Appendices

CALFED Water Use Efficiency Program

Yolo County Resource Conservation District
Pilot Program 2001 Final Report

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Yolo County Resource Conservation District
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Table of Contents Pages

Appendix A: Cover Crop Trial A-1 through A-20

Insert A1-1: Model 900 MAX Portable Sampler Specifications A-1

Table A1-1: Cover crop biomass and Nitrogen Content, March 27, 2001 A-5

Table A1-2: Cover Crop Trial Water Sample Analysis: Jan. 9-10, 2001, Station 2 A-6

Table A1-3: Cover Crop Trial Water Sample Analysis: Jan. 9-10, 2001, Station 3 A-7

Table A1-4: Cover Crop Trial Water Sample Analysis: Jan. 9-10, 2001, Station 4 A-8

Table A1-5: Cover Crop Trial Water Sample Analysis: Feb. 20, 2001, Station 1 A-9

Table A1-6: Cover Crop Trial Water Sample Analysis: Feb. 20, 2001, Station 2 A-10

Table A1-7: Cover Crop Trial Water Sample Analysis: Feb. 20, 2001, Station 3 A-11

Table A1-8: Cover Crop Trial Water Sample Analysis: Feb. 20, 2001, Station 4 A-12

Table A1-9: Cover Crop Trial Water Sample Analysis: Feb. 23, 2001, Station 2 A-13

Table A1-10: Cover Crop Trial Water Sample Analysis: Feb. 25, 2001, Station 3 A-14

Table A1-11: Cover Crop Trial Water Sample Analysis: Feb. 23, 2001, Station 4 A-15

Table A1-12: Cover Crop Trial Water Sample Analysis: Feb. 22, 2001, Station 4 A-16

Table A1-13: Cover Crop Trial Water Sample Analysis: Feb. 22, 2001, Station 2 A-17

Table A1-14: Cover Crop Trial Water Sample Analysis: Mar. 3, 2001, Station 3 A-18

Table A1-15: Cover Crop Trial Water Sample Analysis: Mar. 3, 2001, Station 4 A-19

Appendix B: Sediment Traps B-1 through B-18

B-1: Sediment Trap SM95 B-1

Tables B1-1, B1-2, B1-3: Inflow & Outflow Water Sediment & Nutrient Content

B-2: Sediment Trap SMCC B-2

Tables B2-1, B2-2, B2-3; & Figures: B2-1, B2-2, B2-3: Inflow & Outflow Water Sediment & Nutrient Content

B-3: Sediment Trap SB64 B-5

Tables B3-1, B3-2, B3-3; & Figures: B3-1, B3-2, B3-3: Inflow & Outflow Water Sediment & Nutrient Content

B-4: Sediment Trap SBTC B-8

Tables B4-1, B4-2, B4-3; & Figures: B4-1, B4-2, B4-3: Inflow & Outflow Water Sediment & Nutrient Content

B-5: Sediment Trap SB17 B-11

Tables B5-1, B5-2, B5-3; & Figures: B5-1, B5-2, B5-3: Inflow & Outflow Water Sediment & Nutrient Content

B-6: Sediment Trap SROM B-14

Tables B6-1, B6-2, B6-3: Inflow & Outflow Water Sediment & Nutrient Content

B-7: Sediment Trap SRCH B-15

Tables B7-1, B7-2, B7-3; & Figures: B7-1, B7-2, B7-3: Inflow & Outflow Water Sediment & Nutrient Content

Appendix C: Tail Water Ponds C-1 through C-13

C-1: Pond PMJ C-1

Tables C1-1, C1-2, C1-3; & Figures: C1-1, C1-2, C1-3: Inflow & Outflow Water Sediment & Nutrient Content

C-2: Pond PMHR C-4

Tables C2-1, C2-2; & Figures: C2-1, C2-2, C2-3: Inflow & Outflow Water Sediment & Nutrient Content

C-3: Pond PBOR C-7

Tables C3-1, C3-2, C3-3; & Figures: C3-1, C3-2, C3-3: Inflow & Outflow Water Sediment & Nutrient Content

C-4: Pond PROM C-10

Tables C4-1, C4-2, C4-3; & Figures: C4-1, C4-2, C4-3: Inflow & Outflow Water Sediment & Nutrient Content

Appendix D: Irrigation Water Management D-1 through D-8

Table D-1: Mass, volume, and average bulk density for sediment samples collected from the different tailwater pond and sediment trap sites D-1

Table D-2: Watermark sensors readings for the western row of Field D1 in centibars D-1

Table D-3: Watermark sensors readings for the eastern row of Field D1 in centibars D-2

Table D-4: Watermark sensors readings for the southern row of Field A1 in centibars D-2

Table D-5: Watermark sensors readings for the northern row of Field A1 in centibars D-3

Table D-6: Watermark sensors readings for the southern row of Field B1 in centibars D-3

Table D-7: Watermark sensors readings for the northern row of Field B1 in centibars D-5

Table D-8: Siphon inflow rate data and calculations for field A1 D-6

Appendix E: Survey and Outreach E-1 through E-4

Contact List for Survey E-1

July Field Meeting Agenda E-2

November Field Meeting Agenda E-4

APPENDICES

A. Cover Crop Trial

Insert (A1-1): Model 900 MAX Portable Sampler Specifications

General:

- Dimensions:
  - 900 with Compact Base and 3 gal. polyethylene container - Diameter 17-3/8" (44.1 cm), Height 24" (61 cm), Weight 28.3 lbs. (12.9 kg).
  - 900 with Standard Base and 3 gal. polyethylene container - Diameter 19-7/8" (50.5 cm), Height 27-3/16" (69.4 cm),
- Weight 32.6 lbs. (14.8 kg).
- Sample Pump: High speed peristaltic, dual roller, with 3/8" (.95 cm) ID by 5/8" (1.6 cm) OD.
- Pump Body: High impact, corrosion resistant, glass reinforced Delrin*.
- Vertical Lift: 27 ft. (8.2 m) maximum (note: Remote Pump Option recommended for lifts from 22 ft. (6.7 m) to 35 ft. (10.7 m).
- Sample Transport Velocity: 2 ft./sec. (.6 m/sec.) minimum, at 15 ft. (4.6 m) vertical lift in a 3/8" (.95 cm) ID intake tube.
- Pump Flow Rate: 60 ml/sec at 3 ft. (.9 m) vertical lift in a 3/8" (.95 cm) ID intake tube.
- Liquid Sensor: Dual sensor, non-wetted, non-contact.
- Sample Volume: Programmed in milliliters, in one ml increments from 10 to 9,999 ml.
- Sample Volume Repeatability: ±5% typical.
- Sample Bottle Capacity:
  - Composite: 2-1/2 gal. glass, 5 gal. glass, 3 gal. polyethylene, 4 gal. polyethylene, and 5-1/2 gal. polyethylene.
  - Multiple Bottle: (2) 1 gal. glass, (2) 1 gal. polyethylene, (4) 1 gal. glass, (4) 1 gal. polyethylene, (8) 950 ml glass, (8) 1.9 liter glass, (8) 2.3 liter polyethylene, (12) 950 ml glass, (24) 350 ml glass, and (24) 575 ml polyethylene and (24) 1 liter polyethylene.
- Sampling Modes: Multiple Bottle Time, Multiple Bottle Flow, Composite Multiple Bottle Time, Composite Multiple Bottle Flow, Composite Time, Composite Flow, Flow with Time Override, Variable Interval, Start/Stop, and Level Actuation.
- Interval Between Samples: Selectable in single increments from 1 to 9,999 flow pulses (momentary contact closure 25 msec. or 5-12 VDC pulse; 4-20 mA interface optional), or 1 to 9,999 minutes in one minute increments.
- Multiplex: Multiple Bottle Mode: multiple samples per bottle and/or multiple bottles per sample collection.
- Intake Purge: Air purged automatically before and after each sample; duration automatically compensated for varying intake line lengths.
- Pump/Controller Housing: High impact injection molded ABS; submersible, watertight, dust tight, corrosion & ice resistant; NEMA 4X,6.
- Control Panel: 21 key membrane switch keypad with 4 multiple function soft keys; 8 line x 40 character alphanumeric, liquid crystal graphics display. Self-prompting/menu driven program.
- Internal Clock: Indicates real time and date; 0.007% time base accuracy.
- Diagnostics: Tests keypad, display, ROM, pump, and distributor.
- Flash Memory: Via RS232; permits embedded software upgrades in the field.
- Program Delay: Three formats: (1) 1-9,999 minutes or flow pulses in one unit increments (2) programmable sampler start time/day, and (3) programmable time/day/week.
- Manual Sample: Initiates a sample collection independent of program in progress.
- Intake Rinse: Intake line automatically rinsed with source liquid prior to each sample, from 1 to 3 rinses.
- Intake Fault: Sample collection cycle automatically repeated from 1 to 3 times if sample not obtained on initial attempt.

- Multiple Programs: Stores up to five sampling programs. Cascade: Allows using two samplers in combination where the first sampler at the completion of the program initiates the second.
- Data Logging: Records program start time and date, stores up to 400 sample collection times/dates, all program entries, operational status including number of minutes or pulses to next sample, bottle number, number of samples collected, number remaining, sample volume collected, volume remaining, sample identification number, and all logged data (i.e. level, flow, pH, stream temperature, ORP, rainfall, and any externally logged data - up to 7 external channels).
- Set Point Sample Trigger: When equipped with integral flow meter, pH/temperature/ORP meter, conductivity, and/or D.O. monitoring options ... Mode 1 - Sampling can be triggered upon an upset condition when field selectable limits are exceeded. Mode 2 - Concurrent with normal sampling routine, sample liquid is deposited in designated "Trouble Bottle(s)".
- Serial Interface: RS232 compatible; allows on-site collection of stored data.
- Status Output: Low main battery, low memory power, plugged intake, jammed distributor arm, sample collected, and purge failure.
- Automatic Shutdown: Multiple Bottle Mode: After complete revolution of distributor arm (unless Continuous Mode selected). Composite Mode: After preset number of samples have been delivered to composite container, from 1-999 samples, or upon full container.
- Program Languages: Cantonese, Dutch, English, French, German, Greek, Italian, Japanese, Korean, Spanish, Swedish, and Thai.
- Program Lock: Access code protection precludes tampering.
- Intake Tubing: 1/4" (.64 cm) and 3/8" (.95 cm) ID vinyl or 3/8" (.95 cm) ID Teflon* lined polyethylene with protective outer cover.
- Intake Strainers: Choice of Teflon* and 316 stainless construction, and all 316 stainless steel in standard size and low profile for shallow depth applications.
- Sampler Case: High impact ABS, 3 section construction; double walled insulated base.
- Icing Capacity: Compact Base: 8-1/2 lbs. (3.9 kg) with (24) 575 ml bottles; Standard Base; 32 lbs. (14.5 kg) with (24) 350 ml glass bottles.
- Power Requirements: 12 VDC (supplied by 12 VDC battery or AC adapter).
- Optional AC Power Backup: Rechargeable 6 Amp-hour gel lead acid battery takes over automatically with AC line power failure. Integral trickle charger maintains battery at full charge.
- Internal Battery: Two C cell alkaline batteries; maintains program logic and real time clock for five years.Internal battery current draws less than 40 micro amps.
- Overload Protection:
    - 5 amp DC line fuse
    - 1 amp AC line fuse (AC power converter).
- Temperature Range:
    - General use: 32° to 120°F (0° to 49°C)
    - Liquid Crystal Display: Operating - 14° to 158°F (-10° to 70°C, Storage -40°F to 176°F (-40° to 80°C).

SIGMA 900 MAX FACTORY INSTALLED OPTIONS

- Integral pH-Temperature/ORP Meter
    - Control/Logging: Field selectable to log pH-Temperature/ORP independent of sampler operation or to control sample collection in response to value exceeding low/high set points.
    - Recording Intervals: 1, 2, 3, 5, 6, 10, 12, 15, 20, 30, and 60 minutes.
    - Probe Pre-amplifier/Junction Box: NEMA 4X with labeled terminal strip.
    - pH-Temperature Sensor: Temperature compensated; impact resistant ABS plastic body; combination electrode with porous Teflon* junction.
    - Measurement Range: 0 to 14 pH.
    - Operating Temperature Range: 0 to 176°F (-18° to 80°C).
    - Dimensions: .75" (1.9 cm) dia. x 6" (15.2 cm) long with .75" (1.9 cm) mpt cable end.
    - Accuracy: ±1%; resolution .01 pH
    - Cable Length: 25 ft. (7.6 m)
- Integral Temperature Meter
    - Measures and records ambient or sample stream temperature.

    - Control/Logging: Field selectable to log temperature independent of sampler operation or to control sample collection in response to value exceeding low/high set points.
    - Recording Intervals: 1, 2, 3, 5, 6, 10, 12, 15, 20, 30 and 60 minutes.
    - Sensor: Platinum RTD with 316 stainless steel body.
    - Range: 32 to 212°F (0 to 100°C).
    - Accuracy: ±1.8°F (±1°C).
    - Operating Temperature Range: 0 to 176°F (0 to 80°C).
    - Dimensions: .125" (.3 cm) dia. x 8" (20.3 cm) long, with .75" (1.9 cm) mpt cable end.
    - Cable Length: 15 ft. (4.6 m).
- Integral Dissolved Oxygen Meter
    - Control/Logging: Field selectable to log dissolved oxygen independent of sampler operation or to control sample collection in response to value exceeding low/high set points.
    - Recording Intervals: 1, 2, 3, 5, 6, 10, 12, 15, 20, 30 and 60 minutes.
    - Measurement Method: Galvanic.
    - Sensor: Temperature compensated; impact resistant polypropylene body.
    - Range: 0-20 mg/L.
    - Resolution: .01 mg/L.
    - Accuracy: ±3% of reading or .1 ppm.
    - Operating Temperature Range: 32° to 122°F (0 to 50°C).
    - Dimensions: .65" (1.7 cm) dia. x 6.25" (15.7 cm) long with .75 (1.9 cm) mpt cable end.
    - Cable Length: 25 ft. (7.6 m).
- Integral Conductivity Meter
    - Control/Logging: Field selectable to log conductivity independent of sampler operation or to control sample collection in response to value exceeding low/high set points.
    - Recording Intervals: 1, 2, 3, 5, 6, 10, 12, 15, 20, 30 and 60 minutes.
    - Sensor: Temperature compensated; impact resistant polypropylene body.
    - Range: 0-40 mS/cm.
    - Resolution: 0.01 mS/cm or 1 mS/cm.
    - Accuracy: ±2% of reading or .01 ms.
    - Operating Temperature Range: 32° to 122°F (o to 50°C).
    - Dimensions: .67" (1.7 cm) dia. x 6" (15.2 cm) long with .75 (1.9 cm) mpt cable end.
    - Cable Length: 25 ft. (7.6 m).
- Rain Gauge Input
    - For use with Sigma Tipping Bucket Rain Gauge; the sampling program can be initiated upon field selectable rate of rain; sampler records rainfall data.
- Analog Input Data Logging Channels
    - Seven additional data logging channels record data from external source(s); field assignable channel name(s) and units; -4 to +4 VDC and 0-20 mA.
- 4-20 mA Outputs
    - Two field assignable outputs, optically isolated, up to 600 ohm load per output each.
- Modem
    - 2400 baud with X modem, 2 byte, CRC, auto ranging with cyclic auto to checksum; FCC approved.
- Expanded Memory
    - Increases memory from 18,432 data points to 116,736 points.
- AC Power Backup
    - Provides power in the event of an AC power failure.
    - Internal trickle charger maintains 6 amp-hour battery.

* registered E.I.Dupont

Submerged Water Level (Depth) Sensor:

- **Principle of Operation**

The SIGMA 900MAX Integral Flow Meter utilizes a submerged pressure transducer to measure head in an open channel flow stream.

The submerged sensor is mounted in the flow stream at proper location for head measurement. As the level in the channel increases and decreases, the pressure at the submerged probe varies proportionately. The pressure transducer converts the water pressure to a voltage which s then used by the SIGMA 900MAX microprocessor to calculate the liquid level in the channel. After calculating the level, the microprocessor then converts the level reading to a flow rate based on the user defined characteristics of the primary device through which the stream flows.

The transducer in the submerged probe first reads the pressure in the channel, then, at a regular interval, switches to a reference port to compare it to the atmospheric pressure. This pressure difference is converted to a number which represents the liquid level.

- **Specifications**

Depth Accuracy:	0’ – 11’ (0 – 3.35m) +/- 0.054’’ (1.37 mm) 0’-33’ (0-10.06m) +/- 0.161’’ (4.09 mm)
Maximum Pressure Range:	psi 0’ – 11’ (34.47 Kilopascals 0 m to 3.35 m) psi 0’ – 33’ (103 Kilopascals 0 m to 10.06 m)
Thermal Span Error:	+/- 1.0%
Thermal Zero Error:	+/- 0.4%
Temperature Comp. Range:	32^o – 86^o F (0^o – 30^o C)
Air Intake:	Atmospheric pressure reference is desiccant protected.
Material:	Polyurethane body, 316 series stainless steel diaphragm.
Cable:	8 conductor Polyurethane sensor cable with air vent.
Probe Dimensions:	Length: 5 inches (12.7 cm) Width: 1.5 inches (3.81 cm) Height: 0.75 inches (1.9 cm)
Cable Length:	25’ (7.6 m), 50’ (15.4 m), 100’ (30.48m)

Table (A1-1): Cover crop biomass, and nitrogen content, March 27, 2001

Sample No.	Sample + bag Fresh Weight - oz.	Tare weight	Net Fresh Wet Weight - oz	Est. Biomass/Acre oz.(fresh wt.)	**Est. Biomass/Acre lb. (fresh wt.)**	Dry Weight + Bag	Net Dry Weight - oz.	Percent Dry Weight - oz	Est. Biomass/Acre (dry weight) - lb.	**Nitrogen Estimate based on %**	Net Fresh Wt.- oz. X 4	Net Fresh Wt.- lb.	Est. of N content - lb.**
W-1	28.25	2.25	26.00	286,000	**17,875**	5.80	3.55	13.65	2,440.63	**298.98**	104.00	6.50	85.48
W-2	28.75	2.25	26.50	291,500	**18,219**	6.10	3.85	14.53	2,646.88	**324.24**	106.00	6.63	87.12
W-3	38.00	2.25	35.75	393,250	**24,578**	6.80	4.55	12.73	3,128.13	**383.20**	143.00	8.94	117.53
W-4	30.20	2.25	27.95	307,450	**19,216**	6.10	3.85	13.77	2,646.88	**324.24**	111.80	6.99	91.89
W-5	41.60	2.25	39.35	432,850	**27,053**	7.80	5.55	14.10	3,815.63	**467.41**	157.40	9.84	129.36
W-6	33.20	2.25	30.95	340,450	**21,278**	6.80	4.55	14.70	3,128.13	**383.20**	123.80	7.74	101.75
W-7	33.60	2.25	31.35	344,850	**21,553**	6.50	4.25	13.56	2,921.88	**357.93**	125.40	7.84	103.06
W-8	36.20	2.25	33.95	373,450	**23,341**	6.90	4.65	13.70	3,196.88	**391.62**	135.80	8.49	111.61
W-9	42.00	2.25	39.75	437,250	**27,328**	7.25	5.00	12.58	3,437.50	**421.09**	159.00	9.94	130.68
W-10	41.10	2.25	38.85	427,350	**26,709**	7.75	5.50	14.16	3,781.25	**463.20**	155.40	9.71	127.72
J-1	40.75	2.25	38.50	423,500	**26,469**	7.50	5.25	13.64	3,609.38	**442.15**	154.00	9.63	126.57
J-2	38.50	2.25	36.25	398,750	**24,922**	7.30	5.05	13.93	3,471.88	**425.30**	145.00	9.06	119.17
J-3	33.75	2.25	31.50	346,500	**21,656**	6.75	4.50	14.29	3,093.75	**378.98**	126.00	7.88	103.56
Average									**3,178.37**				**110.42**

** Assumes 65% of cover crop is vetch, 25% is pea, 10% is wheat, with vetch/pea multipliers of 16 & 10 respectively (conservative estimate

Table (A1-2): Cover crop trial water Sampling analysis: Jan 9-10, 2001, Station 2

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
Jan 9-10, 2001	Station 2	1	3.90	0.557	0.057	1.131
		2	(no sample)			
		3	2.88	0.533	0.050	0.412
		4	5.48	0.516	0.070	0.450
		5	4.29	0.537	0.078	0.464
		6	2.29	0.474	0.049	0.230
		7	2.57	0.464	0.191	0.272
		8	2.15	0.508	0.072	0.303
		9	1.78	0.496	0.070	0.340
		10	1.80	0.532	0.016	0.550

Table (A1-3): Cover crop trial water Sampling analysis: Jan 9-10, 2001, Station 3

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
January 9-10, 2001	Station 3	1	6.04	0.882	0.083	12.824
		2	5.48	0.547	0.057	0.550
		3	3.28	0.581	0.079	0.449
		4	1.19	0.579	0.063	0.679
		5	2.71	0.600	0.097	1.034
		6	4.46	1.174	0.118	1.021
		7	3.72	0.493	0.116	0.210
		8	3.16	0.457	0.123	0.247
		9	2.07	0.506	0.076	0.505
		10	2.22	0.469	0.071	0.399
		11	1.84	0.584	0.069	1.104
		12	1.62	0.514	0.084	0.543
		13	1.71	0.501	0.046	0.436
		14	1.22	0.264	0.108	0.450
		15	1.23	0.532	0.101	0.949
		16	1.87	0.604	0.104	2.314
		17	1.64	0.539	0.104	1.965
		18	1.15	0.860	0.076	4.822
		19	1.20	0.686	0.054	2.931
		20	1.10	0.505	0.060	0.968
		21	0.96	0.453	0.089	0.610
		22	0.97	0.433	0.106	0.398
		23	0.95	0.436	0.065	0.457
		24	0.91	0.438	0.036	0.586

Table (A1-4): Cover crop trial water Sampling analysis: Jan 9-10, 2001, Station 4

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
January 9-10, 2001	Station 4	1	3.61	0.612	0.088	2.959
		2	2.25	0.587	0.061	0.549
		3	1.76	0.566	0.058	0.207
		4	1.54	0.574	0.057	0.229
		5	1.53	0.596	0.066	0.268
		6	1.71	0.572	0.083	0.312
		7	1.40	0.623	0.096	0.365

Table (A1-5): Cover crop trial water Sampling analysis: Feb. 20, 2001, Station 1

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
2/20/2001	Station 1	1	5.98	0.007	1.357	0.297
		2	3.90	0.010	0.382	0.505
		3	2.95	0.000	0.296	0.485
		4	1.97	0.005	0.238	0.466
		5	1.43	0.016	0.272	0.491
		6	1.75	0.002	0.226	0.473
		7	1.68	0.000	0.301	0.452
		8	1.33	0.000	0.242	0.453
		9	1.63	0.014	0.183	0.448
		10	1.25	0.009	0.144	0.433
		11	1.28	0.002	0.127	0.423
		12	1.19	0.000	0.136	0.409
		13	3.54	0.010	0.181	0.401
		14	1.27	0.002	0.313	0.439
		15	1.06	0.000	0.121	0.391
		16	1.13	0.000	0.210	0.389
		17	0.70	0.000	0.156	0.369
		18	0.77	0.000	0.107	0.355
		19	0.79	0.000	0.150	0.372
		20	0.72	0.005	0.245	0.378
		21	0.53	0.003	0.231	0.356
		22	1.20	0.000	0.245	0.373
		23	0.89	0.000	0.239	0.367
		24	0.64	0.000	0.220	0.344

Table (A1-6): Cover crop trial water Sampling analysis: Feb. 20, 2001, Station 2

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
2/20/2001	Station 2	3	2.05	0.003	0.776	0.600
		4	1.36	0.012	0.558	0.514
		7	1.19	0.003	0.540	0.487
		8	0.91	0.001	0.629	0.518
		9	0.85	0.013	0.696	0.537
		10	5.88	0.022	1.814	0.780
		11	3.27	0.000	0.377	0.505
		12	1.26	0.049	0.045	0.426
		13	1.61	0.009	0.132	0.419
		14	0.83	0.083	0.064	0.411
		15	1.19	0.000	0.151	0.434
		16	1.22	0.003	0.255	0.470
		17	1.09	0.000	0.246	0.447
		18	0.98	0.000	0.227	0.433
		19	1.00	0.001	0.246	0.442
		20	0.91	0.000	0.232	0.427
		21	0.74	0.011	0.295	0.453
		22	0.91	0.000	0.321	0.443
		23	0.79	0.000	0.388	0.476
		24	0.77	0.000	0.391	0.473

Table (A1-7): Cover crop trial water Sampling analysis: Feb. 20, 2001, Station 3

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
2/20/2001	Station 3	2	1.51	0.050	2.607	0.769
		3	1.18	0.063	1.056	0.644
		4	1.01	0.023	0.797	0.521
		5	0.92	0.056	0.759	0.507
		6	4.50	0.049	0.773	0.565
		7	2.73	0.067	0.406	0.459
		8	1.58	0.024	0.387	0.468
		9	1.54	0.043	0.360	0.474
		10	1.40	0.021	0.321	0.441
		11	1.13	0.029	0.320	0.424
		12	1.13	0.035	0.327	0.490

Table (A1-8): Cover crop trial water Sampling analysis: Feb. 20, 2001, Station 4

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
2/20/2001	Station 4	1	1.73	0.000	0.646	0.658
		2	3.60	0.000	0.647	0.684
		3	0.50	0.000	0.426	0.532
		4	1.39	0.000	0.324	0.493
		5	0.97	0.000	0.283	0.489
		6	0.97	0.008	0.310	0.485
		7	0.97	0.000	0.282	0.500
		8	0.88	0.007	0.323	0.523
		9	0.85	0.001	0.311	0.495
		10	0.76	0.015	0.296	0.451
		11	0.74	0.005	0.321	0.482
		12	0.70	0.000	0.323	0.482
		13	0.72	0.000	0.335	0.502
		14	0.72	0.000	0.351	0.509
		15	0.68	0.005	0.389	0.546
		16	0.69	0.002	0.421	0.573
		17	0.69	0.000	0.413	0.550
		18	0.64	0.002	0.414	0.539
		19	0.65	0.000	0.425	0.537
		20	0.57	0.005	0.494	0.533
		21	0.62	0.000	0.511	0.574
		22	0.59	0.000	0.508	0.521

Table (A1-9): Cover crop trial water Sampling analysis: Feb. 23, 2001, Station 2

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
2/23/2001	Station 2	1	1.28	0.126	0.405	0.373
		2	2.96	0.117	0.732	0.465
		3	3.29	0.159	1.146	0.653
		6	0.33	0.035	0.909	0.320
		15	1.16	0.116	0.656	0.419
		16	0.96	0.064	0.510	0.389
		17	0.96	0.062	0.459	0.345
		19	1.57	0.033	0.307	0.311
		20	1.29	0.058	0.275	0.295
		21	1.00	0.480	0.379	0.326
		22	1.12	0.069	0.243	0.253
		23	0.92	0.062	0.246	0.233
		24	1.05	0.057	0.236	0.246

Table (A1-10): Cover crop trial water Sampling analysis: Feb. 25, 2001, Station 3

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
2/25/2001	Station 3	1	1.97	0.099	0.232	0.280
		2	1.46	0.077	0.264	0.272
		3	1.59	0.092	0.275	0.233
		4	1.33	0.086	0.266	0.237
		5	1.29	0.094	0.259	0.241
		6	1.02	0.102	0.254	0.230
		7	0.88	0.124	0.250	0.284
		8	0.97	0.095	0.257	0.228
		9	0.89	0.084	0.258	0.249
		10	0.87	0.112	0.285	0.246
		11	0.91	0.103	0.366	0.236
		12	0.61	0.241	0.400	0.336
		13	0.78	0.155	0.285	0.290
		14	0.76	0.107	0.378	0.249
		15	0.61	0.161	0.468	0.248
		16	0.64	0.112	0.418	0.256
		17	0.71	0.109	0.432	0.287
		18	0.67	0.202	0.459	0.270
		19	0.69	0.111	0.502	0.337
		20	0.67	0.132	0.704	0.430
		21	0.85	0.108	0.651	0.350
		22	0.84	0.109	0.578	0.313
		23	0.77	0.111	0.558	0.298
		24	0.75	0.137	0.518	0.281

Table (A1-11): Cover crop trial water Sampling analysis: Feb. 23, 2001, Station 4

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
2/23/2001	Station 4	1	0.72	0.071	0.243	0.371
		2	2.88	0.067	0.339	0.473
		3	1.64	0.064	0.275	0.451
		4	1.52	0.070	0.280	0.437
		5	1.09	0.078	0.270	0.443
		6	1.35	0.124	0.585	0.547
		7	0.98	0.103	0.590	0.443
		8	0.11	0.117	0.556	0.431
		9	0.44	0.201	0.488	0.367
		10	0.57	0.028	0.440	0.356
		11	0.51	0.049	0.404	0.355
		12	0.51	0.061	0.425	0.342
		13	0.85	0.130	0.445	0.364
		14	0.49	0.142	0.375	0.347
		15	0.92	0.081	0.293	0.338
		16	0.30	0.099	0.288	0.366
		17	0.62	0.045	0.255	0.269
		18	0.52	0.060	0.266	0.265
		19	0.52	0.069	0.259	0.265
		20	0.87	0.089	0.265	0.230
		21	0.51	0.084	0.244	0.235
		22	0.43	0.051	0.229	0.244
		23	0.37	0.042	0.247	0.244
		24	0.36	0.052	0.234	0.238

Table (A1-12): Cover crop trial water Sampling analysis: Feb. 22, 2001, Station 4

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
02/22/01	Station 4	1	0.74	0.057	0.664	0.580
		2	0.50	0.059	0.712	0.532
		3	0.24	0.118	0.661	0.431
		4	0.23	0.106	0.620	0.393
		5	0.26	0.094	0.587	0.388
		6	0.17	0.094	0.592	0.368
		7	0.14	0.081	0.550	0.379
		8	0.16	0.080	0.554	0.388
		9	0.16	0.063	0.554	0.390
		10	0.15	0.061	0.558	0.392
		11	0.15	0.074	0.554	0.391
		12	0.14	0.065	0.579	0.428
		13	0.12	0.065	0.550	0.432
		14	2.34	0.054	0.322	0.398
		15	1.38	0.022	0.306	0.366
		16	1.33	0.041	0.251	0.338
		17	1.09	0.009	0.222	0.345
		18	0.94	0.011	0.223	0.345
		19	0.92	0.034	0.222	0.324
		20	0.53	0.085	0.218	0.345
		21	0.73	0.043	0.227	0.324
		22	0.69	0.036	0.234	0.330
		23	0.57	0.027	0.250	0.274
		24	0.17	0.091	0.232	0.366

Table (A1-13): Cover crop trial water Sampling analysis: Feb. 22, 2001, Station 2

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
02/22/01	Station 2	1	1.58	0.152	1.434	0.919
		2	0.98	0.277	1.464	0.916
		3	1.09	0.207	0.834	0.358
		4	0.38	0.180	0.660	0.524
		5	0.29	0.148	0.568	0.345
		7	0.27	0.127	0.578	0.292
		8	0.27	0.261	0.511	0.308
		10	0.43	0.135	0.558	0.306
		11	0.19	0.113	0.591	0.331
		12	0.28	0.139	0.600	0.341
		13	0.23	0.122	0.596	0.350
		14	0.26	0.554	0.630	0.332
		15	0.12	0.264	0.887	0.518
		16	0.71	0.000	0.000	0.483

Table (A1-14): Cover crop trial water Sampling analysis: Mar. 3, 2001, Station 3

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
03/03/01	Station 3	1	1.03	0.056	0.419	0.356
		2	0.51	0.085	0.537	0.310
		3	0.38	0.102	0.559	0.312
		4	0.04	0.176	0.523	0.341
		5	0.30	0.087	0.509	0.306
		6	0.30	0.084	0.486	0.306
		7	0.27	0.092	0.469	0.293
		8	0.61	0.101	0.456	0.292
		9	0.31	0.104	0.423	0.290
		10	0.20	0.065	0.372	0.253
		11	0.23	0.071	0.368	0.238
		12	0.23	0.078	0.381	0.234
		13	0.18	0.074	0.386	0.223
		14	0.26	0.109	0.412	0.224
		15	0.20	0.115	0.421	0.216
		16	0.16	0.100	0.429	0.197
		17	0.22	0.088	0.431	0.186
		18	0.13	0.114	0.444	0.188
		19	0.50	0.142	0.474	0.186
		20	0.24	0.110	0.463	0.181
		21	0.13	0.096	0.461	0.177
		22	0.01	0.139	0.470	0.202
		23	0.12	0.097	0.534	0.176
		24	0.17	0.122	0.546	0.190

Table (A1-15): Cover crop trial water Sampling analysis: Mar. 3, 2001, Station 4

Date Sampled	Specific Site	Sample Number	Sediment weight (g/L)	NH_4 mg N/L	NO_3 mg N/L	PO_4 mg P/L
03/03/01	Station 4	1	0.68	0.135	1.846	0.472
		2	0.49	0.175	0.804	0.370
		3	0.47	0.166	0.694	0.342
		4	0.47	0.153	0.714	0.333
		5	0.43	0.151	0.751	0.349
		6	0.43	0.191	0.651	0.288
		7	0.49	0.153	0.629	0.308
		8	0.51	0.155	0.607	0.282
		9	0.89	0.117	0.554	0.283
		10	0.47	0.109	0.455	0.267
		11	0.56	0.086	0.420	0.246
		15	0.81	0.166	0.544	0.240
		16	0.80	0.100	0.469	0.250
		17	0.93	0.112	0.512	0.212
		18	0.69	0.119	0.541	0.191
		19	0.54	0.123	0.564	0.191
		20	0.44	0.147	0.584	0.194
		21	0.43	0.143	0.583	0.261
		22	0.43	0.127	0.542	0.185
		23	0.09	0.168	0.570	0.215
		24	0.07	0.141	0.588	0.182

B. Sediment traps

B-1 Sediment trap SM95

Table (B1-1): Sediment content in inflow and outflow samples collected from the SM95 sediment trap.

	Trap Inflow	Trap Outflow	Reduction rate
Date	(g/L)	(g/L)	(%)
06/28/01	28.883	3.994	86.17
06/28/01	2.927	0.536	81.69
06/29/01	2.363	0.973	58.84
07/03/01	1.489	1.550	-4.12
07/17/01	2.660	2.995	-12.58
07/18/01	1.529	1.024	33.03
08/02/01	2.335	2.025	13.25
08/03/01	2.487	1.848	25.67

Table (B1-2): Inflow properties for the SM95 sediment trap.

Trap Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/28/01	0.000	10.904	0.307
06/28/01	0.859	3.961	0.182
06/29/01	0.103	1.673	0.158
07/03/01	0.121	1.955	0.169
07/17/01	0.195	1.085	0.282
07/18/01	0.013	1.787	0.127
08/02/01	0.000	1.147	0.186
08/03/01	0.056	1.000	0.167

Table (B1-3): Outflow properties for the SM95 sediment trap.

Trap Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/28/01	0.031	2.150	0.220
06/28/01	0.233	1.280	0.168
06/29/01	0.060	1.738	0.137
07/03/01	0.086	1.845	0.152
07/17/01	0.216	1.600	0.303
07/18/01	0.019	1.734	0.125
08/02/01	0.000	1.188	0.188
08/03/01	0.088	0.972	0.164

B-2 Sediment trap SMCC

Table (B2-1): Sediment content in inflow and outflow samples collected from the SMCC sediment trap.

	Trap Inflow	Trap Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
06/03/01	1.793	0.044	97.56
06/11/01	0.296	0.320	-8.11
06/22/01	0.395	0.272	31.22
07/01/01	0.322	0.208	35.52
08/02/01	0.238	0.245	-3.05

Table (B2-2): Inflow properties for the SMCC sediment trap.

Trap Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/03/01	0.240	1.744	0.162
06/11/01	0.091	0.765	0.087
06/22/01	2.668	6.105	0.160
07/01/01	2.243	3.774	0.104
08/02/01	0.180	0.683	0.068

Table (B2-3): Outflow properties for the SMCC sediment trap.

Trap Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/03/01	0.160	2.239	0.160
06/11/01	0.076	0.884	0.098
06/22/01	3.136	5.083	0.187
07/01/01	1.804	2.625	0.101
08/02/01	0.000	1.069	0.068

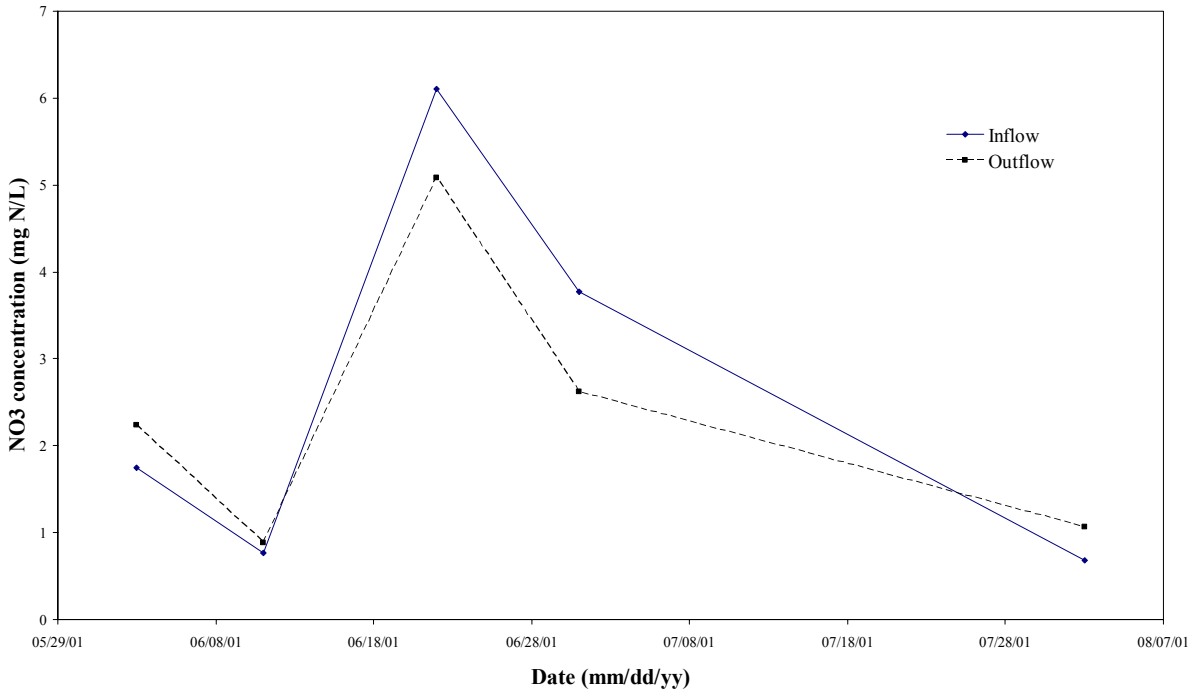

Figure B2-1 : NO3 nitrogen concentration in samples collected from the SMCC trap.

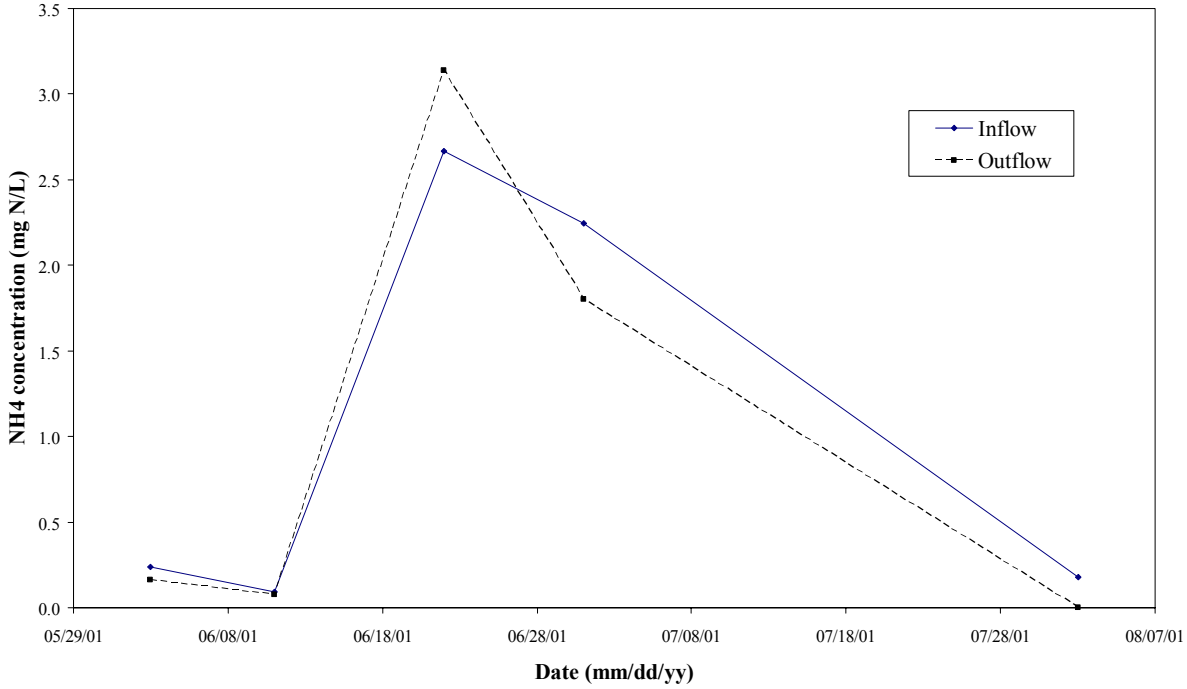

Figure B2-2 : NH4 nitrogen concentration in samples collected from the SMCC trap.

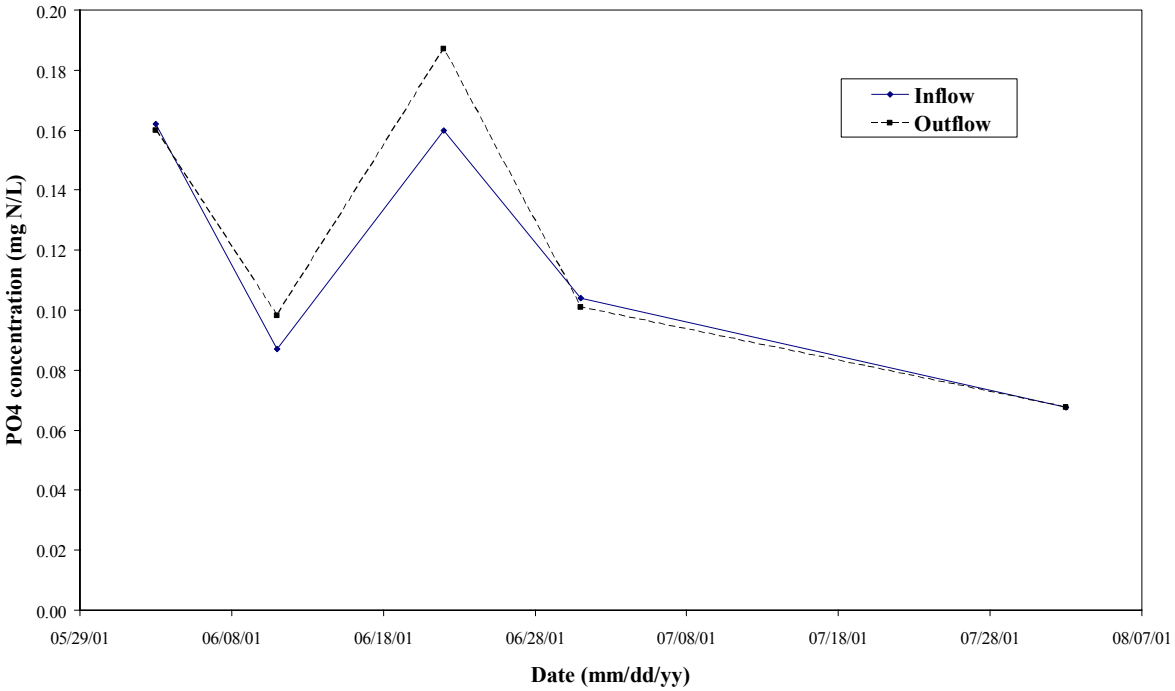

Figure B2-3 : PO4 concentration in samples collected from the SMCC trap.

B-3 Sediment trap SB64

Table (B3-1): Sediment content in inflow and outflow samples collected from the SB64 sediment trap.

	Trap Inflow	Trap Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
06/11/01	0.758	0.547	27.82
06/12/01	0.228	0.140	38.70
06/14/01	0.087	0.153	-76.04
07/02/01	0.583	0.533	8.45
07/24/01	0.431	0.390	9.59

Table (B3-2): Inflow properties for the SB64 sediment trap.

Trap Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/11/01	0.041	3.097	0.121
06/12/01	0.292	8.071	0.121
06/14/01	0.451	8.686	0.104
07/02/01	0.109	3.202	0.102
07/24/01	0.077	1.618	0.065

Table (B3-3): Outflow properties for the SB64 sediment trap.

Trap Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/11/01	0.019	3.335	0.131
06/12/01	0.269	5.975	0.124
06/14/01	0.473	6.065	0.111
07/02/01	0.057	3.564	0.099
07/24/01	0.083	1.605	0.075

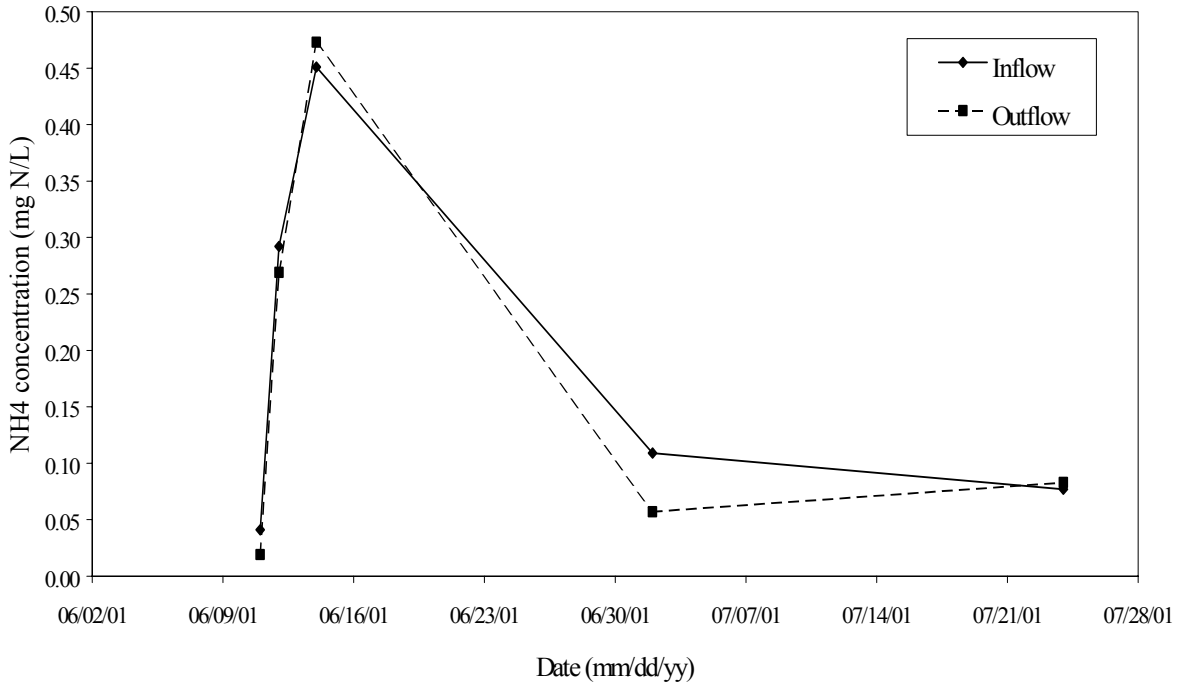

Figure B3 -1: NH4 nitrogen concentration in samples collected from the SB64 trap.

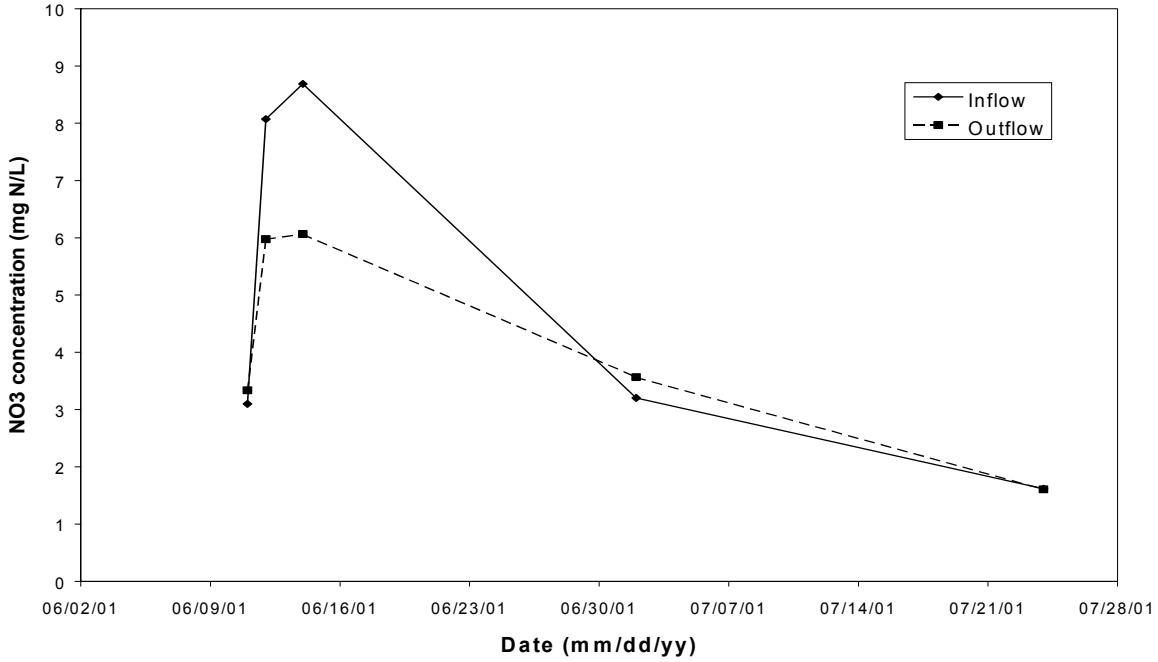

Figure B3 -2: NO3 Nitrogen concentration in samples collected from the SB64 trap.

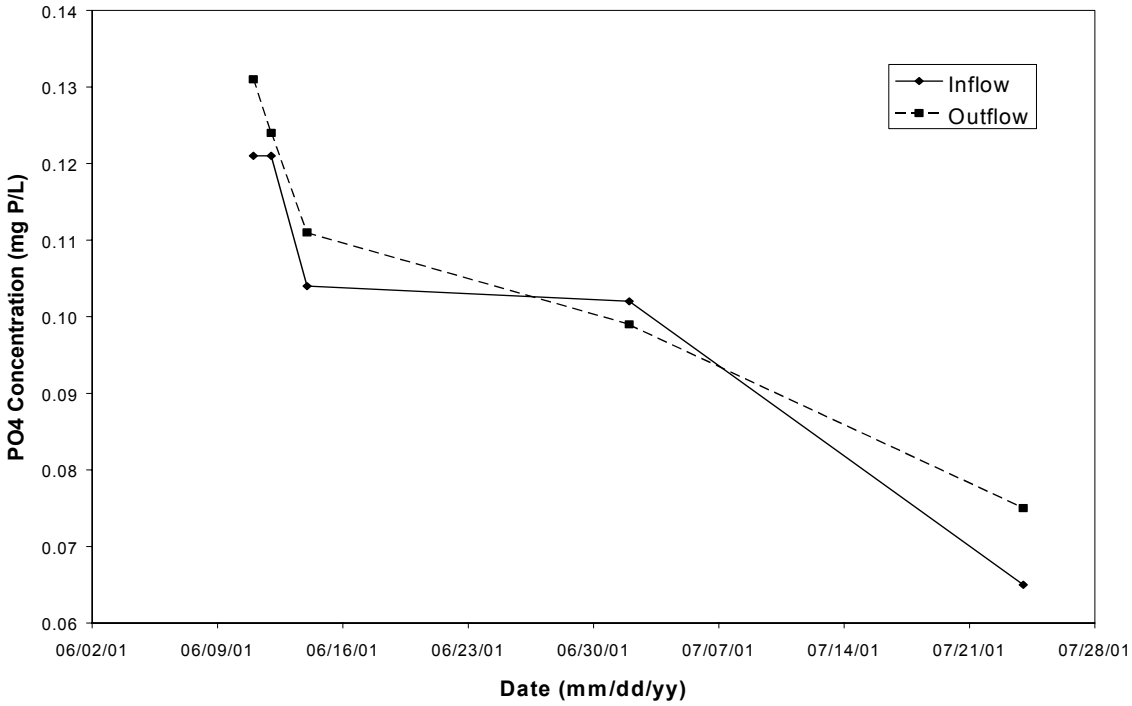

Figure B3 -3: PO4 concentration in samples collected from the the SB64 trap.

B-4 Sediment trap SBTC

Table (B4-1): Sediment content in inflow and outflow samples collected from the SBTC sediment trap.

	Trap Inflow	Trap Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
06/12/01	3.590	1.524	57.56
06/14/01	0.317	0.137	56.75
06/15/01	0.328	0.304	7.55
06/30/01	3.206	1.516	52.70
07/06/01	0.854	0.540	36.73
07/24/01	0.285	0.234	17.97
08/02/01	1.192	0.814	31.67
08/03/01	1.316	0.542	58.81

Table (B4-2): Inflow properties for the SBTC sediment trap.

Trap Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/12/01	0.026	6.059	0.200
06/14/01	0.329	3.612	0.169
06/15/01	0.251	3.287	0.172
06/30/01	0.000	3.669	0.211
07/06/01	0.143	2.472	0.188
07/24/01	0.012	1.226	0.115
08/02/01	0.200	1.224	0.175
08/03/01	2.068	2.152	0.103

Table (B4-3): Outflow properties for the SBTC sediment trap.

Trap Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
06/12/01	0.126	6.330	0.238
06/14/01	0.215	3.570	0.160
06/15/01	0.273	3.476	0.173
06/30/01	0.000	4.200	0.216
07/06/01	0.128	2.548	0.189
07/24/01	0.049	1.144	0.127
08/02/01	0.426	1.047	0.190
08/03/01	2.248	2.055	0.100

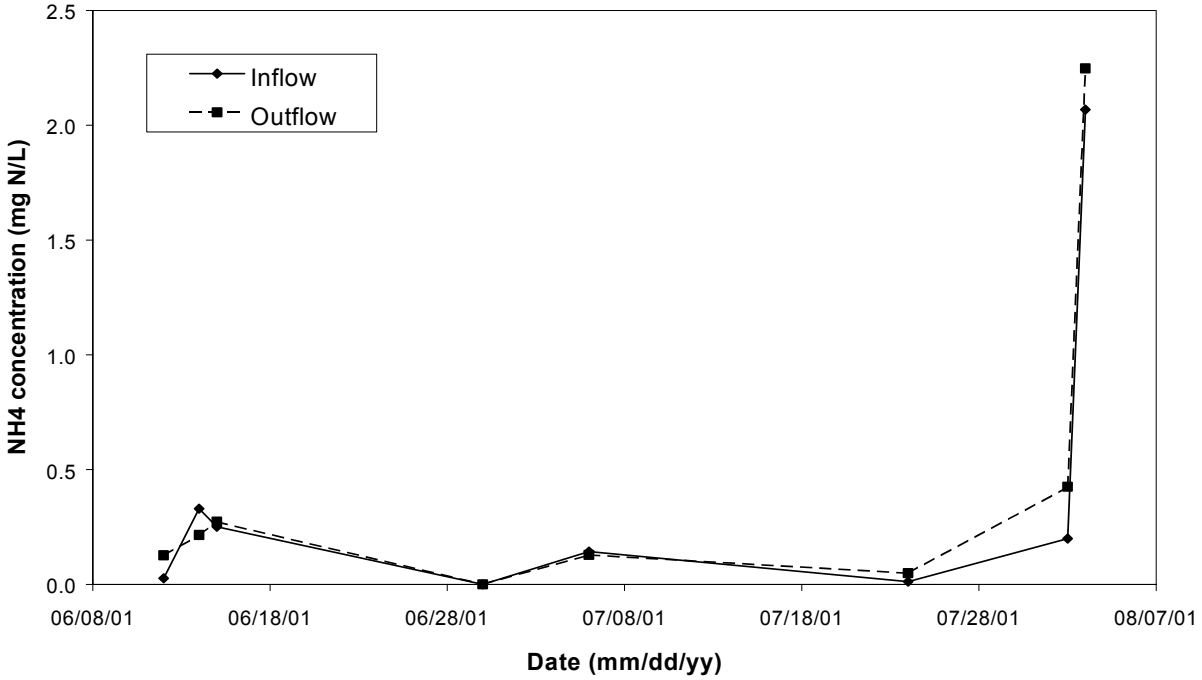

Figure B4 -1: NH4 nitrogen concentration in samples collected from the SBTC pond.

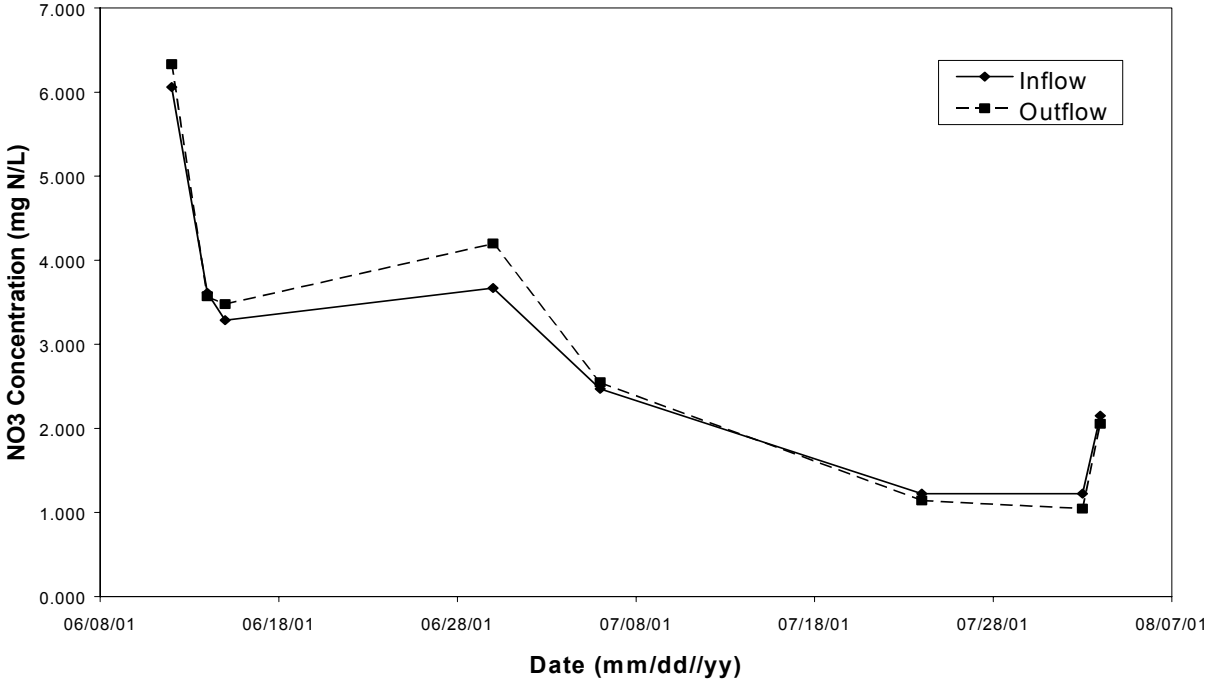

Figure B4 -2: NO3 Nitrogen concentration in samples collected from the SBTC sediment trap.

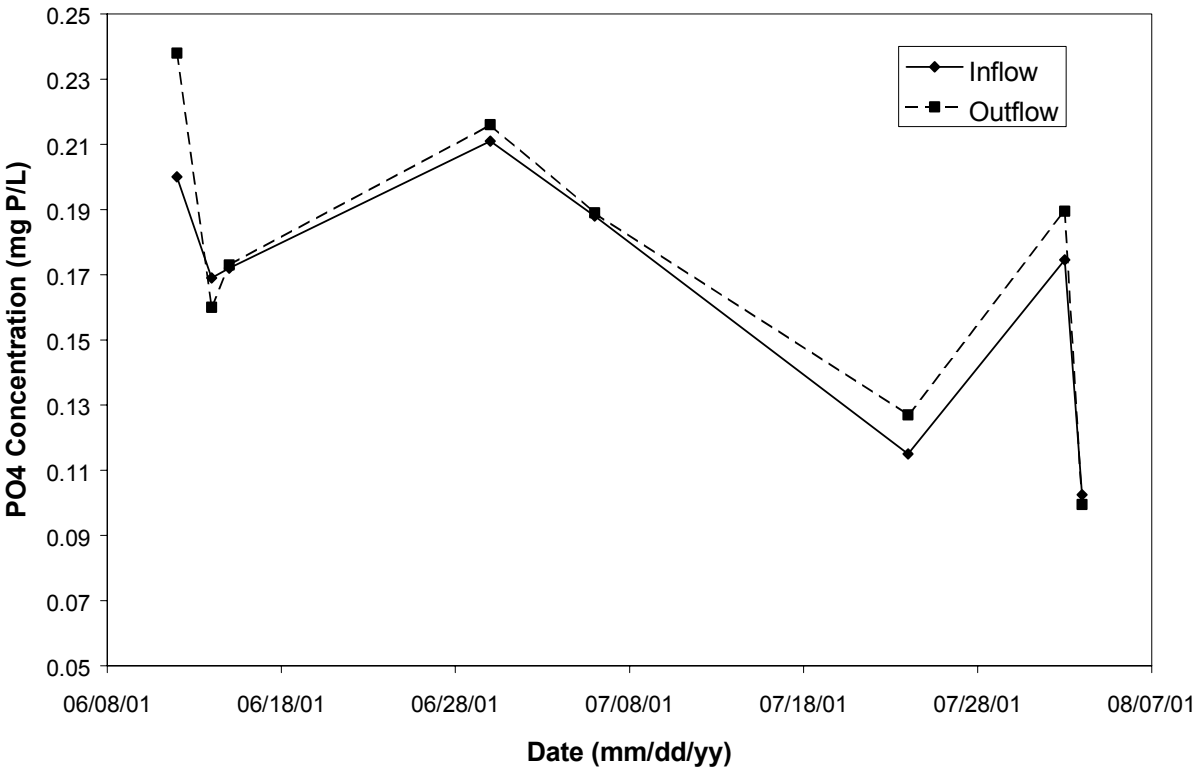

Figure B4 -3: PO4 concentration in samples collected from the SBTC trap.

B-5 Sediment trap SB17

Table (B5-1): Sediment content in inflow and outflow samples collected from the SB17 sediment trap.

	Trap Inflow	Trap Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
04/28/01	3.202	2.566	19.88
04/30/01	1.891	2.680	-41.69
05/01/01	0.562	0.348	38.10
05/01/01	1.540	1.273	17.33
05/11/01	1.281	0.805	37.16
05/21/01	1.662	0.030	98.22

Table (B5-2): Inflow properties for the SB17 sediment trap.

Trap Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
04/28/01	0.138	1.712	0.526
04/30/01	0.091	0.736	0.137
05/01/01	0.109	0.710	0.174
05/01/01	0.148	0.684	0.229
05/11/01	0.072	0.606	0.238
05/21/01	0.096	0.548	0.239

Table (B5-3): Outflow properties for the SB17 sediment trap.

Trap Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
04/28/01	0.100	0.746	0.264
04/30/01	0.116	0.784	0.132
05/01/01	0.112	0.691	0.180
05/01/01	0.157	0.639	0.238
05/11/01	0.115	0.659	0.204
05/21/01	0.103	0.626	0.228

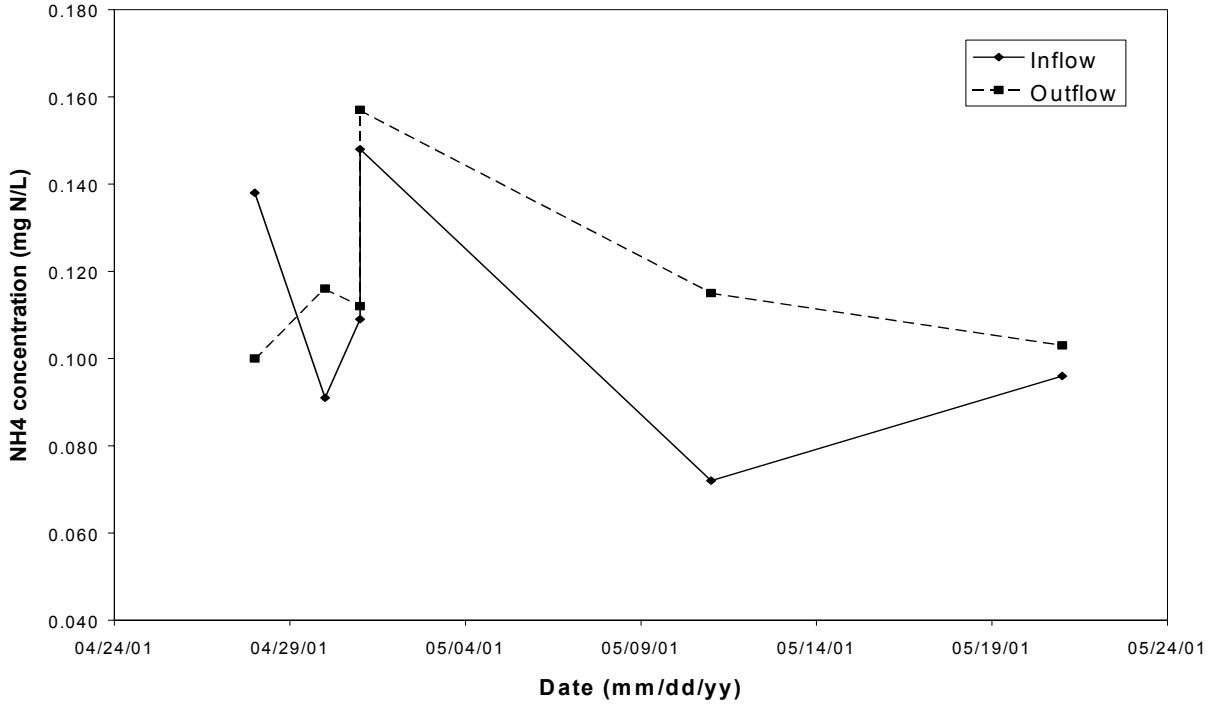

Figure B5 -1: NH4 nitrogen concentration in samples collected from the SB17 trap.

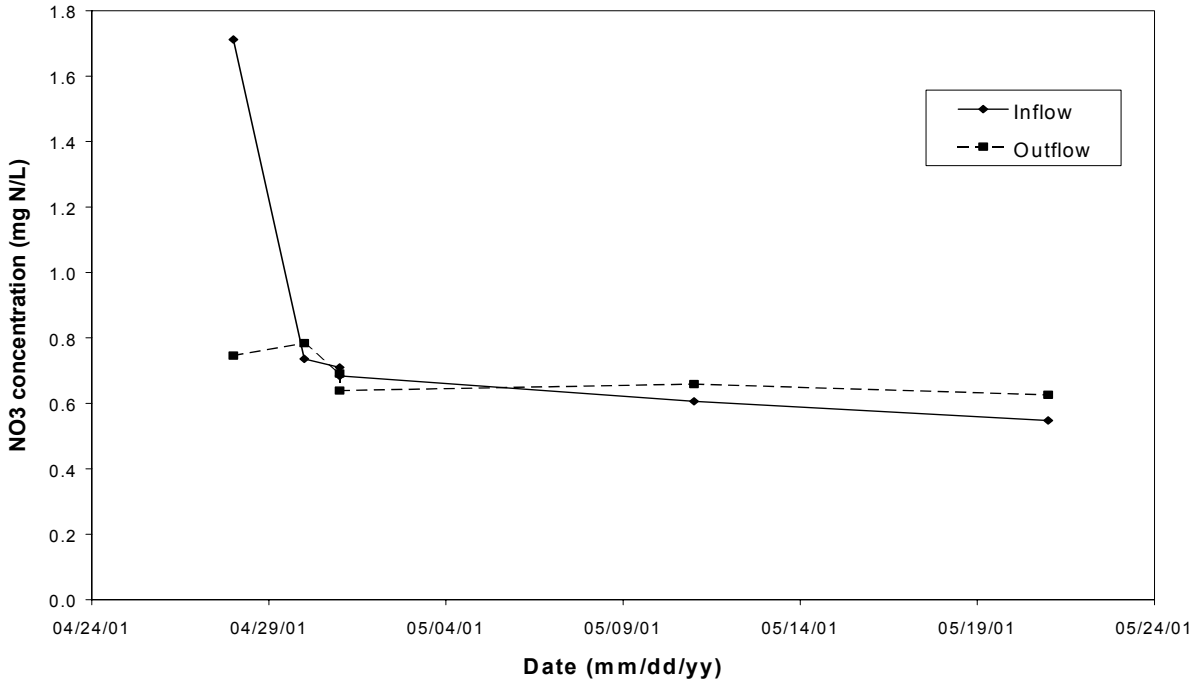

Figure B5 -2: NO3 Nitrogen concentration in samples collected from the SB17 trap.

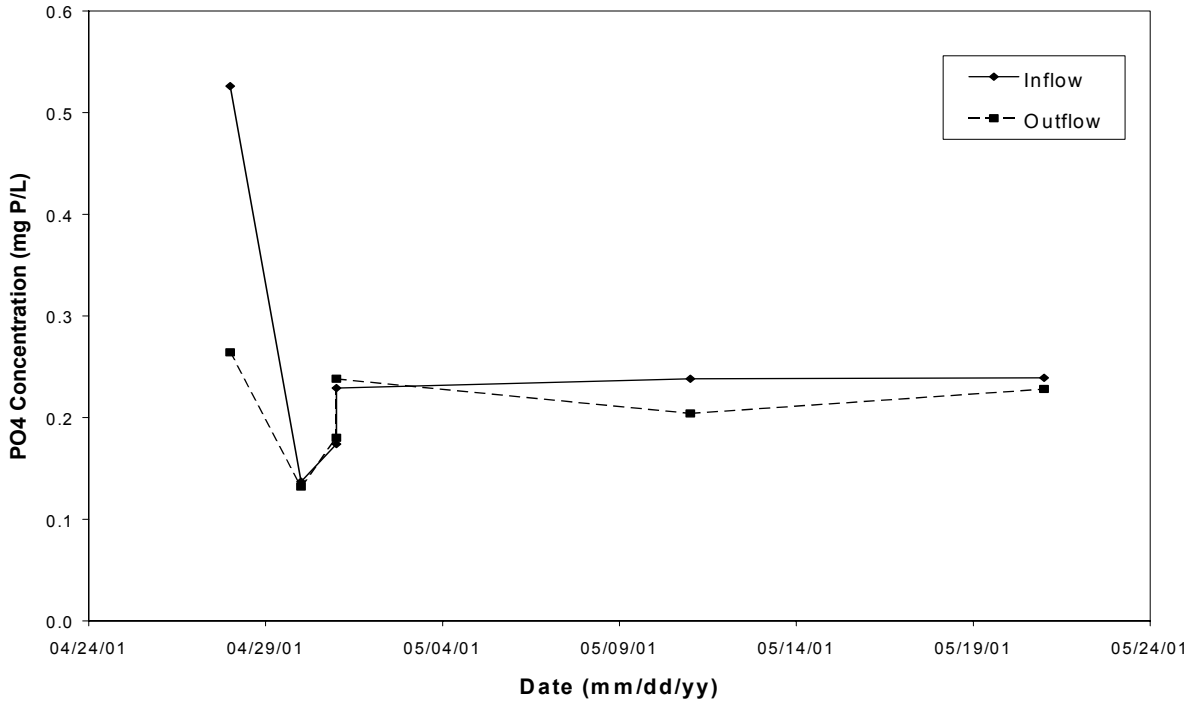

Figure B5 -3: PO4 concentration in samples collected from the the SB17 trap.

B-6 Sediment trap SROM

Table (B6-1): Sediment content in inflow and outflow samples collected from the SROM sediment trap.

	Trap Inflow	Trap Outflow	Reduction Rate
Date	(g/L)	(g/L)	(%)
05/14/01	9.426	0.047	99.50
05/15/01	0.052	0.070	-35.07
05/16/01	0.035	0.898	-2465.88
06/25/01		1.049	
07/26/01	0.631	0.079	87.47

Table (B6-2): Inflow properties for the SROM sediment trap.

Trap Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/14/01	12.413	1.921	0.203
05/15/01	14.419	1.910	0.164
05/16/01	18.764	1.075	0.221
07/26/01	0.051	0.727	0.118

Table (B6-3): Outflow properties for the SROM sediment trap.

Trap Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/14/01	12.826	1.748	0.197
05/15/01	13.049	1.585	0.220
05/16/01	19.873	0.782	0.220
06/25/01	0.010	0.259	0.087

B-7 Sediment trap SRCH

Table (B7-1): Sediment content in inflow and outflow samples collected from the SRCH sediment trap.

	Trap Inflow	Trap Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
04/21/01	1.115	0.826	25.95
04/22/01	0.420	0.553	-31.58
05/01/01	0.005	5.080	*-98960.00*
05/11/01	0.678	0.448	33.95
05/22/01	7.342	3.122	57.48
05/23/01	2.297	1.702	25.93
05/24/01	1.542	0.165	89.30

Table (B7-2): Inflow properties for the SRCH sediment trap.

Trap Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
04/21/01	0.109	1.243	0.095
04/22/01	0.132	0.366	0.043
05/01/01	0.268	1.687	0.220
05/11/01	0.071	0.119	0.055
05/22/01	0.117	0.425	0.144
05/23/01	0.110	0.494	0.099
05/24/01	0.124	0.154	0.085

Table (B7-3): Outflow properties for the SRCH sediment trap.

Pond Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
04/21/01	0.109	1.299	0.101
04/22/01	0.101	0.572	0.074
05/01/01	0.310	2.104	0.245
05/11/01	0.551	0.100	0.039
05/22/01	0.151	0.398	0.165
05/23/01	0.102	0.186	0.098
05/24/01	0.211	0.171	0.068

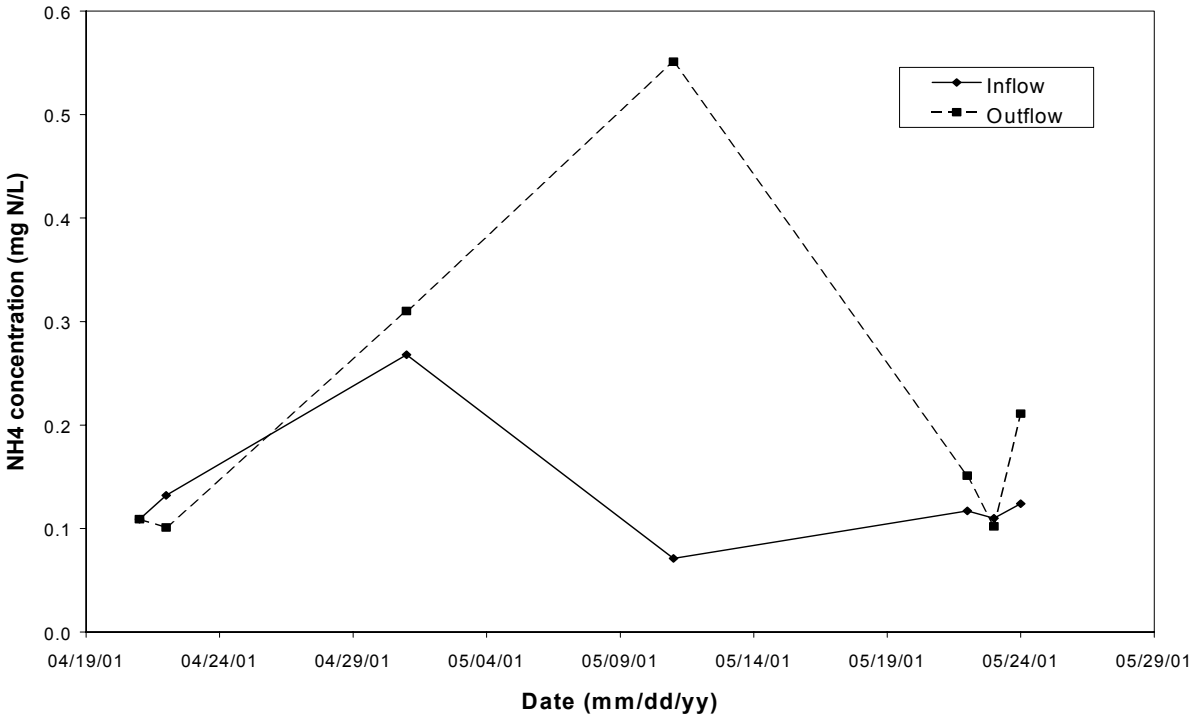

Figure B7 - 1: NH4 nitrogen concentration in samples collected from the SRCH trap.

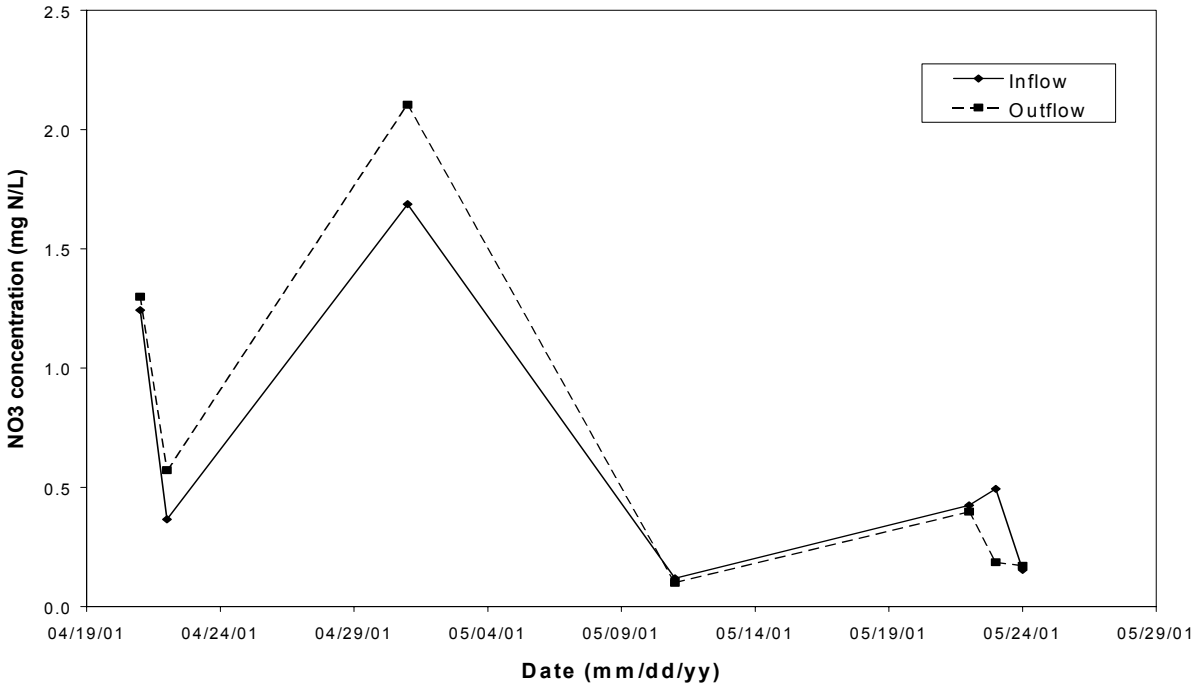

Figure B7 -2: NO3 Nitrogen concentration in samples collected from the SRCH trap.

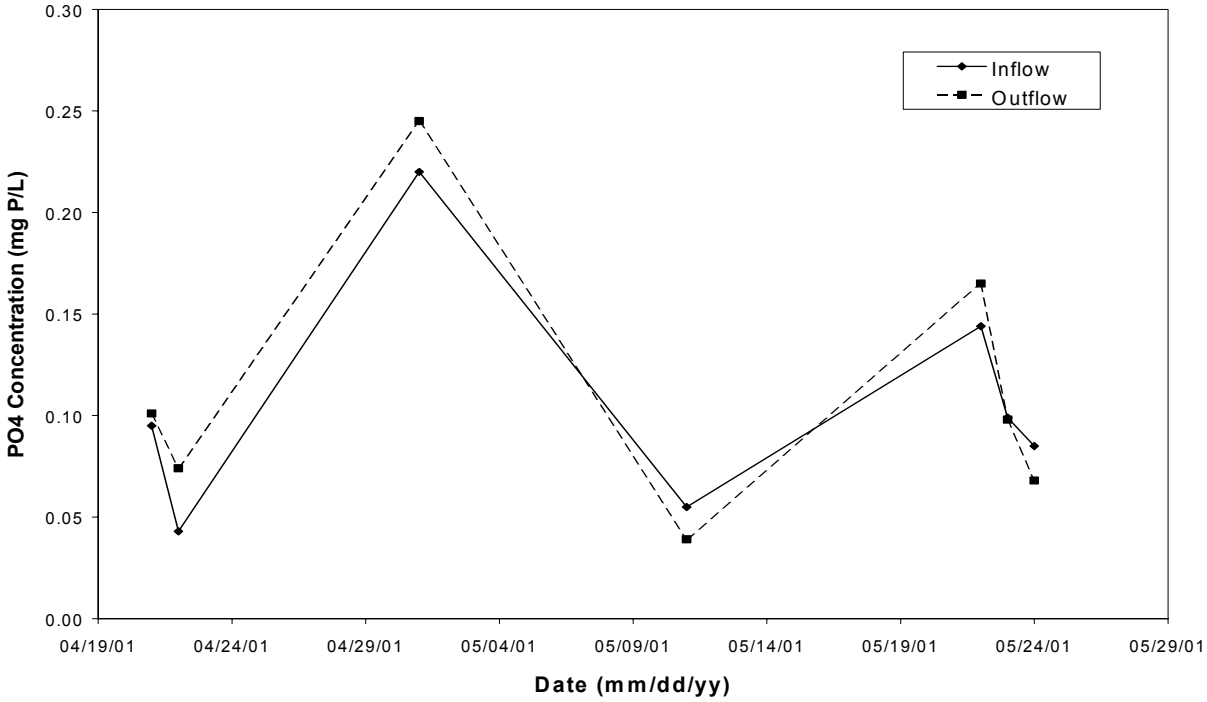

Figure B7 -3: PO4 concentration in samples collected from the the SRCH trap.

C. Tail Water Ponds

C-1 Pond PMJ

Table (C1-1): Sediment content in inflow and outflow samples collected from the PMJ pond.

	Pond Inflow	Pond Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
05/21/01	0.377	0.305	19.18
05/22/01	1.144	0.142	87.63
06/05/01	0.281		
06/11/01	0.130	0.180	-38.89

Table (C1-2): Inflow properties for the PMJ pond.

Pond Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/21/01	0.170	0.982	0.102
05/22/01	0.190	1.060	0.105
06/05/01	0.090	1.647	0.092
06/11/01	0.127	0.982	0.094

Table (C1-3): Outflow properties for the PMJ pond.

Pond Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/21/01	0.140	0.537	0.082
05/22/01	0.183	1.335	0.112
06/11/01	0.047	1.056	0.097

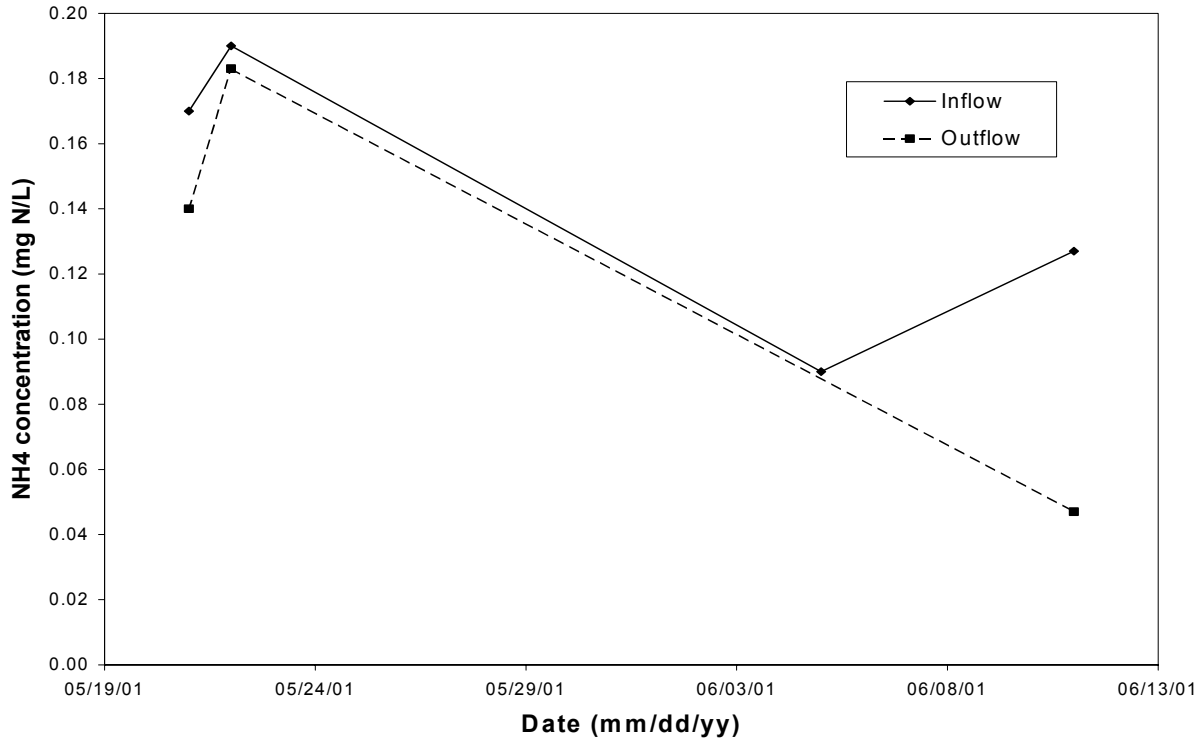

Figure C1 -1: NH4 nitrogen concentration in samples collected from the PMJ pond.

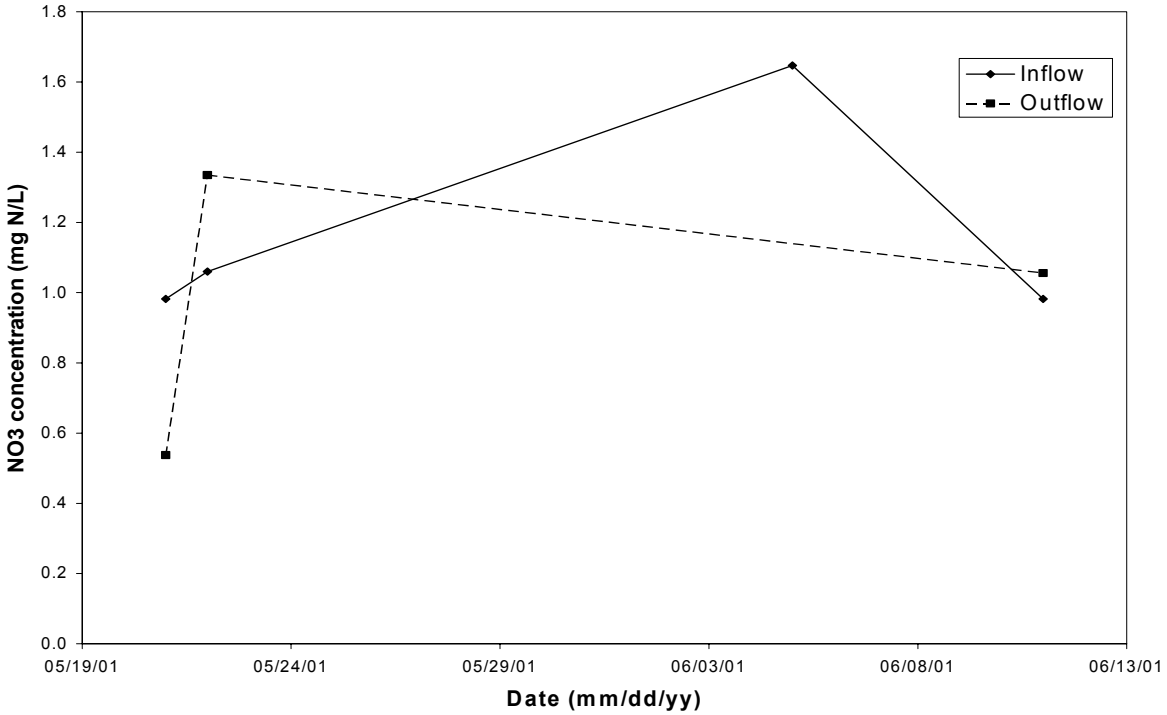

Figure C1 -2: NO3 Nitrogen concentration in samples collected from the PMJ pond.

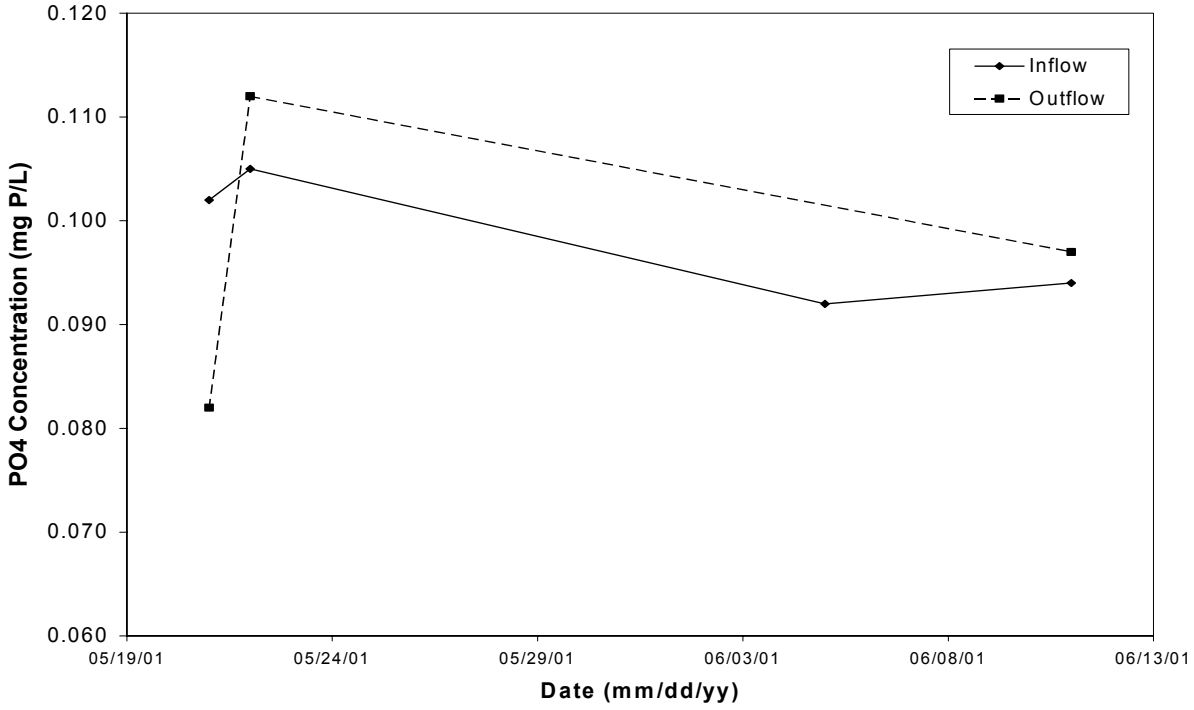

Figure C1 -3: PO4 concentration in samples collected from the the PMJ pond.

C-2 Pond PMHR

Table (C2-1): Sediment content in inflow and outflow samples collected from the PBHR pond.

	Pond Inflow	Pond Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
05/15/01	1.482		
05/22/01	0.946		
05/23/01	2.240		
05/24/01	0.438		
05/25/01	1.869		
07/23/01	1.025	0.241	76.486
08/06/01	0.137	0.052	61.888

Table (C2-2): Inflow properties for the PBHR pond.

Pond Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/15/01	0.112	9.002	0.108
05/22/01	0.350	9.105	0.701
05/23/01	0.215	8.021	0.576
05/24/01	0.228	9.238	0.506
05/25/01	0.158	9.130	0.246
07/23/01	0.023	9.812	0.300

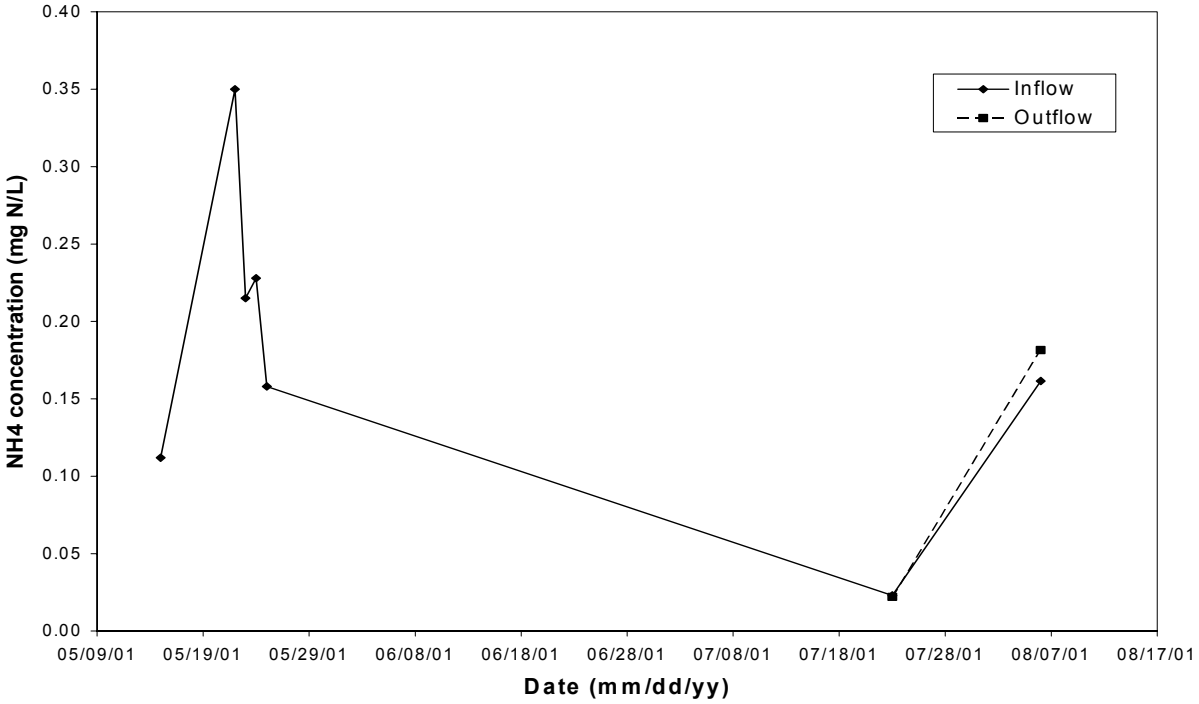

Figure C2 -1: NH4 nitrogen concentration in samples collected from the PBHR pond.

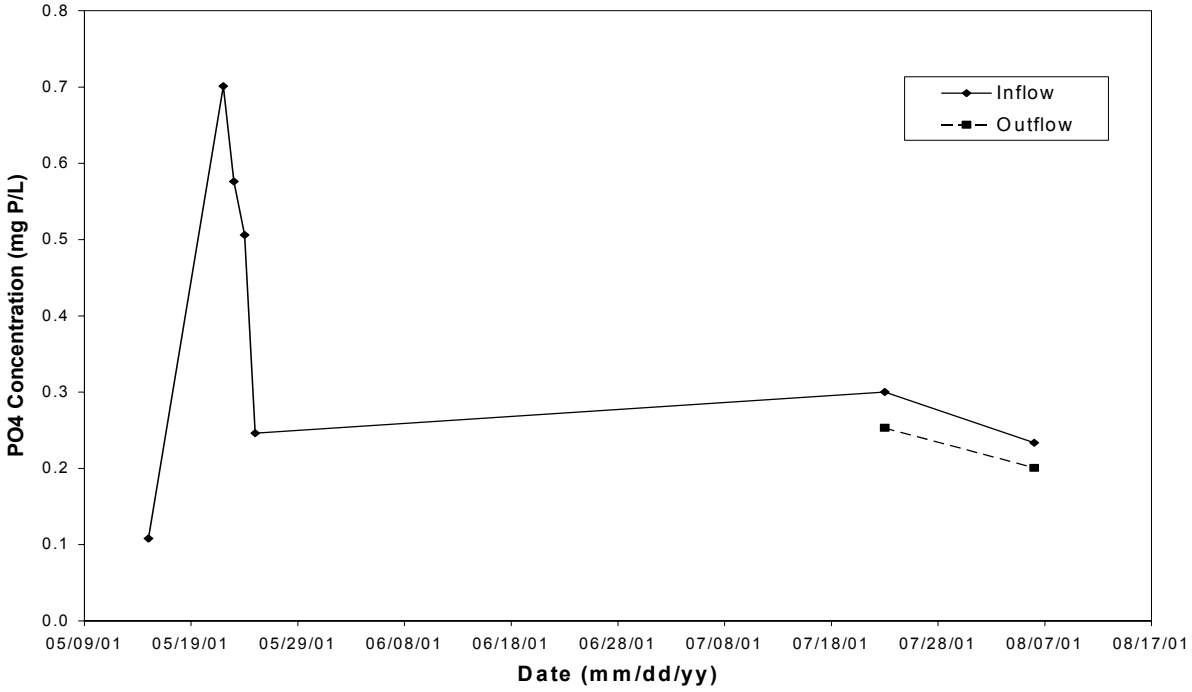

Figure C2 -3: PO4 concentration in samples collected from the the PBHR pond.

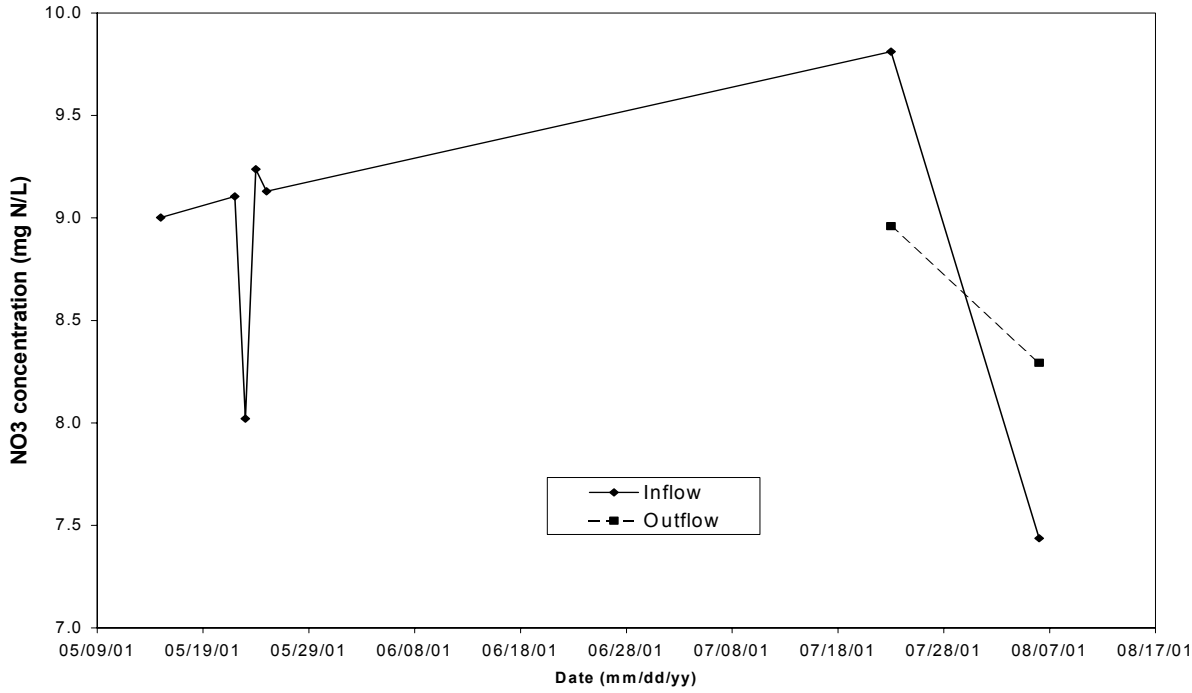

Figure C2 -2: NO3 Nitrogen concentration in samples collected from the PBHR pond.

C-3 Pond PBOR

Table (C3-1): Sediment content in inflow and outflow samples collected from the PBOR pond.

	Pond Inflow	Pond Outflow	Reduction Rate
Date	(g/L)	(g/L)	%
05/24/01	0.322		
05/25/01	2.785	0.095	96.60
05/29/01	0.367		
06/05/01	0.162	0.062	61.48
06/14/01	0.116	0.103	11.03
07/06/01	0.137		

Table (C3-2): Inflow properties for the PBOR pond.

Pond Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/24/01	0.257	0.869	0.158
05/25/01	0.202	0.661	0.130
05/29/01	0.175	1.191	0.120
06/05/01	0.146	0.779	0.118
06/06/01	0.059	1.518	0.118
06/14/01	0.063	0.809	0.147

Table (C3-3): Outflow properties for the PBOR pond.

Pond Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/25/01	0.194	0.736	0.116
06/05/01	0.086	0.912	0.071
06/14/01	0.055	0.706	0.161

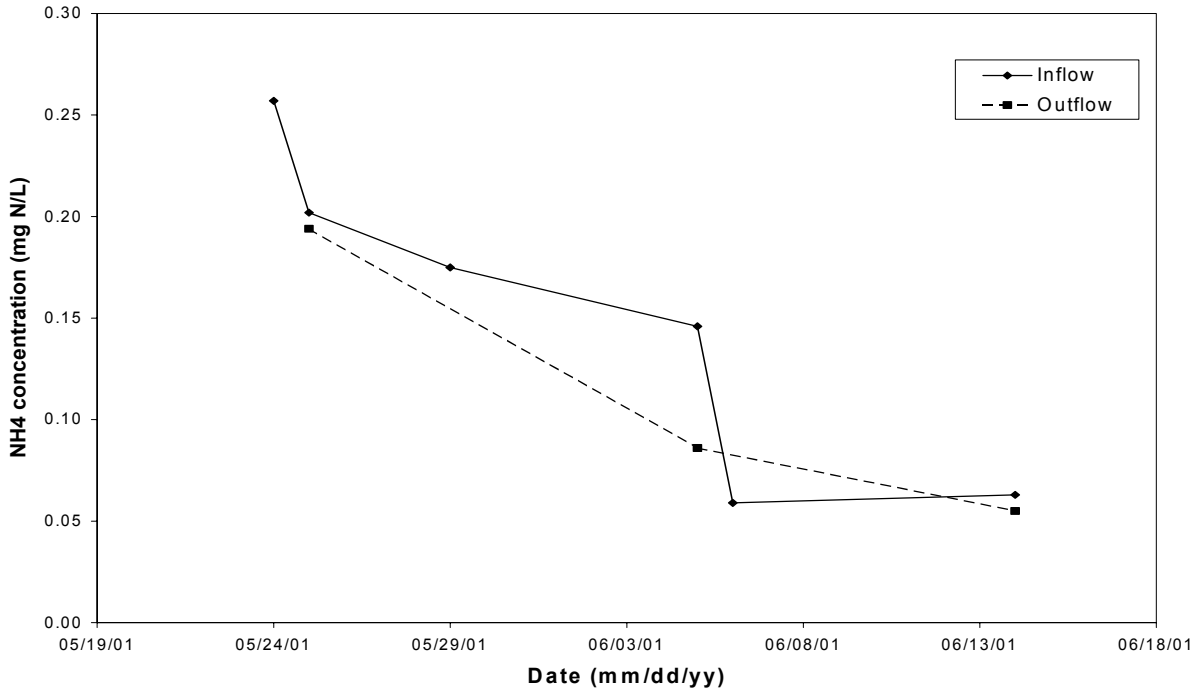

Figure C3 -1: NH4 nitrogen concentration in samples collected from the PBOR pond.

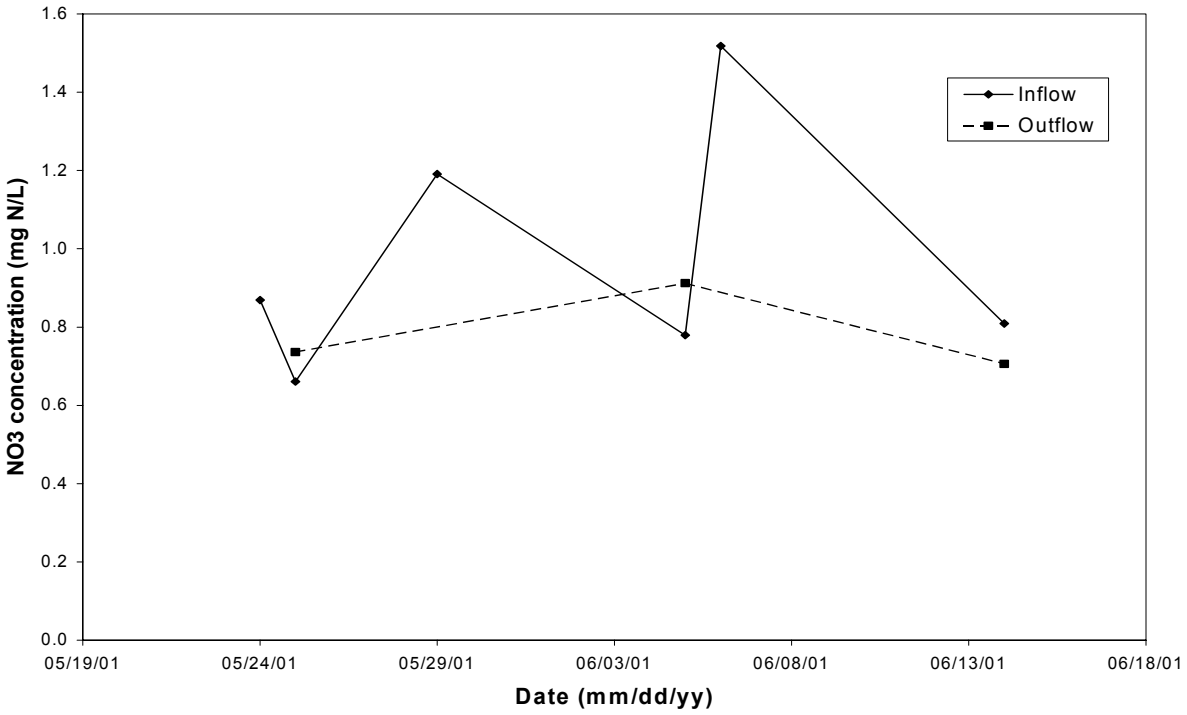

Figure C3 -2: NO3 Nitrogen concentration in samples collected from the PBOR pond.

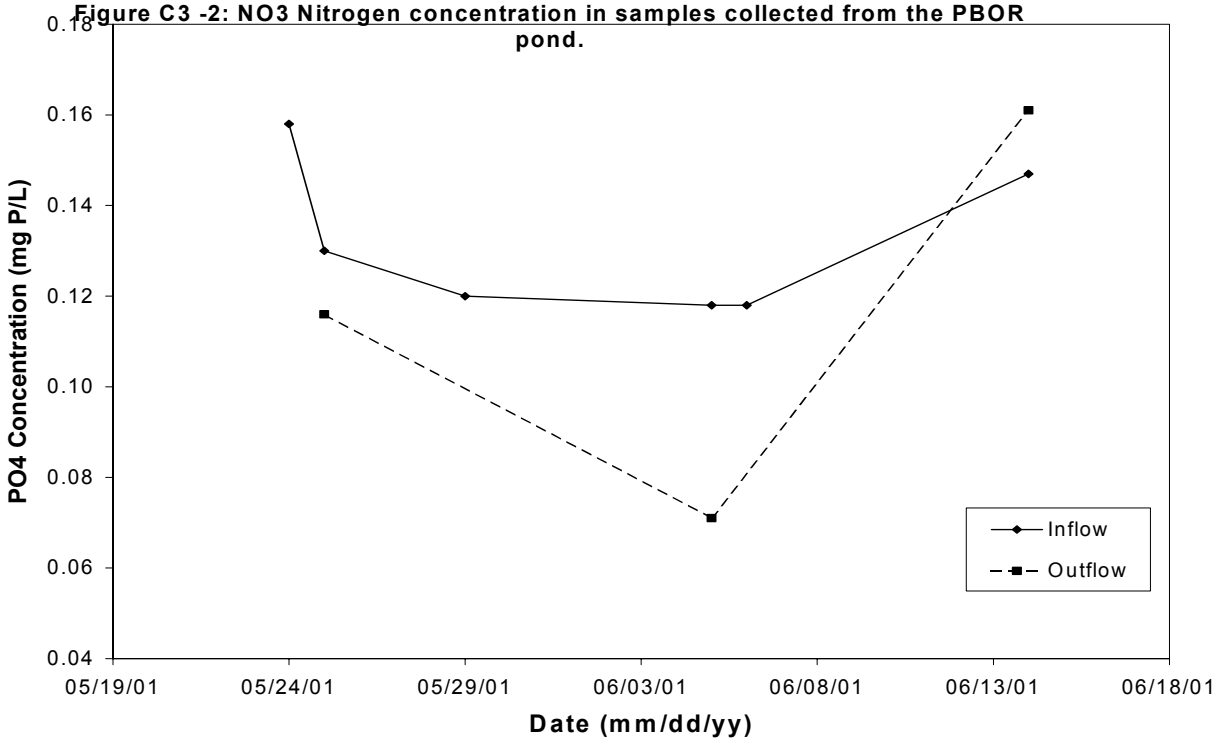

Figure C3 -3: PO4 concentration in samples collected from the the PBOR pond.

C-4 Pond PROM

Table (C4-1): Sediment content in inflow and outflow samples collected from the PROM pond.

	Pond Inflow	Pond Outflow	Reduction Rate
Date	(g/L)	(g/L)	(%)
05/14/01		0.028	
05/15/01		0.028	
05/29/01	2.681	0.332	87.62
06/25/01	0.566	0.344	39.16
07/26/01	0.079	0.065	17.41

Table (C4-2): Inflow properties for the PROM pond.

Pond Inflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/29/01	0.994	3.898	0.117
06/25/01	0.037	0.222	0.096
07/26/01	0.197	0.420	0.079

Table (C4-3): Outflow properties for the PROM pond.

Pond Outflow	NH_4	NO_3	PO_4
Date	mg N/L	mg N/L	mg P/L
05/14/01	13.677	1.944	0.215
05/15/01	14.677	1.598	0.190
05/29/01	0.586	2.060	0.087
06/25/01	0.061	0.228	0.093
07/26/01	0.227	0.359	0.081

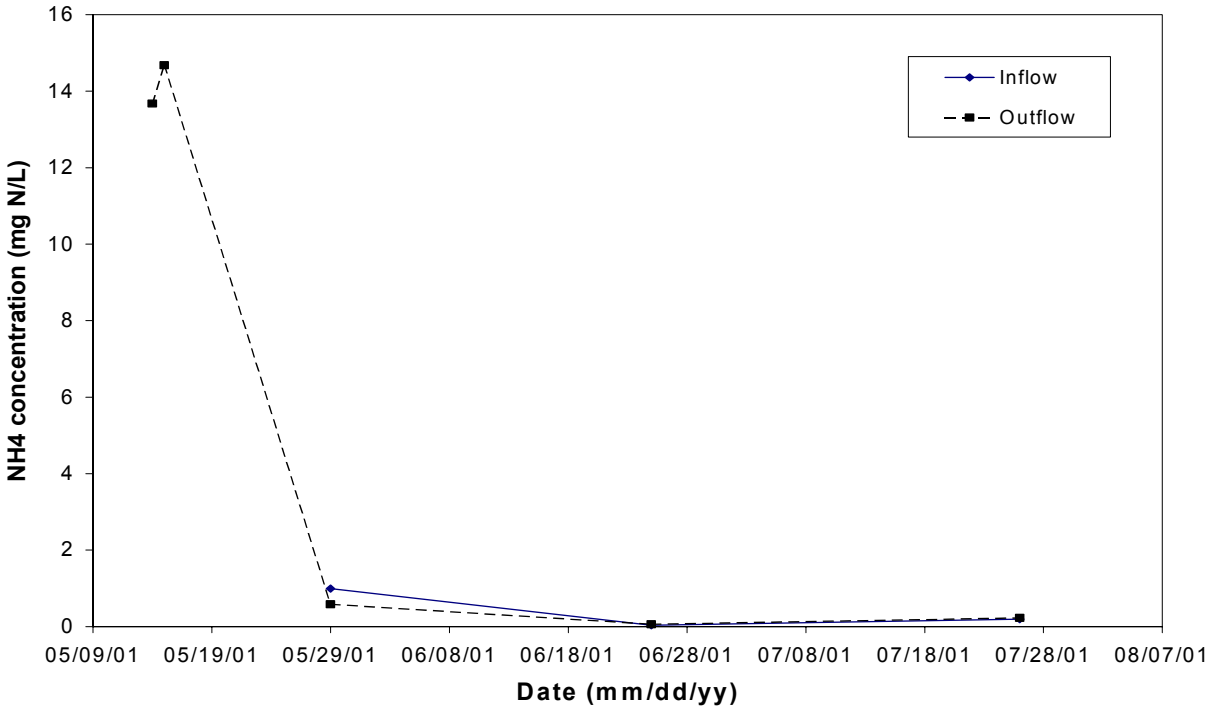

Figure C4 -1: NH4 nitrogen concentration in samples collected from the PROM pond

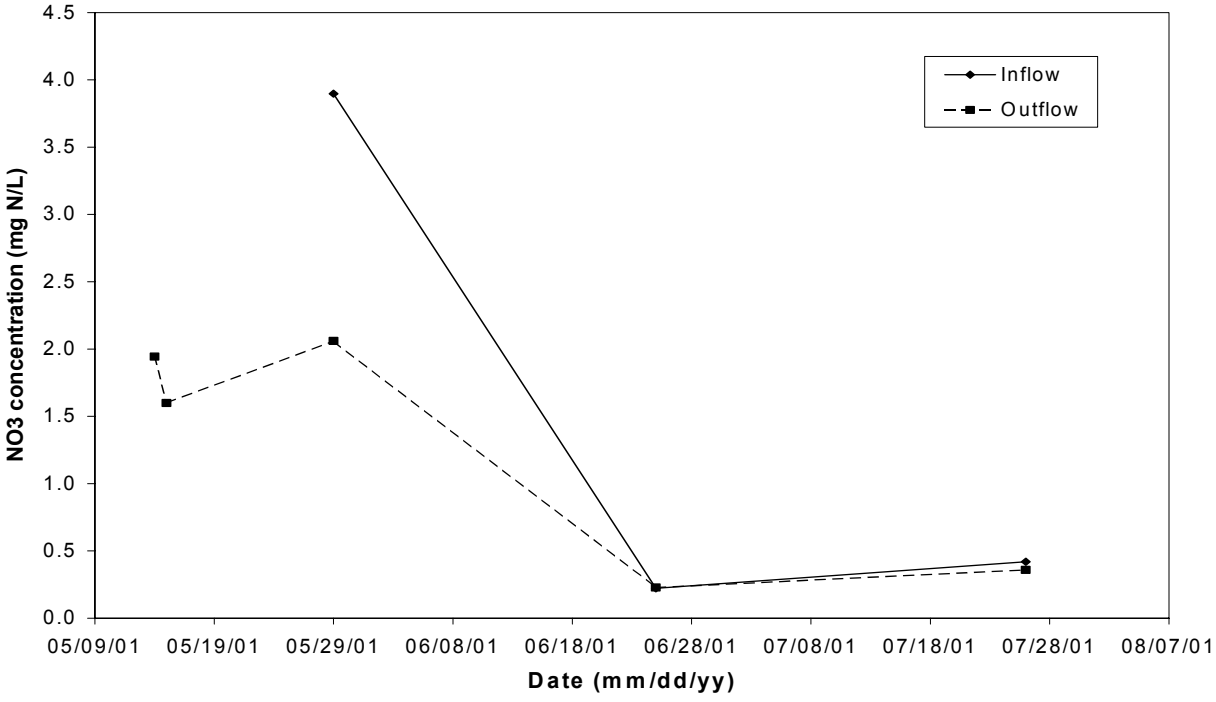

Figure C4 -2: NO3 Nitrogen concentration in samples collected from the PROM pond

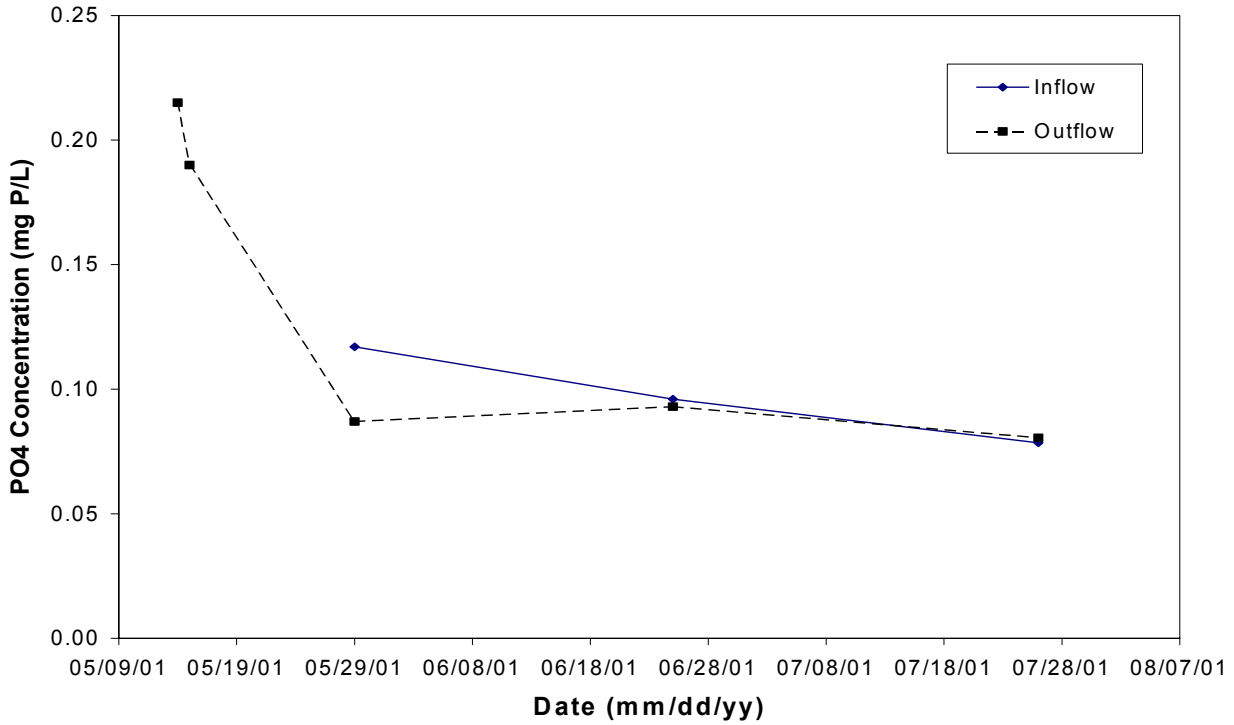

Figure C4 -3: PO4 concentration in samples collected from the PROM pond.

D. Irrigation Water Management

Table (D-1): Mass, volume, and average bulk density for sediment samples collected from the different tailwater pond and sediment trap sites.

Trap/Pond	Sample Location	Mass	Soil volume	Density	Avg. Density	Avg. Density
		(g)	(cm^3)	(g/cm^3)	(g/cm^3)	(kg/f^3)
SM95		71.5	100.67	0.71	0.71	20.11
SMCC	upper	76	100.67	0.75		
SMCC	lower	80.2	100.67	0.80	0.78	21.97
SB64		90.5	100.67	0.90	0.90	25.46
SBTC	upper	80.5	100.67	0.80		
SBTC	lower	76.8	100.67	0.76	0.78	22.12
SB17	upper	87.3	100.67	0.87		
SB17	middle 6"	83.2	100.67	0.83		
SB17	middle 12"	90.1	100.67	0.90		
SB17	lower	72.2	100.67	0.72	0.80	22.76
SRCH		74.8	100.67	0.74	0.74	21.04
PMJ		81.6	100.67	0.81	0.81	22.95
PROM	Lower	64.9	100.67	0.64	0.64	18.26
PBOR	upper	79.7	100.67	0.79		
PBOR	lower	68.4	100.67	0.68	0.74	20.83
PMR						
PBHR						
PROM						

Table (D-2): Watermark sensors readings for the western row of Field D1 in centibars.

Western Row			Row head			Row midpoint			Row tail end		
Day	Date	Time	1 - ft	2 - ft	3 - ft	1 - ft	2 - ft	3 - ft	1 - ft	2 - ft	3 - ft
Wednesday	06/20/01										
Friday	06/22/01	10:00 AM	18	27	22	43	28	18	35	23	17
Friday	06/29/01	3:00 PM	28	48	25	92	56	30	75	56	23
Sunday	07/01/01	2:00 PM	28	54	25	94	64	37	78	67	25
Tuesday	07/03/01	5:30 PM	31	59	26	101	81	48	79	71	27
Tuesday	07/10/01	7:30 PM	52	66	29	114	89	75	87	80	30
Monday	07/16/01	3:00 PM	62	72	31	124	95	86	95	91	32
Wednesday	07/18/01	1:00 PM	64	75	33	127	98	89	99	95	33
Saturday	07/21/01	4:00 PM	67	77	34	128	101	92	104	104	37

Table (D-3): Watermark sensors readings for the eastern row of Field D1 in centibars.

Eastern Row			Row head			Row mid point			Row tail end		
Day	Date	Time	1 - ft	2 - ft	3 - ft	1 - ft	2 - ft	3 - ft	1 - ft	2 - ft	3 - ft
Wednesday	06/20/01		0	0	0	0	0	0	0	0	0
Friday	06/22/01	10:00 AM	15	15	12	29	22	16	27	19	18
Friday	06/29/01	3:00 PM	34	21	15	52	27	18	63	31	22
Sunday	07/01/01	2:00 PM	38	24	17	52	27	19	68	35	22
Tuesday	07/03/01	5:30 PM	43	30	21	53	28	20	71	39	24
Tuesday	07/10/01	7:30 PM	62	60	34	61	32	23	81	48	32
Monday	07/16/01	3:00 PM	75	74	45	73	38	28	91	53	48
Wednesday	07/18/01	1:00 PM	80	78	48	77	42	30	96	55	51

Table (D-4): Watermark sensors readings for the southern row of Field A1 in centibars.

Southern Row			Row head			Row midpoint			Row tail end		
Day	Date	Time	1 - ft	2 - ft	3 - ft	1 - ft	2 - ft	3 - ft	1 - ft	2 - ft	3 - ft
Thursday											
Monday	06/25/01	10:00 AM	32	15	17	15	34	19	56	49	46
Wednesday	06/27/01	10:10 AM	38	16	17	21	36	20	60	50	49
Sunday	07/01/01	1:00 PM	20	3	1	42	43	27	57	53	57
Thursday	07/05/01	10:30 AM	24	10	13	58	43	29	57	55	62
Sunday	07/08/01	6:00 PM	55	13	16	75	50	45	70	57	65
Wednesday	07/11/01	8:00 AM	62	10	3	0	0	0	83	62	67
Friday	07/13/01	8:00 PM	68	12	12	32	9	13	90	65	71
Monday	07/16/01	9:00 AM	74	20	15	64	18	18	99	67	76
Wednesday	07/18/01	3:00 PM	78	33	17	72	26	24	107	71	77
Friday	07/20/01	7:30 PM	81	51	21	78	37	30	112	73	82
Monday	07/23/01	10:00 AM	84	60	23	82	50	34	117	75	83
Wednesday	07/25/01	9:00 AM	85	63	26	86	55	41	120	77	83
Tuesday	08/14/01	9:30 AM	90	71	36	98	74	66	125	92	91

Table (D-5): Watermark sensors readings for the northern row of Field A1 in centibars.

Northern Row			Row head			Row midpoint			Row tail end		
Day	**Date**	**Time**	**1 - ft**	**2 - ft**	**3 - ft**	**1 - ft**	**2 - ft**	**3 - ft**	**1 - ft**	**2 - ft**	**3 - ft**
Thursday	6/21/01										
Monday	6/25/01	10:00 AM	38	33	42	51	50	18	33	43	27
Wednesday	6/27/01	10:10 AM	41	42	44	66	53	16	33	44	25
Sunday	7/1/01	1:00 PM	18	48	50	60	60	21	50	60	31
Thursday	7/5/01	10:30 AM	19	23	35	55	60	16	12	61	37
Sunday	7/8/01	6:00 PM	25	29	38	56	61	17	31	52	38
Wednesday	7/11/01	8:00 AM	19	19	42	61	65	21	50	57	43
Friday	7/13/01	8:00 PM	22	15	21	68	67	24	66	56	45
Monday	7/16/01	9:00 AM	43	20	26	72	70	25	75	63	50
Wednesday	7/18/01	3:00 PM	56	26	33	76	71	26	80	66	53
Friday	7/20/01	7:30 PM	66	34	43	79	72	28	86	69	56
Monday	7/23/01	10:00 AM	69	44	46	81	72	29	92	71	61
Wednesday	7/25/01	9:00 AM	72	50	50	81	72	22	97	72	65
Tuesday	8/14/01	9:30 AM	89	70	65	94	74	33	127	94	79

Table (D-6): Watermark sensors readings for the southern row of Field B1 in centibars.

Southern Row			Row head			Midpoint (1)			Midpoint (2)		
Day	**Date**	**Time**	**1 - ft**	**2 - ft**	**3 - ft**	**1 - ft**	**2 - ft**	**3 - ft**	**1 - ft**	**2 - ft**	**3 - ft**
Tuesday							**(Alkaline Spot)**				
Monday	25-Jun-01		0	0	0				0	0	0
Wednesday	27-Jun-01	9:15 AM	0	0	0				0	0	0
Friday	29-Jun-01	12:00 PM	0	0	0				0	0	0
Sunday	1-Jul-01	8:10 AM	12	0	0				0	0	0
Tuesday	3-Jul-01	11:00 AM	22	10	6				12	6	0
Thursday	5-Jul-01	9:30 AM	34	14	12	21	12	0	19	12	0
Tuesday	10-Jul-01	6:30 PM	13	0	0	0	0	0	1	0	0
Friday	13-Jul-01	6:30 PM	26	14	14	12	0	0	20	15	7
Monday	16-Jul-01	10:30 AM	40	23	21	21	0	0	40	23	12
Friday	20-Jul-01	8:00 PM	51	39	32	10	0	0	28	36	16

Table (D-6) cont.: Watermark sensors readings for the southern row of Field B1 in centibars.

Southern Row			Midpoint (3)			Furrow tail end		
Day	**Date**	**Time**	**1 - ft**	**2 - ft**	**3 - ft**	**1 - ft**	**2 - ft**	**3 - ft**
Tuesday								
Monday	25-Jun-01		2	0	0			
Wednesday	27-Jun-01	9:15 AM	0	0	0			
Friday	29-Jun-01	12:00 PM	0	0	0			
Sunday	1-Jul-01	8:10 AM	12	0	0			
Tuesday	3-Jul-01	11:00 AM	21	10	10			
Thursday	5-Jul-01	9:30 AM	32	12	13	21	20	24
Tuesday	10-Jul-01	6:30 PM	19	0	0	13	24	35
Friday	13-Jul-01	6:30 PM	51	1	7	18	31	50
Monday	16-Jul-01	10:30 AM	69	11	13	23	36	56
Friday	20-Jul-01	8:00 PM	20	0	14	17	46	58

Table (D-6) cont.: Watermark sensors readings for an additional row of Field B1 in centibars.

Additional Row			Row midpoint		
Day	Date	Time	1 - ft	2 - ft	3 - ft
			(Alkaline Spot)		
Tuesday	3-Jul-01				
Thursday	5-Jul-01	9:30 AM	13	3	11
Tuesday	10-Jul-01	6:30 PM	0	0	0
Friday	13-Jul-01	6:30 PM	0	0	0
Monday	16-Jul-01	10:30 AM	0	0	0
Friday	20-Jul-01	8:00 PM	0	0	0

Table (D-7): Watermark sensors readings for the northern row of Field B1 in centibars.

Northern Row			Row head			Row midpoint (1)		
Day	**Date**	**Time**	**1 - ft**	**2 - ft**	**3 - ft**	**1 - ft**	**2 - ft**	**3 - ft**
Tuesday	19-Jun-01		0	0	0	0	0	0
Monday	25-Jun-01		34	16	11	32	14	13
Friday	29-Jun-01	12:00 PM	7	11	4	4	7	7
Sunday	1-Jul-01	8:10 AM	13	12	7	14	11	10
Tuesday	3-Jul-01	11:00 AM	20	14	10	21	13	11
Thursday	5-Jul-01	9:30 AM	38	15	12	32	14	12
Tuesday	10-Jul-01	6:30 PM	13	24	17	22	18	16
Friday	13-Jul-01	6:30 PM	19	25	18	24	19	17
Monday	16-Jul-01	10:30 AM	33	28	19	34	22	19
Friday	20-Jul-01	8:00 PM	56	31	24	55	30	24

Table (D-7) cont.: Watermark sensors readings for the northern row of Field B1 in centibars.

Northern Row			Row midpoint (2)			Row tail end		
Day	**Date**	**Time**	**1 - ft**	**2 - ft**	**3 - ft**	**1 - ft**	**2 - ft**	**3 - ft**
Tuesday	19-Jun-01		0	0	0			
Monday	25-Jun-01		23	0	0			
Friday	29-Jun-01	12:00 PM	0	1	6			
Sunday	1-Jul-01	8:10 AM	13	11	12			
Tuesday	3-Jul-01	11:00 AM	26	14	14			
Thursday	5-Jul-01	9:30 AM	45	15	15	29	20	17
Tuesday	10-Jul-01	6:30 PM	67	16	15	38	18	20
Friday	13-Jul-01	6:30 PM	67	18	17	48	25	34
Monday	16-Jul-01	10:30 AM	70	19	18	55	30	41
Friday	20-Jul-01	8:00 PM	73	22	20	64	40	51

Table (D8): Siphon inflow rate data and calculations for field A1

Siphon # (Small size)	Day	Reading Time (hh:mm)	Time (sec)	Daily Avg. Time (sec)	Siphon Avg. Time (sec)	Total Avg. (sec)
1	1	11:00 AM	16.3			
		12:00 AM	15.3			
		1:30 PM	15.0			
		6:00 PM	15.0	15.4		
	2	8:00 AM	15.8	15.8	15.6	
2	1	11:00 AM	17.7			
		12:00 AM	15.3			
		1:30 PM	14.7			
		6:00 PM	16.0	15.9		
	2	8:00 AM	16.2	16.2	16.1	
3	1	11:00 AM	25.7			
		12:00 AM	19.0			
		1:30 PM	19.7			
		6:00 PM	23.7	22.0		
	2	8:00 AM	23.0	23.0	22.5	
4	1	11:00 AM	30.0			
		12:00 AM	24.0			
		1:30 PM	24.0			
		6:00 PM	13.7	22.9	22.9	
5	2	11:00 AM	20.4			
		1:00 PM	20.1			
		4:00 PM	20.8			
		7:00 PM	21.3	20.7		
	3	5:00 PM	21.4	21.4		
	4	9:00 AM	24.9	24.9	22.3	
6	2	11:00 AM	28.8			
		1:00 PM	30.6			
		4:00 PM	33.9			
		7:00 PM	25.4	29.7		
	3	5:00 PM	22.8	22.8		

	4	9:00 AM	28.9	28.9	27.1	
7	2	11:00 AM	28.3			
		1:00 PM	27.2			
		4:00 PM	26.7			
		7:00 PM	27.4	27.4		
	3	5:00 PM	22.8	22.8		
	4	9:00 AM	41.5	41.5	30.6	
8	2	11:00 AM	26.7			
		1:00 PM	22.3			
		4:00 PM	28.2			
		7:00 PM	26.5	25.9		
	3	5:00 PM	21.7	21.7		
	4	9:00 AM	25.8	25.8	24.5	
9	2	11:00 AM	26.8			
		1:00 PM	23.3			
		4:00 PM	22.8			
		7:00 PM	19.7	23.2		
	3	5:00 PM	18.7	18.7		
	4	9:00 AM	21.3	21.3	21.1	**22.5**
(Large size)						
1	1	6:00 PM	9.2	9.2		
	2	8:00 AM	9.5	9.5	9.4	
2	1	6:00 PM	8.6	8.6		
	2	8:00 AM	9.2	9.2	8.9	
3	1	6:00 PM	7.8	7.8		
	2	8:00 AM	8.1	8.1	7.9	
4	1	6:00 PM	7.9	7.9		
	2	8:00 AM	8.5	8.5	8.2	
5	2	11:00 AM	16.4			
		1:00 PM	15.7			
		4:00 PM	16.0			
		7:00 PM	13.3	15.4		
	3	5:00 PM	10.6	10.6		

	4	9:00 AM	12.5	12.5	12.8	
6	2	11:00 AM	10.9			
		1:00 PM	10.5			
		4:00 PM	10.6			
		7:00 PM	10.5	10.6		
	3	5:00 PM	16.8	16.8		
	4	9:00 AM	7.5	7.5	11.7	
7	2	11:00 AM	10.6			
		1:00 PM	10.1			
		4:00 PM	10.2			
		7:00 PM	10.5	10.4		
	3	5:00 PM	9.6	9.6		
	4	9:00 AM	10.2	10.2	10.1	**9.8**

E. Survey and Outreach

Contact FN	Contact LN	Organization	Position	Number	AWMD Region	email
Louis	Bair	RD 108				
Dennis	Bowkers	Sac R. Watershed Prog.		530 661 3635		dennisbowker@volcano.net
Dave	Bradshaw	Imperial Irrigation District	Supervisor	76 339 9134?		debradshaw@iid.com
Sheldon	Childs	self	irrigation scheduler	559 905 6130		argonian@pacbell.net
Martha	Davis	Inland Empire Utilities Agency		909-357-0241		mdavis@ieua.org
Anisa	Divine	Imperial I.D.	Ag Water Management Council	(760) 339-9036	Southern California	ajdivine@iid.com
Nettie	Drake	Panoche-Silver Creek Watershed	CRMP Coordinator	559-332-2837		nrdrake@psnw.com
Allen	Fulton	UC Extension - Colusa?		530 527-3101		aefulton@ucdavis.edu
David	Guy	NACWA				
Brian	Hockett	PSWRCD	District Manager			brian.hockett@ca.usda.gov
Lawrence	Kimura	Friant-Kern Water Users Authority	Engineer/Water Conservation	559-562-6305		lkimura@fwua.org
Trevor	Lee	Mission RCD	Irrigation Water Mgmt. Team member	760 728 1332		missnrcd@tfb.com
Joe	Lima	Modesto Irrigation District	Ag Water Management Council	(209) 526-7562	East San Joaquin Valley	joel@mid.org
Tom	Lockhart	Santa Maria RCD	Director	805 928 6269 x5		left message
Red	Martin	Westside RCD	Director	559-227-2489		fax: 559 227 0215
Bill	Menke	Glenn-Colusa Irrigation District	Ag Water Management Council	(530) 934-8881	Sac Valley	wmenke@gcid.net
Mark	Mulkay	Kern-Delta W.D	Ag Water Management Council	(661) 834-4656	South S.J. Valley	mulkay@bak.rr.com
Greg	Norris	NRCS Paso Robles	Engineer	805 434 0396		greg.norris@ca.usda.gov
Tim	O'Halloran	Kings River Water Users	Water Master	559 266 0767		ohallorant@aol.com
Roger	Reynolds	Hanford	Ag Water Management Council	(559) 582-9237	Co-Chairman	rreynolds@summerseng.com
Jerry	Robb	Westlands Water District	Ag Water Management Council	559-241-6237		jrobb@westlandswater.org
Sue	Sutton	Family Water Alliance		530 438 2026		fwa@mako.com
John	Tiedeman	NRCS Santa Barbara	Engineer	805 928 9269 x3		john.tiedeman@ca.usda.gov
Mary-Ann	Warmerdam	YCFCWCD	General Manager			mwarmerdam@earthlink.net
Doug	Welch	Chowchilla Water District	General Manager	559 665 3740		cwd@thegrid.com
Laosheng	Wu	UC Extension UC Riverside		909 787 4664		left message
Dave	Zoldolske	Fresno State	Director	559 278 2066		david_zoldoske@csufresno.edu

YOLO COUNTY RESOURCE CONSERVATION DISTRICT

SEDIMENT TRAP AND TAILWATER POND FIELD MEETING

Joe Muller & Sons Ranch
9:00 AM, MONDAY, AUGUST 13, 2001

DISCUSSION TOPICS

- Yolo RCD's Water Use Efficiency Pilot Program (funded by CALFED)
- Sediment Traps
- Tailwater Ponds
- Cover Crop Demonstration
- Questions/Comments

PARTICIPANTS

Paul Robins – RCD Executive Director, Project Manager
robins@yolorcd.ca.gov

William Spong – RCD Water Quality Specialist
spong@yolorcd.ca.gov

Samer Talozi – RCD Agricultural Engineering Intern (UC Davis)
satalozi@ucdavis.edu

Tom Muller – RCD President, Farmer

Yolo County RCD
221 West Court Street, #1
Woodland, CA 95695
(530) 662-2037 ext 3
www.yolorcd.ca.gov

This field meeting was made possible by funding from the CALFED Water Use Efficiency Program and technical and institutional support from the USDA Natural Resources Conservation Service

AGENDA
TAILWATER RETURN SYSTEMS, PONDS AND SEDIMENT TRAPS
Rominger Brother's Farming
Cty Rd. 29 x Cty. Rd. 88
November 29, 2001
9:00a.m. – 11:00a.m.

(5-10 min)**Welcome and Introduction** Jeanette.

Charlie R.,	William S.,
Samer T.,	Judy/Jeanne,
Jack Alderson,	John W.,
Ha T.,	Jenny,
Paul,	Kate Laddish,
Kate Russell,	Vance, . . .

WUE, LUSSWIP, USSWIP, WSWRIP
3 years of work on USS Watershed (describe)
Projects: 2 Hedgerows, 5+5+5 sediment traps, Cover Crops, etc.
Studies on Project effects: water quality & Cover Crops, Sediment capture
Non-native Invasives/Weeds
Education/Outreach (like this workshop)

(10+ min)**Landowner perspective** Charlie Rominger
Why install a pond?
Benefits of a pond
Detriments of a pond
Overall farm perspective related to habitat, etc.

(10+min)**USWP, WSWSRIP**/Audubon Judy/Jeanne
Original USSWIP and this pond site
New Willow Slough W/Shed Rangeland Program

(15min)**Planting with Native Plants** Jeanne(or Jeanette)
Weed Control
Planting zones
Plant selection
Planting
Maintenance
(see handouts for costs, sources, procedures, designs, plant lists)

(15min)**WUE Program results** (as related to this site) William/Paul/Samer
Water Quality in regard to sediment, nutrients.
Sediment traps

(15min)**Pond Engineering** Jack Alderson
Soil considerations
Site selection
Design
Excavation

(15min)**NRCS Cost-Share** John Weatherford
EQIP: signups and requirements

Optional visit to mature pond at Hedgerow Farms