Revision of Representative Delta Island Return Flow Quality for DSM2 and DICU Model Runs

Prepared for the
CALFED Ad-Hoc Workgroup To Simulate Historical
Water Quality Conditions in the Delta

Marvin Jung and Associates, Inc.

December 2000

Consultant's Report to the Department of Water Resources
Municipal Water Quality Investigations Program

MWQI-CR#3

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This report was prepared under DWR contract B80985 by Marvin Jung and Associates, Inc. for the Department of Water Resources, Division of Planning and Local Assistance, Water Quality Assessments Branch

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Acknowledgments

In addition to myself, participating members of the CALFED Ad Hoc Workgroup To Simulate Historical Water Quality Conditions in the Delta included:

Paul Hutton, Workgroup Chairman and Chief of DWR's Delta Modeling Section
Phil Wendt, Chief of DWR's Water Quality Assessment Branch
Dan Otis, Chief of Technical Services for the WQA Branch
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Bruce Agee, Chief of the Quality Assurance and Quality Control Program
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Lori Weisser, WREA for the MWQI Program, assisted with the classification of the DOC and EC data at the MWQI sampled islands and tracts and with organizing this report. Ganesh Pandey, Engineer for the Delta Modeling Section, conducted the model runs.

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Tables and Figures

Approach

The following steps were used to develop monthly values for representative drain water quality in the Delta for the computer models:

1. Delta drain water quality data collected by the MWQI Program was tabulated. The period of record was from 1982 through 1997. Data for each sample (i.e., drain pump station) were grouped and combined by island and tract. Descriptive statistics, dot plots, and box and whisker plots of monthly DOC concentrations were made for each island. Based on the monthly trends seen in the plots, the Delta islands were subdivided into three classes based on their highest monthly DOC concentrations. Inferences were then made on the expected DOC range classes at all Delta Island Consumptive Use (DICU) model subunits. The classification of unsampled MWQI areas were based on the monthly patterns and other similar characteristics (e.g., soil type, peat soil thickness, land surface elevation, location) of adjacent sampled areas.

2. Correlations were determined for selected drain water quality parameters (DOC, UVA-254nm, THMFP, bromide, chloride, EC). The UVA-254nm and bromide data were not collected until 1991. Therefore, correlation matrices and regression analyses comparing DOC, UVA254nm, TFPC, or bromide were limited to data from 1991 – 1997. Also, due to an earlier laboratory method, THMFP or TFPC data for samples with more than 20 mg/l DOC and collected prior to 1991 were found to be inaccurately low. DWR consequently revised their raw water THMFP test in 1991 (DWR, 1994).

3. Historical EC data of Delta agricultural drain water were tabulated for each MWQI sampled island. Scatter plots and box and whiskers plots of monthly EC values were made for each island and tract. Based on the general trend in the highest monthly EC values, each island/tract were grouped into four EC ranges and mapped to identify regional differences. Monthly average values for EC, TDS, bromide, and chloride were also computed for three subregions of the Delta based on primary water source

in Bulletin 123 (DWR, 1967). Correlation matrices and regression equations to compute bromide from EC, TDS, and chloride were also computed.

4. The monthly average values for the other mineral constituents (TDS, Ca, Mg, Na, Cl, SO_4) in drain water were computed from the monthly average values for each island within each Bulletin 123 Delta region. Time series plots provided information about the seasonal trends of the mineral salts in Delta drainage by region.

Dissolved Organic Carbon

DOC concentrations in Delta agricultural drainage appear to be associated with location, season, soil type, and land surface elevations. During the wet months, soils have more water content and longer contact time with water due to rainfall and the managed flooding of fields to remove salt buildup, control weeds, or to attract waterfowl. These activities result in higher DOC concentrations in drain water than during the dry months when the water table is lower and when the soil is less moist. In the winter when river channels are high, seepage pressure is the greatest and results in a higher water table under the fields. Islands and tracts that have the lowest land surface elevation below mean sea level appear to have the higher DOC concentrations. Most of the Delta Lowlands are comprised of peat and mucky soils that are high in organic matter and carbon content and are very porous. In contrast, the surrounding uplands soils are mostly mineral type that are low in organic matter content (DWR, 1995c).

The islands and tracts fell into three classes based on their highest monthly drainage DOC concentrations. The assumption was made that the trends seen in the highest monthly DOC concentrations could be used as a good indicator for ranking the relative magnitude of the islands and tracts as organic carbon sources. The classes were: (1) a low-range DOC subarea (most maximum non-outlier or highest values less than 15 mg/l), (2) a mid-range DOC subarea (most maximum non-outlier or highest values between 16 and 30 mg/l), and (3) a high-range DOC subarea (most maximum non-outlier or highest values greater than or equal to 31 mg/l DOC).

Dot plots and box and whisker plots of the monthly DOC concentrations for each of the three classes are shown in Figures 1a-f. The spread in DOC ranges were smallest at the islands and tracts that were classified into the low-range DOC subarea. The spread in DOC ranges were the largest in the high-range DOC subarea. In general, the magnitude of monthly median values corresponded with the three ranges.

The low-range DOC subarea is located along the periphery of the Delta Lowlands where the soil is predominately classified as a mineral type. The remaining drains located in the peat soil areas were either in the high-range or mid-range DOC classes.

Figure 1a. Low Range DOC Subarea Monthly DOC

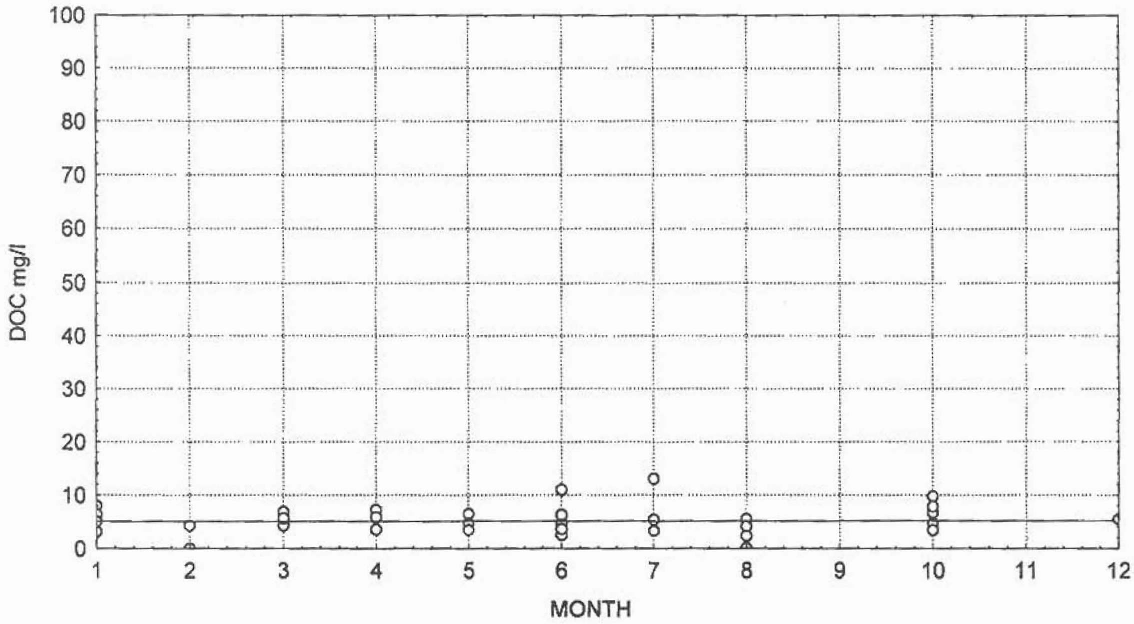


Figure 1b. Box & Whiskers Plot of Low Range DOC Subarea DOC

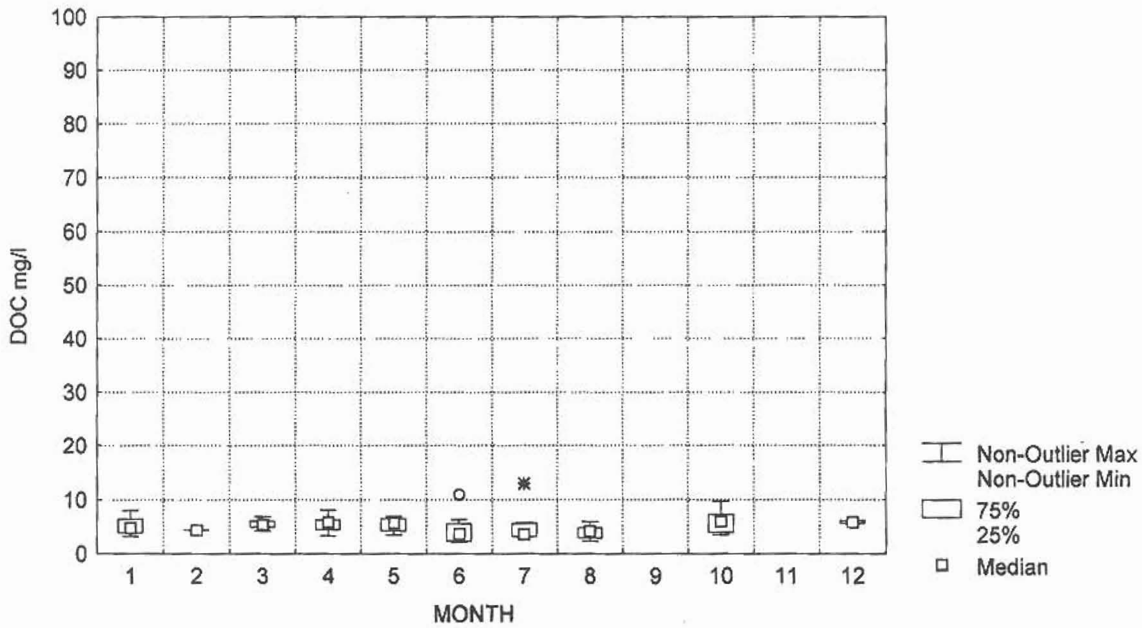


Figure 1c. Midrange DOC Subarea Monthly DOC

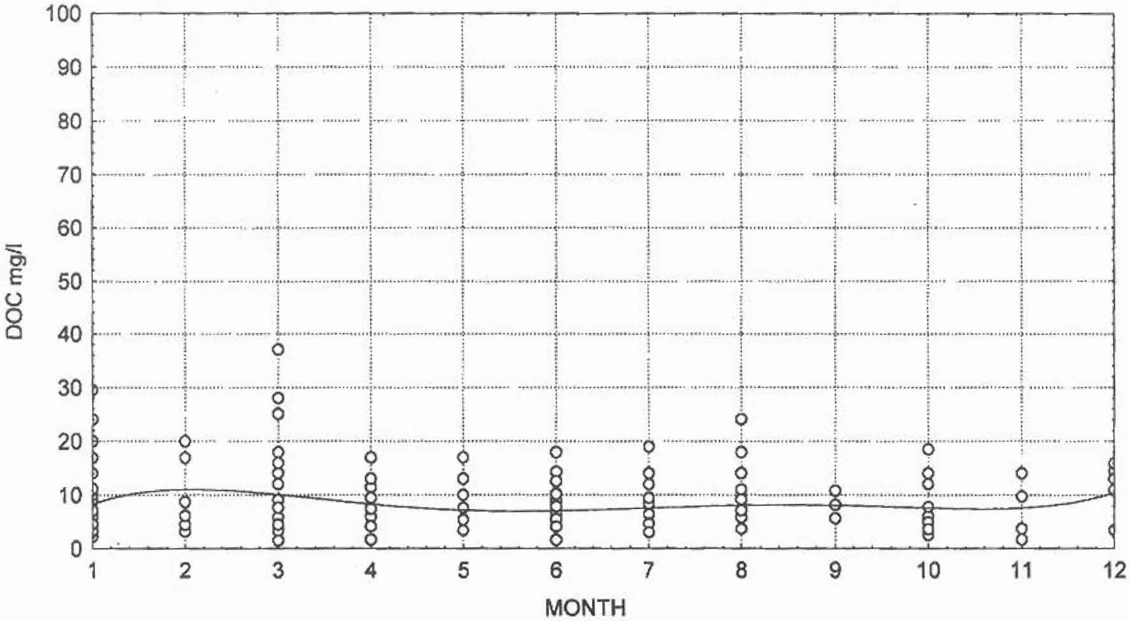


Figure 1d. Box & Whiskers Plot of Midrange DOC Subarea DOC

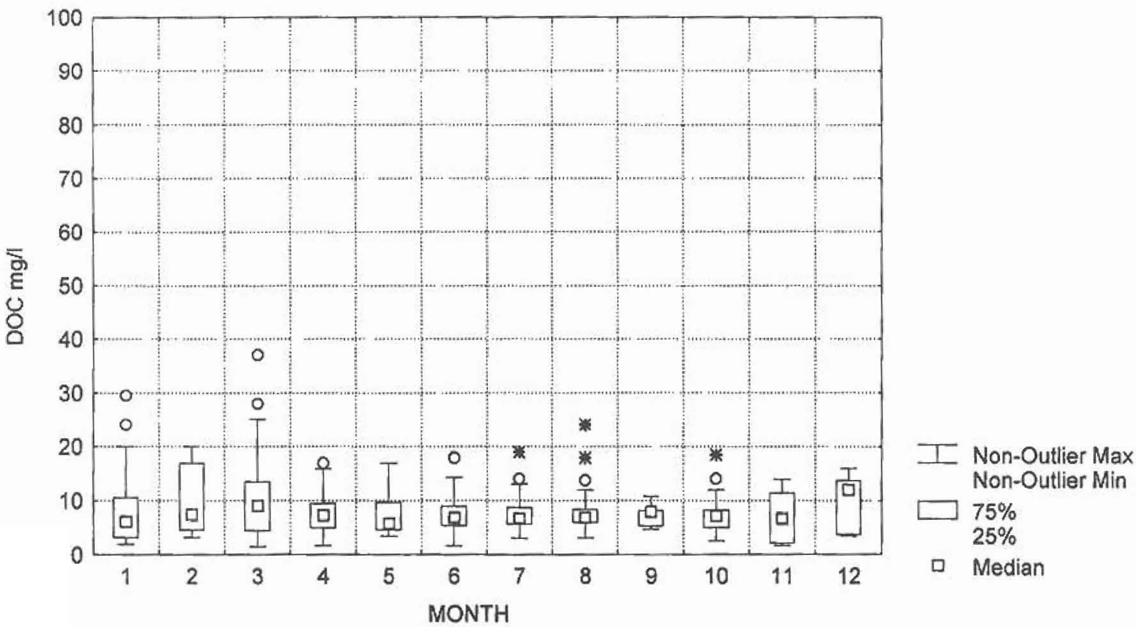


Figure 1e. High Range DOC Subarea Monthly DOC

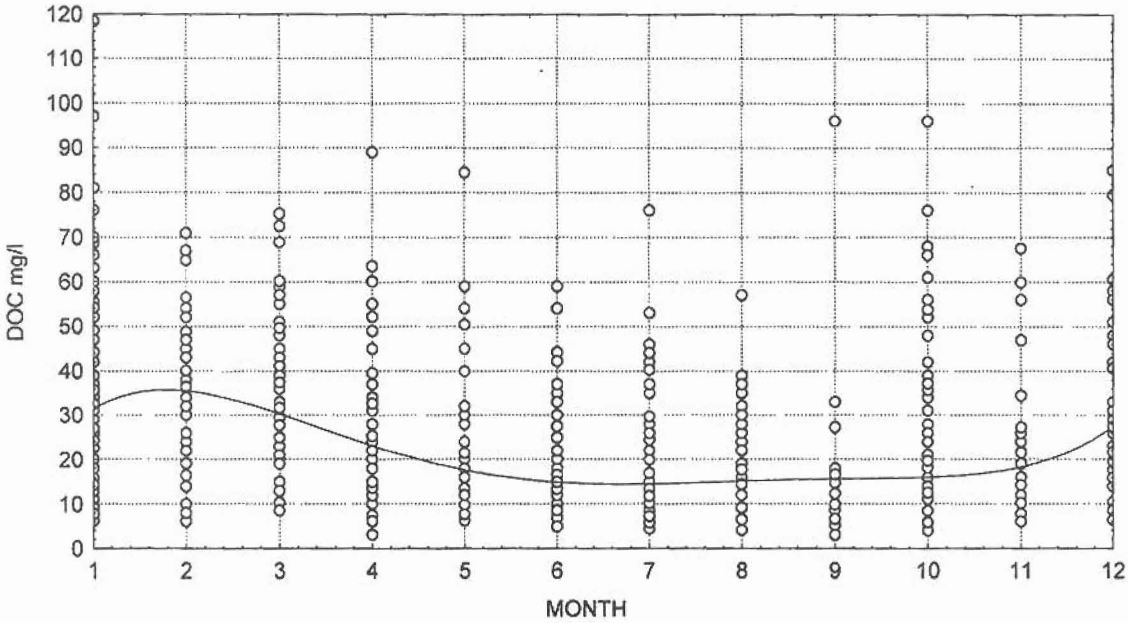
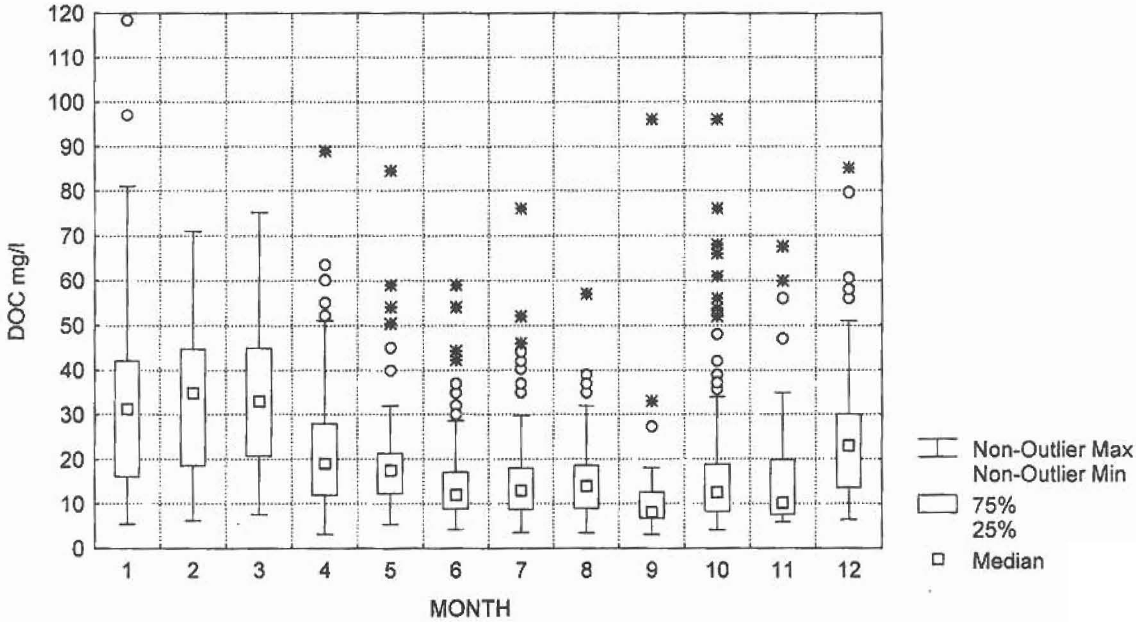


Figure 1f. Box & Whiskers Plot of High Range DOC Subarea DOC



The low-range DOC class included drains at the following four MWQI sampled islands and tracts: Moss Tract, Netherlands Tract, Rio Blanco Tract, and Shima Tract. The mid-range DOC class range included nine islands: Bacon Island, Clifton Court Forebay drain, Grand Island, Mossdale Tract, Orwood Tract, Pescadero Tract, Pierson District, Prospect Island, and Woodward Island. The high-range DOC class included nineteen islands: Brannan-Andrus Island, Bouldin Island, Egbert and Upper Egbert Tract, Empire Tract, Holland Tract, Jersey Island, King Island, Lower and Upper Jones Tracts, Mandeville Island, Palm Tract, Staten Island, Rindge Tract, Terminous Island, Tyler Island, Twitchell Island, Webb Tract, and Venice Island. Dot plots and box and whisker plots of monthly drain water DOC at each of the thirty-two islands and tracts are presented in the Appendix.

Greater detail than the previous mapping of the hypothesized DOC regions (DWR, 1994) was made by classifying the Upland areas peripheral to the Delta Lowlands and by classifying smaller land parcels (DICU subareas). These areas are listed in Table 1 and shown in Figure 2 for the DICU model subunits (DWR, 1995a). Under the new ranking procedure for classifying islands and tracts as high, mid, or low-range DOC subareas, several islands and tracts were reclassed into the next higher class than previously assigned in the MWQI Five-Year Summary Report for 1978-1991. Figures 1a-1f show that the new ranking scheme and additional data from 1992-1997 resulted in identifying three very distinct DOC distribution patterns.

The descriptive statistics for the monthly DOC concentrations for the three DOC range classes are presented in Table 2. The table includes the number of samples, lowest and highest values, range, median, mean, upper and lower 95 percent confidence limits, and the standard deviations.

The spread in monthly DOC values in the high-range DOC subarea during the first six months of the year is a near mirror image of the last six months. Water saturation in the peat soils caused by high seepage throughout the year is the suspected cause as these islands and tracts are several feet below mean sea level (Figure 3).

Table 1. DOC subregion classification for DICU model subareas

DICU subarea	Category	Subarea name	DICU subarea	Category	Subarea name
1	M	Union Isl. (east)	72	H	Brannan Isl.
2	M	Union Isl. (west)	73	L	Yolano (counties 48 & 57)
3	M	Grand Isl.	74	M	Woodward Isl.
4	M	Mossdale	75	L	Sargent-Barnhart Tr.
5	L	Meritt Isl.	76	L	McMullin ranch
6	L	Lisbon District	77	L	Inactive
7	H	Andrus Isl. (lower)	78	L	Unnamed
8	H	Sherman Isl.	79	L	Kasson
9	L	New Hope Tr.	80	H	Canal ranch
10	L	Sutter Isl.	81	L	Canal ranch
11	L	Rough and Ready	82	M	Stark Tr.
12	L	Mos Tr. (Boggs)	83	L	Liberty Isl. (counties 48 & 57)
13	H	Andrus Isl. (middle)	84	L	Walthall Tr.
14	M	Ryer Isl.	85	L	Paradise junction
15	L	Roberts Isl. (middle)	86	L	Wetherbee Lake
16	H	Egbert Tr.	87	L	Cache-Haas area
17	H	Egbert Tr.	88	L	Cache-Haas area
18	L	Roberts Isl. (upper)	89	L	Peter Pocket
19	H	Terminous Tr.	90	M	Mossdale 2
20	M	Pierson District	91	M	Mossdale 2
21	M	Walnut Grove	92	L	Undesignated area
22	H	Andrus Isl. (upper)	93	L	Undesignated area
23	H	Tyler Isl.	94	L	Ehrhardt club (ARD)
24	L	Pocket District	95	L	Cosumnes-Mokelumne
25	H	Roberts Isl. (lower)	96	L	Dead Horse Isl.
26	L	Scribner	97	L	Hood area
27	L	Hood Junction	98	M	Ida Isl.
28	L	Randall Isl.	99	L	Locke area
29	H	Bouldin Isl.	100	L	McCormack-Williamnson Tr,
30	L	Glide District	101	L	Stone Lake area
31	M	El Pescadero	102	H	Undesignated area
32	M	Hotchkiss Tr.	103	L	Undesignated area
33	M	Byron Tr.	104	L	Acker Isl.
34	M	Clifton Court	105	L	Atlas Tr.
35	L	Inactive	106	L	Atlas Tr.
36	L	Weber Tr.	107	L	Drexler Tr.
37	H	Jersey Isl.	108	H	Elmwood Tr.
38	L	West Sacramento	109	H	Fern Isl.
39	L	Netherlands (counties 48 & 5)	110	H	Headreach Isl.
40	L	Unnamed	111	H	Henning Tr.
41	L	Pico and Naglee	112	H	Hog Isl.
42	H	Twitchell Isl.	113	L	Honker Lake Tr.
43	L	Smith ranch	114	H	Morrison Isl.
44	L	Privately owned	115	L	Rio Blanco Tr.
45	L	Smith Tr.	116	L	Shima Tr.
46	M	Prospect Isl.	117	L	Shin Kee Tr.

DICU subarea	Category	Subarea name	DICU subarea	Category	Subarea name
47	H	Mildred Isl.	118	H	Spud Isl.
48	H	Venice Isl.	119	H	Staten Isl.
49	M	Orwood Tr.	120	L	Wright Tr.
50	H	Holland Tr.	121	L	Undesignated area
51	H	Webb Tr.	122	L	Undesignated area
52	H	Mandeville Isl.	123	L	Decker Isl.
53	H	Bacon Isl.	124	L	Little Holland Tr.
54	H	Empire Tr.	125	L	Undesignated area
55	H	McDonald Tr.	126	L	Undesignated area
56	L	Brack Tr.	127	L	Little Holland Tr.
57	H	Palm Tr.	128	L	Undesignated area
58	H	Rindge Tr.	129	L	Undesignated area
59	H	Jones Tr. (lower)	130	L	Undesignated area
60	H	Jones Tr. (upper)	131	H	Bethel Isl.
61	M	Victoria Isl.	132	M	Coney Isl.
62	H	Medford Isl.	133		Dutch Sl. and portion of Sand Mound Sl.
63	L	Bishop Tr.	134		False River, Piper Sl., Sand Mound Sl., & Rock Sl.
64	H	King Isl.	135		Fisherman Cut Waterway
65	M	Pescadero District	136	L	Franks Tr.
66	M	Pescadero District	137		Old River, Holland Cut, & Indian Sl.
67	M	Bradford Isl.	138	M	Quimby Isl.
68	L	Hastings Tr.	139	M	Rhode Isl.
69	L	Stewart Tr.	140		San Joaquin River waterway
70	L	River junction	141		San Joaquin River waterway north of industrial strip
71	M	Veale Tr.	142		Taylor Sl. Waterway

H = high DOC range class

M = mid-range DOC class

L = low DOC range class

Figure 2—DICU Model Consumptive Use Subareas

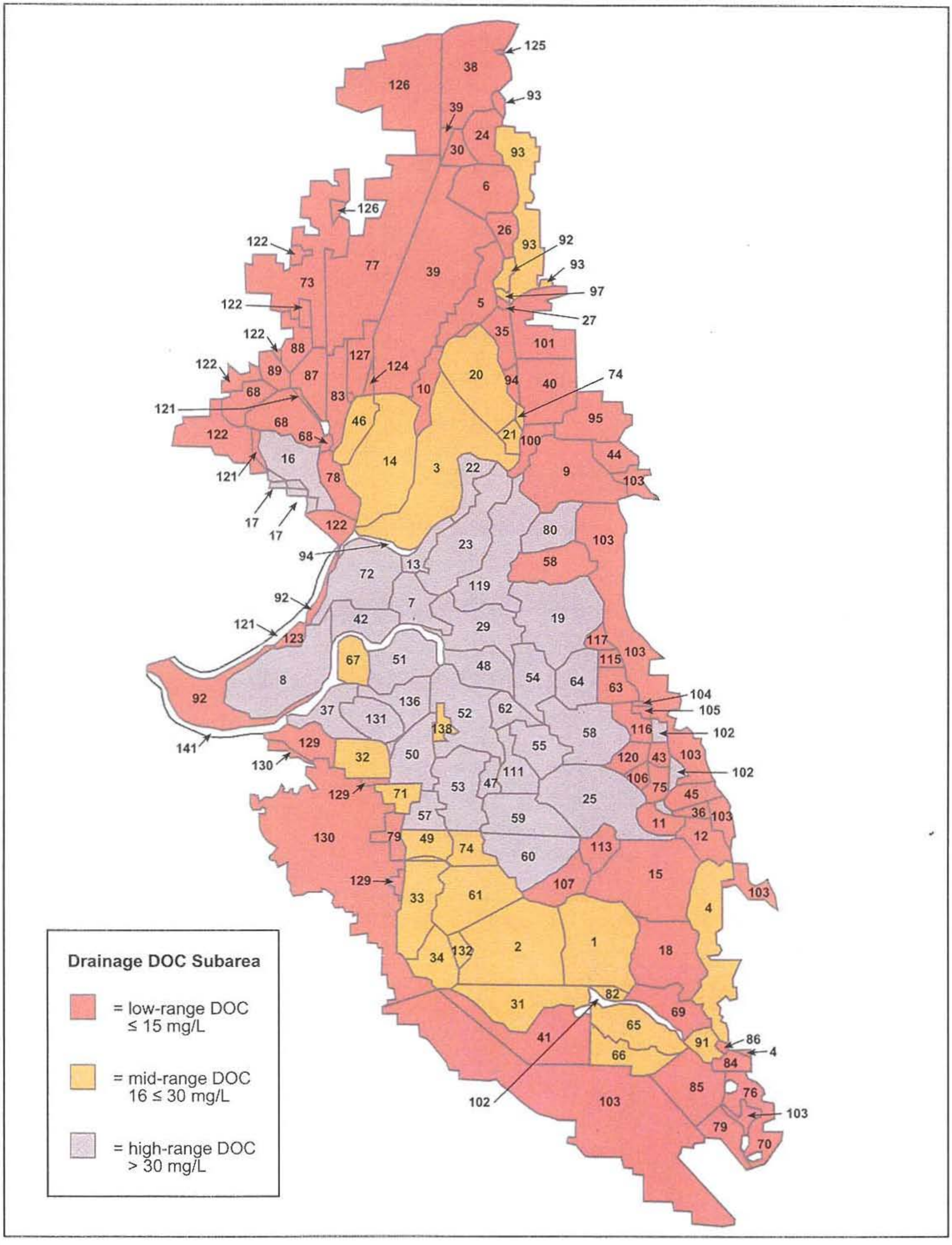


Table 2. Summary Descriptive Statistics for Delta Drainage DOC

Data excludes drain into Clifton Court Forebay

High DOC Range Subarea

Concentration units in mg/L DOC

Month	Count	Min	Max	Range	Median	Mean	95% Upper CI	95% Lower CI	Std. Dev.
1	178	5.4	118.5	113.1	32	32.3	35.1	29.6	18.4
2	56	6.2	71	64.8	36.6	35.5	40.1	31	16.9
3	82	7.6	75.2	67.6	34.5	33.8	37.4	30.3	16.3
4	177	3.1	89	85.9	20.8	22	20.1	23.8	12.7
5	59	5.3	84.5	79.2	18	20.6	16.9	24.2	13.9
6	154	4.1	59	54.9	12.2	15.3	13.8	16.8	9.9
7	177	3.5	76	72.5	13	15.4	16.8	14	9.8
8	147	4.7	57	52.3	15	15.5	16.8	14.2	8.2
9	40	3	96	93	7.7	12	16.8	7.3	14.9
10	144	5.3	96	90.7	13	17.8	20.4	15.3	15.4
11	45	5.9	67.5	61.6	12	17.5	22	13	14.9
12	57	7.1	85	77.9	23.7	28.5	33.3	23.7	18.1

Mid-DOC Range Subarea

Concentration units in mg/L DOC

Month	Count	Min	Max	Range	Median	Mean	95% Upper CI	95% Lower CI	Std. Dev.
1	57	1.9	29.5	27.6	7.9	10.5	12.6	8.4	8
2	12	3.2	20	16.8	16.3	12.8	17	8.6	6.6
3	31	1.5	37	35.5	10	11.8	15	8.5	8.9
4	57	1.7	17	15.3	7.7	8.3	9.3	7.4	3.4
5	21	3.4	17	13.6	6	7.4	9.1	5.7	3.7
6	42	1.6	18	16.4	6.7	7.3	8.2	6.4	2.8
7	51	3	18	15	6.7	7.5	8.4	6.7	3.1
8	48	3.1	18	14.9	6.9	7.7	8.8	6.7	3.5
9	9	4.7	14.8	10.1	8.2	9	11.4	6.6	3.2
10	46	2.5	18.7	16.2	7.1	8	9.1	6.8	4
11	9	1.7	14	12.3	6.7	7.5	10.8	4.1	4.4
12	10	3.4	19.6	16.2	12	11.6	15.6	7.6	5.6

Low DOC Range Subarea

Concentration units in mg/L DOC

Month	Count	Min	Max	Range	Median	Mean	95% Upper CI	95% Lower CI	Std. Dev.
1	12	3.2	8	4.8	4.8	5.1	6	4.2	1.5
2	2	4.3	4.4	0.1	4.4	4.4	5	3.7	0.07
3	14	4.2	6.9	2.7	5.4	5.5	6	5	0.8
4	14	3.3	8.1	4.8	5.9	5.7	6.5	4.9	1.5
5	7	3.5	6.9	3.4	5.7	5.6	6.7	4.5	1.2
6	7	2.1	11	8.9	3.7	4.8	7.6	1.9	3.1
7	7	3.1	13	9.9	3.6	5.3	8.6	2.1	3.6
8	5	2.3	5.9	3.6	4.1	4.3	6.1	2.4	1.5
9									
10	7	3.4	9.7	6.3	6	6.1	8.1	4.1	2.2
11									
12	3	5.5	6.1	0.6	5.8	5.8	6.6	5.1	0.3

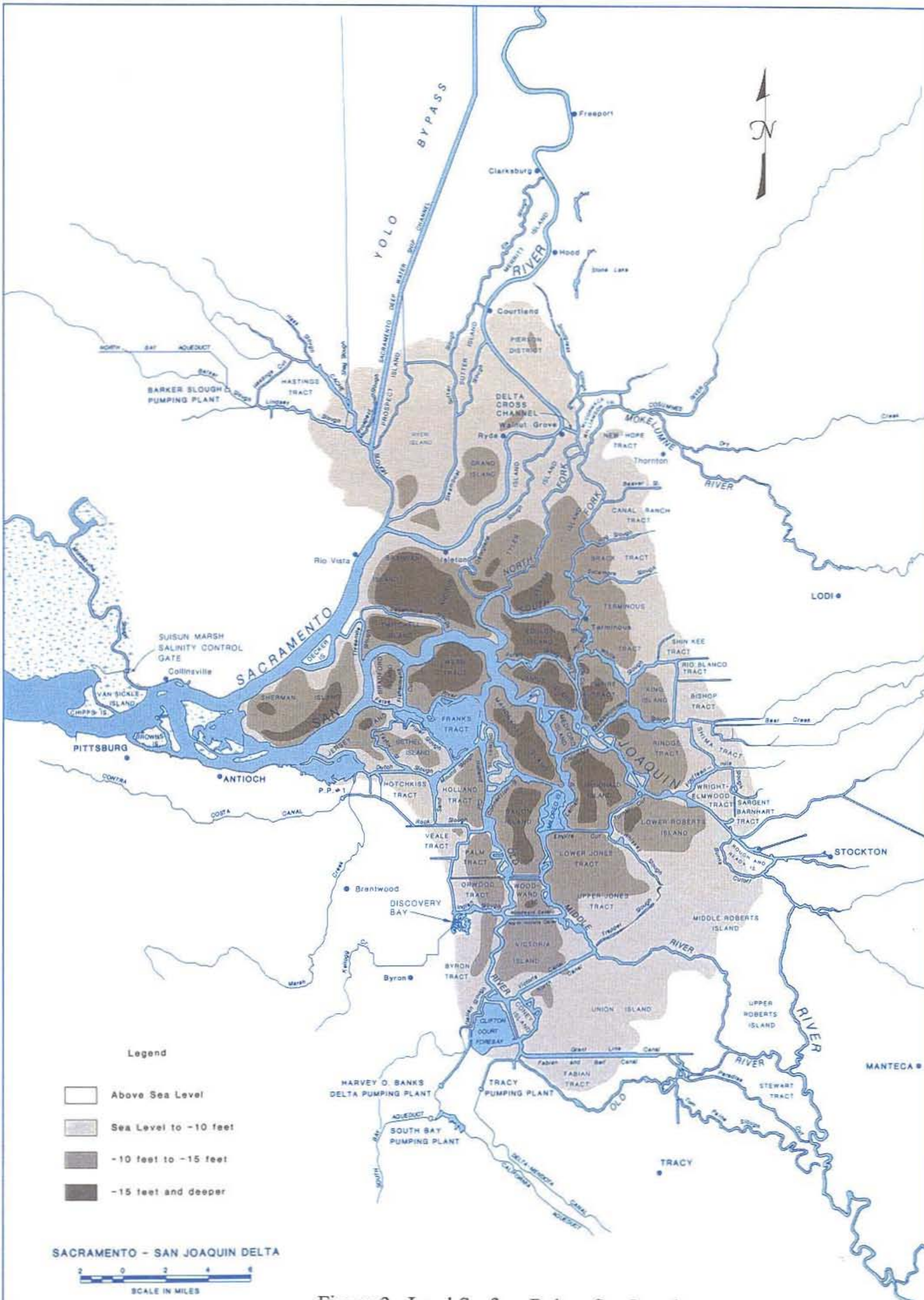


Figure 3. Land Surface Below Sea Level

The lower DOC concentrations seen during the summer are attributed to the pumping off of drain water. This is done to lower the water table to avoid damage to the crop roots. Pumping reduces the subsurface water contact time and water saturation level in the organic soils, thereby, lowering the DOC concentrations in the drain water. Historic drainage volume data showed that one peak drainage period for the Delta is in the summer (July-August) when irrigation is increased to meet higher crop demands for water (Jung and Tran, 1998; 1999). The other peak period is in the late fall and winter during heavy rains and when managed flooded fields are drained.

Based on Table 2 information and Figures 1a-1f, the following DOC concentration values will be used as input to the DSM2 model run (Table 3).

Table 3. DSM2 Model DOC Values

Units in mg/l

Month	Low DOC range subarea	Mid-range DOC subarea	High DOC range subarea
January	5.4	12	32
February	5.4	12	36
March	5.4	12	34
April	5.4	7.8	22
May	5.4	7.8	20
June	5.4	7.8	15
July	5.4	7.8	15
August	5.4	7.8	15
September	5.4	9	15
October	5.4	8	18
November	5.4	7.5	18
December	5.4	11.6	28

TFPC and UVA-254nm

The THMFP carbon (TFPC) concentration is computed from THMFP concentration data. The amount of carbon in each of the four THM compounds is totaled to obtain the TFPC concentrations. Regression analysis of DOC, TFPC, and UVA-254nm data collected by the MWQI Program from 1991 – 1997 were used to determine if there were any strong relationships among these parameters. This later data set was used because THMFP analysis prior to 1991 tended to yield lower results than actual in waters with more than 20 mg/L DOC. A revised THMFP method was instituted in 1991 to provide more reliable determinations (DWR, 1994). There were 953 samples that had all four parameters measured.

A regression plot of the TFPC (µg/l) versus DOC (mg/L) concentrations for the sampled drains in 1991-1997 is shown in Figure 4a. A similar plot for drainage UVA-254nm readings and corresponding DOC concentrations for all sampled drains is shown in Figures 4b and 5b. The UVA to TFPC relationship is shown in Figure 5a. The simple linear regressions are shown below in Table 4. Data scatter showed that the DOC pool of organic compounds in the samples varied in the formation of trihalomethanes and ultraviolet absorbance at 254nm. However, there was no significant difference among the three DOC range subareas.

Table 4. TFPC, DOC, and UVA-254nm Regression Equations

DOC subarea	**Equations** ***UVA in cm^{-1} and TFPC in µg/l and DOC in mg/L***	**Data range n = 953**	**Correlation coefficients**
All (Fig.	TFPC = 36.815+7.52*DOC	TFPC(8.86-917.2)	R = 0.86
4a-b)	UVA = 1.2415 + 20.46*DOC	UVA(0.059-3.86)	R = 0.95
All (Fig.	TFPC = 37.535 + 164.46*UVA	DOC (2 – 98)	R = 0.87
5a-b)	UVA = 0.02374 + 0.04415*DOC		R = 0.95

Monthly TFPC and UVA-254 nm values for the DSM2 model run were computed from the two above equations using the DSM2 DOC values in Table 3. The model input values are shown in Table 5.

Figure 4a. Delta Drainage DOC vs. TFPC
TFPC = 36.815 + 7.5200 * DOC
Correlation: r = .85911
MWQI data 1991-1997 n=953

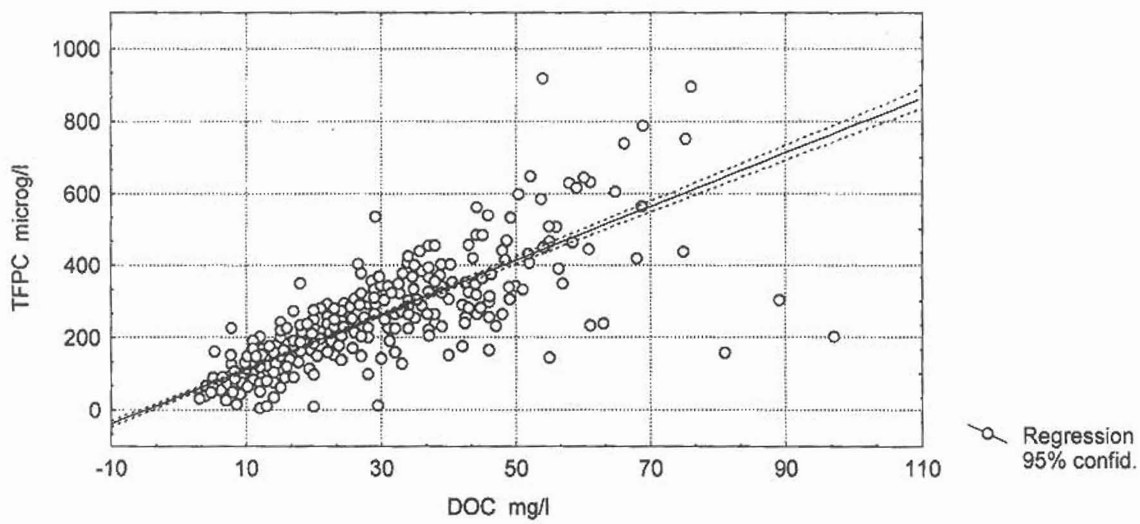


Figure 4b. Delta Drainage UVA vs. DOC
DOC = 1.2415 + 20.460 * UVA
Correlation: r = .95041
MWQI data 1991-1997 n=953

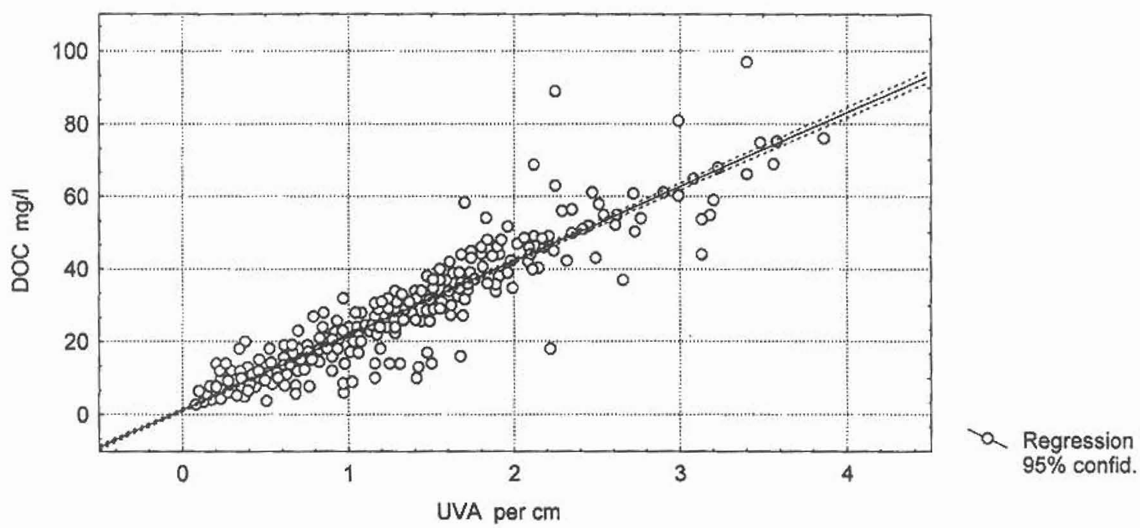


Figure 5a. Delta Drainage UVA vs. TFPC
TFPC = 37.535 + 164.46 * UVA
Correlation: r = .87281
MWQI data 1991-1997 n-953

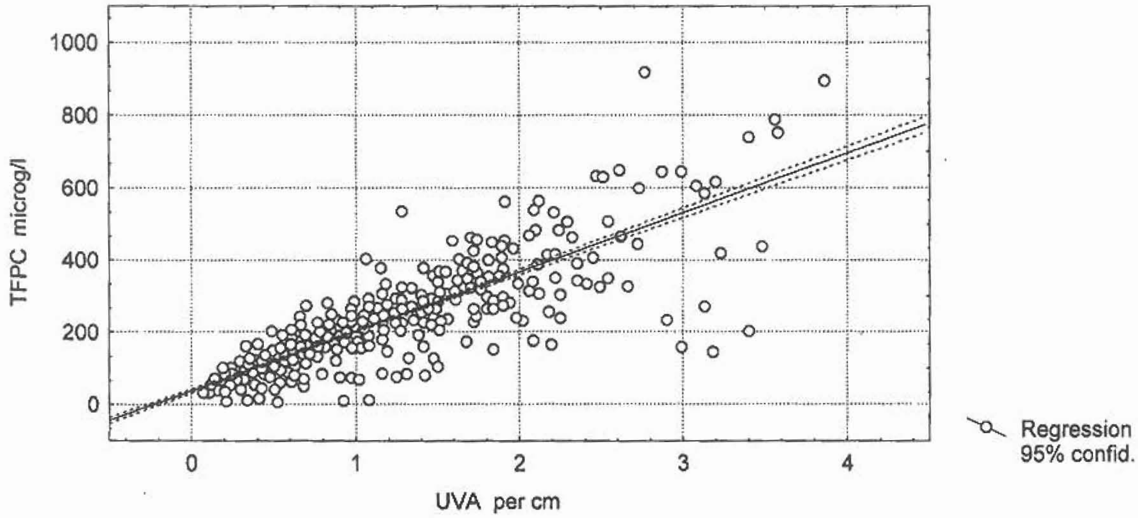


Figure 5b. Delta Drainage DOC vs. UVA
UVA = .02374 + .04415 * DOC
Correlation: r = .95041
MWQI data 1991-1997 n=953

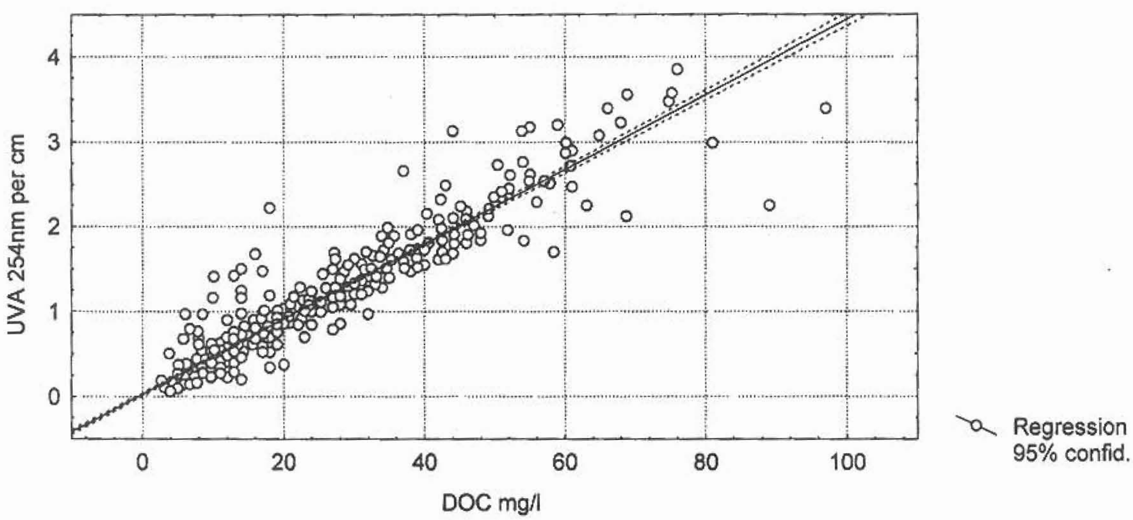


Table 5. DSM2 Model TFPC and UVA-254nm Values

High Range DOC Subarea				Mid-Range DOC Subarea				Low Range DOC Subarea			
Month	**DOC**	**TFPC**	**UVA-254nm**	**Month**	**DOC**	**TFPC**	**UVA-254nm**	**Month**	**DOC**	**TFPC**	**UVA-254nm**
1	32	277.5	1.42	**1**	12	127.1	0.55	**1**	5.4	77.4	0.26
2	36	307.5	1.59	**2**	12	127.1	0.55	**2**	5.4	77.4	0.26
3	34	292.5	1.50	**3**	12	127.1	0.55	**3**	5.4	77.4	0.26
4	22	202.3	0.97	**4**	7.8	95.5	0.37	**4**	5.4	77.4	0.26
5	20	187.2	0.89	**5**	7.8	95.5	0.37	**5**	5.4	77.4	0.26
6	15	149.6	0.66	**6**	7.8	95.5	0.37	**6**	5.4	77.4	0.26
7	15	149.6	0.66	**7**	7.8	95.5	0.37	**7**	5.4	77.4	0.26
8	15	149.6	0.66	**8**	7.8	95.5	0.37	**8**	5.4	77.4	0.26
9	15	149.6	0.66	**9**	7.8	95.5	0.37	**9**	5.4	77.4	0.26
10	18	172.2	0.80	**10**	7.8	95.5	0.37	**10**	5.4	77.4	0.26
11	18	172.2	0.80	**11**	7.8	95.5	0.37	**11**	5.4	77.4	0.26
12	28	247.4	1.24	**12**	12	127.1	0.55	**12**	5.4	77.4	0.26

TFPC (microg/l) = 36.815+7.52*DOC (mg/l)
UVA-254nm per cm = 0.02374+0.04415*DOC (mg/l)
DOC (mg/l) are DSM2 values in Table 3.

Bromide and EC

The regional distribution of bromide concentrations in the Delta is related to the degree of influence by seawater intrusion and the primary source of water applied to the islands and tracts for irrigation or that is seeped onto the islands. Seawater is the dominant source of bromide to the Delta. Areas of the western Delta are most impacted by daily ocean tides. Areas to the north and further inland (Southeast) are less impacted by tidal excursions. The areas (Figure 6) for salinity related constituents do not follow that for organic carbon but are based on earlier work reported in Bulletin 123 (DWR, 1967).

The MWQI sampled islands and tracts that are in the north Delta included: Grand, Tyler, Bouldin, Brannan-Andrus, Egbert and Upper Egbert, McCormick-Williamson, Netherlands, Pierson, Prospect, Terminous, and Twitchell. The western Delta islands included: drain at Clifton Court Forebay, Holland, Jersey, Orwood, Palm, Pierson, Prospect, and Webb. The southeastern Delta islands and tracts included: Bacon, Empire, King, Lower and Upper Jones, Mandeville, Moss, Mossdale, Rindge, Rio Blanco, Shima, Staten, and Venice.

Pearson moment correlation matrices were computed to assess the correlations among the drain water mineral constituents at each of the three Bulletin 123 Delta subregions. The variables included EC, TDS, Br, Ca, Cl, Mg, Na, and SO_4. The correlation matrix table (n=168) for the western Delta island drains is presented in Table 6a. Bromide concentrations correlated extremely well ($r = 0.96 – 0.98$) with EC, TDS, Cl, and Na). The relationship between Br and EC is shown in Figure 7a, for EC and TDS in Figure 7b, and for Br and Cl in Figure 7c.

The correlation matrix for the northern segment of the Delta is shown in Table 6b (n=257 samples). The highest correlation ($r = 0.85$) for bromide was with chloride (Fig. 8a). Chloride correlated well with EC ($r = 0.95$; Fig. 8b). EC correlated well with TDS ($r = 0.98$; Fig. 8c).

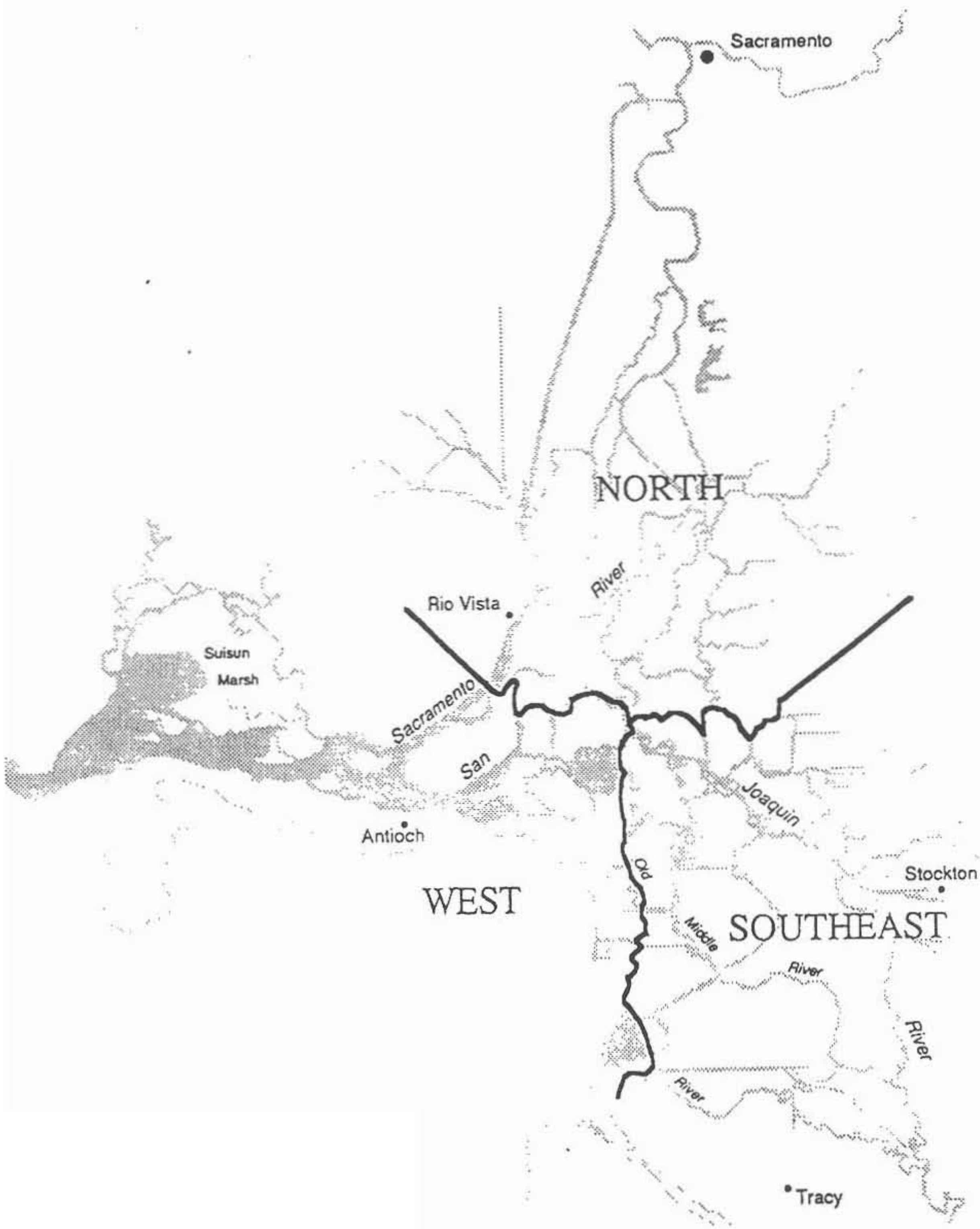


Figure 6. Bulletin 123 Delta Subregions

The correlation matrix for the southeastern Delta drain water samples (n=353) is presented in Table 6c. Again bromide correlated well with chloride (r = 0.93; Figure 9a). EC had a correlation value of 0.96 with chloride (Figure 9b). EC and TDS had a 0.98 correlation coefficient (Figure 9c). The chloride to TDS correlation was 0.91 (Figure 9d).

Table 6a. West Delta Drainage
Correlation Matrix Table

STAT. BASIC STATS	Correlations (drwq3.sta) Marked correlations are significant at p < .05000 N=168 (Casewise deletion of missing data)							
Variable	EC	TDS	BR	CA	CL	MG	NA	SO4
EC	1.00	1.00 *	.96 *	.73 *	.99 *	.95 *	.99 *	.92 *
TDS	1.00 *	1.00	.96 *	.75 *	.99 *	.96 *	.98 *	.94 *
BR	.96 *	.96 *	1.00	.58 *	.98 *	.87 *	.98 *	.82 *
CA	.73 *	.75 *	.58 *	1.00	.68 *	.86 *	.63 *	.85 *
CL	.99 *	.99 *	.98 *	.68 *	1.00	.92 *	.99 *	.88 *
MG	.95 *	.96 *	.87 *	.86 *	.92 *	1.00	.91 *	.95 *
NA	.99 *	.98 *	.98 *	.63 *	.99 *	.91 *	1.00	.88 *
SO4	.92 *	.94 *	.82 *	.85 *	.88 *	.95 *	.88 *	1.00

Table 6a Correlation Plots for West Delta Drainage

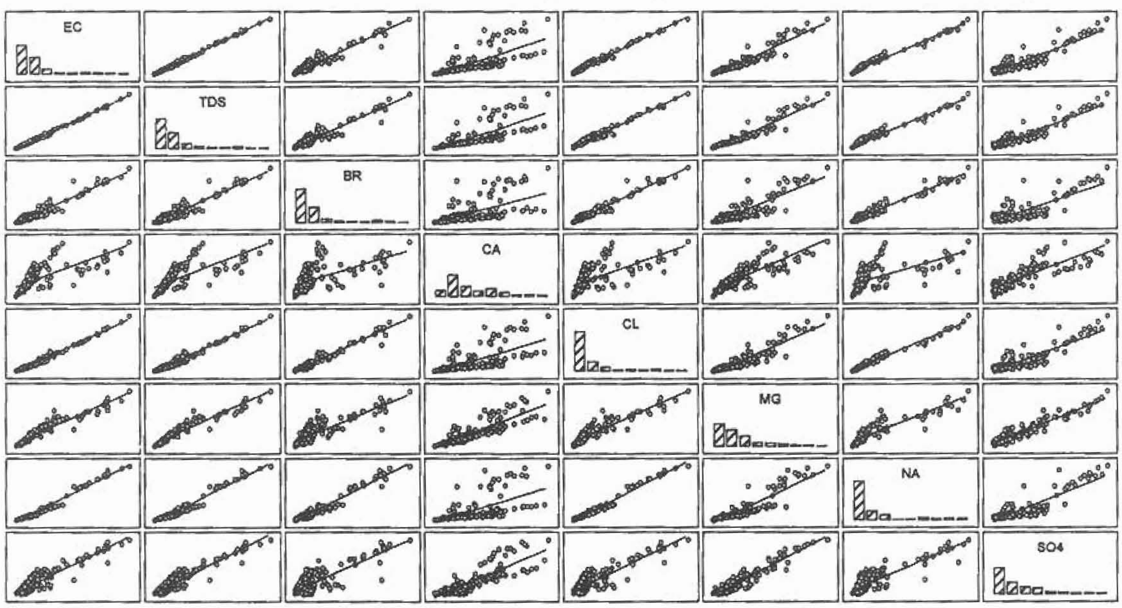


Table 6b. North Delta Drainage Correlation Matrix Table

STAT. BASIC STATS	Correlations (drwq3.sta) Marked correlations are significant at p < .05000 N=257 (Casewise deletion of missing data)							
Variable	EC	TDS	BR	CA	CL	MG	NA	SO4
EC	1.00	.98 *	.77 *	.92 *	.95 *	.91 *	.93 *	.85 *
TDS	.98 *	1.00	.72 *	.94 *	.91 *	.91 *	.90 *	.87 *
BR	.77 *	.72 *	1.00	.58 *	.85 *	.59 *	.81 *	.39 *
CA	.92 *	.94 *	.58 *	1.00	.79 *	.97 *	.74 *	.88 *
CL	.95 *	.91 *	.85 *	.79 *	1.00	.79 *	.95 *	.71 *
MG	.91 *	.91 *	.59 *	.97 *	.79 *	1.00	.71 *	.83 *
NA	.93 *	.90 *	.81 *	.74 *	.95 *	.71 *	1.00	.73 *
SO4	.85 *	.87 *	.39 *	.88 *	.71 *	.83 *	.73 *	1.00

Table 6b Correlation Plots for North Delta Drainage

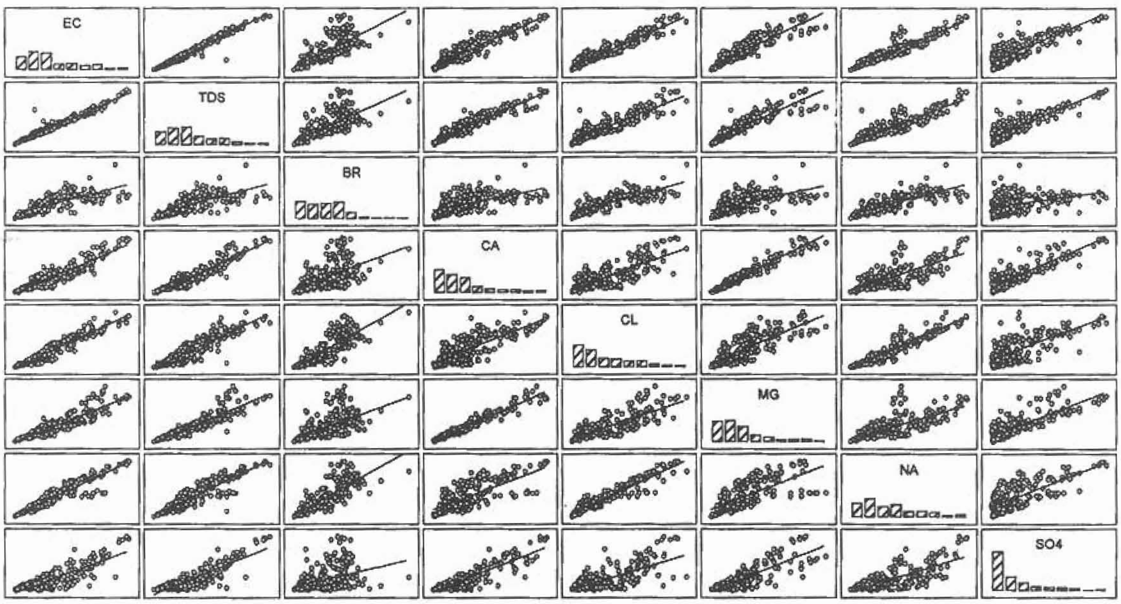


Table 6c. Southeastern Delta Drainage Correlation Matrix Table

STAT. BASIC STATS — Correlations (drwq3.sta)
Marked correlations are significant at p < .05000
N=353 (Casewise deletion of missing data)

Variable	EC	TDS	BR	CA	CL	MG	NA	SO4
EC	1.00	.98 *	.86 *	.95 *	.96 *	.97 *	.96 *	.80 *
TDS	.98 *	1.00	.82 *	.96 *	.92 *	.96 *	.93 *	.84 *
BR	.86 *	.82 *	1.00	.78 *	.93 *	.79 *	.84 *	.47 *
CA	.95 *	.96 *	.78 *	1.00	.88 *	.98 *	.84 *	.81 *
CL	.96 *	.92 *	.93 *	.88 *	1.00	.90 *	.93 *	.64 *
MG	.97 *	.96 *	.79 *	.98 *	.90 *	1.00	.89 *	.83 *
NA	.96 *	.93 *	.84 *	.84 *	.93 *	.89 *	1.00	.75 *
SO4	.80 *	.84 *	.47 *	.81 *	.64 *	.83 *	.75 *	1.00

Table 6c Correlation Plots for Southeast Delta Drainage

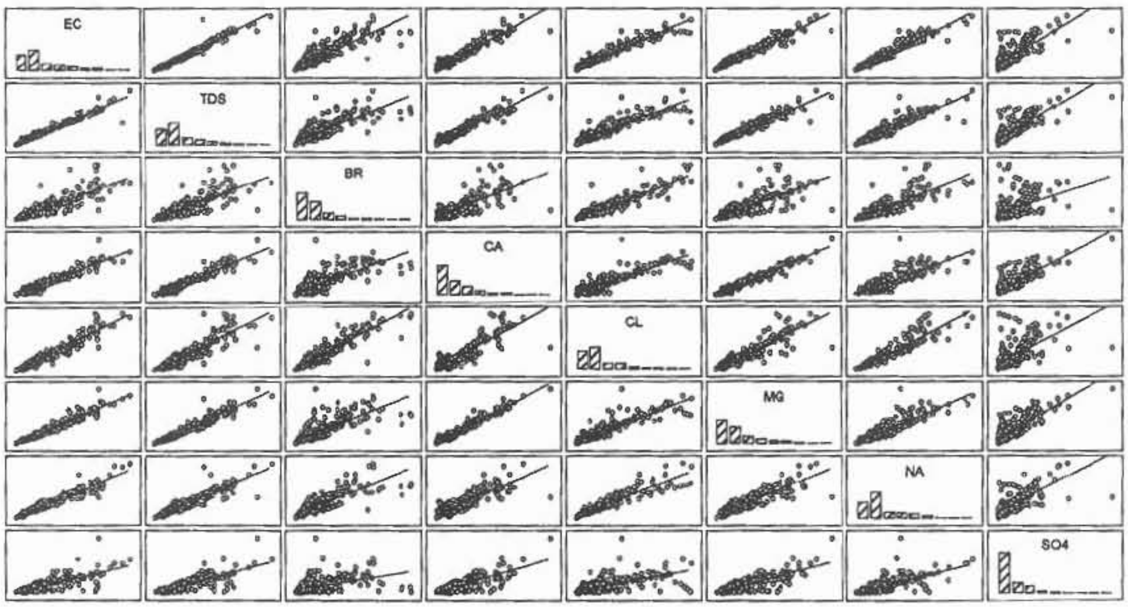


Figure 7c. West Delta Drainage Chloride vs. Bromide
BR = .09611 + .00257 * CL
Correlation: r = .97900

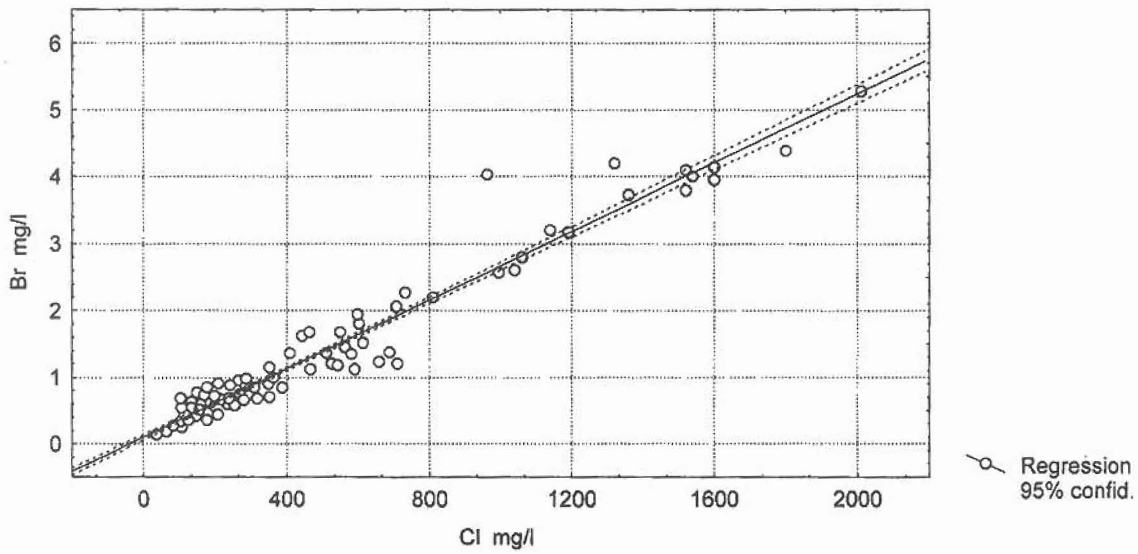


Figure 8a. Northern Delta Drainage Chloride vs. Bromide
BR = .11569 + .00214 * CL
Correlation: r = .84643

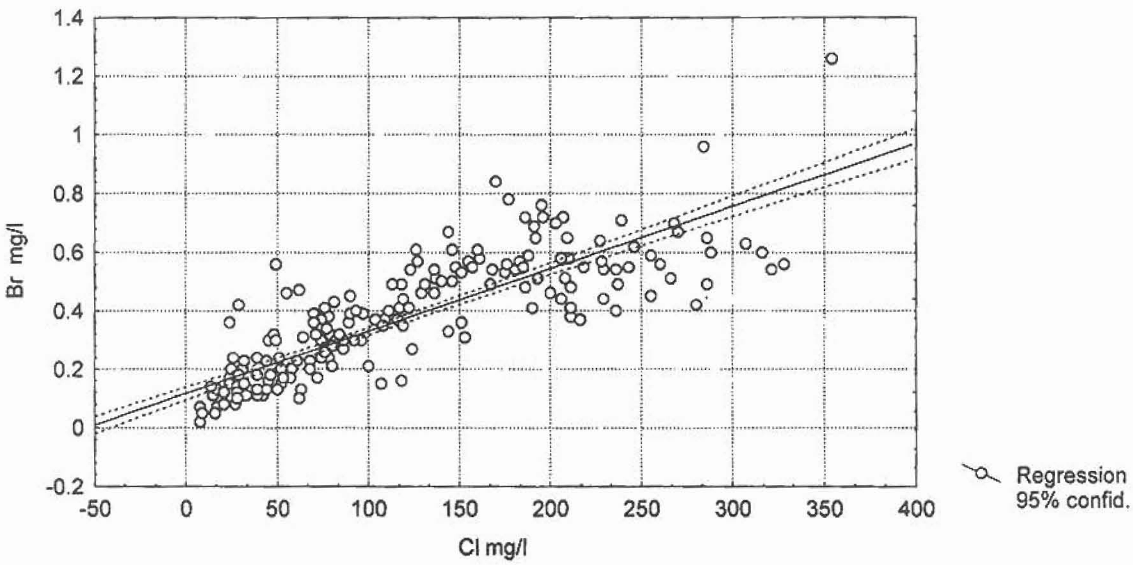


Figure 8b. Northern Delta Drainage EC vs. Chloride

CL = -26.27 + .19225 * EC

Correlation: r = .95345

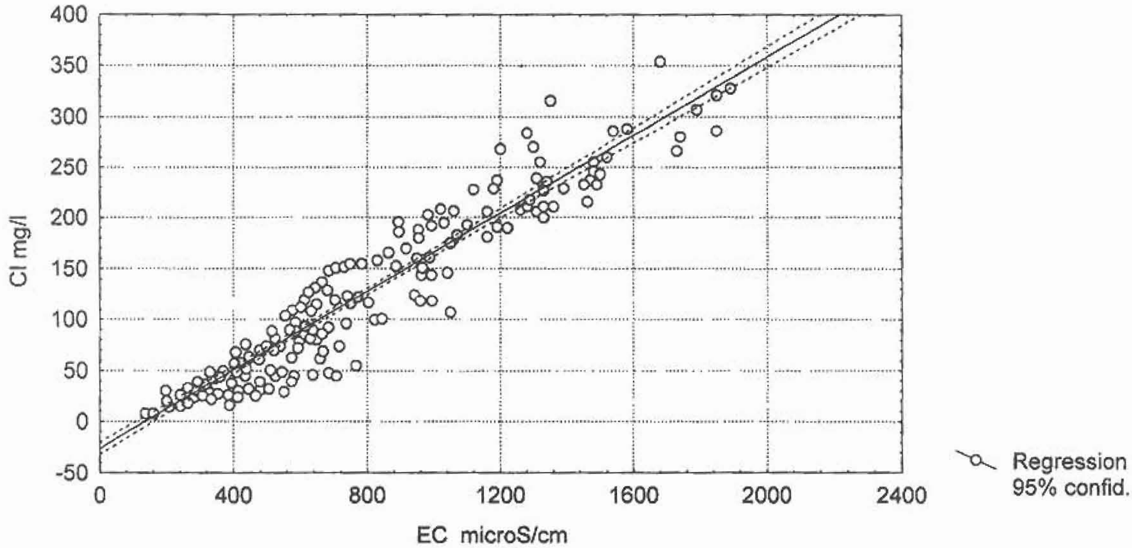


Figure 8c. Northern Delta Drainage EC vs. TDS

TDS = 22.384 + .60782 * EC

Correlation: r = .98061

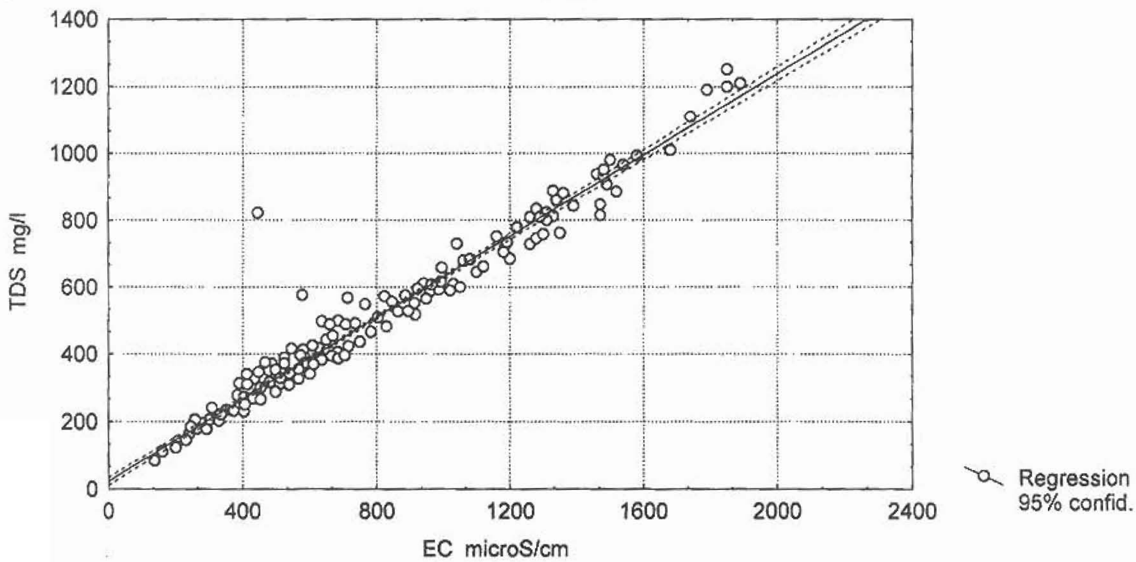


Figure 9a. Southeastern Delta Drainage Chloride vs. Bromide
BR = .02749 + .00306 * CL
Correlation: r = .92666

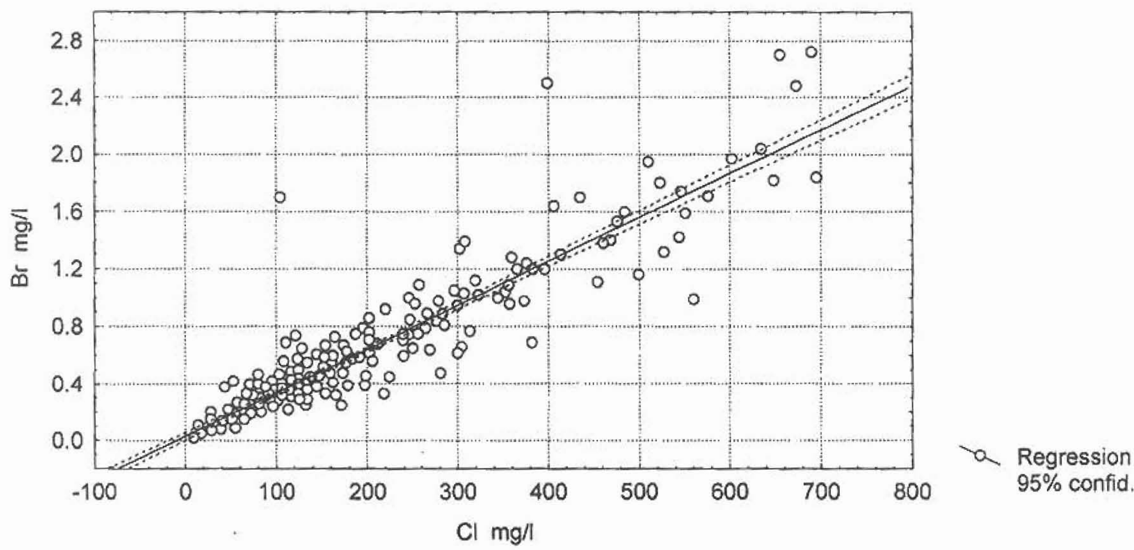


Figure 9b. Southeastern Delta Drainage EC vs. Chloride
CL = -43.43 + .21514 * EC
Correlation: r = .96083

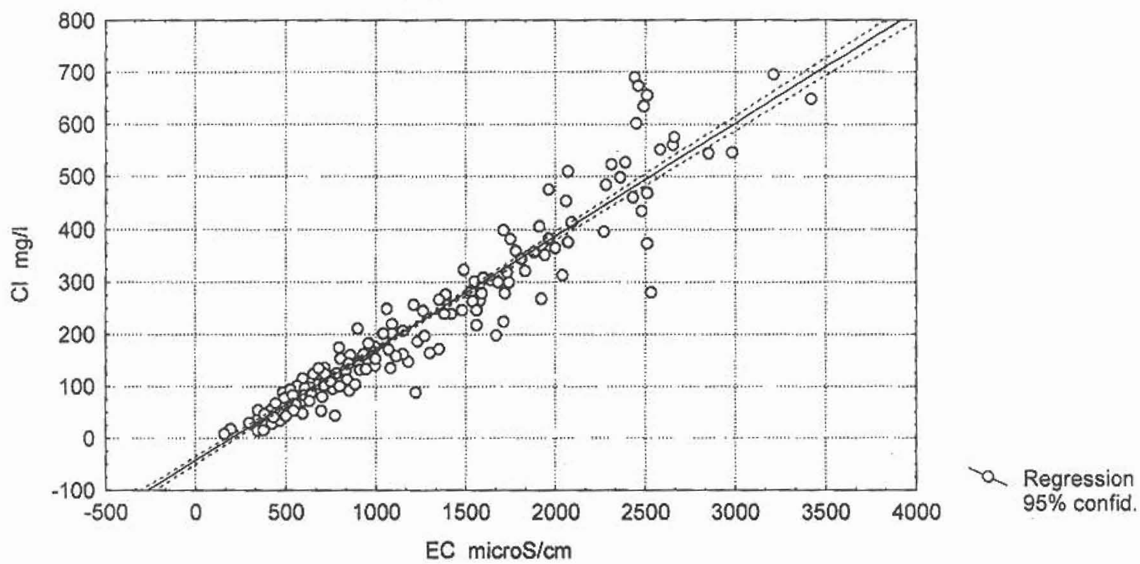


Figure 9c. Southeastern Delta Drainage EC vs. TDS
TDS = 20.709 + .58997 * EC
Correlation: r = .98128

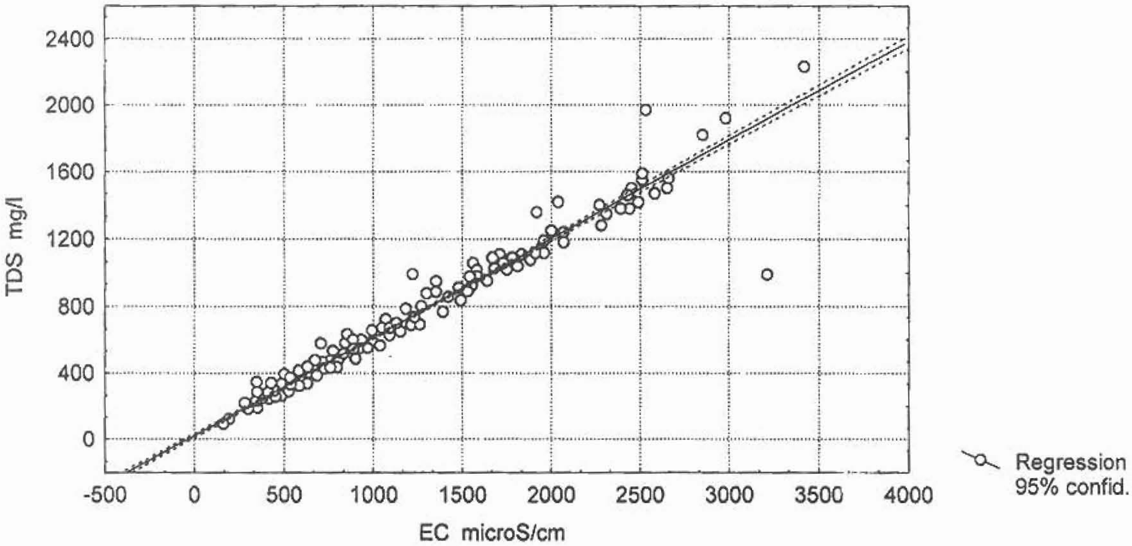
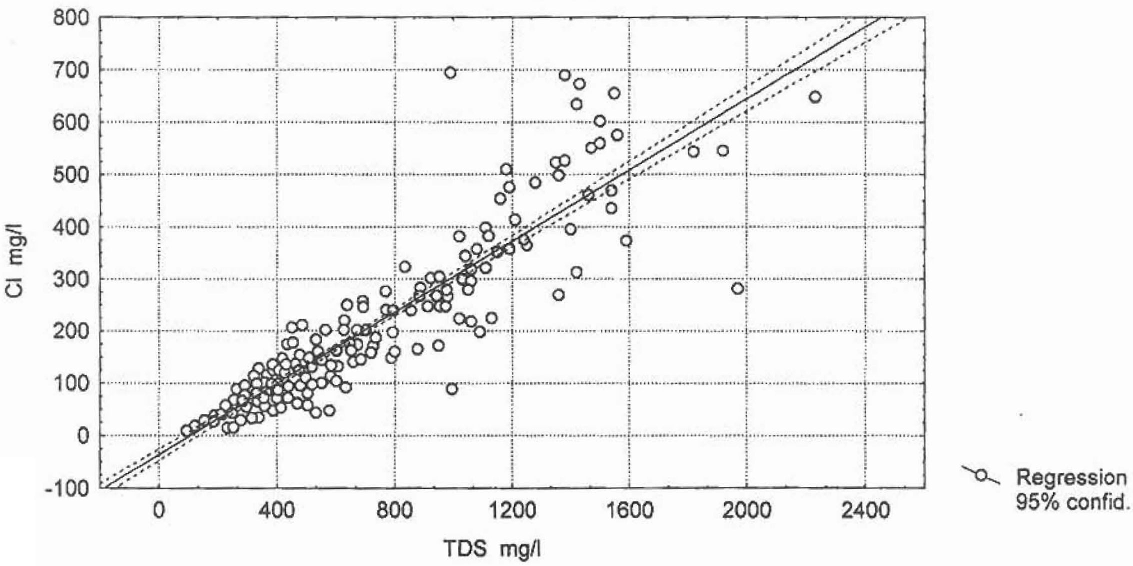


Figure 9d. Southeastern Delta Drainage TDS vs. Chloride
CL = -37.27 + .34088 * TDS
Correlation: r = .91532



Scatter plots and box and whiskers plots of drainage EC were made for each of the sampled islands (Appendix B). This was done to determine if there were areas that were more saline than others within the three Bulletin 123 subregions. The monthly highest EC readings were used to categorize each island. The assumption was made that the trends in the highest monthly EC values could be used to indicate the mineral quality of the islands as affected by the irrigation and seepage water quality and evapotranspiration. The island/tracts were categorized by the following monthly peak EC values:

EC range in microS/cm	EC classification
Less than or equal to 1000	low range EC
Between 1001 and 2000	midrange EC
Between 2001 and 3000	high range EC
Above 3000	extremely high EC

The results of the EC classification are shown in Figure 10. The western Delta subarea has the highest EC due to the influence of seawater (Jersey, Holland, Webb) and possibly mineral springs (drain into Clifton Court Forebay). Most of the southeastern segment of the Delta had midrange EC values. The exceptions were at Empire Tract (connate water), Pescadero and Moss tracts (mineral soil and irrigates water from the San Joaquin River), which had higher EC values. The uppermost segment (Grand, Pierson, McCormick-Williamson) of the northern subregion had the lowest EC drains. This is attributed to the use of fresh water from the Sacramento River. Areas in the middle segment (e.g., Brannan, Tyler, Bouldin) had midrange EC and in the lower end (Twitchell) high EC values due to seawater influences.

An examination of the data set showed that the number of drains and samples taken varied among the islands. This would skew the data when computing representative monthly average values of EC, bromide, and other constituents. To minimize this effect, monthly average values for each island were first computed (Appendix C), then summed and divided by the number of islands to obtain regional monthly average values. Data from the drain at Clifton Court Forebay was excluded as it is a small drain and does not drain into the Delta channels. The computed average monthly EC and bromide concentration at the three Delta subareas are shown in Figures 11 and 12, respectively. The northern subarea had the lowest EC and bromide values, followed by the southeastern Delta subarea, and the highest in the west Delta. The spatial pattern in EC, bromide, and other minerals at the island drains is controlled by the quality of channel water applied on and seeping into the islands and tracts. The qualities of the applied and seepage water are controlled by the combined effects of tidal intrusion and river flows from the Sacramento and San Joaquin rivers.

Figure 10—EC Ranges of Delta Island Drains

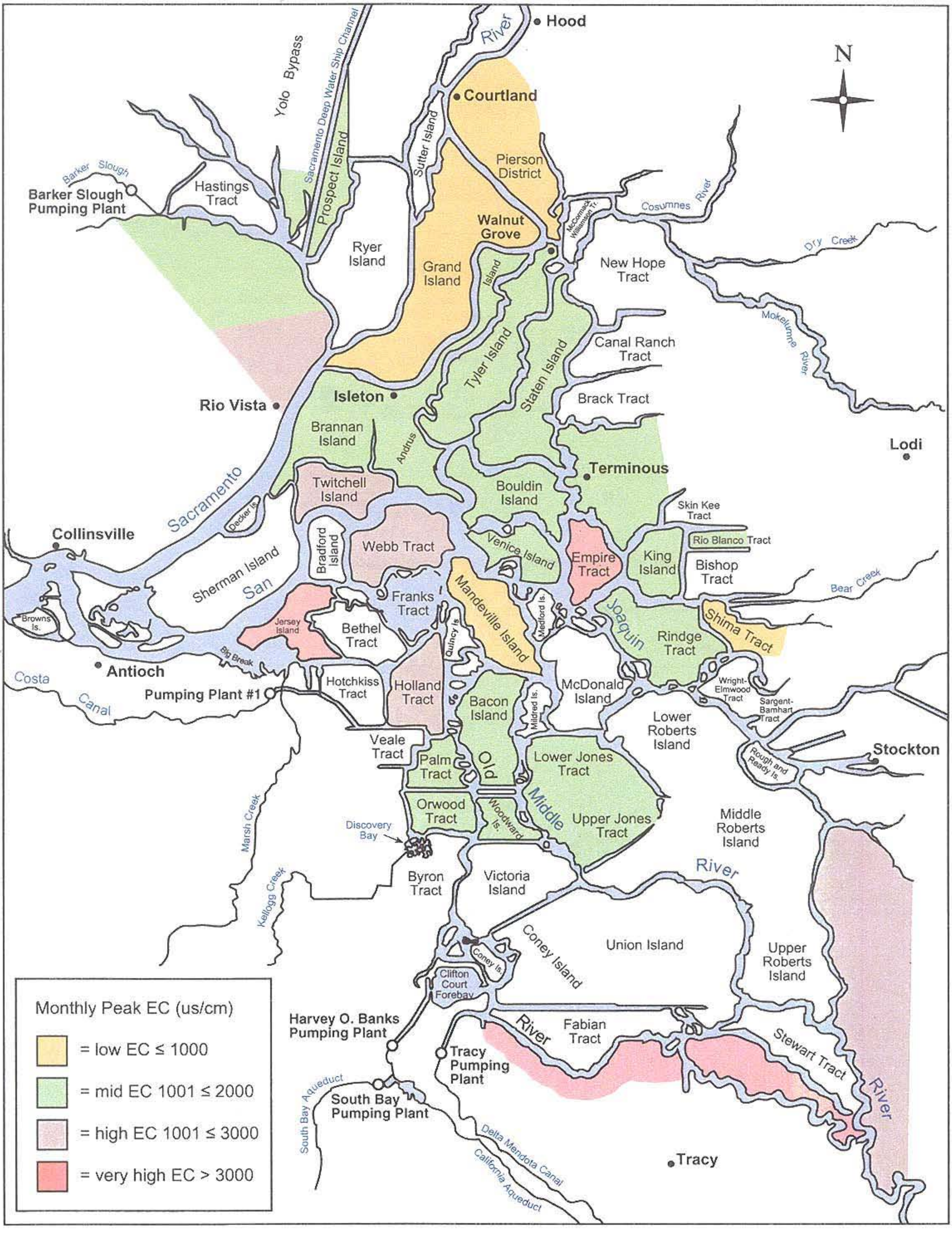


Figure 11. Average Monthly EC Values in Delta Drainage

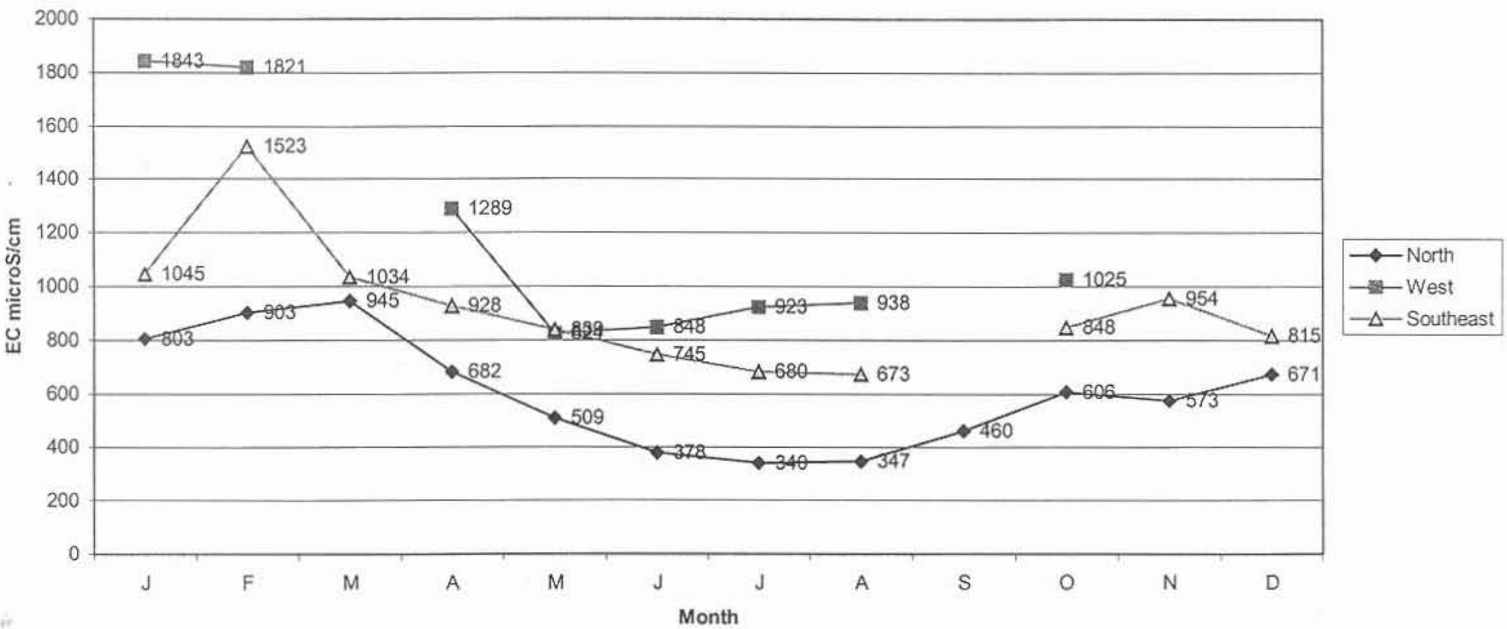
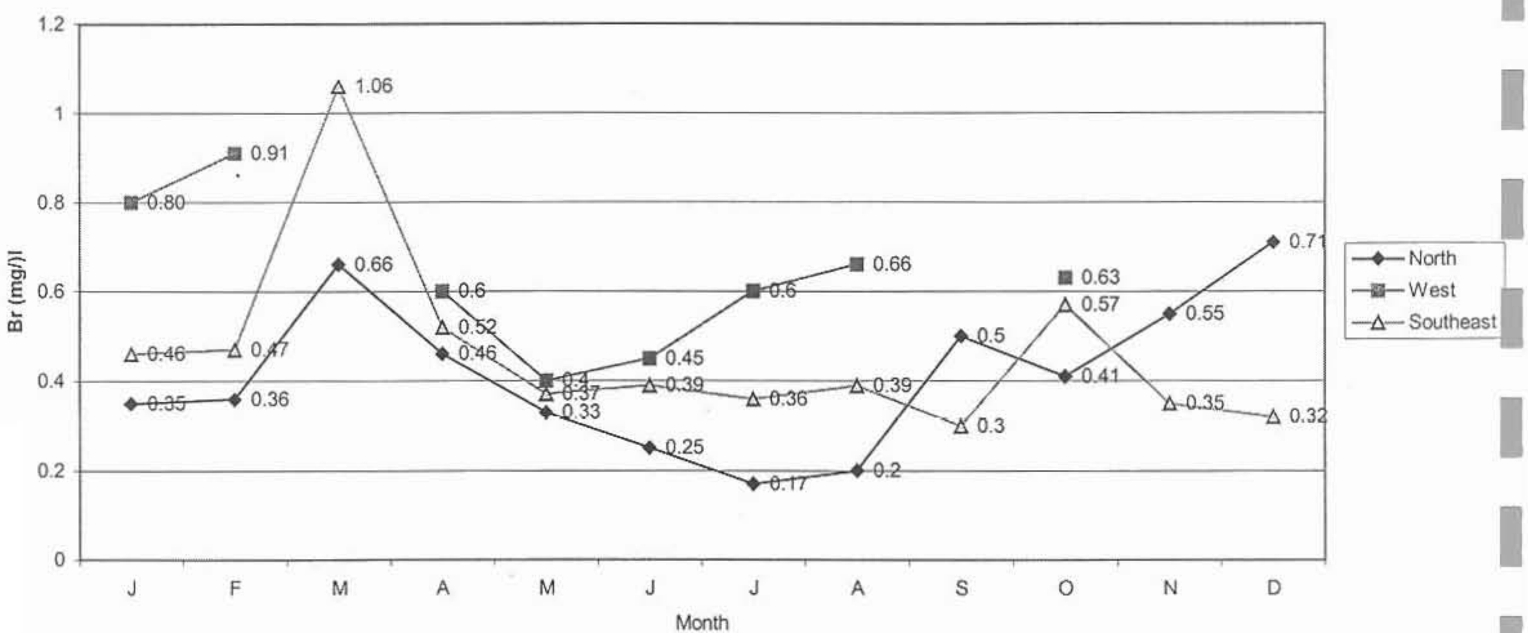


Figure 12. Average Monthly Bromide Concentrations in Delta Drainage



Other Mineral Constituents

As with the EC and bromide data, the monthly average concentrations of total dissolved solids, calcium, magnesium, sodium, chloride, and sulfate were computed from the monthly average concentrations for each island within each of the DWR Bulletin 123 Delta regions (Appendix C). The data were plotted to show the seasonal trends of these mineral salts in the Delta drainages by region. In cases, where there were insufficient data for a particular region and month, the data were not plotted in the figures. Examples of omitting data include instances when there were only data for a highly saline island or tract (e.g., Jersey Island, Empire Tract) and none for other islands or tracts within the same Delta region. If the data from the high saline areas were used, the plots would be skewed towards showing higher monthly values than the more likely average for the region and month. The TDS, calcium, magnesium, and sodium monthly averages are presented in Figures 13 to 16, respectively. The monthly average concentrations of the anions, chloride and sulfate, are shown in Figures 17 and 18, respectively.

The mineral salt concentrations in the west and southeast Delta drains were generally highest in the winter (Feb-Mar) and lowest during the summer months. The summer lows are attributed to high applications of irrigation water during the growing season to meet crop demands with high pump off of drain water to maintain water table heights. The combined actions result in deposition of salts in the soil surface due to high evaporation and lower salt concentrations in the subsurface drainage. The increases in salt levels in the drainage occur after the summer as the climate becomes cooler. The drain water salinity increases as there is less water evaporation and curtailment of irrigation for most crops, which then results in less salt buildup in the soil. The sharp increases in drain water salts that occur in the late fall and winter are due to ponding of the fields and heavy rainfall that resolubilizes the salts in the soil that had built up during the summer. These observations agree with the seasonal trends studied in 1954-55 by DWR (DWR, 1956; Figure 19).

Salt concentrations were highest in the west Delta due to seawater influences on the applied irrigation water. The lowest concentrations were found in the north Delta that uses Sacramento River.

Figure 13. Average TDS in Delta Drainage

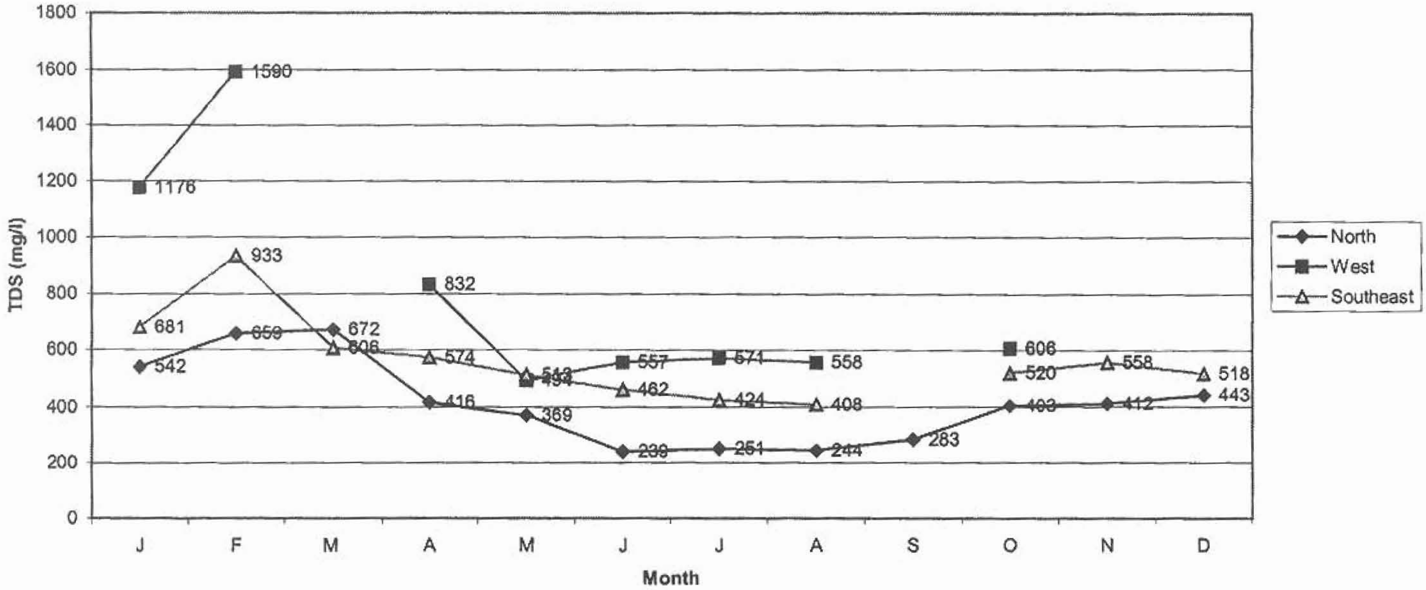


Figure 14. Average Calcium Levels in Delta Drainage

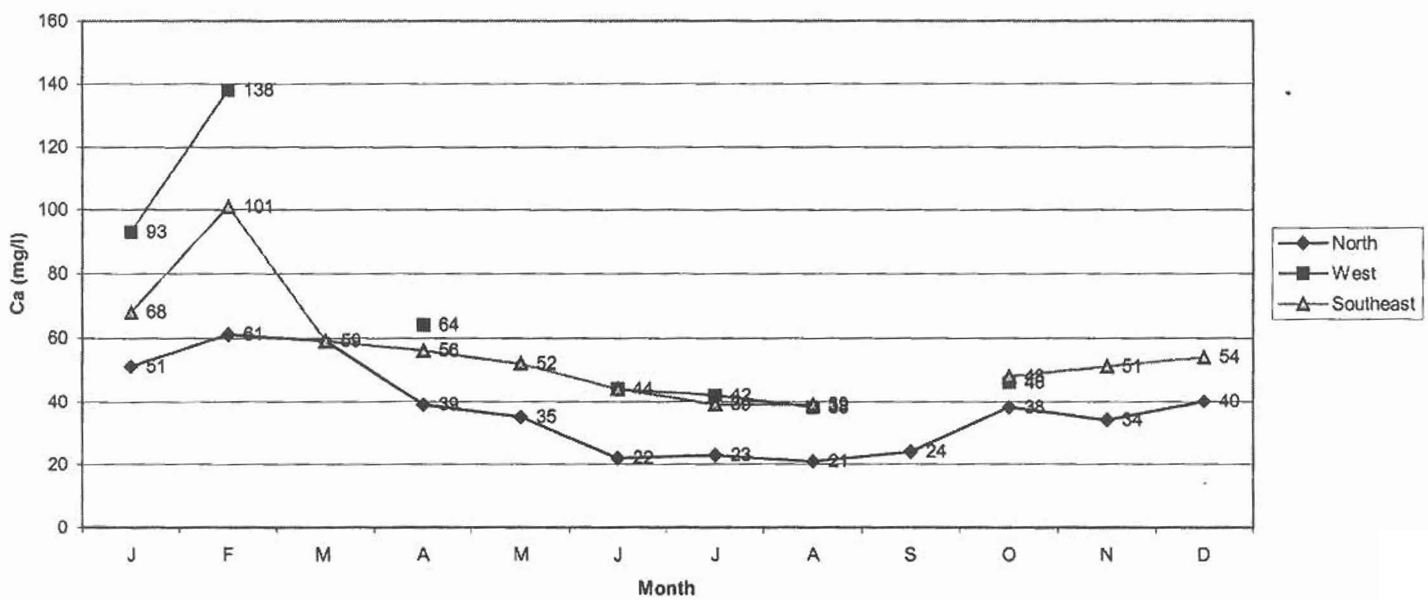


Figure 17. Average Chloride Levels in Delta Drainage

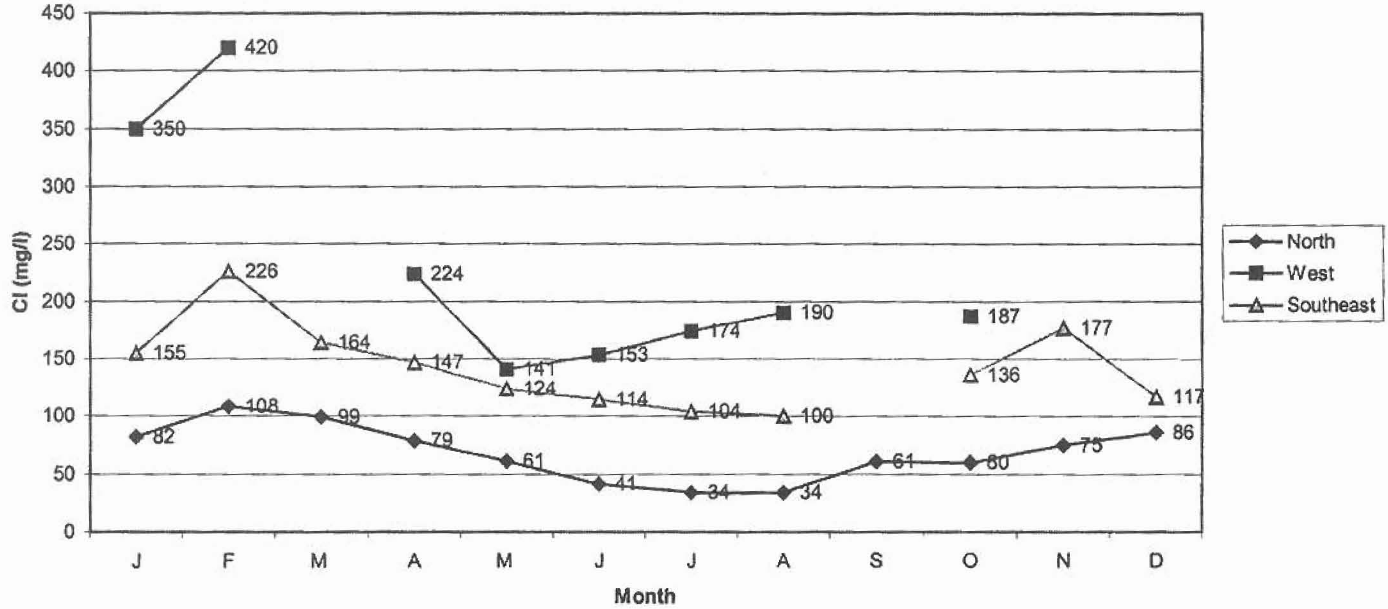


Figure 18. Average Sulfate Levels in Delta Drainage

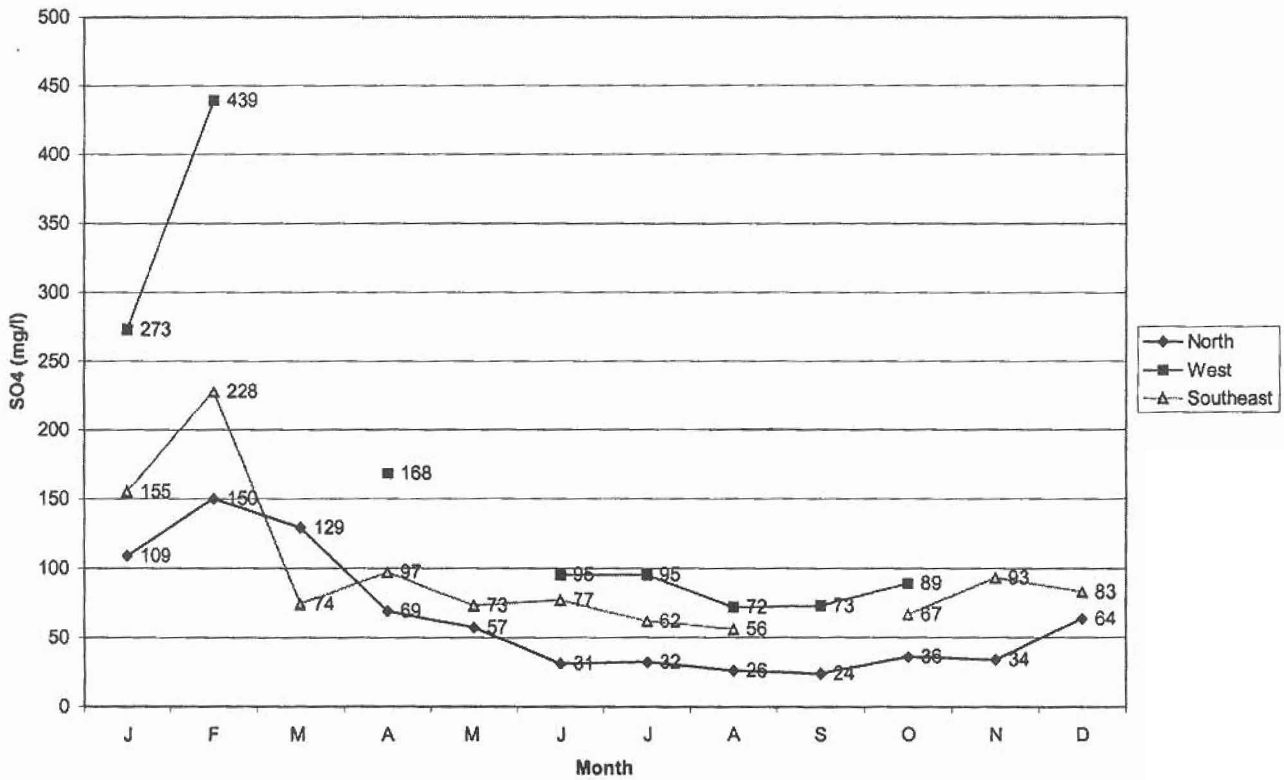
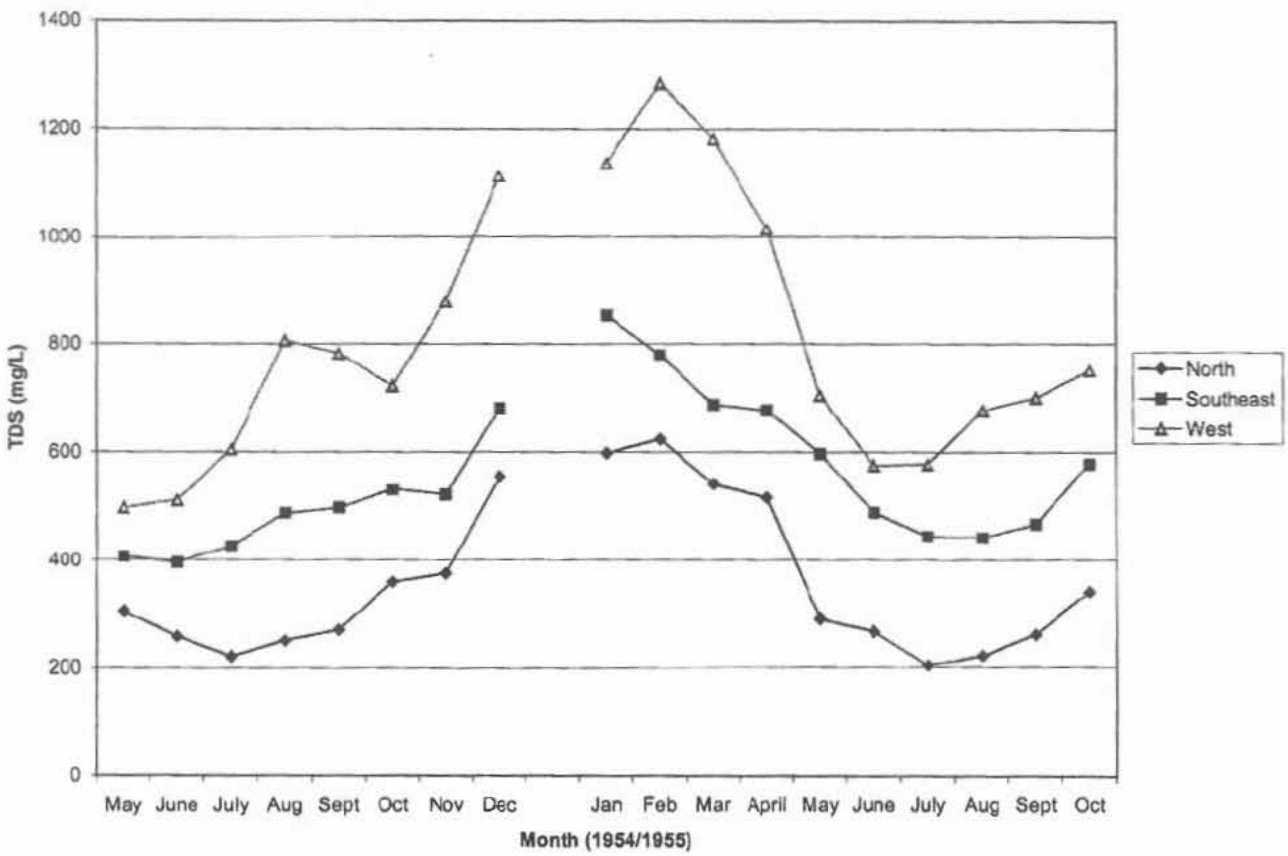


Figure 19. Delta Lowlands Average Drainage TDS, 1954- 55



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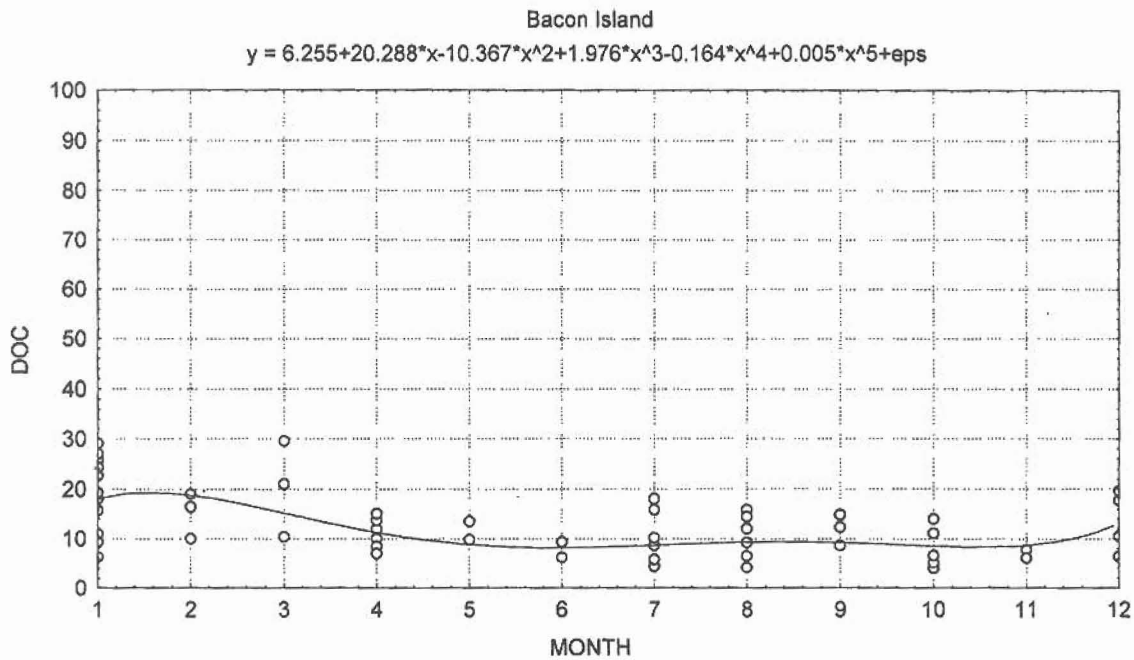
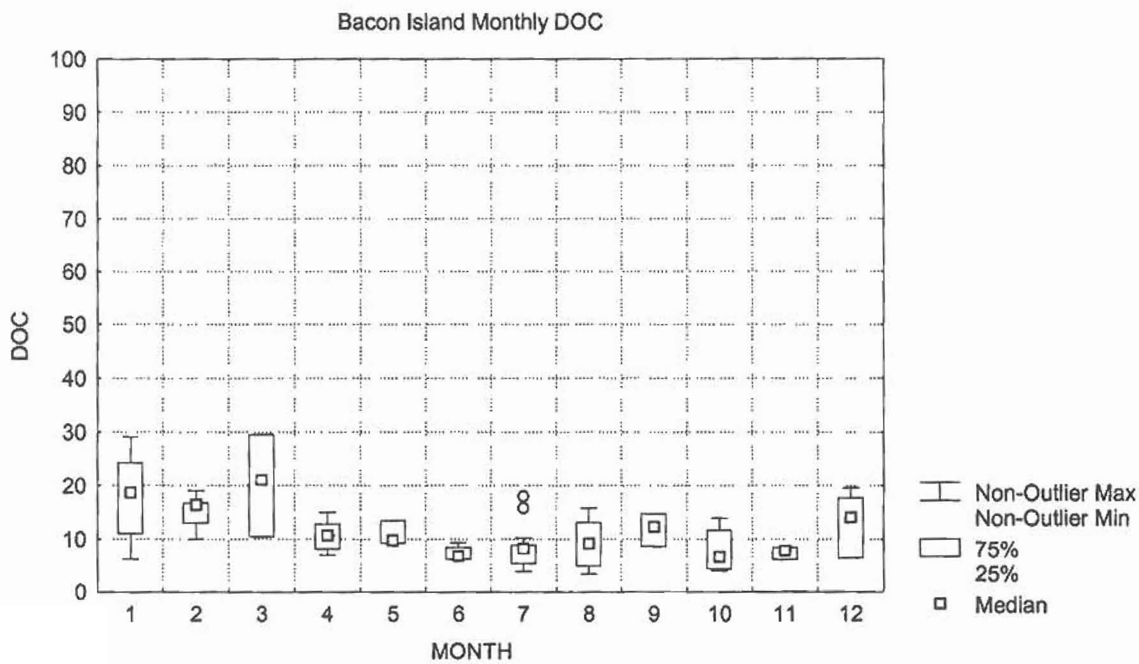
Appendix A

Monthly Delta Island/Tract Drainage DOC Concentrations

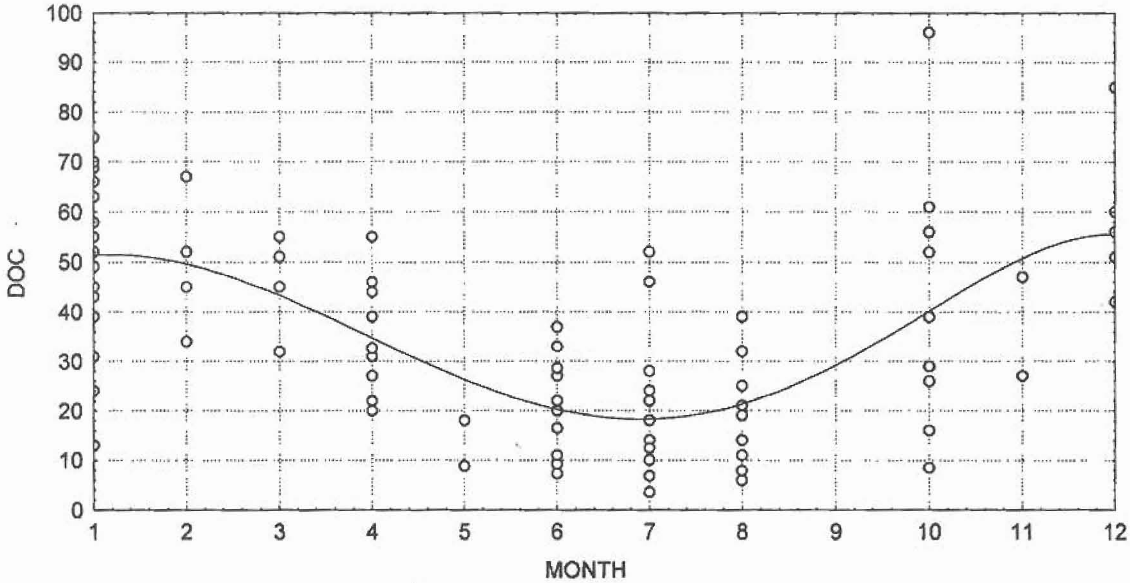
DOC in mg/l
Months are calendar months


Bacon Island
y = 6.255+20.288*x-10.367*x^2+1.976*x^3-0.164*x^4+0.005*x^5+eps
DOC
MONTH
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12

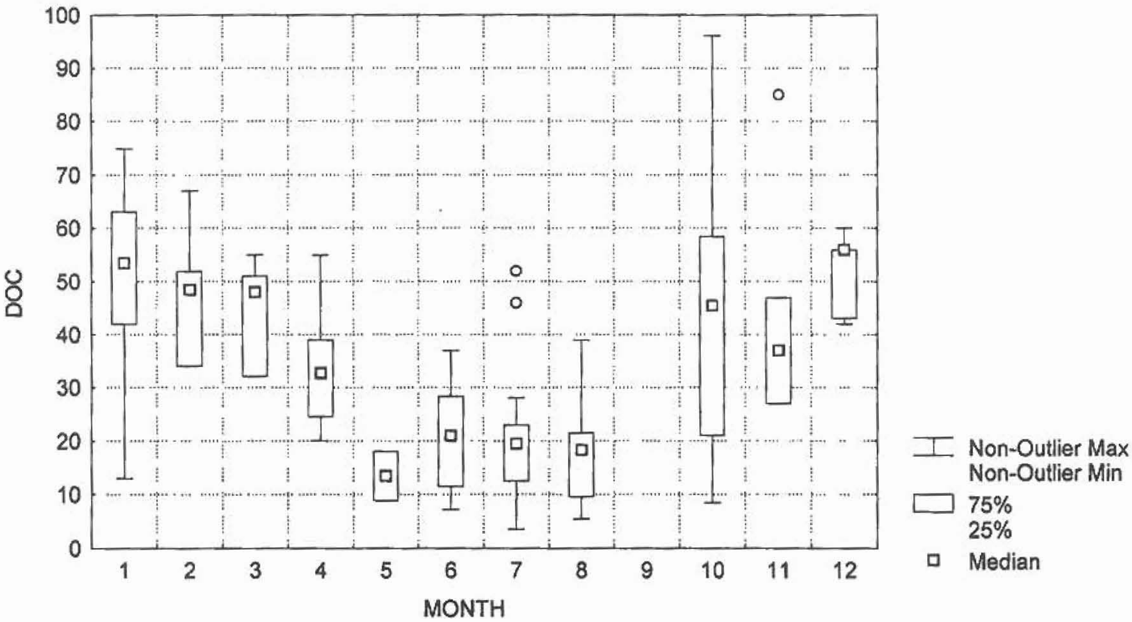

Bacon Island Monthly DOC
DOC
MONTH
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

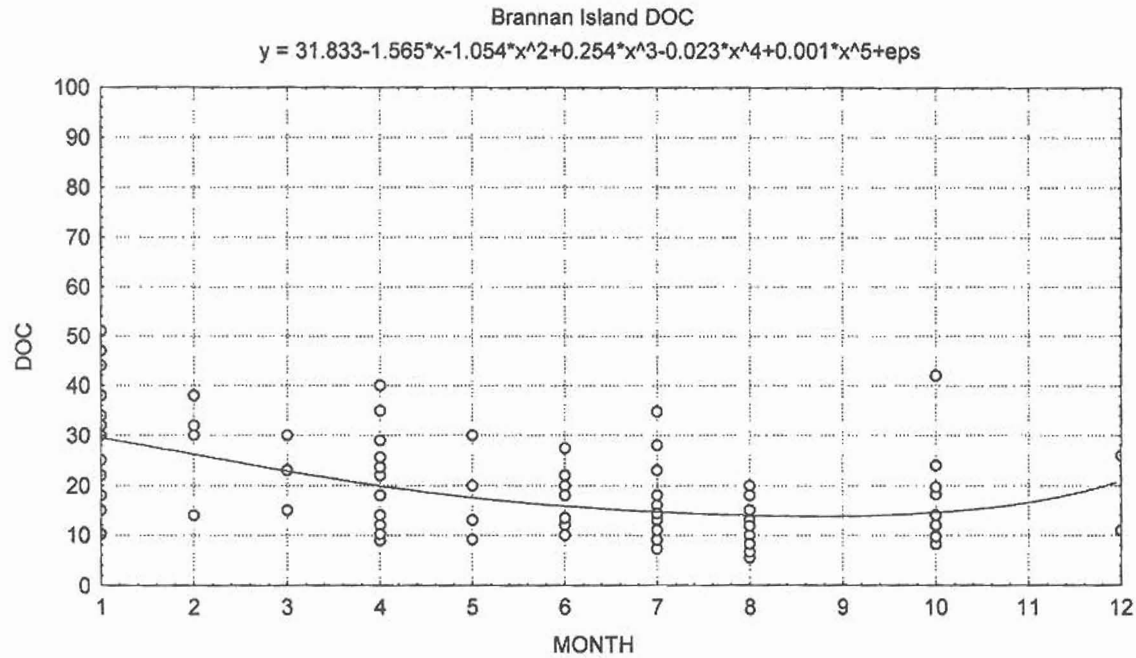
Bouldin Island DOC

$y = 46.809+8.13*x-3.699*x^2+0.085*x^3+0.047*x^4-0.003*x^5+eps$

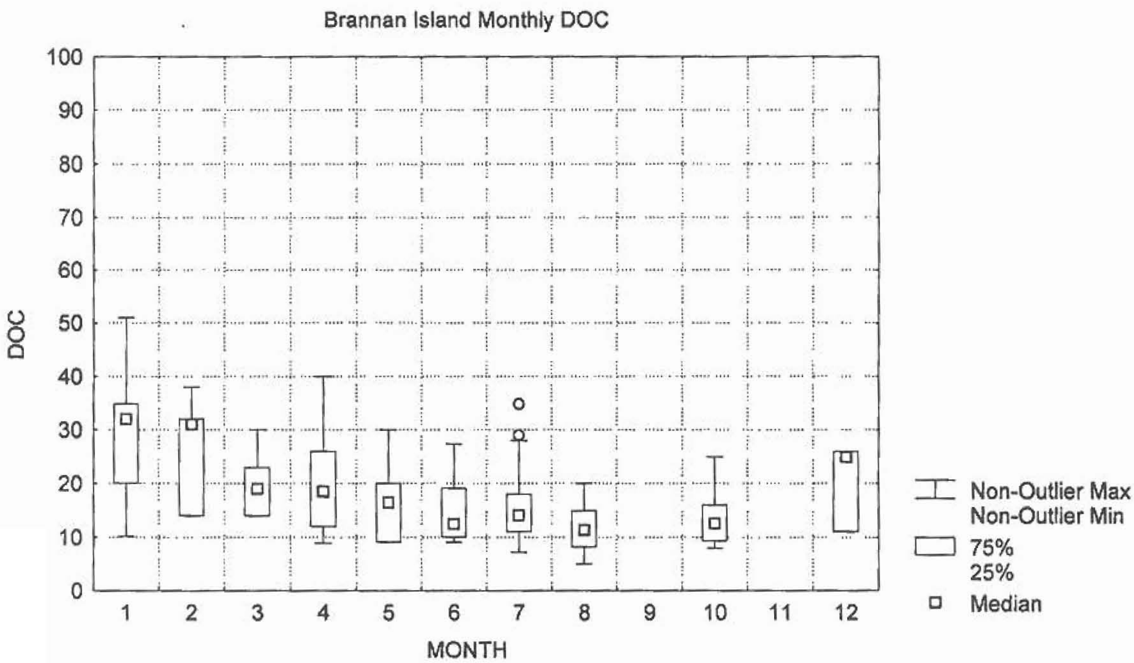


Bouldin Island Monthly DOC

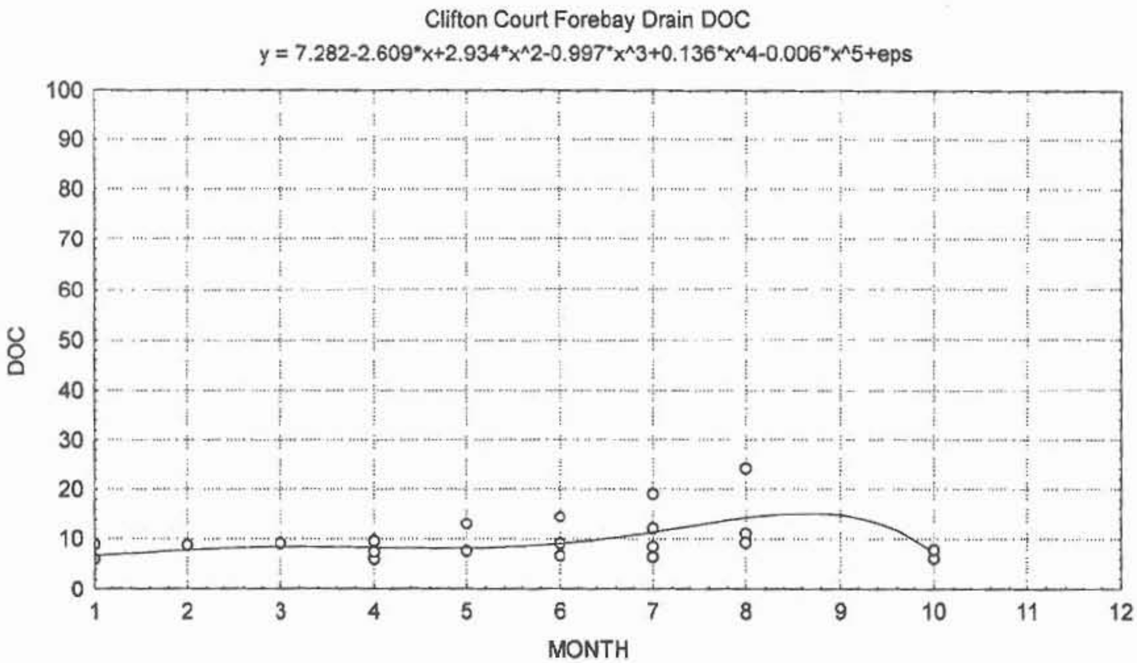


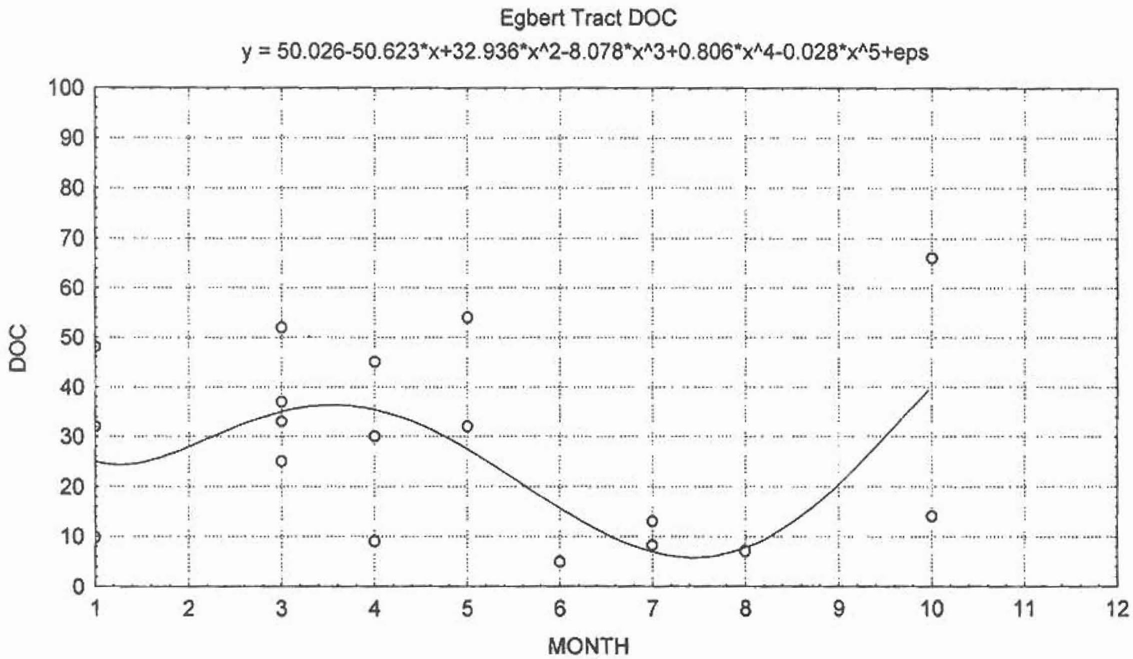


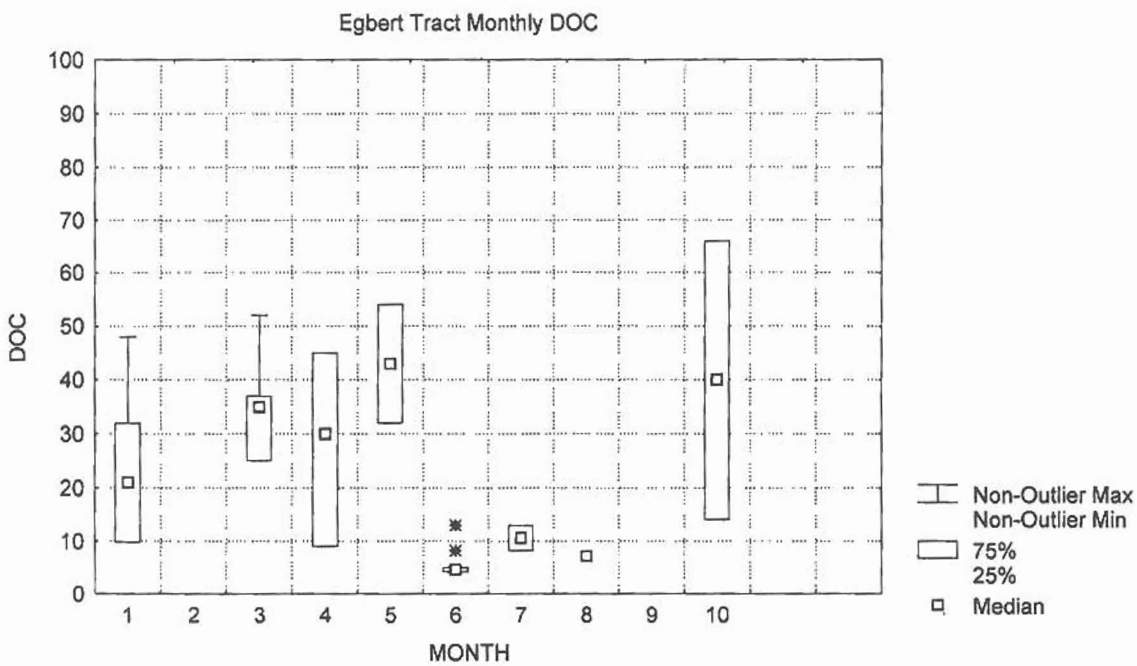
Brannan Island DOC
y = 31.833-1.565*x-1.054*x^2+0.254*x^3-0.023*x^4+0.001*x^5+eps
DOC
MONTH

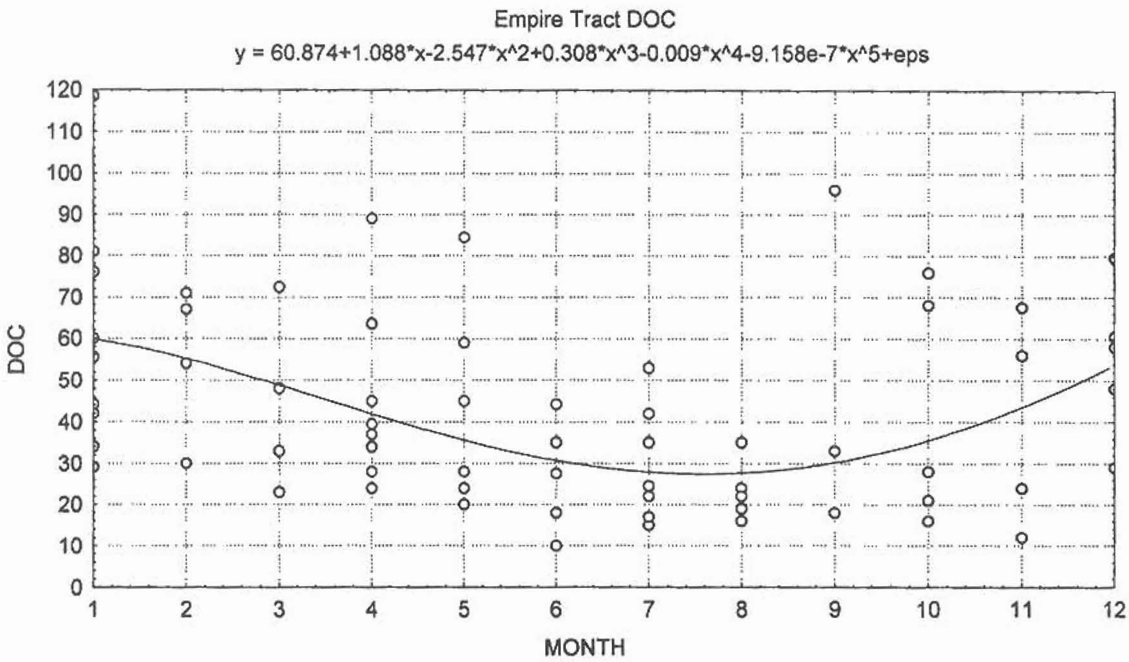


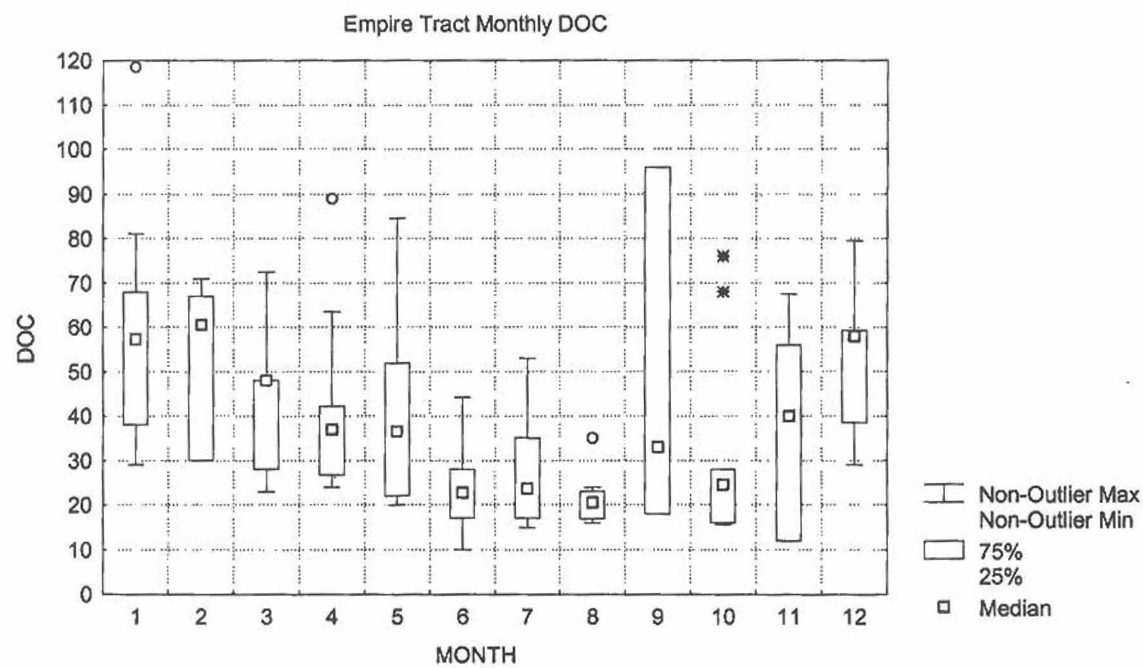
Brannan Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Clifton Court Forebay Drain DOC
y = 7.282-2.609*x+2.934*x^2-0.997*x^3+0.136*x^4-0.006*x^5+eps
DOC
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
MONTH


Egbert Tract DOC
y = 50.026-50.623*x+32.936*x^2-8.078*x^3+0.806*x^4-0.028*x^5+eps
100
90
80
70
60
50
40
30
20
10
0
DOC
1
2
3
4
5
6
7
8
9
10
11
12
MONTH

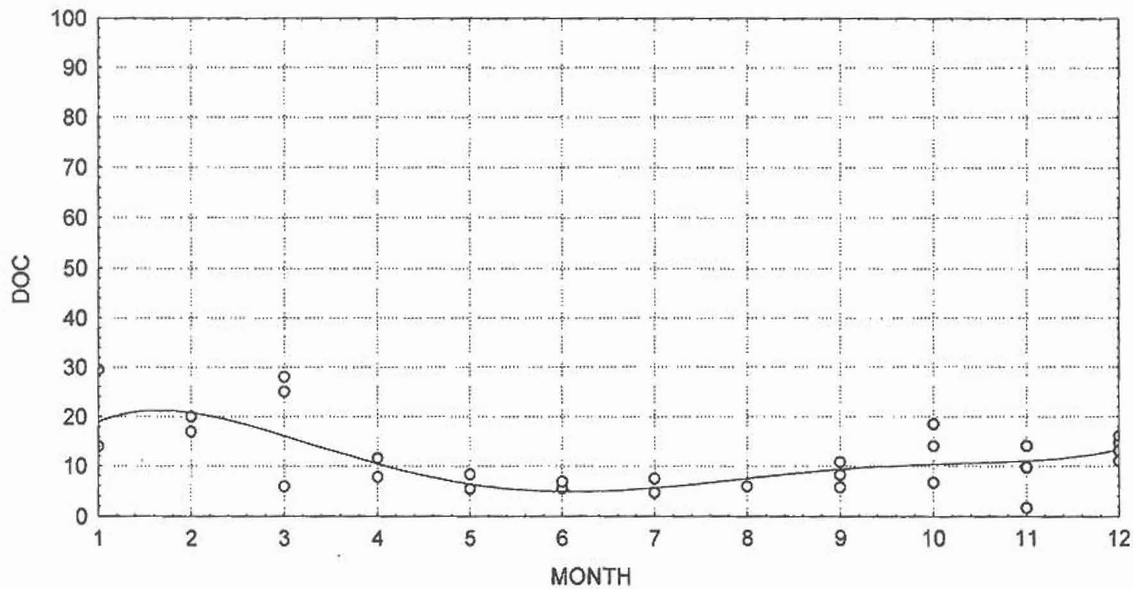

Egbert Tract Monthly DOC
100
90
80
70
60
50
40
30
20
10
0
DOC
1
2
3
4
5
6
7
8
9
10
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Empire Tract DOC
y = 60.874+1.088*x-2.547*x^2+0.308*x^3-0.009*x^4-9.158e-7*x^5+eps
DOC
MONTH

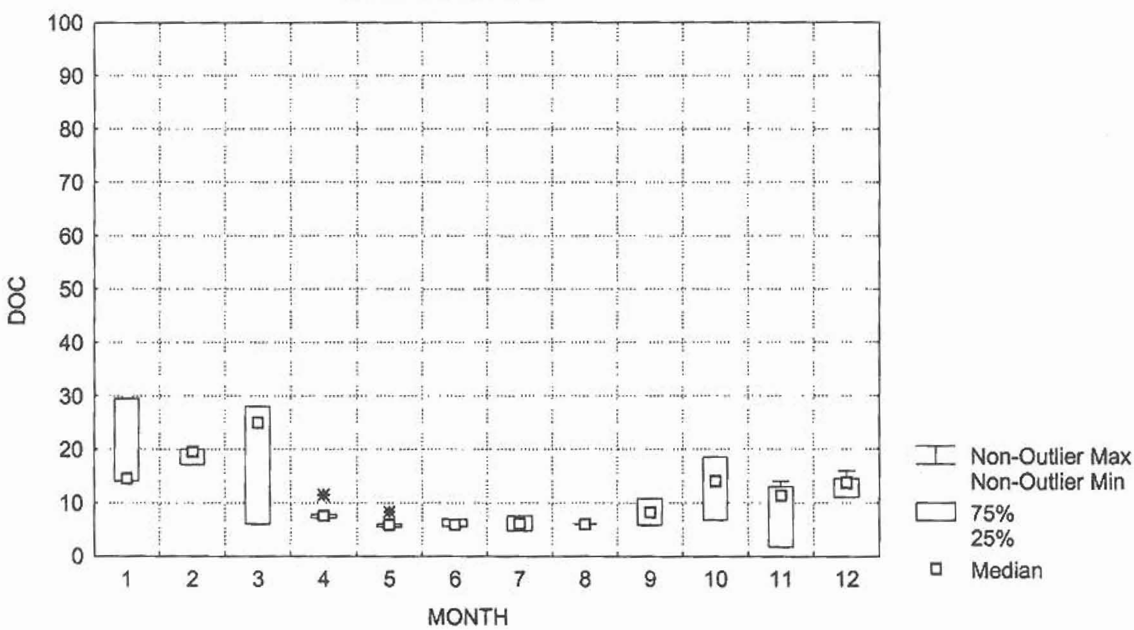

Empire Tract Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

Grand Island DOC

$y = 2.403+27.566*x-13.19*x^2+2.33*x^3-0.177*x^4+0.005*x^5+eps$

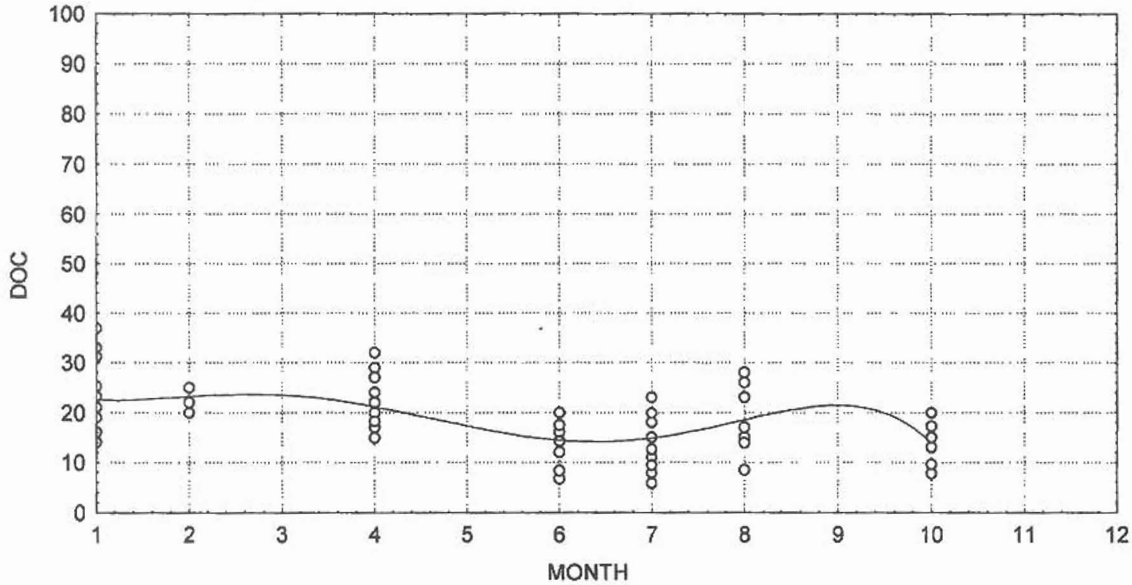


Grand Island Monthly DOC

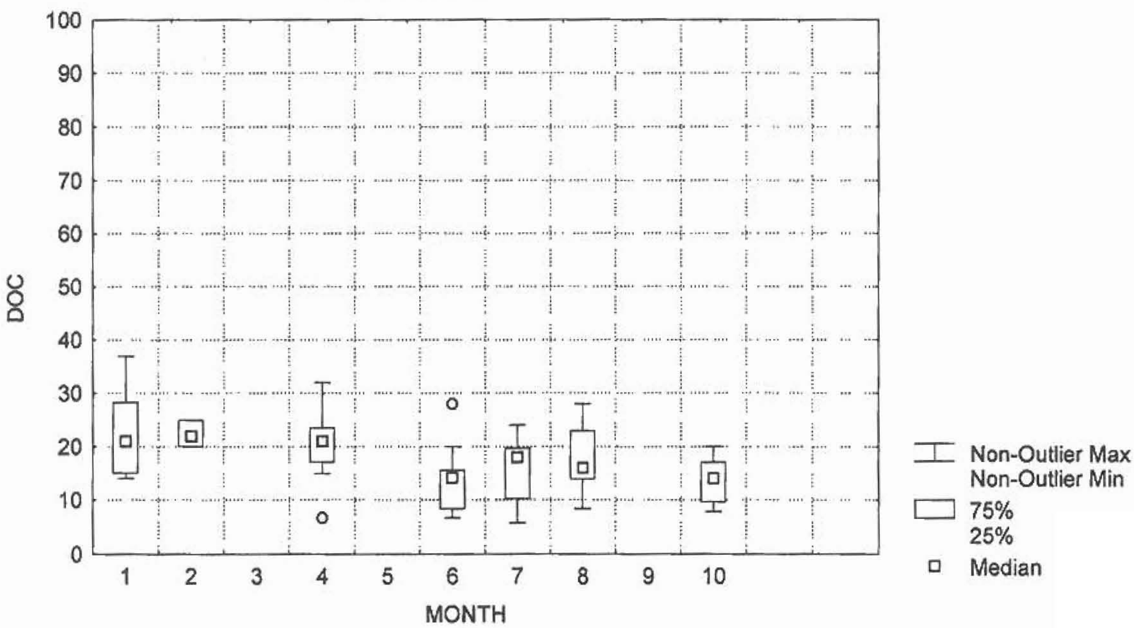


Holland Tract DOC

$y = 28.946-14.07*x+10.362*x^2-3.06*x^3+0.368*x^4-0.015*x^5+eps$

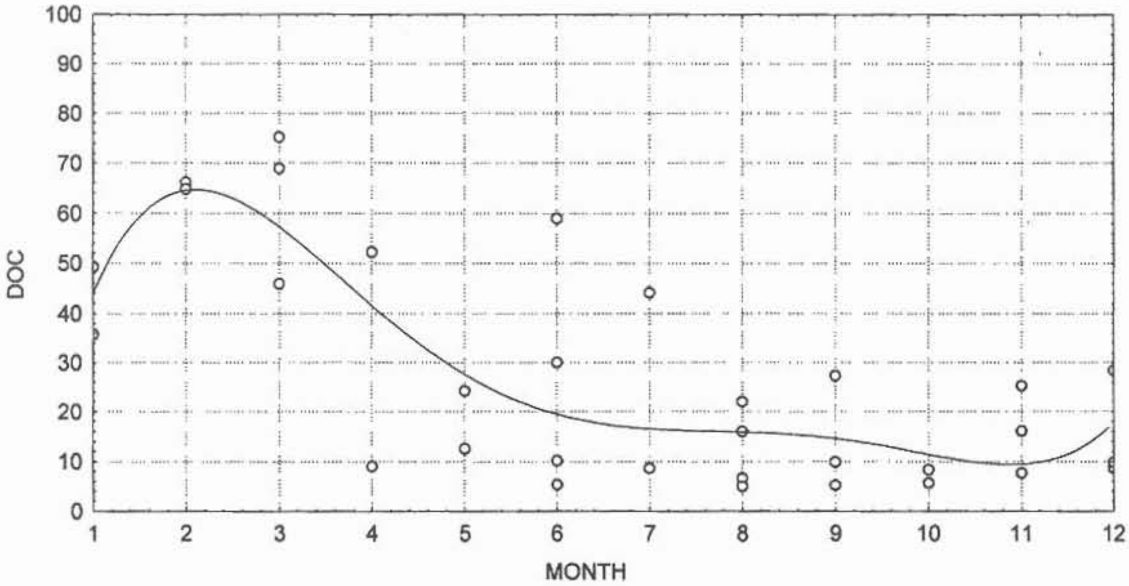


Holland Tract Monthly DOC

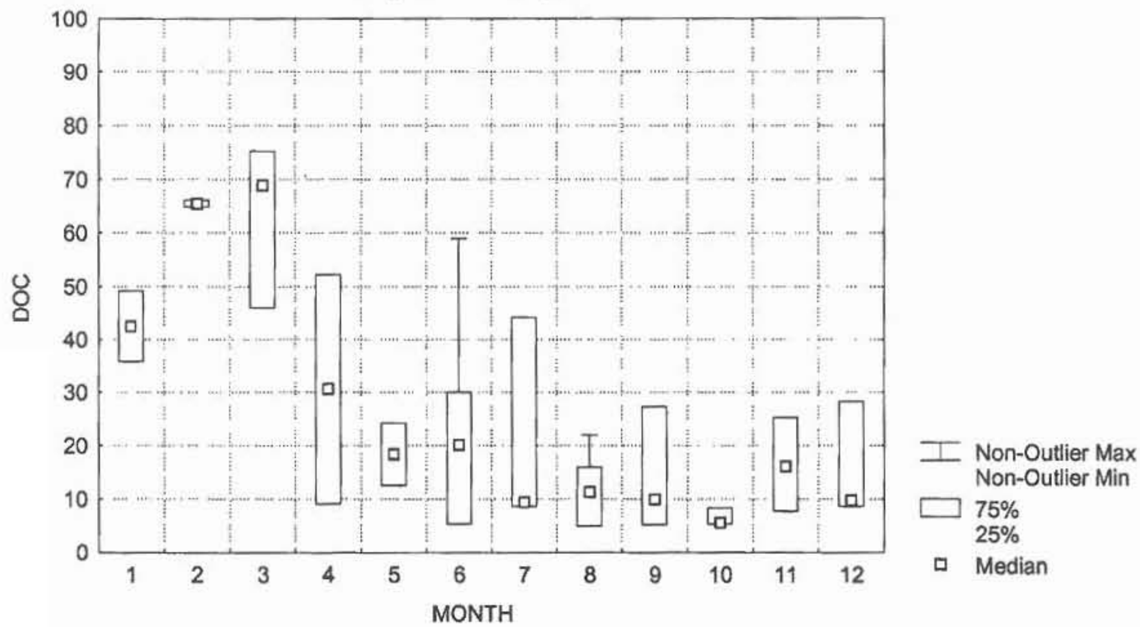


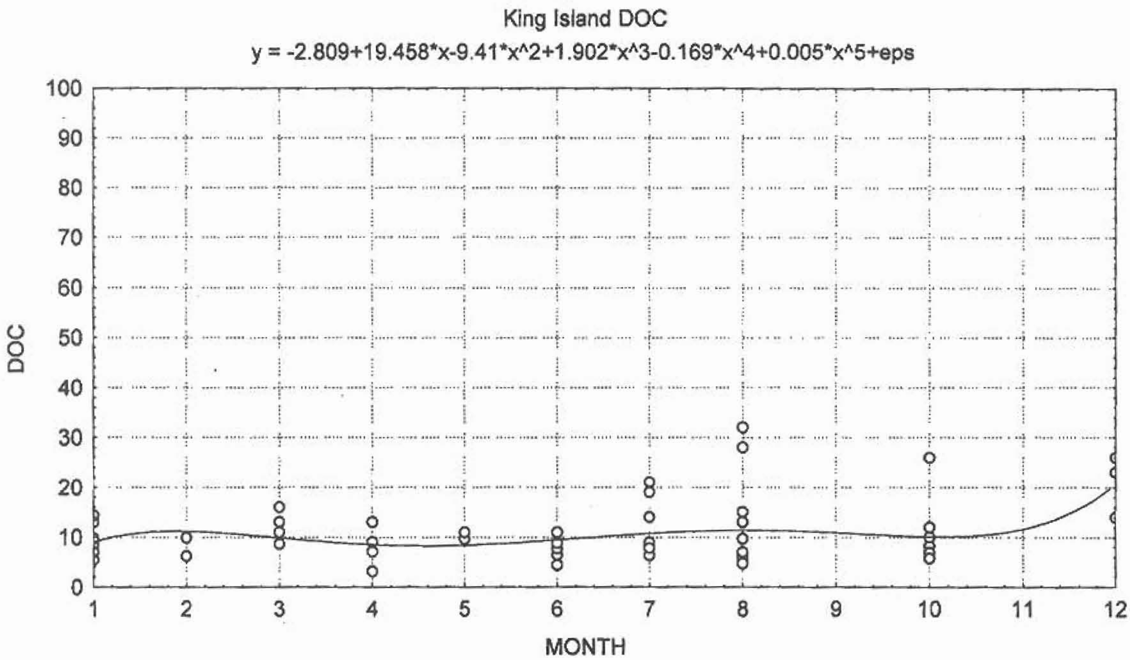
Jersey Island DOC

$y = -34.862+120.867*x-49.919*x^2+8.358*x^3-0.631*x^4+0.018*x^5+eps$

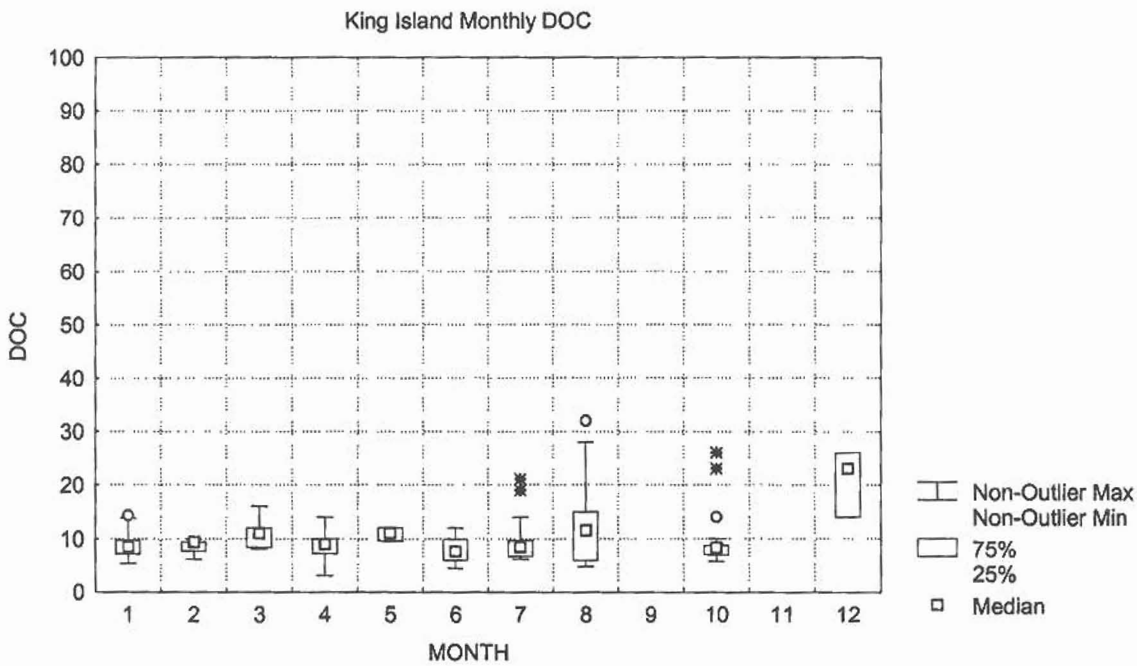


Jersey Island Monthly DOC





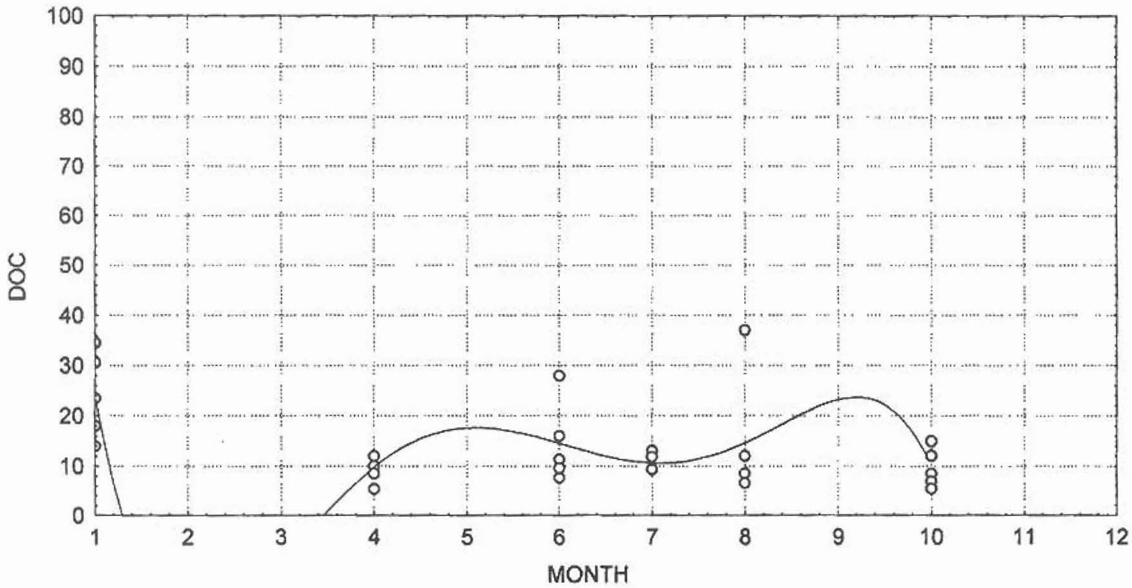
King Island DOC
y = -2.809+19.458*x-9.41*x^2+1.902*x^3-0.169*x^4+0.005*x^5+eps
DOC
MONTH



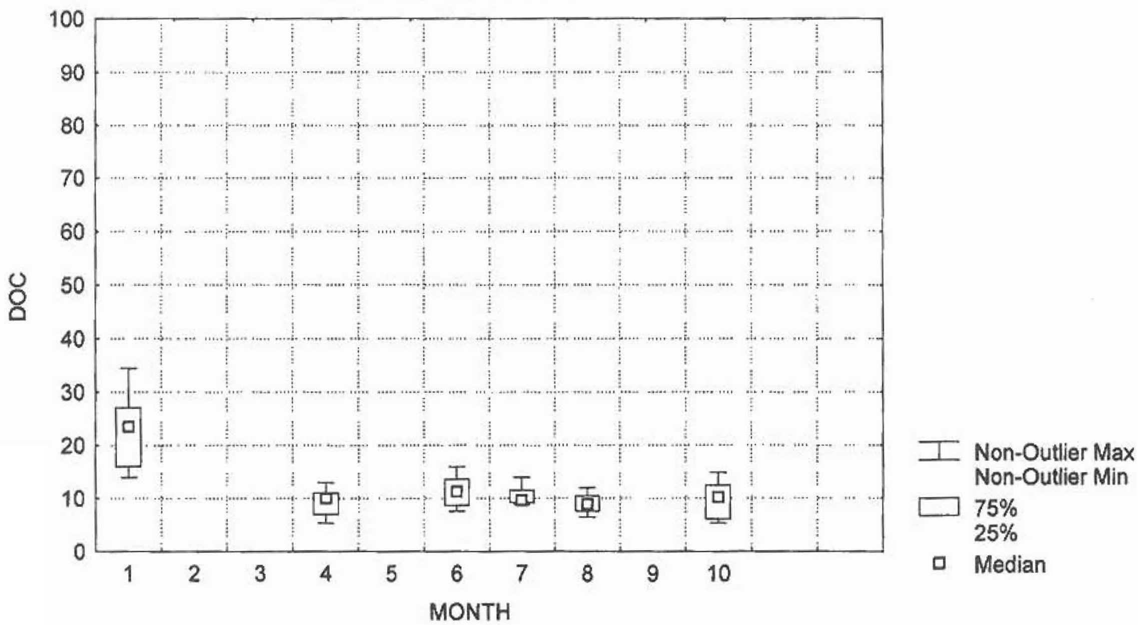
King Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

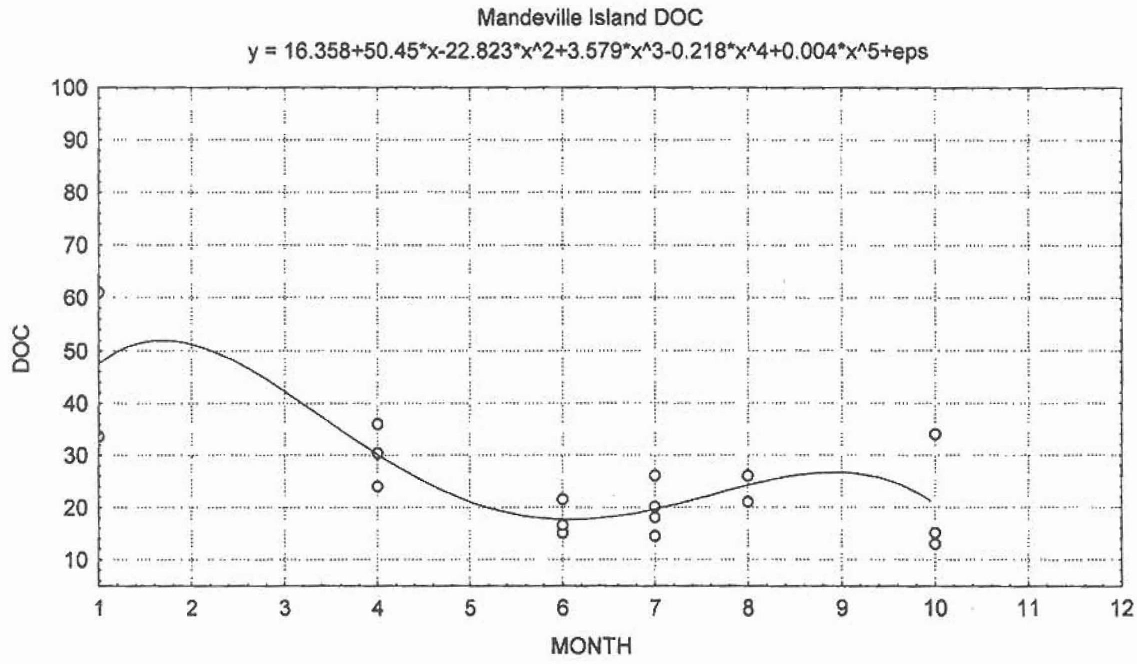
Lower Jones Tract DOC

y = 219.345-313.01*x+144.04*x^2-28.79*x^3+2.625*x^4-0.089*x^5+eps

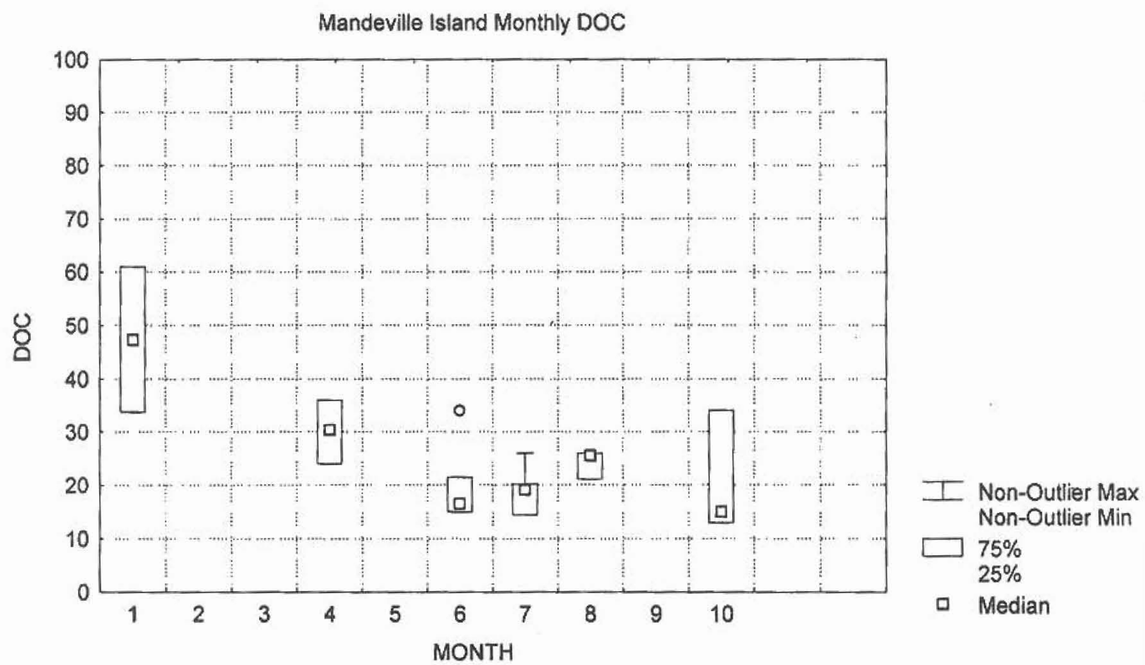


Lower Jones Tract Monthly DOC

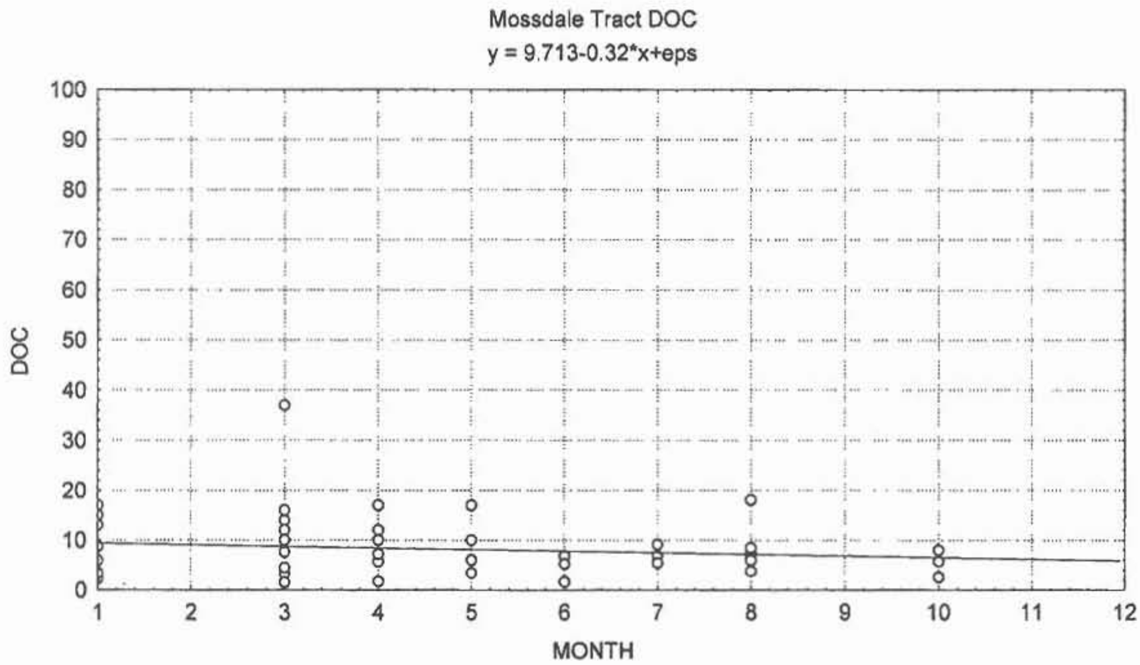


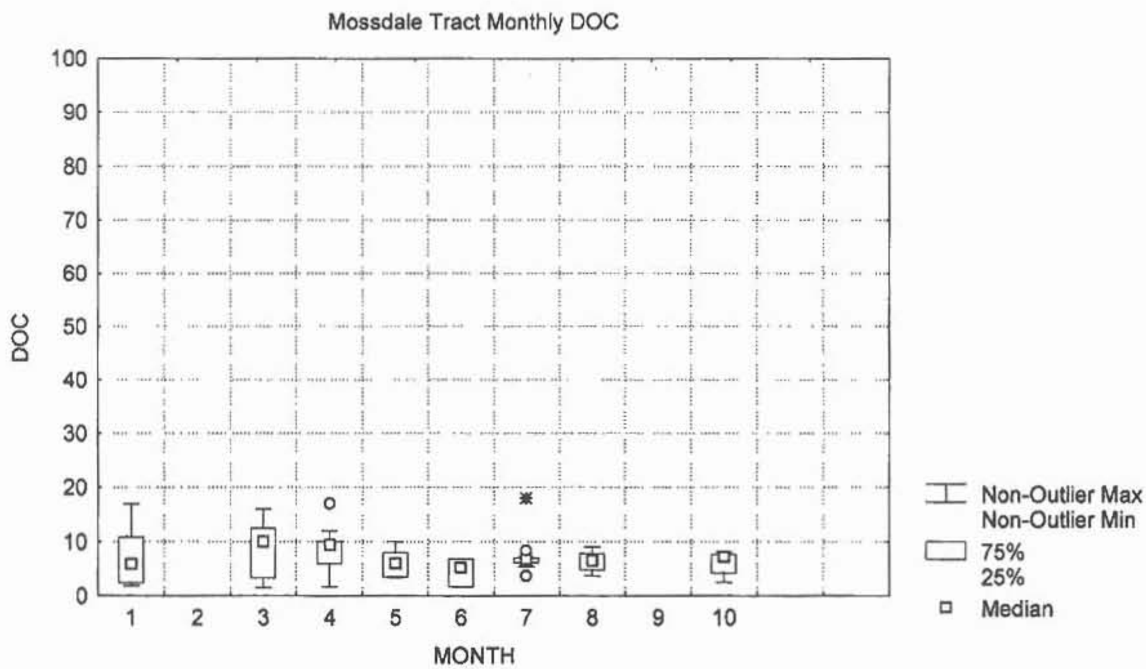


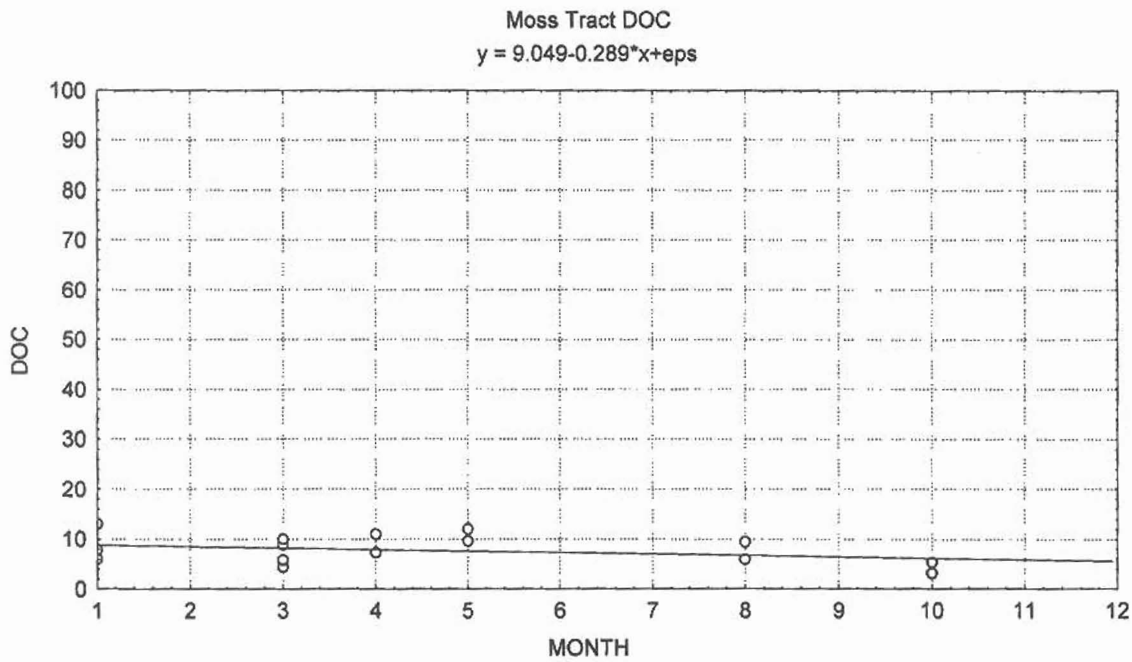
Mandeville Island DOC
y = 16.358+50.45*x-22.823*x^2+3.579*x^3-0.218*x^4+0.004*x^5+eps
DOC
MONTH

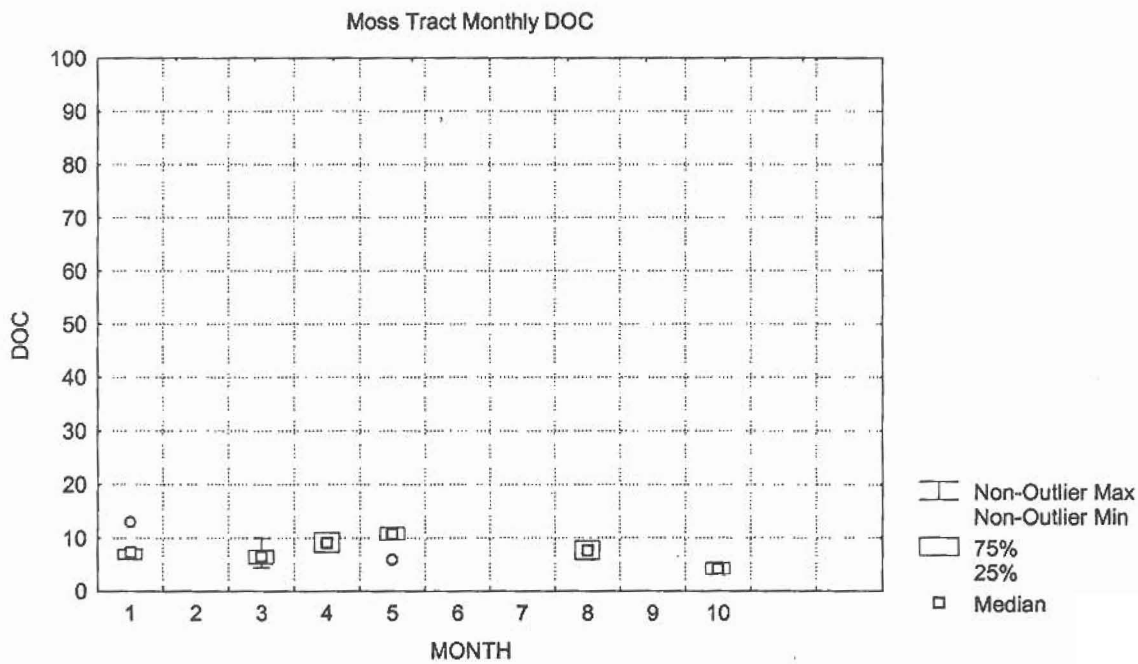


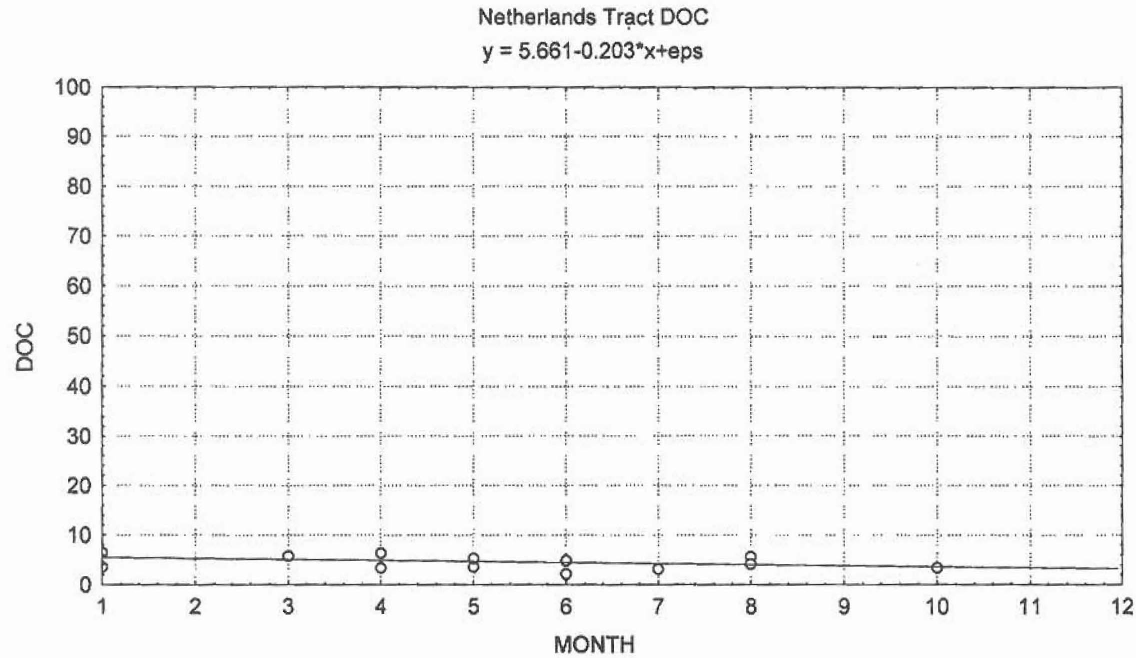
Mandeville Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

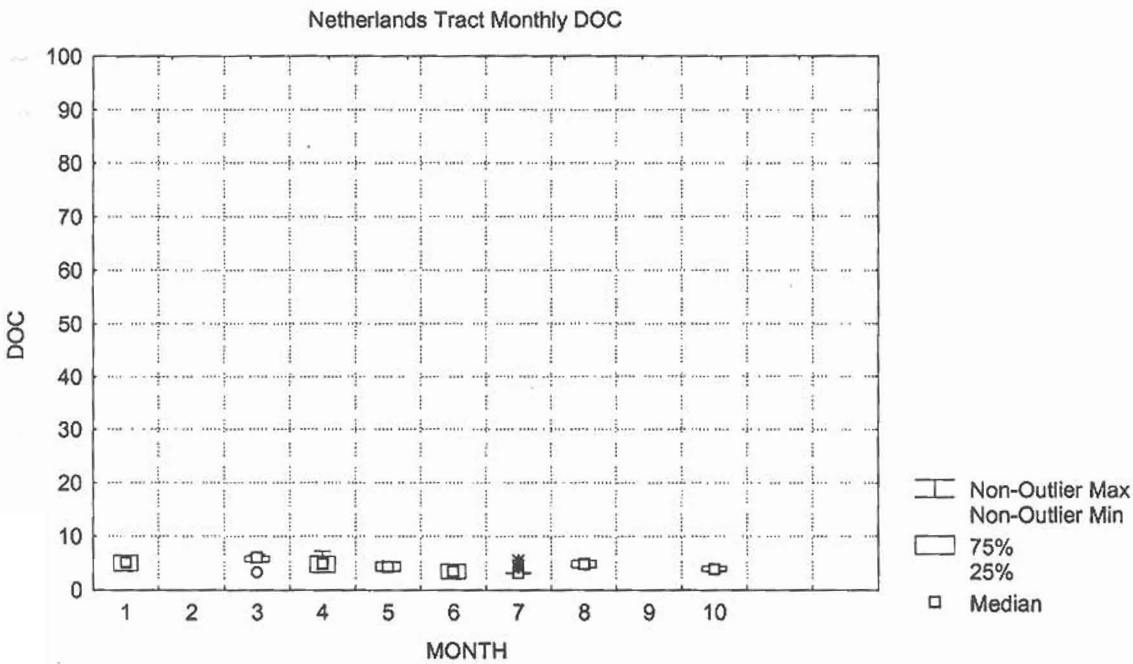

Mossdale Tract DOC
y = 9.713-0.32*x+eps
100
90
80
70
60
50
40
30
20
10
0
DOC
1
2
3
4
5
6
7
8
9
10
11
12
MONTH


Mossdale Tract Monthly DOC
100
90
80
70
60
50
40
30
20
10
0
DOC
1
2
3
4
5
6
7
8
9
10
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Moss Tract DOC
y = 9.049-0.289*x+eps
DOC
MONTH
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12

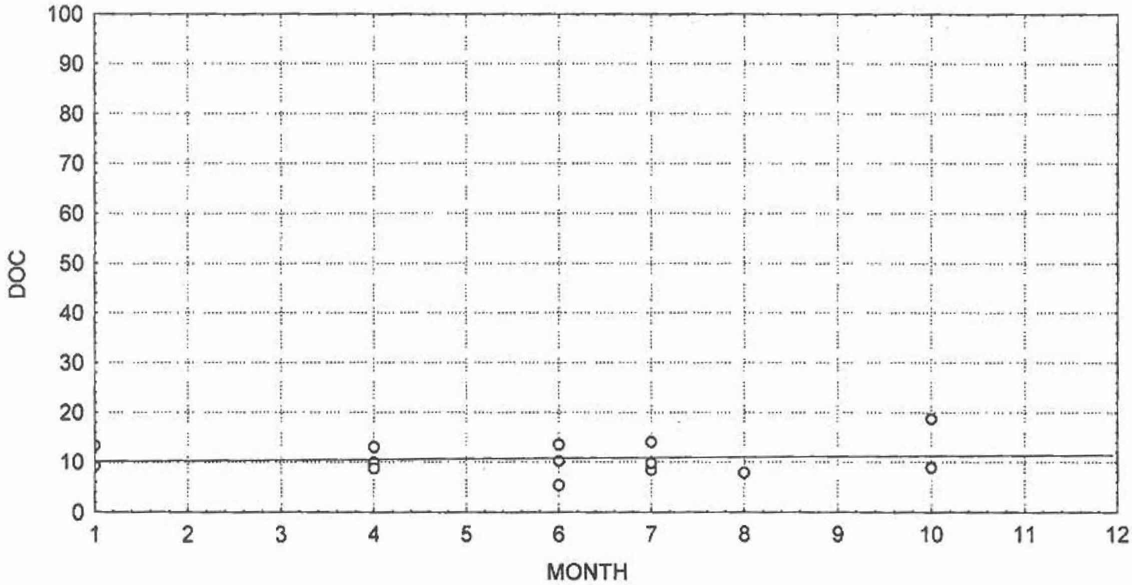

Moss Tract Monthly DOC
DOC
MONTH
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Netherlands Tract DOC
y = 5.661-0.203*x+eps
DOC
MONTH

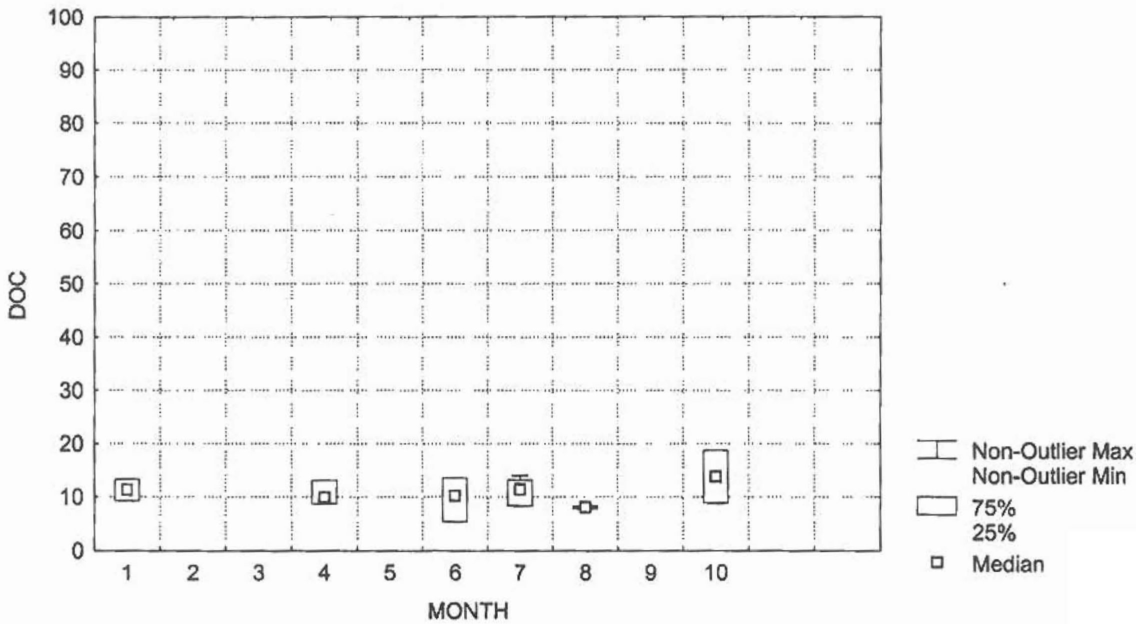

Netherlands Tract Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

Orwood Tract DOC

y = 10.063+0.111*x+eps

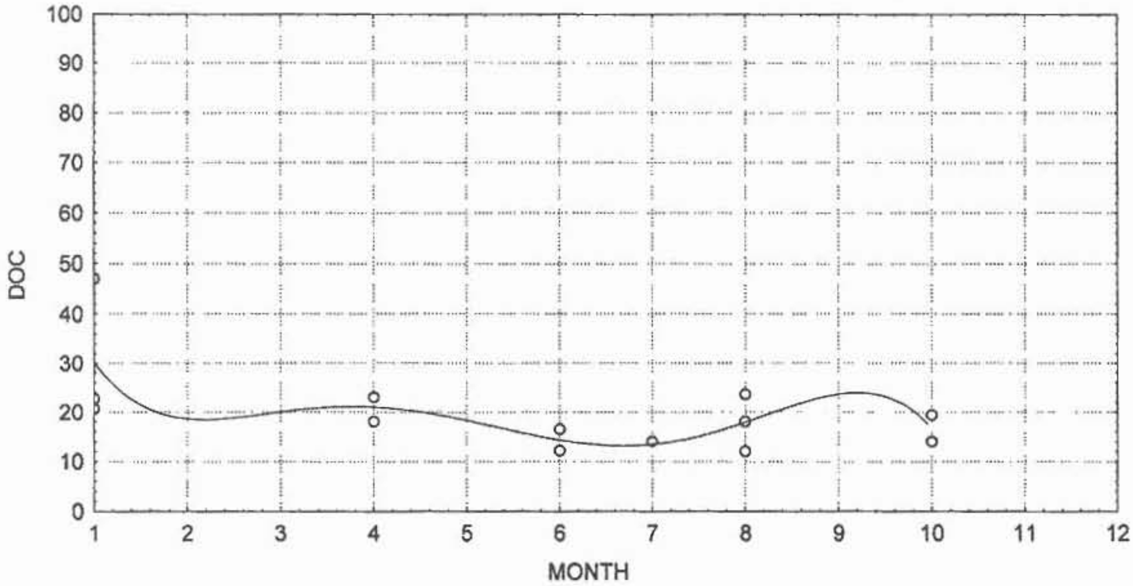


Orwood Tract Monthly DOC

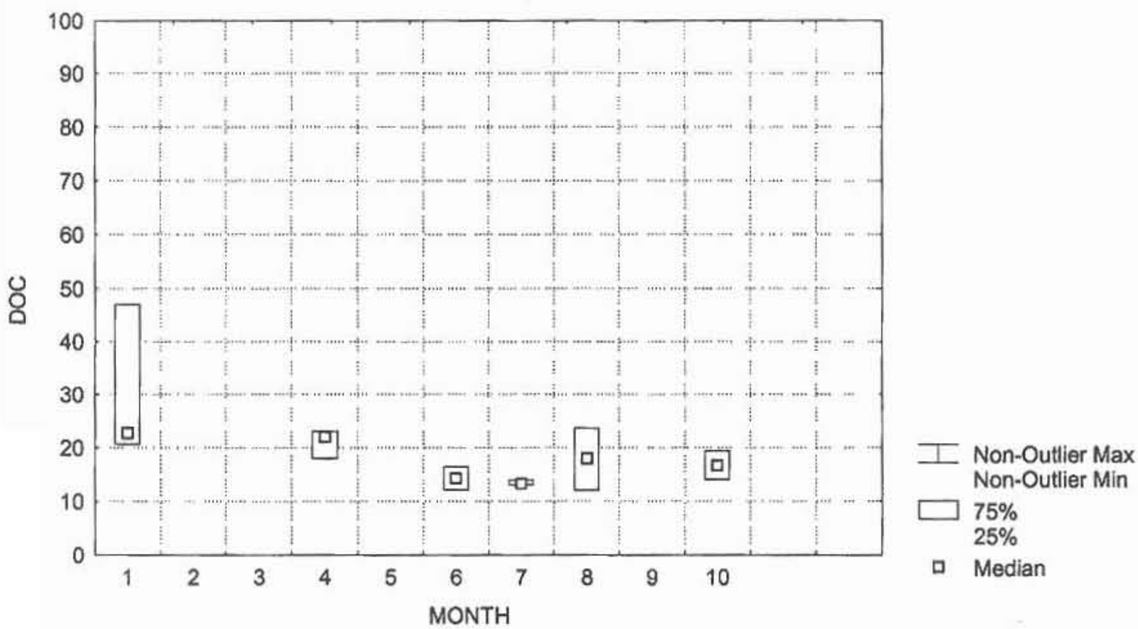


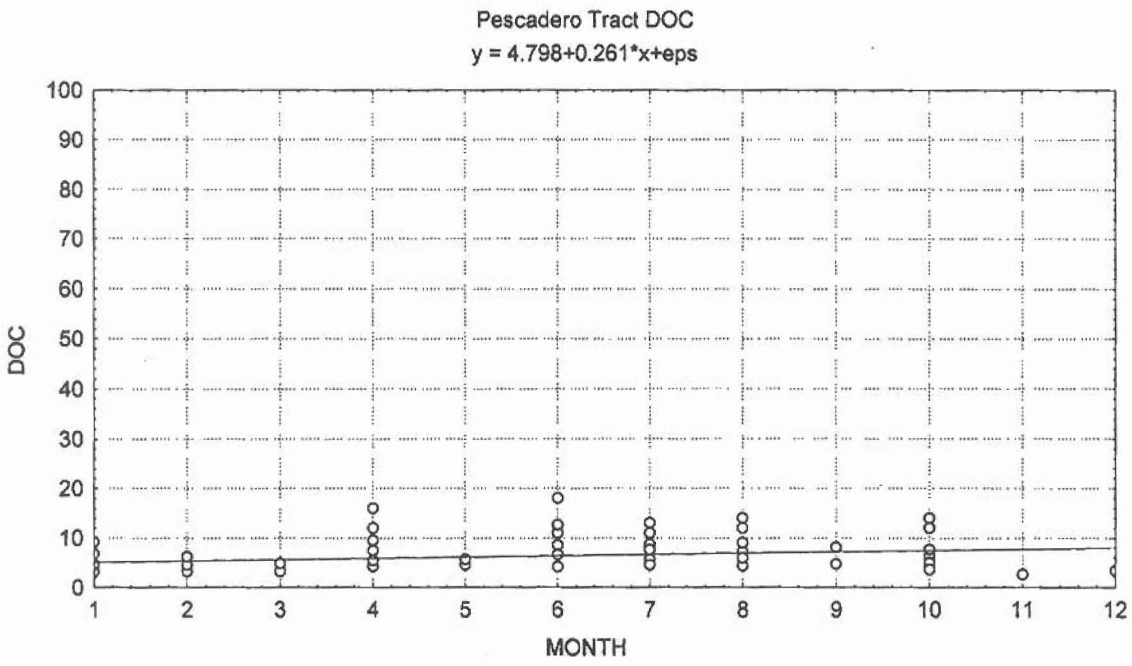
Palm Tract DOC

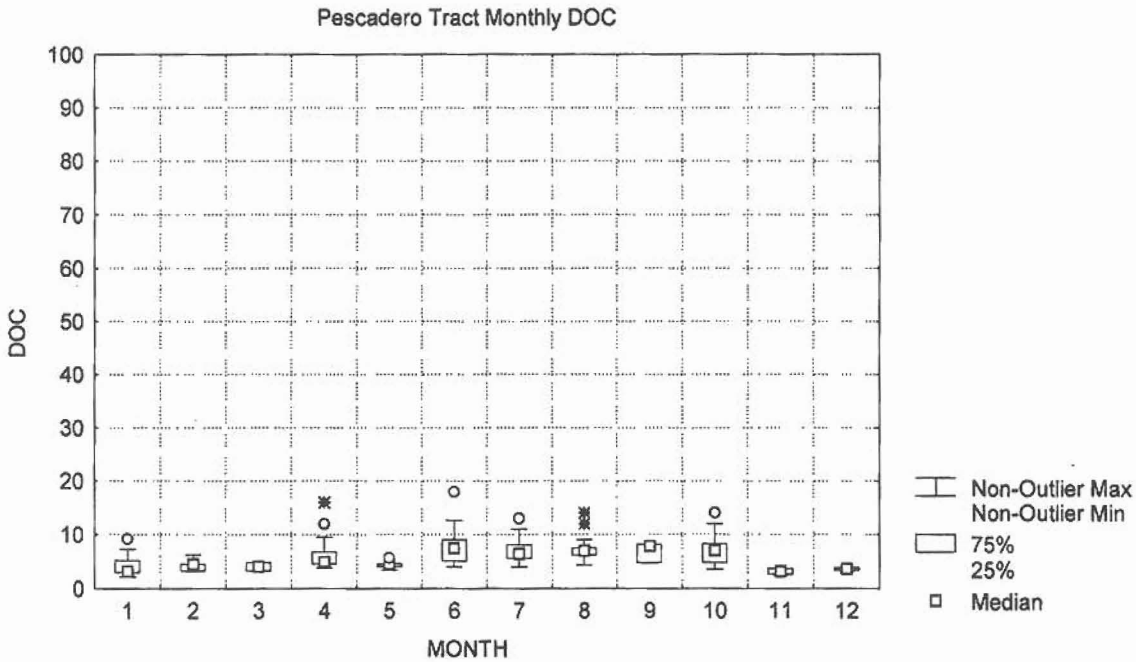
$y = 81.467-84.596*x+41.49*x^2-9.138*x^3+0.91*x^4-0.033*x^5+eps$

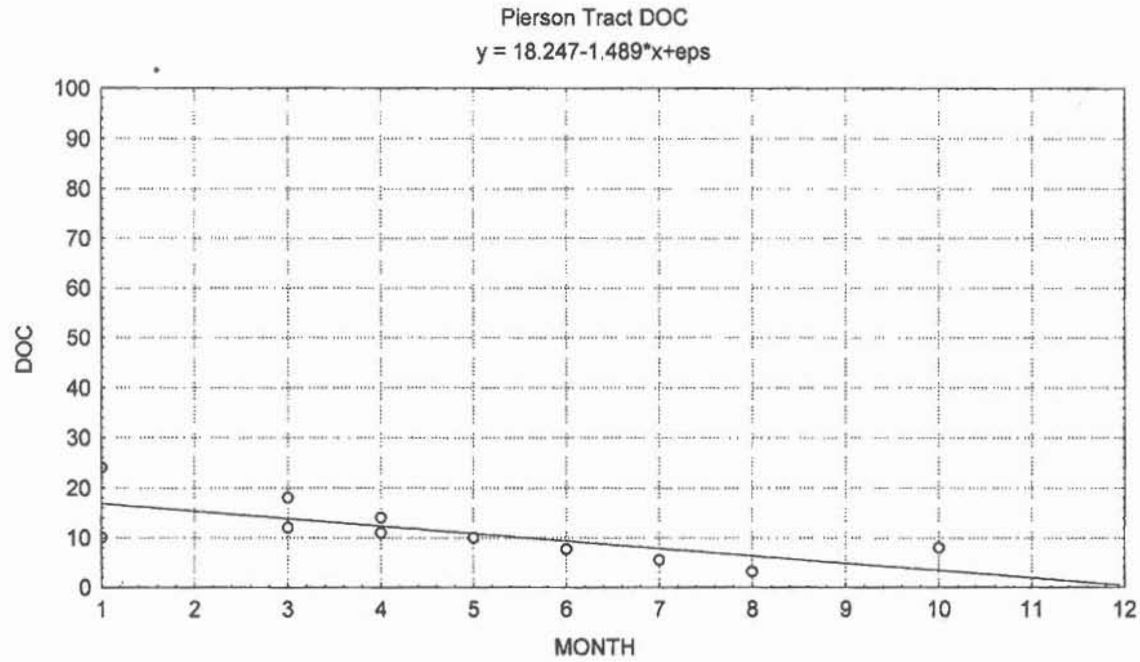


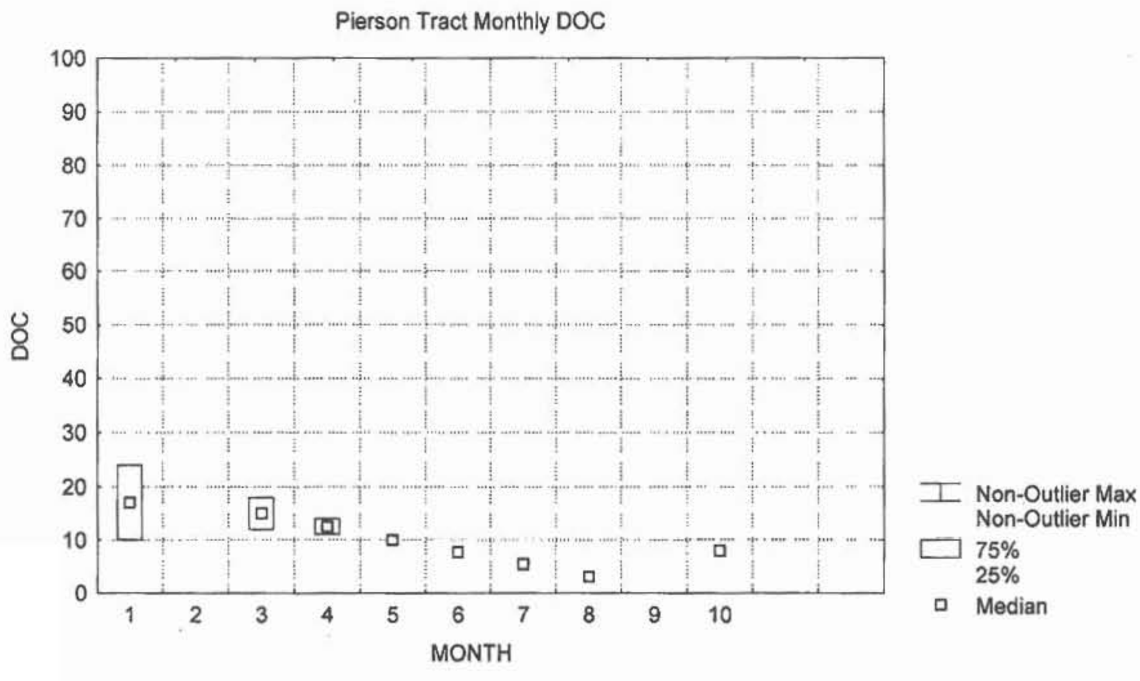
Palm Tract Monthly DOC

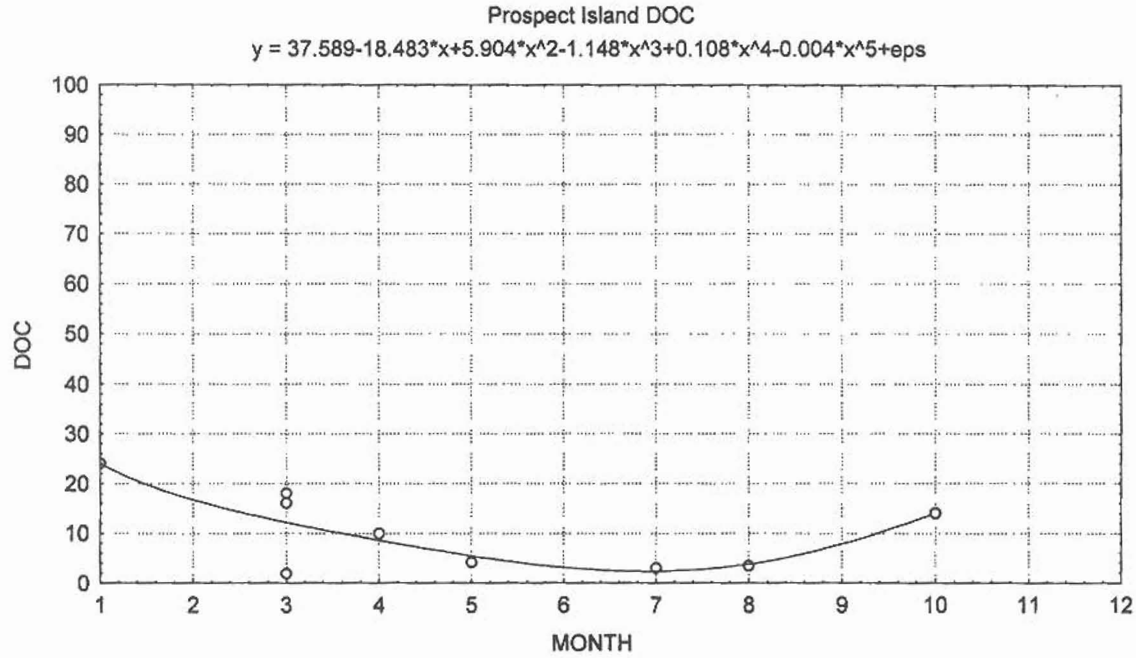


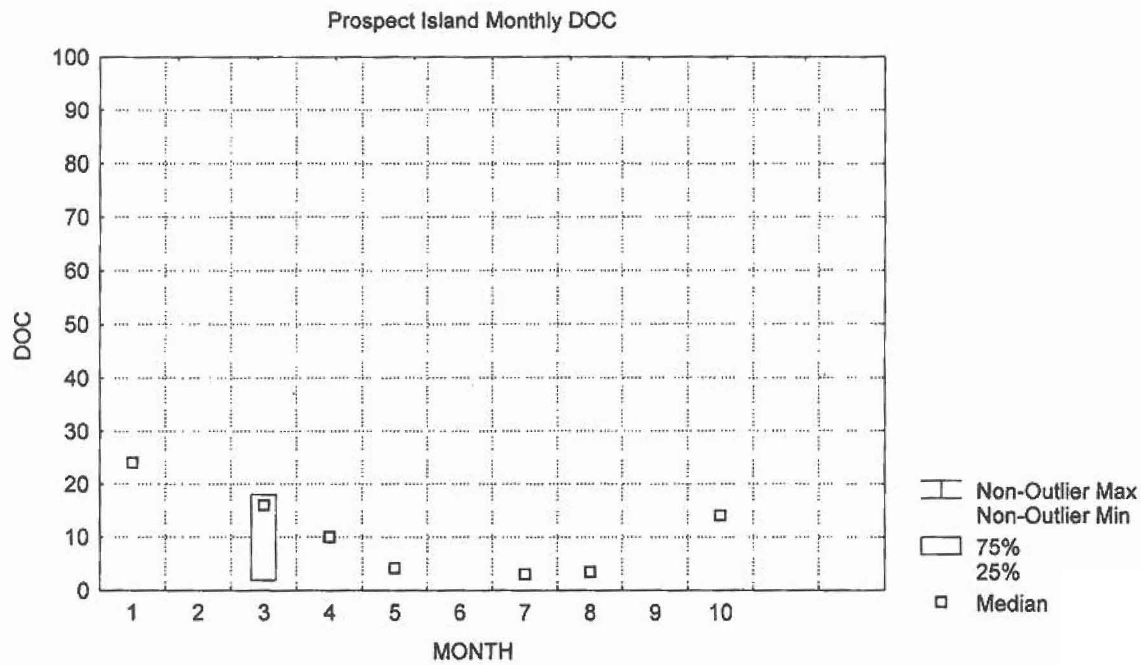

Pescadero Tract DOC
y = 4.798+0.261*x+eps
DOC
MONTH

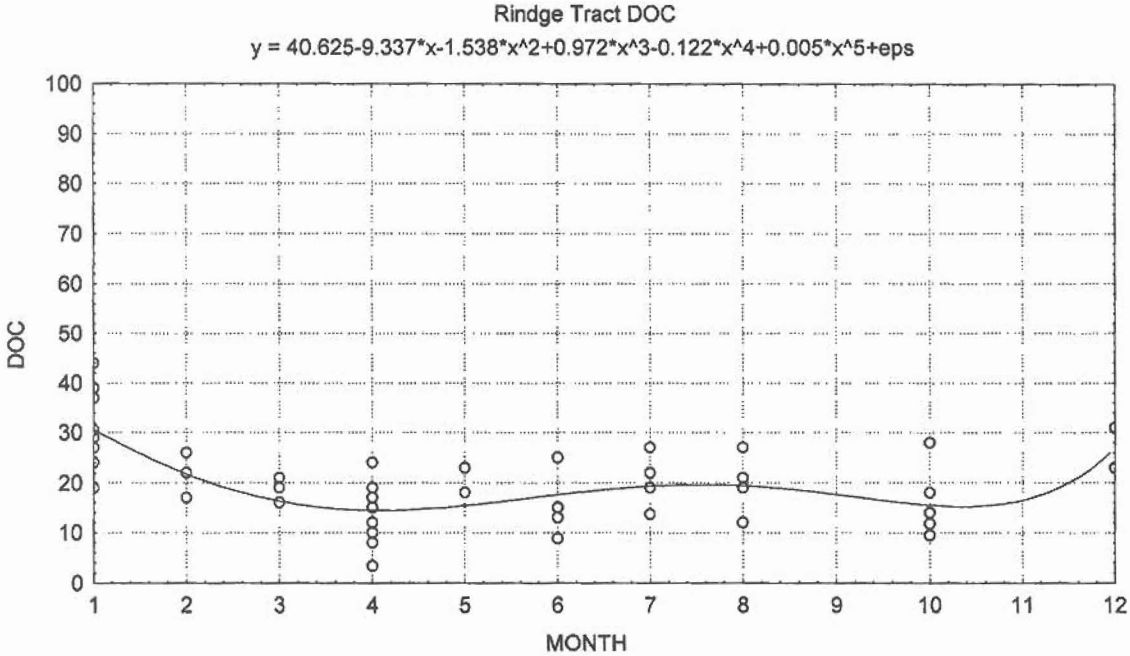

Pescadero Tract Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Pierson Tract DOC
y = 18.247-1.489*x+eps
DOC
MONTH
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
11
12


Pierson Tract Monthly DOC
DOC
MONTH
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Prospect Island DOC
y = 37.589-18.483*x+5.904*x^2-1.148*x^3+0.108*x^4-0.004*x^5+eps
DOC
MONTH


Prospect Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Rindge Tract DOC
y = 40.625-9.337*x-1.538*x^2+0.972*x^3-0.122*x^4+0.005*x^5+eps
DOC
MONTH
0
10
20
30
40
50
60
70
80
90
100
1
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5
6
7
8
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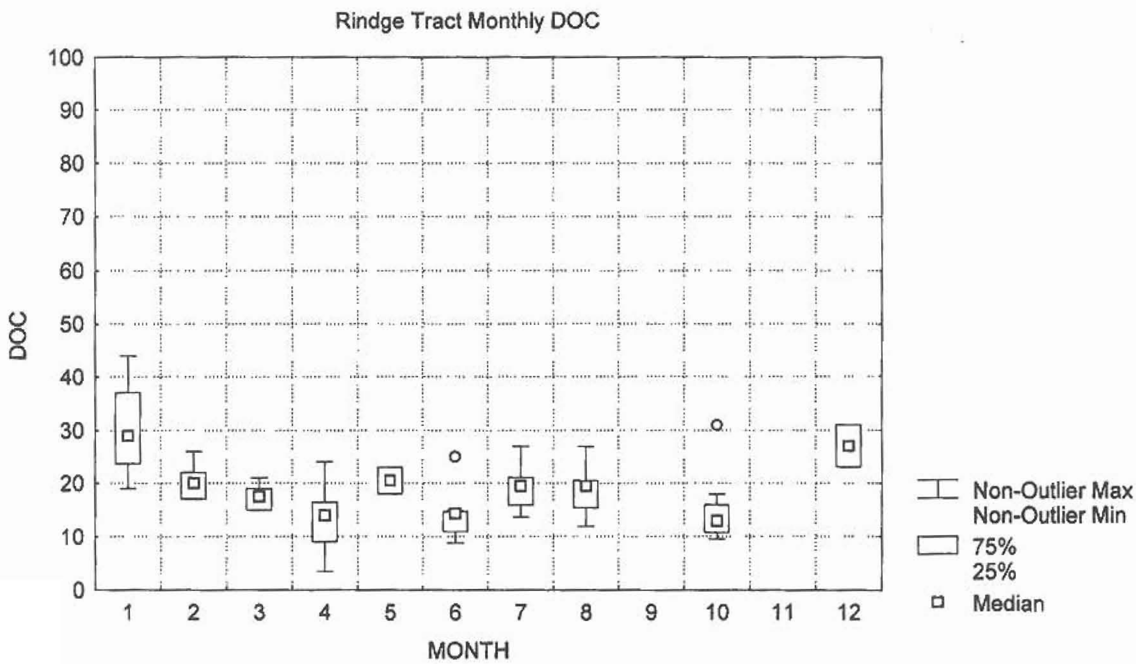
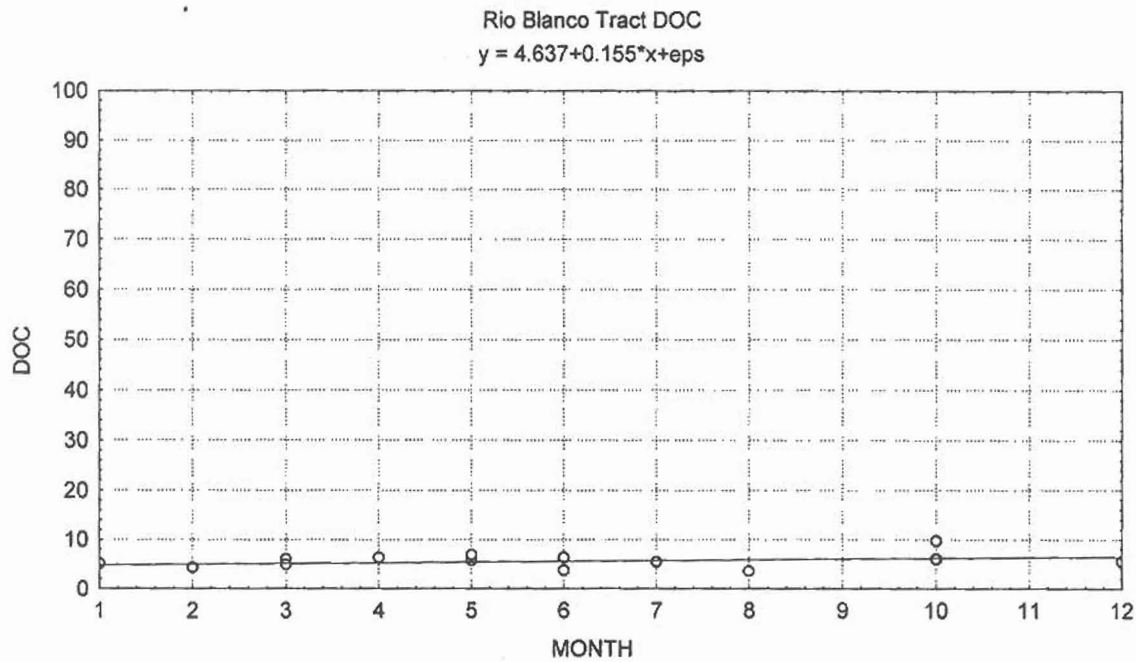
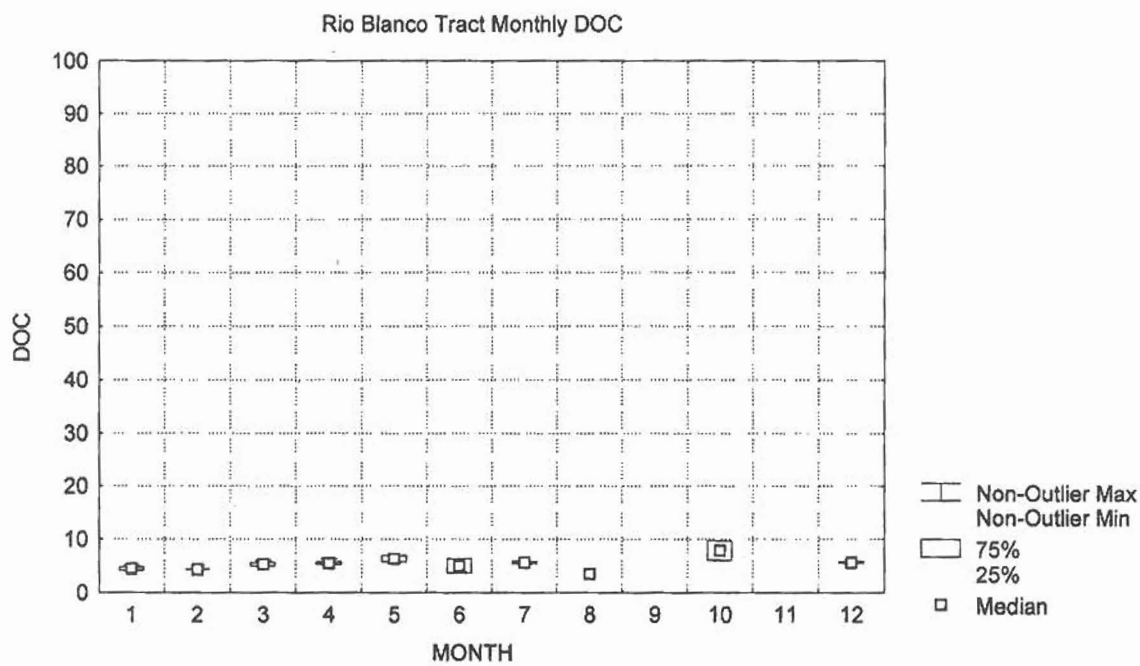
12

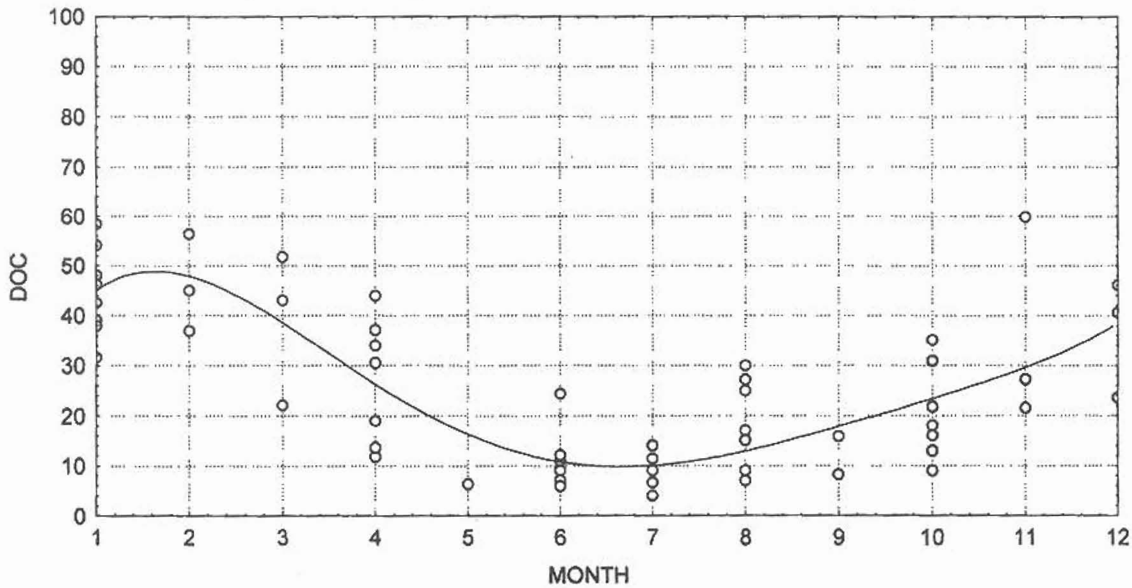

Rindge Tract Monthly DOC
DOC
MONTH
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
11
12
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Rio Blanco Tract DOC
y = 4.637+0.155*x+eps
DOC
MONTH

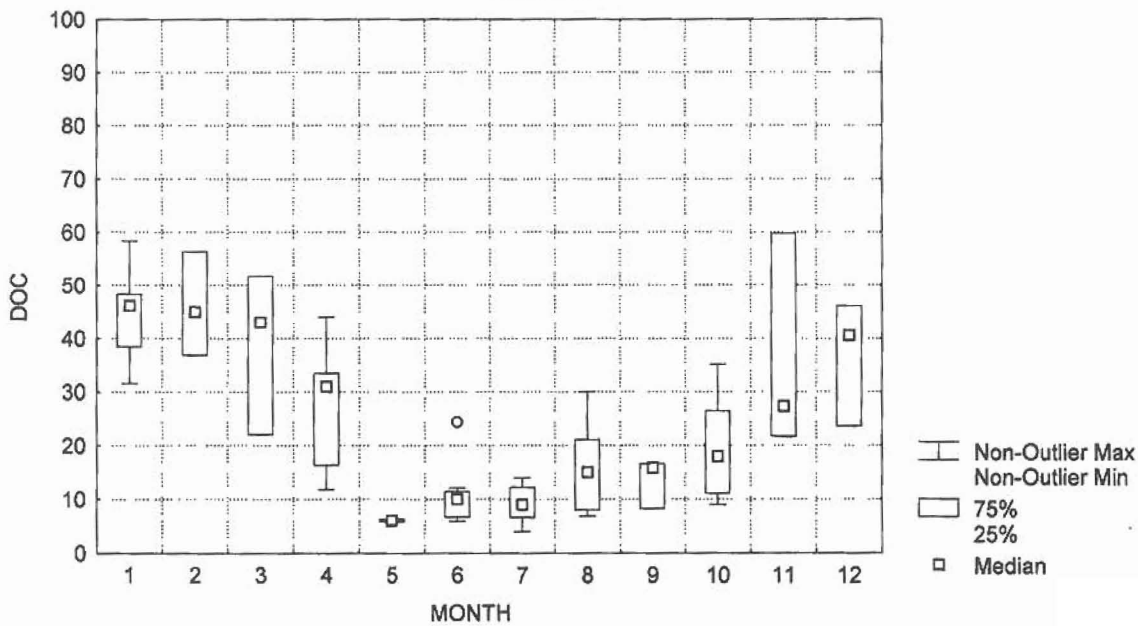

Rio Blanco Tract Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

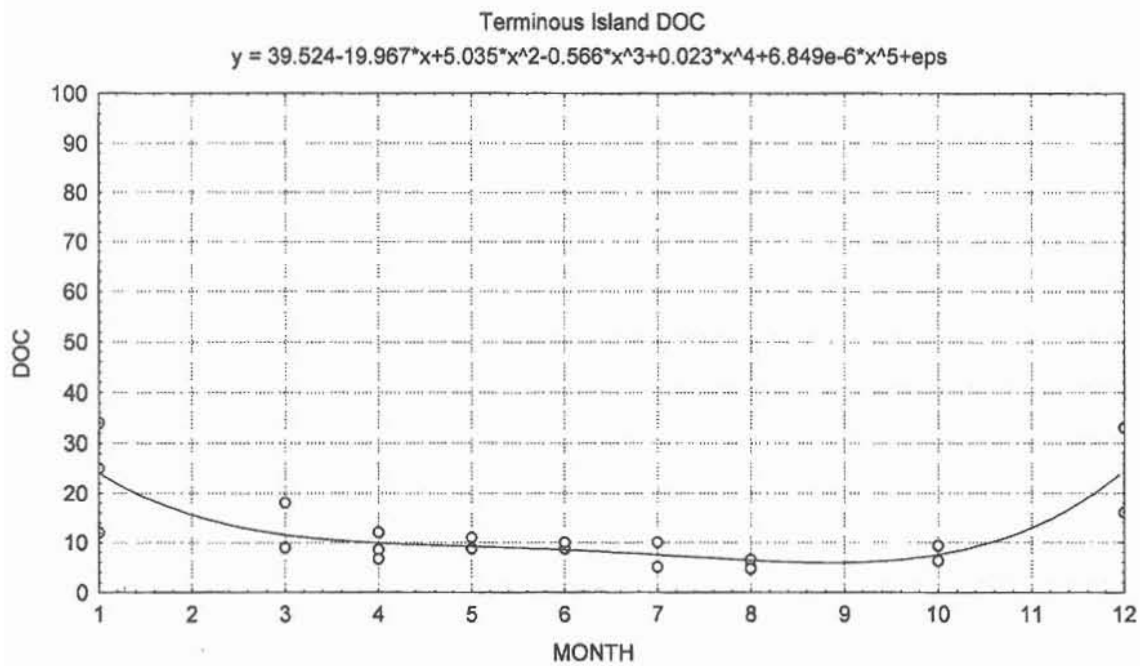
Staten Island DOC

$y = 16.328+47.446*x-22.21*x^2+3.678*x^3-0.261*x^4+0.007*x^5+eps$

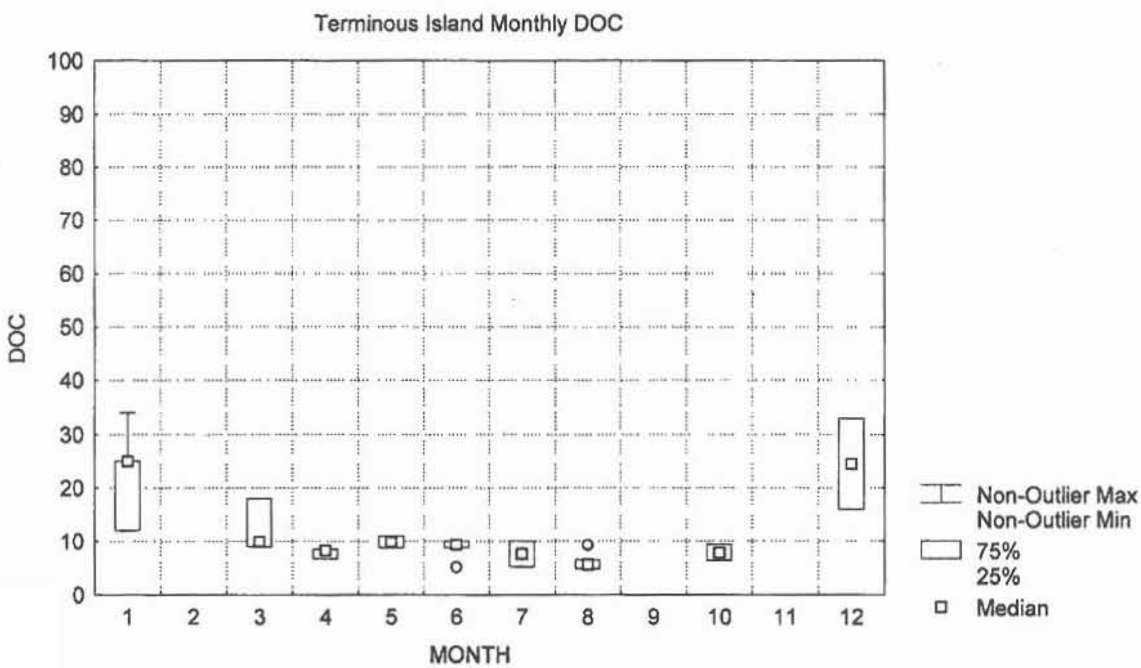


Staten Island Monthly DOC

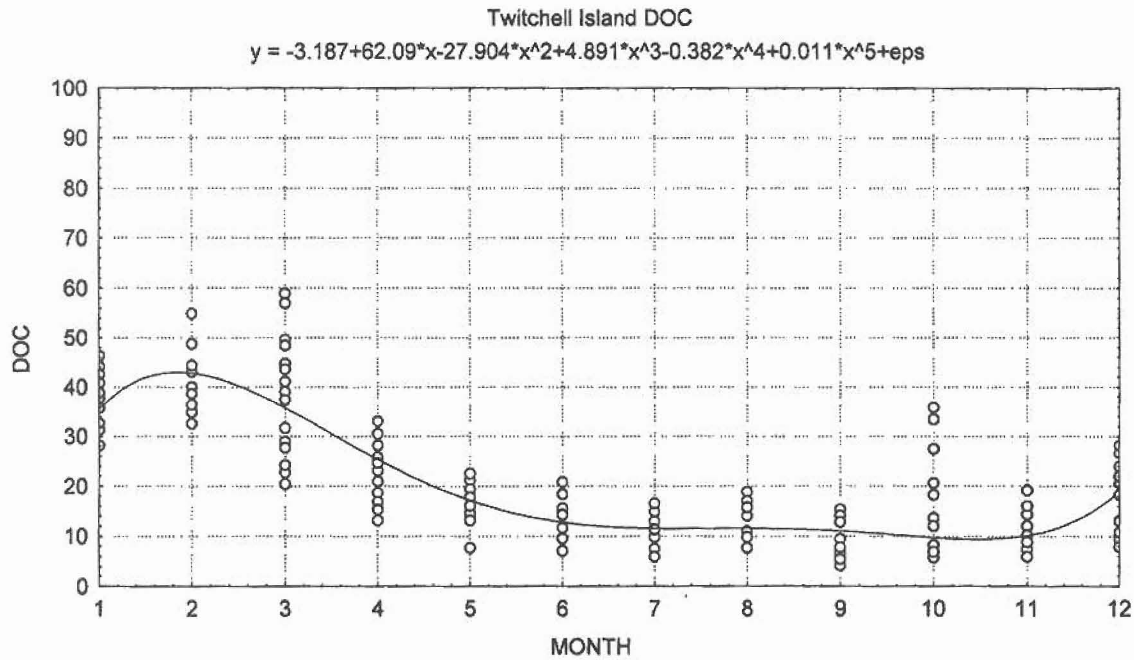


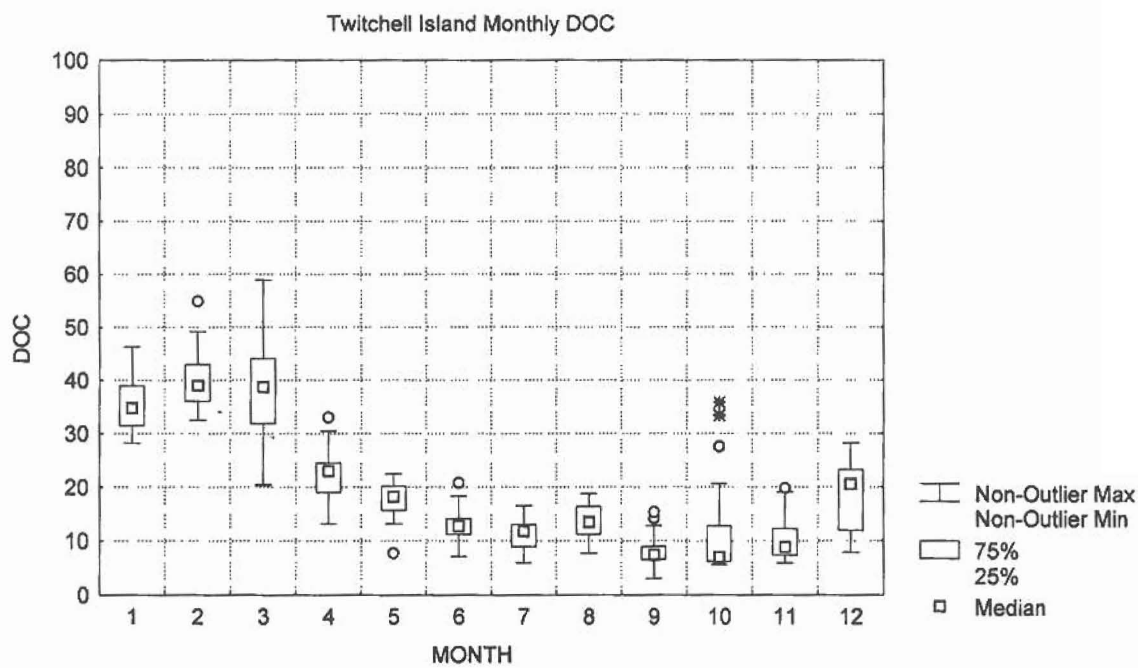


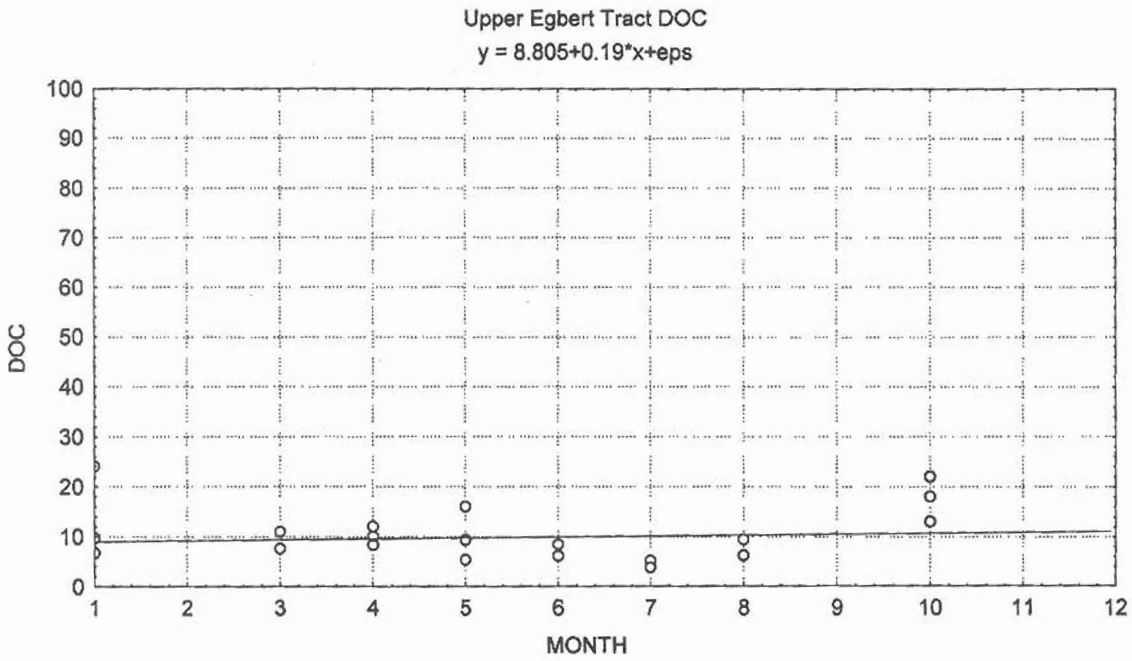
Terminous Island DOC
y = 39.524-19.967*x+5.035*x^2-0.566*x^3+0.023*x^4+6.849e-6*x^5+eps
DOC
MONTH



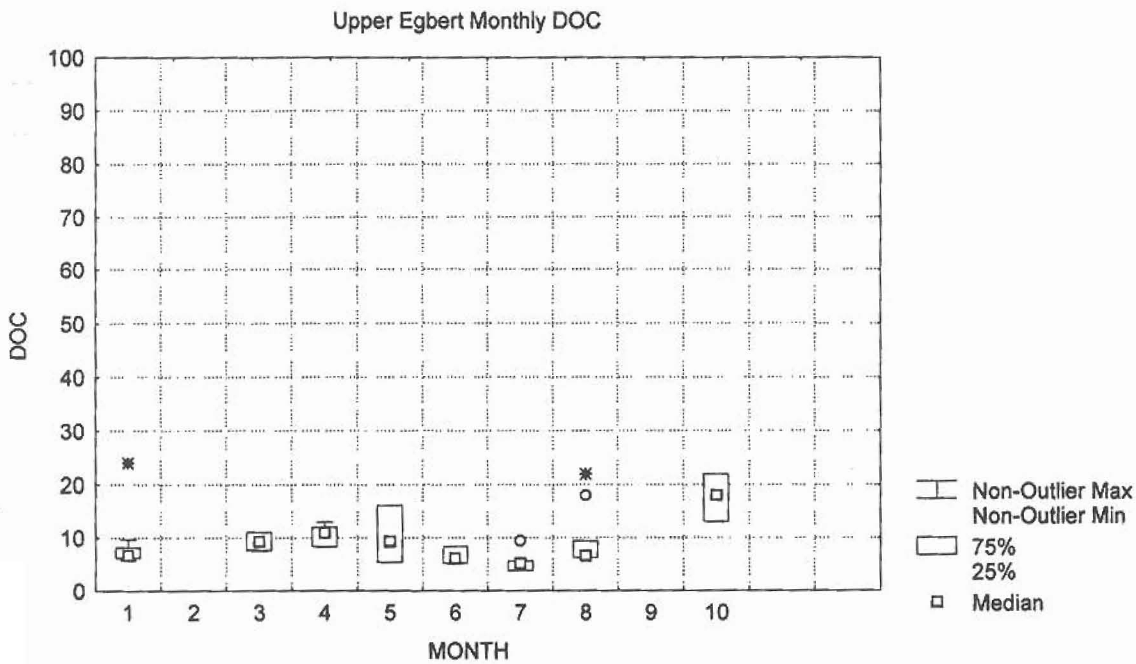
Terminous Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Twitchell Island DOC
y = -3.187+62.09*x-27.904*x^2+4.891*x^3-0.382*x^4+0.011*x^5+eps
DOC
MONTH
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
11
12

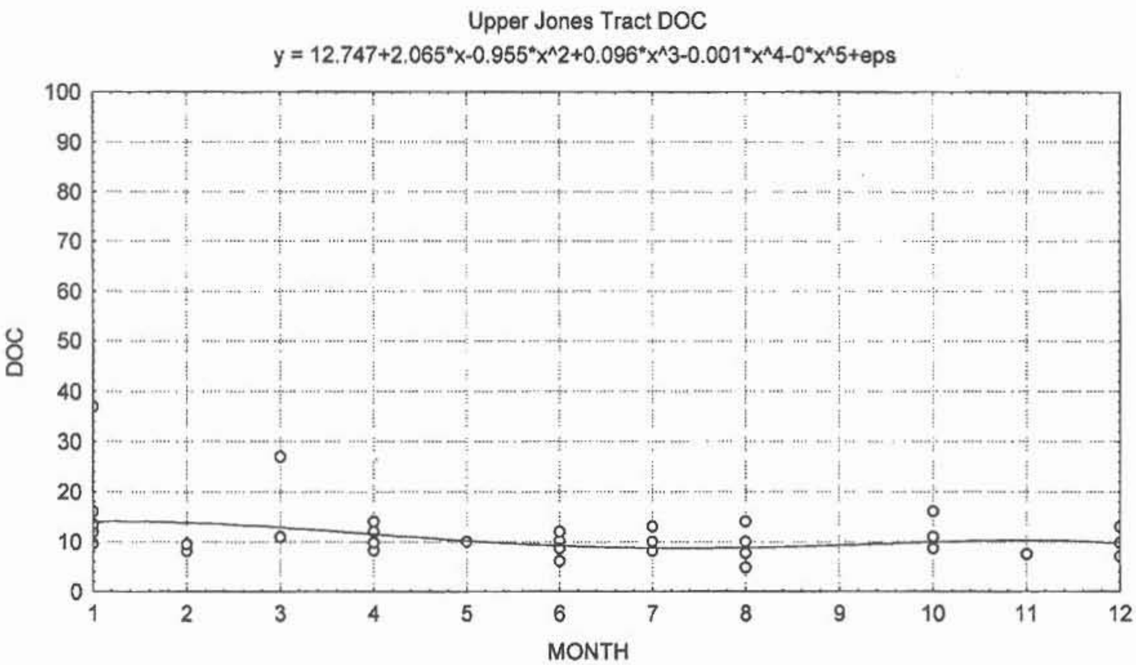

Twitchell Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

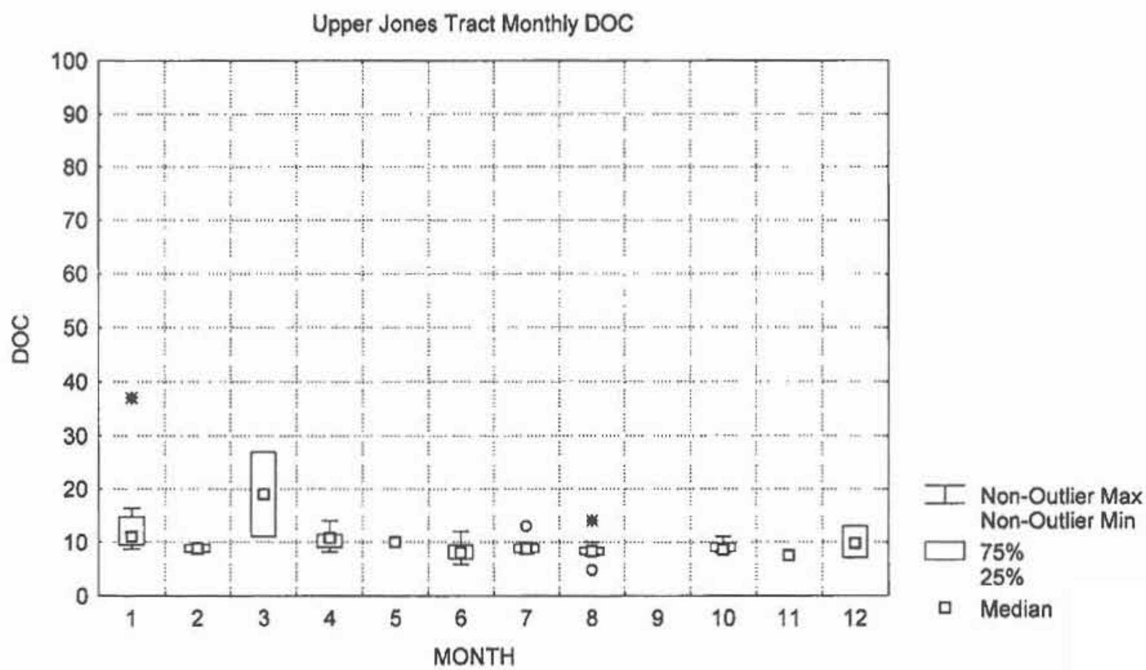


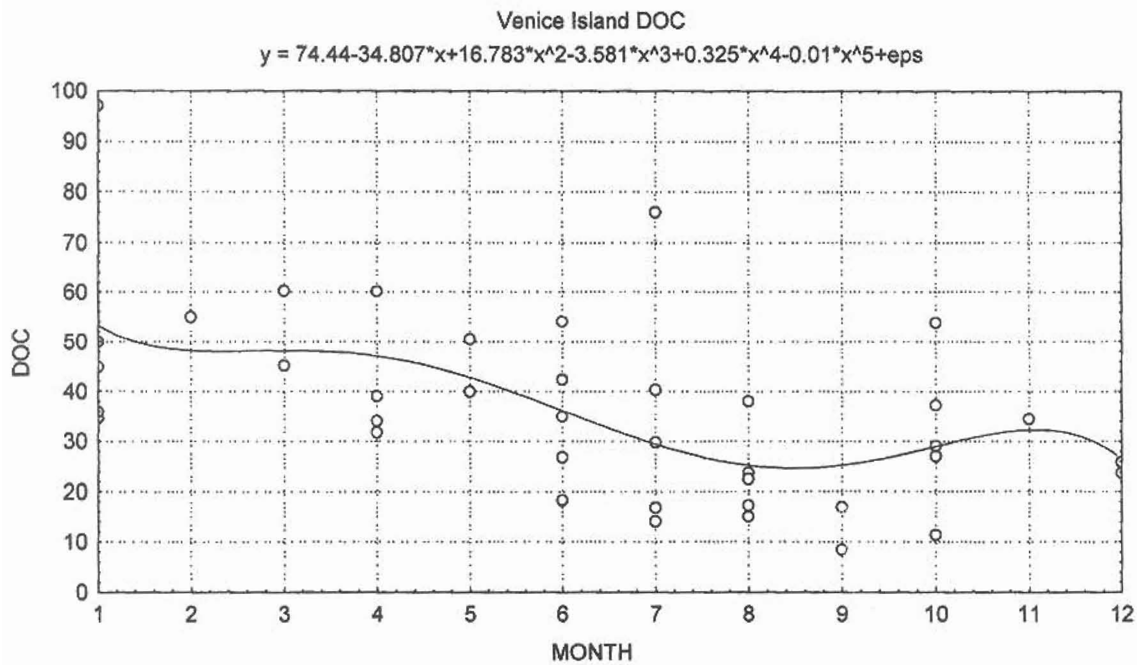
Upper Egbert Tract DOC
y = 8.805+0.19*x+eps
DOC
MONTH

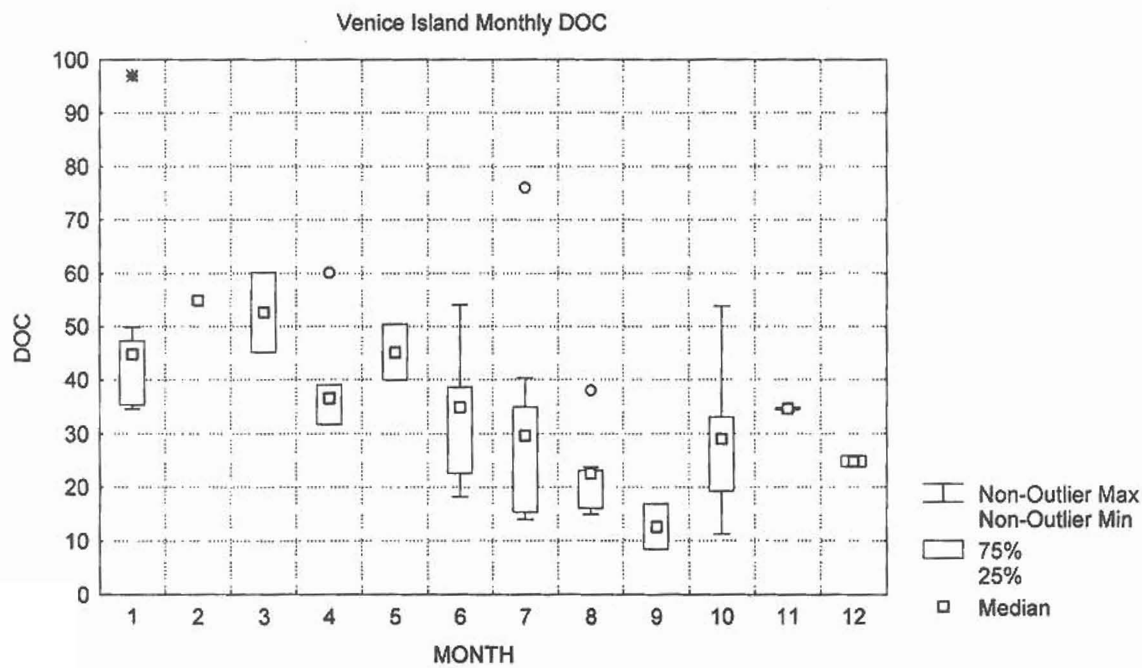


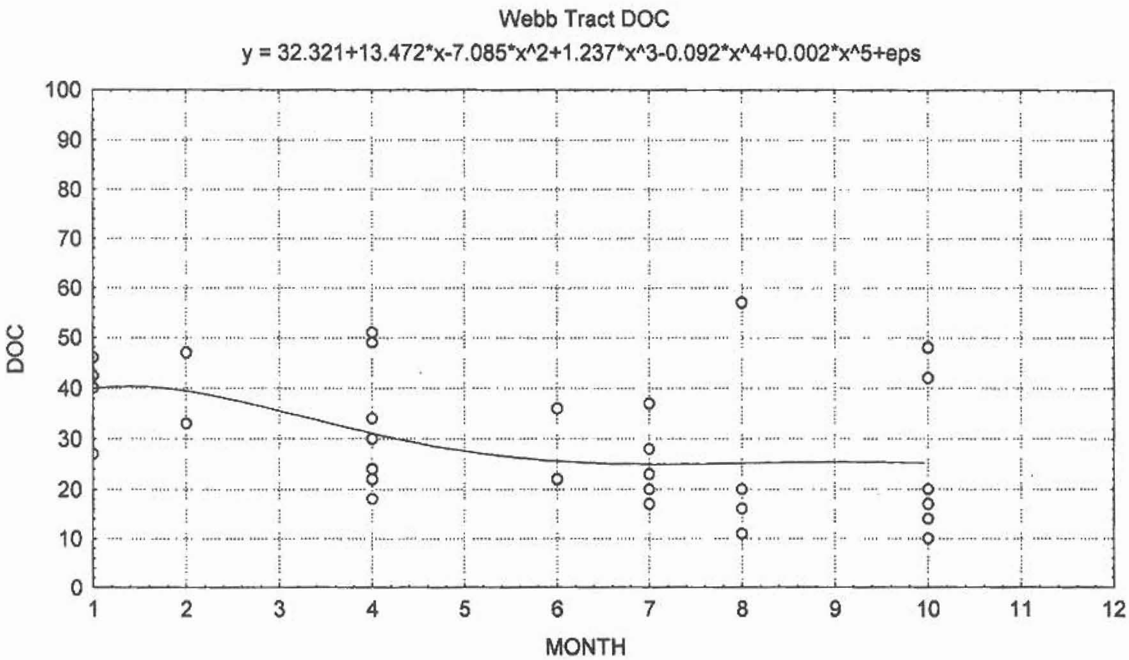
Upper Egbert Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

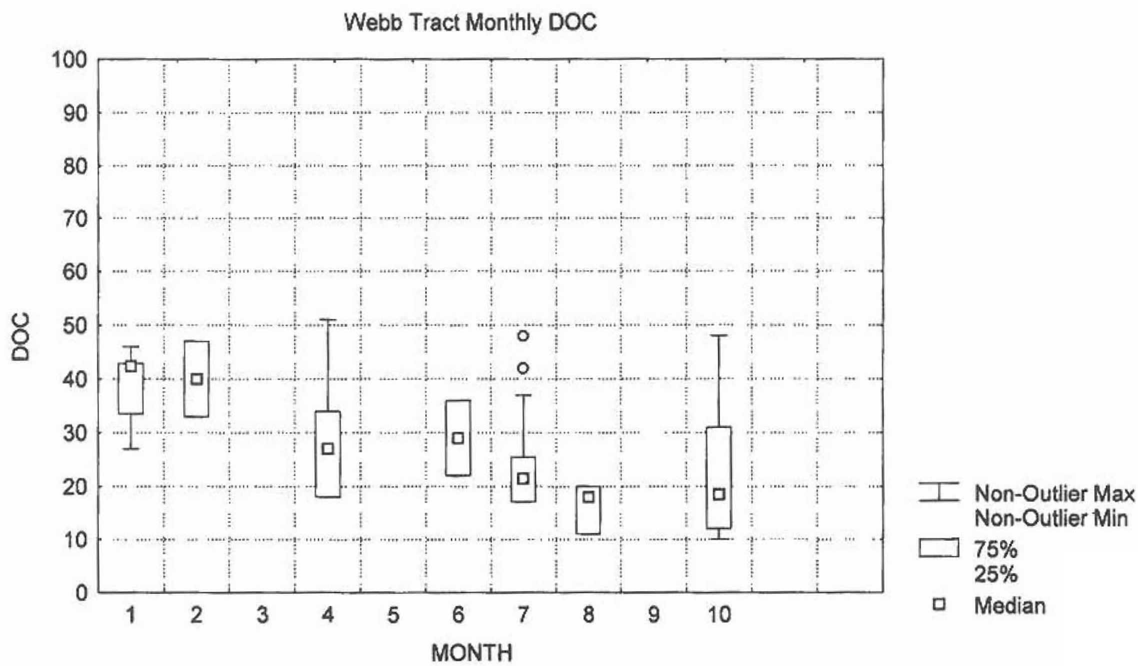

Upper Jones Tract DOC
y = 12.747+2.065*x-0.955*x^2+0.096*x^3-0.001*x^4-0*x^5+eps
DOC
MONTH
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12

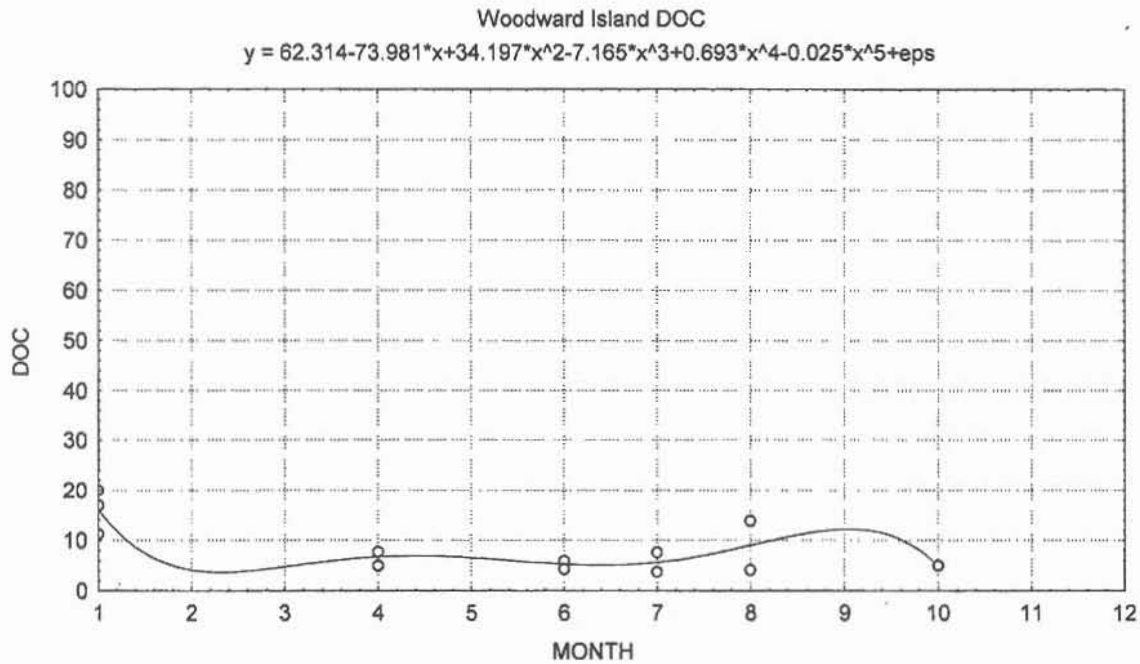

Upper Jones Tract Monthly DOC
DOC
MONTH
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
6
7
8
9
10
11
12
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

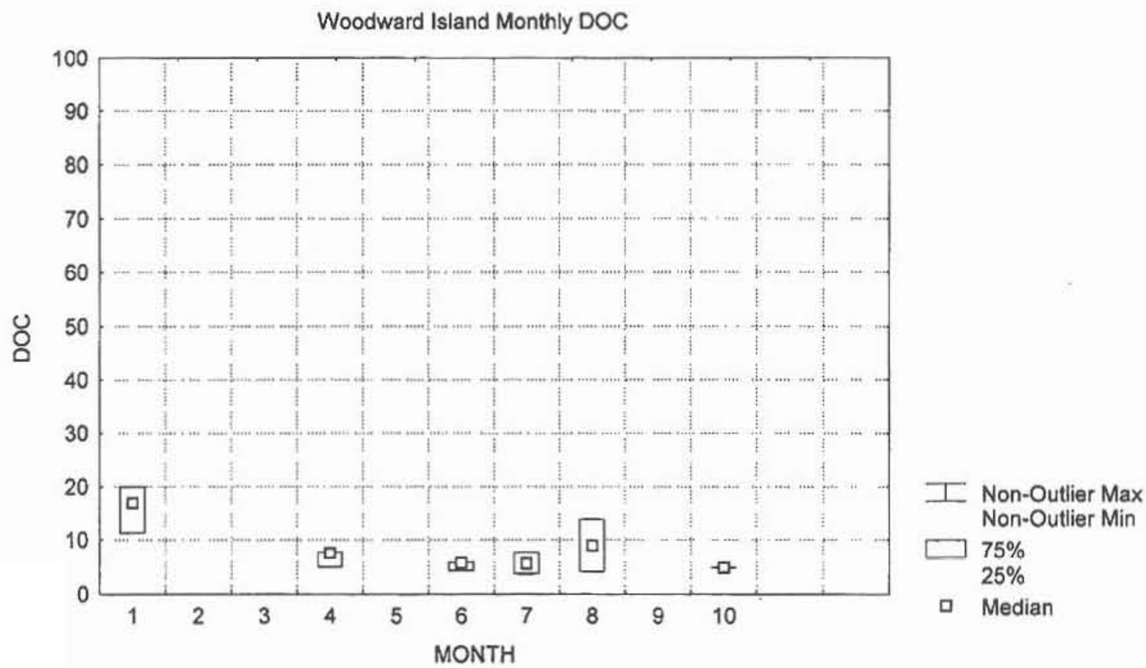

Venice Island DOC
y = 74.44-34.807*x+16.783*x^2-3.581*x^3+0.325*x^4-0.01*x^5+eps
DOC
MONTH
0
10
20
30
40
50
60
70
80
90
100
1
2
3
4
5
6
7
8
9
10
11
12


Venice Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Webb Tract DOC
y = 32.321+13.472*x-7.085*x^2+1.237*x^3-0.092*x^4+0.002*x^5+eps
DOC
MONTH

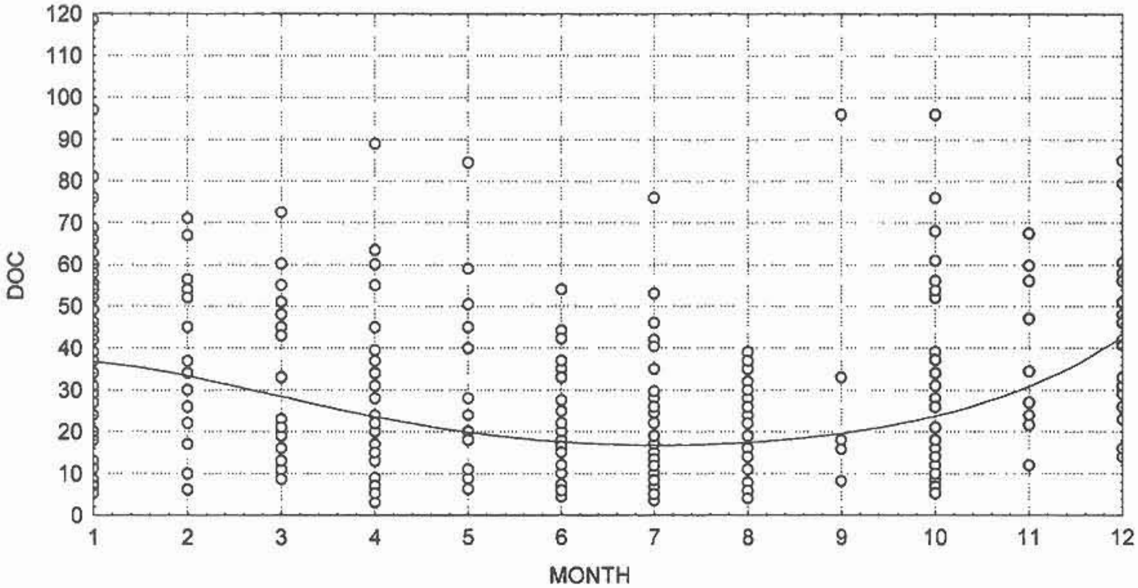

Webb Tract Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median


Woodward Island DOC
y = 62.314-73.981*x+34.197*x^2-7.165*x^3+0.693*x^4-0.025*x^5+eps
DOC
MONTH


Woodward Island Monthly DOC
DOC
MONTH
Non-Outlier Max
Non-Outlier Min
75%
25%
Median

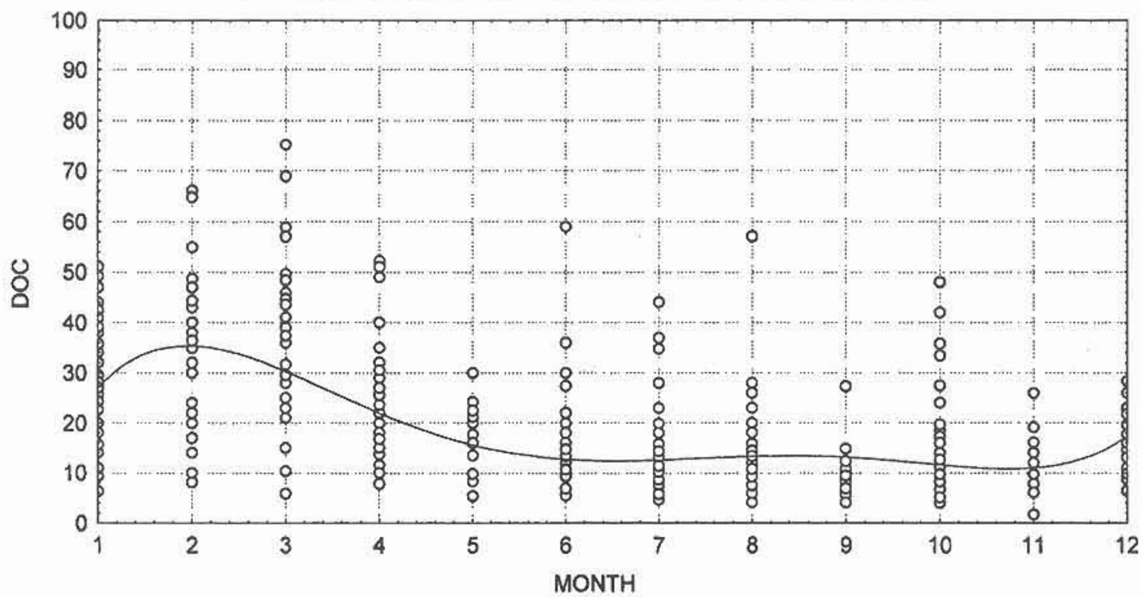
High DOC Subarea Pattern

y = 35.877+4.144*x-4.011*x^2+0.763*x^3-0.06*x^4+0.002*x^5+eps

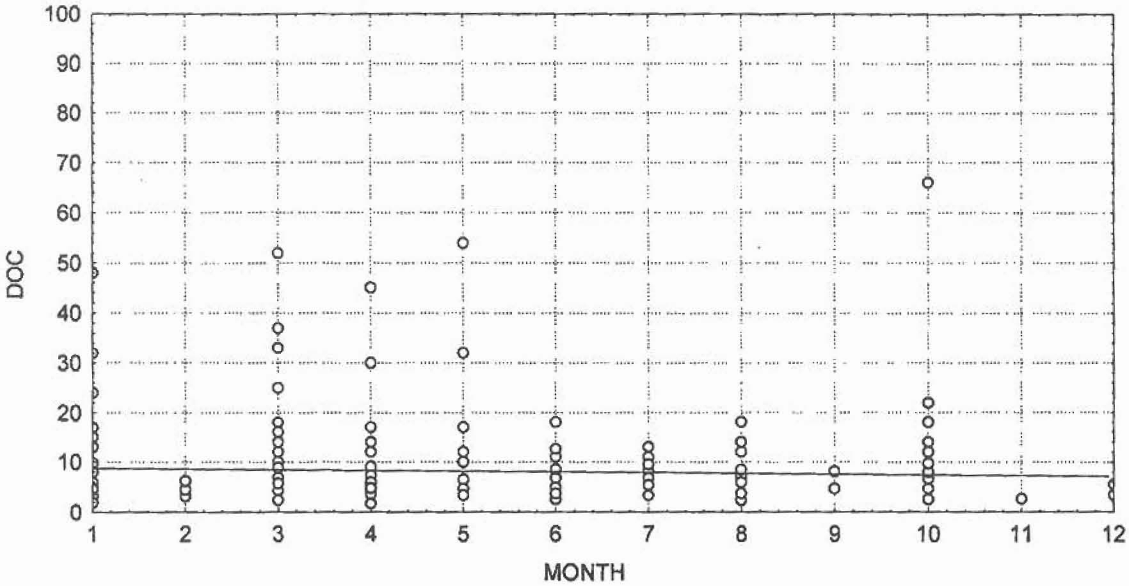


Midrange DOC Subarea Pattern

y = -10.521+59.415*x-26.021*x^2+4.558*x^3-0.356*x^4+0.01*x^5+eps



Low DOC Subarea Pattern
y = 8.888-0.143*x+eps



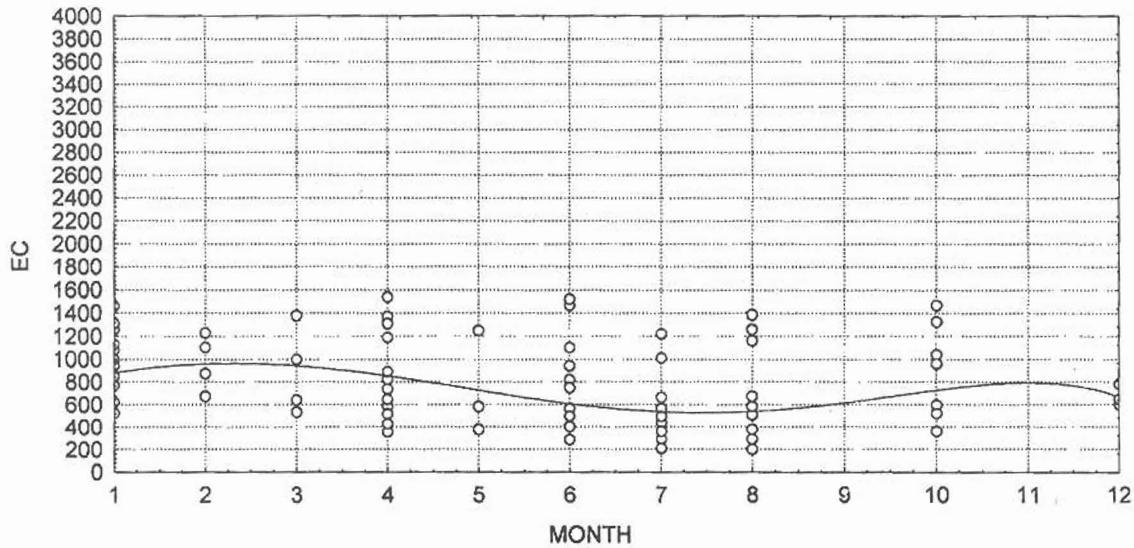
APPENDIX B.

Delta Drainage EC by Island/Tract

Brannan Island EC

Scatterplot (DRWQ3.STA 34v*1903c)

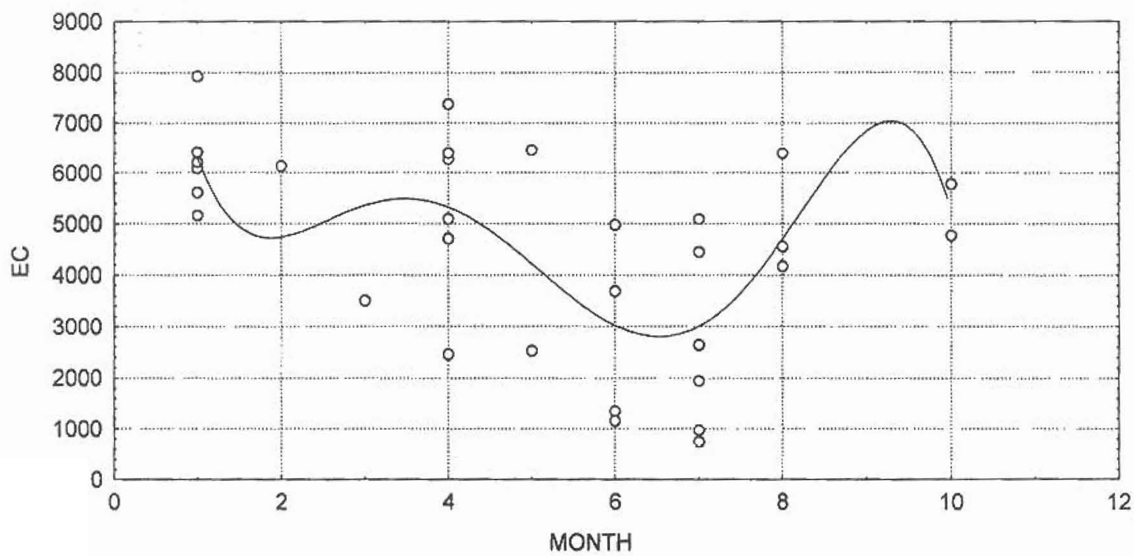
y=717.445+193.892*x-21.397*x^2-11.511*x^3+2.065*x^4-0.089*x^5+eps

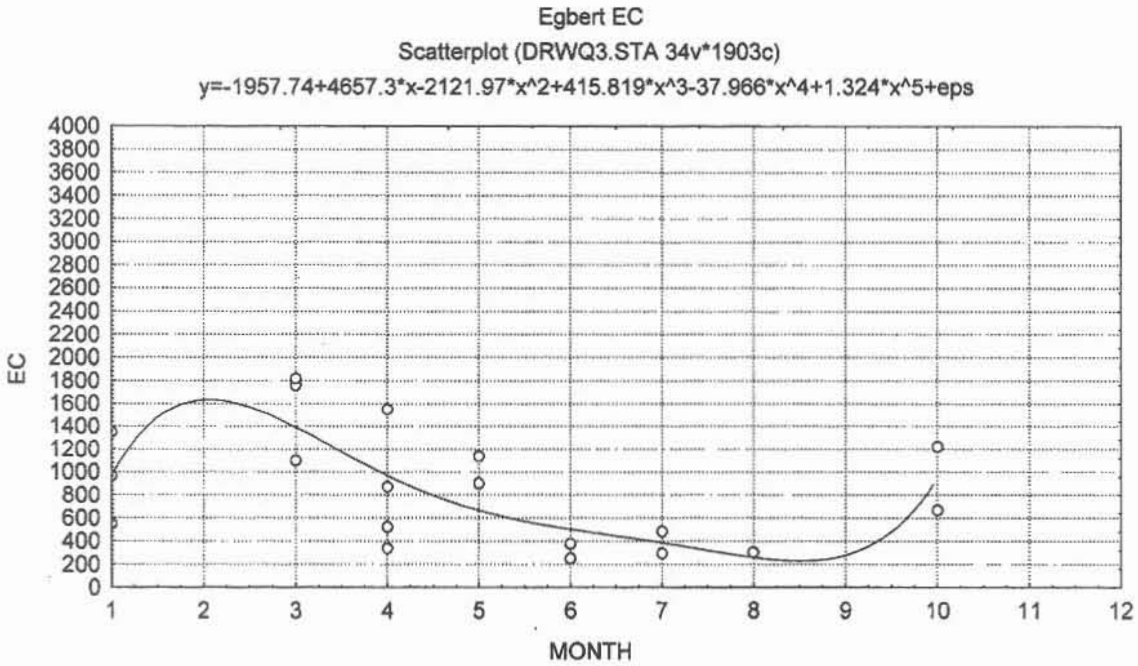


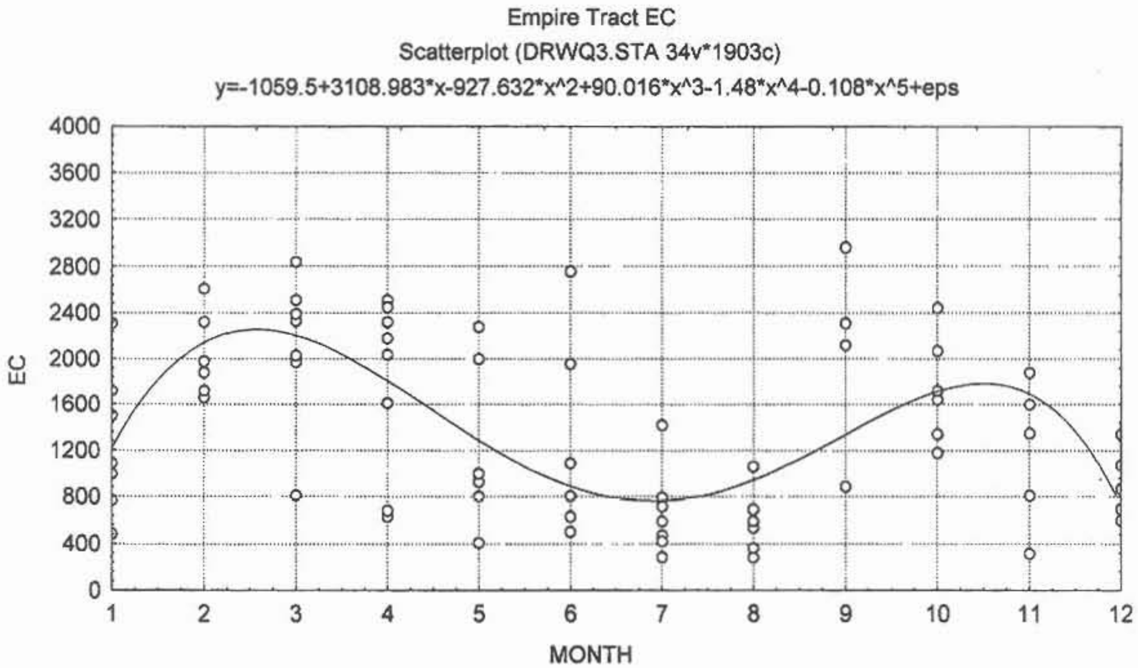
Drain into Clifton Court Forebay EC

Scatterplot (DRWQ3.STA 34v*1903c)

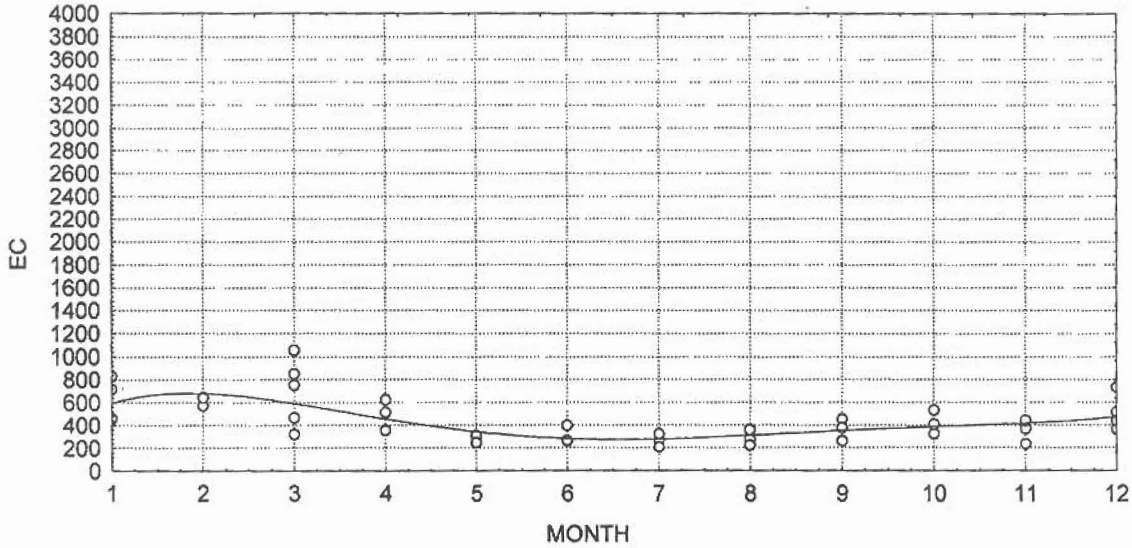
y = 1.639e4-1.756e4*x+9.489e3*x^2-2.244e3*x^3+234.582*x^4-8.861*x^5+eps



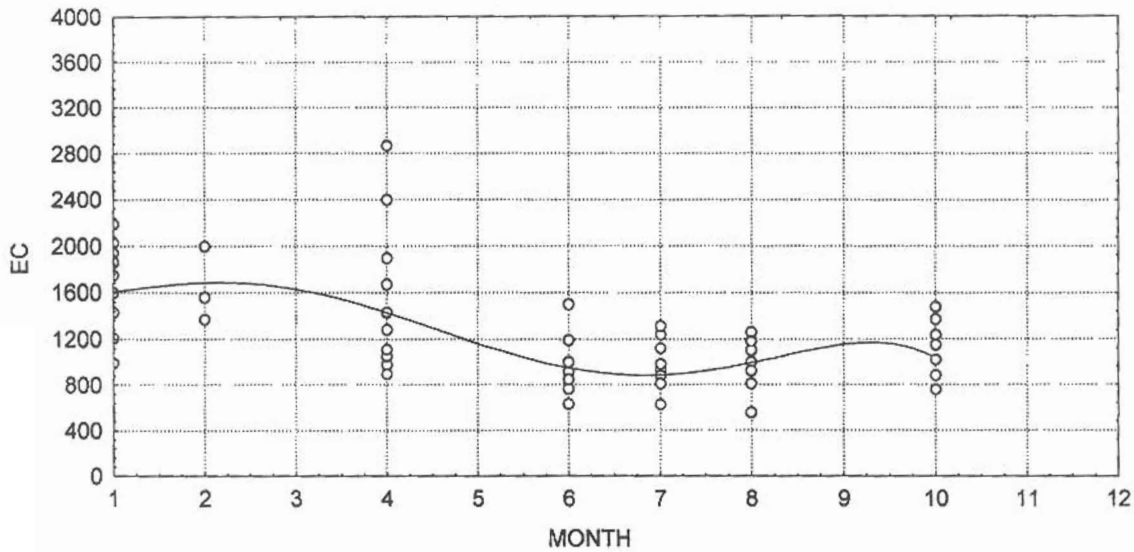

Egbert EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=-1957.74+4657.3*x-2121.97*x^2+415.819*x^3-37.966*x^4+1.324*x^5+eps
EC
MONTH


Empire Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=-1059.5+3108.983*x-927.632*x^2+90.016*x^3-1.48*x^4-0.108*x^5+eps
EC
MONTH

Grand Island EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=138.603+721.349*x-316.541*x^2+52.566*x^3-3.808*x^4+0.102*x^5+eps



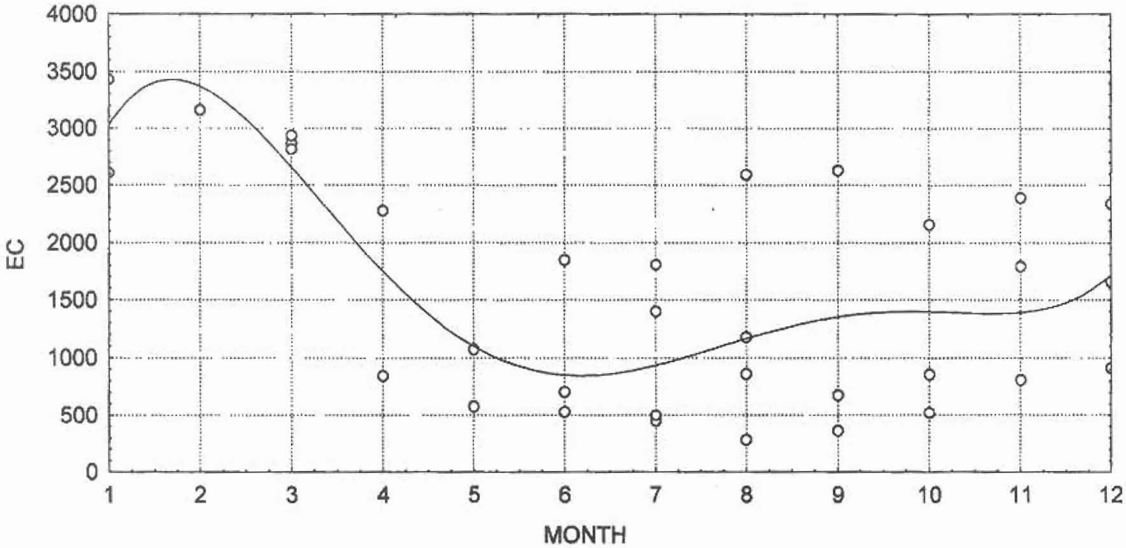
Holland Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=1578.324-109.369*x+210.878*x^2-86.631*x^3+11.583*x^4-0.497*x^5+eps



Jersey Island EC

Scatterplot (DRWQ3.STA 34v*1903c)

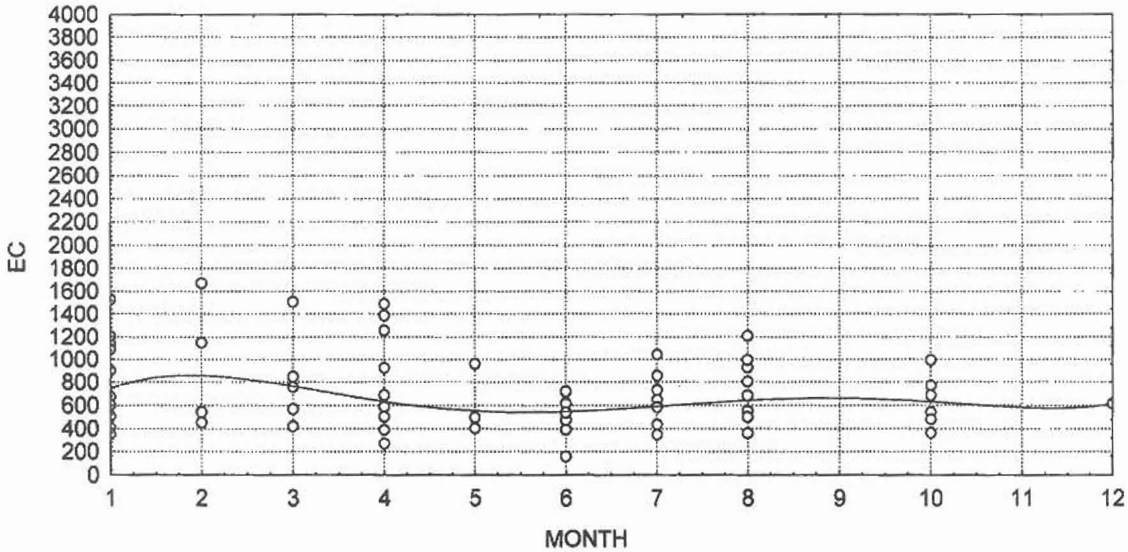
$y=222.192+4632.44*x-2194.68*x^2+389.131*x^3-29.911*x^4+0.843*x^5+eps$



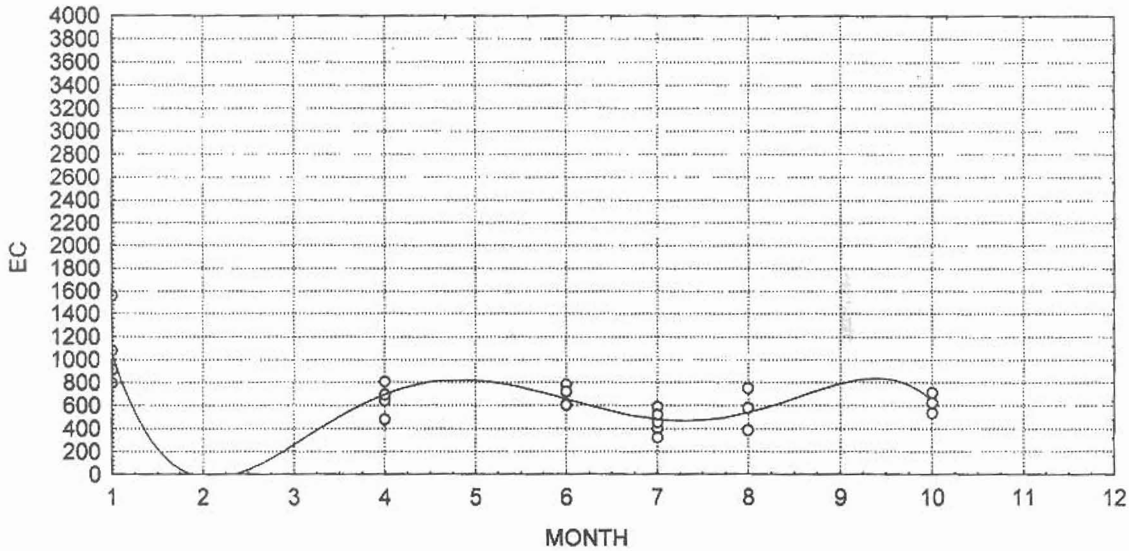
King Island EC

Scatterplot (DRWQ3.STA 34v*1903c)

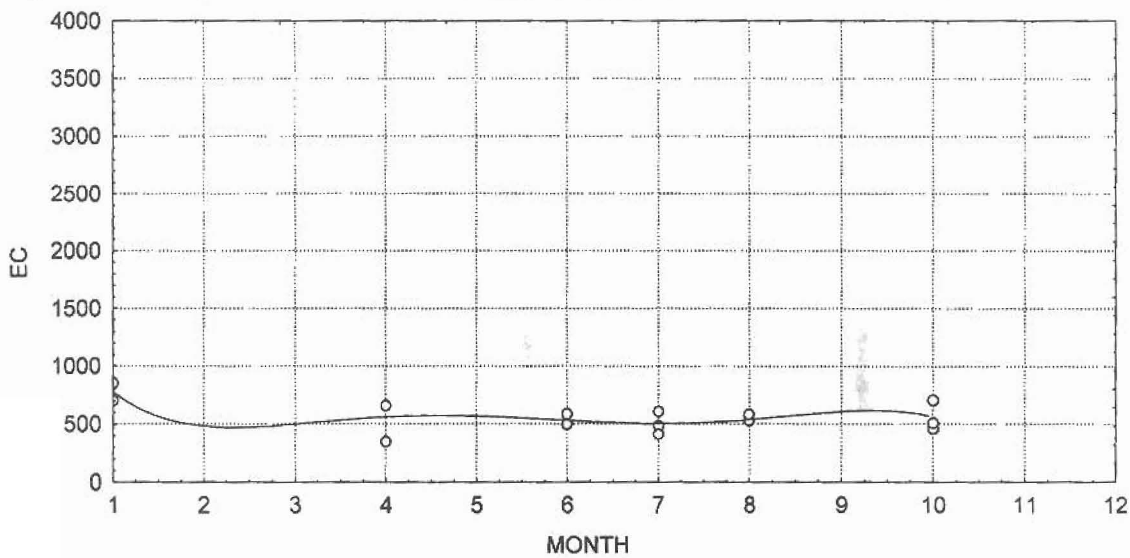
$y=123.128+993.064*x-452.919*x^2+82.132*x^3-6.507*x^4+0.188*x^5+eps$

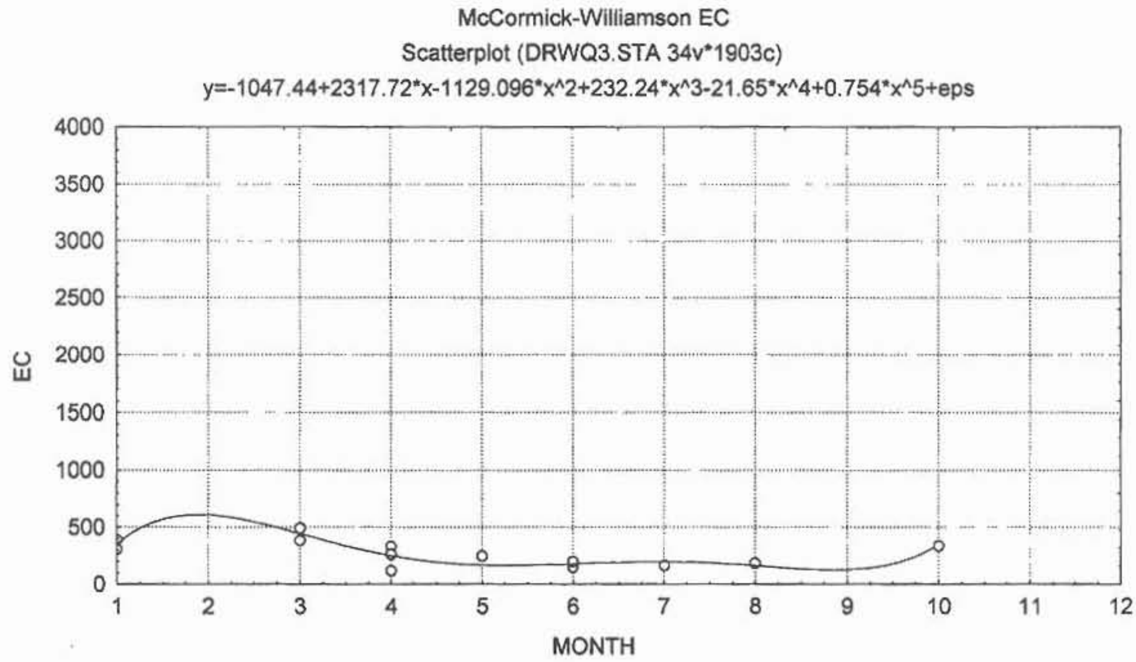


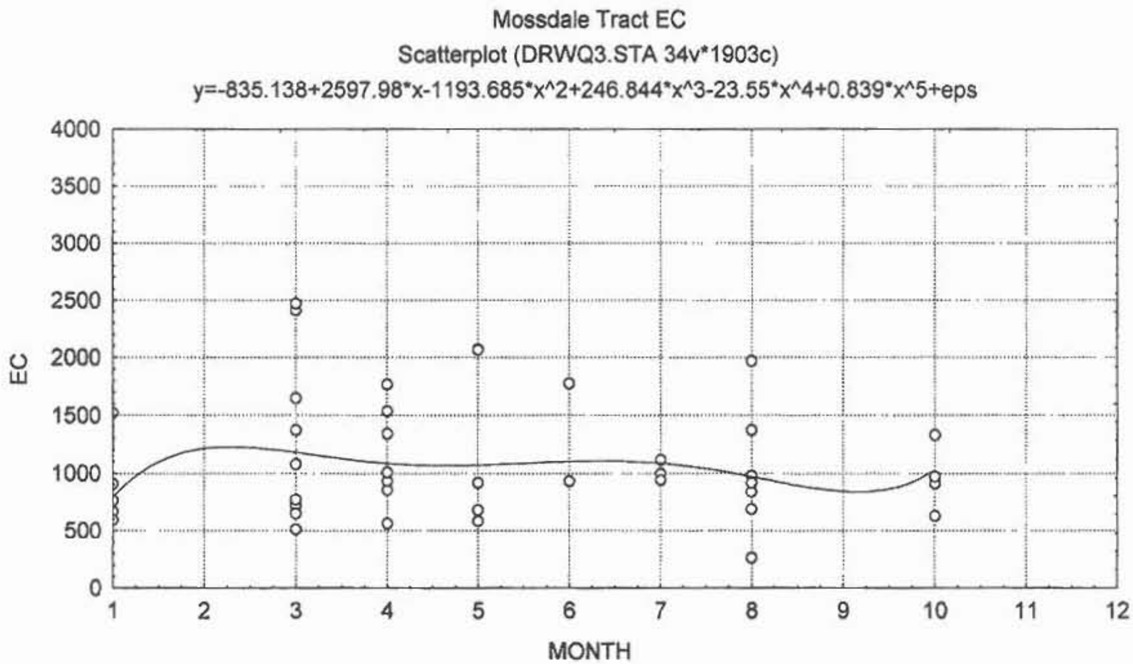
Lower Jones Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=5745.363-7552.943*x+3501.565*x^2-704.189*x^3+64.177*x^4-2.173*x^5+eps



Mandeville Island EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=1876.074-1732.41*x+775.617*x^2-155.61*x^3+14.323*x^4-0.492*x^5+eps



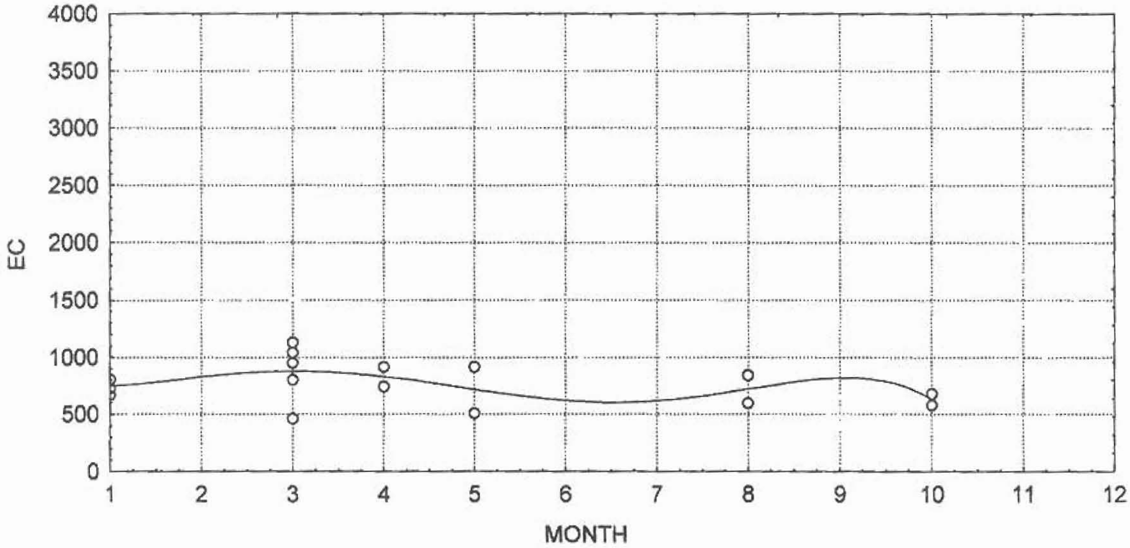

McCormick-Williamson EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=-1047.44+2317.72*x-1129.096*x^2+232.24*x^3-21.65*x^4+0.754*x^5+eps
EC
MONTH


Mossdale Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=-835.138+2597.98*x-1193.685*x^2+246.844*x^3-23.55*x^4+0.839*x^5+eps
EC
MONTH

Moss Tract EC

Scatterplot (DRWQ3.STA 34v*1903c)

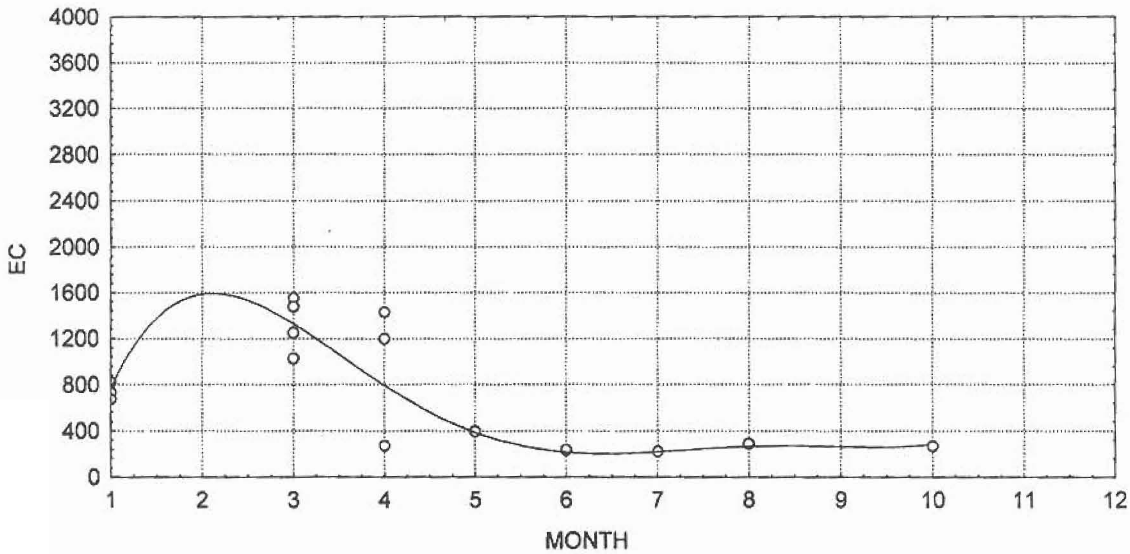
y=855.817-332.601*x+304.42*x^2-93.11*x^3+11.184*x^4-0.461*x^5+eps



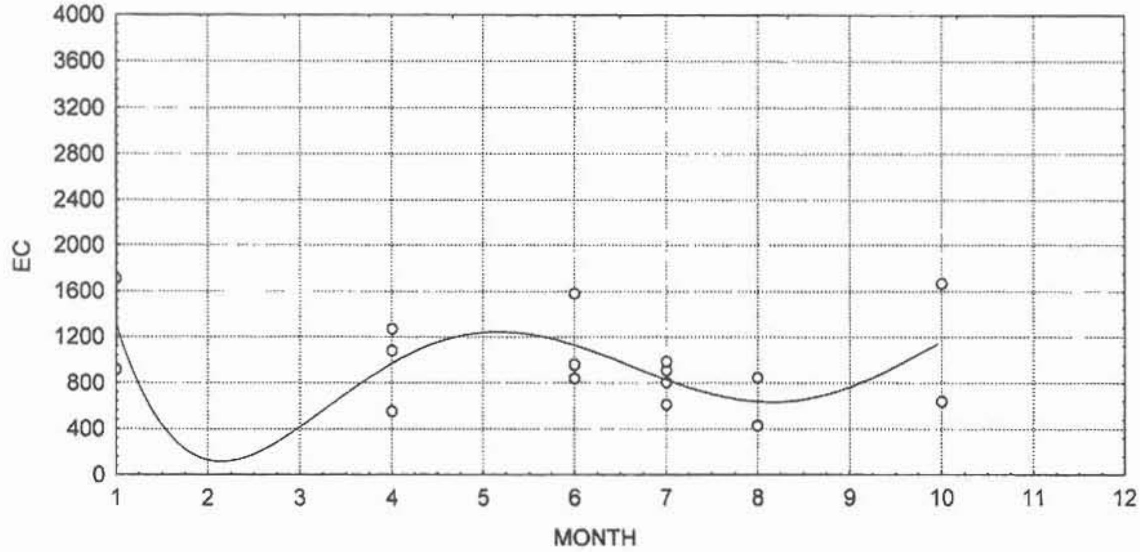
Netherlands Tract EC

Scatterplot (DRWQ3.STA 34v*1903c)

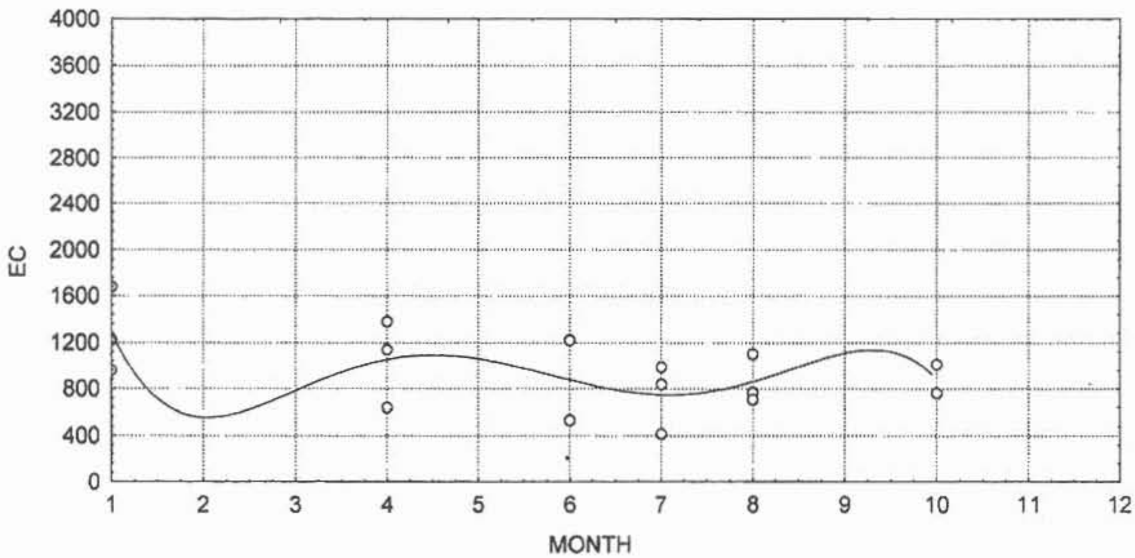
y=-2456.93+5006.53*x-2137.886*x^2+380.069*x^3-30.65*x^4+0.929*x^5+eps



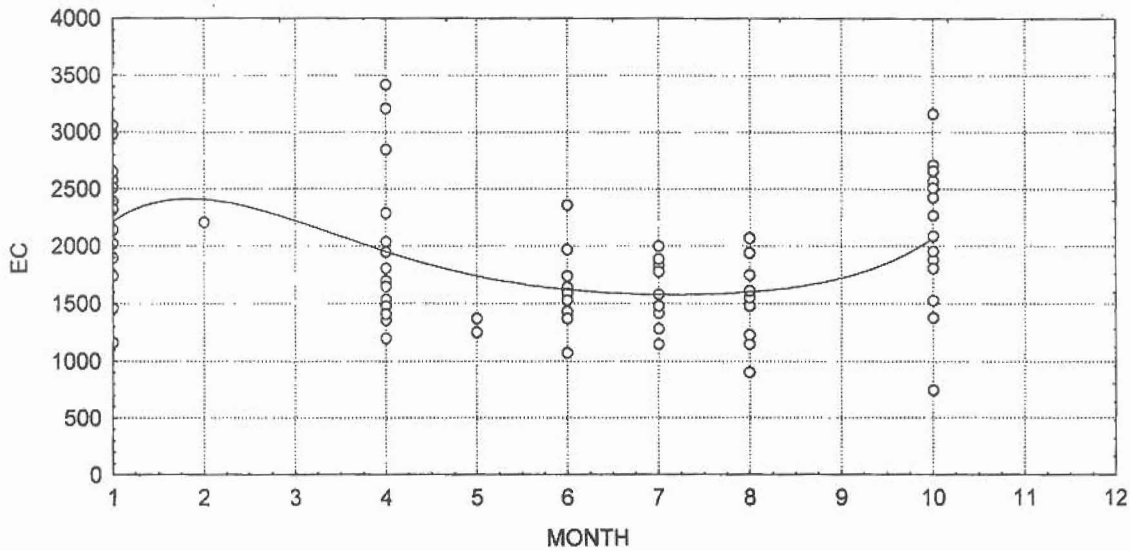
OrwoodTract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=5989.09-7340.114*x+3212.734*x^2-596.696*x^3+49.492*x^4-1.509*x^5+eps



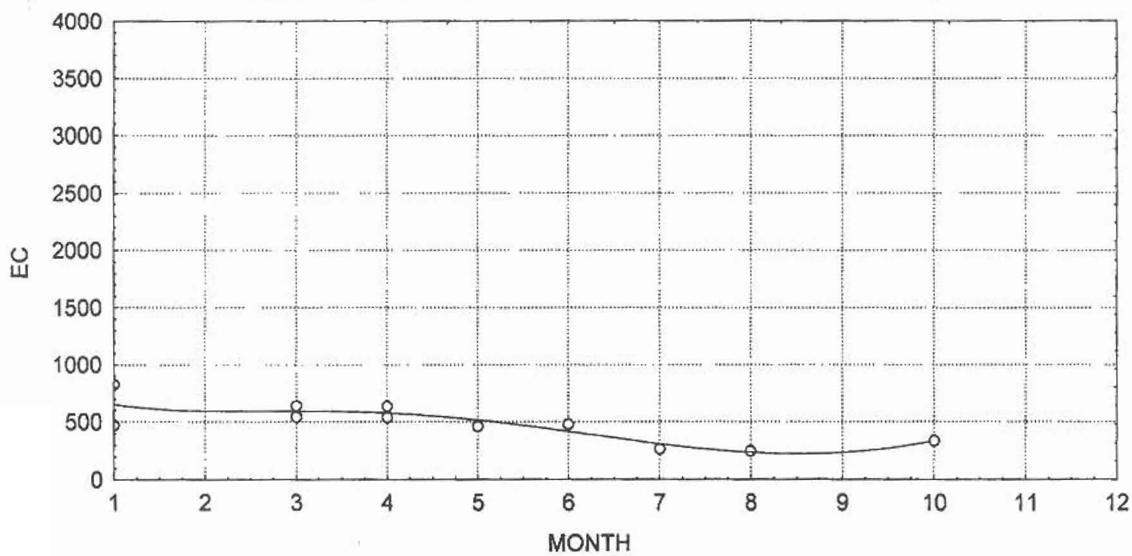
Palm Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=4738.9-5648.13*x+2711.19*x^2-566.157*x^3+53.391*x^4-1.862*x^5+eps



Pescadero Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=1132.416+1757.17*x-813.622*x^2+151.413*x^3-12.981*x^4+0.431*x^5+eps



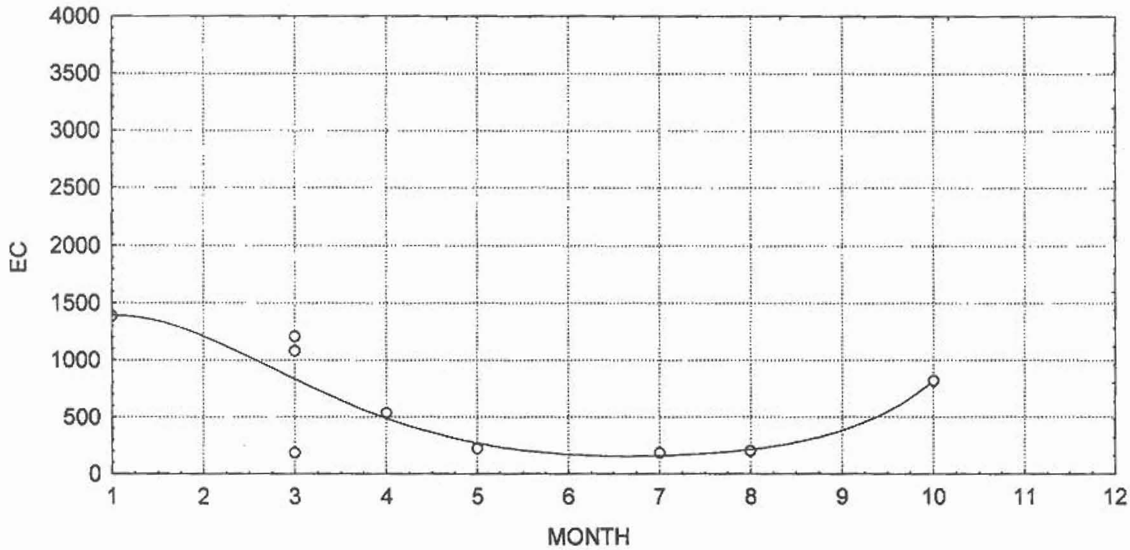
Pierson Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=897.983-401.782*x+191.046*x^2-39.506*x^3+3.337*x^4-0.095*x^5+eps



Prospect Island EC

Scatterplot (DRWQ3.STA 34v*1903c)

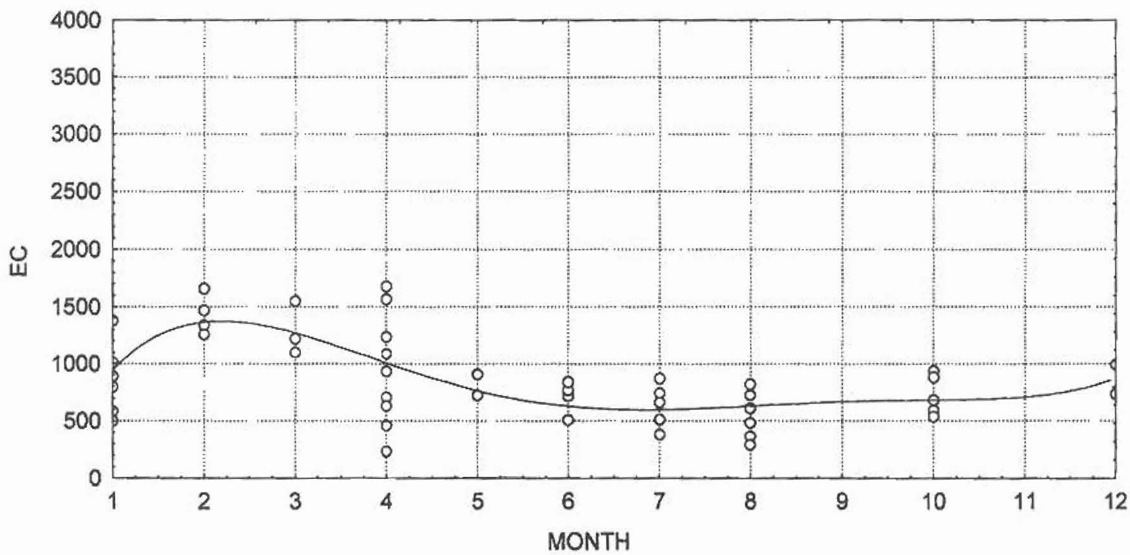
y=953.041+941.919*x-627.153*x^2+132.822*x^3-12.256*x^4+0.429*x^5+eps



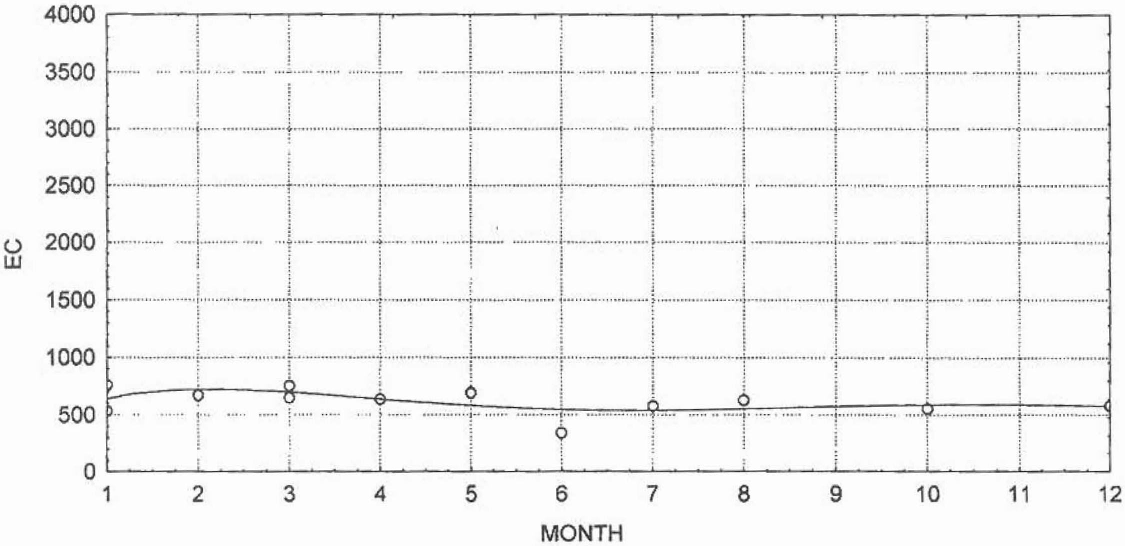
Rindge Tract EC

Scatterplot (DRWQ3.STA 34v*1903c)

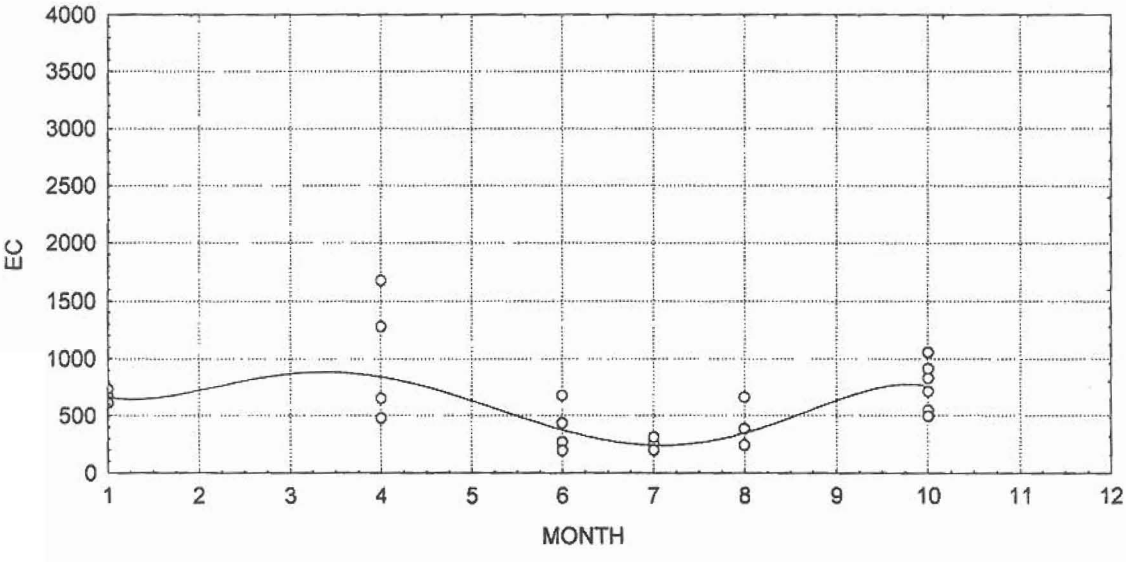
y=-536.056+2236.933*x-895.012*x^2+146.316*x^3-10.759*x^4+0.296*x^5+eps

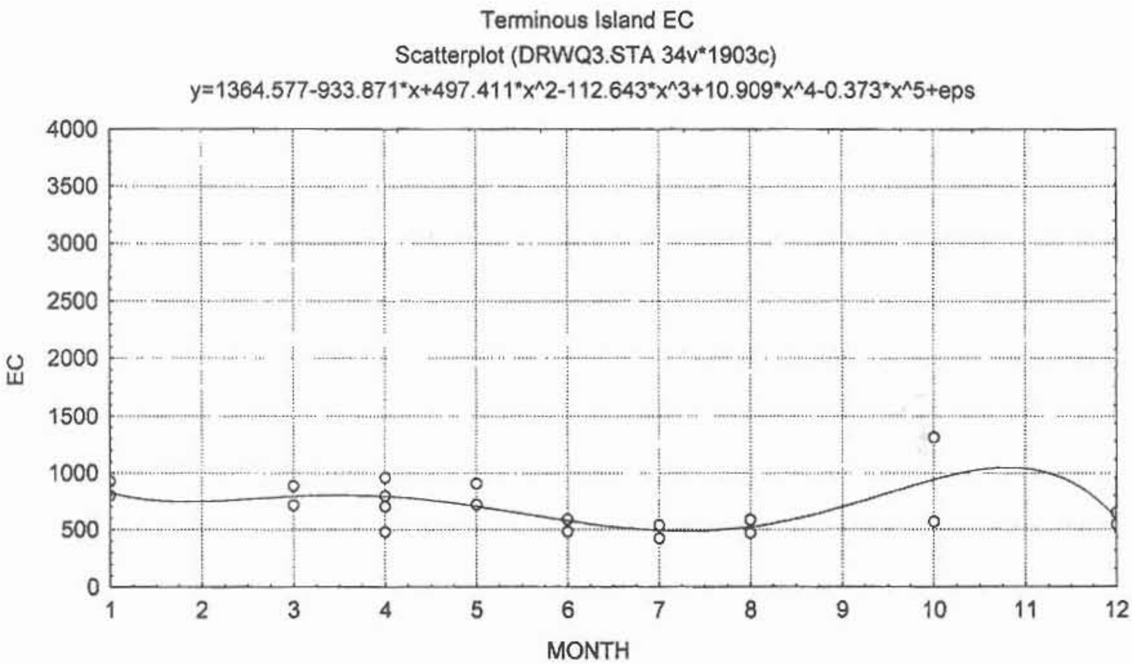


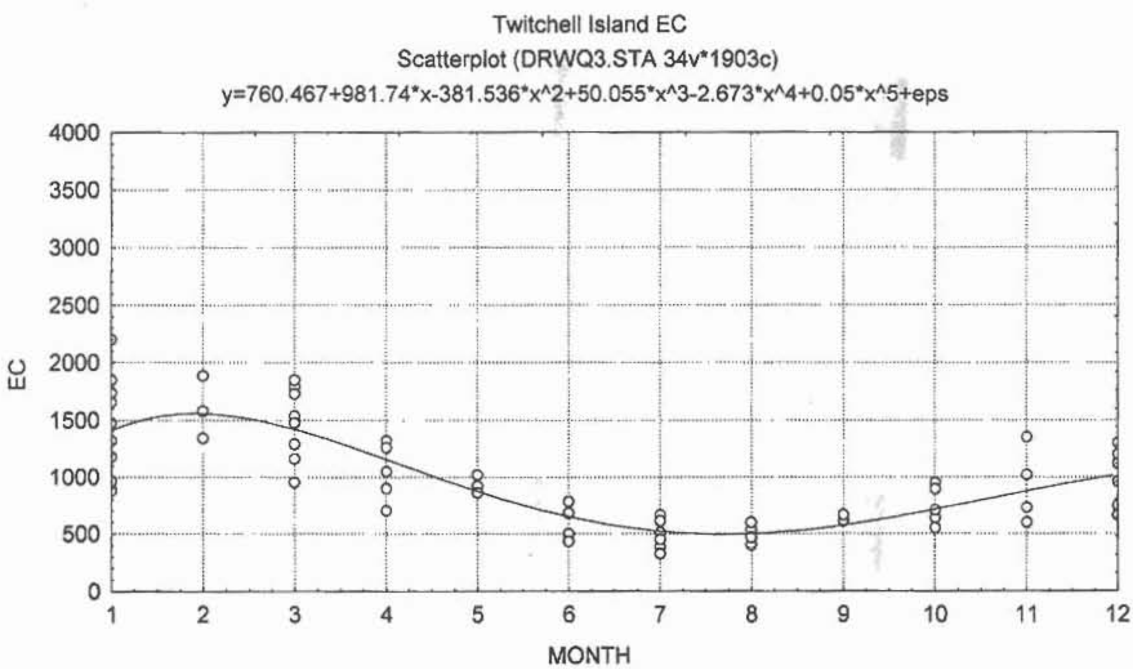
Shima Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=361.466+421.393*x-165.16*x^2+25.472*x^3-1.719*x^4+0.043*x^5+eps



Staten Island EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=1316.376-1319.037*x+868.753*x^2-222.46*x^3+23.577*x^4-0.875*x^5+eps



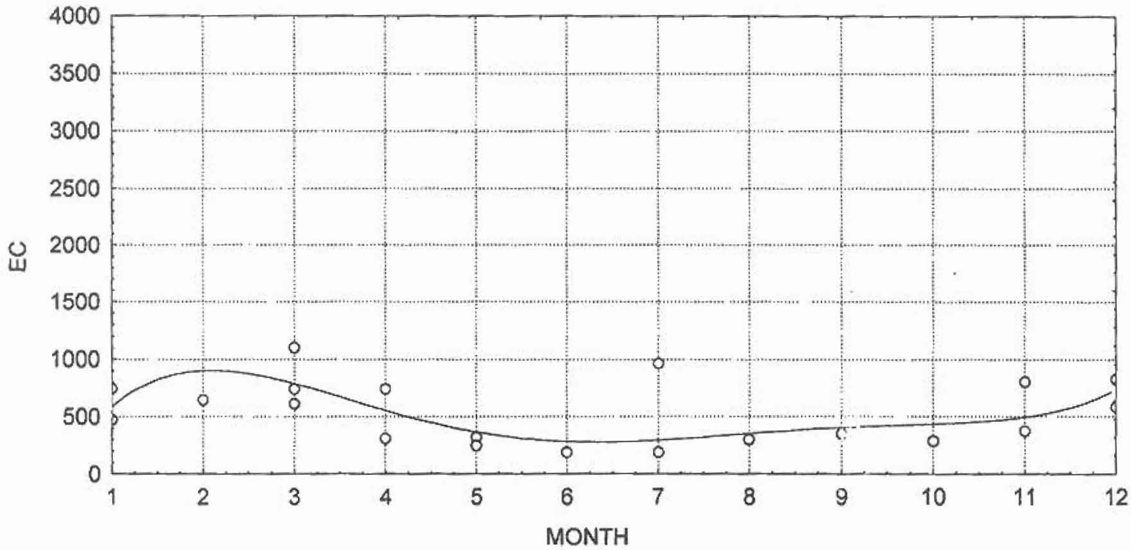

Terminous Island EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=1364.577-933.871*x+497.411*x^2-112.643*x^3+10.909*x^4-0.373*x^5+eps
EC
MONTH


Twitchell Island EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=760.467+981.74*x-381.536*x^2+50.055*x^3-2.673*x^4+0.05*x^5+eps
EC
MONTH

Tyler Island EC

Scatterplot (DRWQ3.STA 34v*1903c)

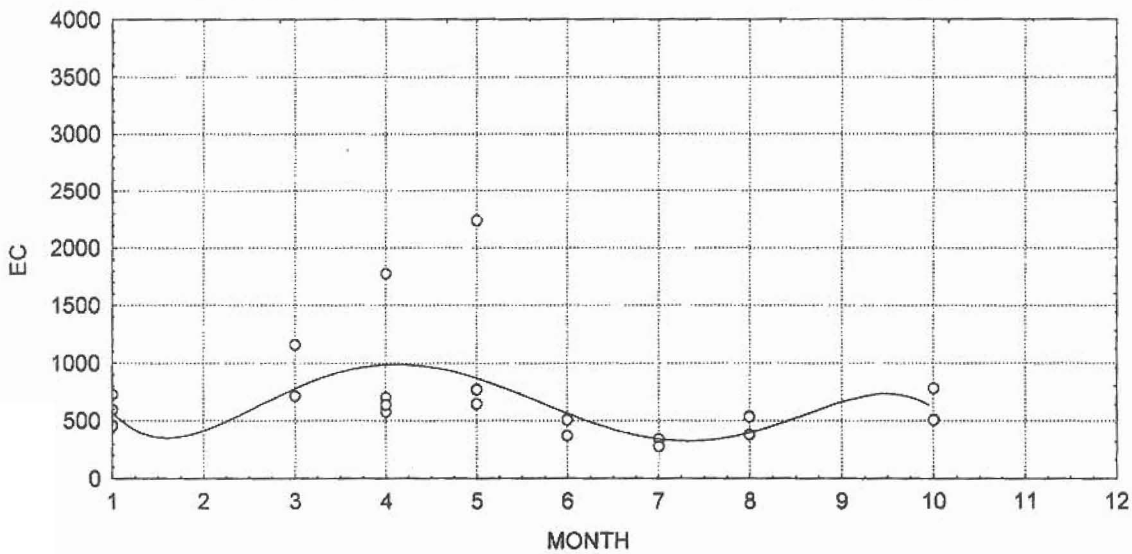
y=-648.027+1902.826*x-795.881*x^2+135.248*x^3-10.272*x^4+0.291*x^5+eps



Upper Egbert Tract EC

Scatterplot (DRWQ3.STA 34v*1903c)

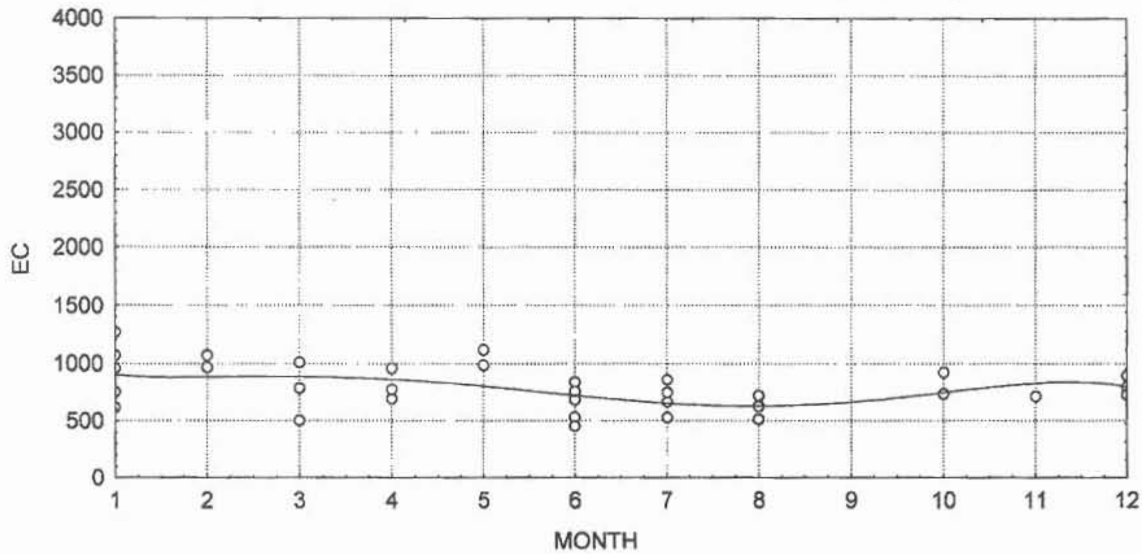
y=2626.817-3674.654*x+2035.925*x^2-459.728*x^3+45.091*x^4-1.6*x^5+eps



Upper Jones Tract EC

Scatterplot (DRWQ3.STA 34v*1903c)

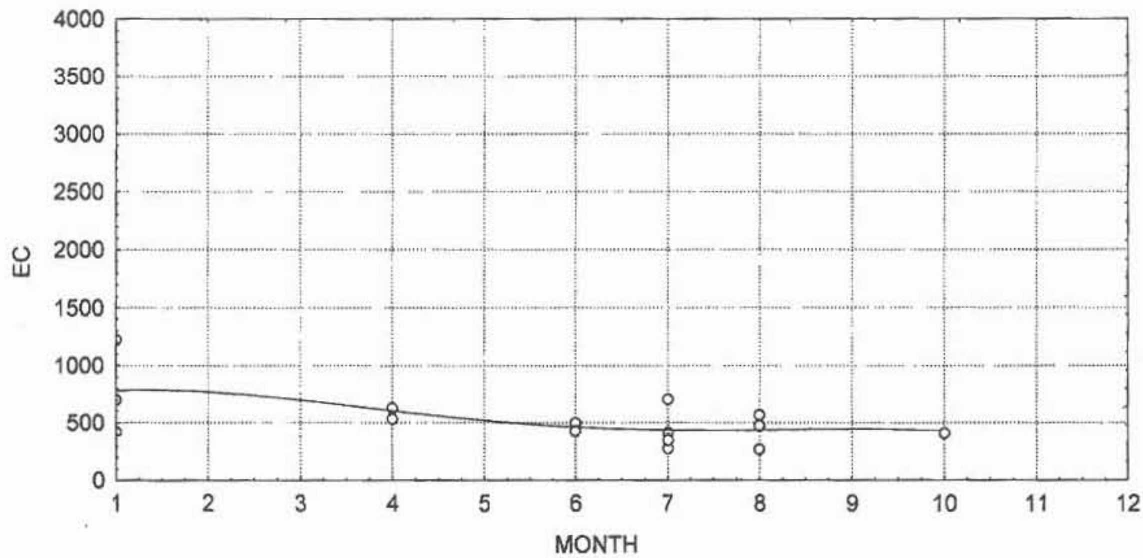
y=1032.345-242.323*x+139.265*x^2-33.788*x^3+3.312*x^4-0.111*x^5+eps



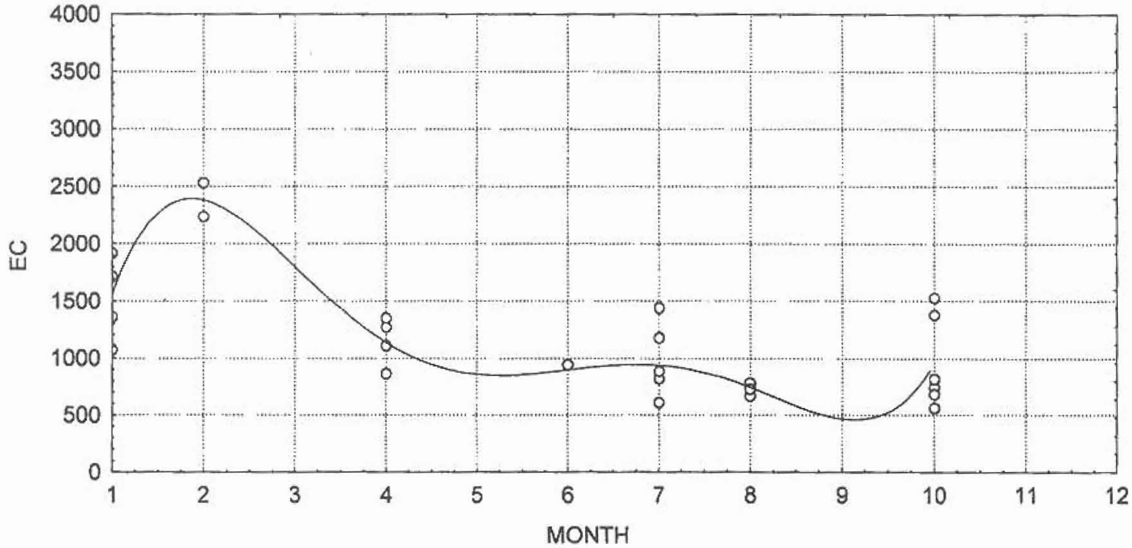
Venice Island EC

Scatterplot (DRWQ3.STA 34v*1903c)

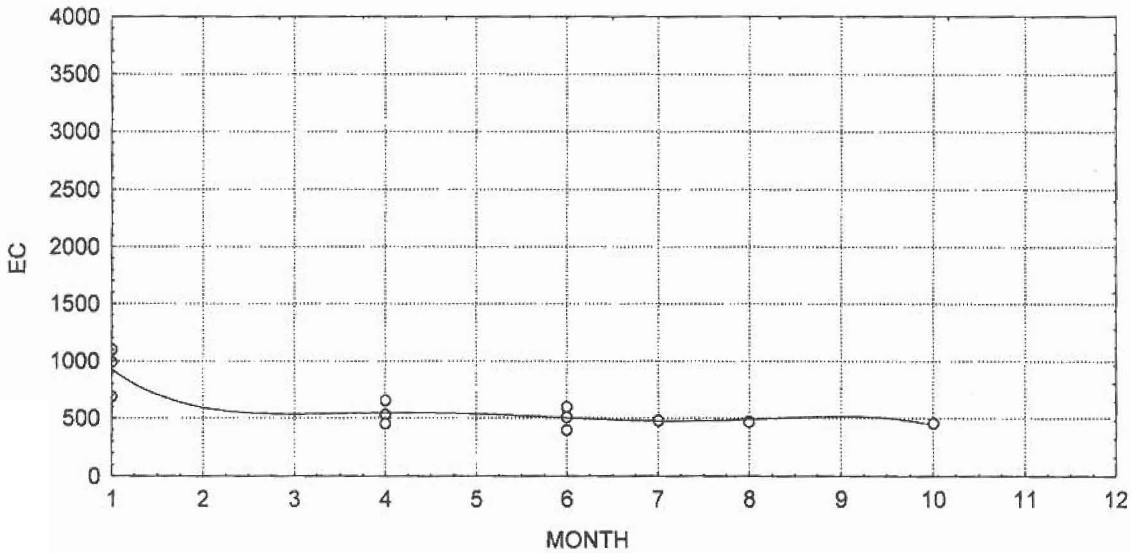
y=677+180.404*x-87.539*x^2+11.224*x^3-0.419*x^4-0.003*x^5+eps



Webb Tract EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=-3193.976+7889.83*x-3873.464*x^2+800.24*x^3-74.72*x^4+2.596*x^5+eps



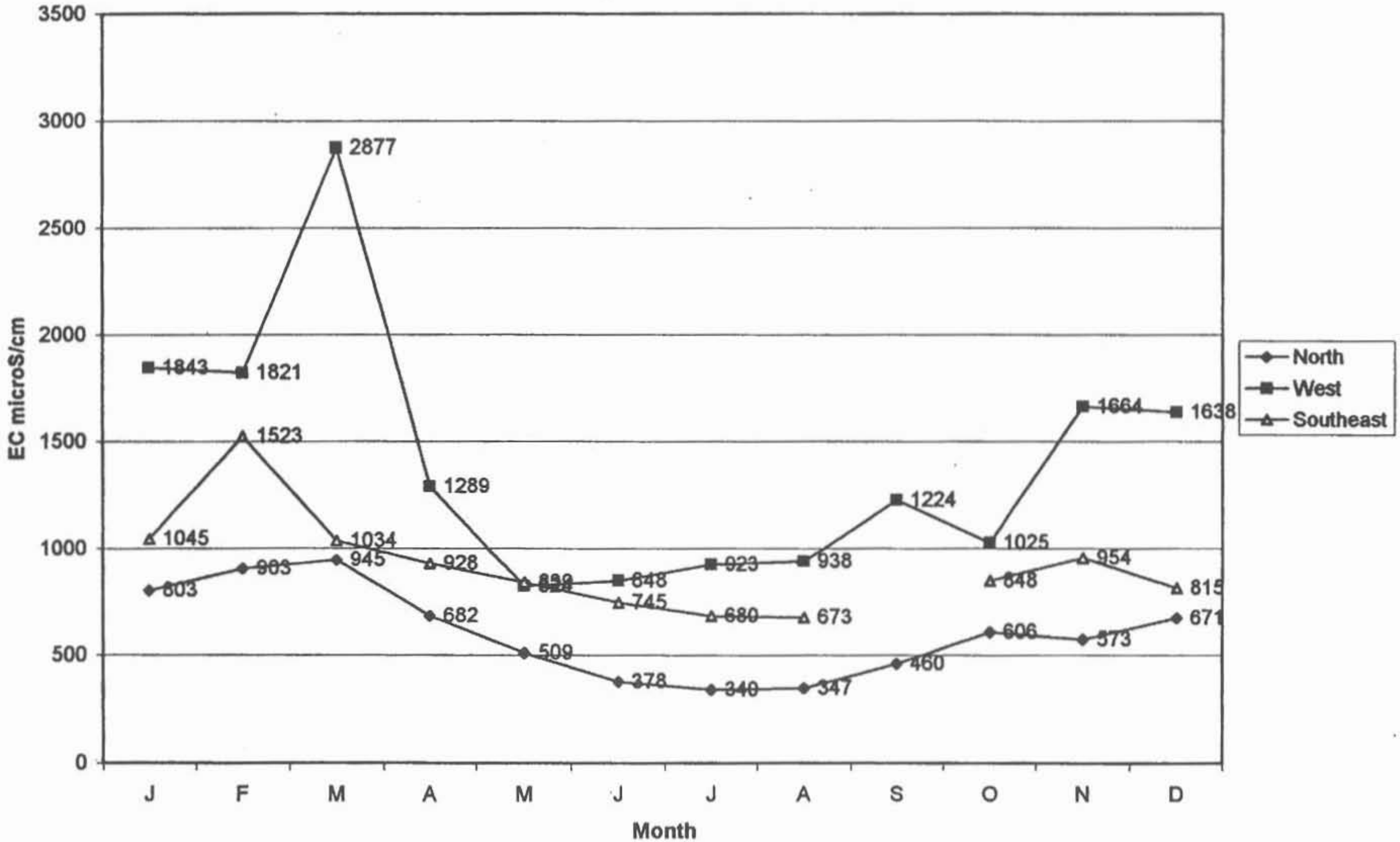
Woodard Island EC
Scatterplot (DRWQ3.STA 34v*1903c)
y=1921.9-1505.563*x+618.958*x^2-119.383*x^3+10.789*x^4-0.368*x^5+eps



Appendix C.

Monthly Average Mineral Quality by Delta Island/Tract

Figure 11. Average Monthly EC Values in Delta Drainage



Drainage EC avgs.

Month	North	West	Southeast
J	803	1843	1045
F	903	1821	1523
M	945	2877	1034
A	682	1289	928
M	509	824	839
J	378	848	745
J	340	923	680
A	347	938	673
S	460	1224	
O	606	1025	848
N	573	1664	954
D	671	1638	815

CASENAME		EC_MEAN	EC_N
G_1:1	GRAND	622	4
G_1:1	TYLER	611	2
G_1:1	BOULD	588	20
G_1:1	BRANN	881	25
G_1:1	EGBER	954	4
G_1:1	MCCOR	351	2
G_1:1	NETHE	762	4
G_1:1	PROSP	1390	1
G_1:1	STATE	666	6
G_1:1	TERMP	825	4
G_1:1	TWITC	1414	11
G_1:1	UPEGB	568	5
Jan avg.		803	
G_2:2	GRAND	589	5
G_2:2	TYLER	647	1
G_2:2	BOULD	810	4
G_2:2	BRANN	970	4
G_2:2	EGBER		0
G_2:2	MCCOR		0
G_2:2	NETHE		0
G_2:2	PROSP		0
G_2:2	STATE		0
G_2:2	TERMP		0
G_2:2	TWITC	1500	5
G_2:2	UPEGB		0
Feb avg.		903	
G_3:3	GRAND	692	5
G_3:3	TYLER	881	4
G_3:3	BOULD	646	4
G_3:3	BRANN	890	4
G_3:3	EGBER	1440	4
G_3:3	MCCOR	456	4
G_3:3	NETHE	1328	4
G_3:3	PROSP	826	3
G_3:3	STATE		0
G_3:3	TERMP	818	3
G_3:3	TWITC	1474	10
G_3:3	UPEGB	938	2
Mar avg.		945	
G_4:4	GRAND	443	5
G_4:4	TYLER	527	2
G_4:4	BOULD	485	14
G_4:4	BRANN	862	24
G_4:4	EGBER	822	4
G_4:4	MCCOR	219	4
G_4:4	NETHE	790	4
G_4:4	PROSP	539	1
G_4:4	STATE	842	6
G_4:4	TERMP	736	4
G_4:4	TWITC	1085	9

G_4:4	UPEGB	831	6
Apr avg.		682	
G_5:5	GRAND	295	5
G_5:5	TYLER	285	2
G_5:5	BOULD	240	2
G_5:5	BRANN	654	4
G_5:5	EGBER	1022	2
G_5:5	MCCOR	227	2
G_5:5	NETHE	386	2
G_5:5	PROSP	222	1
G_5:5	STATE		0
G_5:5	TERMP	815	2
G_5:5	TWITC	942	5
G_5:5	UPEGB	1219	3
May avg.		509	
G_6:6	GRAND	311	5
G_6:6	TYLER	181	3
G_6:6	BOULD	330	18
G_6:6	BRANN	648	20
G_6:6	EGBER	316	2
G_6:6	MCCOR	178	2
G_6:6	NETHE	218	2
G_6:6	PROSP		0
G_6:6	STATE	374	6
G_6:6	TERMP	538	2
G_6:6	TWITC	660	6
G_6:6	UPEGB	409	3
Jun avg.		378	
G_7:7	GRAND	270	4
G_7:7	TYLER	578	2
G_7:7	BOULD	251	20
G_7:7	BRANN	478	24
G_7:7	EGBER	391	2
G_7:7	MCCOR	167	2
G_7:7	NETHE	214	2
G_7:7	PROSP	183	1
G_7:7	STATE	242	8
G_7:7	TERMP	484	2
G_7:7	TWITC	504	7
G_7:7	UPEGB	317	3
Jul avg.		340	
G_8:8	GRAND	276	4
G_8:8	TYLER	289	2
G_8:8	BOULD	279	18
G_8:8	BRANN	590	16
G_8:8	EGBER	305	1
G_8:8	MCCOR	180	2
G_8:8	NETHE	266	2
G_8:8	PROSP	200	1
G_8:8	STATE	348	6
G_8:8	TERMP	530	2

G_8:8	TWITC	469	7
G_8:8	UPEGB	432	3
Aug avg.		347	
G_9:9	GRAND	391	5
G_9:9	TYLER	362	2
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	EGBER		0
G_9:9	MCCOR		0
G_9:9	NETHE		0
G_9:9	PROSP		0
G_9:9	STATE		0
G_9:9	TERMP		0
G_9:9	TWITC	627	5
G_9:9	UPEGB		0
Sep avg.		460	
G_10:10	GRAND	405	4
G_10:10	TYLER	289	1
G_10:10	BOULD	437	10
G_10:10	BRANN	717	18
G_10:10	EGBER	944	2
G_10:10	MCCOR	346	2
G_10:10	NETHE	287	2
G_10:10	PROSP	821	1
G_10:10	STATE	761	6
G_10:10	TERMP	941	2
G_10:10	TWITC	717	12
G_10:10	UPEGB	606	3
Oct avg.		606	
G_11:11	GRAND	380	5
G_11:11	TYLER	590	2
G_11:11	BOULD	469	2
G_11:11	BRANN		0
G_11:11	EGBER		0
G_11:11	MCCOR		0
G_11:11	NETHE		0
G_11:11	PROSP		0
G_11:11	STATE		0
G_11:11	TERMP		0
G_11:11	TWITC	852	8
G_11:11	UPEGB		0
Nov avg.		573	
G_12:12	GRAND	484	5
G_12:12	TYLER	708	2
G_12:12	BOULD	537	8
G_12:12	BRANN	675	3
G_12:12	EGBER		0
G_12:12	MCCOR		0
G_12:12	NETHE		0
G_12:12	PROSP		0
G_12:12	STATE		0

G_12:12	TERMP	596	2
G_12:12	TWITC	1025	7
G_12:12	UPEGB		0
Dec avg.		671	

CASENAME		EC_MEAN	EC_N
G_1:1	HOLLA	1607	15
G_1:1	JERSE	3020	2
G_1:1	PALMT	1287	3
G_1:1	WEBB0	1458	4
Jan avg.		1843	
G_2:2	HOLLA	1643	3
G_2:2	JERSE	1580	2
G_2:2	PALMT		0
G_2:2	WEBB0	2240	1
Feb avg.		1821	
G_3:3	HOLLA		3
G_3:3	JERSE	2877	3
G_3:3	PALMT		1
G_3:3	WEBB0		0
Mar avg.		2877	
G_4:4	HOLLA	1442	15
G_4:4	JERSE	1562	2
G_4:4	PALMT	1052	3
G_4:4	WEBB0	1100	6
Apr avg.		1289	
G_5:5	HOLLA		0
G_5:5	JERSE	824	2
G_5:5	PALMT		0
G_5:5	WEBB0		0
May avg.		824	
G_6:6	HOLLA	891	12
G_6:6	JERSE	728	5
G_6:6	PALMT	876	2
G_6:6	WEBB0	896	1
Jun avg.		848	
G_7:7	HOLLA	934	15
G_7:7	JERSE	1041	4
G_7:7	PALMT	748	3
G_7:7	WEBB0	968	4
Jul avg.		923	
G_8:8	HOLLA	965	12
G_8:8	JERSE	1229	4
G_8:8	PALMT	859	3
G_8:8	WEBB0	699	2
Aug avg.		938	
G_9:9	HOLLA		0
G_9:9	JERSE	1224	3
G_9:9	PALMT		0
G_9:9	WEBB0		0
Sep avg.		1224	
G_10:10	HOLLA	1037	12
G_10:10	JERSE	1180	3
G_10:10	PALMT	887	2
G_10:10	WEBB0	996	5
Oct avg.		1025	

G_11:11 HOLLA		0
G_11:11 JERSE	1664	3
G_11:11 PALMT		0
G_11:11 WEBB0		0
Nov avg.	1664	
G_12:12 HOLLA		0
G_12:12 JERSE	1638	3
G_12:12 PALMT		0
G_12:12 WEBB0		0
Dec avg.	1638	
All Groups	1184	163

CASENAME		EC_MEAN	EC_N
G_1:1	EMPIR	1241	11
G_1:1	BACON	955	9
G_1:1	KINGI	746	17
G_1:1	LJONE	1052	5
G_1:1	MANDE	778	2
G_1:1	MOSSD	793	9
G_1:1	MOSST	745	4
G_1:1	ORWOO	1313	2
G_1:1	PESCA	2218	18
G_1:1	PIERS	651	2
G_1:1	RINDG	933	11
G_1:1	RIOBL	1176	4
G_1:1	SHIMA	651	2
G_1:1	UPJON	893	10
G_1:1	VENIC	781	3
G_1:1	WEBB0	1920	1
G_1:1	WOODW	926	3
Jan avg.		1045	
G_2:2	EMPIR	2028	6
G_2:2	BACON	967	2
G_2:2	KINGI	806	6
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	MOSSD		0
G_2:2	MOSST		0
G_2:2	ORWOO		0
G_2:2	PESCA	2210	1
G_2:2	PIERS		0
G_2:2	RINDG	1433	4
G_2:2	RIOBL	1035	2
G_2:2	SHIMA	673	1
G_2:2	UPJON	1019	2
G_2:2	VENIC		0
G_2:2	WEBB0	2530	1
G_2:2	WOODW		0
Feb avg.		1523	
G_3:3	EMPIR	2126	7
G_3:3	BACON		0
G_3:3	KINGI	758	6
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	MOSSD	1178	13
G_3:3	MOSST	878	5
G_3:3	ORWOO		0
G_3:3	PESCA		0
G_3:3	PIERS	591	2
G_3:3	RINDG	1263	4
G_3:3	RIOBL	1043	4
G_3:3	SHIMA	703	2
G_3:3	UPJON	769	3

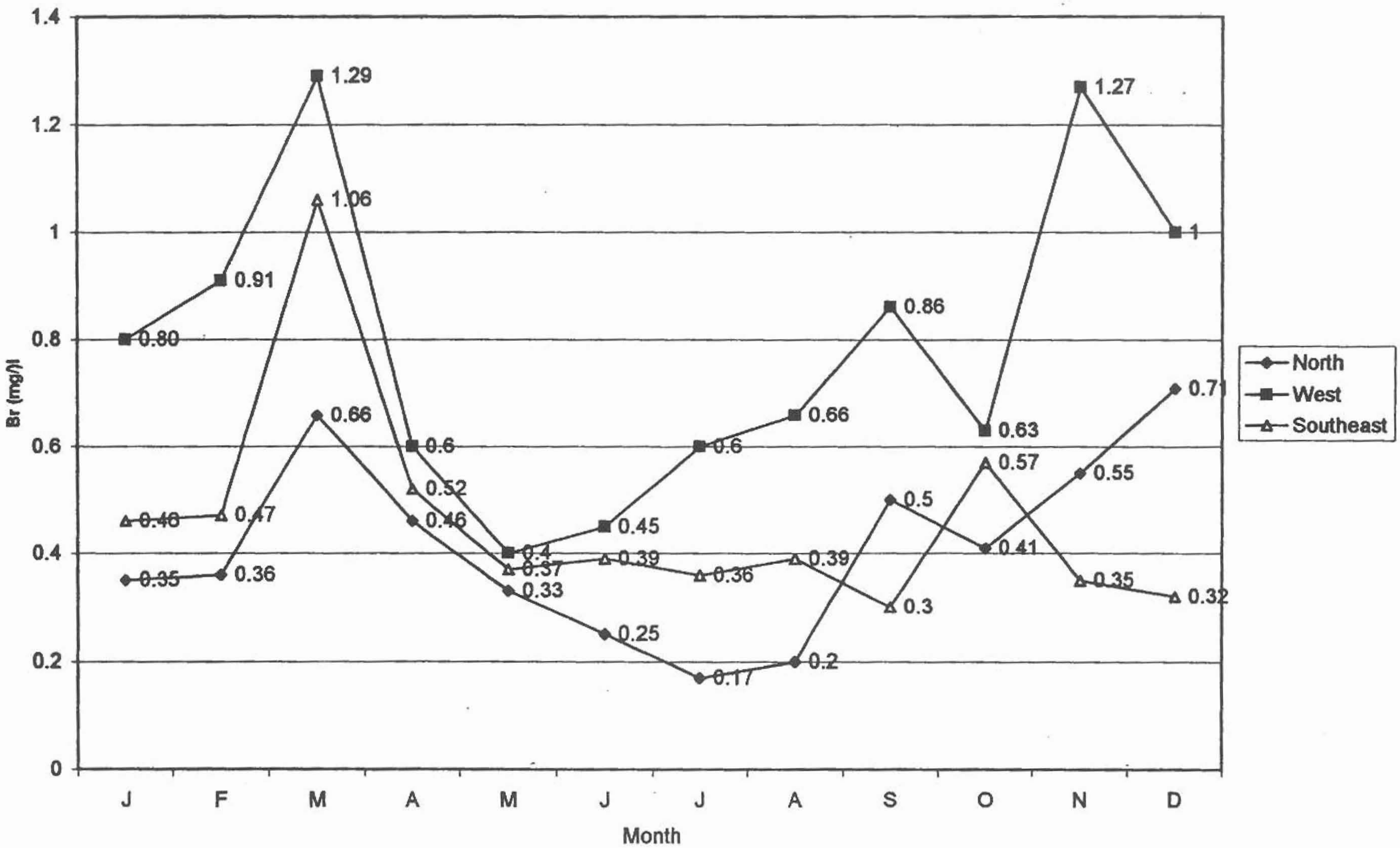
G_3:3	VENIC		0
G_3:3	WEBB0		0
G_3:3	WOODW		0
Mar avg.		1034	
G_4:4	EMPIR	1957	11
G_4:4	BACON	626	8
G_4:4	KINGI	657	19
G_4:4	LJONE	695	5
G_4:4	MANDE	560	3
G_4:4	MOSSD	1088	9
G_4:4	MOSST	829	2
G_4:4	ORWOO	968	3
G_4:4	PESCA	1988	19
G_4:4	PIERS	588	2
G_4:4	RINDG	967	11
G_4:4	RIOBL	966	4
G_4:4	SHIMA	652	2
G_4:4	UPJON	852	6
G_4:4	VENIC	606	3
G_4:4	WEBB0	1230	2
G_4:4	WOODW	547	3
Apr avg.		928	
G_5:5	EMPIR	1168	7
G_5:5	BACON		0
G_5:5	KINGI	620	3
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	MOSSD	1032	5
G_5:5	MOSST	715	2
G_5:5	ORWOO		0
G_5:5	PESCA	1310	2
G_5:5	PIERS	463	1
G_5:5	RINDG	819	2
G_5:5	RIOBL	512	2
G_5:5	SHIMA	696	1
G_5:5	UPJON	1052	2
G_5:5	VENIC		0
G_5:5	WEBB0		0
G_5:5	WOODW		0
May avg.		839	
G_6:6	EMPIR	1021	10
G_6:6	BACON	470	8
G_6:6	KINGI	469	11
G_6:6	LJONE	655	5
G_6:6	MANDE	531	3
G_6:6	MOSSD	1225	3
G_6:6	MOSST		0
G_6:6	ORWOO	1126	3
G_6:6	PESCA	1626	15
G_6:6	PIERS	481	1
G_6:6	RINDG	678	5

G_6:6	RIOBL	701	2
G_6:6	SHIMA	344	1
G_6:6	UPJON	689	9
G_6:6	VENIC	464	2
G_6:6	WEBB0	945	1
G_6:6	WOODW	503	3
Jun avg.		745	
G_7:7	EMPIR	646	10
G_7:7	BACON	530	10
G_7:7	KINGI	595	15
G_7:7	LJONE	480	10
G_7:7	MANDE	505	4
G_7:7	MOSSD	1027	5
G_7:7	MOSST		0
G_7:7	ORWOO	829	4
G_7:7	PESCA	1604	20
G_7:7	PIERS	268	1
G_7:7	RINDG	645	6
G_7:7	RIOBL	762	2
G_7:7	SHIMA	577	1
G_7:7	UPJON	649	10
G_7:7	VENIC	438	4
G_7:7	WEBB0	853	2
G_7:7	WOODW	478	2
Jul avg.		680	
G_8:8	EMPIR	553	8
G_8:8	BACON	553	8
G_8:8	KINGI	682	12
G_8:8	LJONE	538	5
G_8:8	MANDE	537	3
G_8:8	MOSSD	981	10
G_8:8	MOSST	720	2
G_8:8	ORWOO	638	2
G_8:8	PESCA	1583	14
G_8:8	PIERS	248	1
G_8:8	RINDG	550	6
G_8:8	RIOBL	870	2
G_8:8	SHIMA	631	1
G_8:8	UPJON	631	9
G_8:8	VENIC	439	3
G_8:8	WEBB0	801	2
G_8:8	WOODW	490	2
Aug avg.		673	
G_9:9	EMPIR	2083	5
G_9:9	BACON		0
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	MOSSD		0
G_9:9	MOSST		0
G_9:9	ORWOO		0

G_9:9	PESCA		0
G_9:9	PIERS		0
G_9:9	RINDG		0
G_9:9	RIOBL		0
G_9:9	SHIMA		0
G_9:9	UPJON		0
G_9:9	VENIC		0
G_9:9	WEBB0		0
G_9:9	WOODW		0
Sep avg.			
G_10:10	EMPIR	1810	9
G_10:10	BACON	648	8
G_10:10	KINGI	617	13
G_10:10	LJONE	643	6
G_10:10	MANDE	560	3
G_10:10	MOSSD	1027	5
G_10:10	MOSST	633	2
G_10:10	ORWOO	1155	2
G_10:10	PESCA	2070	17
G_10:10	PIERS	337	1
G_10:10	RINDG	705	7
G_10:10	RIOBL	1265	2
G_10:10	SHIMA	559	1
G_10:10	UPJON	770	5
G_10:10	VENIC	428	3
G_10:10	WEBB0	747	1
G_10:10	WOODW	439	2
Oct avg.		848	
G_11:11	EMPIR	1190	5
G_11:11	BACON		0
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	MOSSD		0
G_11:11	MOSST		0
G_11:11	ORWOO		0
G_11:11	PESCA		0
G_11:11	PIERS		0
G_11:11	RINDG		0
G_11:11	RIOBL		0
G_11:11	SHIMA		0
G_11:11	UPJON	718	1
G_11:11	VENIC		0
G_11:11	WEBB0		0
G_11:11	WOODW		0
Nov avg.		954	
G_12:12	EMPIR	858	6
G_12:12	BACON		0
G_12:12	KINGI	623	3
G_12:12	LJONE		0
G_12:12	MANDE		0

G_12:12	MOSSD		0
G_12:12	MOSST		0
G_12:12	ORWOO		0
G_12:12	PESCA		0
G_12:12	PIERS		0
G_12:12	RINDG	866	2
G_12:12	RIOBL	1150	2
G_12:12	SHIMA	585	1
G_12:12	UPJON	807	3
G_12:12	VENIC		0
G_12:12	WEBB0		0
G_12:12	WOODW		0
Dec avg.		815	
All Groups		1002	716

Figure 12. Average Monthly Bromide Concentrations in Delta Drainage



Month	North	West	Southeast
J	0.35	0.80	0.46
F	0.36	0.91	0.47
M	0.66	1.29	1.06
A	0.46	0.6	0.52
M	0.33	0.4	0.37
J	0.25	0.45	0.39
J	0.17	0.6	0.36
A	0.2	0.66	0.39
S	0.5	0.86	0.3
O	0.41	0.63	0.57
N	0.55	1.27	0.35
D	0.71	1	0.32
annual	0.41	0.79	0.46

CASENAME		BR_MEAN	BR_N
G_1:1	EMPIR	0.69	5
G_1:1	BACON	0.33	10
G_1:1	KINGI	0.37	9
G_1:1	LJONE	0.28	5
G_1:1	MANDE	0.32	2
G_1:1	ORWOO	0.37	2
G_1:1	PESCA	1.10	11
G_1:1	RINDG	0.52	5
G_1:1	UPJON	0.35	4
G_1:1	VENIC	0.22	5
G_1:1	WEBB0	0.64	1
G_1:1	WOODW	0.29	3
Jan avg.		0.46	
G_2:2	EMPIR		0
G_2:2	BACON	0.24	4
G_2:2	KINGI		0
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	ORWOO		0
G_2:2	PESCA	0.95	3
G_2:2	RINDG		0
G_2:2	UPJON		0
G_2:2	VENIC	0.20	1
G_2:2	WEBB0	0.48	1
G_2:2	WOODW		0
Feb avg.		0.47	
G_3:3	EMPIR	2.70	1
G_3:3	BACON	0.17	3
G_3:3	KINGI		0
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	ORWOO		0
G_3:3	PESCA	1.02	2
G_3:3	RINDG		0
G_3:3	UPJON		0
G_3:3	VENIC	0.35	2
G_3:3	WEBB0		0
G_3:3	WOODW		0
Mar avg.		1.06	
G_4:4	EMPIR	1.53	5
G_4:4	BACON	0.28	10
G_4:4	KINGI	0.42	12
G_4:4	LJONE	0.27	5
G_4:4	MANDE	0.30	3
G_4:4	ORWOO	0.24	3
G_4:4	PESCA	1.07	9
G_4:4	RINDG	0.71	5
G_4:4	UPJON	0.32	3
G_4:4	VENIC	0.26	4
G_4:4	WEBB0	0.59	2

G_4:4	WOODW	0.24	3
Apr avg.		0.52	
G_5:5	EMPIR	0.42	1
G_5:5	BACON	0.22	3
G_5:5	KINGI		0
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	ORWOO		0
G_5:5	PESCA	0.47	3
G_5:5	RINDG		0
G_5:5	UPJON		0
G_5:5	VENIC	0.35	2
G_5:5	WEBB0		0
G_5:5	WOODW		0
May avg.		0.37	
G_6:6	EMPIR	0.79	4
G_6:6	BACON	0.20	10
G_6:6	KINGI	0.22	6
G_6:6	LJONE	0.25	5
G_6:6	MANDE	0.30	3
G_6:6	ORWOO	0.43	3
G_6:6	PESCA	0.86	11
G_6:6	RINDG	0.32	3
G_6:6	UPJON	0.28	3
G_6:6	VENIC	0.21	5
G_6:6	WEBB0	0.55	1
G_6:6	WOODW	0.26	3
Jun avg.		0.39	
G_7:7	EMPIR	0.37	5
G_7:7	BACON	0.26	13
G_7:7	KINGI	0.33	12
G_7:7	LJONE	0.24	8
G_7:7	MANDE	0.27	4
G_7:7	ORWOO	0.43	4
G_7:7	PESCA	0.80	19
G_7:7	RINDG	0.33	4
G_7:7	UPJON	0.34	5
G_7:7	VENIC	0.13	5
G_7:7	WEBB0	0.59	2
G_7:7	WOODW	0.28	2
Jul avg.		0.36	
G_8:8	EMPIR	0.45	4
G_8:8	BACON	0.31	11
G_8:8	KINGI	0.40	9
G_8:8	LJONE	0.24	5
G_8:8	MANDE	0.33	3
G_8:8	ORWOO	0.26	2
G_8:8	PESCA	0.89	14
G_8:8	RINDG	0.38	4
G_8:8	UPJON	0.33	4
G_8:8	VENIC	0.16	5

G_8:8	WEBB0	0.65	2
G_8:8	WOODW	0.25	2
Aug avg.		0.39	
G_9:9	EMPIR		0
G_9:9	BACON	0.16	3
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	ORWOO		0
G_9:9	PESCA	0.66	3
G_9:9	RINDG		0
G_9:9	UPJON		0
G_9:9	VENIC	0.09	2
G_9:9	WEBB0		0
G_9:9	WOODW		0
Sep avg.		0.30	
G_10:10	EMPIR	1.97	4
G_10:10	BACON	0.39	11
G_10:10	KINGI	0.33	10
G_10:10	LJONE	0.26	6
G_10:10	MAND	0.29	3
G_10:10	ORWO	0.35	2
G_10:10	PESCA	1.09	16
G_10:10	RINDG	0.64	5
G_10:10	UPJON	0.37	4
G_10:10	VENIC	0.13	5
G_10:10	WEBB	0.77	1
G_10:10	WOOD	0.22	2
Oct avg.		0.57	
G_11:11	EMPIR		0
G_11:11	BACON	0.25	3
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	ORWOO		0
G_11:11	PESCA	0.71	3
G_11:11	RINDG		0
G_11:11	UPJON		0
G_11:11	VENIC	0.10	2
G_11:11	WEBB0		0
G_11:11	WOODW		0
Nov avg.		0.35	
G_12:12	EMPIR		0
G_12:12	BACON	0.25	4
G_12:12	KINGI		0
G_12:12	LJONE		0
G_12:12	MANDE		0
G_12:12	ORWOO		0
G_12:12	PESCA	0.58	2
G_12:12	RINDG		0
G_12:12	UPJON		0

G_12:12	VENIC	0.12	2
G_12:12	WEBB0		0
G_12:12	WOODW		0
Dec avg.		0.32	
All Groups		0.49	450

CASENAME		BR_MEAN	BR_N
G_1:1	BOULD	0.29	9
G_1:1	BRANN	0.29	13
G_1:1	STATE	0.37	9
G_1:1	TWITC	0.44	9
Jan avg.		0.35	
G_2:2	BOULD	0.18	1
G_2:2	BRANN		0
G_2:2	STATE	0.40	3
G_2:2	TWITC	0.50	6
Feb avg.		0.36	
G_3:3	BOULD		0
G_3:3	BRANN		0
G_3:3	STATE	0.76	3
G_3:3	TWITC	0.56	11
Mar avg.		0.66	
G_4:4	BOULD	0.28	9
G_4:4	BRANN	0.37	13
G_4:4	STATE	0.65	9
G_4:4	TWITC	0.52	9
Apr avg.		0.46	
G_5:5	BOULD		0
G_5:5	BRANN		0
G_5:5	STATE	0.15	2
G_5:5	TWITC	0.51	5
May avg.		0.33	
G_6:6	BOULD	0.14	7
G_6:6	BRANN	0.32	12
G_6:6	STATE	0.18	9
G_6:6	TWITC	0.36	6
Jun avg.		0.25	
G_7:7	BOULD	0.10	10
G_7:7	BRANN	0.21	20
G_7:7	STATE	0.09	11
G_7:7	TWITC	0.29	7
July avg.		0.17	
G_8:8	BOULD	0.10	8
G_8:8	BRANN	0.32	12
G_8:8	STATE	0.13	9
G_8:8	TWITC	0.24	8
Aug avg.		0.20	
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	STATE	0.58	3
G_9:9	TWITC	0.43	6
Sep avg.		0.50	
G_10:10	BOULD	0.22	8
G_10:10	BRANN	0.44	15
G_10:10	STATE	0.44	7
G_10:10	TWITC	0.54	13
Oct avg.		0.41	

G_11:11 BOULD		0
G_11:11 BRANN		0
G_11:11 STATE	0.54	3
G_11:11 TWITC	0.56	9
Nov avg.	0.55	
G_12:12 BOULD		0
G_12:12 BRANN		0
G_12:12 STATE	0.82	3
G_12:12 TWITC	0.60	8
Dec avg.	0.71	
All Groups	0.36	305

CASENAME		BR_MEAN	BR_N
G_1:1	HOLLA	0.75	12
G_1:1	JERSE	1.28	2
G_1:1	PALMT	0.48	3
G_1:1	WEBB0	0.72	4
Jan avg.		0.80	
G_2:2	HOLLA	0.59	1
G_2:2	JERSE	1.24	2
G_2:2	PALMT		0
G_2:2	WEBB0		0
Feb avg.		0.91	
G_3:3	HOLLA		0
G_3:3	JERSE	1.29	3
G_3:3	PALMT		0
G_3:3	WEBB0		0
Mar avg.		1.29	
G_4:4	HOLLA	0.67	12
G_4:4	JERSE	0.77	2
G_4:4	PALMT	0.38	3
G_4:4	WEBB0	0.59	5
Apr avg.		0.60	.
G_5:5	HOLLA		0
G_5:5	JERSE	0.40	2
G_5:5	PALMT		0
G_5:5	WEBB0		0
May avg.		0.40	
G_6:6	HOLLA	0.54	9
G_6:6	JERSE	0.53	4
G_6:6	PALMT	0.29	2
G_6:6	WEBB0		0
Jun avg.		0.45	
G_7:7	HOLLA	0.59	15
G_7:7	JERSE	0.85	3
G_7:7	PALMT	0.42	3
G_7:7	WEBB0	0.54	4
Jul avg.		0.60	
G_8:8	HOLLA	0.65	12
G_8:8	JERSE	0.87	4
G_8:8	PALMT	0.47	3
G_8:8	WEBB0	0.66	2
Aug avg.		0.66	
G_9:9	HOLLA		0
G_9:9	JERSE	0.86	3
G_9:9	PALMT		0
G_9:9	WEBB0		0
Sep avg.		0.86	
G_10:10	HOLLA	0.73	12
G_10:10	JERSE	0.84	3
G_10:10	PALMT	0.39	2
G_10:10	WEBB0	0.58	5
Oct avg.		0.63	

G_11:11	HOLLA		0
G_11:11	JERSE	1.27	3
G_11:11	PALMT		0
G_11:11	WEBB0		0
Nov avg.		1.27	
G_12:12	HOLLA		0
G_12:12	JERSE	1.00	3
G_12:12	PALMT		0
G_12:12	WEBB0		0
Dec. avg.		1.00	
All Groups		0.68	143

west		SO4 avg	n
G_1:1	HOLLA	206	15
G_1:1	JERSE	388	2
G_1:1	PALMT	263	3
G_1:1	WEBBO	235	4
jan		273	
G_2:2	HOLLA	244	3
G_2:2	JERSE	378	1
W			0
G_2:2	WEBBO	696	1
feb		439	
G_3:3	HOLLA		0
G_3:3	JERSE	346	3
G_3:3	PALMT		0
G_3:3	WEBBO		0
mar		346	
G_4:4	HOLLA	165	15
G_4:4	JERSE	177	2
G_4:4	PALMT	163	3
G_4:4	WEBBO	166	6
apr		168	
G_5:5	HOLLA		0
G_5:5	JERSE	72	2
G_5:5	PALMT		0
G_5:5	WEBBO		0
may		72	
G_6:6	HOLLA	63	12
G_6:6	JERSE	104	4
G_6:6	PALMT	130	2
G_6:6	WEBBO	83	1
jun		95	
G_7:7	HOLLA	60	15
G_7:7	JERSE	82	4
G_7:7	PALMT	85	3
G_7:7	WEBBO	153	4
jul		95	
G_8:8	HOLLA	55	12
G_8:8	JERSE	88	4
G_8:8	PALMT	104	3
G_8:8	WEBBO	42	2
aug		72	
G_9:9	HOLLA		0
G_9:9	JERSE	73	3
G_9:9	PALMT		0
G_9:9	WEBBO		0
sep		73	
G_10:10	HOLLA	59	12
G_10:10	JERSE	62	3
G_10:10	PALMT	112	2
G_10:10	WEBBO	123	5
oct		89	

G_11:11 HOLLA		0
G_11:11 JERSE	108	3
G_11:11 PALMT		0
G_11:11 WEBBO		0
nov	108	
G_12:12 HOLLA		0
G_12:12 JERSE	135	3
G_12:12 PALMT		0
G_12:12 WEBBO		0
dec	135	
All Groups	131	157

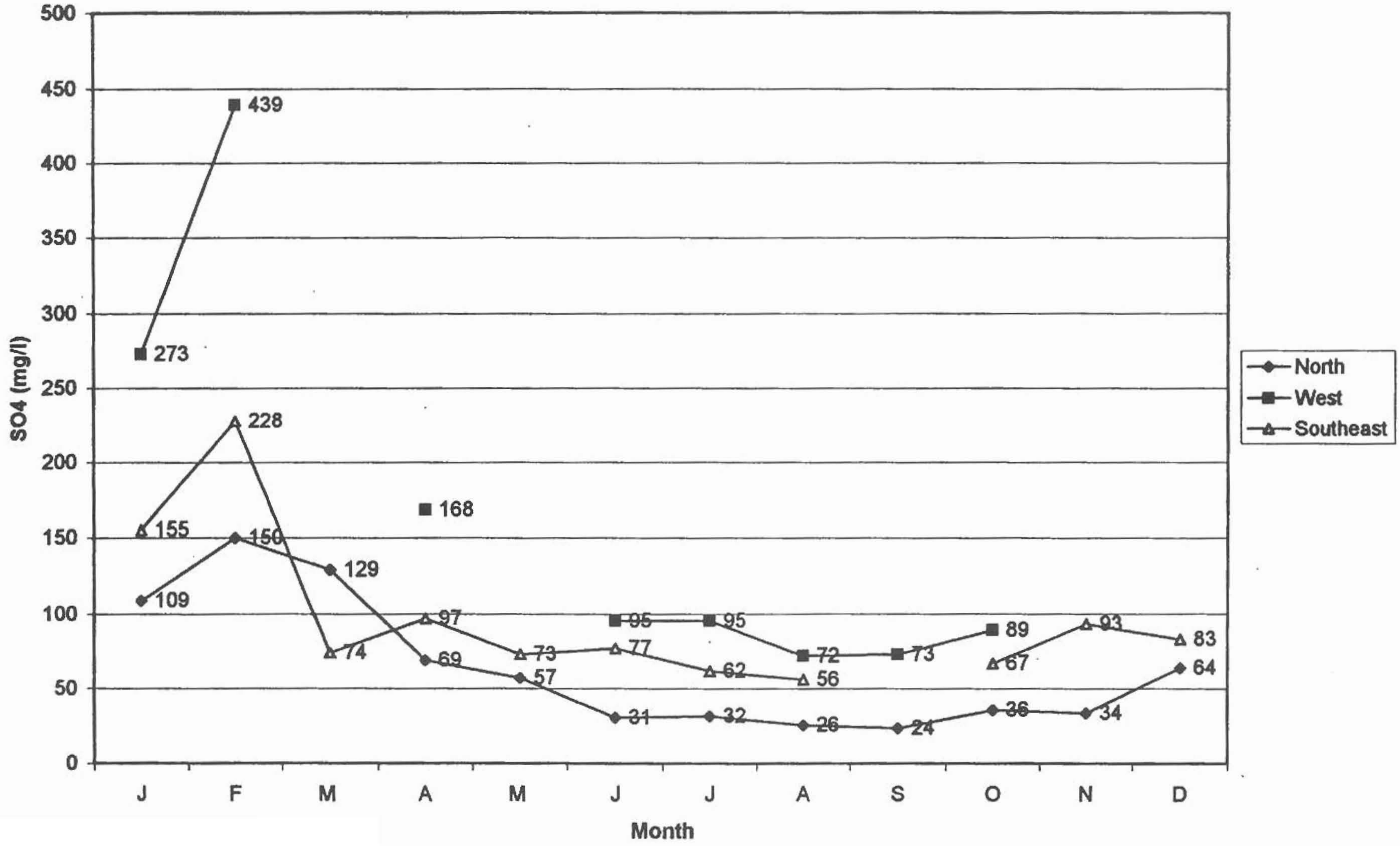
southeast		SO4 avg	n
G_1:1	EMPIR	160	10
G_1:1	BACON	154	9
G_1:1	KINGI	33	17
G_1:1	LJONE	205	5
G_1:1	MANDE	107	2
G_1:1	MOSSD	67	9
G_1:1	MOSST	89	4
G_1:1	ORWOO	255	2
G_1:1	PESCA	269	18
G_1:1	PIERS	84	2
G_1:1	RINDG	113	11
G_1:1	RIOBL	44	4
G_1:1	SHIMA	51	2
G_1:1	UPJON	120	10
G_1:1	VENIC	173	3
G_1:1	WEBB0	554	1
G_1:1	WOODW	157	3
jan		155	
G_2:2	EMPIR	190	3
G_2:2	BACON	180	2
G_2:2	KINGI	34	6
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	MOSSD		0
G_2:2	MOSST		0
G_2:2	ORWOO		0
G_2:2	PESCA	382	1
G_2:2	PIERS		0
G_2:2	RINDG	176	4
G_2:2	RIOBL	33	2
G_2:2	SHIMA	40	1
G_2:2	UPJON	121	2
G_2:2	VENIC		0
G_2:2	WEBB0	900	1
G_2:2	WOODW		0
feb		228	
G_3:3	EMPIR	169	6
G_3:3	BACON		0
G_3:3	KINGI	30	3
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	MOSSD	78	4
G_3:3	MOSST	95	2
G_3:3	ORWOO		0
G_3:3	PESCA		0
G_3:3	PIERS	50	1
G_3:3	RINDG	81	2
G_3:3	RIOBL	22	2
G_3:3	SHIMA	53	1
G_3:3	UPJON	88	1

G_3:3	VENIC		0
G_3:3	WEBB0		0
G_3:3	WOODW		0
mar		74	
G_4:4	EMPIR	110	10
G_4:4	BACON	58	8
G_4:4	KINGI	20	19
G_4:4	LJONE	60	5
G_4:4	MANDE	62	3
G_4:4	MOSSD	107	9
G_4:4	MOSST	107	2
G_4:4	ORWOO	155	3
G_4:4	PESCA	273	16
G_4:4	PIERS	44	2
G_4:4	RINDG	68	11
G_4:4	RIOBL	47	4
G_4:4	SHIMA	38	2
G_4:4	UPJON	94	6
G_4:4	VENIC	78	3
G_4:4	WEBB0	276	2
G_4:4	WOODW	47	3
apr		97	
G_5:5	EMPIR	81	6
G_5:5	BACON		0
G_5:5	KINGI	12	3
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	MOSSD	110	5
G_5:5	MOSST	87	2
G_5:5	ORWOO		0
G_5:5	PESCA	188	2
G_5:5	PIERS	28	1
G_5:5	RINDG	41	2
G_5:5	RIOBL	22	2
G_5:5	SHIMA	45	1
G_5:5	UPJON	117	1
G_5:5	VENIC		0
G_5:5	WEBB0		0
G_5:5	WOODW		0
may		73	
G_6:6	EMPIR	68	9
G_6:6	BACON	43	8
G_6:6	KINGI	15	11
G_6:6	LJONE	89	5
G_6:6	MANDE	38	3
G_6:6	MOSSD	94	3
G_6:6	MOSST		0
G_6:6	ORWOO	162	3
G_6:6	PESCA	221	15
G_6:6	PIERS	49	1
G_6:6	RINDG	74	5

G_6:6	RIOBL	31	2
G_6:6	SHIMA	20	1
G_6:6	UPJON	69	9
G_6:6	VENIC	75	2
G_6:6	WEBB0	146	1
G_6:6	WOODW	39	3
jun		77	
G_7:7	EMPIR	66	9
G_7:7	BACON	43	10
G_7:7	KINGI	22	15
G_7:7	LJONE	50	10
G_7:7	MANDE	51	4
G_7:7	MOSSD	110	5
G_7:7	MOSST		0
G_7:7	ORWOO	82	4
G_7:7	PESCA	215	20
G_7:7	PIERS	15	1
G_7:7	RINDG	71	6
G_7:7	RIOBL	16	2
G_7:7	SHIMA	30	1
G_7:7	UPJON	64	10
G_7:7	VENIC	64	4
G_7:7	WEBB0	52	2
G_7:7	WOODW	35	2
jul		62	
G_8:8	EMPIR	41	7
G_8:8	BACON	35	8
G_8:8	KINGI	38	11
G_8:8	LJONE	55	5
G_8:8	MANDE	35	3
G_8:8	MOSSD	114	10
G_8:8	MOSST	78	2
G_8:8	ORWOO	72	2
G_8:8	PESCA	196	14
G_8:8	PIERS	11	1
G_8:8	RINDG	55	6
G_8:8	RIOBL	41	2
G_8:8	SHIMA	34	1
G_8:8	UPJON	52	5
G_8:8	VENIC	43	3
G_8:8	WEBB0	19	2
G_8:8	WOODW	43	2
aug		56	
G_9:9	EMPIR	116	4
G_9:9	BACON		0
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	MOSSD		0
G_9:9	MOSST		0
G_9:9	ORWOO		0

G_9:9	PESCA		0
G_9:9	PIERS		0
G_9:9	RINDG		0
G_9:9	RIOBL		0
G_9:9	SHIMA		0
G_9:9	UPJON		0
G_9:9	VENIC		0
G_9:9	WEBB0		0
G_9:9	WOODW		0
sep		116	
G_10:10	EMPIR	64	8
G_10:10	BACON	41	8
G_10:10	KINGI	23	13
G_10:10	LJONE	68	6
G_10:10	MANDE	38	3
G_10:10	MOSSD	84	5
G_10:10	MOSST	63	2
G_10:10	ORWOO	219	2
G_10:10	PESCA	243	17
G_10:10	PIERS	15	1
G_10:10	RINDG	44	7
G_10:10	RIOBL	39	2
G_10:10	SHIMA	25	1
G_10:10	UPJON	81	5
G_10:10	VENIC	58	3
G_10:10	WEBB0	7	1
G_10:10	WOODW	27	2
oct		67	
G_11:11	EMPIR	110	4
G_11:11	BACON		0
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	MOSSD		0
G_11:11	MOSST		0
G_11:11	ORWOO		0
G_11:11	PESCA		0
G_11:11	PIERS		0
G_11:11	RINDG		0
G_11:11	RIOBL		0
G_11:11	SHIMA		0
G_11:11	UPJON	75	1
G_11:11	VENIC		0
G_11:11	WEBB0		0
G_11:11	WOODW		0
nov		93	
G_12:12	EMPIR	121	5
G_12:12	BACON		0
G_12:12	KINGI	61	3
G_12:12	LJONE		0
G_12:12	MANDE		0

Figure 18. Average Sulfate Levels in Delta Drainage



	Sulfate Averages		
Month	North	West	Southeast
J	109	273	155
F	150	439	228
M	129		74
A	69	168	97
M	57		73
J	31	95	77
J	32	95	62
A	26	72	56
S	24	73	
O	36	89	67
N	34		93
D	64		83

north		SO4 avg	n
G_1:1	GRAND	91	2
G_1:1	TYLER	37	1
G_1:1	BOULD	88	20
G_1:1	BRANN	124	25
G_1:1	EGBER	212	4
G_1:1	MCCOR	17	2
G_1:1	NETHE	68	4
G_1:1	PROSP	321	1
G_1:1	STATE	47	6
G_1:1	TERMP	52	4
G_1:1	TWITC	186	9
G_1:1	UPEGB	62	5
jan		109	
G_2:2	GRAND	89	3
G_2:2	TYLER		0
G_2:2	BOULD	142	4
G_2:2	BRANN	141	4
G_2:2	EGBER		0
G_2:2	MCCOR		0
G_2:2	NETHE		0
G_2:2	PROSP		0
G_2:2	STATE		0
G_2:2	TERMP		0
G_2:2	TWITC	227	5
G_2:2	UPEGB		0
feb		150	
G_3:3	GRAND	96	3
G_3:3	TYLER	157	1
G_3:3	BOULD	99	2
G_3:3	BRANN	84	4
G_3:3	EGBER	330	2
G_3:3	MCCOR	28	2
G_3:3	NETHE	119	2
G_3:3	PROSP	114	1
G_3:3	STATE		0
G_3:3	TERMP	50	2
G_3:3	TWITC	233	10
G_3:3	UPEGB	106	2
mar		129	
G_4:4	GRAND	43	2
G_4:4	TYLER	19	1
G_4:4	BOULD	66	14
G_4:4	BRANN	88	24
G_4:4	EGBER	176	4
G_4:4	MCCOR	19	4
G_4:4	NETHE	60	4
G_4:4	PROSP	40	1
G_4:4	STATE	42	6
G_4:4	TERMP	30	4
G_4:4	TWITC	117	8

G_4:4	UPEGB	131	6
apr		69	
G_5:5	GRAND	26	3
G_5:5	TYLER	16	1
G_5:5	BOULD	19	2
G_5:5	BRANN	44	4
G_5:5	EGBER	141	2
G_5:5	MCCOR	13	2
G_5:5	NETHE	21	2
G_5:5	PROSP	13	1
G_5:5	STATE		0
G_5:5	TERMP	23	2
G_5:5	TWITC	75	4
G_5:5	UPEGB	235	3
may		57	
G_6:6	GRAND	27	3
G_6:6	TYLER	12	1
G_6:6	BOULD	34	18
G_6:6	BRANN	58	20
G_6:6	EGBER	56	2
G_6:6	MCCOR	11	2
G_6:6	NETHE	14	2
G_6:6	PROSP		0
G_6:6	STATE	15	6
G_6:6	TERMP	37	2
G_6:6	TWITC	50	5
G_6:6	UPEGB	32	3
jun		31	
G_7:7	GRAND	28	3
G_7:7	TYLER	122	1
G_7:7	BOULD	28	20
G_7:7	BRANN	46	24
G_7:7	EGBER	37	2
G_7:7	MCCOR	9	2
G_7:7	NETHE	12	2
G_7:7	PROSP	10	1
G_7:7	STATE	14	8
G_7:7	TERMP	22	2
G_7:7	TWITC	36	7
G_7:7	UPEGB	23	3
jul		32	
G_8:8	GRAND	18	2
G_8:8	TYLER	38	1
G_8:8	BOULD	21	10
G_8:8	BRANN	43	16
G_8:8	EGBER	32	1
G_8:8	MCCOR	11	2
G_8:8	NETHE	17	2
G_8:8	PROSP	15	1
G_8:8	STATE	21	6
G_8:8	TERMP	24	2

G_8:8	TWITC	38	7
G_8:8	UPEGB	38	3
aug		26	
G_9:9	GRAND	31	3
G_9:9	TYLER	20	1
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	EGBER		0
G_9:9	MCCOR		0
G_9:9	NETHE		0
G_9:9	PROSP		0
G_9:9	STATE		0
G_9:9	TERMP		0
G_9:9	TWITC	19	5
G_9:9	UPEGB		0
sep		24	
G_10:10	GRAND	31	3
G_10:10	TYLER		0
G_10:10	BOULD	31	10
G_10:10	BRANN	44	17
G_10:10	EGBER	99	2
G_10:10	MCCOR	7	2
G_10:10	NETHE	14	2
G_10:10	PROSP	72	1
G_10:10	STATE	15	6
G_10:10	TERMP	23	2
G_10:10	TWITC	31	12
G_10:10	UPEGB	34	3
oct		36	
G_11:11	GRAND	28	3
G_11:11	TYLER	28	1
G_11:11	BOULD	43	2
G_11:11	BRANN		0
G_11:11	EGBER		0
G_11:11	MCCOR		0
G_11:11	NETHE		0
G_11:11	PROSP		0
G_11:11	STATE		0
G_11:11	TERMP		0
G_11:11	TWITC	39	8
G_11:11	UPEGB		0
nov		34	
G_12:12	GRAND	33	3
G_12:12	TYLER	24	1
G_12:12	BOULD	87	8
G_12:12	BRANN	85	3
G_12:12	EGBER		0
G_12:12	MCCOR		0
G_12:12	NETHE		0
G_12:12	PROSP		0
G_12:12	STATE		0

G_12:12 TERMP	83	2
G_12:12 TWITC	75	7
G_12:12 UPEGB		0
dec	64	
All Groups	66	533

casename	na avg	n
G_1:1 HOLLA	182	15
G_1:1 JERSE	342	2
G_1:1 PALMT	127	3
G_1:1 WEBB0	136	4
jan	196	
G_2:2 HOLLA	184	3
G_2:2 JERSE	374	2
G_2:2 PALMT		0
G_2:2 WEBB0	180	1
feb	246	
G_3:3 HOLLA		0
G_3:3 JERSE	349	3
G_3:3 PALMT		0
G_3:3 WEBB0		0
mar	349	
G_4:4 HOLLA	170	15
G_4:4 JERSE	174	2
G_4:4 PALMT	101	3
G_4:4 WEBB0	108	6
apr	138	
G_5:5 HOLLA		0
G_5:5 JERSE	98	2
G_5:5 PALMT		0
G_5:5 WEBB0		0
may	98	
G_6:6 HOLLA	103	12
G_6:6 JERSE	102	4
G_6:6 PALMT	89	2
G_6:6 WEBB0	94	1
jun	97	
G_7:7 HOLLA	110	15
G_7:7 JERSE	135	4
G_7:7 PALMT	86	3
G_7:7 WEBB0	89	4
jul	105	
G_8:8 HOLLA	113	12
G_8:8 JERSE	160	4
G_8:8 PALMT	95	3
G_8:8 WEBB0	76	2
aug	111	
G_9:9 HOLLA		0
G_9:9 JERSE	171	3
G_9:9 PALMT		0
G_9:9 WEBB0		0
sep	171	
G_10:10 HOLLA	121	12
G_10:10 JERSE	158	3
G_10:10 PALMT	86	2
G_10:10 WEBB0	96	5
oct	115	

G_11:11 HOLLA		0
G_11:11 JERSE	210	3
G_11:11 PALMT		0
G_11:11 WEBB0		0
nov	210	
G_12:12 HOLLA		0
G_12:12 JERSE	192	3
G_12:12 PALMT		0
G_12:12 WEBB0		0
dec	192	
All Groups	141	158

casename		na avg	n
G_1:1	GRAND	48	4
G_1:1	TYLER	47	2
G_1:1	BOULD	42	20
G_1:1	BRANN	75	25
G_1:1	EGBER	55	4
G_1:1	MCCOR	16	2
G_1:1	NETHE	63	4
G_1:1	PROSP	84	1
G_1:1	STATE	55	6
G_1:1	TERMP	64	4
G_1:1	TWITC	136	9
G_1:1	UPEGB	43	5
jan		61	
G_2:2	GRAND	42	5
G_2:2	TYLER	42	1
G_2:2	BOULD	63	4
G_2:2	BRANN	78	4
G_2:2	EGBER		0
G_2:2	MCCOR		0
G_2:2	NETHE		0
G_2:2	PROSP		0
G_2:2	STATE		0
G_2:2	TERMP		0
G_2:2	TWITC	152	5
G_2:2	UPEGB		0
feb		75	
G_3:3	GRAND	43	5
G_3:3	TYLER	64	4
G_3:3	BOULD	60	4
G_3:3	BRANN	65	4
G_3:3	EGBER	81	4
G_3:3	MCCOR	24	4
G_3:3	NETHE	123	4
G_3:3	PROSP	49	3
G_3:3	STATE		0
G_3:3	TERMP	63	3
G_3:3	TWITC	150	10
G_3:3	UPEGB	79	2
mar		73	
G_4:4	GRAND	31	5
G_4:4	TYLER	36	2
G_4:4	BOULD	44	14
G_4:4	BRANN	67	24
G_4:4	EGBER	49	4
G_4:4	MCCOR	12	4
G_4:4	NETHE	69	4
G_4:4	PROSP	26	1
G_4:4	STATE	75	6
G_4:4	TERMP	55	4
G_4:4	TWITC	110	8

G_4:4	UPEGB	69	6
apr		54	
G_5:5	GRAND	21	5
G_5:5	TYLER	21	2
G_5:5	BOULD	19	2
G_5:5	BRANN	48	4
G_5:5	EGBER	65	2
G_5:5	MCCOR	14	2
G_5:5	NETHE	28	2
G_5:5	PROSP	14	1
G_5:5	STATE		0
G_5:5	TERMP	58	2
G_5:5	TWITC	108	4
G_5:5	UPEGB	99	3
may		45	
G_6:6	GRAND	24	5
G_6:6	TYLER	12	3
G_6:6	BOULD	28	18
G_6:6	BRANN	51	20
G_6:6	EGBER	21	2
G_6:6	MCCOR	11	2
G_6:6	NETHE	15	2
G_6:6	PROSP		0
G_6:6	STATE	32	6
G_6:6	TERMP	39	2
G_6:6	TWITC	71	5
G_6:6	UPEGB	31	3
jun		31	
G_7:7	GRAND	18	3
G_7:7	TYLER	45	2
G_7:7	BOULD	19	20
G_7:7	BRANN	42	24
G_7:7	EGBER	24	2
G_7:7	MCCOR	11	2
G_7:7	NETHE	15	2
G_7:7	PROSP	11	1
G_7:7	STATE	19	8
G_7:7	TERMP	38	2
G_7:7	TWITC	58	7
G_7:7	UPEGB	25	3
jul		27	
G_8:8	GRAND	21	4
G_8:8	TYLER	21	2
G_8:8	BOULD	24	18
G_8:8	BRANN	45	16
G_8:8	EGBER	19	1
G_8:8	MCCOR	11	2
G_8:8	NETHE	19	2
G_8:8	PROSP	12	1
G_8:8	STATE	28	6
G_8:8	TERMP	40	2

G_8:8	TWITC	52	7
G_8:8	UPEGB	36	3
aug		27	
G_9:9	GRAND	31	5
G_9:9	TYLER	24	2
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	EGBER		0
G_9:9	MCCOR		0
G_9:9	NETHE		0
G_9:9	PROSP		0
G_9:9	STATE		0
G_9:9	TERMP		0
G_9:9	TWITC	75	5
G_9:9	UPEGB		0
sep		43	
G_10:10	GRAND	28	4
G_10:10	TYLER	26	1
G_10:10	BOULD	34	10
G_10:10	BRANN	64	18
G_10:10	EGBER	55	2
G_10:10	MCCOR	16	2
G_10:10	NETHE	18	2
G_10:10	PROSP	41	1
G_10:10	STATE	68	6
G_10:10	TERMP	85	2
G_10:10	TWITC	92	12
G_10:10	UPEGB	46	3
oct		48	
G_11:11	GRAND	29	5
G_11:11	TYLER	42	2
G_11:11	BOULD	30	2
G_11:11	BRANN		0
G_11:11	EGBER		0
G_11:11	MCCOR		0
G_11:11	NETHE		0
G_11:11	PROSP		0
G_11:11	STATE		0
G_11:11	TERMP		0
G_11:11	TWITC	106	8
G_11:11	UPEGB		0
nov		51	
G_12:12	GRAND	37	5
G_12:12	TYLER	47	2
G_12:12	BOULD	37	8
G_12:12	BRANN	60	3
G_12:12	EGBER		0
G_12:12	MCCOR		0
G_12:12	NETHE		0
G_12:12	PROSP		0
G_12:12	STATE		0

G_12:12 TERMP	44	2
G_12:12 TWITC	118	7
G_12:12 UPEGB		0
dec	57	
All Groups	53	590

casename		na avg	n
G_1:1	EMPIR	97	11
G_1:1	BACON	87	9
G_1:1	KINGI	57	17
G_1:1	LJONE	101	5
G_1:1	MANDE	74	2
G_1:1	MOSSD	81	9
G_1:1	MOSST	79	4
G_1:1	ORWOO	122	2
G_1:1	PESCA	201	18
G_1:1	PIERS	44	2
G_1:1	RINDG	89	10
G_1:1	RIOBL	118	4
G_1:1	SHIMA	48	2
G_1:1	UPJON	93	10
G_1:1	VENIC	61	3
G_1:1	WEBBO	138	1
G_1:1	WOODW	88	3
jan		93	
G_2:2	EMPIR	175	6
G_2:2	BACON	79	2
G_2:2	KINGI	61	6
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	MOSSD		0
G_2:2	MOSST		0
G_2:2	ORWOO		0
G_2:2	PESCA	232	1
G_2:2	PIERS		0
G_2:2	RINDG	131	4
G_2:2	RIOBL	101	2
G_2:2	SHIMA	46	1
G_2:2	UPJON	114	2
G_2:2	VENIC		0
G_2:2	WEBBO	151	1
G_2:2	WOODW		0
feb		121	
G_3:3	EMPIR	192	7
G_3:3	BACON		0
G_3:3	KINGI	57	6
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	MOSSD	115	13
G_3:3	MOSST	92	5
G_3:3	ORWOO		0
G_3:3	PESCA		0
G_3:3	PIERS	44	2
G_3:3	RINDG	125	4
G_3:3	RIOBL	99	4
G_3:3	SHIMA	49	2
G_3:3	UPJON	85	3

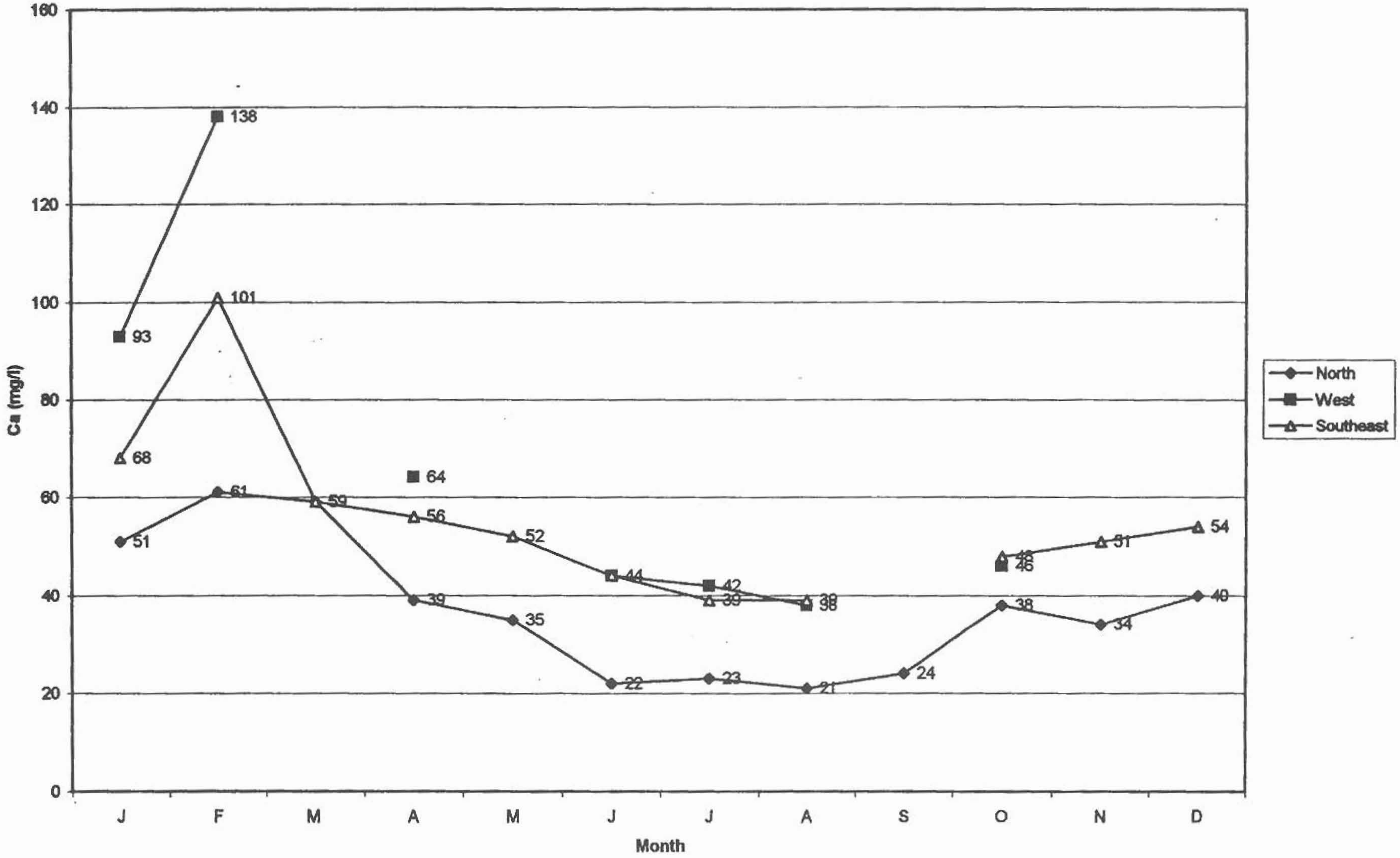
G_3:3	VENIC		0
G_3:3	WEBBO		0
G_3:3	WOODW		0
mar		95	
G_4:4	EMPIR	178	11
G_4:4	BACON	63	8
G_4:4	KINGI	48	19
G_4:4	LJONE	70	5
G_4:4	MANDE	61	3
G_4:4	MOSSD	118	9
G_4:4	MOSST	97	2
G_4:4	ORWOO	94	3
G_4:4	PESCA	206	19
G_4:4	PIERS	44	2
G_4:4	RINDG	93	11
G_4:4	RIOBL	107	4
G_4:4	SHIMA	45	2
G_4:4	UPJON	97	6
G_4:4	VENIC	56	3
G_4:4	WEBBO	93	2
G_4:4	WOODW	57	3
apr		90	
G_5:5	EMPIR	113	7
G_5:5	BACON		0
G_5:5	KINGI	47	3
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	MOSSD	115	5
G_5:5	MOSST	78	2
G_5:5	ORWOO		0
G_5:5	PESCA	144	2
G_5:5	PIERS	35	1
G_5:5	RINDG	78	2
G_5:5	RIOBL	38	2
G_5:5	SHIMA	44	1
G_5:5	UPJON	131	1
G_5:5	VENIC		0
G_5:5	WEBBO		0
G_5:5	WOODW		0
may		82	
G_6:6	EMPIR	99	10
G_6:6	BACON	48	8
G_6:6	KINGI	33	11
G_6:6	LJONE	68	5
G_6:6	MANDE	56	3
G_6:6	MOSSD	123	3
G_6:6	MOSST		0
G_6:6	ORWOO	119	3
G_6:6	PESCA	173	15
G_6:6	PIERS	34	1
G_6:6	RINDG	63	5

G_6:6	RIOBL	71	2
G_6:6	SHIMA	29	1
G_6:6	UPJON	76	9
G_6:6	VENIC	44	2
G_6:6	WEBB0	77	1
G_6:6	WOODW	56	3
jun		73	
G_7:7	EMPIR	56	10
G_7:7	BACON	60	10
G_7:7	KINGI	45	15
G_7:7	LJONE	50	10
G_7:7	MANDE	51	4
G_7:7	MOSSD	117	5
G_7:7	MOSST		0
G_7:7	ORWOO	95	4
G_7:7	PESCA	179	20
G_7:7	PIERS	21	1
G_7:7	RINDG	60	6
G_7:7	RIOBL	69	2
G_7:7	SHIMA	49	1
G_7:7	UPJON	71	10
G_7:7	VENIC	38	4
G_7:7	WEBB0	78	2
G_7:7	WOODW	52	2
jul		68	
G_8:8	EMPIR	46	8
G_8:8	BACON	65	8
G_8:8	KINGI	50	12
G_8:8	LJONE	56	5
G_8:8	MANDE	57	3
G_8:8	MOSSD	119	10
G_8:8	MOSST	85	2
G_8:8	ORWOO	67	2
G_8:8	PESCA	170	14
G_8:8	PIERS	17	1
G_8:8	RINDG	52	6
G_8:8	RIOBL	88	2
G_8:8	SHIMA	47	1
G_8:8	UPJON	71	9
G_8:8	VENIC	41	3
G_8:8	WEBB0	78	2
G_8:8	WOODW	52	2
aug		68	
G_9:9	EMPIR	187	5
G_9:9	BACON		0
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	MOSSD		0
G_9:9	MOSST		0
G_9:9	ORWOO		0

G_9:9	PESCA		0
G_9:9	PIERS		0
G_9:9	RINDG		0
G_9:9	RIOBL		0
G_9:9	SHIMA		0
G_9:9	UPJON		0
G_9:9	VENIC		0
G_9:9	WEBB0		0
G_9:9	WOODW		0
sep		187	
G_10:10	EMPIR	171	9
G_10:10	BACON	76	8
G_10:10	KINGI	44	13
G_10:10	LJONE	68	6
G_10:10	MANDE	56	3
G_10:10	MOSSD	126	5
G_10:10	MOSST	67	2
G_10:10	ORWOO	110	2
G_10:10	PESCA	210	17
G_10:10	PIERS	18	1
G_10:10	RINDG	60	7
G_10:10	RIOBL	130	2
G_10:10	SHIMA	38	1
G_10:10	UPJON	84	5
G_10:10	VENIC	34	3
G_10:10	WEBB0	68	1
G_10:10	WOODW	49	2
oct		83	
G_11:11	EMPIR	104	5
G_11:11	BACON		0
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	MOSSD		0
G_11:11	MOSST		0
G_11:11	ORWOO		0
G_11:11	PESCA		0
G_11:11	PIERS		0
G_11:11	RINDG		0
G_11:11	RIOBL		0
G_11:11	SHIMA		0
G_11:11	UPJON	73	1
G_11:11	VENIC		0
G_11:11	WEBB0		0
G_11:11	WOODW		0
nov		89	
G_12:12	EMPIR	66	6
G_12:12	BACON		0
G_12:12	KINGI	48	3
G_12:12	LJONE		0
G_12:12	MANDE		0

G_12:12 MOSSD		0
G_12:12 MOSST		0
G_12:12 ORWOO		0
G_12:12 PESCA		0
G_12:12 PIERS		0
G_12:12 RINDG	88	2
G_12:12 RIOBL	112	2
G_12:12 SHIMA	41	1
G_12:12 UPJON	82	3
G_12:12 VENIC		0
G_12:12 WEBB0		0
G_12:12 WOODW		0
dec	73	
All Groups	97	714

Figure 14. Average Calcium Levels in Delta Drainage



Calcium averages

Month	North	West	Southeast
J	51	93	68
F	61	138	101
M	59		59
A	39	64	56
M	35		52
J	22	44	44
J	23	42	39
A	21	38	39
S	24		
O	38	46	48
N	34		51
D	40		54

north		CA_MEANS	CA_N
G_1:1	GRAND	46	2
G_1:1	TYLER	47	1
G_1:1	BOULD	45	18
G_1:1	BRANN	51	25
G_1:1	EGBER	62	4
G_1:1	MCCOR	31	2
G_1:1	NETHE	33	4
G_1:1	PROSP	101	1
G_1:1	STATE	45	6
G_1:1	TERMP	53	4
G_1:1	TWITC	67	9
G_1:1	UPEGB	29	5
jan		51	
G_2:2	GRAND	42	3
G_2:2	TYLER		0
G_2:2	BOULD	60	4
G_2:2	BRANN	60	4
G_2:2	EGBER		0
G_2:2	MCCOR		0
G_2:2	NETHE		0
G_2:2	PROSP		0
G_2:2	STATE		0
G_2:2	TERMP		0
G_2:2	TWITC	83	5
G_2:2	UPEGB		0
feb		61	
G_3:3	GRAND	43	3
G_3:3	TYLER	71	1
G_3:3	BOULD	48	2
G_3:3	BRANN	53	4
G_3:3	EGBER	103	2
G_3:3	MCCOR	34	2
G_3:3	NETHE	54	2
G_3:3	PROSP	73	1
G_3:3	STATE		0
G_3:3	TERMP	49	2
G_3:3	TWITC	81	10
G_3:3	UPEGB	45	2
mar		59	
G_4:4	GRAND	24	2
G_4:4	TYLER	16	1
G_4:4	BOULD	32	14
G_4:4	BRANN	52	24
G_4:4	EGBER	53	4
G_4:4	MCCOR	17	4
G_4:4	NETHE	38	4
G_4:4	PROSP	39	1
G_4:4	STATE	51	6
G_4:4	TERMP	48	4
G_4:4	TWITC	48	8

G_4:4	UPEGB	46	6
apr		39	
G_5:5	GRAND	18	3
G_5:5	TYLER	17	1
G_5:5	BOULD	17	2
G_5:5	BRANN	42	4
G_5:5	EGBER	71	2
G_5:5	MCCOR	18	2
G_5:5	NETHE	21	2
G_5:5	PROSP	15	1
G_5:5	STATE		0
G_5:5	TERMP	57	2
G_5:5	TWITC	38	4
G_5:5	UPEGB	69	3
may		35	
G_6:6	GRAND	20	3
G_6:6	TYLER	13	1
G_6:6	BOULD	22	18
G_6:6	BRANN	38	20
G_6:6	EGBER	19	2
G_6:6	MCCOR	13	2
G_6:6	NETHE	13	2
G_6:6	PROSP		0
G_6:6	STATE	21	6
G_6:6	TERMP	37	2
G_6:6	TWITC	27	5
G_6:6	UPEGB	22	3
jun		22	
G_7:7	GRAND	17	2
G_7:7	TYLER	67	1
G_7:7	BOULD	19	20
G_7:7	BRANN	27	24
G_7:7	EGBER	25	2
G_7:7	MCCOR	12	2
G_7:7	NETHE	14	2
G_7:7	PROSP	14	1
G_7:7	STATE	15	8
G_7:7	TERMP	32	2
G_7:7	TWITC	21	7
G_7:7	UPEGB	18	3
jul		23	
G_8:8	GRAND	18	2
G_8:8	TYLER	20	1
G_8:8	BOULD	17	10
G_8:8	BRANN	35	16
G_8:8	EGBER	20	1
G_8:8	MCCOR	13	2
G_8:8	NETHE	16	2
G_8:8	PROSP	14	1
G_8:8	STATE	24	6
G_8:8	TERMP	34	2

G_8:8	TWITC	20	7
G_8:8	UPEGB	23	3
aug		21	
G_9:9	GRAND	24	3
G_9:9	TYLER	24	1
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	EGBER		0
G_9:9	MCCOR		0
G_9:9	NETHE		0
G_9:9	PROSP		0
G_9:9	STATE		0
G_9:9	TERMP		0
G_9:9	TWITC	22	5
G_9:9	UPEGB		0
sep		24	
G_10:10	GRAND	30	3
G_10:10	TYLER		0
G_10:10	BOULD	32	10
G_10:10	BRANN	37	18
G_10:10	EGBER	62	2
G_10:10	MCCOR	29	2
G_10:10	NETHE	16	2
G_10:10	PROSP	53	1
G_10:10	STATE	47	6
G_10:10	TERMP	57	2
G_10:10	TWITC	25	12
G_10:10	UPEGB	32	3
oct		38	
G_11:11	GRAND	27	3
G_11:11	TYLER	46	1
G_11:11	BOULD	36	2
G_11:11	BRANN		0
G_11:11	EGBER		0
G_11:11	MCCOR		0
G_11:11	NETHE		0
G_11:11	PROSP		0
G_11:11	STATE		0
G_11:11	TERMP		0
G_11:11	TWITC	27	8
G_11:11	UPEGB		0
nov		34	
G_12:12	GRAND	29	3
G_12:12	TYLER	53	1
G_12:12	BOULD	41	8
G_12:12	BRANN	35	3
G_12:12	EGBER		0
G_12:12	MCCOR		0
G_12:12	NETHE		0
G_12:12	PROSP		0
G_12:12	STATE		0

G_12:12 TERMP	41	2
G_12:12 TWITC	40	7
G_12:12 UPEGB		0
dec	40	
All Groups	37	531

west		CA_MEANS	CA_N
G_1:1	HOLLA	76	15
G_1:1	JERSE	138	2
G_1:1	PALMT	71	3
G_1:1	WEBBO	86	4
jan		93	
G_2:2	HOLLA	80	3
G_2:2	JERSE	157	2
G_2:2	PALMT		0
G_2:2	WEBBO	177	1
feb		138	
G_3:3	HOLLA		0
G_3:3	JERSE	135	3
G_3:3	PALMT		0
G_3:3	WEBBO		0
mar		135	
G_4:4	HOLLA	63	15
G_4:4	JERSE	72	2
G_4:4	PALMT	57	3
G_4:4	WEBBO	66	6
apr		64	
G_5:5	HOLLA		0
G_5:5	JERSE	36	2
G_5:5	PALMT		0
G_5:5	WEBBO		0
may		36	
G_6:6	HOLLA	41	12
G_6:6	JERSE	42	4
G_6:6	PALMT	45	2
G_6:6	WEBBO	47	1
jun		44	
G_7:7	HOLLA	42	15
G_7:7	JERSE	35	4
G_7:7	PALMT	33	3
G_7:7	WEBBO	58	4
jul		42	
G_8:8	HOLLA	41	12
G_8:8	JERSE	38	4
G_8:8	PALMT	39	3
G_8:8	WEBBO	34	2
aug		38	
G_9:9	HOLLA		0
G_9:9	JERSE	32	3
G_9:9	PALMT		0
G_9:9	WEBBO		0
sep		32	
G_10:10	HOLLA	45	12
G_10:10	JERSE	30	3
G_10:10	PALMT	50	2
G_10:10	WEBBO	58	5
oct		46	

G_11:11 HOLLA		0
G_11:11 JERSE	51	3
G_11:11 PALMT		0
G_11:11 WEBB0		0
nov	51	
G_12:12 HOLLA		0
G_12:12 JERSE	64	3
G_12:12 PALMT		0
G_12:12 WEBB0		0
dec	64	
All Groups	57	158

southeast		CA_MEANS	CA_N
G_1:1	EMPIR	91	9
G_1:1	BACON	59	9
G_1:1	KINGI	57	14
G_1:1	LJONE	64	5
G_1:1	MANDE	51	2
G_1:1	MOSSD	52	9
G_1:1	MOSST	41	4
G_1:1	ORWOO	79	2
G_1:1	PESCA	141	18
G_1:1	PIERS	44	2
G_1:1	RINDG	57	9
G_1:1	RIOBL	51	4
G_1:1	SHIMA	53	2
G_1:1	UPJON	48	10
G_1:1	VENIC	59	3
G_1:1	WEBBO	152	1
G_1:1	WOODW	55	3
jan		68	
G_2:2	EMPIR	132	3
G_2:2	BACON	67	2
G_2:2	KINGI	63	6
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	MOSSD		0
G_2:2	MOSST		0
G_2:2	ORWOO		0
G_2:2	PESCA	135	1
G_2:2	PIERS		0
G_2:2	RINDG	94	4
G_2:2	RIOBL	56	2
G_2:2	SHIMA	56	1
G_2:2	UPJON	50	2
G_2:2	VENIC		0
G_2:2	WEBBO	256	1
G_2:2	WOODW		0
feb		101	
G_3:3	EMPIR	137	6
G_3:3	BACON		0
G_3:3	KINGI	52	3
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	MOSSD	57	4
G_3:3	MOSST	43	2
G_3:3	ORWOO		0
G_3:3	PESCA		0
G_3:3	PIERS	35	1
G_3:3	RINDG	72	2
G_3:3	RIOBL	50	2
G_3:3	SHIMA	53	1
G_3:3	UPJON	38	1

G_3:3	VENIC		0
G_3:3	WEBB0		0
G_3:3	WOODW		0
mar		59	
G_4:4	EMPIR	118	10
G_4:4	BACON	34	8
G_4:4	KINGI	52	19
G_4:4	LJONE	36	5
G_4:4	MANDE	35	3
G_4:4	MOSSD	66	9
G_4:4	MOSST	41	2
G_4:4	ORWOO	54	3
G_4:4	PESCA	113	16
G_4:4	PIERS	40	2
G_4:4	RINDG	61	11
G_4:4	RIOBL	50	4
G_4:4	SHIMA	59	2
G_4:4	UPJON	43	6
G_4:4	VENIC	38	3
G_4:4	WEBB0	87	2
G_4:4	WOODW	27	3
apr		56	
G_5:5	EMPIR	65	6
G_5:5	BACON		0
G_5:5	KINGI	53	3
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	MOSSD	62	5
G_5:5	MOSST	38	2
G_5:5	ORWOO		0
G_5:5	PESCA	71	2
G_5:5	PIERS	31	1
G_5:5	RINDG	52	2
G_5:5	RIOBL	39	2
G_5:5	SHIMA	60	1
G_5:5	UPJON	54	1
G_5:5	VENIC		0
G_5:5	WEBB0		0
G_5:5	WOODW		0
may		52	
G_6:6	EMPIR	64	9
G_6:6	BACON	22	8
G_6:6	KINGI	39	11
G_6:6	LJONE	35	5
G_6:6	MANDE	28	3
G_6:6	MOSSD	77	3
G_6:6	MOSST		0
G_6:6	ORWOO	55	3
G_6:6	PESCA	91	15
G_6:6	PIERS	31	1
G_6:6	RINDG	43	5

G_6:6	RIOBL	44	2
G_6:6	SHIMA	24	1
G_6:6	UPJON	33	9
G_6:6	VENIC	31	2
G_6:6	WEBBO	62	1
G_6:6	WOODW	23	3
jun		44	
G_7:7	EMPIR	45	9
G_7:7	BACON	21	10
G_7:7	KINGI	47	15
G_7:7	LJONE	24	10
G_7:7	MANDE	28	4
G_7:7	MOSSD	57	5
G_7:7	MOSST		0
G_7:7	ORWOO	35	4
G_7:7	PESCA	89	20
G_7:7	PIERS	18	1
G_7:7	RINDG	42	6
G_7:7	RIOBL	53	2
G_7:7	SHIMA	34	1
G_7:7	UPJON	32	10
G_7:7	VENIC	30	4
G_7:7	WEBBO	52	2
G_7:7	WOODW	24	2
jul		39	
G_8:8	EMPIR	38	7
G_8:8	BACON	21	8
G_8:8	KINGI	53	11
G_8:8	LJONE	27	5
G_8:8	MANDE	29	3
G_8:8	MOSSD	52	10
G_8:8	MOSST	33	2
G_8:8	ORWOO	30	2
G_8:8	PESCA	88	14
G_8:8	PIERS	17	1
G_8:8	RINDG	34	6
G_8:8	RIOBL	48	2
G_8:8	SHIMA	59	1
G_8:8	UPJON	27	5
G_8:8	VENIC	27	3
G_8:8	WEBBO	47	2
G_8:8	WOODW	24	2
aug		39	
G_9:9	EMPIR	144	4
G_9:9	BACON		0
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	MOSSD		0
G_9:9	MOSST		0
G_9:9	ORWOO		0

G_9:9	PESCA		0
G_9:9	PIERS		0
G_9:9	RINDG		0
G_9:9	RIOBL		0
G_9:9	SHIMA		0
G_9:9	UPJON		0
G_9:9	VENIC		0
G_9:9	WEBB0		0
G_9:9	WOODW		0
sep		144	
G_10:10	EMPIR	114	8
G_10:10	BACON	25	8
G_10:10	KINGI	50	13
G_10:10	LJONE	32	6
G_10:10	MANDE	30	3
G_10:10	MOSSD	48	5
G_10:10	MOSST	33	2
G_10:10	ORWOO	64	2
G_10:10	PESCA	115	17
G_10:10	PIERS	24	1
G_10:10	RINDG	48	7
G_10:10	RIOBL	64	2
G_10:10	SHIMA	41	1
G_10:10	UPJON	36	5
G_10:10	VENIC	28	3
G_10:10	WEBB0	44	1
G_10:10	WOODW	20	2
oct		48	
G_11:11	EMPIR	65	4
G_11:11	BACON		0
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	MOSSD		0
G_11:11	MOSST		0
G_11:11	ORWOO		0
G_11:11	PESCA		0
G_11:11	PIERS		0
G_11:11	RINDG		0
G_11:11	RIOBL		0
G_11:11	SHIMA		0
G_11:11	UPJON	36	1
G_11:11	VENIC		0
G_11:11	WEBB0		0
G_11:11	WOODW		0
nov		51	
G_12:12	EMPIR	60	5
G_12:12	BACON		0
G_12:12	KINGI	48	3
G_12:12	LJONE		0
G_12:12	MANDE		0

G_12:12 MOSSD		0
G_12:12 MOSST		0
G_12:12 ORWOO		0
G_12:12 PESCA		0
G_12:12 PIERS		0
G_12:12 RINDG	51	2
G_12:12 RIOBL	72	2
G_12:12 SHIMA	50	1
G_12:12 UPJON	44	3
G_12:12 VENIC		0
G_12:12 WEBBO		0
G_12:12 WOODW		0
dec	54	
All Groups	60	664

west delta		MG	n
G_1:1	HOLLA	51	15
G_1:1	JERSE	82	2
G_1:1	PALMT	41	3
G_1:1	WEBB0	49	4
JAN		56	
G_2:2	HOLLA	55	3
G_2:2	JERSE	99	2
G_2:2	PALMT		0
G_2:2	WEBB0	92	1
FEB		82	
G_3:3	HOLLA		0
G_3:3	JERSE	87	3
G_3:3	PALMT		0
G_3:3	WEBB0		0
MAR		87	
G_4:4	HOLLA	48	15
G_4:4	JERSE	47	2
G_4:4	PALMT	38	3
G_4:4	WEBB0	36	6
APR		42	
G_5:5	HOLLA		0
G_5:5	JERSE	25	2
G_5:5	PALMT		0
G_5:5	WEBB0		0
MAY		25	
G_6:6	HOLLA	25	12
G_6:6	JERSE	27	4
G_6:6	PALMT	33	2
G_6:6	WEBB0	25	1
JUN		27	
G_7:7	HOLLA	26	15
G_7:7	JERSE	28	4
G_7:7	PALMT	22	3
G_7:7	WEBB0	33	4
JUL		27	
G_8:8	HOLLA	27	12
G_8:8	JERSE	31	4
G_8:8	PALMT	25	3
G_8:8	WEBB0	20	2
AUG		26	
G_9:9	HOLLA		0
G_9:9	JERSE	32	3
G_9:9	PALMT		0
G_9:9	WEBB0		0
SEP		32	
G_10:10	HOLLA	30	12
G_10:10	JERSE	31	3
G_10:10	PALMT	29	2
G_10:10	WEBB0	34	5
OCT		31	

G_11:11	HOLLA		0
G_11:11	JERSE	43	3
G_11:11	PALMT		0
G_11:11	WEBB0		0
NOV		43	
G_12:12	HOLLA		0
G_12:12	JERSE	46	3
G_12:12	PALMT		0
G_12:12	WEBB0		0
DEC		46	
All Groups		38	158

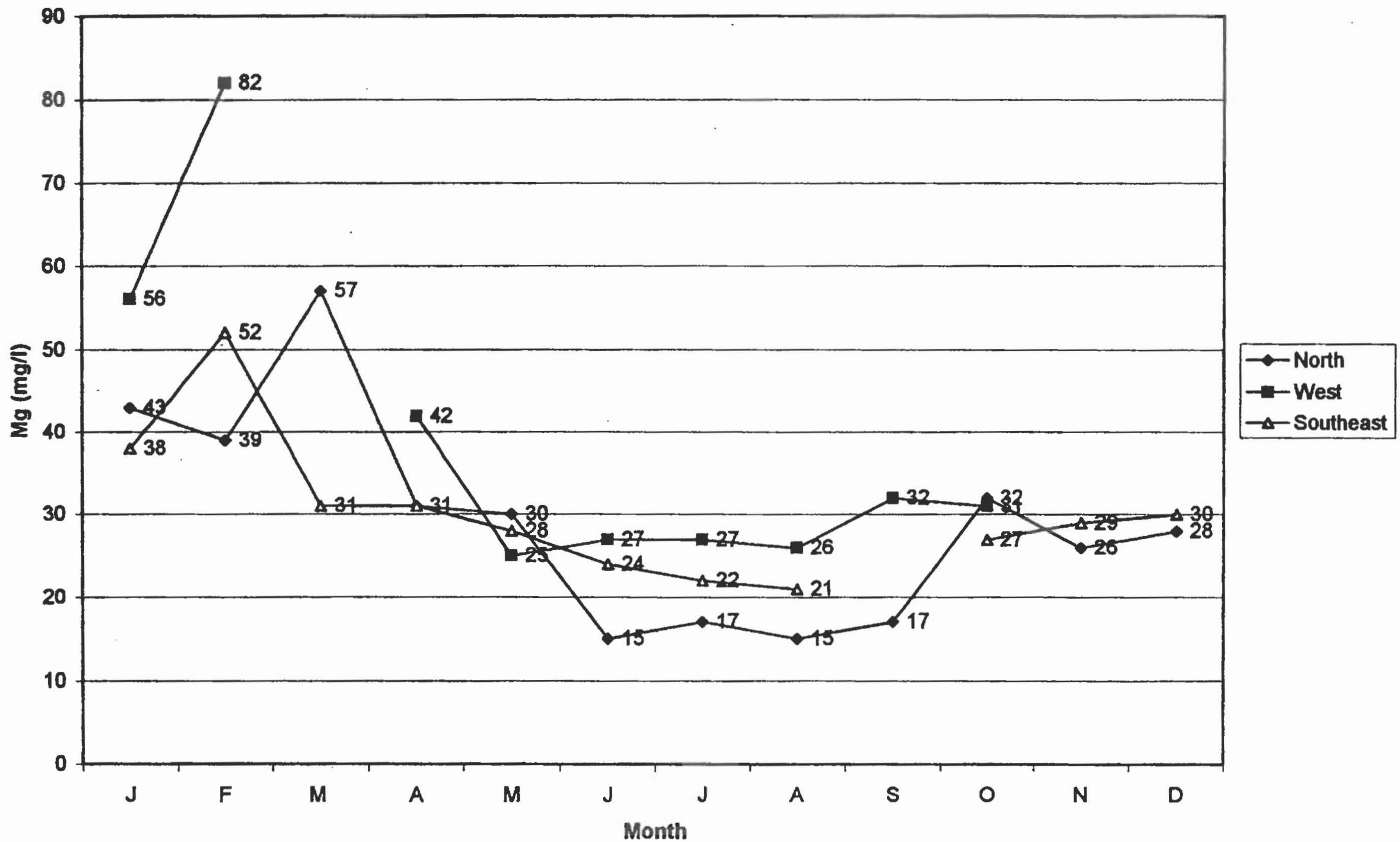
north delta		MG	n
G_1:1	GRAND	37	2
G_1:1	TYLER	40	1
G_1:1	BOULD	27	18
G_1:1	BRANN	38	25
G_1:1	EGBER	75	4
G_1:1	MCCOR	20	2
G_1:1	NETHE	44	4
G_1:1	PROSP	103	1
G_1:1	STATE	30	6
G_1:1	TERMP	35	4
G_1:1	TWITC	39	9
G_1:1	UPEGB	33	5
JAN		43	
G_2:2	GRAND	32	3
G_2:2	TYLER		0
G_2:2	BOULD	35	4
G_2:2	BRANN	42	4
G_2:2	EGBER		0
G_2:2	MCCOR		0
G_2:2	NETHE		0
G_2:2	PROSP		0
G_2:2	STATE		0
G_2:2	TERMP		0
G_2:2	TWITC	46	5
G_2:2	UPEGB		0
FEB		39	
G_3:3	GRAND	34	3
G_3:3	TYLER	59	1
G_3:3	BOULD	30	2
G_3:3	BRANN	42	4
G_3:3	EGBER	123	2
G_3:3	MCCOR	24	2
G_3:3	NETHE	85	2
G_3:3	PROSP	88	1
G_3:3	STATE		0
G_3:3	TERMP	33	2
G_3:3	TWITC	49	10
G_3:3	UPEGB	59	2
MAR		57	
G_4:4	GRAND	18	2
G_4:4	TYLER	11	1
G_4:4	BOULD	18	14
G_4:4	BRANN	37	24
G_4:4	EGBER	58	4
G_4:4	MCCOR	11	4
G_4:4	NETHE	42	4
G_4:4	PROSP	38	1
G_4:4	STATE	33	6
G_4:4	TERMP	30	4
G_4:4	TWITC	30	8

G_4:4	UPEGB	48	6
APR		31	
G_5:5	GRAND	13	3
G_5:5	TYLER	12	1
G_5:5	BOULD	10	2
G_5:5	BRANN	30	4
G_5:5	EGBER	81	2
G_5:5	MCCOR	11	2
G_5:5	NETHE	21	2
G_5:5	PROSP	12	1
G_5:5	STATE		0
G_5:5	TERMP	36	2
G_5:5	TWITC	25	4
G_5:5	UPEGB	81	3
MAY		30	
G_6:6	GRAND	15	3
G_6:6	TYLER	8	1
G_6:6	BOULD	12	18
G_6:6	BRANN	27	20
G_6:6	EGBER	16	2
G_6:6	MCCOR	7	2
G_6:6	NETHE	10	2
G_6:6	PROSP		0
G_6:6	STATE	14	6
G_6:6	TERMP	21	2
G_6:6	TWITC	18	5
G_6:6	UPEGB	20	3
JUN		15	
G_7:7	GRAND	12	2
G_7:7	TYLER	54	1
G_7:7	BOULD	10	20
G_7:7	BRANN	19	24
G_7:7	EGBER	25	2
G_7:7	MCCOR	7	2
G_7:7	NETHE	12	2
G_7:7	PROSP	10	1
G_7:7	STATE	10	8
G_7:7	TERMP	19	2
G_7:7	TWITC	12	7
G_7:7	UPEGB	16	3
JUL		17	
G_8:8	GRAND	14	2
G_8:8	TYLER	13	1
G_8:8	BOULD	9	10
G_8:8	BRANN	25	16
G_8:8	EGBER	17	1
G_8:8	MCCOR	8	2
G_8:8	NETHE	15	2
G_8:8	PROSP	11	1
G_8:8	STATE	14	6
G_8:8	TERMP	22	2

G_8:8	TWITC	13	7
G_8:8	UPEGB	24	3
AUG		15	
G_9:9	GRAND	19	3
G_9:9	TYLER	18	1
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	EGBER		0
G_9:9	MCCOR		0
G_9:9	NETHE		0
G_9:9	PROSP		0
G_9:9	STATE		0
G_9:9	TERMP		0
G_9:9	TWITC	14	5
G_9:9	UPEGB		0
SEP		17	
G_10:10	GRAND	23	3
G_10:10	TYLER		0
G_10:10	BOULD	18	10
G_10:10	BRANN	28	18
G_10:10	EGBER	71	2
G_10:10	MCCOR	20	2
G_10:10	NETHE	14	2
G_10:10	PROSP	65	1
G_10:10	STATE	29	6
G_10:10	TERMP	39	2
G_10:10	TWITC	16	12
G_10:10	UPEGB	35	3
OCT		32	
G_11:11	GRAND	22	3
G_11:11	TYLER	42	1
G_11:11	BOULD	22	2
G_11:11	BRANN		0
G_11:11	EGBER		0
G_11:11	MCCOR		0
G_11:11	NETHE		0
G_11:11	PROSP		0
G_11:11	STATE		0
G_11:11	TERMP		0
G_11:11	TWITC	19	8
G_11:11	UPEGB		0
NOV		26	
G_12:12	GRAND	23	3
G_12:12	TYLER	47	1
G_12:12	BOULD	25	8
G_12:12	BRANN	26	3
G_12:12	EGBER		0
G_12:12	MCCOR		0
G_12:12	NETHE		0
G_12:12	PROSP		0
G_12:12	STATE		0

G_12:12 TERMP	23	2
G_12:12 TWITC	24	7
G_12:12 UPEGB		0
DEC	28	
All Groups	27	531

Figure 15. Average Magnesium Levels in Delta Drainage



MONTH	NORTH MG AVG	WEST MG AVG	SOUTHEAST MG AVG
J	43	56	38
F	39	82	52
M	57		31
A	31	42	31
M	30	25	28
J	15	27	24
J	17	27	22
A	15	26	21
S	17	32	
O	32	31	27
N	26		29
D	28		30
annual	27	38	32

SOUTHEAST DELTA MG			N
G_1:1	EMPIR	45	9
G_1:1	BACON	29	9
G_1:1	KINGI	28	14
G_1:1	LJONE	32	5
G_1:1	MANDE	28	2
G_1:1	MOSSD	25	9
G_1:1	MOSST	21	4
G_1:1	ORWOO	52	2
G_1:1	PESCA	80	18
G_1:1	PIERS	31	2
G_1:1	RINDG	28	9
G_1:1	RIOBL	50	4
G_1:1	SHIMA	26	2
G_1:1	UPJON	24	10
G_1:1	VENIC	33	3
G_1:1	WEBB0	86	1
G_1:1	WOODW	28	3
JAN		38	
G_2:2	EMPIR	69	3
G_2:2	BACON	34	2
G_2:2	KINGI	30	6
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	MOSSD		0
G_2:2	MOSST		0
G_2:2	ORWOO		0
G_2:2	PESCA	63	1
G_2:2	PIERS		0
G_2:2	RINDG	46	4
G_2:2	RIOBL	47	2
G_2:2	SHIMA	28	1
G_2:2	UPJON	28	2
G_2:2	VENIC		0
G_2:2	WEBB0	126	1
G_2:2	WOODW		0
FEB		52	
G_3:3	EMPIR	69	6
G_3:3	BACON		0
G_3:3	KINGI	24	3
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	MOSSD	31	4
G_3:3	MOSST	23	2
G_3:3	ORWOO		0
G_3:3	PESCA		0
G_3:3	PIERS	27	1
G_3:3	RINDG	36	2
G_3:3	RIOBL	24	2
G_3:3	SHIMA	27	1
G_3:3	UPJON	22	1

G_3:3	VENIC		0
G_3:3	WEBB0		0
G_3:3	WOODW		0
MAR		31	
G_4:4	EMPIR	61	10
G_4:4	BACON	18	8
G_4:4	KINGI	24	19
G_4:4	LJONE	20	5
G_4:4	MANDE	19	3
G_4:4	MOSSD	32	9
G_4:4	MOSST	22	2
G_4:4	ORWOO	37	3
G_4:4	PESCA	62	16
G_4:4	PIERS	28	2
G_4:4	RINDG	29	11
G_4:4	RIOBL	37	4
G_4:4	SHIMA	26	2
G_4:4	UPJON	23	6
G_4:4	VENIC	22	3
G_4:4	WEBB0	48	2
G_4:4	WOODW	15	3
APR		31	
G_5:5	EMPIR	32	6
G_5:5	BACON		0
G_5:5	KINGI	24	3
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	MOSSD	30	5
G_5:5	MOSST	19	2
G_5:5	ORWOO		0
G_5:5	PESCA	39	2
G_5:5	PIERS	22	1
G_5:5	RINDG	27	2
G_5:5	RIOBL	22	2
G_5:5	SHIMA	32	1
G_5:5	UPJON	30	1
G_5:5	VENIC		0
G_5:5	WEBB0		0
G_5:5	WOODW		0
MAY		28	
G_6:6	EMPIR	33	9
G_6:6	BACON	14	8
G_6:6	KINGI	17	11
G_6:6	LJONE	19	5
G_6:6	MANDE	15	3
G_6:6	MOSSD	29	3
G_6:6	MOSST		0
G_6:6	ORWOO	40	3
G_6:6	PESCA	49	15
G_6:6	PIERS	24	1
G_6:6	RINDG	20	5

G_6:6	RIOBL	27	2
G_6:6	SHIMA	11	1
G_6:6	UPJON	18	9
G_6:6	VENIC	17	2
G_6:6	WEBB0	36	1
G_6:6	WOODW	13	3
JUN		24	
G_7:7	EMPIR	23	9
G_7:7	BACON	15	10
G_7:7	KINGI	21	15
G_7:7	LJONE	13	10
G_7:7	MANDE	15	4
G_7:7	MOSSD	26	5
G_7:7	MOSST		0
G_7:7	ORWOO	26	4
G_7:7	PESCA	48	20
G_7:7	PIERS	13	1
G_7:7	RINDG	20	6
G_7:7	RIOBL	31	2
G_7:7	SHIMA	20	1
G_7:7	UPJON	17	10
G_7:7	VENIC	17	4
G_7:7	WEBB0	31	2
G_7:7	WOODW	14	2
JUL		22	
G_8:8	EMPIR	20	7
G_8:8	BACON	14	8
G_8:8	KINGI	25	11
G_8:8	LJONE	15	5
G_8:8	MANDE	16	3
G_8:8	MOSSD	28	10
G_8:8	MOSST	18	2
G_8:8	ORWOO	22	2
G_8:8	PESCA	48	14
G_8:8	PIERS	11	1
G_8:8	RINDG	16	6
G_8:8	RIOBL	34	2
G_8:8	SHIMA	23	1
G_8:8	UPJON	16	5
G_8:8	VENIC	15	3
G_8:8	WEBB0	29	2
G_8:8	WOODW	14	2
AUG		21	
G_9:9	EMPIR	76	4
G_9:9	BACON		0
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	MOSSD		0
G_9:9	MOSST		0
G_9:9	ORWOO		0

G_9:9	PESCA		0
G_9:9	PIERS		0
G_9:9	RINDG		0
G_9:9	RIOBL		0
G_9:9	SHIMA		0
G_9:9	UPJON		0
G_9:9	VENIC		0
G_9:9	WEBB0		0
G_9:9	WOODW		0
SEP		76	
G_10:10	EMPIR	52	8
G_10:10	BACON	17	8
G_10:10	KINGI	23	13
G_10:10	LJONE	18	6
G_10:10	MANDE	17	3
G_10:10	MOSSD	27	5
G_10:10	MOSST	17	2
G_10:10	ORWOO	49	2
G_10:10	PESCA	69	17
G_10:10	PIERS	16	1
G_10:10	RINDG	23	7
G_10:10	RIOBL	50	2
G_10:10	SHIMA	21	1
G_10:10	UPJON	19	5
G_10:10	VENIC	15	3
G_10:10	WEBB0	24	1
G_10:10	WOODW	11	2
OCT		27	
G_11:11	EMPIR	37	4
G_11:11	BACON		0
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	MOSSD		0
G_11:11	MOSST		0
G_11:11	ORWOO		0
G_11:11	PESCA		0
G_11:11	PIERS		0
G_11:11	RINDG		0
G_11:11	RIOBL		0
G_11:11	SHIMA		0
G_11:11	UPJON	21	1
G_11:11	VENIC		0
G_11:11	WEBB0		0
G_11:11	WOODW		0
NOV		29	
G_12:12	EMPIR	30	5
G_12:12	BACON		0
G_12:12	KINGI	25	3
G_12:12	LJONE		0
G_12:12	MANDE		0

G_12:12	MOSSD		0
G_12:12	MOSST		0
G_12:12	ORWOO		0
G_12:12	PESCA		0
G_12:12	PIERS		0
G_12:12	RINDG	26	2
G_12:12	RIOBL	50	2
G_12:12	SHIMA	23	1
G_12:12	UPJON	24	3
G_12:12	VENIC		0
G_12:12	WEBB0		0
G_12:12	WOODW		0
Southeast		30	
All Groups		32	664

west		CL_MEANS	CL_N
G_1:1	HOLLA	285	15
G_1:1	JERSE	645	2
G_1:1	PALMT	205	3
G_1:1	WEBBO	264	4
jan		350	
G_2:2	HOLLA	272	3
G_2:2	JERSE	687	1
G_2:2	PALMT		0
G_2:2	WEBBO	301	1
feb		420	
G_3:3	HOLLA		0
G_3:3	JERSE	621	3
G_3:3	PALMT		0
G_3:3	WEBBO		0
mar		621	
G_4:4	HOLLA	247	15
G_4:4	JERSE	308	2
G_4:4	PALMT	154	3
G_4:4	WEBBO	189	6
apr		224	
G_5:5	HOLLA		0
G_5:5	JERSE	141	2
G_5:5	PALMT		0
G_5:5	WEBBO		0
may		141	
G_6:6	HOLLA	155	12
G_6:6	JERSE	160	4
G_6:6	PALMT	128	2
G_6:6	WEBBO	168	1
jun		153	
G_7:7	HOLLA	172	15
G_7:7	JERSE	222	4
G_7:7	PALMT	138	3
G_7:7	WEBBO	163	4
jul		174	
G_8:8	HOLLA	184	12
G_8:8	JERSE	283	4
G_8:8	PALMT	157	3
G_8:8	WEBBO	138	2
aug		190	
G_9:9	HOLLA		0
G_9:9	JERSE	291	3
G_9:9	PALMT		0
G_9:9	WEBBO		0
sep		291	
G_10:10	HOLLA	193	12
G_10:10	JERSE	266	3
G_10:10	PALMT	133	2
G_10:10	WEBBO	157	5
oct		187	

G_11:11 HOLLA		0
G_11:11 JERSE	388	3
G_11:11 PALMT		0
G_11:11 WEBBO		0
nov	388	
G_12:12 HOLLA		0
G_12:12 JERSE	364	3
G_12:12 PALMT		0
G_12:12 WEBBO		0
dec	364	
All Groups	229	157

SOUTHEAST DELTA		CL AVG	N
G_1:1	EMPIR	226	11
G_1:1	BACON	149	9
G_1:1	KINGI	104	17
G_1:1	LJONE	150	5
G_1:1	MANDE	86	2
G_1:1	MOSSD	98	9
G_1:1	MOSST	102	4
G_1:1	ORWOO	175	2
G_1:1	PESCA	462	18
G_1:1	PIERS	54	2
G_1:1	RINDG	150	11
G_1:1	RIOBL	201	4
G_1:1	SHIMA	71	2
G_1:1	UPJON	142	10
G_1:1	VENIC	61	3
G_1:1	WEBB0	269	1
G_1:1	WOODW	137	3
JAN		155	
G_2:2	EMPIR	453	6
G_2:2	BACON	129	2
G_2:2	KINGI	112	6
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	MOSSD		0
G_2:2	MOSST		0
G_2:2	ORWOO		0
G_2:2	PESCA	412	1
G_2:2	PIERS		0
G_2:2	RINDG	261	4
G_2:2	RIOBL	146	2
G_2:2	SHIMA	68	1
G_2:2	UPJON	170	2
G_2:2	VENIC		0
G_2:2	WEBB0	281	1
G_2:2	WOODW		0
FEB		226	
G_3:3	EMPIR	481	7
G_3:3	BACON		0
G_3:3	KINGI	99	6
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	MOSSD	159	13
G_3:3	MOSST	112	5
G_3:3	ORWOO		0
G_3:3	PESCA		0
G_3:3	PIERS	55	2
G_3:3	RINDG	229	4
G_3:3	RIOBL	158	4
G_3:3	SHIMA	65	2
G_3:3	UPJON	118	3

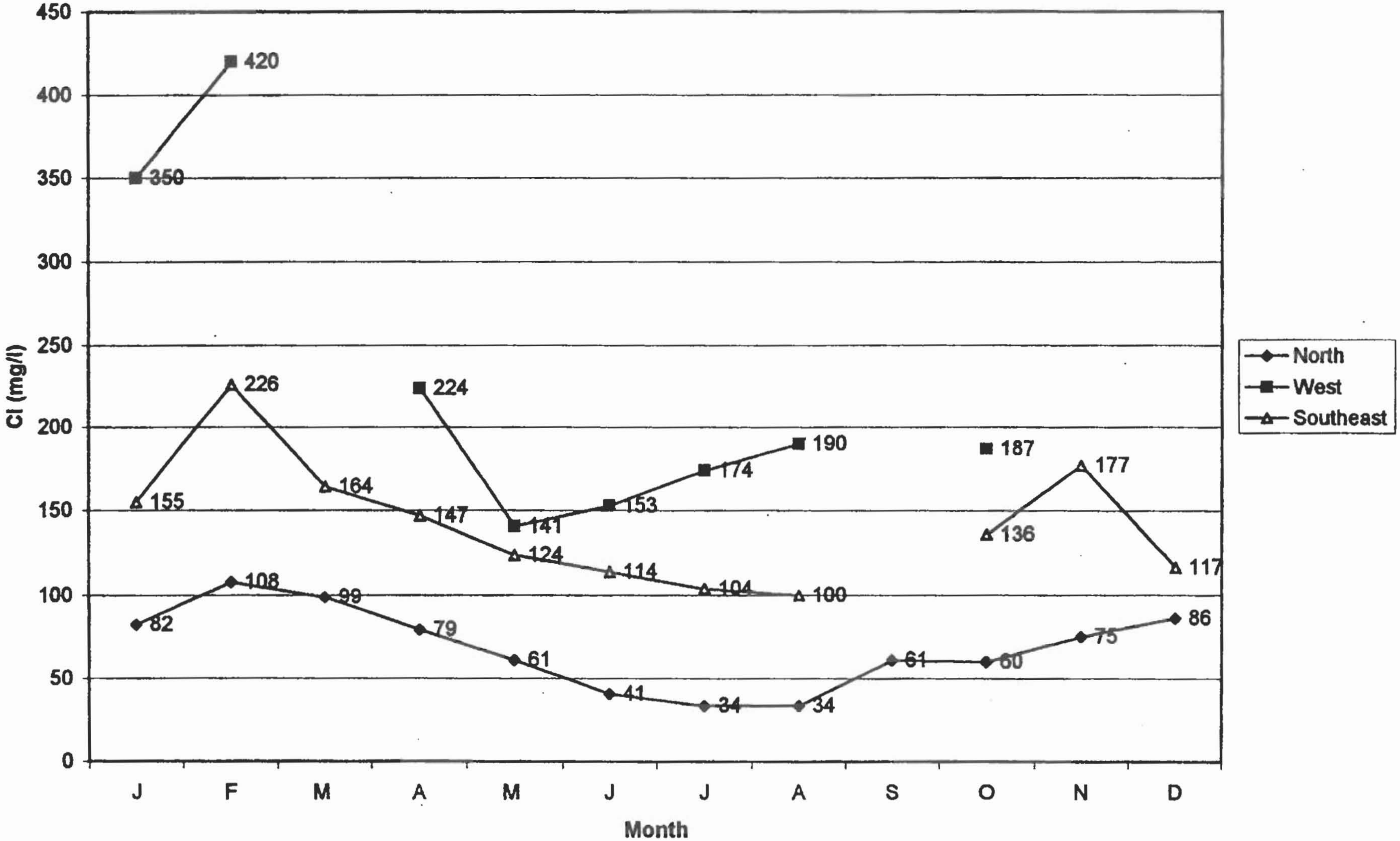
G_3:3	VENIC		0
G_3:3	WEBBO		0
G_3:3	WOODW		0
MAR		164	
G_4:4	EMPIR	457	11
G_4:4	BACON	99	8
G_4:4	KINGI	92	19
G_4:4	LJONE	104	5
G_4:4	MANDE	81	3
G_4:4	MOSSD	174	9
G_4:4	MOSST	120	2
G_4:4	ORWOO	120	3
G_4:4	PESCA	376	19
G_4:4	PIERS	63	2
G_4:4	RINDG	170	11
G_4:4	RIOBL	127	4
G_4:4	SHIMA	63	2
G_4:4	UPJON	141	6
G_4:4	VENIC	65	3
G_4:4	WEBBO	165	2
G_4:4	WOODW	86	3
APR		147	
G_5:5	EMPIR	228	7
G_5:5	BACON		0
G_5:5	KINGI	70	3
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	MOSSD	137	5
G_5:5	MOSST	96	2
G_5:5	ORWOO		0
G_5:5	PESCA	205	2
G_5:5	PIERS	47	1
G_5:5	RINDG	141	2
G_5:5	RIOBL	52	2
G_5:5	SHIMA	60	1
G_5:5	UPJON	201	1
G_5:5	VENIC		0
G_5:5	WEBBO		0
G_5:5	WOODW		0
MAY		124	
G_6:6	EMPIR	219	10
G_6:6	BACON	72	8
G_6:6	KINGI	51	11
G_6:6	LJONE	95	5
G_6:6	MANDE	83	3
G_6:6	MOSSD	240	3
G_6:6	MOSST		0
G_6:6	ORWOO	168	3
G_6:6	PESCA	282	15
G_6:6	PIERS	41	1
G_6:6	RINDG	103	5

G_6:6	RIOBL	75	2
G_6:6	SHIMA	25	1
G_6:6	UPJON	110	9
G_6:6	VENIC	42	2
G_6:6	WEBB0	134	1
G_6:6	WOODW	85	3
JUN		114	
G_7:7	EMPIR	109	10
G_7:7	BACON	97	10
G_7:7	KINGI	79	15
G_7:7	LJONE	71	10
G_7:7	MANDE	68	4
G_7:7	MOSSD	162	5
G_7:7	MOSST		0
G_7:7	ORWOO	145	4
G_7:7	PESCA	279	20
G_7:7	PIERS	18	1
G_7:7	RINDG	99	6
G_7:7	RIOBL	106	2
G_7:7	SHIMA	58	1
G_7:7	UPJON	106	10
G_7:7	VENIC	41	4
G_7:7	WEBB0	141	2
G_7:7	WOODW	81	2
JUL		104	
G_8:8	EMPIR	98	8
G_8:8	BACON	106	8
G_8:8	KINGI	96	12
G_8:8	LJONE	84	5
G_8:8	MANDE	80	3
G_8:8	MOSSD	132	10
G_8:8	MOSST	108	2
G_8:8	ORWOO	97	2
G_8:8	PESCA	277	14
G_8:8	PIERS	15	1
G_8:8	RINDG	80	6
G_8:8	RIOBL	110	2
G_8:8	SHIMA	55	1
G_8:8	UPJON	100	9
G_8:8	VENIC	53	3
G_8:8	WEBB0	134	2
G_8:8	WOODW	77	2
AUG		100	
G_9:9	EMPIR	493	5
G_9:9	BACON		0
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	MOSSD		0
G_9:9	MOSST		0
G_9:9	ORWOO		0

G_9:9	PESCA		0
G_9:9	PIERS		0
G_9:9	RINDG		0
G_9:9	RIOBL		0
G_9:9	SHIMA		0
G_9:9	UPJON		0
G_9:9	VENIC		0
G_9:9	WEBBO		0
G_9:9	WOODW		0
SEP		493	
G_10:10	EMPIR	444	9
G_10:10	BACON	122	8
G_10:10	KINGI	63	13
G_10:10	LJONE	97	6
G_10:10	MANDE	79	3
G_10:10	MOSSD	127	5
G_10:10	MOSST	87	2
G_10:10	ORWOO	143	2
G_10:10	PESCA	404	17
G_10:10	PIERS	16	1
G_10:10	RINDG	102	7
G_10:10	RIOBL	230	2
G_10:10	SHIMA	42	1
G_10:10	UPJON	127	5
G_10:10	VENIC	43	3
G_10:10	WEBBO	118	1
G_10:10	WOODW	68	2
OCT		136	
G_11:11	EMPIR	241	5
G_11:11	BACON		0
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	MOSSD		0
G_11:11	MOSST		0
G_11:11	ORWOO		0
G_11:11	PESCA		0
G_11:11	PIERS		0
G_11:11	RINDG		0
G_11:11	RIOBL		0
G_11:11	SHIMA		0
G_11:11	UPJON	112	1
G_11:11	VENIC		0
G_11:11	WEBBO		0
G_11:11	WOODW		0
NOV		177	
G_12:12	EMPIR	133	6
G_12:12	BACON		0
G_12:12	KINGI	59	3
G_12:12	LJONE		0
G_12:12	MANDE		0

G_12:12 MOSSD		0
G_12:12 MOSST		0
G_12:12 ORWOO		0
G_12:12 PESCA		0
G_12:12 PIERS		0
G_12:12 RINDG	133	2
G_12:12 RIOBL	195	2
G_12:12 SHIMA	52	1
G_12:12 UPJON	130	3
G_12:12 VENIC		0
G_12:12 WEBB0		0
G_12:12 WOODW		0
DEC	117	
All Groups	170	715

Figure 17. Average Monthly Chloride Levels in Delta Drainage



MONTH	NORTH CL	WEST CL	SOUTHEAST CL
J	82	350	155
F	108	420	226
M	99		164
A	79	224	147
M	61	141	124
J	41	153	114
J	34	174	104
A	34	190	100
S	61		
O	60	187	136
N	75		177
D	86		117

north delta		Cl avg	n
G_1:1	GRAND	38	4
G_1:1	TYLER	79	2
G_1:1	BOULD	46	20
G_1:1	BRANN	117	25
G_1:1	EGBER	41	4
G_1:1	MCCOR	12	2
G_1:1	NETHE	96	4
G_1:1	PROSP	65	1
G_1:1	STATE	96	6
G_1:1	TERMP	130	4
G_1:1	TWITC	222	9
G_1:1	UPEGB	48	5
JAN		82	
G_2:2	GRAND	33	5
G_2:2	TYLER	73	1
G_2:2	BOULD	59	4
G_2:2	BRANN	122	4
G_2:2	EGBER		0
G_2:2	MCCOR		0
G_2:2	NETHE		0
G_2:2	PROSP		0
G_2:2	STATE		0
G_2:2	TERMP		0
G_2:2	TWITC	253	5
G_2:2	UPEGB		0
FEB		108	
G_3:3	GRAND	38	5
G_3:3	TYLER	113	4
G_3:3	BOULD	58	4
G_3:3	BRANN	129	4
G_3:3	EGBER	60	4
G_3:3	MCCOR	21	4
G_3:3	NETHE	190	4
G_3:3	PROSP	30	3
G_3:3	STATE		0
G_3:3	TERMP	136	3
G_3:3	TWITC	247	10
G_3:3	UPEGB	71	2
MAR		99	
G_4:4	GRAND	24	5
G_4:4	TYLER	59	2
G_4:4	BOULD	38	14
G_4:4	BRANN	127	24
G_4:4	EGBER	37	4
G_4:4	MCCOR	10	4
G_4:4	NETHE	119	4
G_4:4	PROSP	16	1
G_4:4	STATE	142	6
G_4:4	TERMP	128	4
G_4:4	TWITC	180	8

G_4:4	UPEGB	68	6
APR		79	
G_5:5	GRAND	15	5
G_5:5	TYLER	23	2
G_5:5	BOULD	18	2
G_5:5	BRANN	95	4
G_5:5	EGBER	39	2
G_5:5	MCCOR	12	2
G_5:5	NETHE	41	2
G_5:5	PROSP	8	1
G_5:5	STATE		0
G_5:5	TERMP	148	2
G_5:5	TWITC	175	4
G_5:5	UPEGB	97	3
MAY		61	
G_6:6	GRAND	17	5
G_6:6	TYLER	9	3
G_6:6	BOULD	28	18
G_6:6	BRANN	94	20
G_6:6	EGBER	14	2
G_6:6	MCCOR	9	2
G_6:6	NETHE	13	2
G_6:6	PROSP		0
G_6:6	STATE	54	6
G_6:6	TERMP	72	2
G_6:6	TWITC	110	5
G_6:6	UPEGB	30	3
JUN		41	
G_7:7	GRAND	15	4
G_7:7	TYLER	61	2
G_7:7	BOULD	16	20
G_7:7	BRANN	67	24
G_7:7	EGBER	15	2
G_7:7	MCCOR	8	2
G_7:7	NETHE	10	2
G_7:7	PROSP	7	1
G_7:7	STATE	27	8
G_7:7	TERMP	75	2
G_7:7	TWITC	88	7
G_7:7	UPEGB	19	3
JUL		34	
G_8:8	GRAND	15	4
G_8:8	TYLER	21	2
G_8:8	BOULD	21	18
G_8:8	BRANN	88	16
G_8:8	EGBER	12	1
G_8:8	MCCOR	7	2
G_8:8	NETHE	12	2
G_8:8	PROSP	7	1
G_8:8	STATE	40	6
G_8:8	TERMP	79	2

G_8:8	TWITC	71	7
G_8:8	UPEGB	34	3
AUG		34	
G_9:9	GRAND	26	5
G_9:9	TYLER	32	2
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	EGBER		0
G_9:9	MCCOR		0
G_9:9	NETHE		0
G_9:9	PROSP		0
G_9:9	STATE		0
G_9:9	TERMP		0
G_9:9	TWITC	127	5
G_9:9	UPEGB		0
SEP		61	
G_10:10	GRAND	22	4
G_10:10	TYLER	18	1
G_10:10	BOULD	31	10
G_10:10	BRANN	111	18
G_10:10	EGBER	33	2
G_10:10	MCCOR	7	2
G_10:10	NETHE	16	2
G_10:10	PROSP	22	1
G_10:10	STATE	111	6
G_10:10	TERMP	165	2
G_10:10	TWITC	146	12
G_10:10	UPEGB	37	3
OCT		60	
G_11:11	GRAND	20	5
G_11:11	TYLER	69	2
G_11:11	BOULD	30	2
G_11:11	BRANN		0
G_11:11	EGBER		0
G_11:11	MCCOR		0
G_11:11	NETHE		0
G_11:11	PROSP		0
G_11:11	STATE		0
G_11:11	TERMP		0
G_11:11	TWITC	182	8
G_11:11	UPEGB		0
NOV		75	
G_12:12	GRAND	26	5
G_12:12	TYLER	86	2
G_12:12	BOULD	36	8
G_12:12	BRANN	96	3
G_12:12	EGBER		0
G_12:12	MCCOR		0
G_12:12	NETHE		0
G_12:12	PROSP		0
G_12:12	STATE		0

G_12:12 TERMP	60	2
G_12:12 TWITC	211	7
G_12:12 UPEGB		0
DEC	86	
All Groups	78	591

West		TDS avg	n
G_1:1	HOLLA	988	15
G_1:1	JERSE	1915	2
G_1:1	PALMT	849	3
G_1:1	WEBBO	953	4
jan		1176	
G_2:2	HOLLA	1039	3
G_2:2	JERSE	2040	1
G_2:2	PALMT		0
G_2:2	WEBBO	1690	1
feb		1590	
G_3:3	HOLLA		0
G_3:3	JERSE	1840	3
G_3:3	PALMT		0
G_3:3	WEBBO		0
mar		1840	
G_4:4	HOLLA	887	15
G_4:4	JERSE	1017	2
G_4:4	PALMT	663	3
G_4:4	WEBBO	759	6
apr		832	
G_5:5	HOLLA		0
G_5:5	JERSE	494	2
G_5:5	PALMT		0
G_5:5	WEBBO		0
may		494	
G_6:6	HOLLA	520	12
G_6:6	JERSE	566	4
G_6:6	PALMT	541	2
G_6:6	WEBBO	602	1
jun		557	
G_7:7	HOLLA	550	15
G_7:7	JERSE	639	4
G_7:7	PALMT	455	3
G_7:7	WEBBO	642	4
jul		571	
G_8:8	HOLLA	563	12
G_8:8	JERSE	702	4
G_8:8	PALMT	509	3
G_8:8	WEBBO	457	2
aug		558	
G_9:9	HOLLA		0
G_9:9	JERSE	699	3
G_9:9	PALMT		0
G_9:9	WEBBO		0
sep		699	
G_10:10	HOLLA	603	12
G_10:10	JERSE	646	3
G_10:10	PALMT	545	2
G_10:10	WEBBO	629	5
oct		606	

G_11:11 HOLLA		0
G_11:11 JERSE	926	3
G_11:11 PALMT		0
G_11:11 WEBBO		0
nov	926	
G_12:12 HOLLA		0
G_12:12 JERSE	916	3
G_12:12 PALMT		0
G_12:12 WEBBO		0
dec	916	
All Groups	753	157

southeast		TDS avg	n
G_1:1	EMPIR	875	10
G_1:1	BACON	611	9
G_1:1	KINGI	457	17
G_1:1	LJONE	698	5
G_1:1	MANDE	569	2
G_1:1	MOSSD	486	9
G_1:1	MOSST	448	4
G_1:1	ORWOO	848	2
G_1:1	PESCA	1322	18
G_1:1	PIERS	456	2
G_1:1	RINDG	605	11
G_1:1	RIOBL	695	4
G_1:1	SHIMA	403	2
G_1:1	UPJON	554	10
G_1:1	VENIC	604	3
G_1:1	WEBB0	1360	1
G_1:1	WOODW	592	3
jan		681	
G_2:2	EMPIR	1330	3
G_2:2	BACON	635	2
G_2:2	KINGI	488	6
G_2:2	LJONE		0
G_2:2	MANDE		0
G_2:2	MOSSD		0
G_2:2	MOSST		0
G_2:2	ORWOO		0
G_2:2	PESCA	1410	1
G_2:2	PIERS		0
G_2:2	RINDG	909	4
G_2:2	RIOBL	610	2
G_2:2	SHIMA	412	1
G_2:2	UPJON	637	2
G_2:2	VENIC		0
G_2:2	WEBB0	1970	1
G_2:2	WOODW		0
feb		933	
G_3:3	EMPIR	1388	6
G_3:3	BACON		0
G_3:3	KINGI	435	3
G_3:3	LJONE		0
G_3:3	MANDE		0
G_3:3	MOSSD	580	4
G_3:3	MOSST	647	2
G_3:3	ORWOO		0
G_3:3	PESCA		0
G_3:3	PIERS	364	1
G_3:3	RINDG	744	2
G_3:3	RIOBL	374	2
G_3:3	SHIMA	414	1
G_3:3	UPJON	513	1

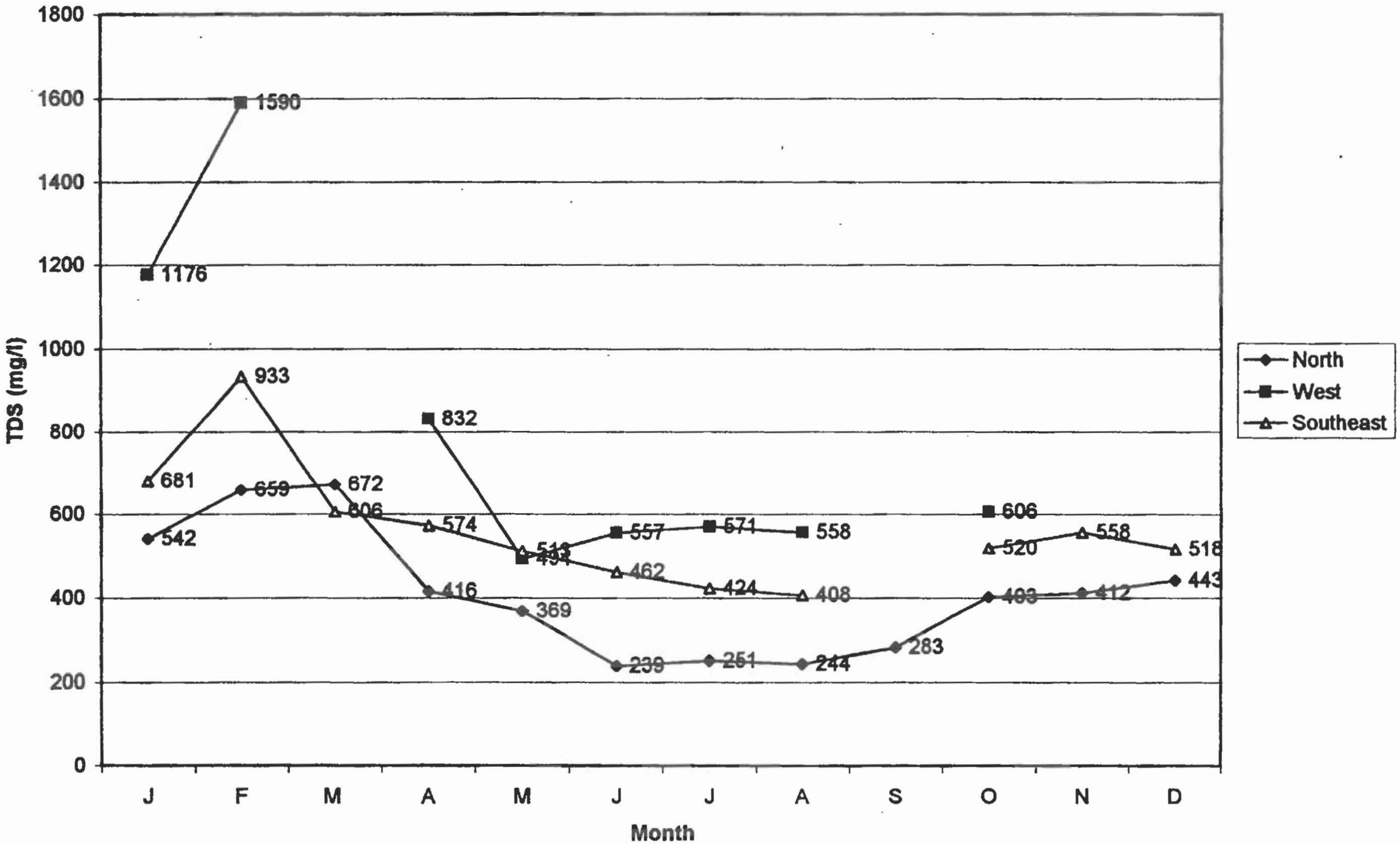
G_3:3	VENIC		0
G_3:3	WEBB0		0
G_3:3	WOODW		0
mar		606	
G_4:4	EMPIR	1190	10
G_4:4	BACON	375	8
G_4:4	KINGI	395	19
G_4:4	LJONE	420	5
G_4:4	MANDE	421	3
G_4:4	MOSSD	667	9
G_4:4	MOSST	500	2
G_4:4	ORWOO	598	3
G_4:4	PESCA	1156	16
G_4:4	PIERS	371	2
G_4:4	RINDG	583	11
G_4:4	RIOBL	578	4
G_4:4	SHIMA	404	2
G_4:4	UPJON	516	6
G_4:4	VENIC	426	3
G_4:4	WEBB0	834	2
G_4:4	WOODW	329	3
apr		574	
G_5:5	EMPIR	655	6
G_5:5	BACON		0
G_5:5	KINGI	397	3
G_5:5	LJONE		0
G_5:5	MANDE		0
G_5:5	MOSSD	631	5
G_5:5	MOSST	426	2
G_5:5	ORWOO		0
G_5:5	PESCA	801	2
G_5:5	PIERS	294	1
G_5:5	RINDG	525	2
G_5:5	RIOBL	310	2
G_5:5	SHIMA	428	1
G_5:5	UPJON	666	1
G_5:5	VENIC		0
G_5:5	WEBB0		0
G_5:5	WOODW		0
may		513	
G_6:6	EMPIR	659	9
G_6:6	BACON	265	8
G_6:6	KINGI	285	11
G_6:6	LJONE	400	5
G_6:6	MANDE	345	3
G_6:6	MOSSD	737	3
G_6:6	MOSST		0
G_6:6	ORWOO	691	3
G_6:6	PESCA	990	15
G_6:6	PIERS	299	1
G_6:6	RINDG	418	5

G_6:6	RIOBL	426	2
G_6:6	SHIMA	209	1
G_6:6	UPJON	405	9
G_6:6	VENIC	366	2
G_6:6	WEBB0	615	1
G_6:6	WOODW	290	3
jun		462	
G_7:7	EMPIR	452	9
G_7:7	BACON	305	10
G_7:7	KINGI	363	15
G_7:7	LJONE	289	10
G_7:7	MANDE	335	4
G_7:7	MOSSD	621	5
G_7:7	MOSST		0
G_7:7	ORWOO	489	4
G_7:7	PESCA	987	20
G_7:7	PIERS	169	1
G_7:7	RINDG	422	6
G_7:7	RIOBL	459	2
G_7:7	SHIMA	358	1
G_7:7	UPJON	384	10
G_7:7	VENIC	336	4
G_7:7	WEBB0	537	2
G_7:7	WOODW	279	2
jul		424	
G_8:8	EMPIR	366	7
G_8:8	BACON	312	8
G_8:8	KINGI	430	11
G_8:8	LJONE	328	5
G_8:8	MANDE	367	3
G_8:8	MOSSD	605	10
G_8:8	MOSST	436	2
G_8:8	ORWOO	369	2
G_8:8	PESCA	942	13
G_8:8	PIERS	154	1
G_8:8	RINDG	360	6
G_8:8	RIOBL	519	2
G_8:8	SHIMA	319	1
G_8:8	UPJON	363	5
G_8:8	VENIC	296	3
G_8:8	WEBB0	483	2
G_8:8	WOODW	294	2
aug		408	
G_9:9	EMPIR	1410	4
G_9:9	BACON		0
G_9:9	KINGI		0
G_9:9	LJONE		0
G_9:9	MANDE		0
G_9:9	MOSSD		0
G_9:9	MOSST		0
G_9:9	ORWOO		0

G_9:9	PESCA		0
G_9:9	PIERS		0
G_9:9	RINDG		0
G_9:9	RIOBL		0
G_9:9	SHIMA		0
G_9:9	UPJON		0
G_9:9	VENIC		0
G_9:9	WEBB0		0
G_9:9	WOODW		0
sep		1410	
G_10:10	EMPIR	1110	8
G_10:10	BACON	366	8
G_10:10	KINGI	386	13
G_10:10	LJONE	384	6
G_10:10	MANDE	364	3
G_10:10	MOSSD	613	5
G_10:10	MOSST	369	2
G_10:10	ORWOO	747	2
G_10:10	PESCA	1267	17
G_10:10	PIERS	210	1
G_10:10	RINDG	444	7
G_10:10	RIOBL	756	2
G_10:10	SHIMA	344	1
G_10:10	UPJON	460	5
G_10:10	VENIC	299	3
G_10:10	WEBB0	460	1
G_10:10	WOODW	260	2
oct		520	
G_11:11	EMPIR	679	4
G_11:11	BACON		0
G_11:11	KINGI		0
G_11:11	LJONE		0
G_11:11	MANDE		0
G_11:11	MOSSD		0
G_11:11	MOSST		0
G_11:11	ORWOO		0
G_11:11	PESCA		0
G_11:11	PIERS		0
G_11:11	RINDG		0
G_11:11	RIOBL		0
G_11:11	SHIMA		0
G_11:11	UPJON	436	1
G_11:11	VENIC		0
G_11:11	WEBB0		0
G_11:11	WOODW		0
nov		558	
G_12:12	EMPIR	599	5
G_12:12	BACON		0
G_12:12	KINGI	400	3
G_12:12	LJONE		0
G_12:12	MANDE		0

G_12:12 MOSSD		0
G_12:12 MOSST		0
G_12:12 ORWOO		0
G_12:12 PESCA		0
G_12:12 PIERS		0
G_12:12 RINDG	571	2
G_12:12 RIOBL	686	2
G_12:12 SHIMA	362	1
G_12:12 UPJON	489	3
G_12:12 VENIC		0
G_12:12 WEBB0		0
G_12:12 WOODW		0
dec	518	
All Groups	610	669

Figure 13. Average TDS in Delta Drainage



TDS averages

Month	North	West	Southeast
J	542	1176	681
F	659	1590	933
M	672		606
A	416	832	574
M	369	494	513
J	239	557	462
J	251	571	424
A	244	558	408
S	283		
O	403	606	520
N	412		558
D	443		518

north		TDS avg	n
G_1:1	GRAND	444	2
G_1:1	TYLER	453	1
G_1:1	BOULD	471	20
G_1:1	BRANN	591	24
G_1:1	EGBER	688	4
G_1:1	MCCOR	218	2
G_1:1	NETHE	450	4
G_1:1	PROSP	1010	1
G_1:1	STATE	479	6
G_1:1	TERMP	545	4
G_1:1	TWITC	824	9
G_1:1	UPEGB	335	5
jan		542	
G_2:2	GRAND	414	3
G_2:2	TYLER		0
G_2:2	BOULD	606	4
G_2:2	BRANN	649	4
G_2:2	EGBER		0
G_2:2	MCCOR		0
G_2:2	NETHE		0
G_2:2	PROSP		0
G_2:2	STATE		0
G_2:2	TERMP		0
G_2:2	TWITC	966	5
G_2:2	UPEGB		0
feb		659	
G_3:3	GRAND	436	3
G_3:3	TYLER	743	1
G_3:3	BOULD	547	2
G_3:3	BRANN	550	4
G_3:3	EGBER	1120	2
G_3:3	MCCOR	260	2
G_3:3	NETHE	842	2
G_3:3	PROSP	748	1
G_3:3	STATE		0
G_3:3	TERMP	579	2
G_3:3	TWITC	956	10
G_3:3	UPEGB	617	2
mar		672	
G_4:4	GRAND	228	2
G_4:4	TYLER	184	1
G_4:4	BOULD	351	14
G_4:4	BRANN	547	24
G_4:4	EGBER	581	4
G_4:4	MCCOR	144	4
G_4:4	NETHE	476	4
G_4:4	PROSP	334	1
G_4:4	STATE	523	6
G_4:4	TERMP	440	4
G_4:4	TWITC	649	8

G_4:4	UPEGB	536	6
apr		416	
G_5:5	GRAND	183	3
G_5:5	TYLER	183	1
G_5:5	BOULD	168	2
G_5:5	BRANN	427	4
G_5:5	EGBER	726	2
G_5:5	MCCOR	145	2
G_5:5	NETHE	220	2
G_5:5	PROSP	136	1
G_5:5	STATE		0
G_5:5	TERMP	476	2
G_5:5	TWITC	573	4
G_5:5	UPEGB	821	3
may		369	
G_6:6	GRAND	204	3
G_6:6	TYLER	133	1
G_6:6	BOULD	234	18
G_6:6	BRANN	404	20
G_6:6	EGBER	200	2
G_6:6	MCCOR	115	2
G_6:6	NETHE	133	2
G_6:6	PROSP		0
G_6:6	STATE	224	6
G_6:6	TERMP	338	2
G_6:6	TWITC	397	5
G_6:6	UPEGB	248	3
jun		239	
G_7:7	GRAND	173	3
G_7:7	TYLER	712	1
G_7:7	BOULD	182	20
G_7:7	BRANN	315	24
G_7:7	EGBER	246	2
G_7:7	MCCOR	105	2
G_7:7	NETHE	135	2
G_7:7	PROSP	114	1
G_7:7	STATE	155	8
G_7:7	TERMP	289	2
G_7:7	TWITC	313	7
G_7:7	UPEGB	192	3
jul		251	
G_8:8	GRAND	178	2
G_8:8	TYLER	208	1
G_8:8	BOULD	171	10
G_8:8	BRANN	368	16
G_8:8	EGBER	205	1
G_8:8	MCCOR	113	2
G_8:8	NETHE	167	2
G_8:8	PROSP	128	1
G_8:8	STATE	234	6
G_8:8	TERMP	323	2

G_8:8	TWITC	294	7
G_8:8	UPEGB	273	3
aug		244	
G_9:9	GRAND	233	3
G_9:9	TYLER	237	1
G_9:9	BOULD		0
G_9:9	BRANN		0
G_9:9	EGBER		0
G_9:9	MCCOR		0
G_9:9	NETHE		0
G_9:9	PROSP		0
G_9:9	STATE		0
G_9:9	TERMP		0
G_9:9	TWITC	380	5
G_9:9	UPEGB		0
sep		283	
G_10:10	GRAND	268	3
G_10:10	TYLER		0
G_10:10	BOULD	329	10
G_10:10	BRANN	443	18
G_10:10	EGBER	634	2
G_10:10	MCCOR	201	2
G_10:10	NETHE	173	2
G_10:10	PROSP	547	1
G_10:10	STATE	461	6
G_10:10	TERMP	584	2
G_10:10	TWITC	424	12
G_10:10	UPEGB	371	3
oct		403	
G_11:11	GRAND	280	3
G_11:11	TYLER	527	1
G_11:11	BOULD	351	2
G_11:11	BRANN		0
G_11:11	EGBER		0
G_11:11	MCCOR		0
G_11:11	NETHE		0
G_11:11	PROSP		0
G_11:11	STATE		0
G_11:11	TERMP		0
G_11:11	TWITC	491	8
G_11:11	UPEGB		0
nov		412	
G_12:12	GRAND	284	3
G_12:12	TYLER	538	1
G_12:12	BOULD	413	8
G_12:12	BRANN	422	3
G_12:12	EGBER		0
G_12:12	MCCOR		0
G_12:12	NETHE		0
G_12:12	PROSP		0
G_12:12	STATE		0

G_12:12 TERMP	397	2
G_12:12 TWITC	606	7
G_12:12 UPEGB		0
dec	443	
All Groups	416	533