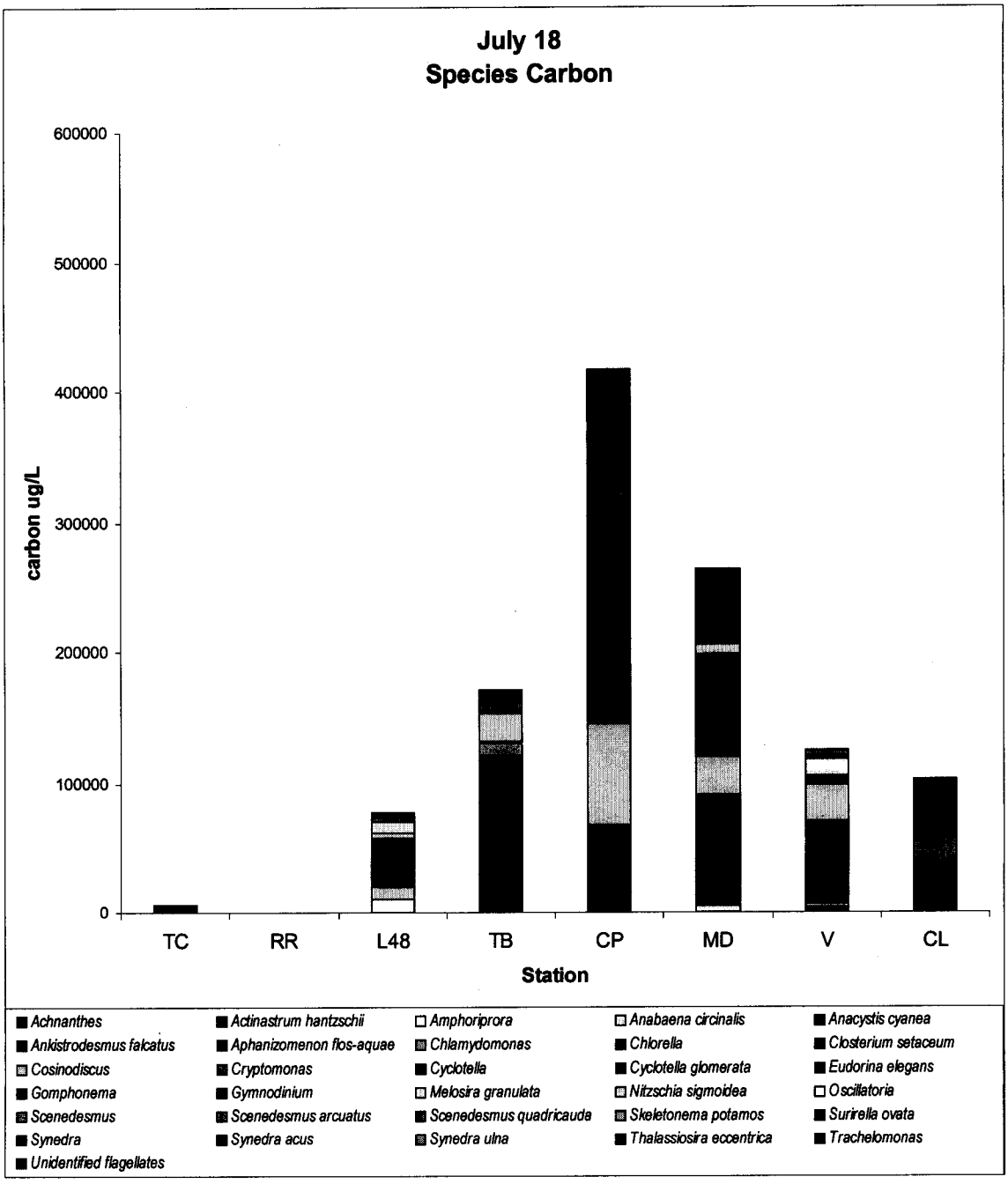


Fig. IV-12 b. Algal species carbon among stations on August 16. Stations are listed in IV-12 a.

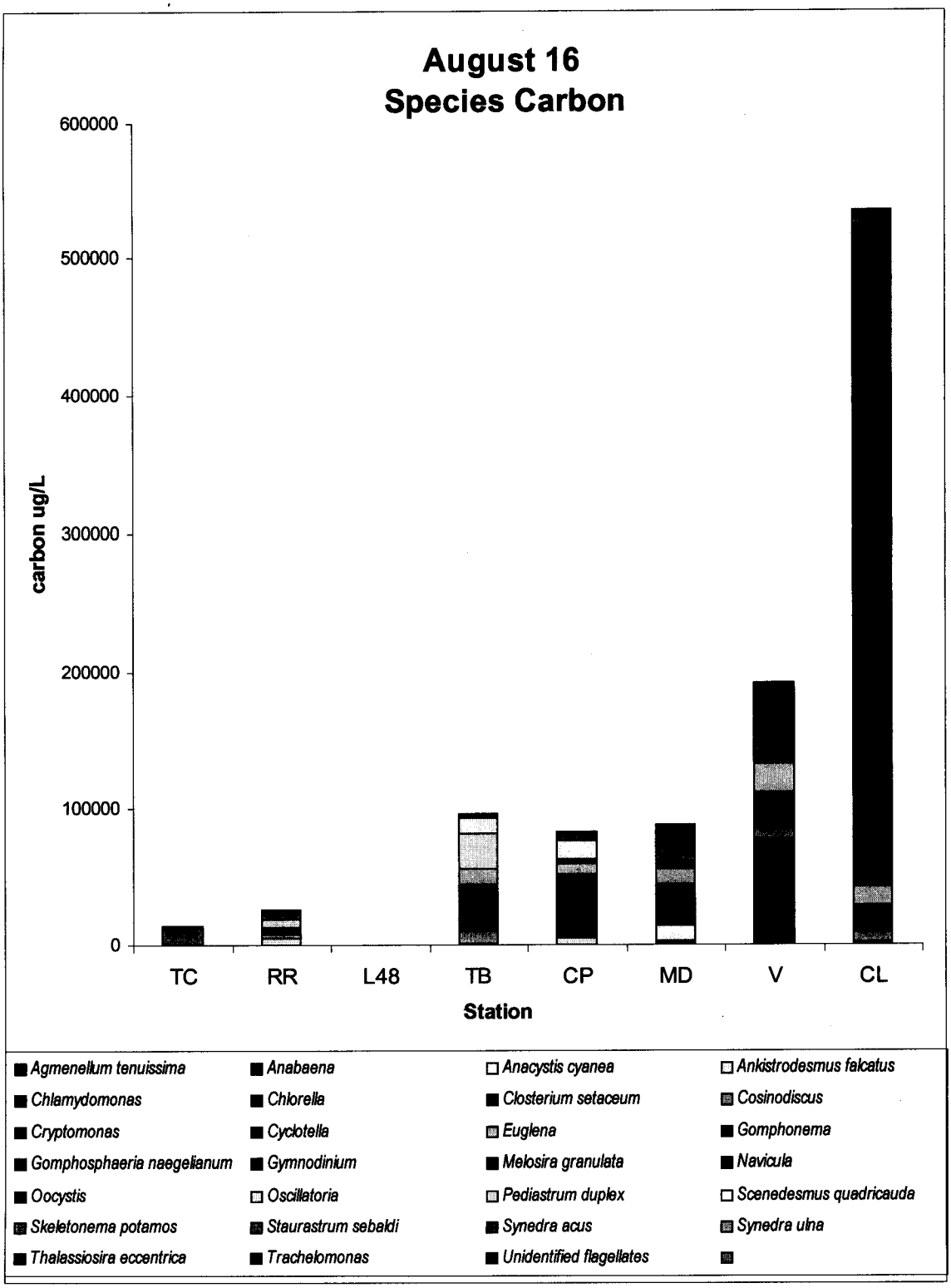


Fig. IV-12 c. Algal species carbon among stations on August 29. Stations are listed in IV-12 a.

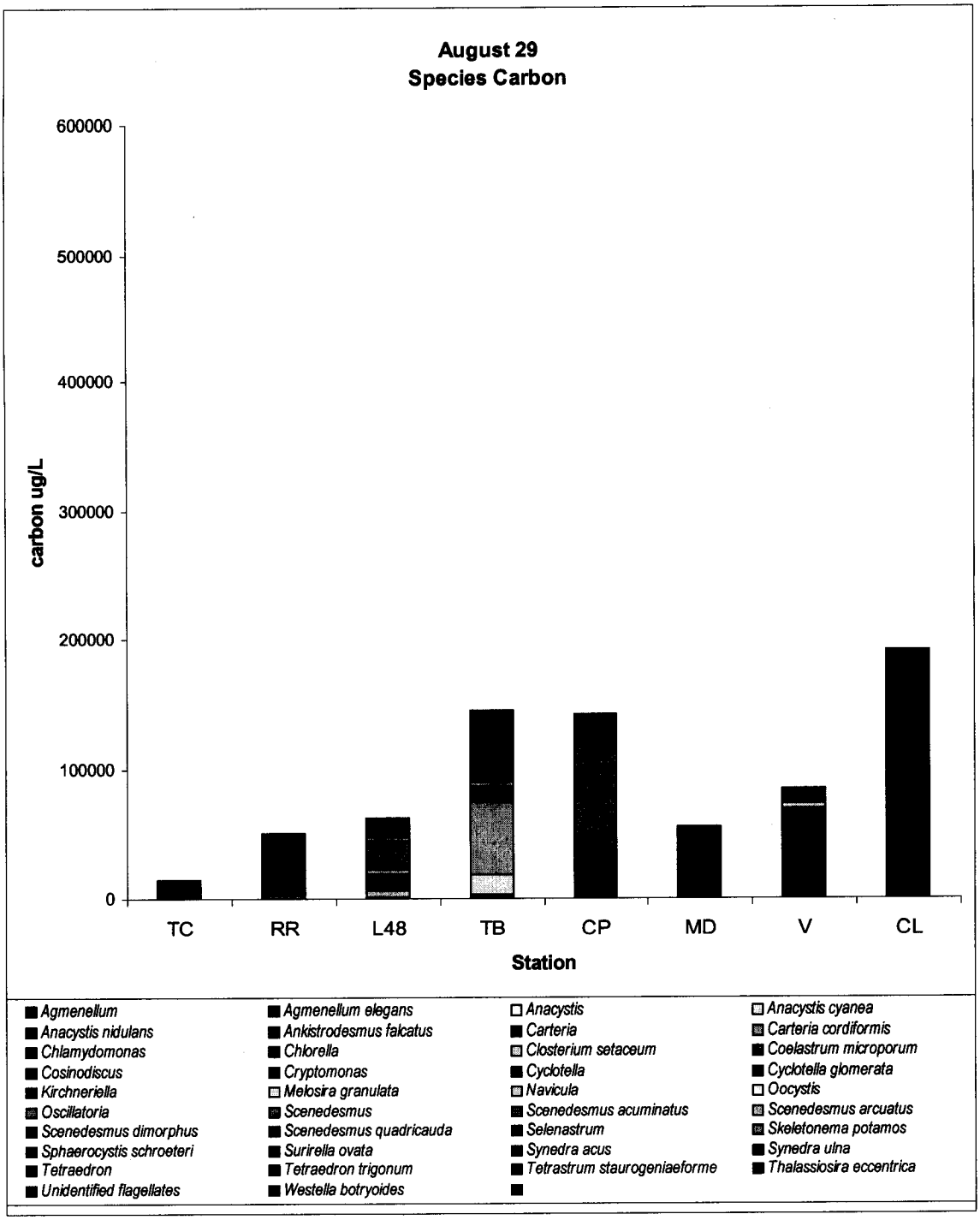
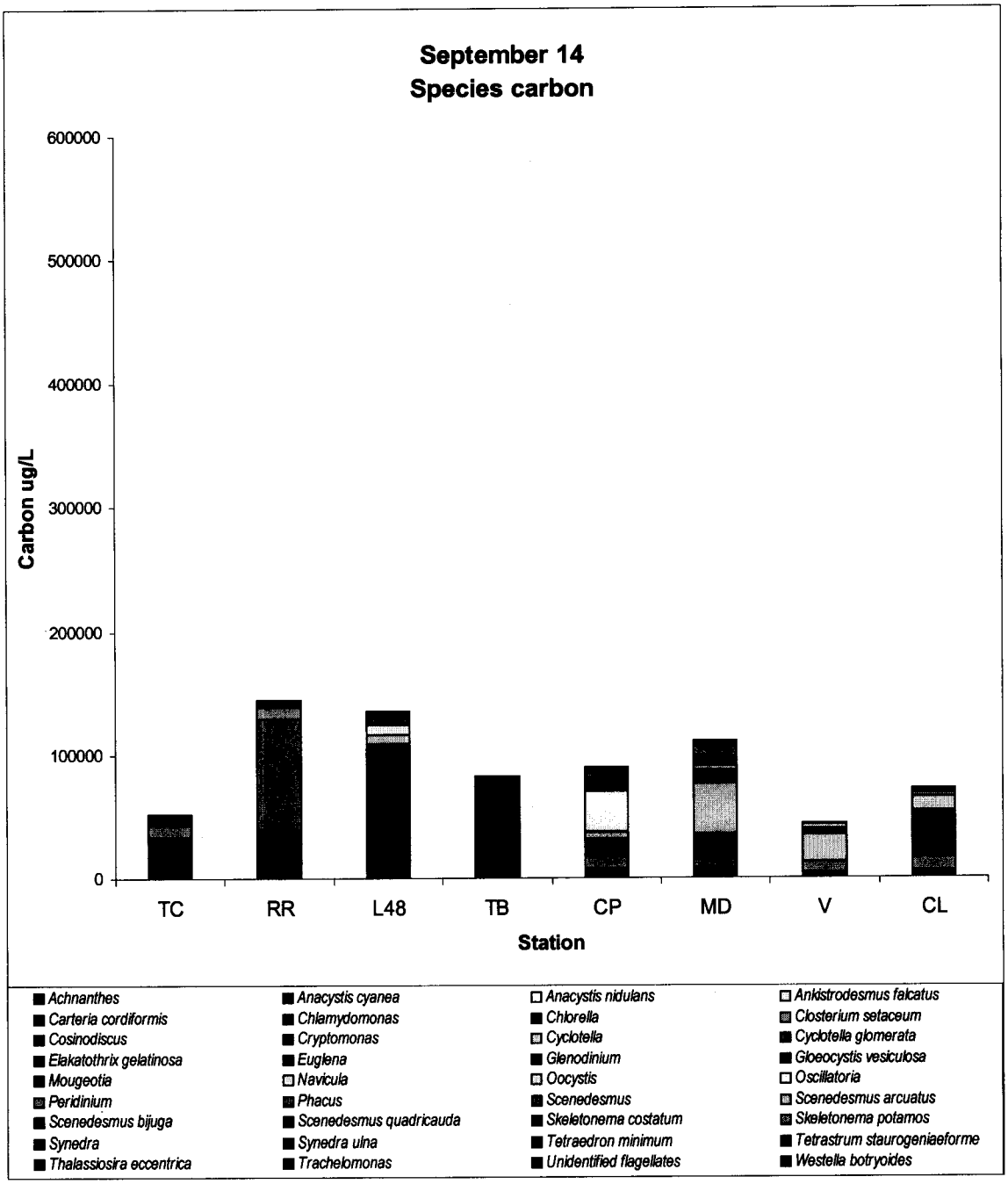


Fig. IV-12 d. Algal species carbon among stations on September 14. Stations are listed in IV-12 a.



Lehman 4-19-02 Oxygen demand Figures and Tables

Table III-1. Average plankton production rate measured for the Deep Water Channel between Turner Cut and Navigation Light 48.

Date	net production rate in photic zone	gross productioin rate in photic zone	respiration rate in aphotic zone	net production rate of water column kg/day	total oxygen demand in study reach	increase chl *a* in photic zone
	kg O2/ day	kg O2/ day	kg O2/ day	kg O2/ day	mg O2 / L	kg / day
26-Jun	7158	9415	-11309	-4151	-0.27	56
18-Jul	10149	12812	-14681	-4532	-0.29	79
16-Aug	13928	17536	-13699	229	0.01	109
29-Aug	15041	18736	-17329	-2287	-0.15	117
14-Sep	11274	16156	-20142	-8869	-0.57	88
03-Oct	6083	8198	-10725	-4643	-0.30	47
mean	10605	13809	-14648	-4042	-0.26	83

Lehman 4-19-02 Oxygen demand Figures and Tables

Table III-2. Estimated production and respiration rate of algae and bacteria in photic and aphotic zones between Turner Cut and Navigation Light 48 in the Deep Water Channel in 2001.

Date	average percent respiration by algae	algal net production rate in photic zone	gross productioin rate in photic zone	algal respiration rate in aphotic zone	algal net production rate in water column	algal oxygen production in study reach	chl *a* produced in photic zone	bacterial respiration in photic zone	bacterial respiration in aphotic zone	bacterial oxygen demand
	percent	kg O2/ day	kg O2/ day	kg O2/ day	g O2/ da	mg / L	kg / day	kg O2/ day	kg O2/ day	mg/L
26-Jun	39	8545	9415	4166	4379	0.28	67	1468	7143	-0.55
18-Jul	49	11564	12812	7021	4542	0.29	90	1415	7659	-0.58
16-Aug	42	16078	17536	5680	10398	0.67	125	2151	8019	-0.65
29-Aug	41	17124	18736	7318	9805	0.63	134	2082	10011	-0.78
14-Sep	59	13001	16156	13499	-498	-0.03	101	1727	6643	-0.54
03-Oct	45	7200	8198	5020	2180	0.14	56	1117	5706	-0.44
mean	46	12252	13809	7117	5134	0.33	96	1660	7530	-0.59

Table III-3. Pearson correlation coefficients calculated among variables measured in the Deep Water Channel at Turner Cut, Rough and Ready Island and Navigation Light 48. n=103.

	BOD10	CBOD10	NBOD10	Ammonia	TKN	non-ammonia TKN	Total pigment	Chloride	Chlorophyll	Dissolved organic carabon	Nitrate	Ortho-phosphate	Phaeophytin	Total phosphorus	Total organic carbon	Total suspended solids
BOD10																
CBOD10	0.62															
NBOD10	0.86	0.13														
Ammonia	0.78	0.09	0.93													
TKN	0.75	0.20	0.82	0.87												
non-ammonia TKN	0.41	0.28	0.34	0.34	0.76											
Total pigment	0.66	0.81	0.30	0.22	0.30	0.28										
chloride	0.44	0.10	0.49	0.40	0.41	0.25	0.03									
Chlorophyll	0.59	0.81	0.21	0.10	0.20	0.24	0.91	0.05								
Dissolved organic carabon	0.46	0.29	.40.40	0.23	0.27	0.20	0.29	0.56	0.24							
Nitrate	0.23	0.13	0.20	0.10	0.22	0.28	0.00	0.49	0.02	0.26						
Orthophosphate	0.27	-0.07	0.40	0.39	0.30	0.05	-0.03	0.43	-0.11	0.36	0.06					
Phaeophytin	0.44	0.36	0.32	0.33	0.34	0.21	0.61	-0.02	0.24	0.23	-0.04	0.16				
Total phosphorus	0.46	0.08	0.58	0.60	0.64	0.44	0.08	0.54	-0.02	0.47	0.22	0.72	0.23			
Total organic carbon	0.24	0.12	0.23	0.20	0.24	0.19	0.18	0.33	0.15	0.36	0.09	0.14	0.13	0.30		
Total suspended solids	-0.12	-0.26	0.01	0.26	0.24	0.11	0.07	0.06	-0.04	0.01	-0.08	0.17	0.25	0.29	0.11	
Volatile suspended solids	0.43	0.33	0.32	0.29	0.31	0.20	0.42	0.14	0.32	0.22	0.07	0.19	0.38	0.24	0.05	0.26

Table III-4. Comparison of stepwise multiple regressions developed to describe the variation in BOD for 2000 and 2001.

Independent variables: Ammonia and CBOD

Year	n	Variable	Parameter estimate	t value	probability	F value	Adj. R-square
2001	85	intercept	1.0	6.5	<.01	446	0.91
		ammonia	5.0	22.6	<.01		
		CBOD	1.1	17.8	<.01		
2000	100	intercept	1.1	4.5	<.01	137	0.73
		ammonia	3.9	15.6	<.01		
		CBOD	1.0	7.8	<.01		
2000 & 2001	186	intercept	0.8	5.8	<.01	458	0.83
		ammonia	4.4	24.0	<.01		
		CBOD	1.2	19.0	<.01		

Independent variables: Ammonia and total pigment

Year	n	Variable	Parameter estimate	t value	probability	F value	Adj. R-square
2001	85	intercept	1.3	6.7	<.01	254	0.86
		ammonia	4.5	15.7	<.01		
		total pigment	0.1	12.6	<.01		
2000	100	intercept	2.2	10.6	<.01	76	0.60
		ammonia	0.0	3.0	<.01		
		total pigment	4.0	12.3	<.01		
2000 & 2001	186	intercept	2.0	10.7	<.01	133	0.59
		ammonia	0.0	6.2	<.01		
		total pigment	4.7	16.0	<.01		

Lehman 4-19-02 Oxygen demand Figures and Tables

Table IV-1. Comparison of the dissolved ammonia load contributed by Mossdale (MD) and the Stockton Wastewater Treatment Control Facility (RWCF at residence times from 1 to 25 days. Percentages were based on mass balance model runs. Model run 1 included only a seasonal adjustment for water temperature on oxidation rate of organic nitrogen. Model 2 included the water temperature adjustment plus an adjustment for the percentage chlorophyll a concentration in the organic nitrogen load.

Model	residence time day	MD median percent	10th percentile	90th percentile	WTCF median percent	10th percentile	90th percentile	Significant difference level	sample size n
Run 1									
	1	38	16	52	62	0	72	< 0.01	102
	5	49	40	56	51	18	56	ns	20
	10	55	42	57	45	29	49	< 0.02	10
	15	61	45	61	39	35	46	< 0.04	7
	20	58	50	62	42	33	46	< 0.04	5
	25	58	56	59	42	38	43	ns	4
Run 2									
	1	34	6	47	66	0	83	< 0.01	102
	5	38	15	47	62	35	70	< 0.01	20
	10	43	26	45	57	46	69	< 0.01	10
	15	42	31	46	58	46	64	< 0.02	7
	20	38	35	45	62	48	63	< 0.05	5
	25	41	34	44	59	49	61	ns	4

Table IV-2. Net tidal day transport between Channel Point and Rough and Ready Island measured in 2001.

	chlorophyll a		organic nitrogen		ammonia		total BOD	
	Net transport kg d -1	Percent retention %	Net transport kg d -1	Percent retention %	Net transport kg d -1	Percent retention %	Net transport kg d -1	Percent retention %
Week								
03-Jun	49	91	903	50	-61	-17	7489	61
10-Jun	25	89	988	64	72	20	6287	69
01-Jul	8	19	-389	-37	8	1	-206	-1
12-Aug	8	27	-181	-11	418	32	-1166	-11
19-Aug	28	85	1054	77	787	69	8025	73
09-Sep	13	51	791	37	333	44	4166	37
16-Sep	41	77	1226	49	782	50	4638	34
07-Oct	32	47	1112	47	3056	84	10186	52
median	27	64	946	48	375	38	5462	44
10th percentile	8	19	-389	-37	-61	-17	-1166	-11
90th percentile	34	86	1068	54	783	55	7623	63