Middle Snake River Productivity
and
Nutrient Assessment

1993

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by

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ABSTRACT

In 1993, the University of Idaho conducted a second year of research on the water quality-limited section of the Middle Snake River from Twin Falls downstream to Upper Salmon Falls Dam (RM 614.8 - 581.0). This study focused on the highly productive shallow reach rich in aquatic macrophyte development throughout the Crystal Springs Reach (RM 599.5 - 601.3). In 1992 research, the Crystal Springs Reach was determined to be the most productive reach in the water quality-limited section. In the 1993 study, we emphasized relationships in these plant beds and between the plants, water quality variables, and sediments.

The dense aquatic macrophyte community was dominated by *Potamogeton pectinatus*, *P. crispus*, and *Ceratophyllum demersum*. Associated with the rooted macrophytes were luxuriant growths of the attached filamentous green algae *Hydrodictyon* and *Cladophora* that formed dense mats on the water surface. Dry biomass levels for this plant community exceeded densities of 3,000 g/m^2 with mean levels of 1,000 g/m^2 common. Macrophyte biomass was greatest in areas of low water velocity, (<0.3 fps), water depths <1.5 m, sediment total nitrogen levels of 0.3 - 0.4%, sediment total phosphorus levels of 900 - 1,200 µg/g, and sediment organic matter of 3 - 4%. These conditions dominated CSR, especially below aquaculture effluent discharges. Sediment nutrient levels for total Kjeldahl nitrogen (TKN) were up to ten times greater than those determined in other macrophyte-rich river systems (Pend Oreille River, Washington and Bow River, Alberta). Sediment total phosphorus (TP) concentrations were also high, with transect means of 1,200 - 1,800 µg/g below aquaculture discharges. Minimum and maximum thresholds of sediment N and P were related to aquatic macrophyte biomass densities. TP declined at a rate of 0.35 mg/l/mile with flow from transect 5 to 7 (heavy AMB) in August. SRP declined at a rate of 0.10 mg/l/mile with flow from transect 5 to 7 in July, and declined at a rate of 0.07 mg/l/mile from transect 5 to 7 in August. This reach of the Middle Snake River was classified as eutrophic based on chlorophyll *a* concentrations, dissolved nitrogen and phosphorus concentrations, dense aquatic macrophyte growths, and sediment nutrient levels.

INTRODUCTION

Study Purpose

The Middle Snake River from Milner Dam downstream to King Hill (Figure 1) has been listed as water quality-limited since 1990 under the Idaho Clean Water Act by the Idaho Department of Welfare's Division of Environmental Quality (IDEQ). This reach is the receiving waters for numerous point and non-point sources throughout its course. Dey and Minshall (1992) reviewed and summarized past studies on the Middle Snake River. They documented historic conditions in the river while recent effluent loading and river water quality studies by Brockway and Robison (1992) documented present loading rates of point and non-point pollutants to this reach of the Snake River. The net effect of these uses has been a visible decline in water quality and an apparent increased productivity (increased floating and attached algae and rooted aquatic plants) in the river. The drought conditions that have continued for the last eight years through 1993 have exacerbated this excessive river production.

Increasing public awareness and sensitivity to water quality problems and the increasing demands by different user groups on regional water resources have brought this river reach and its problems to the forefront. The need for sound management decisions has highlighted the necessity for additional information regarding sediment and nutrient loading and its effects on this reach of the Middle Snake River, specifically on the most degraded section from River Mile (RM) 615 downstream to RM 581 (Twin Falls downstream to Upper Salmon Falls Dam). Consequently, IDEQ and the US Environmental Protection Agency (USEPA), Region 10, began a study in 1992 as an effort to determine the relationship between the nutrients and sediments entering this 34-mile reach of the Snake River and the river's current level of plant productivity. This research will contribute to the development of a nutrient management plan to better control productivity and improve water quality in the reach. The 1992 work was reported in Falter and Carlson (1994) while this report describes work carried out in 1993.

Background Information

Historically the Middle Snake River has been receiving wastewaters from agricultural run-off, aquaculture effluents, wastewater treatment plant returns, and numerous other point and non-point sources. The operations of numerous hydro-projects on the river and subsequent demands for out-of-channel water uses have greatly altered the hydrological regime of the river. These factors have all acted in concert to exacerbate the present conditions of noticeably poor water quality and reduced habitat for several indigenous cold-water biota (Dey and Minshall 1992).

Recently there has been a growing emphasis on improving water quality in the Middle Snake River. This includes problem assessment and development of voluntary nutrient management plans from individual industries targeting the Middle Snake River. Current research efforts on the Middle Snake River have focused on documenting present water quality conditions and identifying in-stream impacts of pollution loading to the river. Brockway and Robison (1992) updated nutrient and sediment loading to the Middle Snake River from known major sources. MacMillan (1992) reviewed water quality status and provided an early emphasis on aquatic macrophyte development in the river. Projects funded by public and private sources have greatly increased the information available regarding the Middle Snake River but the basic questions of river response to these loadings remain unanswered, especially the issues of sediment distribution, sediment nutrient content, plant bed processing of water column and sediment nutrients, and nutrient content of the aquatic macrophytes.

Falter and Carlson (1994) determined the reach of the Middle Snake River from RM 581 to 615 to be eutrophic. This classification was based on the high concentrations of dissolved nitrogen and phosphorus, high chlorophyll *a* concentrations, high sediment total phosphorus and total Kjeldahl nitrogen (TKN) concentrations and the high aquatic macrophyte and associated filamentous algae densities. Aquatic macrophyte biomass in several areas of the river commonly exceeded 1,000 g/m^2, well above densities considered nuisance levels by both the Idaho Department of Environmental Quality and the Washington Department of Ecology standards (Coots and Williams 1991).

Much of the current debate regarding water quality in the Middle Snake River centers around the relationship between primary productivity and nutrient concentrations in the sediments and the water column. Recent literature focusing on nutrient sources for rooted aquatic vegetation concurs that the sediments are the primary source of phosphorus, nitrogen, and other nutrients for *Potamogeton*, *Elodea*, and *Myriophyllum* (Carignan and Kalff 1980a; Graneli and Solander 1988; Barko et al. 1991; Chambers et al. 1991; Rattray et al. 1991). Conversely, current literature agrees that *Ceratophyllum*, and the filamentous algal epiphytes with their lack of roots, typically derive the majority of their nutrients from the water column (Carignan and Kalff 1980b; Howard-Williams and Allanson 1981; Millner et al. 1982; Kennedy and Gunkel 1987; Madsen and Adams 1988). These epiphytic plants are commonly found in association with the rooted macrophytes of the Middle Snake River. The opportunistic nature of aquatic macrophytes makes the plant : nutrient interaction even more complex since *Potamogeton* and *Myriophyllum* have also been shown to sometimes utilize nutrients from the water column (Nichols and Keeney 1976; Best and Mantai 1978; Howard-Williams 1981). Initial research by Falter and Carlson (1994) has indicated that sediment TKN and phosphorus concentrations may be limiting to aquatic macrophyte biomass in the Middle Snake River. It has also been shown that soluble reactive phosphorus (SRP) was negatively correlated to macrophyte biomass (Falter and Carlson 1994), probably as a result of SRP uptake by dense aquatic macrophyte beds (AMB).

The fine sediments on the river bottom appear to be the crux of the macrophyte production in the Middle Snake River. Not only do they provide a very rich nutrient supply for macrophytes, but they also provide a suitable physical substrate for macrophytes. Anderson and Kalff (1988) identified fine organic sediments as a requirement for optimal macrophyte productivity. This is in agreement with literature reviewed by Nichols and Shaw (1986) and Barko et al. (1991). Falter and Carlson (1994) determined that much of the sediments in the Middle Snake River were high in nutrients, particularly TKN, indicative of highly enriched sediments and moderately high in organics.

Exceptionally low flows through the 1986-1993 period have undoubtedly exacerbated the recent high levels of productivity in the Middle Snake River. These continuing drought conditions have further increased the potential for high productivity by increasing sedimentation and allowing for reduced scouring of accrued sediments. Though it has been shown that aquatic macrophyte biomass may be reduced by high water velocity (Chambers et al. 1991a), it is unlikely that at present loading rates of sediments and nutrients to the river, anything less than very high flows (certainly greater than the low mean summer flows of 1986-92) will greatly remove these accumulated sediment deposits and reduce aquatic macrophyte production in the established plant beds.

Study Area

The Crystal Springs Reach (CSR) is a short section of the Middle Snake River from River Mile (RM) 599.5 to 601.3 identified by Falter and Carlson (1994) as the most productive section of the river in their 1992 research. For that reason it was selected as the focal point for the continuation of that research in 1993. The CSR was typified by turbid, high nutrient water, high aquatic macrophyte biomass (both rooted and epiphytic), extremely high planktonic algae blooms, and thick deposits of fine sediments. The river channel in that reach lies in a deeply incised canyon about 80 m below the Snake River Plain. The geology of the area is Banbury basalt of the Snake River group (Covington and Weaver 1990). Inputs to the Middle Snake River affecting this reach include the City of Twin Falls Wastewater Treatment facility (RM 609.9), upstream agricultural returns, and numerous aquaculture facilities.

The aquatic macrophyte community in the CSR is dominated by *Potamogeton pectinatus*, *P. crispus*, and *Ceratophyllum demersum* (Falter and Carlson 1994). Large mats of the filamentous algae *Hydrodictyon* and *Cladophora* also grow in association with the flowering, mostly rooted, aquatic macrophyte growths. These dense plantbeds in the CSR and their relationships to the sediments, water quality, and sedimentation rates in the CSR were the principal focus of the 1993 study.

1993 Objectives:

1. Determine sedimentation rates to the sediments in the Crystal Springs Reach (CSR) (RM 599.5 to 601.3);
2. Determine a nutrient, water, and sediment income to, and outflow from the CSR (599.5 to 601.3);
3. Determine nutrient levels of major ecosystem compartments within the CSR (RM 599.5 to 601.3);
4. Develop distribution of aquatic macrophytes and sediments within the CSR (RM 599.5 to 601.3); and,
5. Determine the bottom morphometry of the CSR.

METHODS

Seven transects were established in the CSR starting at the upstream end and progressing downstream (Figure 1). Most water chemistry, sediment, and aquatic macrophyte samples were taken at points on those transects for accurate site placement, permitting between-year comparisons at specific sites and for correlation analyses between ecosystem variables. Transect 1 was established at RM 601.0 in the deep slow-moving portion of the reach to document conditions in the reach above the direct influence of aquaculture effluents. Transect 2 was established at RM 600.6 directly below several aquaculture facilities and above the large AMB areas in the lower half of the reach. Transects 3 and 4 were established on the right and left sides of the island at RM 600.3, corresponding with the Crystal Springs right channel and left channel sites determined by Falter and Carlson (1994). Transects 5, 6, and 7 were located in the lower portion of the reach at RM 600.2, 600.1, and 600.0. Transects 5 and 7 correspond to the Crystal Springs upper and lower AMB sites used by Falter and Carlson (1994).

	River Mile of Full Sampling Sites	River Mile of Sediment Traps & Transects
Transect 1	601.0	–
	–	600.9
Transect 2	600.6	–
		600.5
Transect 3	600.3	
Transect 4	600.3	
Transect 5	600.2	600.2
Transect 6	600.1	–
Transect 7	600.0	600.0

QA/QC

Water chemistry samples were collected according to IDEQ protocol (Bauer 1986; Bauer et al. 1986). This included the collection of duplicates, blanks, and spike samples at a rate of 1 in 20 samples. Duplicates and blanks were collected throughout the study. Spikes were collected after the first sampling trip and throughout the study year with spiking materials provided by IDEQ's Boise Analytical Lab.

Duplicate samples were collected from the composite water sample in conjunction with the primary sampling effort. Blank samples were taken by filling 1-liter cubitainers in the field with distilled water provided by IDEQ. Spike samples were taken by filling 1-liter cubitainers with 900 ml of water from the composite water sample, adding the spiking material, and sealing the cubitainer.

Duplicate samples were compared to determine percent relative difference and to measure precision. Blanks were analyzed to determine the percentage of blanks containing levels of the selected variables above detection limits to quantify any contamination occurring in the field during sampling. Spikes were analyzed for percent recovery to determine accuracy.

Statistical comparisons were done on duplicate samples to determine any significant variation due to site. Relative ranges were analyzed by ANOVA ($a = 0.05$).

Physical Variables

Maximum depth was measured in meters by sounding with a weighted line. Velocity (ft/sec) was then measured with a Marsh-McBirney current meter at the surface and mid-depth in the water column (maximum 1.5 m depth in waters deeper than 3.0 m).

Temperature and dissolved oxygen profiles were measured with a YSI Model 57 Meter at 1.0 m intervals from the surface to the bottom. The meter was air calibrated daily according to YSI methods for the meter.

Secchi depth was determined with a Secchi disk 20-cm diameter. The recorded depth was the mean of the depths at which the disk disappeared upon lowering and reappeared on raising the disk.

Additional transects for water velocity measurement were established above the reach at RM 601.4 and at the bottom of the reach at RM 599.5. Water velocity data were collected at 5.0 m intervals across the transect with a Marsh-McBirney current meter at the surface and mid-depth in the water column. Velocity was measured at mid-depth in waters shallower than 3.0 m.

Water Chemistry Variables

Samples for water chemistry analyses were collected at mid-depth with a 2-liter Kemmerer bottle. Four grab samples were collected at each point and composited in an acid-washed container for subsampling. Composite water samples were thoroughly mixed and a subsample collected for total alkalinity as $CaCO_3$, total hardness as $CaCO_3$, turbidity, suspended solids, and pH, then placed in a 1-liter cubitainer marked with the study identification number, site number, and date. An Orion Research Model SA 210 pH meter with manual temperature compensation was used to measure water and sediment pH. Water pH was measured in the composite water sample after the water chemistry sub-samples had been collected. Sediment pH was measured from each dredge sample before packaging. The pH meter was calibrated daily with a pH 7.0 buffer solution prior to sampling. Conductivity was measured with a YSI Model 33 S-C-T meter.

A second 1-liter subsample was taken for total ammonia nitrogen, total nitrite + nitrate nitrogen, total Kjeldahl nitrogen, and total phosphorus. Two ml of concentrated H_2SO_4 were added to the 1-liter cubitainer to fix the sample. Cubitainers were labeled with the study identification number, site number, and date for identification. A 50-ml sample was filtered through a 0.45 µm nylon filter into a 100-ml vial for soluble reactive phosphorus (SRP). SRP samples were filtered in the field as they were collected.

All water chemistry samples were stored in iced coolers while in the field. Upon return to the field laboratory at the Magic Valley Fish Hatchery, water chemistry samples were packaged on ice in coolers and shipped to the IDEQ Laboratory in Boise, Idaho. SRP samples that could not be shipped the date of collection were frozen at the field laboratory. The following protocols were followed in the analyses (Personal Communication, Jim Dodds, IDH&W Bureau of Laboratories, September 25, 1995):

Parameter	**Method**	**EPA Protocol**
Total Alkalinity	Titrimetric to pH 4.5	Method 310.1
Total Hardness	Titrimetric, EDTA	Method 130.2
Turbidity	Nephelometric	Method 180.1
Non-Filterable Residue	Gravimetric, dried @ 103-105 °C	Method 160.2
Nitrite + Nitrate N	Colorimetric, automated, cadmium reduction	Method 353.2*
Ammonia N	Colorimetric, automated phenate	Method 350.1*
Total Kjeldahl N	Colorimetric, semi-automated, block digester, method does not measure $NO_2 + NO_3$ nitrogen	Method 351.2**
Ortho-Phosphorus	Colorimetric, semi-automated, ascorbic acid	Method 365.1*
Total Phosphorus	Colorimetric, semi-automated, block digester	Method 365.4**

* Lachat Instrument, System IV EPA-approved flow-injection analysis version of this method

** Perstorp Analytical, Flow Solution, EPA-approved flow-injection analysis version for this method

Phytoplankton

Chlorophyll *a*

A third subsample was collected from the composite water sample and placed in a 1-liter Nalgene bottle for chlorophyll *a* analysis. These samples were placed on ice in coolers immediately after collection for transport to the field laboratory. Chlorophyll *a* samples were filtered at the field laboratory onto GFC glass fiber filters with a millipore filter and vacuum pump. Filters were frozen at the field lab for transport and processing at the University of Idaho. Frozen filters were extracted, ground in iced acetone with Pyrex hand tissue grinders, and the supernatant analyzed with a Beckman DU-8 Spectrophotometer. Chlorophyll *a* levels were determined by monochromatic and trichromatic methods (APHA 1992) and expressed as mg/m^3. Pheophytin *a* levels were also determined on the same samples.

Composition and Counts

Samples were preserved with 1 ml Lugol's solution per 100 ml of sample water (Lugol's solution = 10 ml glacial acetic acid to 100 ml distilled water, with 5 g iodine crystals and 10 g potassium iodide added). Samples were stored in the dark and kept cool. Phytoplankton cells were counted on a Wild-Leitz Wilovert I inverted microscope using the Utermohl settling chamber technique (Utermohl 1958). Approximately 5-50 ml (depending on cell density) of river water preserved in 1% Acid-Lugol's solution (APHA 1992) were poured into sedimentation chamber mounted on microscope slides to permit settling of phytoplankton cells. After settling, the slide was scanned at 100x and 320x to insure random distribution of organisms. Cells were identified to species and enumerated at 320x. Approximately 400-800 cells were counted, until the standard error as percent of the mean for dominant species was less than or equal to 10%. The entire slide was scanned at 100x for counting larger forms such as *Ceratium* and large colonies.

Cell Volume

Cell volume (cubic micrometers/cell) was determined by measuring cell dimensions of ten individuals per species of a particular size class in each sample, then averaging the values. Measurements for less common species were obtained by measuring as many individuals as possible. Volumetric equations for shapes that most closely resemble the shape of individual species were then employed to determine cell volume (Willen 1976). Cell volume was multiplied by cell density (numbers/l) to obtain biovolume estimates (cubic micrometers/l)

As a quality control measure, samples were randomly chosen to be processed twice in order to check for repeatability and consistency in settling technique and enumeration. Although calculations were performed on a computerized program rigorously scrutinized for error, final estimates for density and biovolume were randomly checked in each batch of samples analyzed to ensure accuracy.

Sediments

Sediments Distribution and Cross-Sectional Profiles

Sediments were sampled at each water and plants measurement point with a 225-cm^2 Ponar dredge. After pH was measured from each dredge, the sediment sample was put in ziplock bags and placed in iced coolers while in the field. Sediment samples were immediately frozen upon return to the field laboratory and kept frozen until processing. Sediment samples were processed by the University of Idaho Analytical Laboratory.

In situ sediment typing was done throughout the CSR. Sediment depth was measured to determine the volume of each sediment type held in the reach. Both these measurements were collected with a probe built from a 2.0 m section of steel rod (~ 1.0 cm diameter) mounted on two 2.0 m sections of 1.0 inch PVC pipe.

A rope marked in 5m increments was secured across the river, perpendicular to flow. Starting from the left bank (looking downstream) sediment depths were measured every 5m. The sediment probe was used to measure from the surface of the water to: 1) the top of the fine-grained silty, organic-rich layer; 2) the top of the sand/silt layer; and, 3) to rock (cobble or bedrock) bottom. From these measurements, water column depth, fine layer depth, sand/silt depth, and total sediment depths were calculated.

Particle Size

Soil texture was determined on the fine fraction using the Buoyoucos hydrometer method (Buoyoucos 1962, Omeuti 1980). Soil samples were dried at 35 - 40 °C and ground to pass through a 2 mm sieve. A soil sample weighing 100 g for sandy soils (50 g for all others), was placed in a 150 ml nalgene cup. Distilled water was added along with 5 milliliters of 5% sodium hexametaphosphate to the solution. The soil was mixed (five minutes for sandy soils, ten minutes for all others), then allowed to set for 15 minutes and stirred. The sample was transferred to a hydrometer cylinder and volume adjusted to 1,205 ml for sandy soils (1,130 ml for all others). The solution was stirred and timing started. Readings were taken with the hydrometer at 40 seconds and 2 hours. The 40-second reading allows calculation of percent sand. The two hour reading allows calculation of percent clay. Percent silt is the remainder of 100.

% Carbon - Hydrogen - Nitrogen

Percent carbon, hydrogen, and nitrogen was analyzed by combustion (University of Idaho Analytical Sciences Laboratory 1993). A tin capsule was packed with 0.2 g of soil material (dried at 35 - 40 °C and ground to pass through a 2 mm sieve), then crimped closed. The capsule was placed in a LECO Combustion Analyzer CHN-600 and combusted at 950 - 1,100 °C The method of detection for carbon and hydrogen was infrared adsorption and thermal conductivity for nitrogen. Sensitivity was 0.01% for all three elements. The analytical range for carbon and hydrogen was 0.01% to 100% and for nitrogen from 0.01% to 50%. Accuracy was ± 0.3% for carbon, ± 1.5% for hydrogen, and ± 3% for nitrogen.

Total Organic Carbon (TOC) and Total Organic Matter (TOM)

Total organic carbon and total organic matter were determined using the titrimetric method (Allison 1965). The dichromate ion in conjunction with heat and H_2SO_4 is sufficient to oxidize approximately 89% of the oxidizable matter in a given soil sample. The excess Cr_2O_7(II) was determined by titration with $FeSO_4$ and the oxidized substances quantified by the amount of Cr_2O_7 (II) reduced. A soil sample (dried at 35-40 °C and ground to pass through a 2 mm sieve) weighing between 0.1 and 10 g was placed in a 500 ml Erlenmeyer flask. Ten milliliters of 1N $K_2Cr_2O_7$ was added and swirled in. Twenty milliliters of concentrated H_2SO_4 was added rapidly and the flask was heated to 150 °C under a hood. Water was added (200 ml) after the flask was allowed to cool for 30 minutes. Ferroin indicator was added (3 - 4 drops) and the sample titrated from dark green to red using $FeSO_4$. If over 75% of the dichromate was reduced, the procedure was repeated with less soil.

Total Recoverable Phosphorus

Total recoverable phosphorus was analyzed by ICP atomic emission (UI Analytical Sciences Laboratory 1993 and EPA Protocol 3050). The sample was digested in HNO_3 at 175 °C. Samples were dried at 30 - 40 °C for 12 - 36 hours (until dry). Sample size for analysis was 0.25 g. The samples were placed in 10 ml digestion tubes. Three milliliters of concentrated trace metal grade HNO_3 was added to each tube. Samples were allowed to react under a hood overnight. Tubes were centrifuged if necessary to produce a clear solution and run on a Leeman 2000 ICP. Phosphorus emission was read at 214.91 nm.

Sediment Traps

Sedimentation rates in the reach were determined by sedimentation traps located at four points within the reach. Traps were located at RM 600.9, 600.5, 600.2 and 600.0 in waters greater than

1.5 m depth. One trap was placed at the top of the reach (RM 600.9) to measure deposition rates above the aquatic macrophyte bed (AMB) and above hatchery and irrigated agricultural inputs. The second trap was placed at RM 600.5, above the AMB's but below hatchery and irrigated agricultural returns. Two traps were placed at RM 600.2, in the middle of the AMB. Two traps were also placed at RM 600.0, the bottom of the AMB.

Each sediment trap consisted of an array of six cylinders suspended within a steel rack. A cylindrical shape was chosen for its ability to collect sediment nearest to actual sedimentation rates in still and low velocity waters (Gardner 1980; Håkanson et al 1989). The sediment traps were placed directly on the sediments and held in place by their weight. The sample collection cylinders were 14" sections of 3" PVC pipe with a 0.25" PVC plate bottom. The aspect of the cylinders (height : mouth diameter) was 4.58 as recommended by the literature (Hargrave and Burns 1979; Gardner 1980; Lau 1979; Håkanson et al 1989) with a width > 45 mm to insure trapping dense inorganic particles that can be diverted from the narrower traps by turbulence created by the lip of the trap (Blomqvist and Kofoed 1981). Each sediment trap held five upright cylinders and one inverted control cylinder. The inverted cylinder was a control to correct for upward flux off the bottom and for attached growth (Fuhs 1973; Hargrave and Burns 1979).

Suspended Sediments Composition

The sediment traps were retrieved bi-monthly and individual samples were settled, decanted into 1.0 liter cubitainers, and frozen at the field lab. Preservatives (such as $HgCl_2$, NaCl, etc.) were not used in the traps due too relatively short exposure times and possible confounding of results by accumulating salts in the samples (Hakanson et al 1989). Samples were dried at 65°C, weighted on a model H10W Mettler balance to obtain dry weight, ground, and passed through a 2 mm sieve to separate fine fractions. Samples were later dried at 65 °C at the University of Idaho. Sediment analyses for available phosphorus (AP), available potassium (AK), total organic carbon (TOC), percent carbon, percent hydrogen, and percent nitrogen were conducted by the University of Idaho Analytical Laboratory according to the methods described above under "Sediments."

In addition to the above parameters, sediment trap samples were analyzed for plant-available phosphorus and potassium using the sodium bicarbonate method for soils (Olsen et al. 1954, Olsen and Watanche 1965). This method is used with calcareous, alkaline, or neutral soils containing calcium phosphates. Sodium bicarbonate 0.5M (pH = 8.5) was used to extract available phosphorus and potassium. Potassium on exchange sites was replaced by the sodium ion until equilibrium was achieved. Phosphorus was determined using a single reagent containing sulfuric acid, ammonium molybdate, ascorbic acid, and antimony potassium tartrate. An ammonium molybdiphosphate complex was formed and reduced by ascorbic acid and colorstabilized by antimony. The blue color developed was stable for 24 hr. and read at 660 nm. Potassium was read directly by AA or ICP-AES. A soil sample (dried at 30 - 40 °C and ground to pass through a 2 mm sieve) weighing 5.00 ± 0.05 g was placed in a 500 ml Wheaton bottle. Darco decolorizing carbon and 100 ml of 0.5 M $NaHCO_3$ were added to the bottle. The sample was shaken for 30 minutes and gravity filtered through S & S #605, 18-cm filters. The extract was analyzed for plant-available phosphorus and potassium.

Suspended Sediments Deposition Rates

Rates of accrual ($g/m^2/day$) for total sediment, organic carbon, organic matter, Total P, Plant-available P, Plant-available K, and C, H, and N were calculated for each multi-day (usually 14 days) collection period. We multiplied mean concentration of each parameter by mean weight of total sedimented material to obtain accrual rates ($g/m^2/day$) for each parameter.

Aquatic Macrophytes

Composition and Biomass

Aquatic macrophytes were collected with a 225-cm^2 Ponar dredge and washed in the field over a #32 mesh screen. Samples were then placed in zip-lock bags and placed on ice while in the field. They were then immediately frozen at the field lab for transport back to the University of Idaho. Samples were processed by thawing individual samples and immediately sorting to species. We separated epiphytic algae from the rooted macrophytes.

Plant material was placed in metal tins and wet weights taken on a Mettler H10-W electronic balance to milligrams. Individual tins were then placed in a drying oven and dried at 105 °C for 24 hr. Samples were cooled in desiccators to room temperature before dry weights were measured on the Mettler balance. Samples were then ashed in a muffle oven at 530 °C for 6 hr, placed in a desiccator, cooled to room temperature, re-hydrated, dried at 105 °C for 24 hr, and then weighed to determine ash-free oven dry weight.

Biomass was expressed as oven dry weight per square meter of river bottom. Percent composition by species was also expressed from those biomass data. Percent organics of plant material (ash-free dry weight) was expressed as the dry weight less ash weight divided by dry weight.

Plant Tissue Nutrients

Whole plants were collected monthly, then frozen for transport back to the University of Idaho. Plant tissue samples were processed by the University of Idaho Analytical Sciences Laboratory. Whole plant tissue samples were dried at 30 - 40 °C for 12 - 36 hrs., ground to pass through a

2mm sieve, and analyzed for percent carbon, hydrogen, nitrogen, and total phosphorus. Percent carbon, percent hydrogen, and percent nitrogen were analyzed by combustion techniques described under "Sediments." Absorption was used for the detection of carbon and hydrogen, and thermal conductivity was used for the detection of nitrogen. The sensitivity is 0.01% for all three elements. Total phosphorus was analyzed by ICP (inductively coupled plasma) atomic emission, where the sample was digested in HNO_3 at 175 °C.

Statistical Analyses

Between Transects

Statistical Analyses were done with the PC software package JMP 2.0.5 produced by the SAS Institute, Inc. An *a priori* significance level of a = 0.05 was selected for all statistical tests. In addition, variable significance levels were used *post hoc* throughout the results and discussion of this report to demonstrate the actual degree of certainty that our data provide concerning the hypotheses being tested.

All data was tested for a normal distribution using a Shapiro-Wilk W Test (a = 0.05). Data that did not fit a normal distribution was either transformed to fit a normal distribution or analyzed by non-parametric tests. ANOVA was used to determine significant effects for all normal data sets. Means were compared by Tukey-Kramer, LSD, and a t-test, p = 0.20. Means for data that did not show a normal distribution were compared by the non-parametric Wilcoxon/Kruskal-Wallace Test.

Plant Sites vs. No-Plant Sites

We compared physical and chemical variables between sites containing aquatic macrophytes and sites with little or no macrophyte growth. Plant locations were defined as sites containing > 100 g/m^2 total dry biomass. Sites containing < 100 g/m^2 of macrophyte dry biomass were considered 'no plant sites'. We tested the hypothesis that mean observations of physical and chemical variables were equal between the two treatments (Plant vs. No plant). A multivariate t-test, Hotellings T, was used to test overall treatment effects for all variables measured (PROC GLM, SAS 1987). Individual ANOVAs (t-tests) were also computed by the PROC GLM procedure, comparing each variable between the two treatment effects. For individual variables, ANOVAs reduce to simple t-tests since there were only two treatments.

Clustering Analyses for Similarity Between Variables

Canonical coefficients were generated from the MANOVA model and plotted to illustrate similarities and differences among transects for all variables measured. Canonical coefficients reduce dimensionality of the data and represent transect similarities in multivariate space. Canonical analysis is particularly useful at identifying any clustering tendency of data, such as determining whether parameters from one transect tends to show consistent, significant differences from those same parameters in another transect. It does not indicate causality, simply differences.

RESULTS

QA/QC

The results of QA/QC analyses are summarized in Table 2 for all water chemistry variables and chlorophyll *a*. Duplicate, blank, and spike samples were analyzed according to procedures outlined in Bauer (1986) and Bauer et al. (1986).

Percent relative range data presented in Table 2 indicated high *precision* in the measurement of nitrite + nitrate nitrogen, total alkalinity, total hardness, and total suspended solids. The high precision for suspended solids and small 95% confidence interval (± 2.6%) indicated samples were thoroughly mixed before splitting. Best precision was seen in the samples for total alkalinity (0.65%), hardness (0.38%), nitrite + nitrate nitrogen (0.67%), and suspended solids (2.61%). Precision for total phosphorus (5.21%), SRP (5.80%), and turbidity (6.15%) was good for those variables. Lowest precision was seen with ammonia (16.76%) and TKN (9.88%). Standard errors were also highest for ammonia nitrogen (8.01 %). This was comparable to the QA/QC analysis results for our 1992 samples (Falter and Carlson 1994). Comparison with results for blank ammonia nitrogen and TKN samples indicated the lack of precision for those parameters was attributable to laboratory analysis rather than to sampling error. Blank contamination levels were at minimum detection limits (MDL) for TKN (0.05 mg/l) and only slightly above the MDL for ammonia nitrogen at 0.009 mg/l.

Analysis of blank samples indicated a high frequency of low level contamination for ammonia nitrogen (0.009 mg/l), nitrite + nitrate nitrogen (0.006 mg/l), total phosphorus (0.06 mg/l), and turbidity (2.2 NTU). The highest mean contamination for any one variable was in soluble reactive phosphorus measurements (0.017 mg/l. All other variables showed a low frequency of contamination (<10%) at very low levels (only slightly >MDL).

Analysis of spiked samples showed a high percent recovery for all variables ranging from 92.60 to 103.50% indicating high accuracy. The lowest percent recovery was SRP at 92.60%. TKN and TP had the widest 95% confidence intervals at ± 20.87and ± 13.76%, respectively.

Relative range values were calculated without taking the absolute value to normalize the data and compared by parametric and non-parametric methods. Statistical analysis of the relative ranges for duplicate samples and percent recovery for spiked samples by ANOVA and the non-parametric Wilcoxon/Kruskal Wallace Test indicated there was no significant difference between those samples due to site (a = 0.05).

Physical

Data Organization

Processesed or summarized data are included in the figures and tables with most text references from those Figures and Tables. Raw data is presented in its entirety as Appendices A - G and may be occasionally referenced.

Water Discharge

Water year 1993 (October 1, 1992 - September 30, 1993) and continuing through December, 1993 was the 6th extreme low flow year since Water Year 87 (Figures 2 and 3; Tables 3 and 4). WY 93 total flow past the Buhl gage was 1,750,000 Aft compared to the 1947-1994 average water delivery of 3,678,000 Aft/year. The mid-1980's saw average flows double the long-term mean while the late 80's and early 90's dropped to one quarter of those long-term mean flows.

In 1993, June was the high flow month, averaging 6,892 cfs. For the rest of the study year, 1993 flows averaged less than 3,250 cfs at the Buhl gauge, a pattern consistent with the preceding drought years (Figures 2 and 3). September was the average low flow month (2,405 cfs). Maximum flow was 15,500 cfs on June 13 with minimum flow during study months 1,880 cfs on July 10. In contrast to uncontrolled snowmelt hydrographs in the northern Rockies, low flows occurred in March through early May as high runoff was stored in upstream reservoirs. Flows increased briefly in the early summer. Recharge of the Snake River from irrigation return flows maintained moderate summer flows through September (Table 3).

Water Depth

Water column depth through the 7 CSR transects tended to decrease downstream to transect 3, then increased very slightly to transect 7. Shallowest depths occurred at transect 3 (~1.0 m), with depth increasing very slightly from transect 3 through 6 and 7 (~1.5m). Greatest depths were at transect 1 (~4.7 m)(Table 5).

Water Velocity

Depending on chance placement of samples points in heavy plant cover or open, scoured channel areas between plant clumps, water velocities on a given transect could vary widely. In a given sampling period, water velocity at sample locations was greatest at the shallowest sites, i.e. transects 3 - 7 (Table 6). But low velocities were also seen on those transects. At a given time, water velocities sometimes ranged from study maximum of 2.6 fps to 0 on a transect. Sites of 0 velocity were most common in August and November, but some 0 velocity points occurred in June, the high flow month, attesting to the influence of the heavy plant beds even in June.

Because of the very high velocity range on a transect, significant differences between mean transect velocities were rarely seen (Table 6).

Suspended Solids

Suspended solids were greatest in August (~25 mg/l) and least in June and July (~Mean suspended solids were significantly greatest at transect 1, at the head of the CSR in June, October, and November, the three lowest macrophyte density months (Figure 9 and Table 7)). In June during high flow, suspended solids averaged 19 mg/l at transect 1, significantly greater than all other transects (10 - 14 mg/l). In August, transect 1 increased to 26 mg/l, but transects 5 and 6 had even higher suspended solids (39 mg/l). By October, the earlier pattern of highest TSS upstream and diminishing downstream had re-established, continuing through November.

Turbidity and Water Transparency

Turbidity showed the same patterns as total suspended solids, peaking upstream in low macrophyte months (Figure 10 and Table 8). Mean early summer turbidity was about 15 NTU at the head of CSR and increased through the summer to 25 NTU in August. Individual values up to 56 NTU were seen in August (Figure 10 and Table 8). Turbidity declined in the fall to mean values of 10 - 12 NTU. Throughout 1993 sampling, mean turbidity at the upstream end of CSR was consistently and significantly greater than in lower (downstream) cross-sectional transects (Table 8). As with other parameters, the combination of AMB settling and dilution by spring flows altered site physical and chemical water quality through the CSR.

Water transparency values were more variable than turbidity, but showed similar trends of low transparency in August (means of 0.6 m, minimal values ~ 0.3 m), increasing to 1.0 m through fall. Transparency rapidly increased with water flow through aquatic macrophyte beds (AMB), but high variability between measurements (because of random siting in or out of AMB) reduced significance (Table 9).

Water Temperature

Mean water temperatures in the CSR increased from 16.0 °C in June to 19.7 °C in August before declining to 15.0 °C in October and 7.0 °C in November (Table 10). There were small (~0.5 °C), but significant increases in temperature from upper to lower transects, especially in November when the spring outflows were a great deal warmer than the river. Maximum mean temperature of any transect was 20.6 °C in August.

Water Chemistry

Dissolved Oxygen

Dissolved oxygen means increased downstream through the CSR reach most months except in November when lower transects had significantly less dissolved oxygen than inflowing water to the reach (Table 11). In June mean dissolved oxygen was high (up to 130% saturation) throughout CSR during the very high phytoplankton blooms at that time. In July, mean oxygen declined to less than 6.3 mg/l (80% saturation) with a minimum single value of 5.7 mg/l (72% saturation) at transect 2. This was the annual low oxygen recorded for the year. In August, oxygen increased back to ~100% saturation in the lower transects. Mean November oxygen in CSR was 12.1 mg/l (120% saturation) with significantly lower oxygen saturation from transects 3-7 compared to transects 1-2 (Table 11). Oxygen values in transects 2, 3, and 4 were usually significantly lower than transect 1 throughout the study year.

Hardness and Total Alkalinity

Hardness is summarized in Figure 4 and Table 12. Hardness generally increased down through the reach at all sampling times with transect 1 generally about 5% significantly greater than lower transects. Hardness over all transects in June averaged 225 mg/l, declined to 215 mg/l during summer, and increased to 240 - 250 mg/l in October-November with the cessation of both irrigation water releases and irrigation return flows (Figure 4).

Total Alkalinity (Figures 4 and 7; Table 13) showed no obvious trends through the CSR at any time. Average June levels of 185 mg/l were diluted by less than 5% in July, then increased to 210 mg/l by October-November (Figure 4). Month-to-month differences for both hardness and alkalinity were usually significant.

Electrical Conductivity

Electrical conductivity ranged from 370 - 800 µmho through the year with most values in the 450 - 500 µmho range (Table 14). Transect 6 showed the highest conductivity (July) and also the lowest conductivity (August). In June through August, average values were about 5% lower at transect 1 compared to downstream transects, with these differences significant in summer months. Transect 1 had lowest variability between sites on the transect while transects 3, 4, and 6 had lowest variability between sites on a transect (Table 14).

pH

Water column pH varied little over the study, with individual pH values always falling in the 7.4 - 9.0 range (Table 15). Transect 1 median pH was usually 0.6 - 1.0 units lower than downstream transects. Median pH values were lowest in June (7.9 - 8.4) and highest in August (8.4 - 8.8).

Nitrite + Nitrate Nitrogen

Mean nitrite + nitrate nitrogen concentrations in the Middle Snake River were very high, ranging from 0.81 mg/l in June to 2.16 mg/l in October (Figure 5 and 11; Table 16). Nitrite + nitrate nitrogen individual values ranged from 0.71 - 2.32 mg/l. Transect 1 mean nitrite + nitrate nitrogen levels were always lower than other transects. Highest values were seen in transect 7 at all times except October when transect 6 was slightly higher (Figure 11). Transects 6 and 7 were below all springs and aquaculture sources to CSR. Concentrations increased downstream through CSR at every month. Even though standard errors were low, the small magnitude of the increases were not significant at $p = 0.05$. Differences were evident between upstream and downstream transects, especially in June, October, and November at $p = 0.20$ (Figure 11).

Total Kjeldahl Nitrogen (TKN)

Considering the large magnitude of nitrite + nitrate nitrogen concentrations, Kjeldahl (organic + ammonia and exclusive of $NO_2 + NO_3$) nitrogen levels were comparatively modest, with means over all transects ranging from 0.11 in July to 0.59 mg/l in November (Figure 12 and Table 17). Kjeldahl nitrogen individual values ranged from 0 to 1.58 mg/l. Highest means were in transects 2 - 6 in August and in November.

Sites downstream through CSR showed definite between-site differences. Standard errors were generally 5 - 30% of the mean, so transects were seldom significantly different at $p = 0.05$. But TKN again showed a trend of increased concentrations downstream through CSR in June and November, months of lowest macrophyte densities, contrasted with increased TKN concentrations downstream through AMB in July, August, and October, months of greatest macrophyte biomass. Differences were pronounced at $p = 0.20$ (Figure 12).

Ammonia Nitrogen

Ammonia nitrogen mean values ranged from lows of 0.02 mg/l in June and October to 0.10 mg/l in August (Figure 13 and Table 18). Individual ammonia nitrogen samples ranged from 0 - 0.16 mg/l (July and August). Ammonia nitrogen was lowest at transect 1 and peaked at transects 2 - 7 (Figure 13 and Table 18) in all months except June. Most dramatic increases in ammonia nitrogen occurred from transect 1 to 2 or from transect 2 to 3. Within a sampling period, transects were significantly different ($p = 0.20$) as shown by the downstream trends in Figure 13.

Total Phosphorus (TP)

Mean total phosphorus over all transects in CSR increased steadily through the year from June (0.18 mg/l) through November (0.23 mg/l) (Figures 5 and 14; Table 19). Individual data points ranged from 0.05 mg/l in June and July to 0.51 mg/l in August. These levels of total phosphorus are considered very eutrophic and supportive of high plant production levels (Horne and Goldman 1994). Transect 1 TP means were lower than transect 2 and 3 TP means in June and November (Figure 14). In July, August, and October, there was a trend of decreasing TP from transect 5 downstream through transect 7.

Soluble Reactive Phosphorus (SRP)

Soluble reactive phosphorus increased dramatically through the year from 0.06 mg/l in June to 0.16 mg/l in October (Figures 6 and 15; Table 20). Individual SRP values ranged from 0.02 mg/l in July to 0.19 mg/l in October. There was no consistent upstream - downstream trend in SRP through CSR when all months were averaged, but there were pronounced and significant upstream-downstream trends within months at $p = 0.20$ (Figure 15). The same trend emerges...In June and November, low macrophyte months, SRP increased downstream through CSR. In July, August, and October, high macrophyte months, SRP generally decreased from transects 2 and 3 down through CSR (Figure 15) with water flow through AMB.

The AMB were clearly removing TP and SRP from the water with flow through AMB at times of high plant densities. Removal varied from month to month with random placement of sample sites, but significant declines were seen from transects 3 to 5 and from 5 to 7 in high biomass months (Figures 14 and 15). TP declined at a rate of 0.35 mg/l/mile with flow from transect 5 to 7 (heavy AMB) in August. SRP declined at a rate of 0.10 mg/l/mile with flow from transect 5 to 7 in July, and declined at a rate of 0.07 mg/l/mile from transect 5 to 7 in August.

Interrelationships Between Water Quality Variables

We evaluated relationships between water quality variables using several functions. Strongest relationships between variables are shown in Figures 16 - 22.

Suspended solids were strongly and significantly related to nitrite + nitrate nitrogen, Kjeldahl nitrogen, turbidity, and total phosphorus via polynomial second order fit ($p = 0.0001$) (Figures 20 - 22). Significance is high for these fits since sample number is very large in all data sets. The relationships between suspended solids and these parameters is positive except for the negative relationship between suspended solids and nitrite + nitrate nitrogen.

Total alkalinity is the other parameter which correlated best with other water quality parameters, again via second order polynomial fit (Figures 16 - 19). It seemed to relate well to other parameters because of the very low standard error as a percentage of the mean shown by alkalinity measurements. As alkalinity showed little response to transect, the observed significant relationships of alkalinity with temperature, dissolved oxygen, hardness, conductivity, nitrite + nitrate nitrogen, total phosphorus, and SRP express seasonal changes in these parameters rather than between-transect differences.

Aquatic Plants

Species Composition

Species composition of the aquatic macrophyte community of CSR is shown in Table 21. Ten taxa of flowering aquatic macrophytes from seven families, one moss (*Drapanocladius*), and three macrophytic algae taxa were found in CSR. The algae were all macrophytic (*Chara* spp. and the two filamentous green algae *Hydrodictyon* sp., and *Cladophora* sp). Appendix Table D allocates wet biomass, dry biomass, percent organic, and percent species composition data for individual CSR samples.

In June, *Potamogeton crispus* and *P. pectinatus* dominated composition through all transects. Species distribution was very clumped with adjacent sites on a transect perhaps totally reversing species composition between two sites, depending primarily on bottom composition as well as influence of spring, hatchery, and irrigation flows.

P. crispus biomass diminished through mid-summer as *P. pectinatus* and *Ceratophyllum demersum* dominated in July at transects 1 and 2. Algal epiphytes in lower transects developed rapidly in July, eventually peaking at 1,673 g/m^2 dry weight in transect 7 (>93% of total plant biomass) (Figures 23 and 24; Appendix Table D). Lower transects attained greatest biomass levels in July and August, when *C. demersum* and algal epiphytes dominated the very high biomass levels, contributing 1,600 - 2,200 g/m^2 dry weight to total sample biomass. All three of these latter taxa obtain their nutrients from the water column as they do not have root systems.

In October, peak epiphyte and *C. demersum* densities sporadically declined by up to 40 - 50% but *P. pectinatus* developed biomass levels exceeding 2,000 g/m^2 dry weight at lower transect sites. In November, *P. pectinatus* was again replaced by epiphytes and *C. demersum* with peak plant biomass densities up to 1,800 g/m^2 dry weight.

Plant Biomass Between Sites and Months

Timing of macrophyte development was markedly different between transects (Figures 23 and 24; Table 23). Transects 1 and 4 (the two least enriched transects) did not have significant development of macrophytes until August while downstream transects developed significant densities in June and July. Transect 6 developed a mean 651 g/m^2 dry biomass in July. The lower transects also had peak biomass through October, whereas transects 1 and 4 declined after

August. Enriched transects attained high biomass earlier and sustained them later than transects 1 and 4 (well into November) (Figures 23 and 24).

Transect 1 had low biomass in all months except August when biomass exceeded 800 g/m^2. The fact that high biomass levels even occurred at transect 1 (albeit at the high growth month) indicates that other conditions such as depth, light, and velocity, were suitable for high plant development, so it is likely that lower nutrients (water column or sediments) accounted for less growth at transect 1. Transects downstream of transects 1 and 4 developed their plant growth sooner and sustained high levels longer than did transects 1 and 4. By November, only transect 7 still had high biomass levels.

Figure 24 best expresses these between-transect differences, showing earlier development of AMB in enriched transects, similar mean levels in August, and the AMB persisting through the fall in the downstream, enriched transects. Even in October, mean biomass at transects 3, 6, and 7 was ~1,000 g/m^2 dry weight. Individual sample biomass maxima in transects 3,6, and 7 were 2,131 g/m^2, 3,537 g/m^2, and 3,100 g/m^2 dry weight respectively (Table 23). Site heterogeneity was high with some individual sites on those same transects yielding 2 and 5 g/m^2 dry weight biomass.

Mean plant biomass found in 1993 in CSR was comparable to levels found in 1992 (Table 23). In CSR, plant dry biomass per sample site ranged from 2 - 3,537 g/m^2 while transect means ranged from 5-1,012 g/m^2 (Table 23). Between-sample variation was high, so significance was not often seen. Transect and monthly comparisons are seen in Figures 14 and 15.

We evaluated transect means by separate months with Duncan's Means Separation ($p = 0.05$) (Table 24). In June and July, transect 1 was clearly lower than all other transects. In August, all transects were not significantly different. In October, transects 1 and 4 were again lower than all others. Transect 4 was lower than the others in November (Transect 1 was not sampled in November).

Nutrient Content

Aquatic macrophyte nutrient concentrations were measured in CSR for the months of June, July, August, and October (Table 25). *Potamogeton crispus* had the highest mean phosphorus level over all months (4,830 $\mu g/g$ with a range of 5,900 $\pm$ 124 $\mu g/g$ to 4,180 $\pm$ 269 $\mu g/g$). The other rooted macrophyte analyzed for nutrient content was *P. pectinatus* with a mean total phosphorus concentration of 3,775 $\mu g/g$ and a range of 4,160 $\pm$ 188 $\mu g/g$ to 3,180 $\pm$ 56 $\mu g/g$. Non-rooted species such as *Ceratophyllum demersum* and epiphytes had lower mean phosphorus concentrations of 3,580 and 3,527 $\mu g/g$ respectively, ranging from 2,960 $\pm$ 111 to 4,140 $\pm$ 142 μg/g. Our rooted aquatic macrophyte sample had higher mean phosphorus concentrations than non-rooted aquatic macrophytes.

Rooted aquatic macrophytes also had higher percent carbon concentrations than non-rooted aquatic macrophytes. Mixed vegetation had percent carbon levels ranging from 30.4 % ± 0.6% to 21.9% ± 0.3% with a mean of 25.0%. *Potamogeton crispus* and *P. pectinatus* shared the highest mean percent carbon concentration of 34.0% with a range of 38.6 % ± 0.9% to 31.3 % ± 1.1%. Epiphyton had the lowest mean percent carbon with a mean of 25.0% and ranged from 28.1% ± 0.4% to 22.8% ± 1.0% carbon. *Ceratophyllum demersum* had percent carbon concentrations ranging from 32.8% ± 0.5 to 26.1% ± 0.6% with a mean of 29.0%.

Nutrient level monthly means of composites of mixed aquatic macrophytes were also compared. Phosphorus levels increased slightly from 4,055 μg/g in June to 4,168 μg/g in July. A decrease was seen in August to 3,676 μg/g, while October levels increased to 3,908 μg/g. Percent carbon concentrations were highest in June at 32%, decreasing to ~29% in July, August, and October. Mixed vegetation samples contained a range of total phosphorus from 4,420 ± 104 μg/g to 3,440 ± 111 μg/g with a mean of 3,915 μg/g.

Organic Content

Mean organic content of aquatic macrophytes ranged from 51% to 82% dry weight (Table 28). Monthly mean organic content ranged from ~75% in June-August and declined sharply to 61% and 63% in October and November.

Phytoplankton

Year 1992

Phytoplankton populations were assessed at each of the nine transect sites from Pillar Falls to below Upper Salmon Falls Dam, with transects 3 and 4 immediately above and below CSR, respectively (Appendix G). *Note*: "Transects 3 and 4" in this Section are the transects S-3 and S-4 of the 1992-93 study of Minshall et. al. at RM 600.5 and 599.0, respectively. In late April, 1992, there was a massive algae bloom (up to 2.9×10^7 cells/l; 93% *Cyclotella* by biovolume) through all nine sites from Twin Falls to below Upper Salmon Falls Dam. The phytoplankton bloom peaked in upper reaches and diminished downstream by 75%. Declines were especially evident between transects 3 and 5, the Crystal Springs and Niagara Springs reach. The bloom persisted for six weeks, fading by mid-June coincidentally with higher temperatures and the development of rooted macrophyte communities. By mid-June, phytoplankton numbers had dropped to 8×10^5 cells/l at the top of the 40-mile study reach and declined downstream to 3.5 x

10^5 cell/l. Greatest decline was seen in CSR with a drop from 10×10^5 to 5×10^5 cells/l through that short reach. Diatoms (by mid-June, 1992, a more balanced community of *Cyclotella*, *Gomphonema*, and *Fragilaria*) was again dominant.

The pattern of diatom dominance as measured by both density and biovolume (*Asterionella*, *Coconeis*, *Melosira*, *Fragilaria*, and *Cyclotella*), with a fairly balanced composition, continued through the summer. The bluegreen algae *Chroococcus*, *Oscillatoria*, and *Aphanizomenon* assumed increasing importance into July and August, reaching 35% of total biovolume. In August and September, green algae (dominated by *Scenedesmus*, *Spirogyra*, and *Pandorina*) became dominant in the community. A consistent pattern of phytoplankton decline down to 10-20% of upstream densities continued to be observed with passage downstream. Through July, upstream densities exceeded 3.8×10^8 cells/l and 3.1×10^9 μ^3/l with the pattern of increasing cell size of organisms.

By mid-September, *Aphanizomenon* had attained 60% of total biovolume at downstream sites, but the bluegreens yielded to a 80% biovolume dominance by the green alga *Spirogyra* in late September. In early October, composition over the entire river reach had shifted back to 70-90% biovolume dominance by *Cyclotella* with 1.0×10^9 μ^3/l biovolume at upper and lower reaches.

Year 1993

Phytoplankton composition was not assessed in 1993. Mean monochromatic chlorophyll *a* concentrations in CSR (RM 599.5-601.3) ranged from 3.3 ± 0.5 mg/m^3 to 101.0 ± 24.3 mg/m^3 (Table 29). These concentrations indicate that CSR is mesotrophic to eutrophic (2-10 mg/m^3 for mesotrophy and >10 mg/m^3 for eutrophy as defined by EPA 1990). Specifically: June, August, and November mean values (14.2 ± 2.3 mg/m^3 to 101.0 ± 24.3 mg/m^3) indicate eutrophic conditions, while July and October mean values (3.3 ± 0.5 mg/m^3 to 9.0 ± 0.5 mg/m^3) support a mesotrophic rating.

When comparing means of all transects by month, chlorophyll *a* concentrations decreased from June to July (from 26.3 to 8.0 mg/m^3) before mean transect concentrations increased in August to 19.8 mg/m^3, then declined to 4.6 mg/m^3 in October.. The greatest increase in transect means occurred from October (4.6 mg/m^3) to November (79.5 mg/m^3) with the fall phytoplankton pulse.

Sediments

Sediment Traps and Sediment Deposition Rates

Samples were used to calculate a total sediment dry weight deposition rate (g/m^2/day) with sufficient replicates at each location to determine mean total sediment deposition rate, minimum and maximum deposition rates, standard error, 95% confidence intervals, and sedimentation rate changes through CSR and the aquatic macrophyte beds (Table 30A).

Sediment deposition rates were compared throughout the reach from July 11, 1993 to November 13, 1993. The RM 600.0 site, at transect 7 and below the AMB had the highest mean rate (566.9 $g/m^2/day$) for the entire study period. The lowest rate over the entire study period (302.9 $g/m^2/day$) was measured at RM 600.2, at transect 5 in the middle of the AMB. Mean rates at RM 600.9 (~ transect 1) and 600.5 (between transects 2 and 3) were 339.4 and 471.1 $g/m^2/day$, respectively.

When comparing mean deposition rates for specific time periods (Table 30A), we see that deposition rates measured at RM 600.9, 600.5, and 600.0 were similar. Mean deposition rates measured at RM 600.2 were much less and also less variable than the other locations. The data show that the AMB are dense enough to limit water flow, or the macrophytes filtered sediments from the water column before they can be collected in traps located in AMB.

Highest deposition (~1,000 to 1,700 $g/m^2/day$) occurred from early July through August 21 with greatest rates at RM 600.9 and 600.5 and RM 600.0 (RM 600.0 was high in late August only). The highest 14-day deposition rate was measured at RM 600.0, with a mean of $1{,}690.3 \pm 255.8$ $g/m^2/day$ for the late July - early August period. Lowest deposition rates (90 - 190 $g/m^2/day$) occurred through October. The lowest 14-day deposition rate was measured at RM 600.2 with a mean of 89.2 $g/m^2/day$ for the early October period.

Sediment collected in the sediment traps had a mean plant-available phosphorus (PAP) concentration of 173.3 ± 32.0 µg/g and ranged from 45.8 to 813.0 µg/g at RM 600.5 and RM 600.9 respectively (Table 30B). Plant-available potassium (PAK) averaged 500.5 ± 93.2 µg/g. A broad range of PAK concentrations was measured, from a RM 600.5 low of 197.0 µg/g and a RM 600.2 high of 1,630.0 µg/g. These data show maximum levels of PAP coming into CSR and maximum levels of PAK in the middle of the AMB.

Percent organic carbon ranged from 1.2 to 3.8% with a mean of $2.6 \pm 0.2\%$, and percent organic matter ranged from 3.0 to 6.5% with a mean of $4.4 \pm 0.4\%$. It would appear that ~ 95% of the sediment collected in the trap is inorganic. Percent carbon was similar to percent organic carbon, with a mean of $4.5 \pm 0.3\%$, ranging from 3.0% at RM 600.2 to 9.5% at RM 600.9. Percent hydrogen averaged $0.9 \pm 0.1\%$ and ranged from 1.5% at RM 600.9 to 0.6% at RM 600.0. Percent nitrogen ranged from 0.2 to 0.6% at RM 600.2 with a mean of $0.3 \pm 0.1\%$.

Deposition Rates and Nutrient Movement via Suspended Solids

Mass movement of nutrients and organic matter in suspended matter moving through the CSR is summarized in the following table. Mean collection rates over all four sites were: Total P = 0.59 $g/m^2/day$; Plant-Available P = 0.05 $g/m^2/day$; Plant-Available K = 0.14 $g/m^2/day$; and Organic Matter = 15.1 $g/m^2/day$.

Deposition Rates in Sediment Traps

Transect at RM....	Total P $g/m^2/day$	Plant-Available P $g/m^2/day$	Plant-Available K $g/m^2/day$	Organic Matter $g/m^2/day$
600.9	0.65	0.05	0.14	21.1
600.5	0.50	0.04	0.11	9.3
600.2	0.50	0.04	0.12	8.9
600.0	0.69	0.06	0.17	20.9

Collection rates were higher at the RM 600.9, the upstream site and at RM 600.0, the downstream site compared to sites within the AMB. Collection rates at RM 600.5 and 600.2, the two sites in the AMB and comparable to transects 2 - 3 and 7, were always less than collections outside of the AMB, with respect to all parameters. The AMB were clearly functioning as nutrient and organic matter traps, at least during the macrophyte growing season. The export of these parameters from CSR during the July - November collection period is best expressed by collections at the downstream site, RM 600.0. Export rates from CSR were: Total P = 0.69 $g/m^2/day$; Plant-Available P = 0.06 $g/m^2/day$; Plant-Available K = 0.17 $g/m^2/day$; and Organic Matter = 20.9 $g/m^2/day$.

Sediment Distribution in Crystal Springs

Sediment distribution in CSR was obtained from 5-meter interval depth profiling across four transects (Tables 32 - 35). The following table depicts mean sediment layers on each of the four sediment transects taken in CSR in September 1993:

Sediment Characteristics

Transect at RM....	Water Depth	Organic Depth	Sand-Silt Depth	Total Sediment
	m	m	m	m
600.9	2.97	0.35	0.13	0.48
600.5	2.35	0.40	0.65	1.05
600.2	1.17	0.13	0.11	0.23
600.0	1.93	0.19	0.03	0.23

Mean total sediment deposits were greatest at RM 600.5 (mid-island and between transects 2 and 3) with a mean total sediment depth of 1.05 m although several individual sample points approached 3.0 m in total sediment depth (Table 33). In the above table, "organic depth" refers to the layer of ooze higher in clay and organics. These fine sediments were thickest at RM 600.5 also, averaging 0.40 m in depth. As shown in Tables 32 - 35, the fine sediment layer was often on the surface, grading to sand-silt just above the historic cobble bottom but additional layers of fine sediments below the sand-silt layer were not uncommon.

Sediment Composition in Crystal Springs

Mean surficial sediment composition, all transects averaged

Month	Sand	Clay	Organic Matter	Nitrogen	Hydrogen	Phosphorus
	%	%	%	%	%	µg/g
June	57.4	2.2	2.2	0.2	0.4	902
July	54.9	3.5	2.9	0.2	0.6	1,104
August	59.9	3.2	2.5	0.3	0.9	1,087

Sands dominated sediments in the CSR, averaging 50 - 72% of dredged sediments. Seasonal shift in surficial sediment composition was shown by change in mean percent sand from 57.4% in June, decreasing to 54.9% in August, and increasing to 59.9% in November.

Concurrently, clay and organic matter *increased* in the high-plant month of August. Mean sediment nitrogen increased slightly as plants developed (from a mean of 0.2 to 0.3%), but sediment hydrogen (indicative of high energy, reduced compounds in sediments) steadily increased through November with plant development.

Mean sediment phosphorus over all transects increased by 22% from June to peak plant development in August and remained high through November. Transect 2 had highest average June - November sediment total phosphorus concentrations (1,301 µg/g) while all non-control transects averaged 1,090 µg/g. Control transects 1 and 4 had lowest average June - November sediment total phosphorus concentrations (758 and 922 µg/g, respectively).

Interrelationships Between Plants and Other Factors

Figures 25 - 33 graphically show relationships between total plant dry biomass and environmental factors in water and sediments. The relationships plotted were those which showed best linear correlations in an initial analysis of all parameters over all samples. General trends often were graphically obvious but the wide variability shown by parameters at randomly selected sample sites combined with the large number of variables entered into correlation models can cause low r^2 (but high P) values. Some relationships were fitted by Excel 5.0 (MacIntosh) to determine equations which provided lines of best fit.

Plant Biomass vs. Water Column Parameters

Depth seems to be a major controller of macrophyte occurrence (Figure 25). Plant biomass was always less than 500 g/m^2 at depths greater than 2 m (with the one exception of 2,000 g/m^2 of *P. pectinatus* at 5m on transect 1). The higher plant densities observed (>1,000g/m^2) were clustered in the 0.5 - 1.5m depth band. It is interesting to note that at transect 1, biomass levels were less than 500 g/m^2, even in that preferred depth range. High biomass levels were not obtained in that shallow depth range until further downstream in transects 2 - 7.

Transects 2 - 7 also showed a clear association of high biomass with water velocity less than 0.7 fps (Figure 26). All transects combined show a striking visual relationship with a significant exponential relationship ($p = 0.05$), but r^2 is relatively low (0.30) because of data scatter.

Plant biomass correlated poorly with water column nitrite + nitrate nitrogen, Kjeldahl nitrogen, and total phosphorus (Figures 27 - 29). Soluble reactive phosphorus is related to plant biomass (Figure 30), but weakly so, both graphically and in a power function. Transects 2, 3, 5, 6, and 7 all show a positive relationship of plant biomass with SRP up to an SRP level of about 0.15 mg/l with plant biomass dropping off at higher SRP levels.

Plant Biomass vs. Sediment Parameters

Figures 31 - 33 illustrate the relationships between total dry plant biomass and the sediment parameters of organic matter, total nitrogen, and total phosphorus.

The all-transects-combined plots of organic matter show an optimal relationship of plant biomass with sediment organic matter where biomass increases up to a threshold of ~4% organic matter and declines above that threshold (Figure 31). Transects 1 and 4 did not show this pattern, but the pattern of increasing plant biomass up to ~4% sediment organic matter was seen in all other transects.

Sediment total nitrogen is less well related to plant biomass, either on individual transects or in aggregate (Figure 32). The aggregate plot shows biomass increasing with percent sediment nitrogen up to a weakly-defined upper limit (0.35% total sediment nitrogen) with biomass declining above that point. Transects 1, 2, and 4 showed no such relationship when viewed separately. Transects 3, 5, 6, and 7 did show this pattern of maximal plant biomass in the 3.5% sediment nitrogen range with plant biomass declining above the 3.5% sediment nitrogen level.

The exponential function r^2 is low at 0.17 and $p = 0.02$ since data points above 3.5% sediment nitrogen deflect the curve downward.

Sediment total phosphorus was strongly related to plant biomass (Figure 33). Maximal plant biomass occurred at a total phosphorus level of 1,100 µg/g. This trend was seen at all transects, and was supported even at transect 1 where biomass began to increase as total phosphorus just reached 900 µg/g. With the higher sediment phosphorus levels in downstream transects (up to and beyond 1,000 µg/g), biomass increased to peak levels seen in CSR. Transects 5,6, and 7 had the highest sediment nutrients. Transects 3 - 5 and 6 - 7 clearly show this pattern with biomass declining at sediment phosphorus >1,100 µg/g. Power function r^2 for all transects in aggregate was 0.21, $P = 0.0001$.

Canonical Analysis of All Parameters

Canonical analysis over all months pooled and over all physical-chemical parameters showed clear separation of transects 1 from transects 5 - 7, as evaluated by separate clumping and by distance apart on the *x* or *y* axes (Figures 34). In aggregate, these two groups of transects are clearly different types of habitats even though analysis of individual parameters by individual months seldom showed significant differences (though visual trends were often there, such as with sediments, plants, and some physical - chemical parameters). Transects 2 and 4 clearly separated out from transects 5 - 7 also, but differences were not as consistent.

Canonical analysis over the individual months of August, October, and November showed that most transects differed significantly from one another when all parameters were evaluated in aggregate (Figure 35). Again, these transects fall out as different habitats, even though covering a short river length in CSR. Spring inflows as well as sediment and nutrient loadings account for the rapid changes.

Site Descriptors vs. Plant Density (MANOVA Analysis and Canonical Analysis)

Dissolved oxygen regularly increased progressively downstream from transects 1 through 7 with transect 7 apparently contributing most to between-transect variation in July. Water column nitrate + nitrate nitrogen along with sediment organic carbon and total nitrogen increased from transects 1 through 7. These variables were positively correlated with canonical coefficients, indicating a positive relationship between these variables and loadings along the first canonical axis. Other positive, but less consistent correlations with loadings included sediment TP and water column alkalinity which increased downstream from transect 1 through 7 along the CSR in July. Temperature and trichromatic chlorophyll *a* showed strong inverse relationships with canonical loadings, indicating a consistent decline from transect 1 through 7 down the CSR in the mid-summer period.

Environmental Variables as a Function of Plant Cover

Water Column Variables vs. Plant Cover

Environmental conditions were compared between open water (open channels or no-plant sites) and adjacent aquatic macrophyte beds (AMB). Open water sites were defined as sites with <100 g/m^2 dry biomass. Open water and AMB were compared with respect to mean water column depth and it was observed that mean depths of AMB were 1.5 m or less. Open water sites all averaged >3 m in depth. Hotelling's t-tests showed significant differences between depths of open water vs. AMB sites. Largest differences were observed in June when mean depth for open water sites was 3.4 m depth while AMB averaged 1 m depth (Figure 36).

Hotelling's t-testing also showed a significant difference between velocity of open water vs. AMB (Figure 36). Mean velocity was somewhat slower in AMB than in the open water sites. The greatest difference was observed in August when mean velocity in the open water sites peaked at 1 ft/s. At that time, velocity in the AMB averaged 0.3 ft/s. The August peak velocities reflected the heavy influence of irrigation return flows to the CSR (Figure 36).

Mean temperatures of open water and AMB sites were similar; some differences, however, were observed between open water sites and AMB. Mean temperatures were found to be slightly higher in AMB than they were in the open water sites (Figure 37). Greatest differences in temperatures were observed during November when open water sites had mean temperatures of 7.3 °C and AMB had mean temperatures of 7.8 °C.

Mean water column dissolved oxygen levels showed similar characteristics in open water and the AMB. Dissolved oxygen was lower during July and August when the water temperature was higher and thus held less oxygen. There were, however, no significant differences between AMB and open water sites. Greatest differences were observed in November when AMB showed lower level of oxygen with a mean of 11.5 mg/l when compared to the open water sites which showed mean levels of 12.8 mg/l (Figure 37).

Suspended solid concentrations were one standard error lower in AMB vs. open water sites in July and November. Suspended solids were always lower in AMB vs. open water sites (Figure 38).

Mean Secchi depths were variable between AMB and open water sites with no clear pattern apparent. Visibility dropped during the summer months and increased during the rest of the year. There were, however, no significant differences between AMB and open water Secchi transparency. The fact that so many of the Secchi measurements had to be disregarded because of shallow depth was undoubtedly a factor in the lack of patterns (Figure 38).

Mean turbidity showed comparable trends to the total suspended solids where levels increased during the summer months with peaks in August and minima in the fall of the year. Turbidity levels in the open water sites were consistently higher than in AMB (Figure 38). Although this trend was common, no significant differences were observed. During the months of August and October, mean turbidity was ~ 3 NTU's higher in the open water than it was in the AMB (Figure 38).

Mean water column hardness and total alkalinity both peaked in October (~245 and 215 mg/l, respectively). There were no significant differences between hardness or alkalinity in open water vs. the AMB and the open water sites (Figure 39) although mean hardness in AMB was always greater than in open water. Mean alkalinity showed no consistent differences between the two habitats.

Mean water column conductivity was nearly always higher in the AMB compared to the open water and peaked in November with a AMB mean of 503.2 μmhos and an open water mean of 473.8 μmhos (Figure 40). Hotelling's t-test showed no significant difference between the two sites although differences exceeded one standard error in June, July, and November.

Median water column pH was consistently basic throughout the 1993 sampling season with median pH ranging from 7.9 to 8.6. More basic pH was observed in late summer and early fall with pH values similar between AMB and open water sites except for July when median AMB pH was 8.3 compared to 8.0 at open water sites (Figure 40). July, the only month of major pH differences between open water and AMB sites, was also a month with very low mean plankton chlorophyll *a* concentrations. Low phytoplankton photosynthesis would account for the low open water pH in July.

Mean water column nitrite + nitrate nitrogen were similar between open water sites and AMB. Both sites peaked in October with means of 2.0 mg/l in open water vs. 2.1 mg/l in AMB before falling off rapidly in November. Although t-testing showed no significant differences, AMB showed consistently higher concentrations of mean nitrite + nitrate nitrogen in all months (Figure 41).

Mean water column total Kjeldahl nitrogen concentrations were higher in AMB than in open water sites in June, August, and November. However, t-testing showed no significant difference between AMB and open water (Figure 41). Total Kjeldahl nitrogen levels fell dramatically during August and October.

Mean water column total ammonia nitrogen increased during summer months and decreased in fall months. Although t-testing showed no significant differences between open water and AMB, larger increases in ammonia were observed in AMB during August and October, highest biomass months. Mean ammonia peaked in AMB in August with a mean of 0.08 mg/l (Figure 41).

Mean water column total phosphorus decreased during August and increased in fall (Figure 42). No consistent patterns between open water and AMB sites were seen, for example, the ranking of TP reversed between open water and AMB between August and October, months of highest biomass.

Mean water column soluble reactive phosphorus levels peaked in October with mean levels reaching 0.16 mg/l in the open water and 0.15 mg/l in the AMB before decreasing sharply in November (Figure 42). Through the summer of 1993, SRP in open channels vs. SRP in the AMB was similar in concentration and did not show any significant differences between sites. Only in July did open water and AMB sites differ by more than one standard error. At that time, open water sites had higher SRP than did AMB.

Sediment Variables vs. Plant Cover

Mean sediment pH levels in both open water and AMB were relatively stable, around 7.4 to near 8.0 for the entire summer of 1993 (Table 15). In August and October, the months of greatest plant biomass, AMB sites had lower sediment pH, reflecting the higher sediment organic matter which, under the quiescent conditions beneath the plant cover, would develop accumulations of decomposition end products, including carbon dioxide and organic acids.

Open water sites had lower levels of sediment carbon and organic carbon than did AMB. Hotelling's t-testing showed significant differences between sites with respect to both carbon and organic carbon. Carbon and organic carbon peaked during August in open water sites with mean values of 2.6% and 1.6 %, respectively. Sediment carbon and organic carbon peaked in November in AMB with means reaching 3.2 mg/l and 1.8 mg/l, respectively.

Mean percent sand concentrations were greater in open water sites than in AMB (Figure 44). Sand content of sediments would be expected to be greater at higher velocity, open-channel sites than under AMB. Since the open water channels have greater velocity, it stands to reason that less silt and clay will settle in these channeled areas. Hotelling's t-testing showed significant differences in sediment sand content between AMB and open water sites. Sand concentrations peaked in June in the open water sites with a mean of 79% while AMB had 57% mean sand. In AMB, sand concentrations peaked during November with a mean of 59%.

Mean percent silt levels were higher in the AMB than in the open water areas (Figure 44). This again is more a function of velocity than any other variable. The AMB act as a trap for the fine particulate matter and allow it to settle to the bottom. Hotelling's t-test showed significant differences between open water and AMB silt content in June and July. Silt peaked in June in the AMB with a mean of 45% when silt content in the open water was 20%. Through the summer and fall, silt content steadily increased to 32%.

Mean percent clay was significantly lower in the open water than in the AMB in all months except July (Figure 44). Clay content steadily increased from June through October in the AMB (2.6% to 4.8%). This again is more a function of velocity than of any other variable where clay particles are settled out with passage through the AMB. Hotelling's t-test again showed significant differences between open water and AMB. Clay content peaked in AMB during October with a mean of 4.8% when open water sites averaged 2.3%. In the open water sites, clay content also increased through June and July, but declined sharply from July to August (3.5% to 1.7%), as water discharge rose sharply in July to 4,700 cfs. Meanwhile, clay content in AMB continued to increase in August, an illustration of the stable habitat created by the AMB.

Mean sediment nitrogen levels were consistently higher in AMB than in the open water (Figure 45). Nitrogen levels at both habitats decreased in August at the peak of the growing season and increased into October but the sediment nitrogen in open water sites decreased to 0.13%. The open water decline was a result of scouring while the AMB decline of sediment nitrogen was likely a result of plant utilization at high biomass levels, not scouring (See previous paragraph.). Significant differences were found using Hotelling's t-tests between open water sites and AMB. Mean sediment nitrogen peaked in open water sites in July at 0.21% (when AMB sediment nitrogen was 0.24%) and peaked in AMB in November at 0.28% (when open water sediment nitrogen had declined to 0.13%).

Mean sediment hydrogen concentrations were significantly different when compared using Hotelling's t-test (Figure 45). Hydrogen levels increased in open water sites until August where the levels then decreased through November. In AMB, however, sediment hydrogen steadily increased from June through November (0.47% to 0.64%), suggesting reduced (decaying) organic matter was increasing through this time period coincident with the accumulation of plant biomass. Mean sediment hydrogen in open water peaked at 0.47%.

Mean sediment total phosphorus concentrations at ~1,000 µg/g were more constant in sediments of AMB than in open water sites (Figure 45). Concentrations of phosphorus in open water sites peaked in August with a mean of 1,418 µg/l. AMB, however, showed a much more consistent level of phosphorus concentrations with the peak occurring in October (1,053 µg/g) (Figure 45). There is no apparent explanation for the August peak at open water sites. Although these means appear very different, Hotelling's t-test showed no significant differences between treatments at $p = 0.05$.

CONCLUSIONS

Water Column Physical Variables

- Monthly mean peak water discharge in the study period occurred in June, 1993 at 6,892 cfs. Daily mean peak discharge occurred on June 13 at 15,500 cfs. Flows exceeded 11,000 cfs for nine days in 1993.
- Both total annual water delivery and mean summer water flows through CSR (Crystal Springs Reach) were very low for the sixth year in a row, totaling 1,750,000 Aft in Water Year 1993 and averaging 3,000 cfs in the summer - fall months. Total water yield was less than 50% of the 46-year average.
- Maximum water velocity obtained in CSR was 2.9 fps, in open channel areas between AMB (Aquatic macrophyte beds). Minimum water velocity was 0 at some locations in the AMB.
- Turbidity peaked in August (all-transect mean = 56 NTU) with minimal water clarity at that time (all-transect mean = 0.6 m visibility).

  Total suspended solids peaked in August (all-transect mean = 39 mg/l).
- Maximal water temperatures were in August (all-transect mean = 20.6°C), maintaining this reach as a transitional "cool to warm water" system in August.
  Mean reach temperatures in July and August were 18.7 °C and 19.7 °C, respectively.
  In July and August, mean temperature declined 1.4 °C and 0.4 °C, respectively, through the reach from spring inflows.

Water Column Chemical Variables

- QA/QC for water column chemistry was generally quite good except for NH_3 nitrogen and TKN which showed high variability. Except for NH_3 nitrogen and TKN, precision was high.
- Laboratory recovery of spiked samples was high with recovery of 92.6% to 103.5%.
- Blanks indicated that field and transport contamination of water samples was not excessive.

- Typical mean water column concentrations in Crystal Springs Reach in the June - November, 1993 study period *.

- Ammonia Nitrogen	0.07	mg/l
- Nitrite + Nitrate Nitrogen	1.5	mg/l
- Total Kjeldahl Nitrogen	0.4	mg/l
- Total Phosphorus	0.2	mg/l
- Soluble Reactive Phosphorus	0.1	mg/l
- Total Hardness	200.0	mg/l
- Alkalinity	200.0	mg/l
- Conductivity	500.0	μmhos

* Measures of variability are presented in figures and tables.

- Key water quality conditions observed in late summer - fall:
  - Lowest dissolved oxygen was observed at a single site in July (5.7 mg/l) in heavy plant beds. Lowest mean transect oxygen was 6.3 mg/l at transect 2.
  - Highest mean transect oxygen was 13.3 mg/l at transect 1 in November. Little supersaturation was observed.
  - Median pH fell in the moderately basic range of 7.8 - 8.8.
  - $NO_2 + NO_3$ - N peaked in October (transect mean = 2.16 mg/l).
  - TKN peaked in November (transect mean = 0.59 mg/l but values varied little June through November).
  - TKN increased downstream through CSR, but with different locations of maxima as AMB uptake varied.
  - NH_3 - N peaked in August (transect mean = 0.10 mg/l).
  - Total suspended solids were strongly correlated to water column NO_2-NO_3 - N, TKN, and TP.
  - TP transect means averaged 0.17 mg/l through July and August and peaked at 0.41 mg/l in November. TP decreased through CSR macrophyte beds at times of maximum biomass, but increased in June and November, when biomass levels were low.

- SRP transect means ranged from 0.05 - 0.17 mg/l through CSR, averaged 0.09 mg/l, and peaked at 0.17 mg/l in October.
- SRP increased downstream through macrophyte beds in response to loading in June and November, months of lower macrophyte density, but sharply decreased downstream through macrophyte beds in July, August, and October, months of high macrophyte density.
- Water column TP and SRP concentrations through CSR seemed to be controlled by AMB density with high biomass reducing TP and SRP concentrations. Early- and late-season reduced nutrient uptake by AMB permitted reach loadings to increase TP and SRP phosphorus concentrations through the CSR.
- TP declined at a rate of 0.35 mg/l/mile with flow from transect 5 to 7 (heavy AMB) in August.

  SRP declined at a rate of 0.10 mg/l/mile with flow from transect 5 to 7 in July, and declined at a rate of 0.07 mg/l/mile from transect 5 to 7 in August.

• These levels of $NO_3 + NO_2$, TP, and SRP are associated with highly eutrophic waters.

Phytoplankton and Aquatic Macrophytes

• Phytoplankton in 1992 was dominated by *Cyclotella*, especially during spring and fall blooms. Cell numbers during blooms were extremely high (2.1×10^7 cells/l; 10.5×10^{10} μ^3/l biovolume).

• Phytoplankton chlorophyll *a* (monochromatic) in 1993 ranged from <1 to 172 µg/l through the summer with annual maximum values at the downstream transect in November. Transect means ranged from 5 (October) to 80 µg/l (November).

• As in 1992, epiphytic filamentous green algae (*Hydrodictyon* and *Cladophora*) in 1993 were abundant components of aquatic macrophyte beds, but appeared 4 - 5 weeks later in the summer. Epiphytic algal dominance of the macrophyte biomass (50-60% of total community biomass) was common.

• Species composition of rooted aquatic macrophytes in the CSR was dominated by *Potamogeton crispus*, *P. pectinatus*, *Elodea canadensis*, and *Ceratophyllum demersum.*

• *P. crispus* and *C. demersum* were the dominant macrophytes in more turbid sites. *P. pectinatus* was equally abundant in clear or turbid water sites.

- Rooted macrophyte development was approximately 5-6 weeks later in 1993 than in 1992, with June biomass densities only 156 g/m^2 dry weight.
- Peak plant biomass levels in CSR in 1993 were comparable to 1992, averaging 665 g/m^2 dry weight at peak densities in August, decreasing slightly to 551 g/m^2 in October. There were no significant differences between 1993 biomass densities in August, October, and November.
- Transect peak macrophyte biomass levels were 2,200 - 3,537 g/m2 in August and October. Highest biomass levels occurred at transects 3, 5, 6, and 7, which were below aquaculture and agricultural loading to the reach.
- Densities of submerged aquatic macrophytes in CSR was higher than any literature values found.
- Location in CSR was significant to macrophyte densities; maximum biomass levels were in middle transects of CSR and minimum densities were in the upstream control transect 1. October transect means were 1,012 g/m^2 at transect 3 in the middle of CSR when transect 1 (upstream control) biomass averaged 5 g/m^2. Transect 4, a modified control transect receiving some nearby irrigation return flow impact, averaged 56 g/m^2 at that time.

  Macrophyte biomass at transect 1 was significantly less than macrophyte biomass at transects 2,3, 5, 6, and 7 in all months except November.
- Comparison of aquatic macrophyte beds compared to adjacent open channels:
  - Depth was significantly greater in open channels than in AMB.
  - Water velocities in macrophyte beds were significantly less (sometimes 0) than in open channel sites.
  - Temperatures were slightly greater in AMB than in open channel sites.
  - Total suspended solids and turbidity were both significantly lower in AMB.
  - Water hardness and conductivity were both significantly higher in AMB.
  - Percent sand in sediment was significantly lower in AMB; Percent silt and clay were both significantly higher in AMB.
  - Scouring at slightly elevated August flows decreased sediment clay and nitrogen content in open channel areas, but not in AMB.
  - Mean sediment N, H, and total organic carbon were always higher in AMB.
  - Mean sediment total P was variable between AMB and adjacent open channels.

Sediments

- Sediment phosphorus accumulated in open water sites as water flows declined from June through August, whereas sediment P was constant through the June-August time period in AMB. This suggests either 1) seasonal accrual of sediment P just matched by plant uptake in AMB resulting in no net gain of sediment P through the growing season; 2) differential deposition of sediments and nutrients in the open water *vs.* AMB; or, 3) depletion of sediment P through the growing season by aquatic macrophyte growth.
- As in 1992, 1993 data again indicate lower limits of sediment N (0.1%), sediment P (0.08%), and sediment organic matter (2.0%) for high (>500 g/m^2) macrophyte densities.
- There was a well-defined upper limit of sediment N (0.35%) above which macrophyte densities declined. An upper limit of sediment P was evident at 1,200 $\mu g/l$, but less sharply defined. We do not believe that the sediment N and P are causing the biomass decline at higher nutrient concentrations, but that correlative factors associated with high sediment N and P cause the plant decline, i.e. low sediment oxygen, redox potential or high sediment levels of ammonia and organic acids from organic matter decomposition.
- Nutrient export rates from the downstream end of CSR during July - November, 1993 in the form of suspended solids were: Total P = 0.69 $g/m^2/day$; Plant-available P = 0.06 $g/m^2/day$; Plant-Available K = 0.17 $g/m^2/day$; and Organic Matter = 20.9 $g/m^2/day$.

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FIGURES

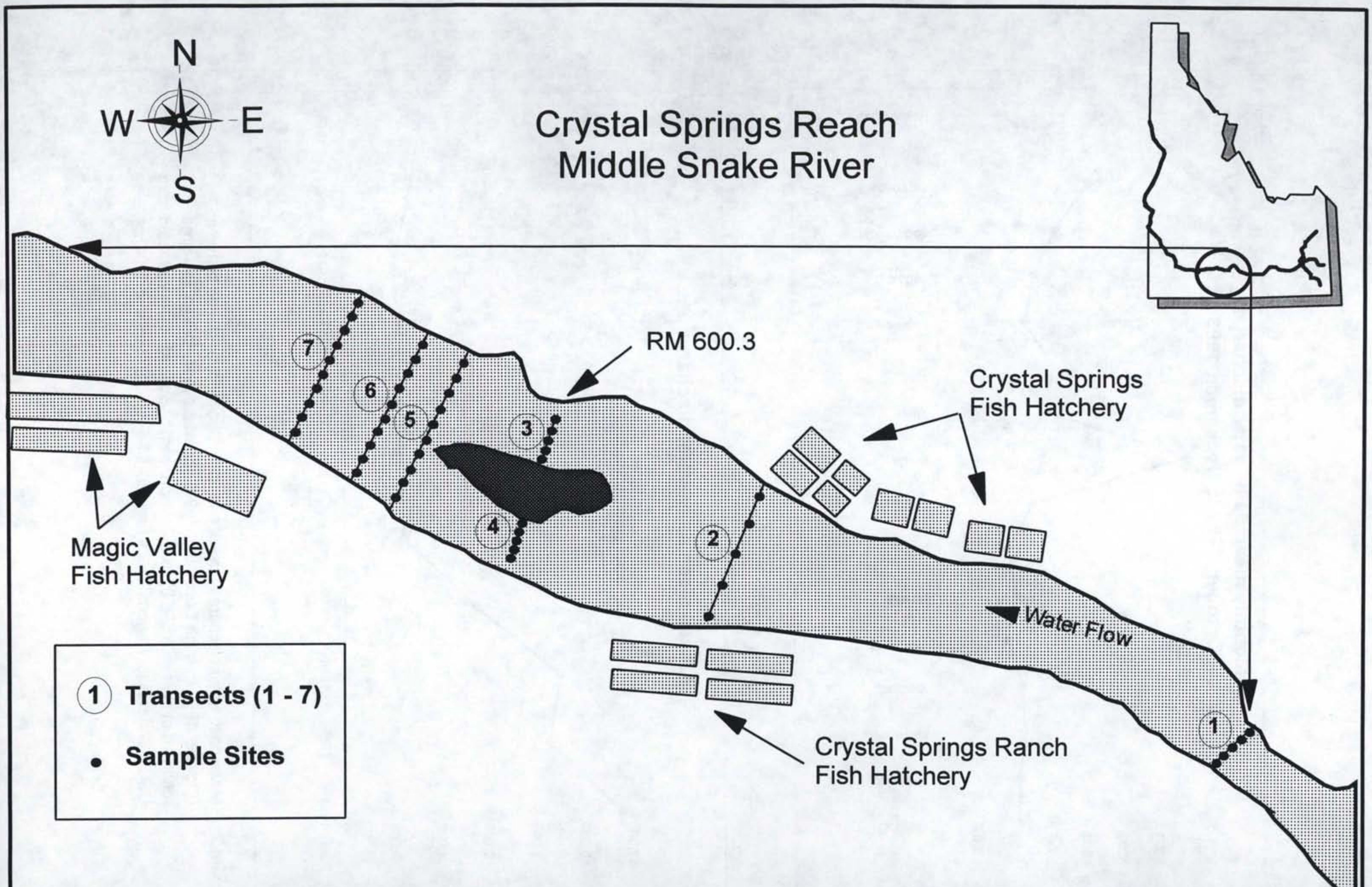
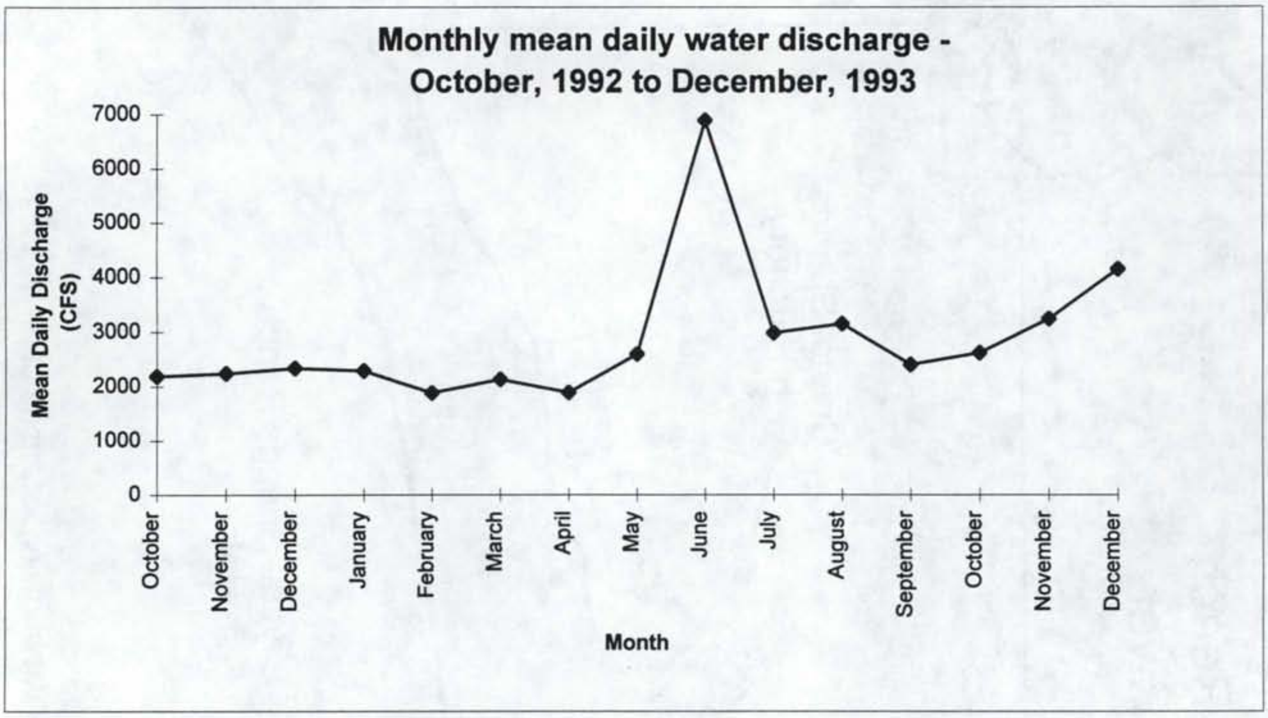


Figure 1. Crystal Springs Reach of the Middle Snake River showing locations of transects and sample sites, 1993.



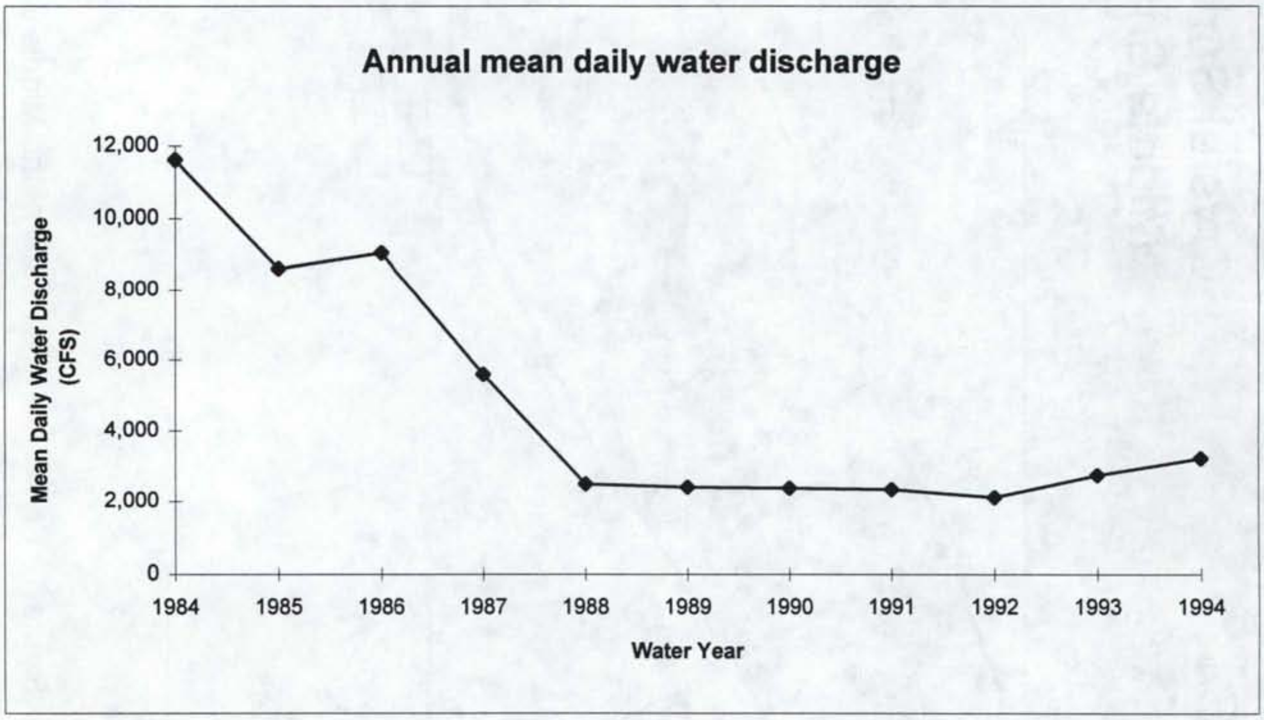
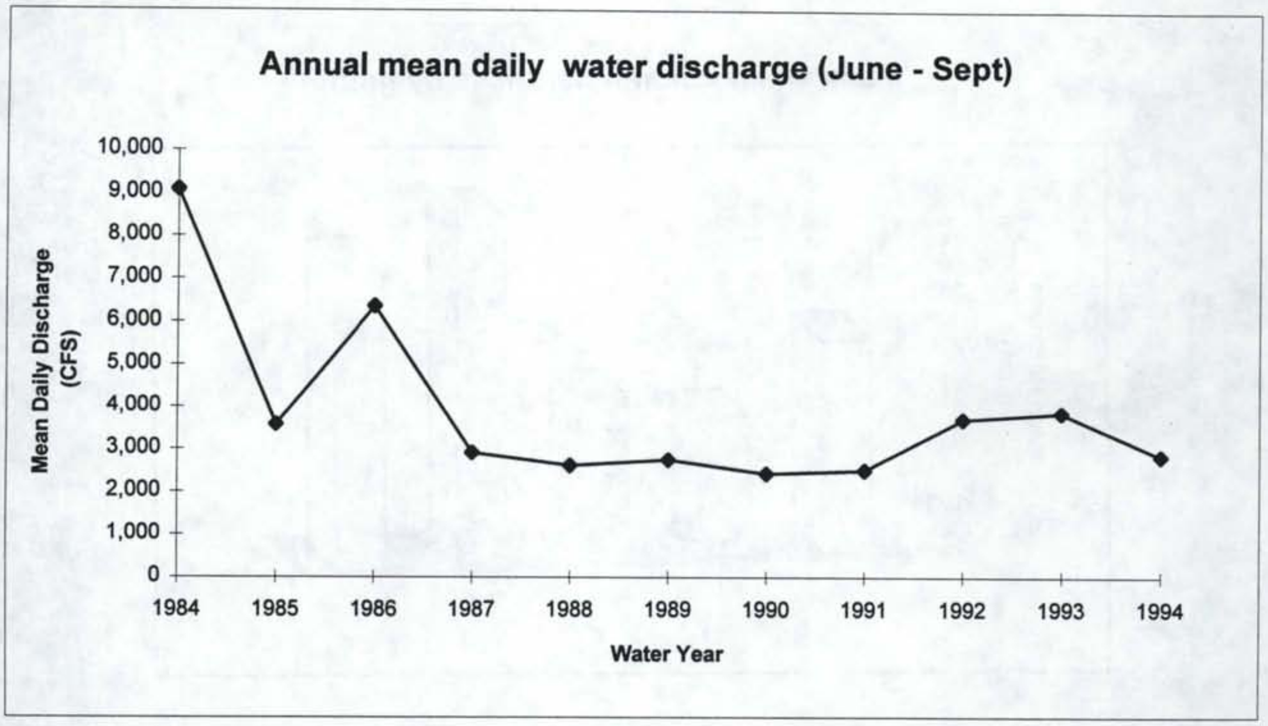


Figure 2. Mean daily water discharge (cfs) of mainstem Snake River plotted by month (October 1992 through December, 1993) and water year. Water discharge recorded at river mile 596.8, six miles northeast of Buhl, Id. Data extracted from USGS Water Data Reports ID-93-1 and ID-94-1 (USGS 1993 and 1994).



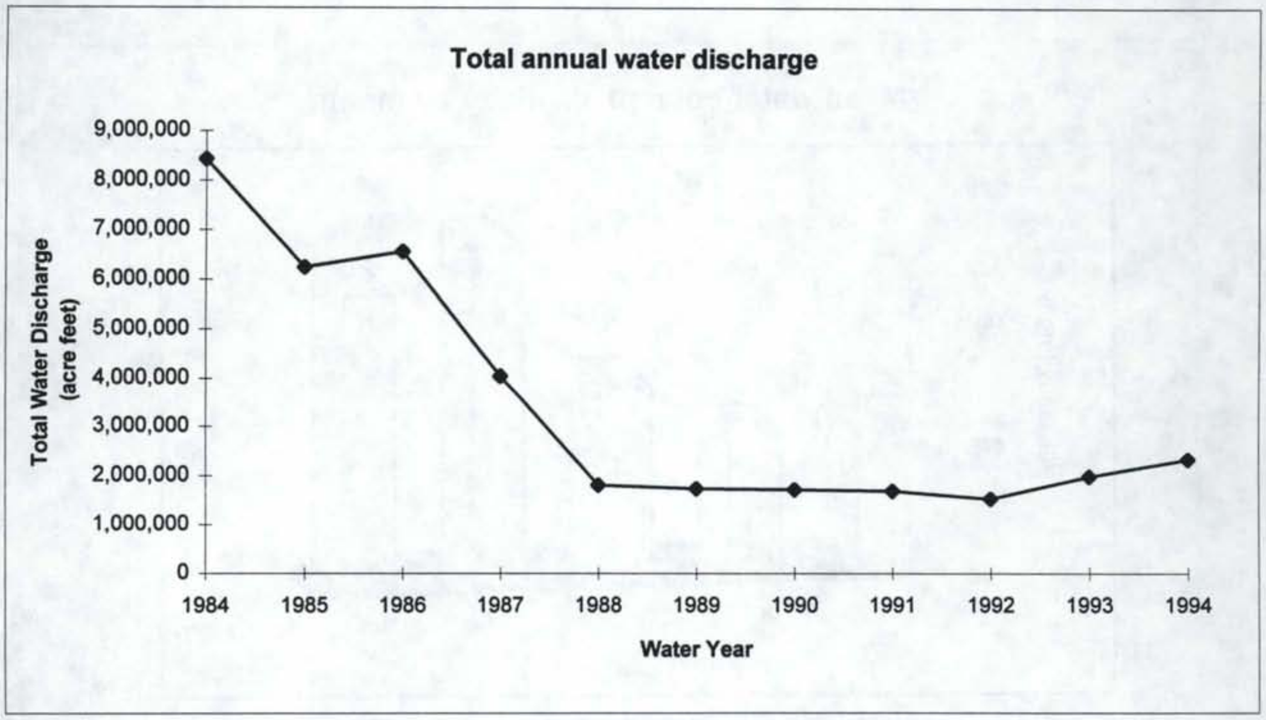
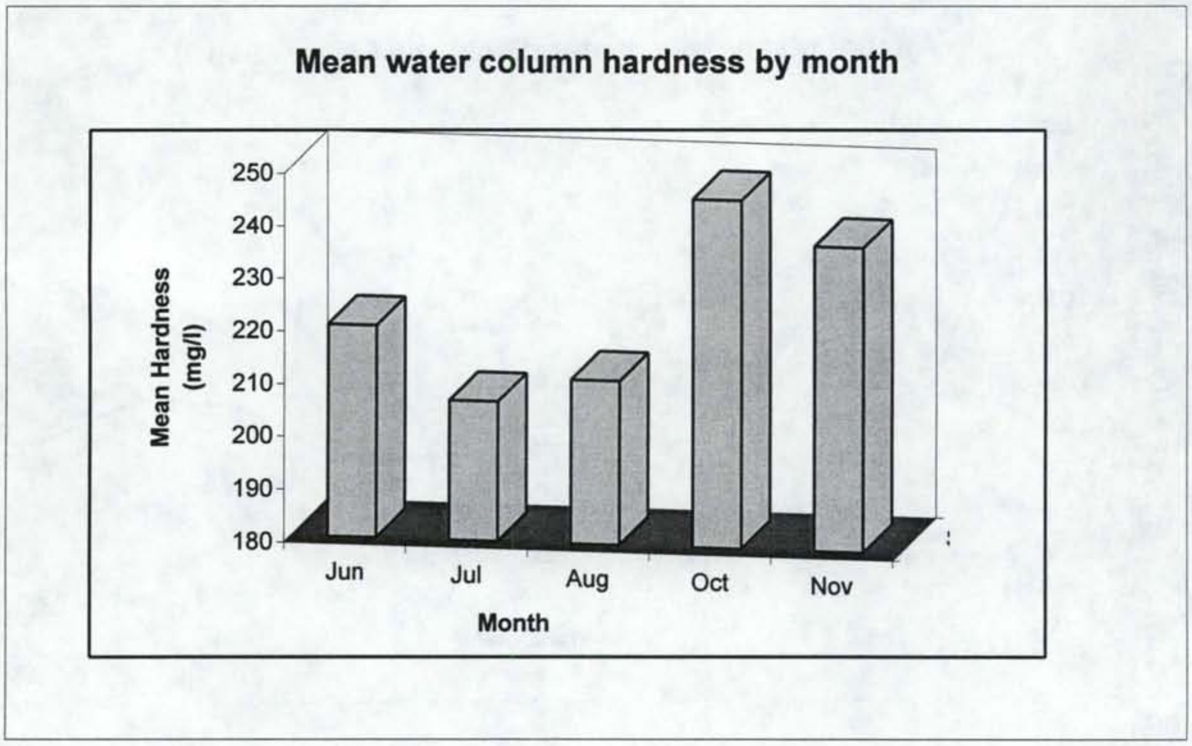


Figure 3. Annual mean daily water discharge (cfs) and total annual flow (ac-ft) of mainstem Snake River recorded at river mile 596.8, six miles northeast of Buhl, Id. for period October 1, 1992 through December 31, 1993. Data extracted from USGS Water Data Reports ID-93-1 and ID-94-1 (USGS 1993 and 1994).



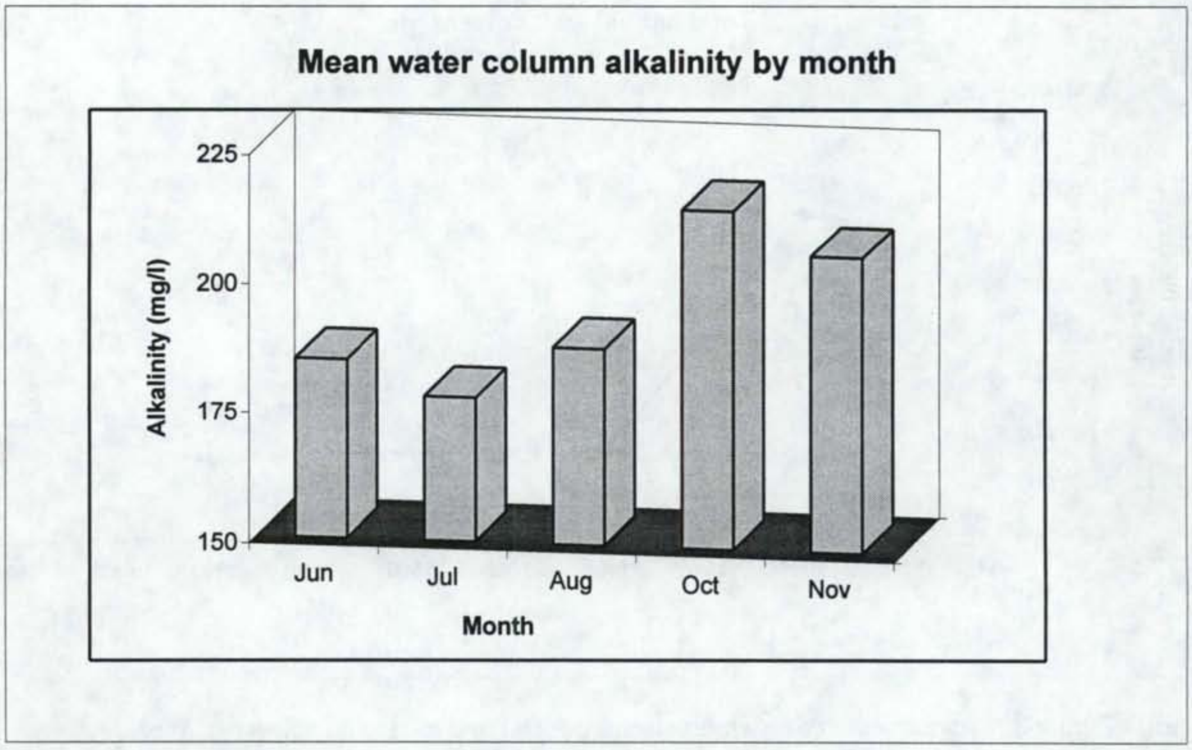
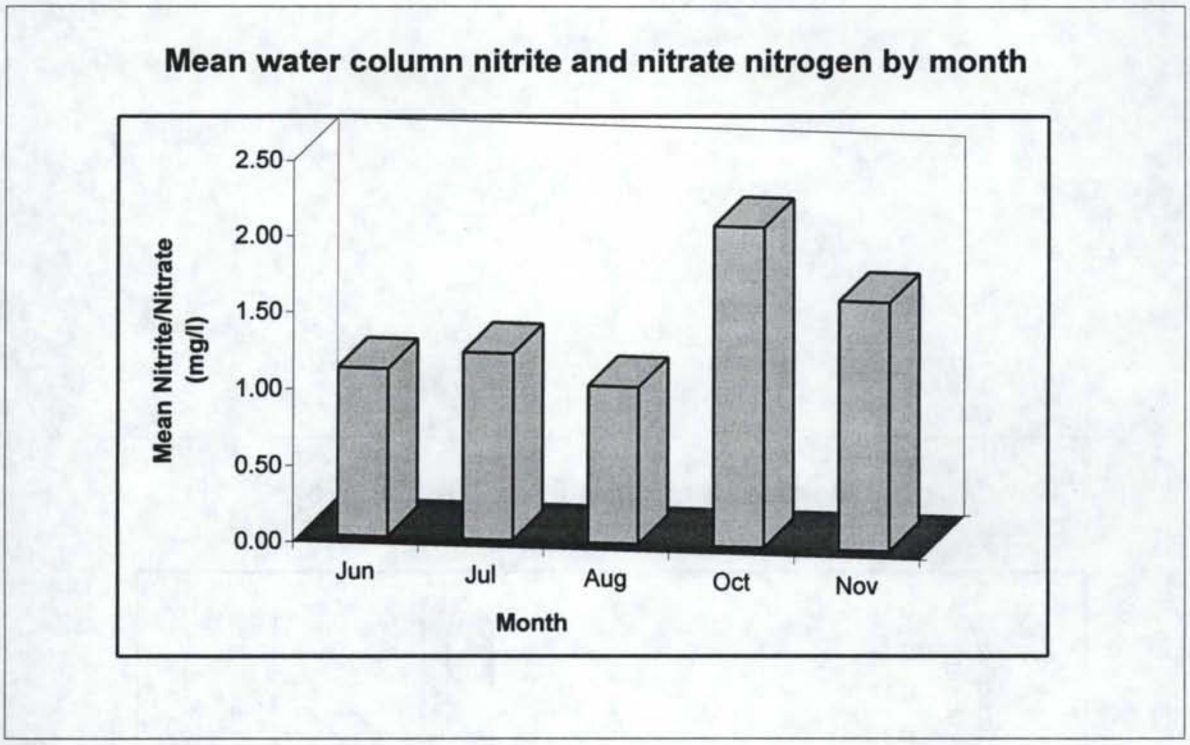


Figure 4. Mean water column hardness and alkalinity by month for all transects (1-7), Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.



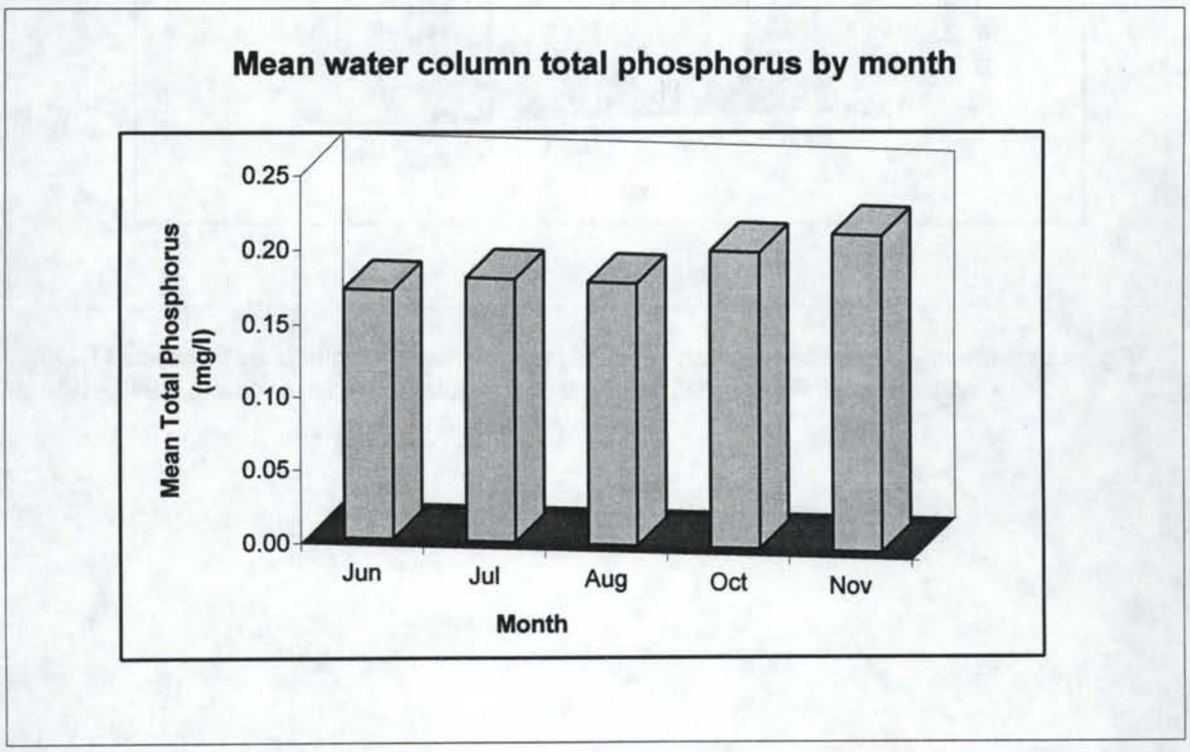


Figure 5. Mean water column nitrite and nitrate nitrogen and total phosphorus by month for all transects (1 - 7), Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

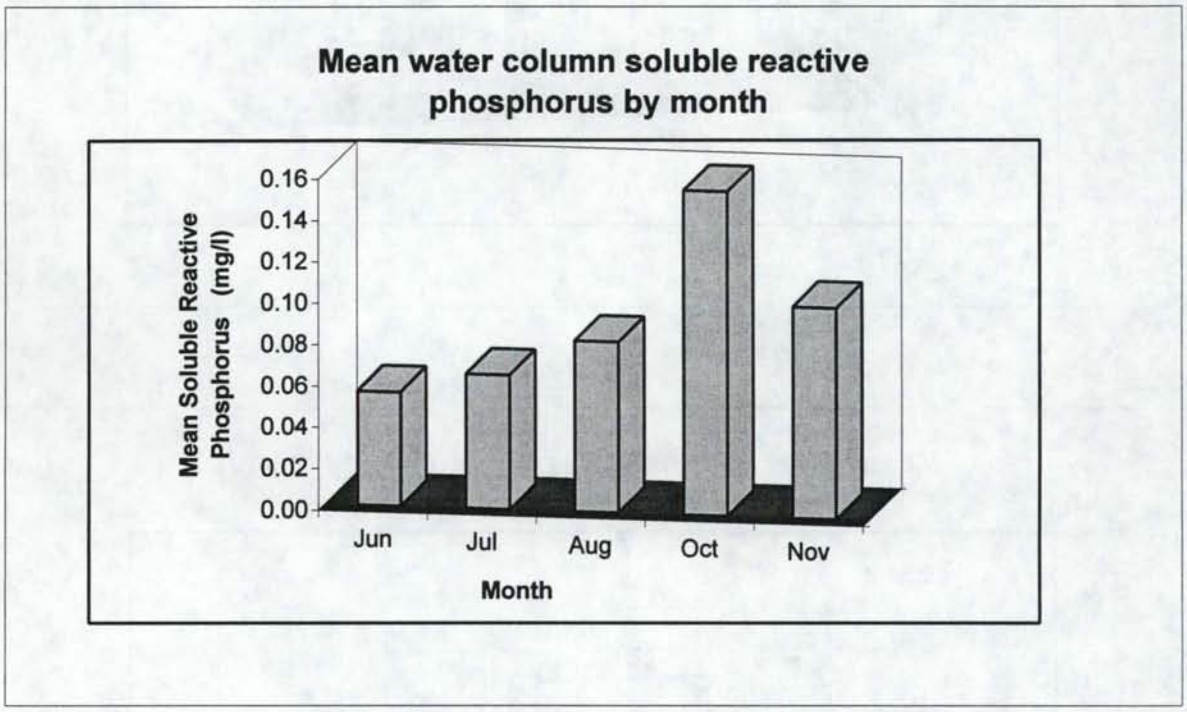


Figure 6. Mean water column soluble reactive phosphorus by month for all transects (1 - 7), Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

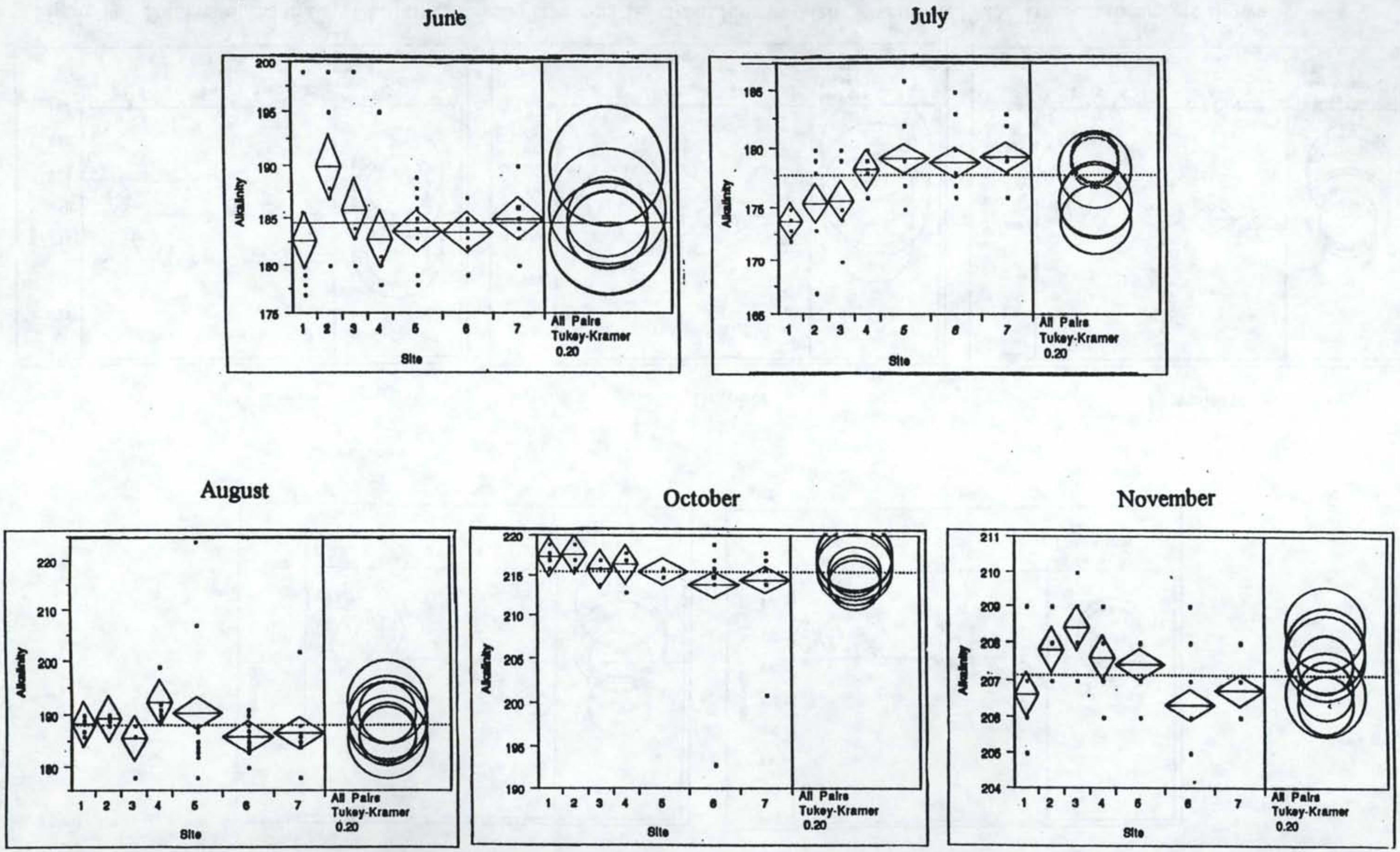


Figure 7. Total alkalinity in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference (p > 0.20) by Tukey-Kramer HSD test.

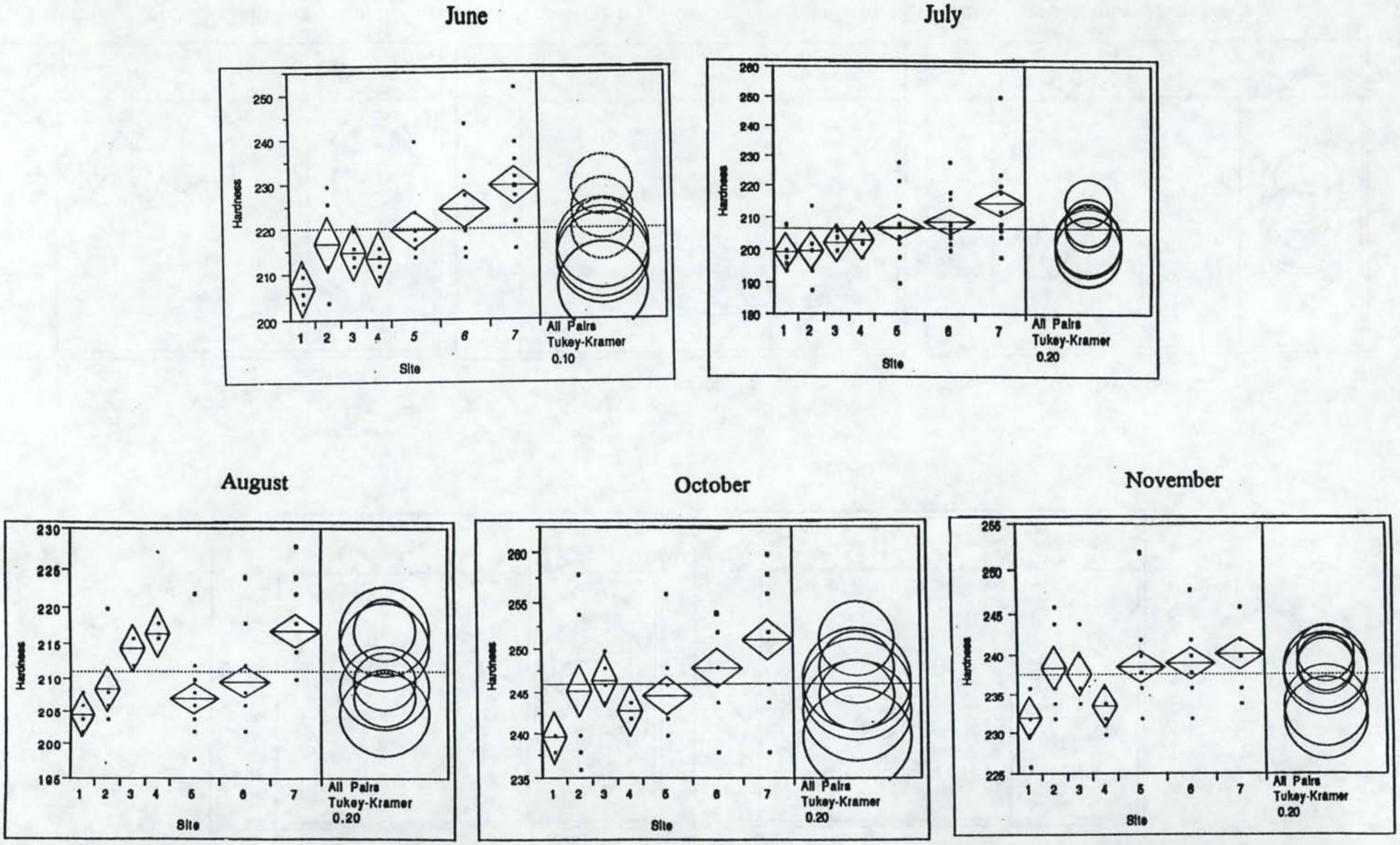


Figure 8. Total hardness in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference ($p > 0.20$) by Tukey-Kramer HSD test.

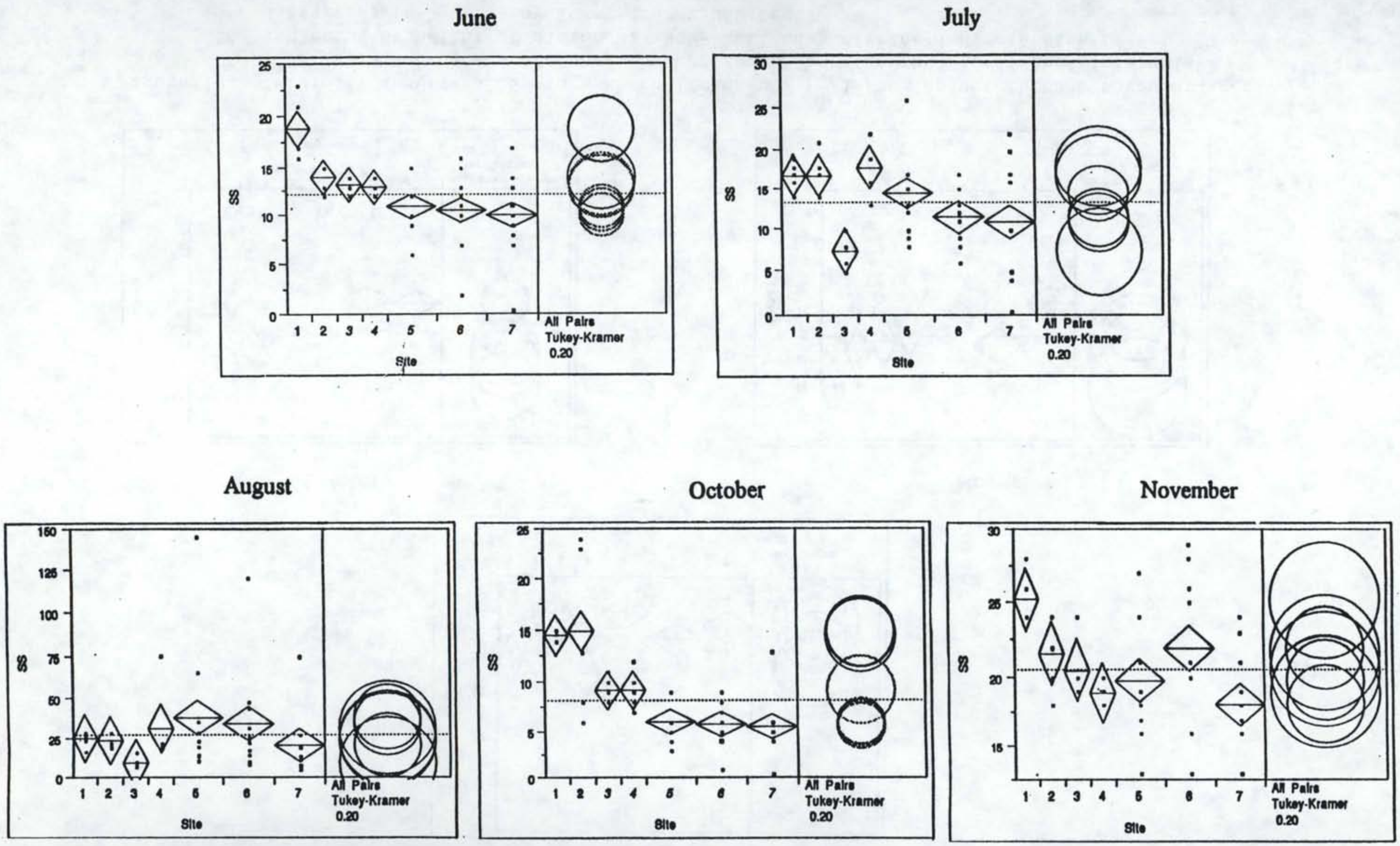


Figure 9. Total suspended solids in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference ($p > 0.20$) by Tukey-Kramer HSD test.

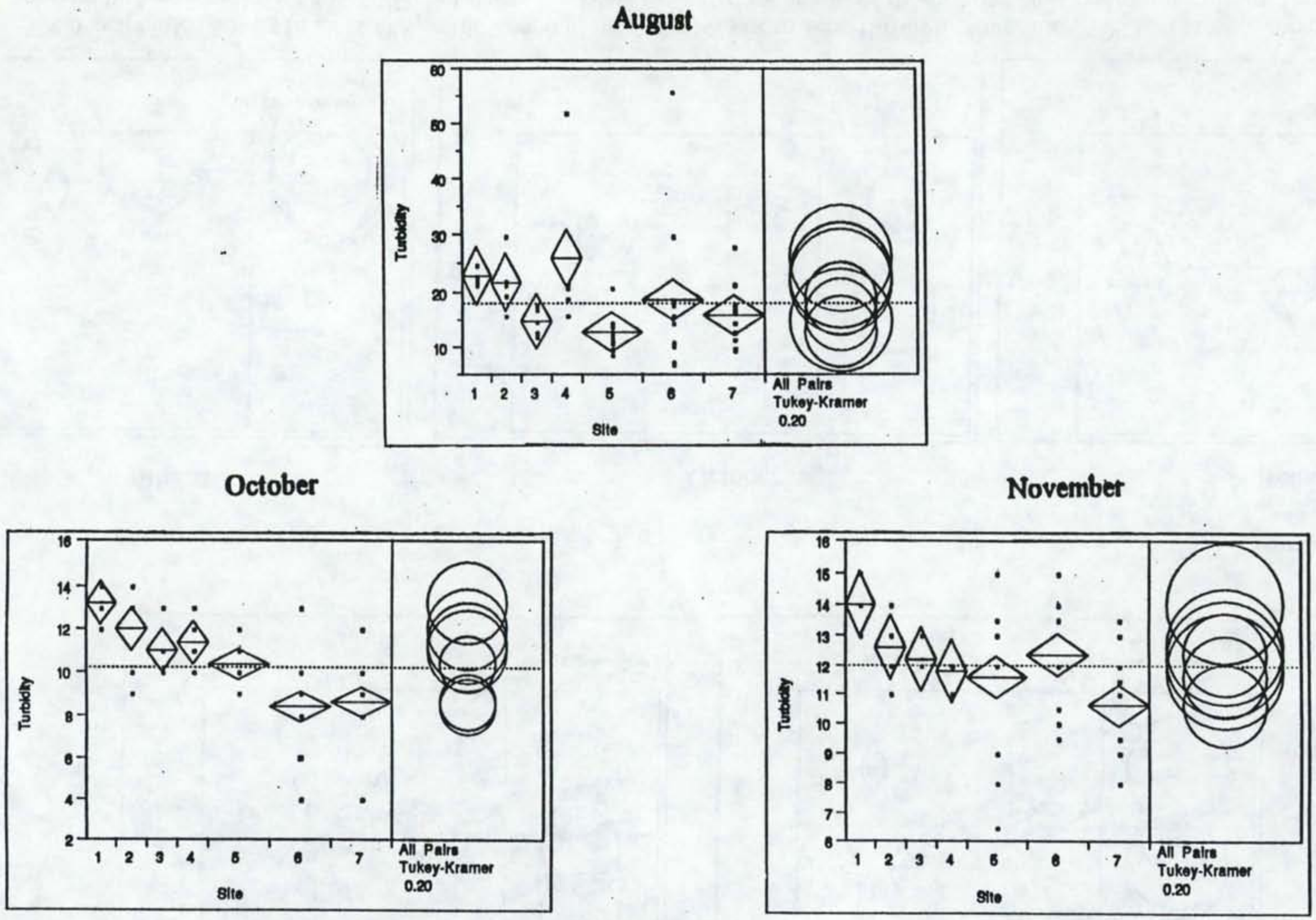


Figure 10. Turbidity in Crystal Springs Reach (Transects 1-7) from August through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference ($p > 0.20$) by Tukey-Kramer HSD test.

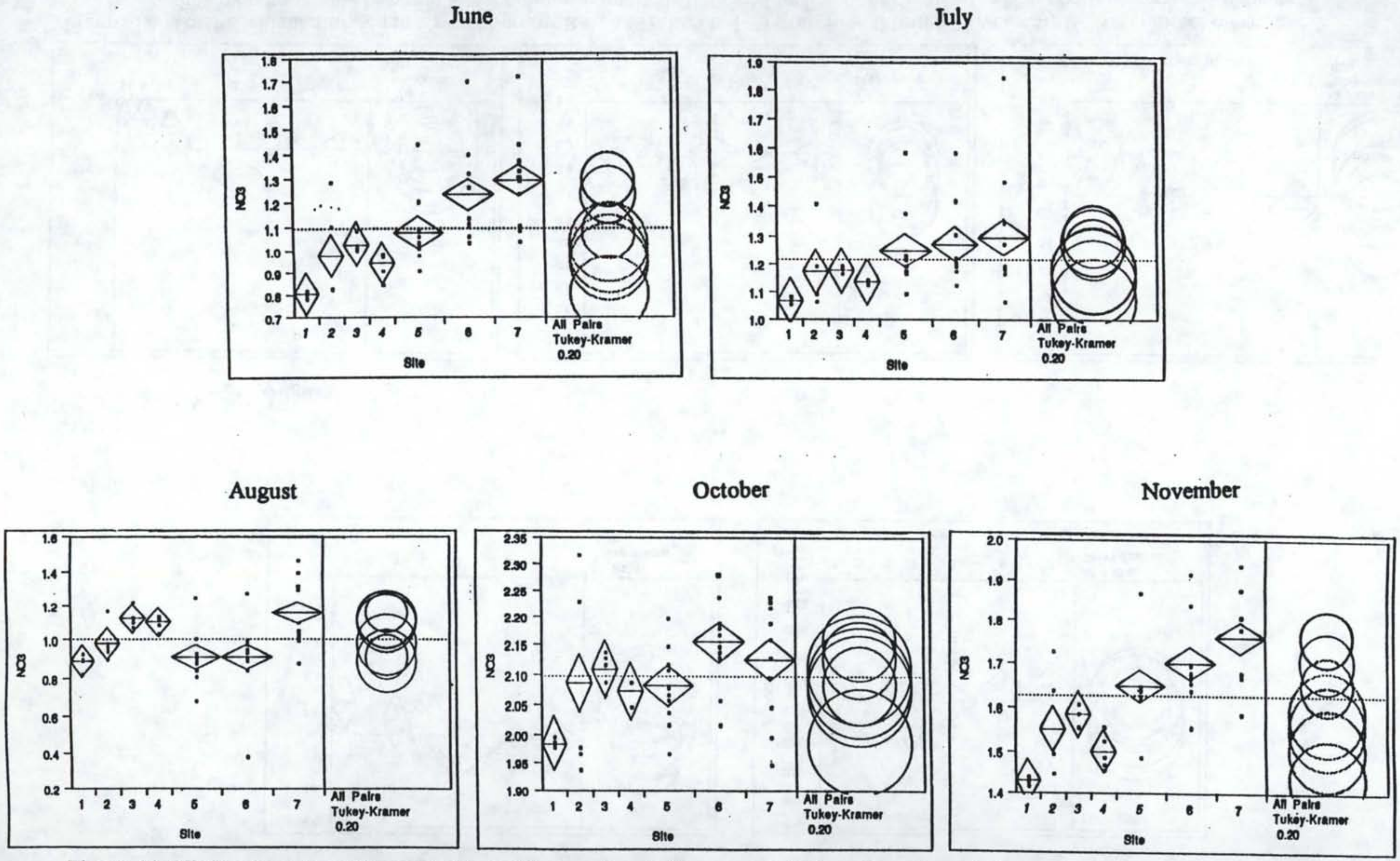


Figure 11. Nitrite plus nitrate nitrogen in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference (p > 0.20) by Tukey-Kramer HSD test.

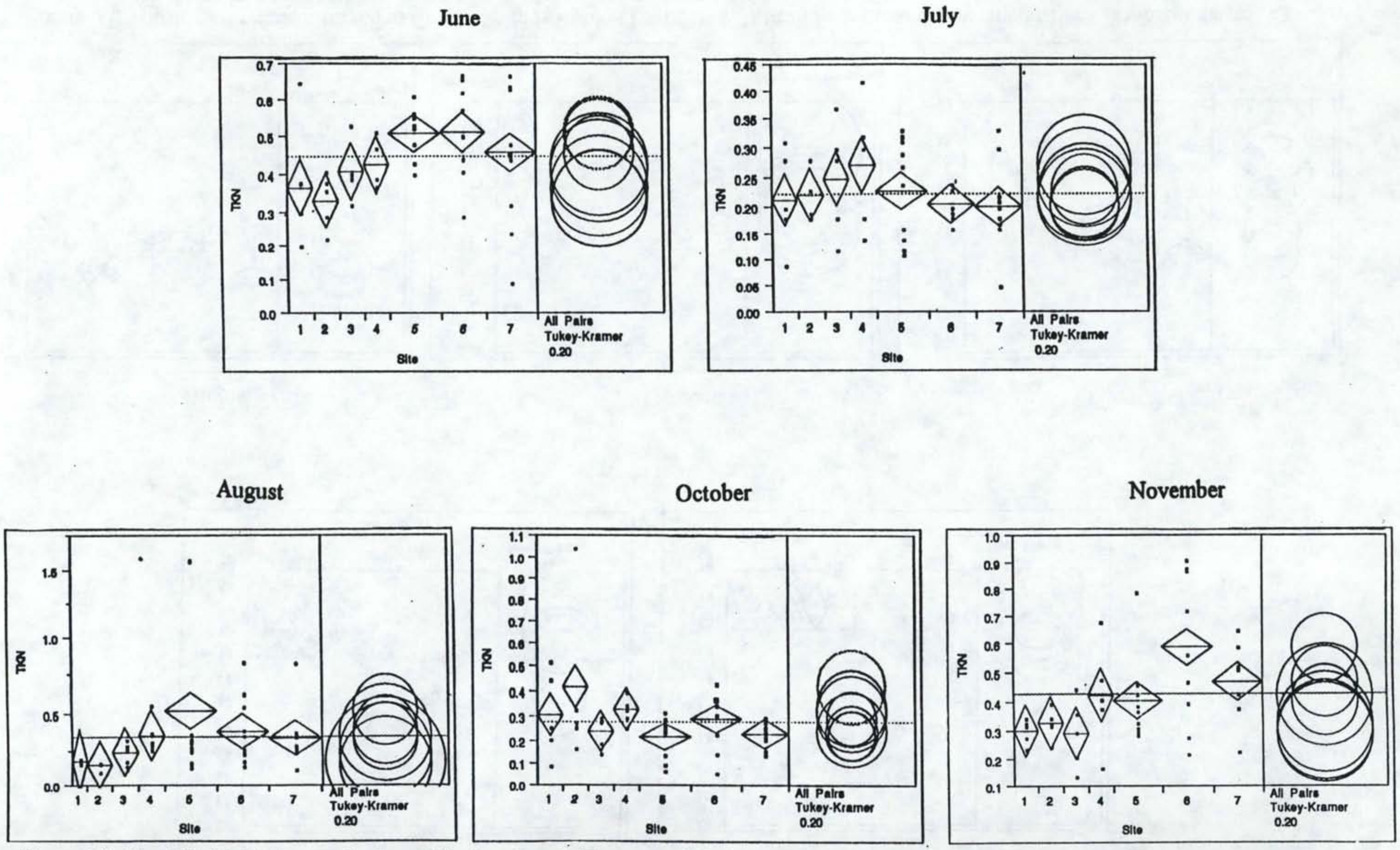


Figure 12. Total Kjeldahl nitrogen in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference (p > 0.20) by Tukey-Kramer HSD test.

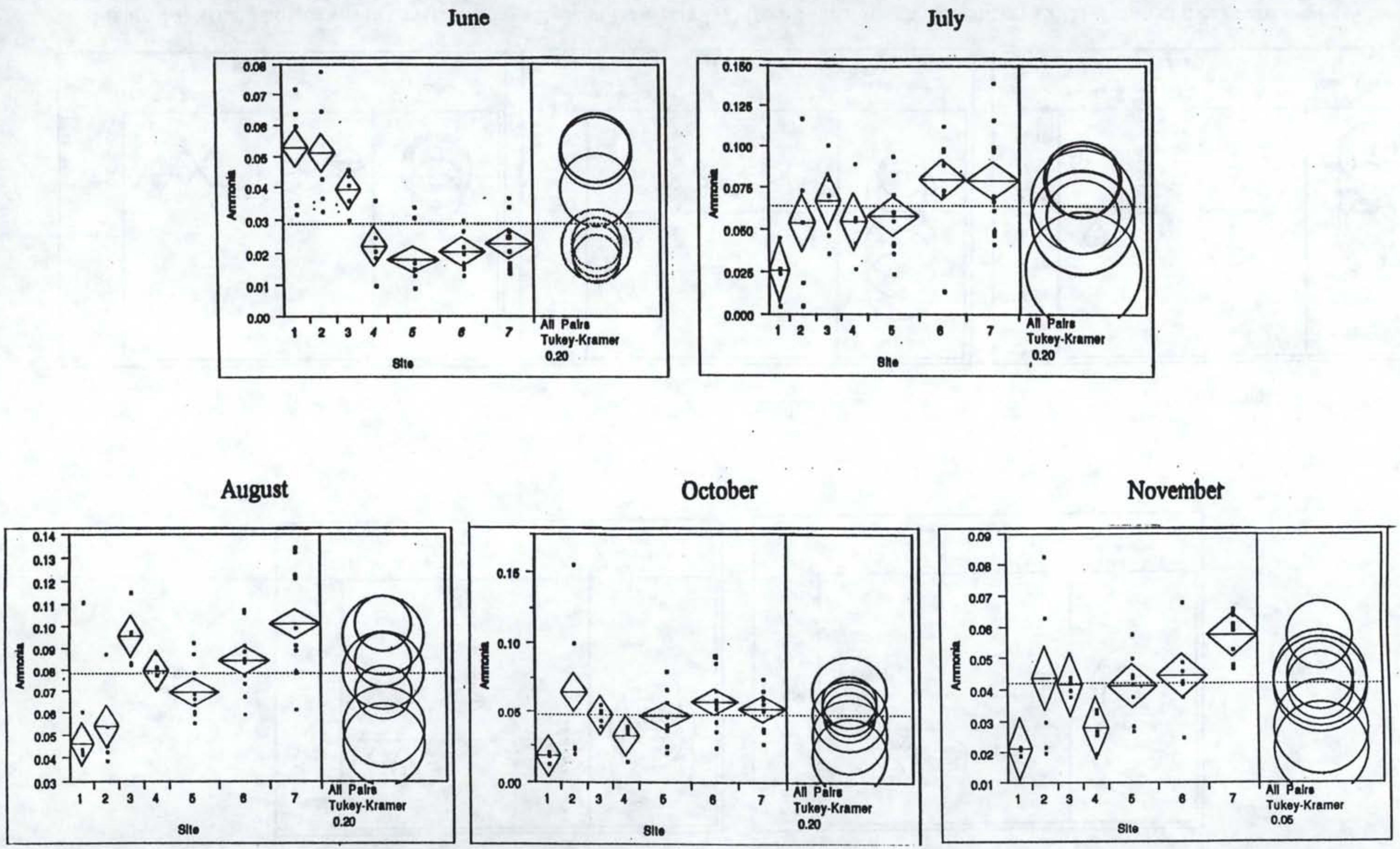


Figure 13. Total ammonia nitrogen in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference ($p > 0.20$) by Tukey-Kramer HSD test.

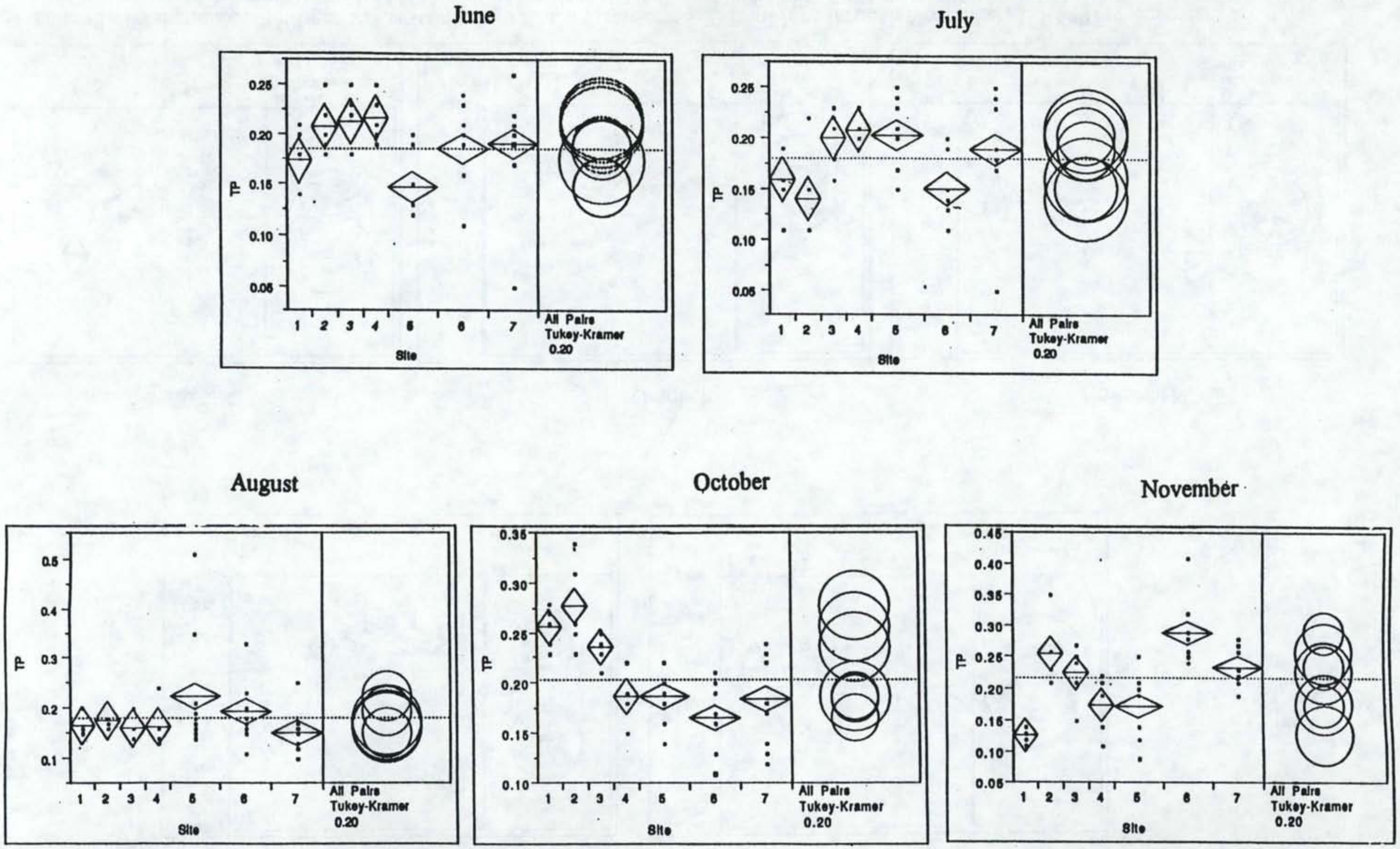


Figure 14. Total phosphorus in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference ($p > 0.20$) by Tukey-Kramer HSD test.

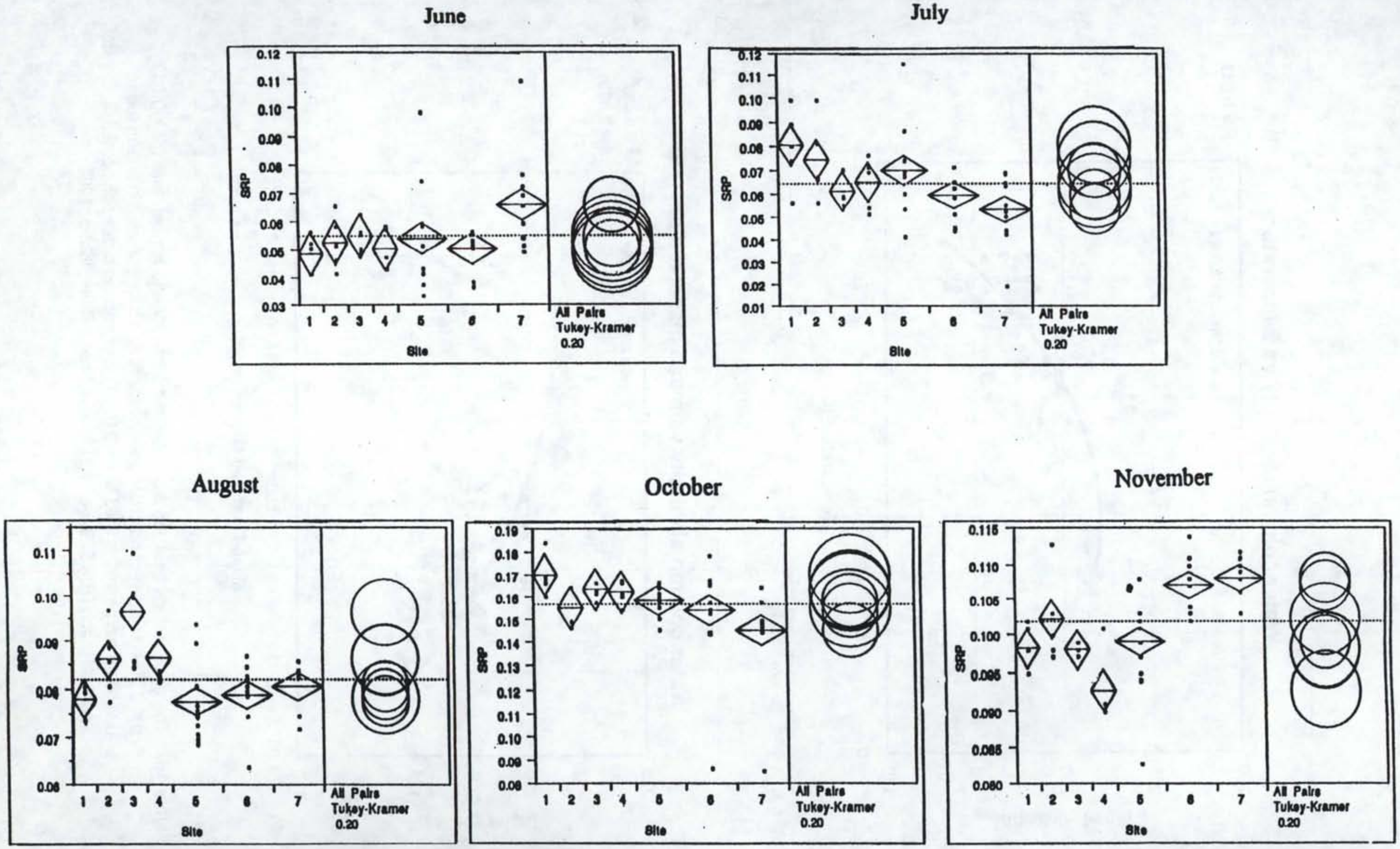
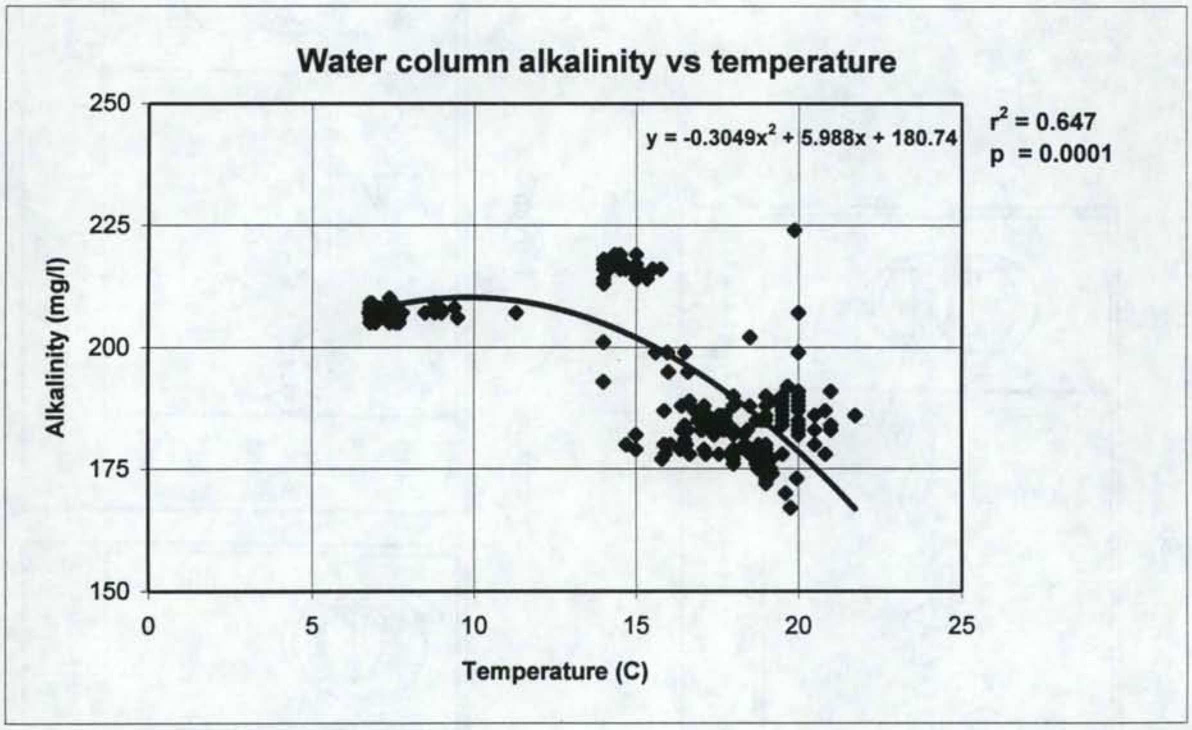


Figure 15. Soluble reactive phosphorus in Crystal Springs Reach (Transects 1-7) from June through November, 1993. Transect means are shown by horizontal bars and 80% confidence intervals indicated by height of diamonds. Non-contiguous circles indicate significant difference ($p > 0.20$) by Tukey-Kramer HSD test.



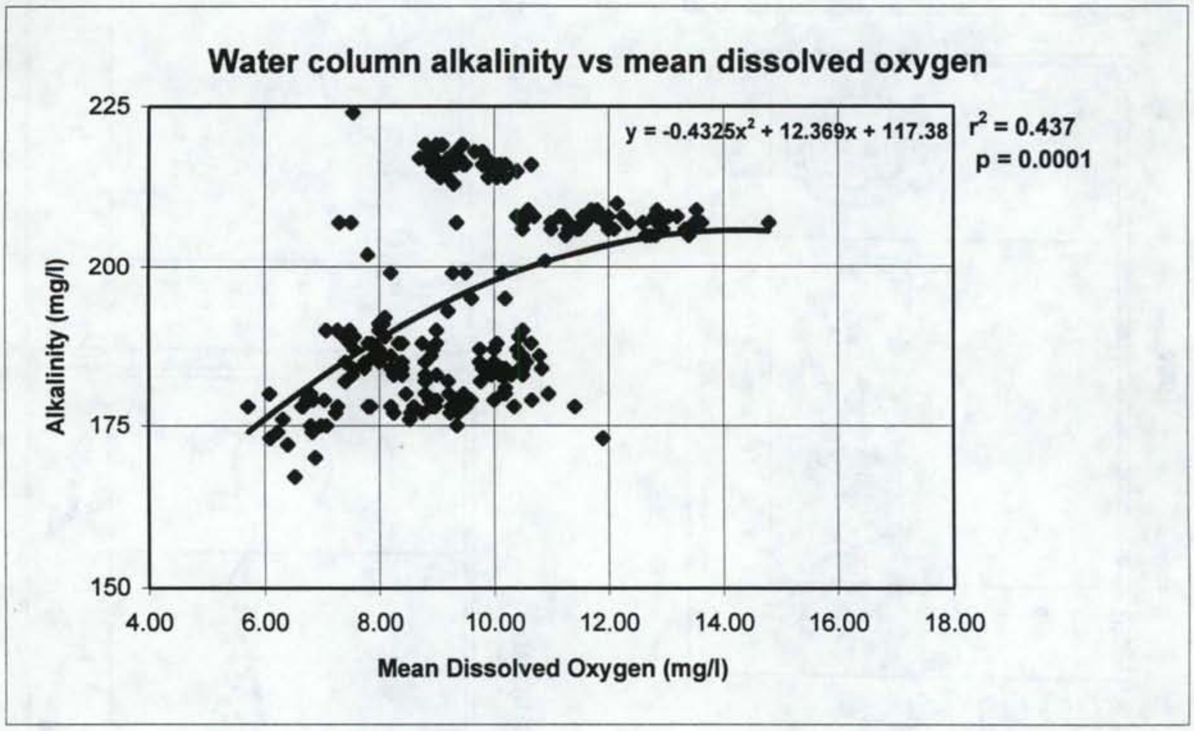
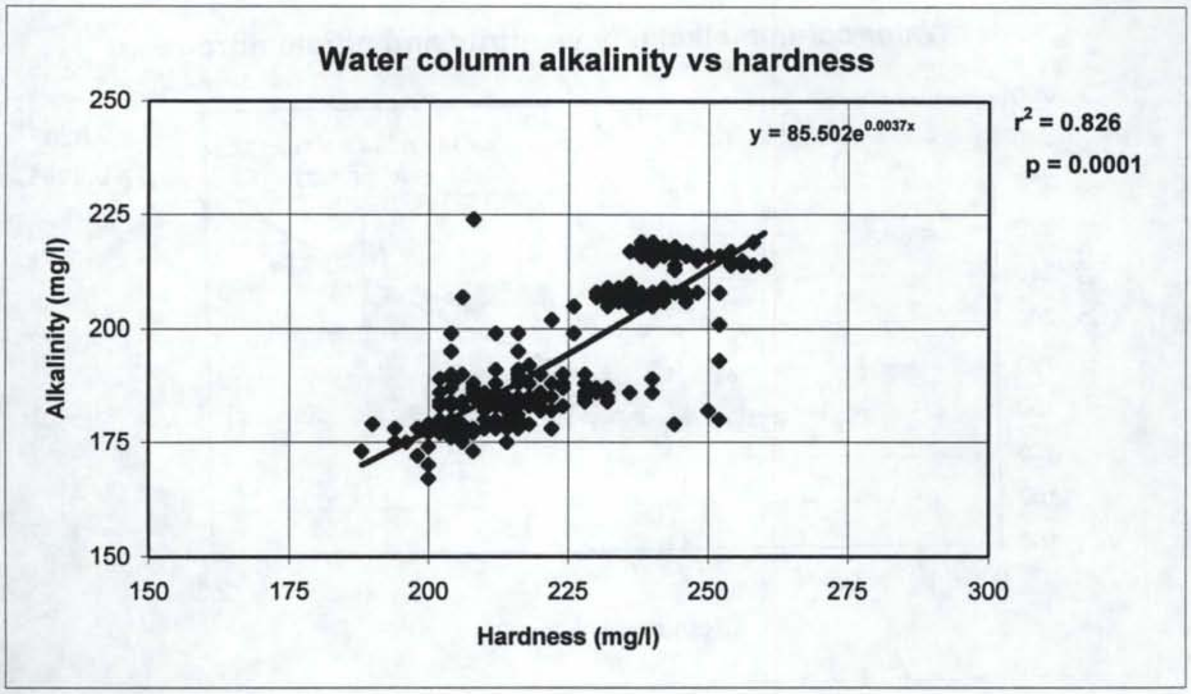


Figure 16. The relationships between water column alkalinity and temperature (r2 = 0.647, p = 0.0001) with second order polynomial fit and between alkalinity and mean dissolved oxygen (r2 = 0.437, p = 0.0001) with second order polynomial fit, Crystal Springs Reach (RM 599.5-601.3),Middle Snake River, Idaho, 1993.



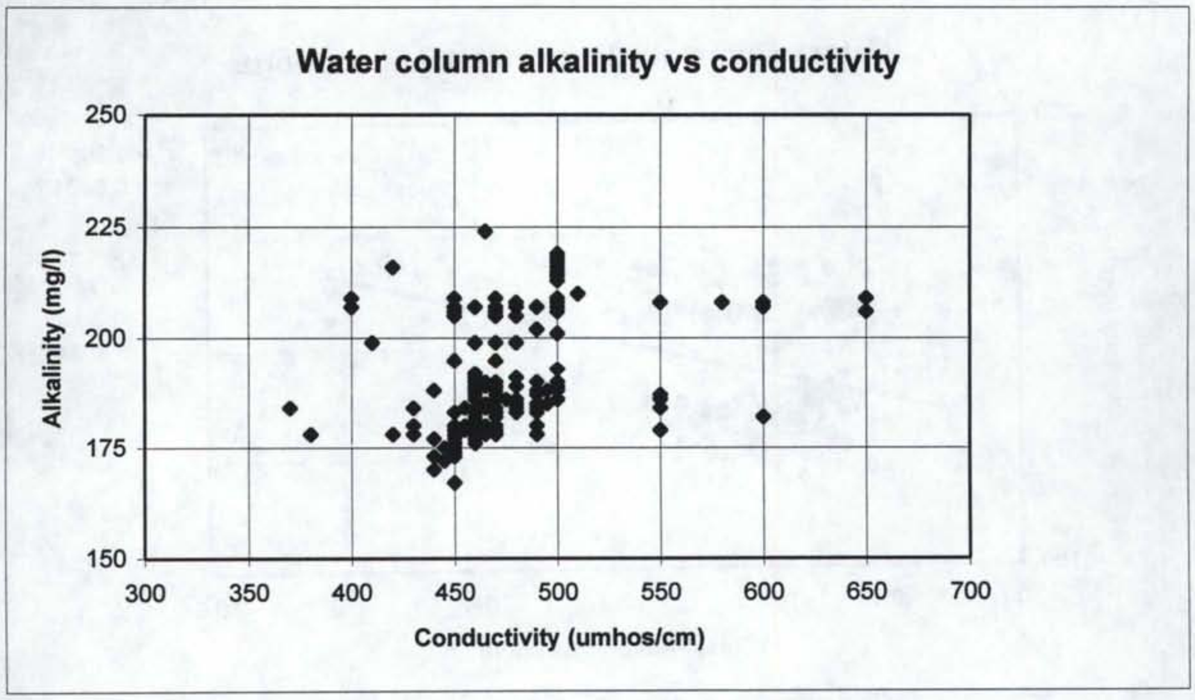
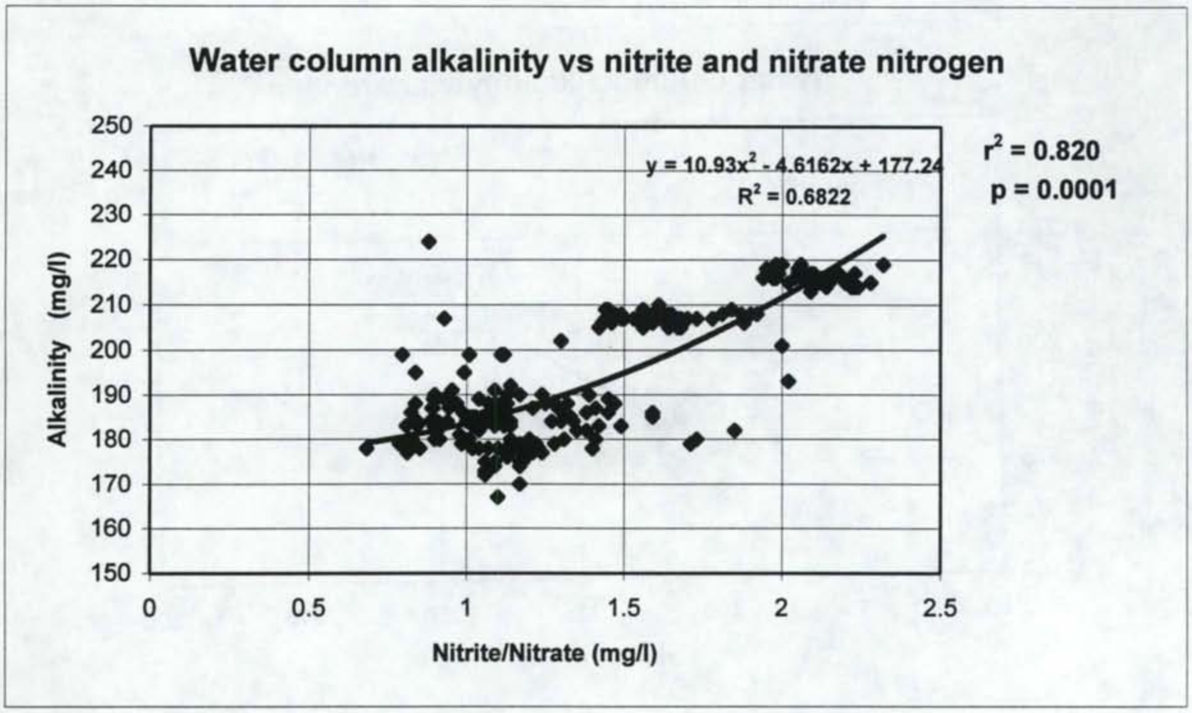


Figure 17. The relationships between water column alkalinity and hardness (r2 = 0.826, p = 0.0001) with best fit exponential curve and between alkalinity and conductivity, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.



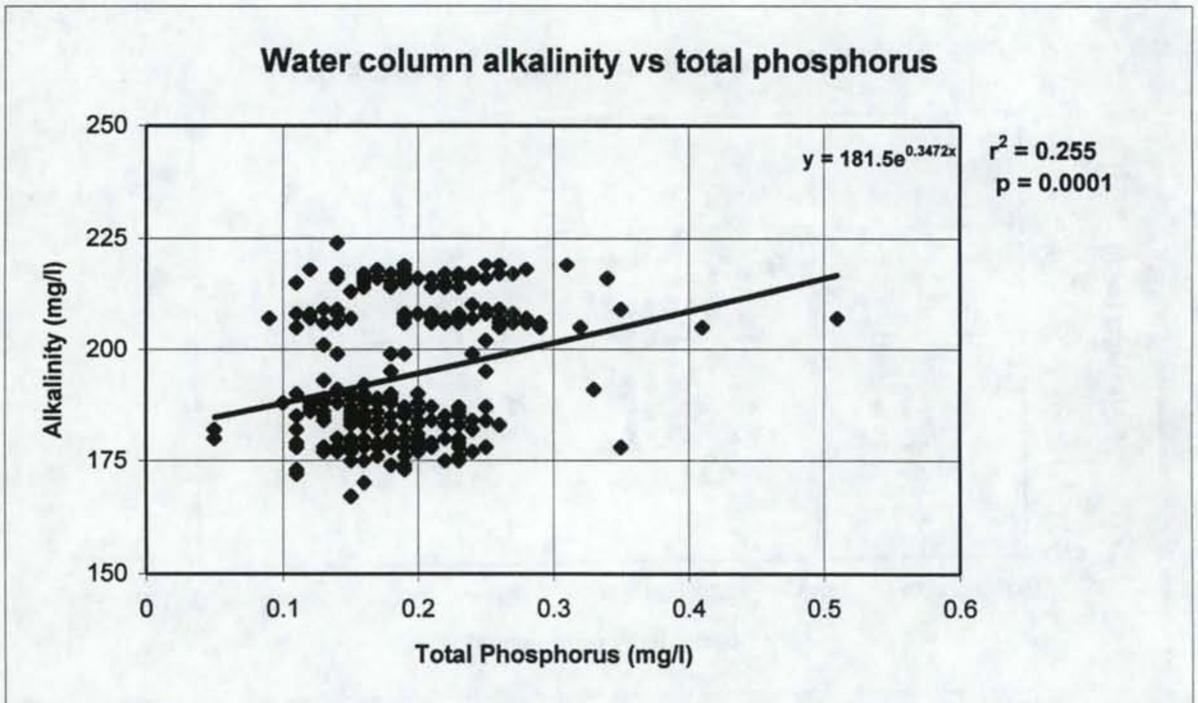


Figure 18. The relationships between water column alkalinity and nitrite/nitrate nitrogen (r2 = 0.820, p = 0.0001) with second order polynomial fit and alkalinity and total phosphorus (r2 = 0.255, p = 0.0001) with exponential curve fit, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

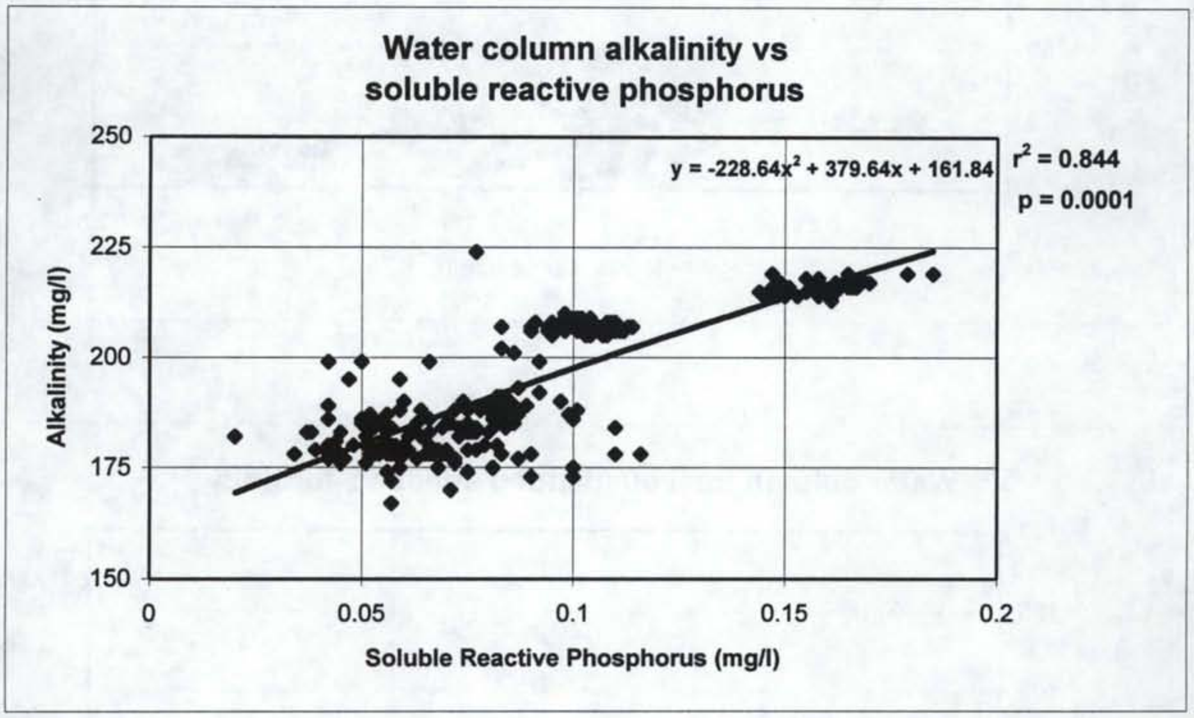
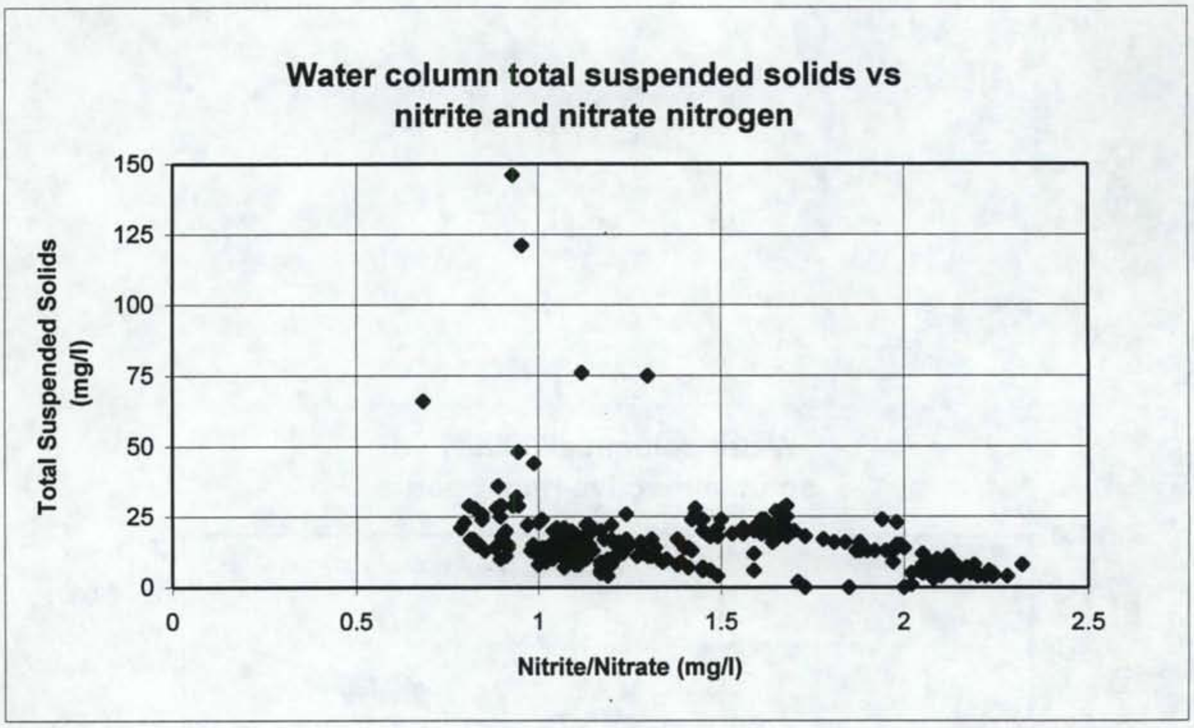


Figure 19. The relationship between water column alkalinity and soluble reactive phosphorus (r2 = 0.844, p = 0.0001) with second order polynomial fit, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.



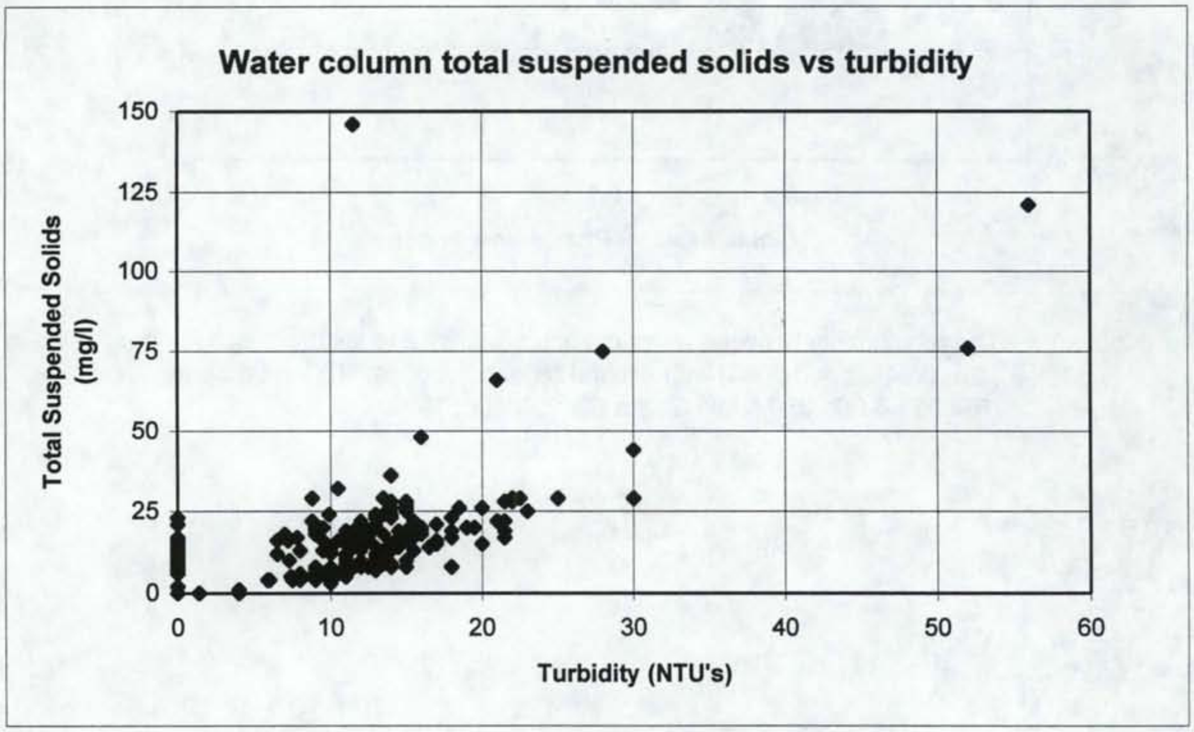


Figure 20. The relationships between water column total suspended solids and nitrite / nitrate nitrogen and between total suspended solids and turbidity, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

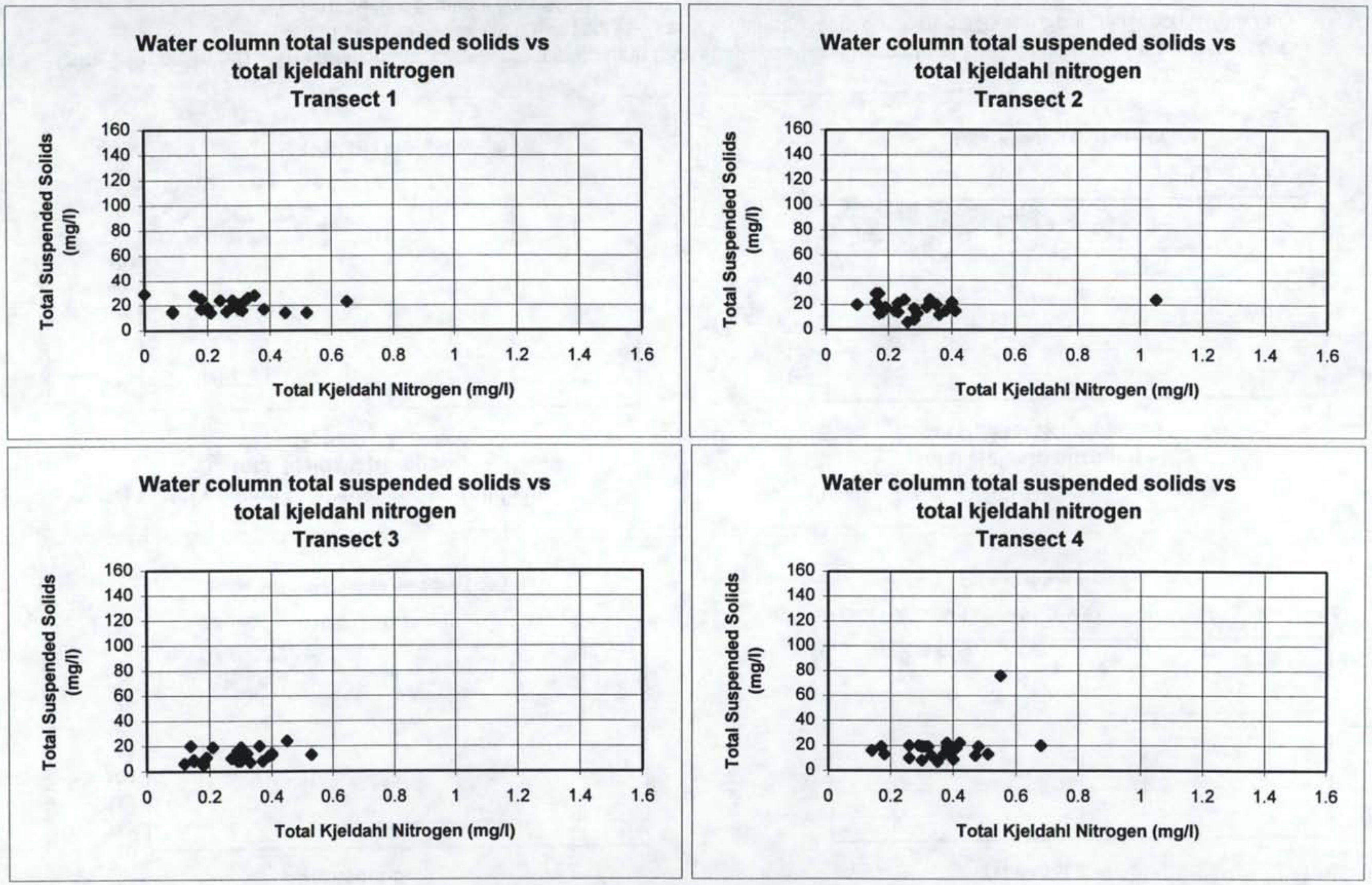


Figure 21. The relationship between water column total suspended solids and total kjeldahl nitrogen for each transect plotted separately (1-7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, 1993.

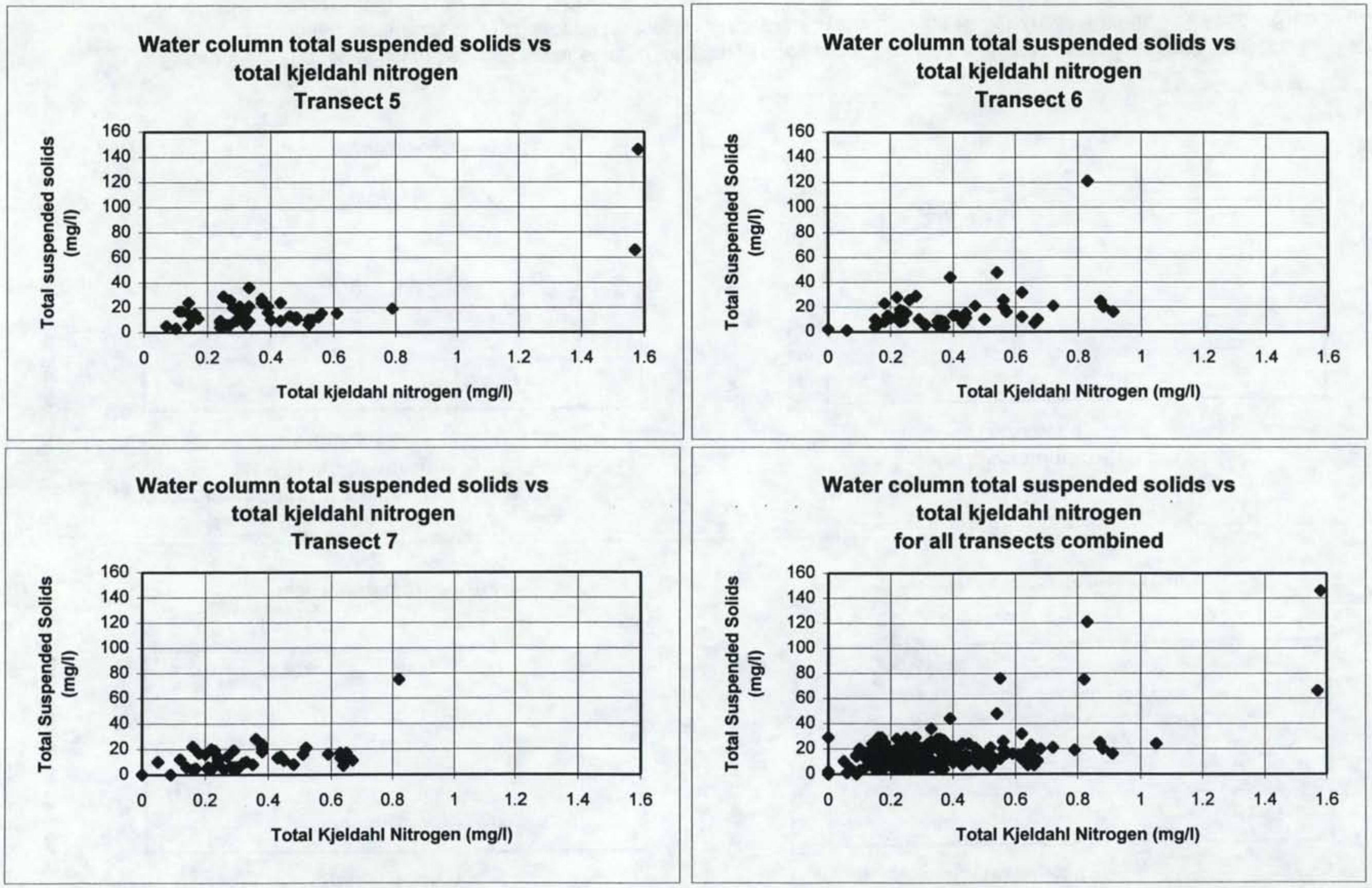


Figure 21 (continued). The relationship between water column total suspended solids and total kjeldahl nitrogen for each transect plotted separately for each transect (1-7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, 1993.

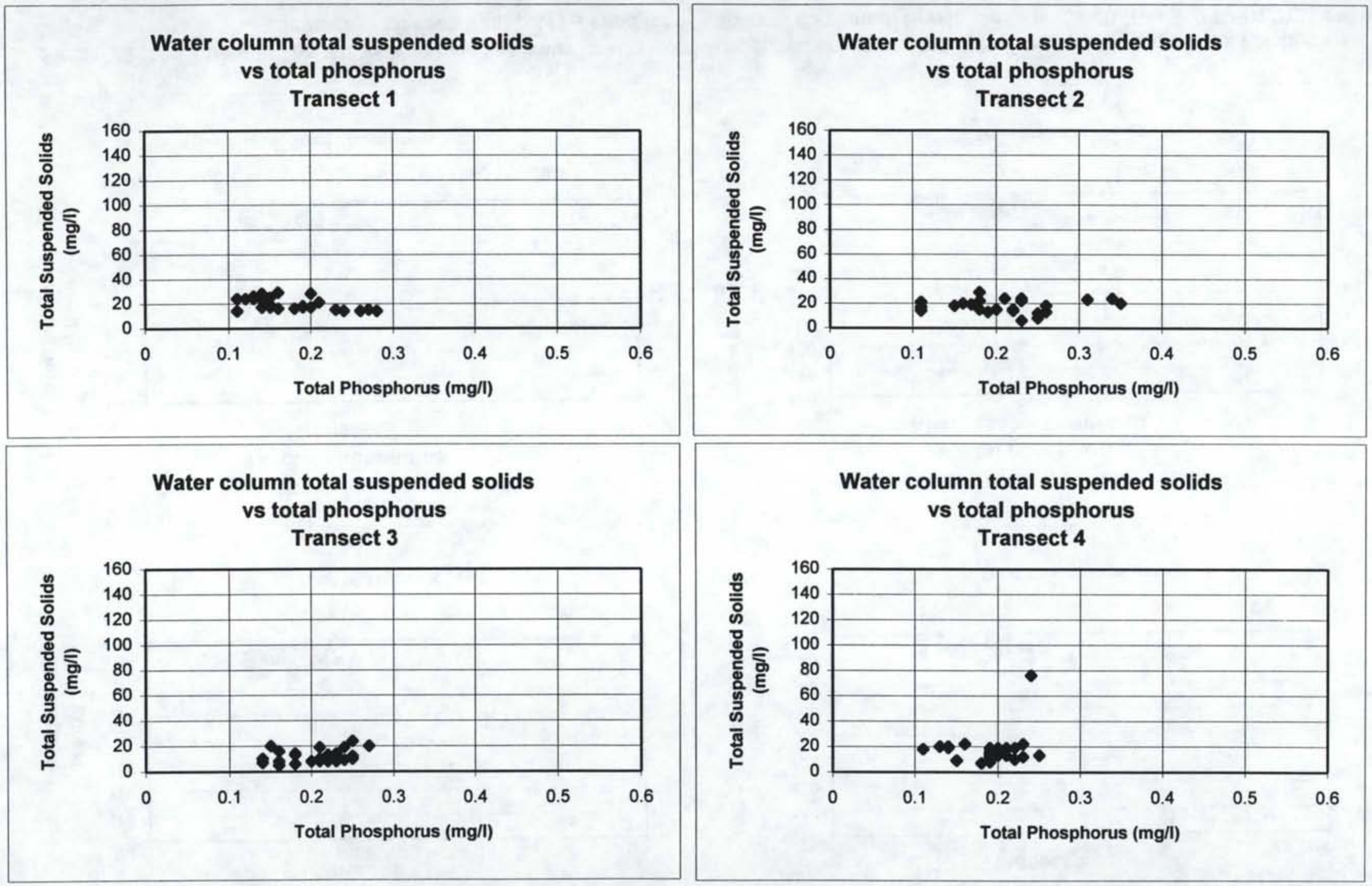


Figure 22. The relationship between water column total suspended solids and total phosphorus for each transect plotted separately for each transect (1-7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, 1993.

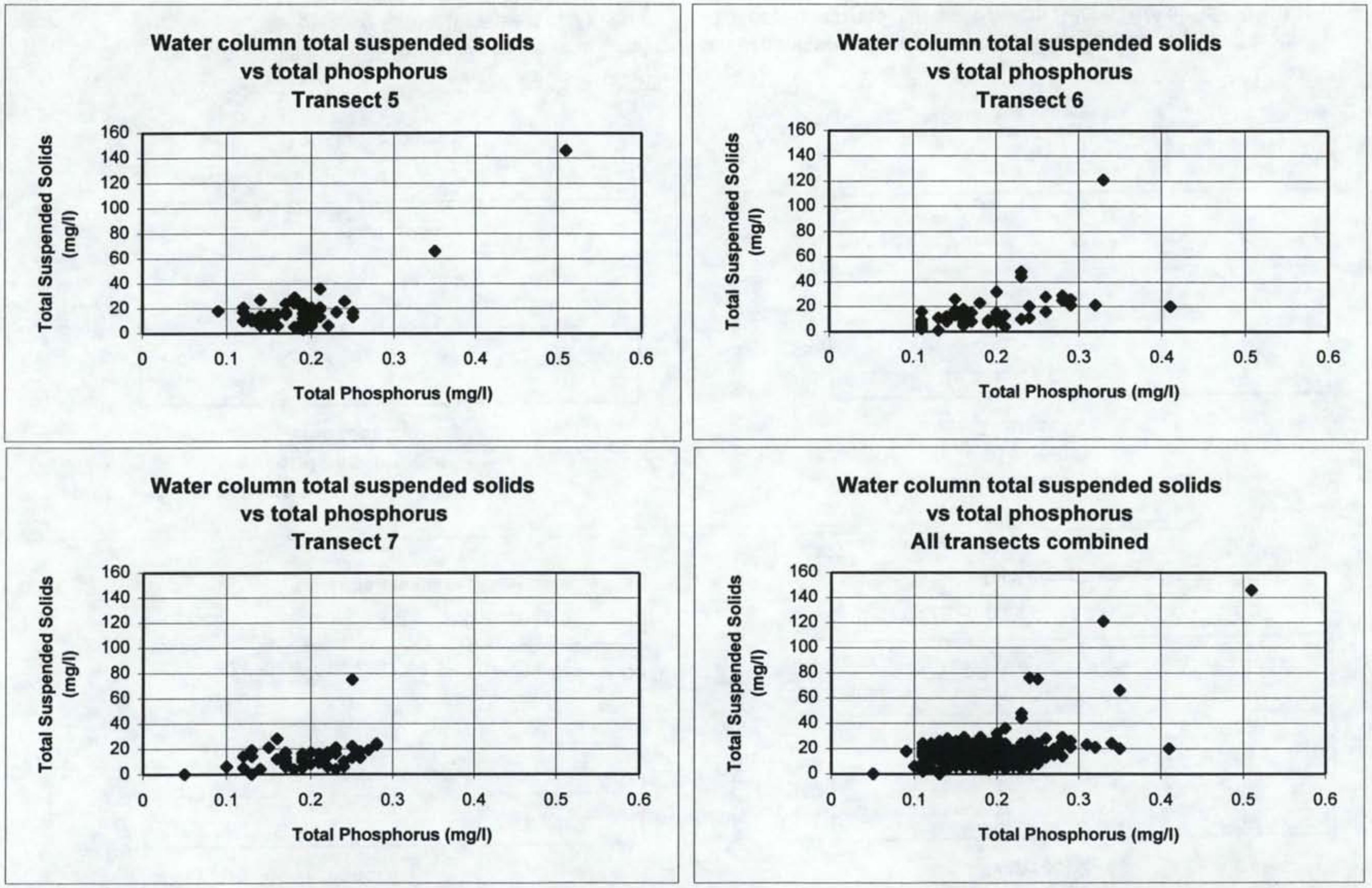
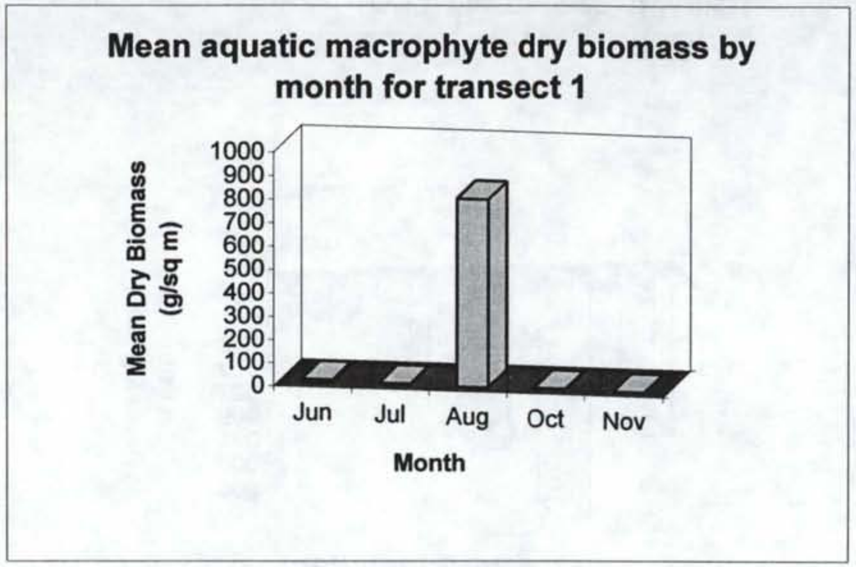
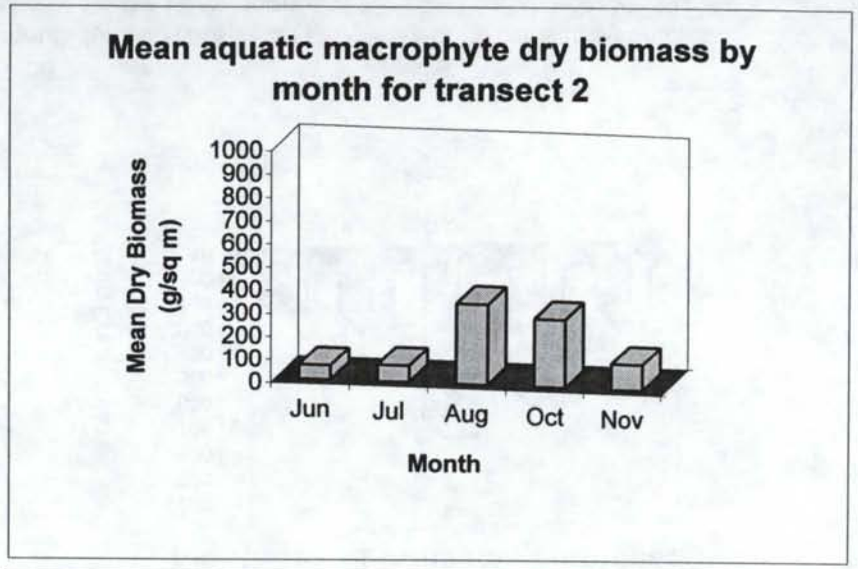
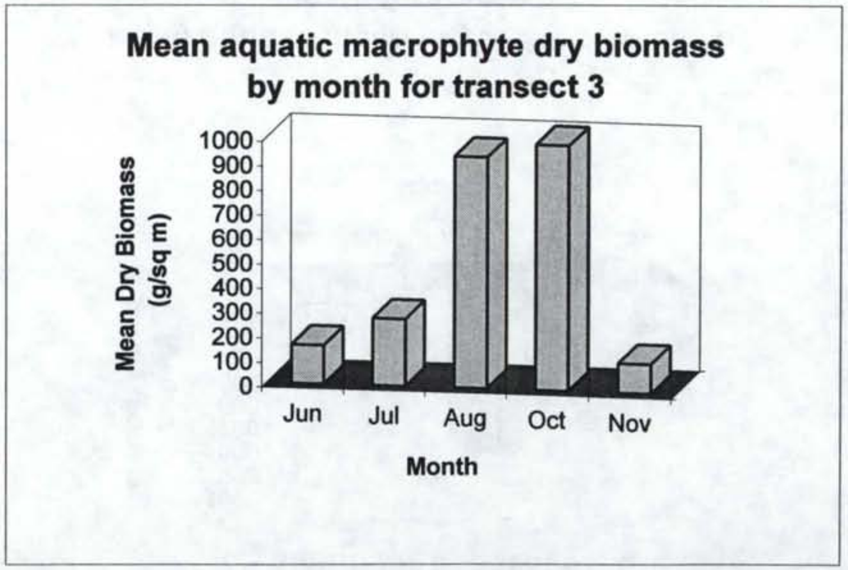


Figure 22 (continued). The relationship between water column total suspended solids and total phosphorus for each transect plotted separately for each transect (1-7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, 1993.







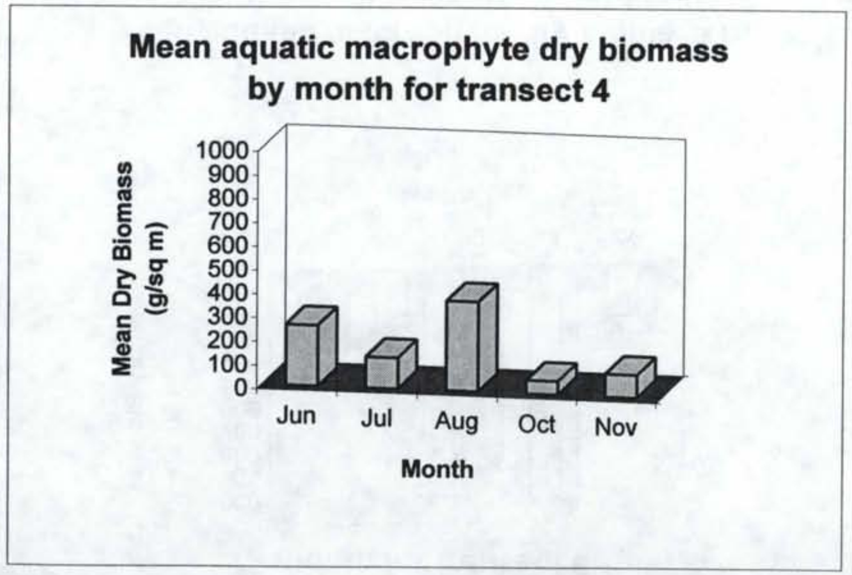


Figure 23. Mean aquatic macrophyte dry biomass by month for each transect (1 - 7), and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

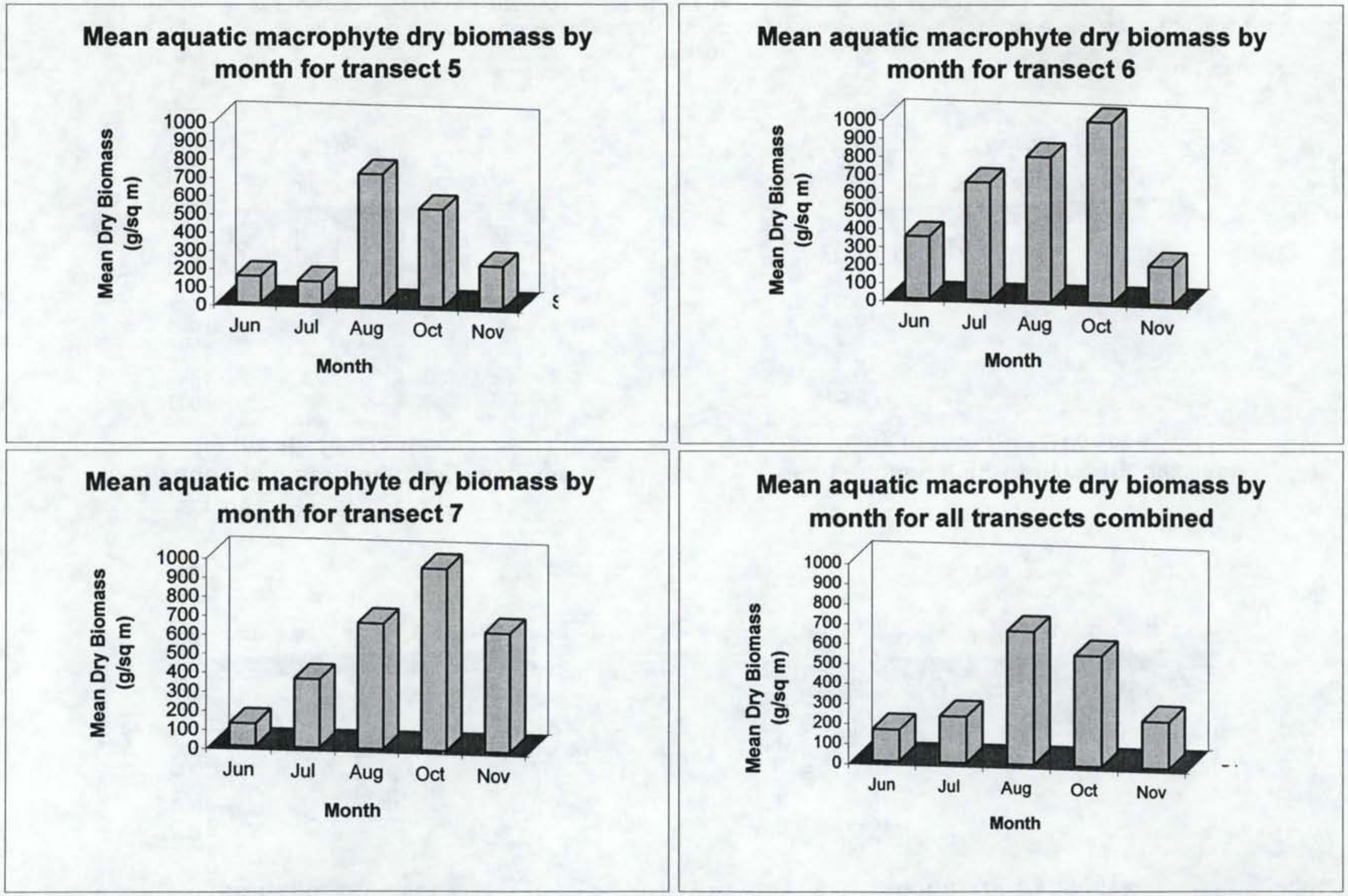
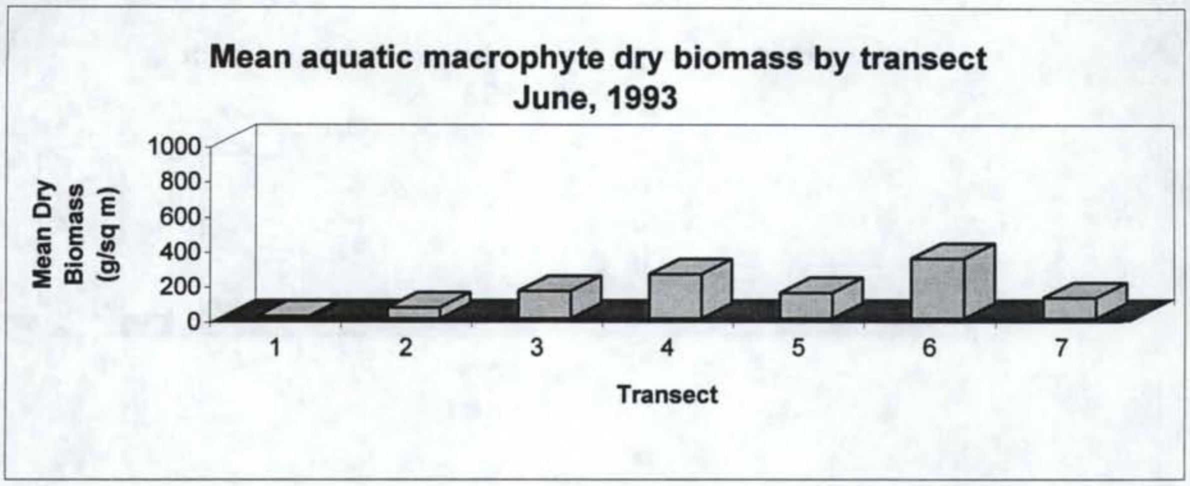
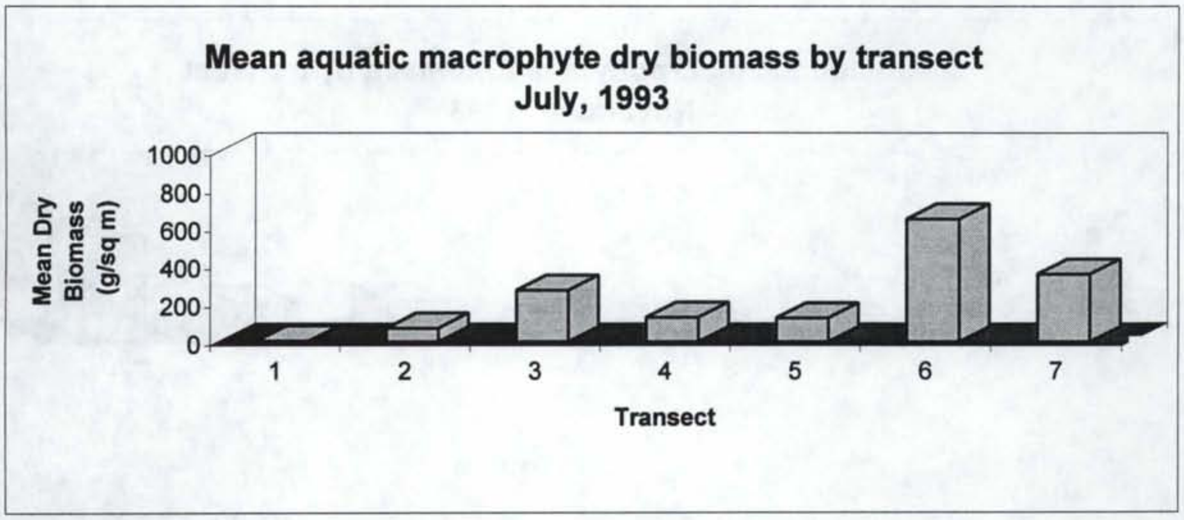


Figure 23 (continued). Mean aquatic macrophyte dry biomass by month for each transect (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.





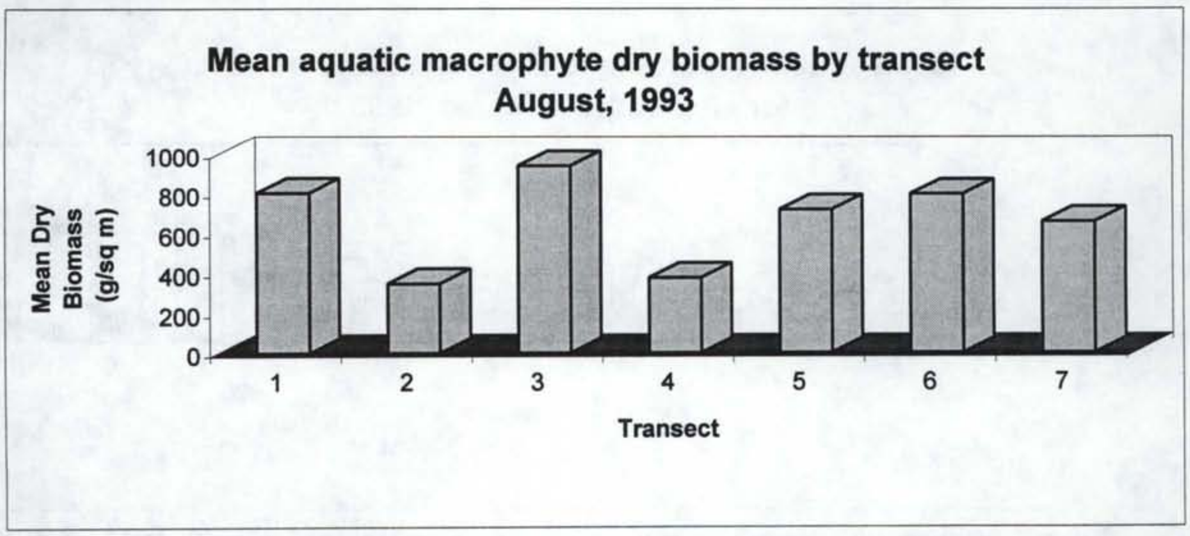
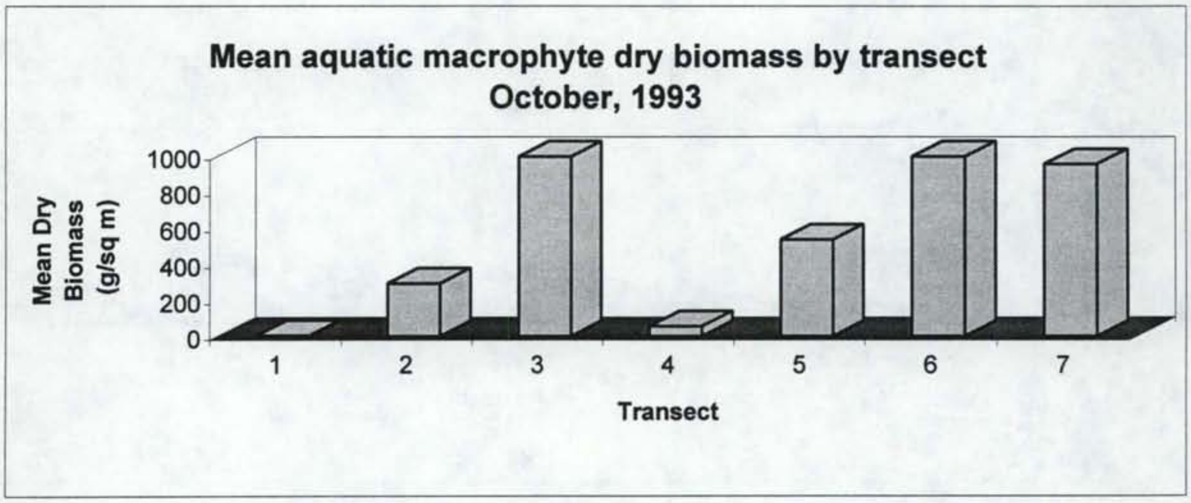
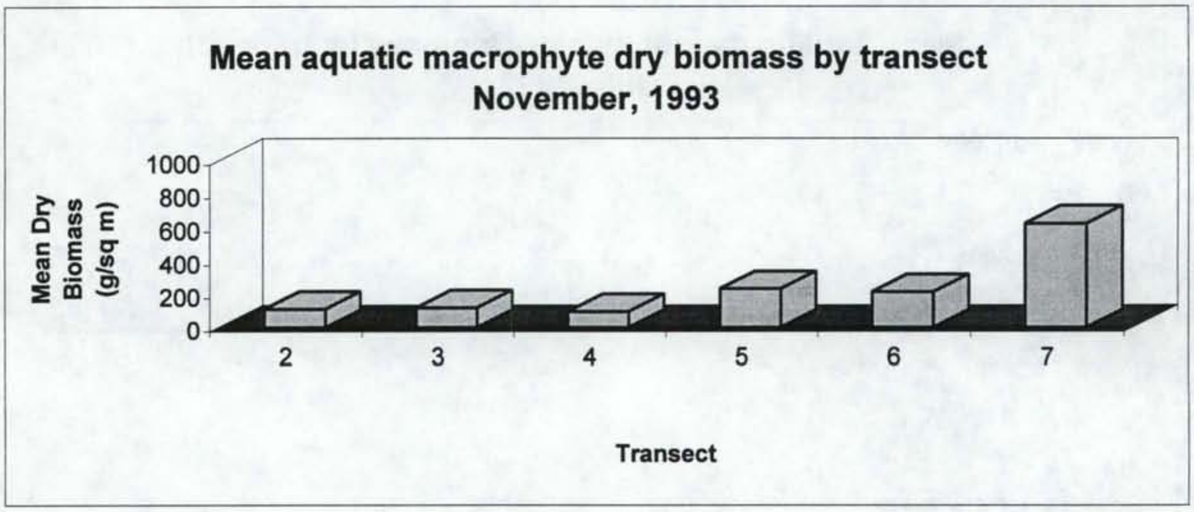


Figure 24. Mean aquatic macrophyte dry biomass for all transects (1 - 7) plotted separately for June, July, August, October, and November, and for all months combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.





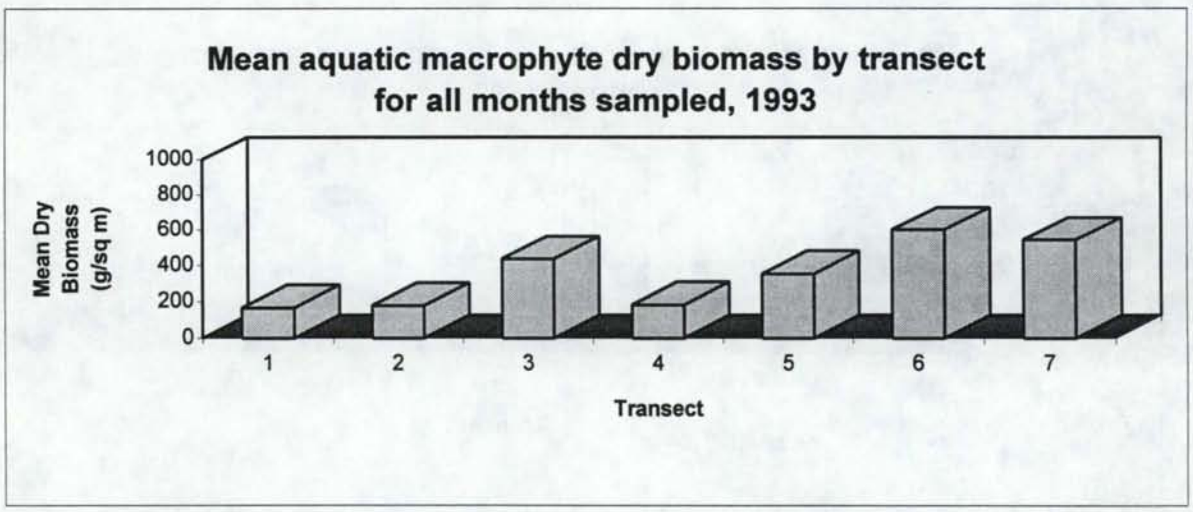


Figure 24 (continued). Mean aquatic macrophyte dry biomass for all transects (1 - 7) plotted separately for June, July, August, October, and November, and for all months combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

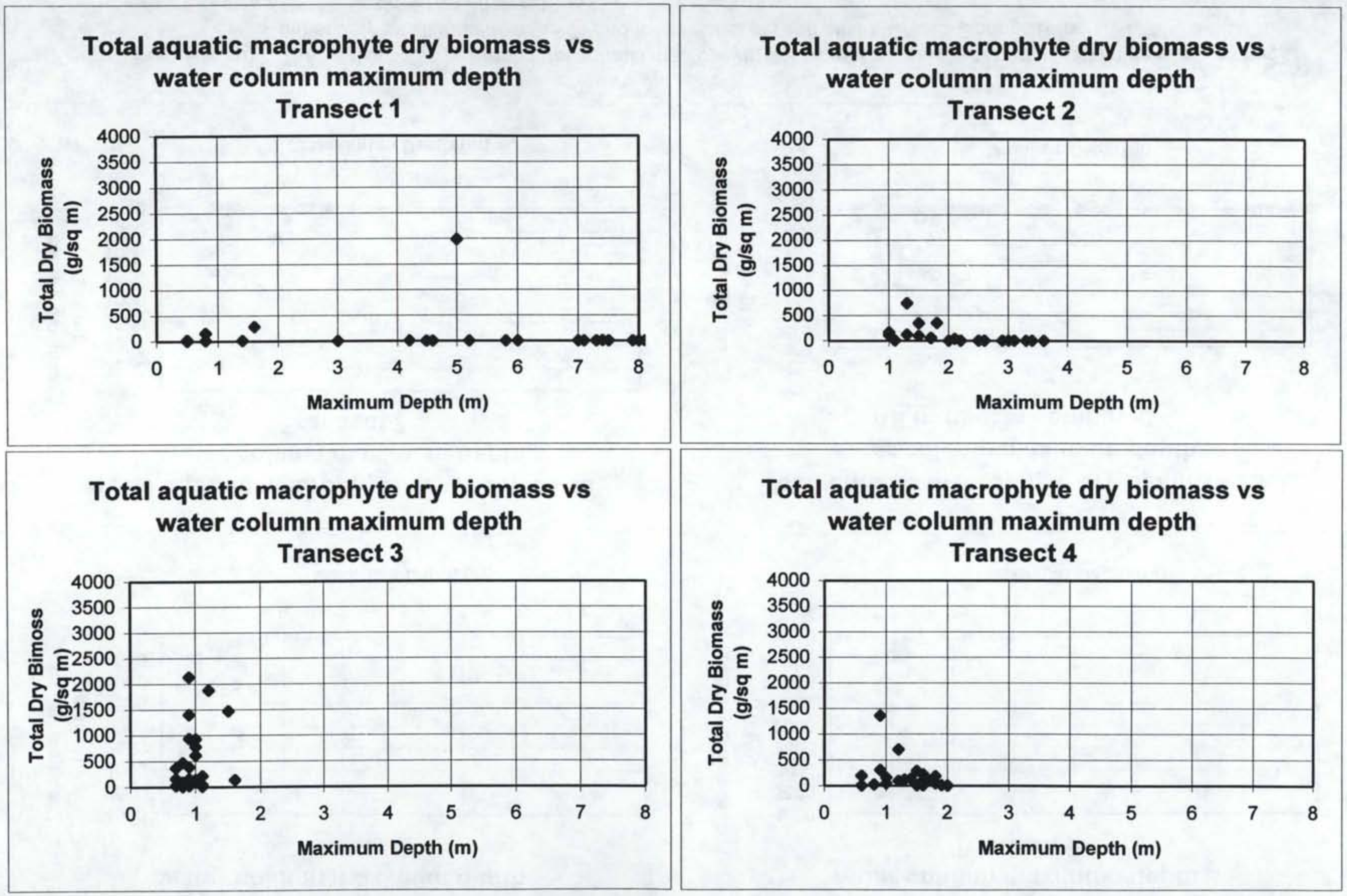


Figure 25. The relationships between total aquatic macrophyte dry biomass and water column maximum depth plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

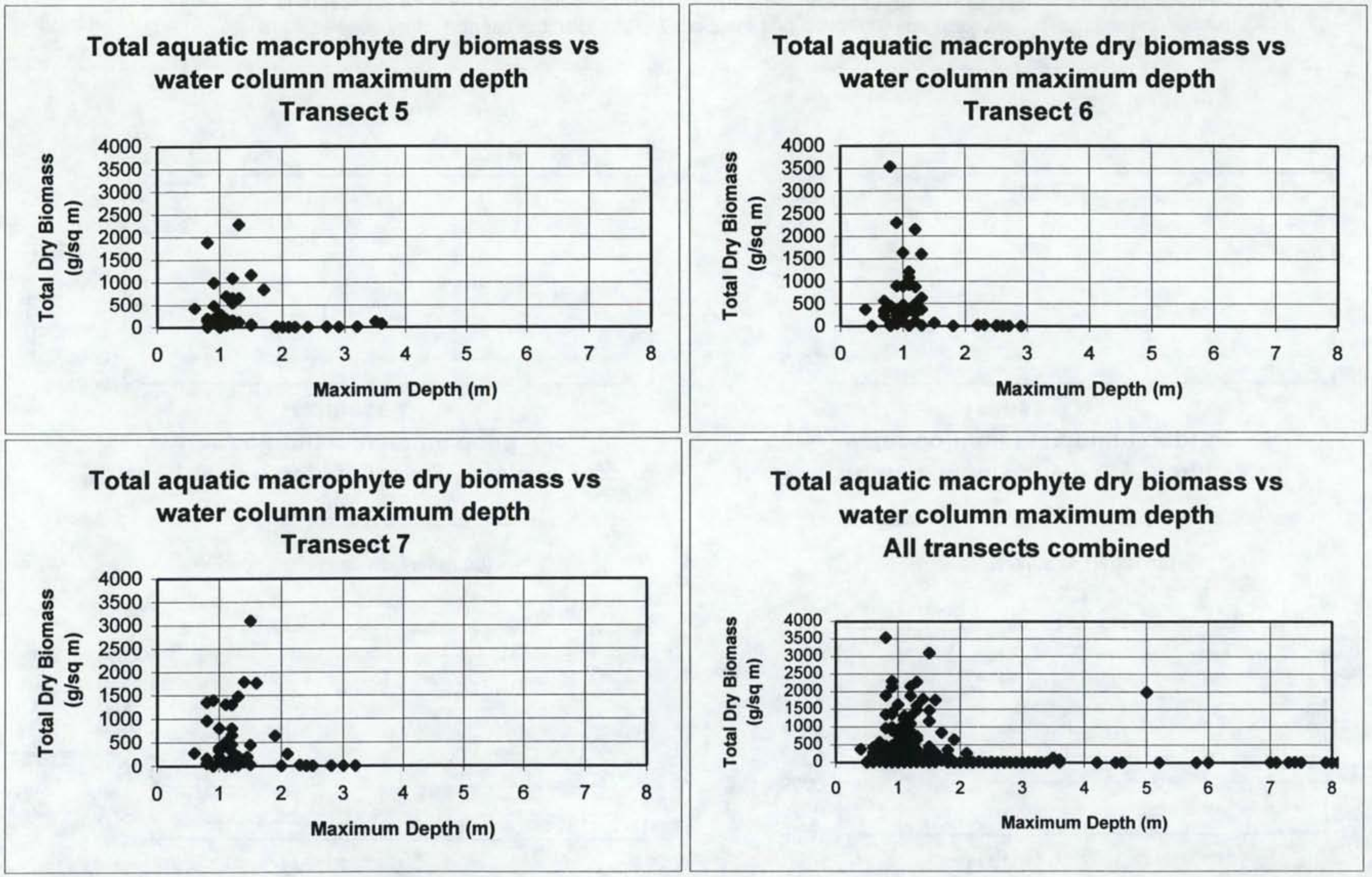


Figure 25 (continued). The relationships between total aquatic macrophyte dry biomass and water column maximum depth plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

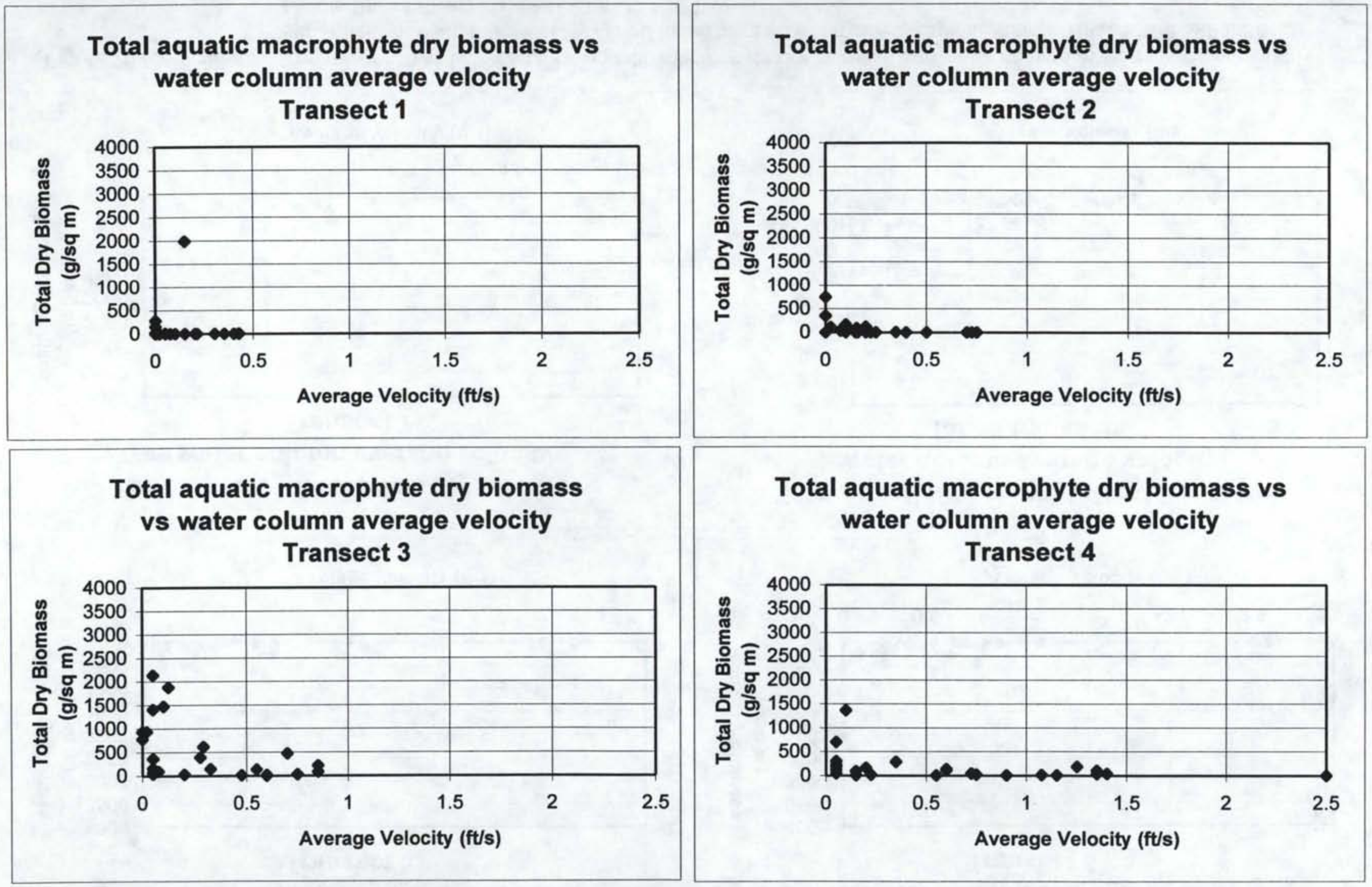
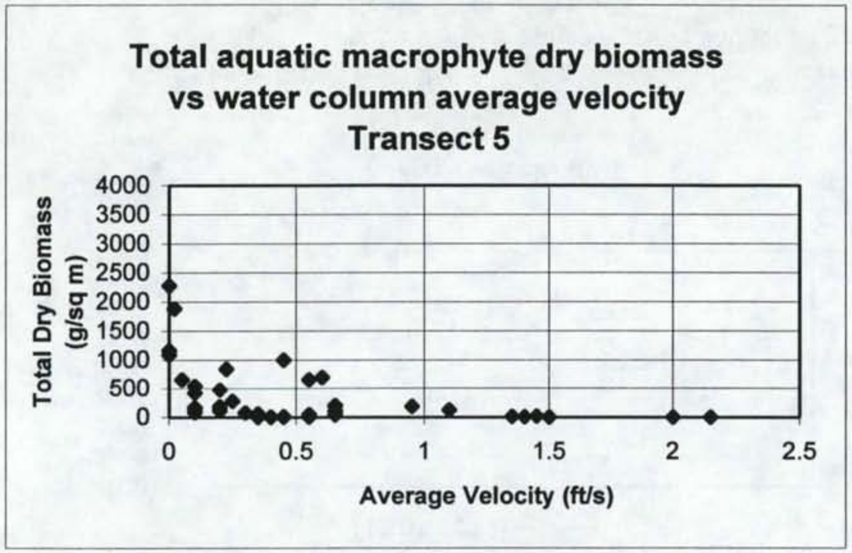
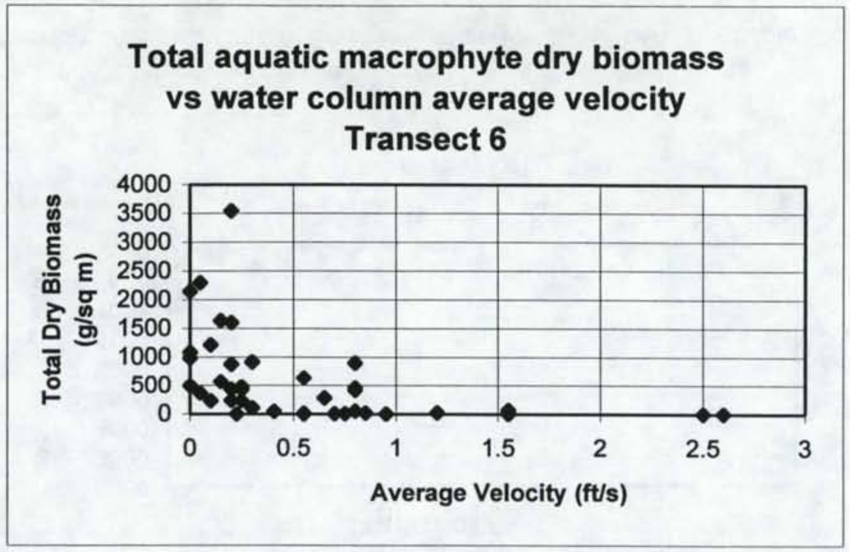
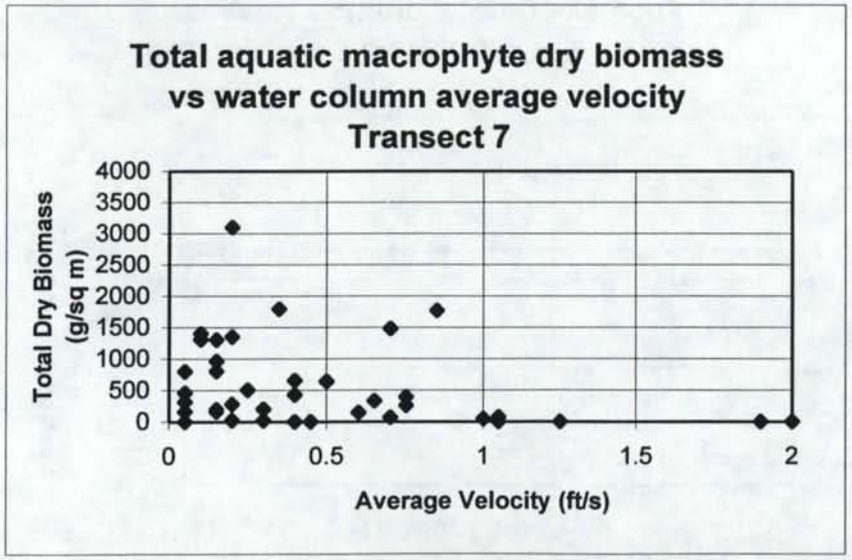


Figure 26. The relationships between total aquatic macrophyte dry biomass and water column average velocity plotted separately for transect (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.







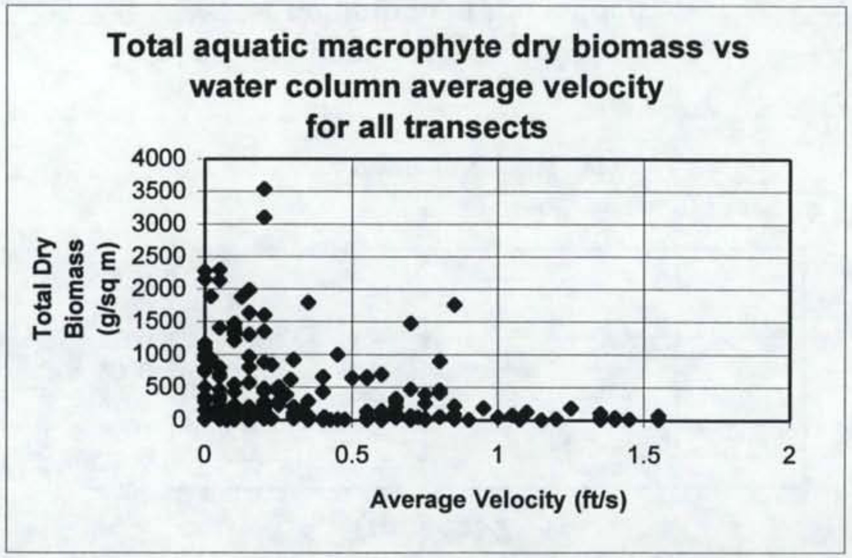


Figure 26 (continued). The relationships between total aquatic macrophyte dry biomass and water column average velocity plotted separately for each transect (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

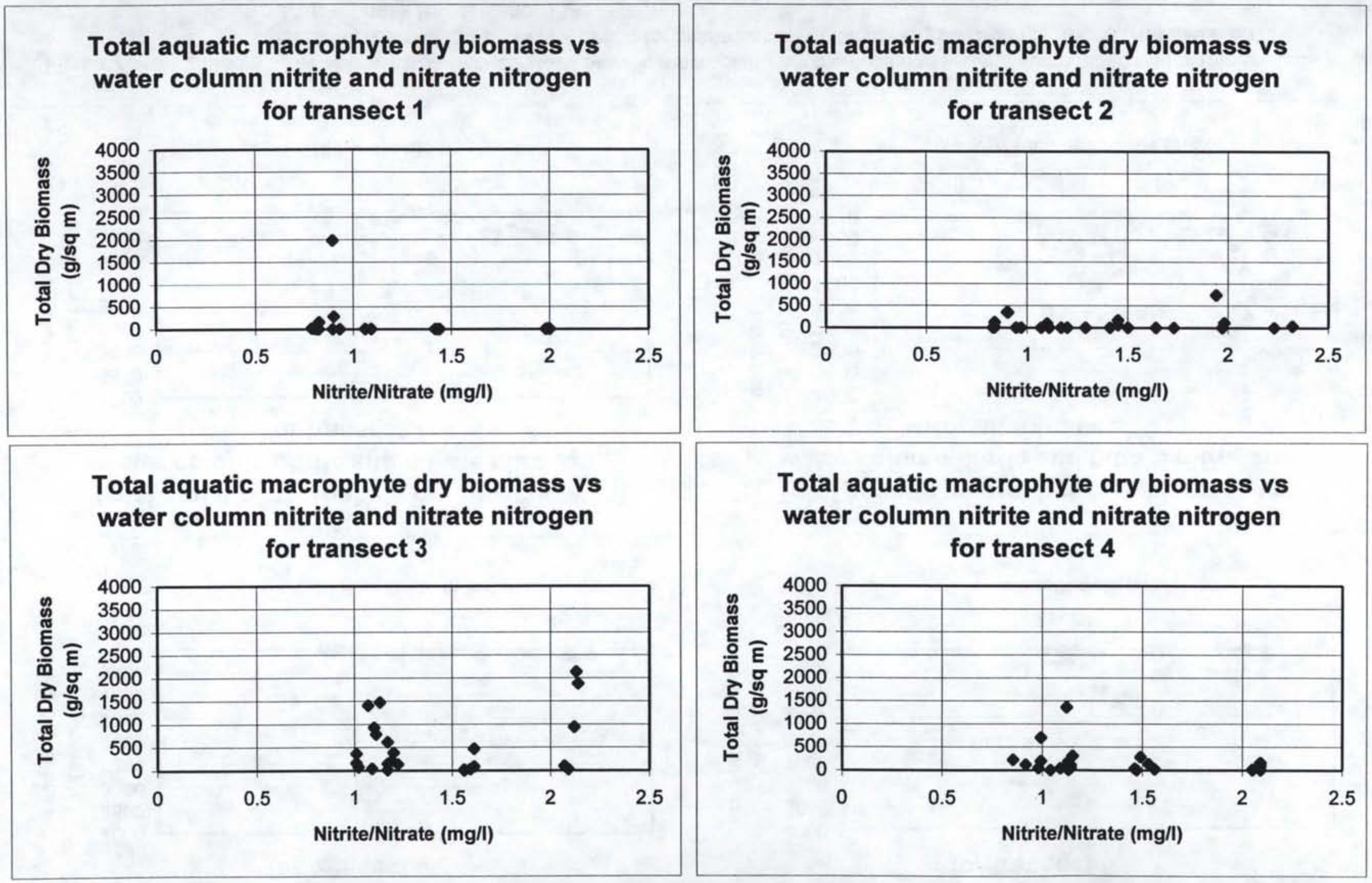
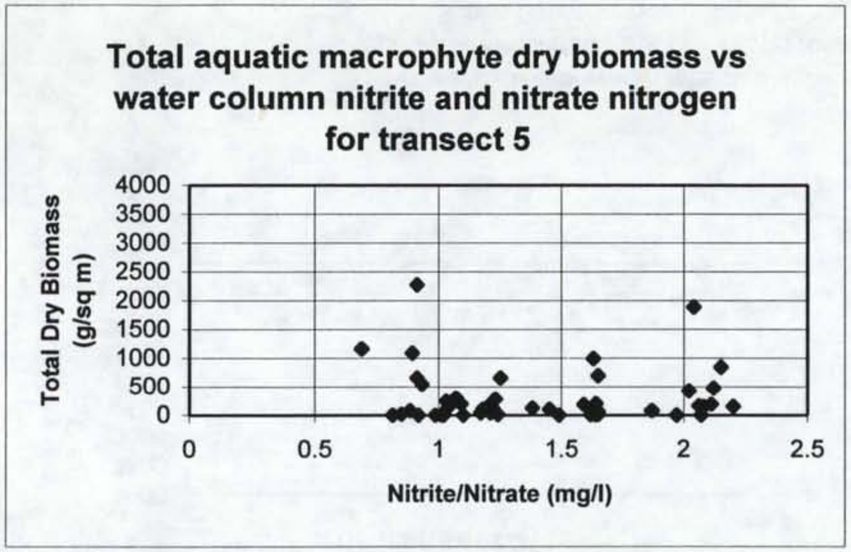
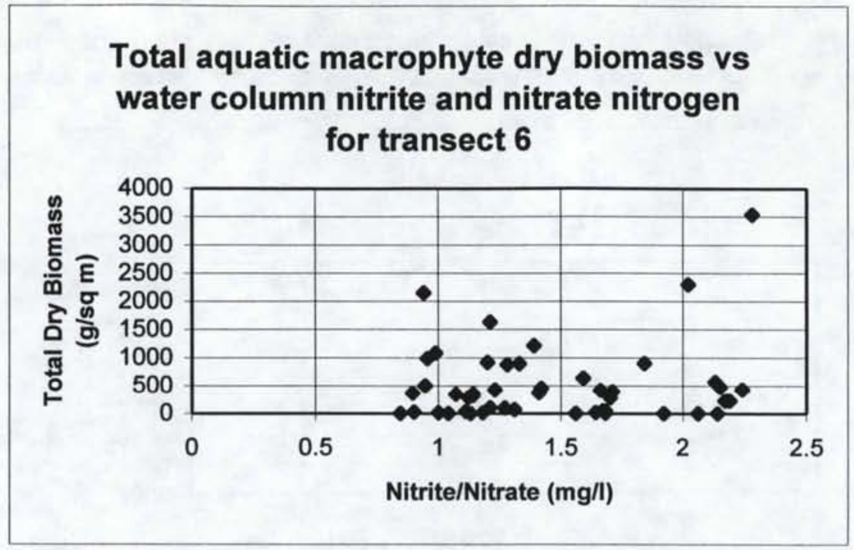
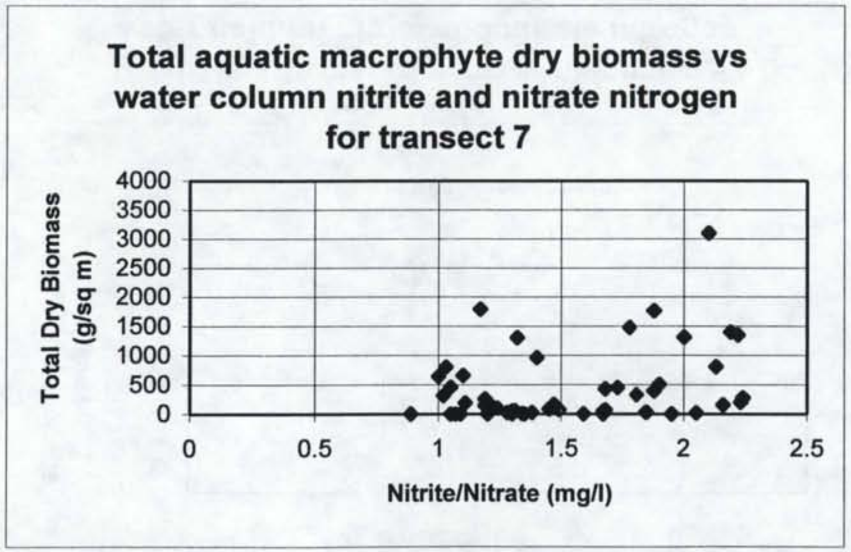


Figure 27. The relationships between total aquatic macrophyte dry biomass and water column nitrite and nitrate plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.







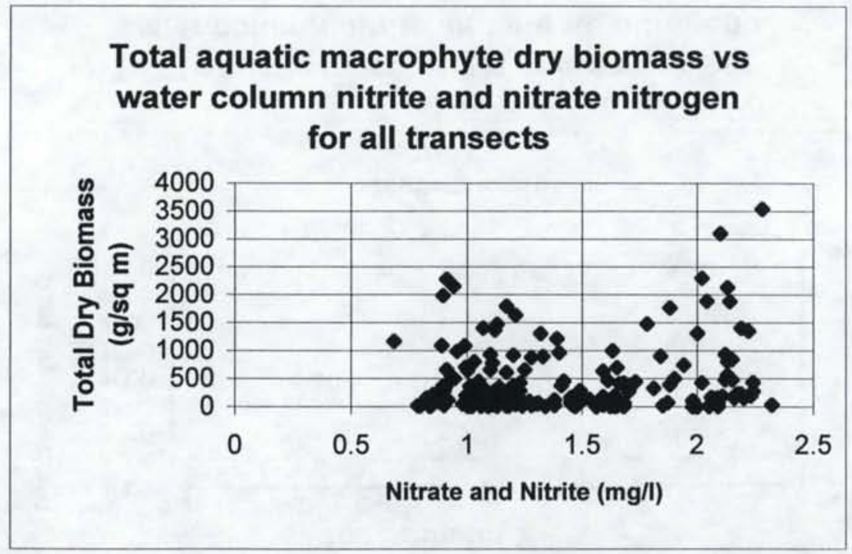


Figure 27 (continued). The relationships between total aquatic macrophyte dry biomass and water column nitrite and nitrate plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

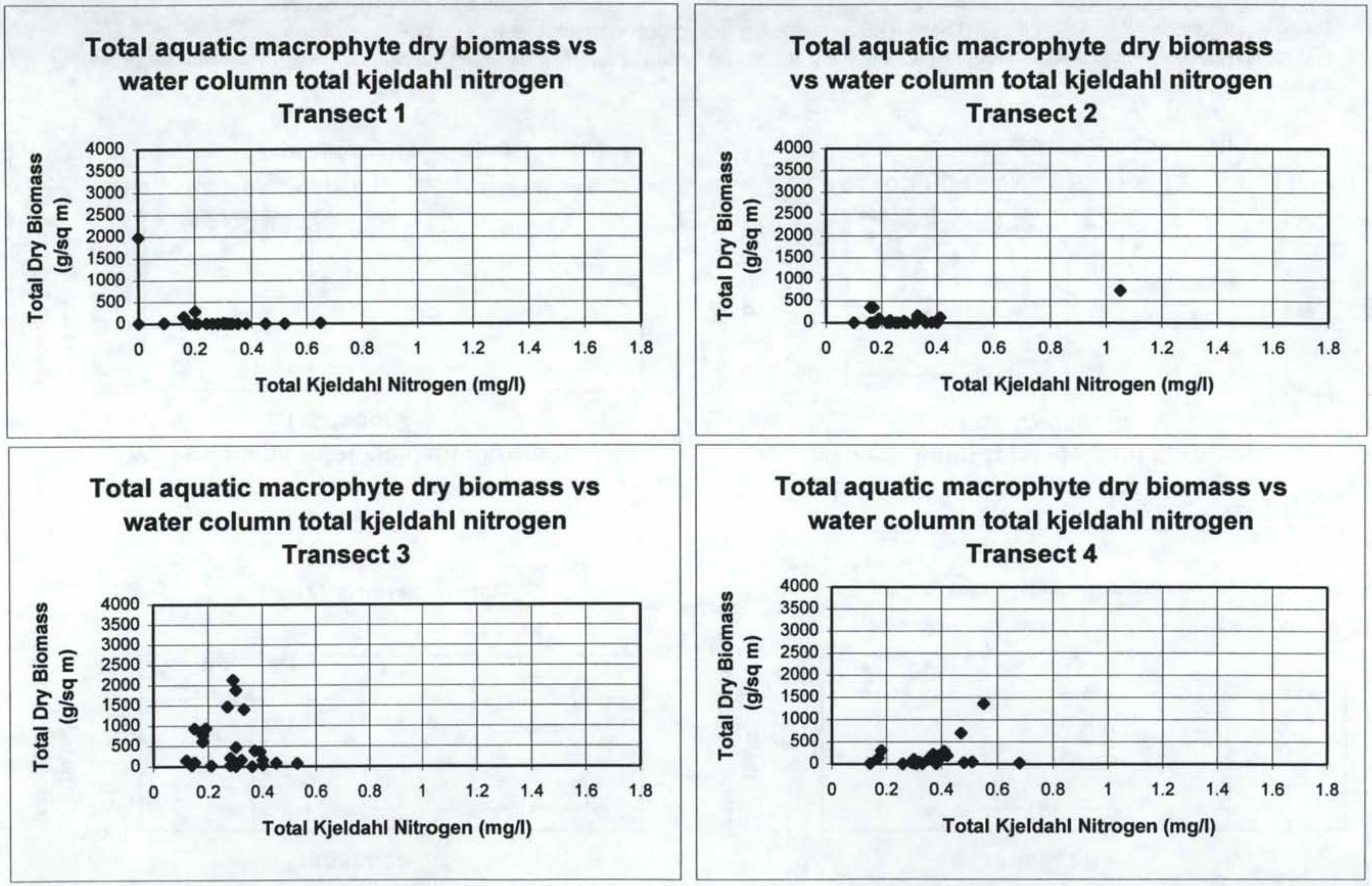
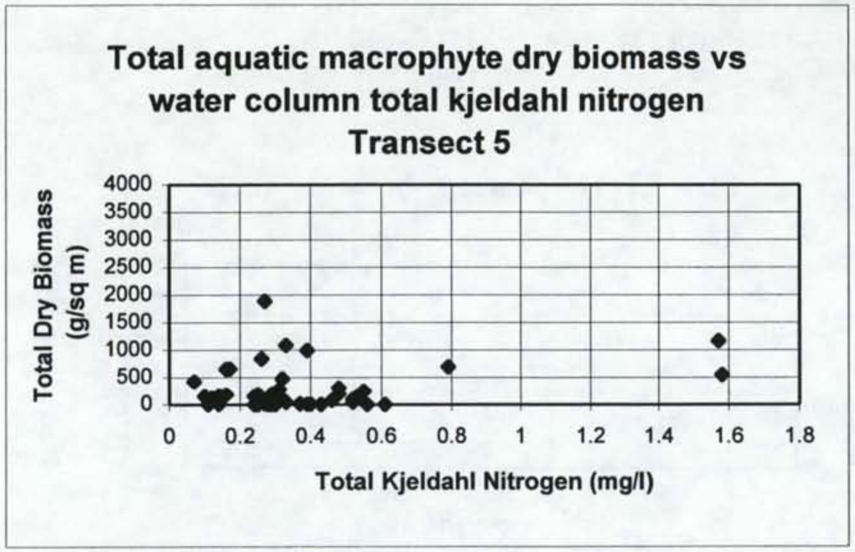
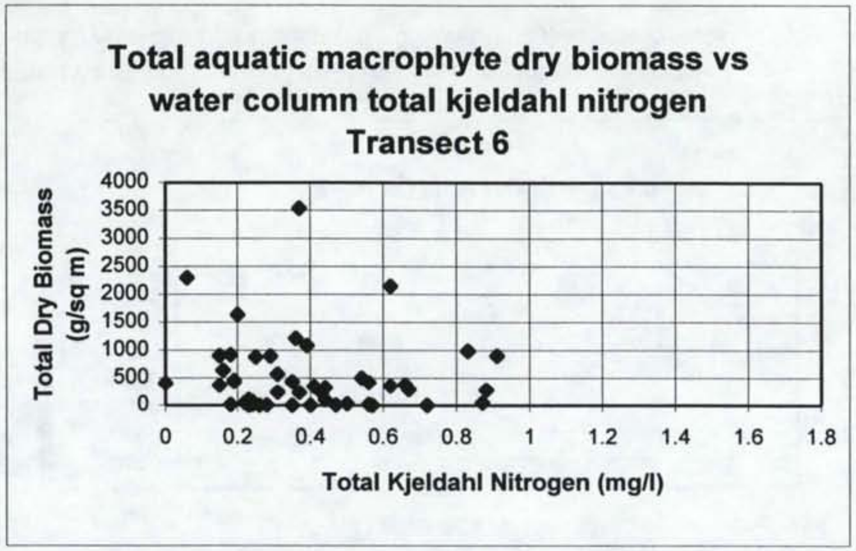
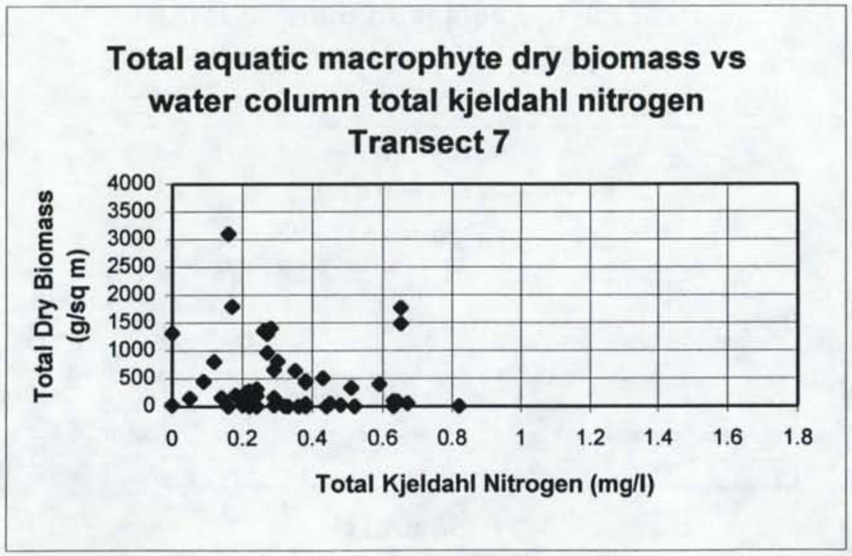


Figure 28. The relationships between total dry biomass and water column total kjeldahl nitrogen plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.







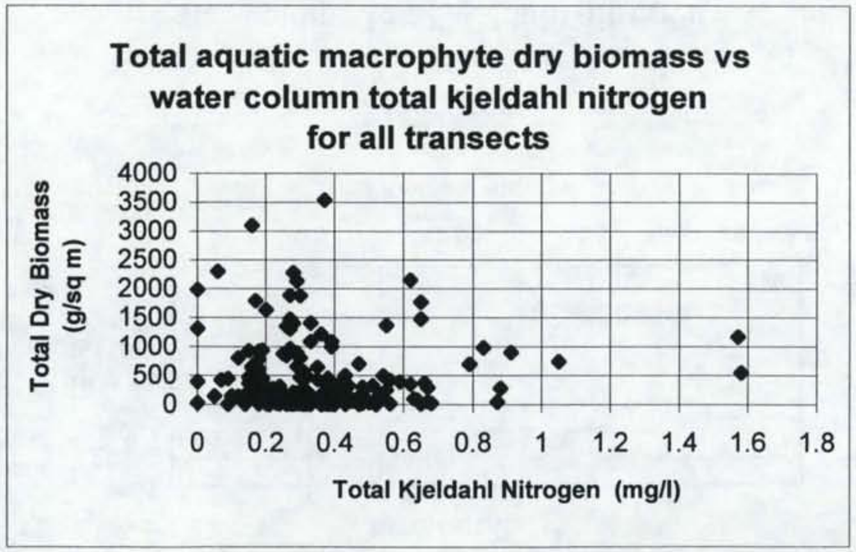


Figure 28 (continued). The relationships between total dry biomass and water column total kjeldahl nitrogen plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

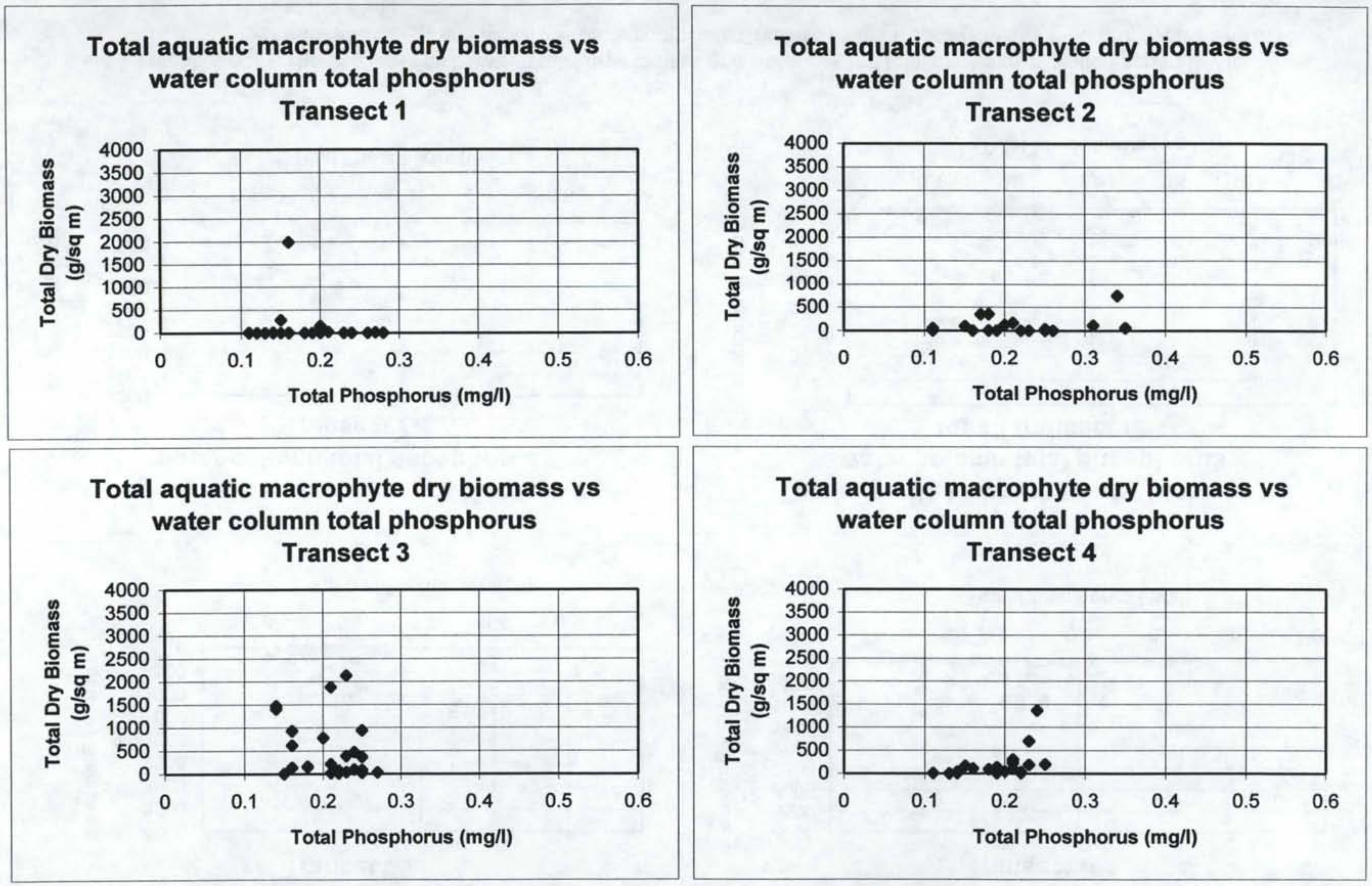


Figure 29. The relationships between total dry biomass and water column total phosphorus plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

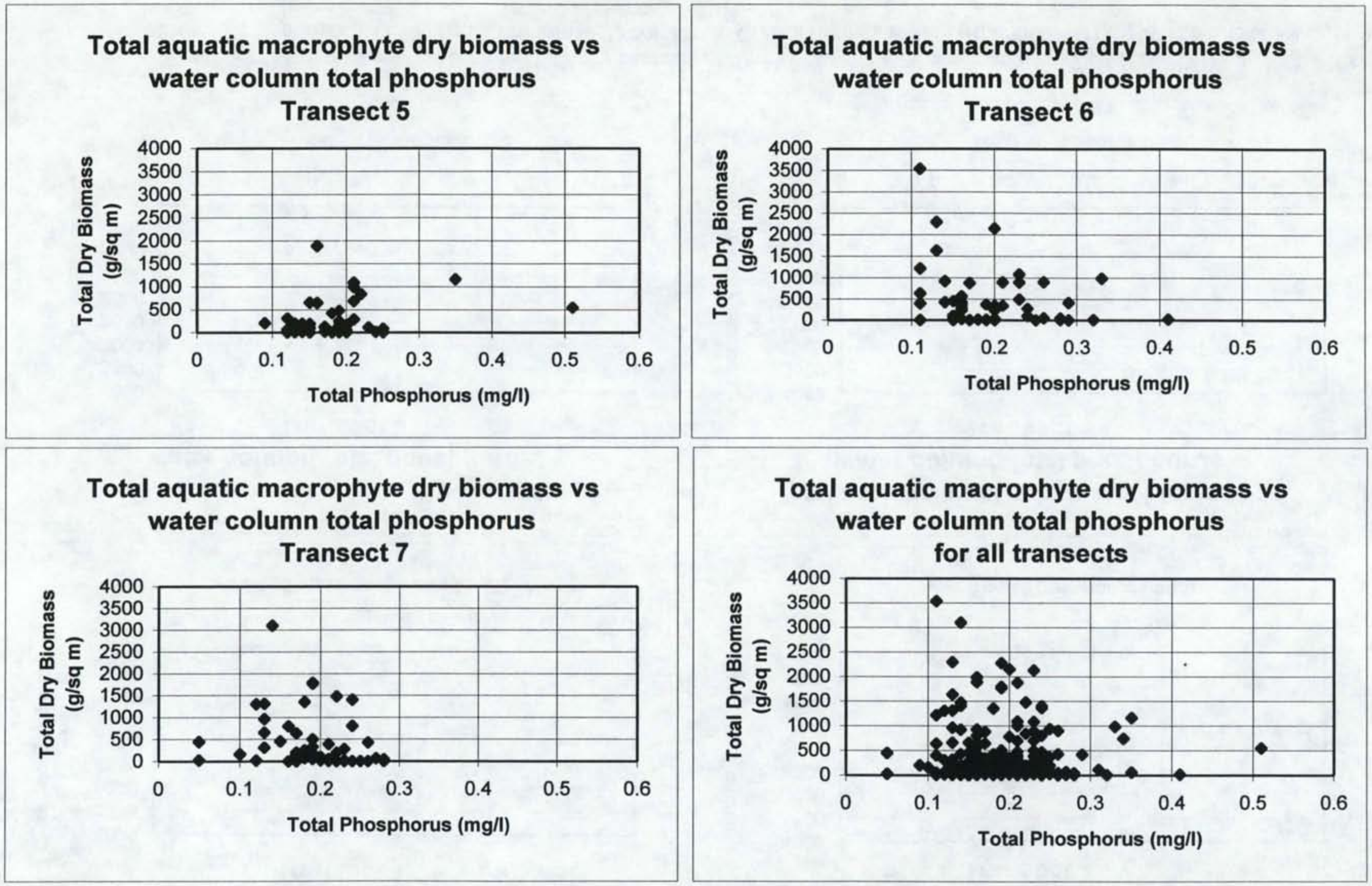


Figure 29 (continued). The relationships between total dry biomass and water column total phosphorus plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

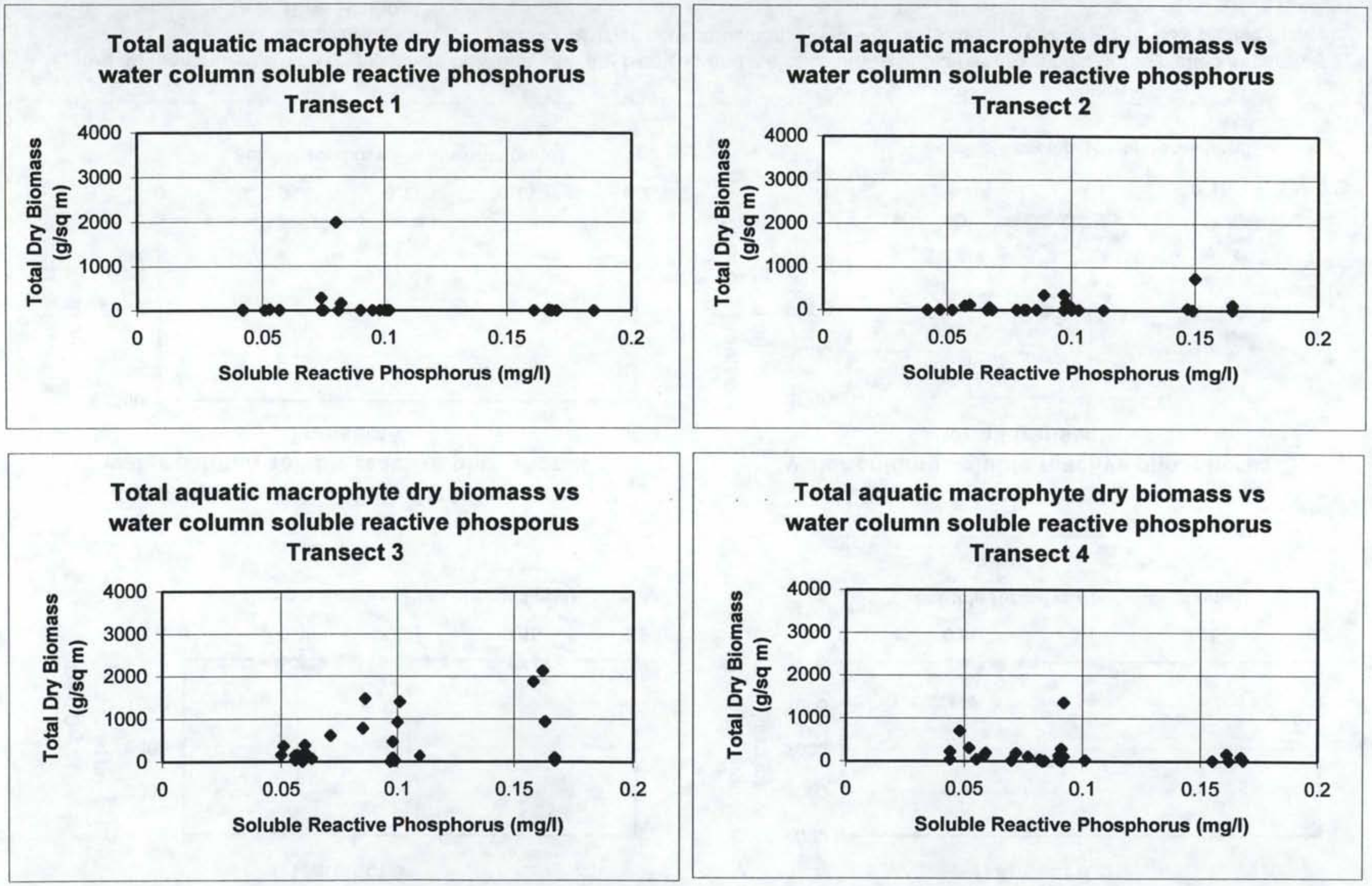


Figure 30. The relationships between total dry biomass and water column soluble reactive phosphorus plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

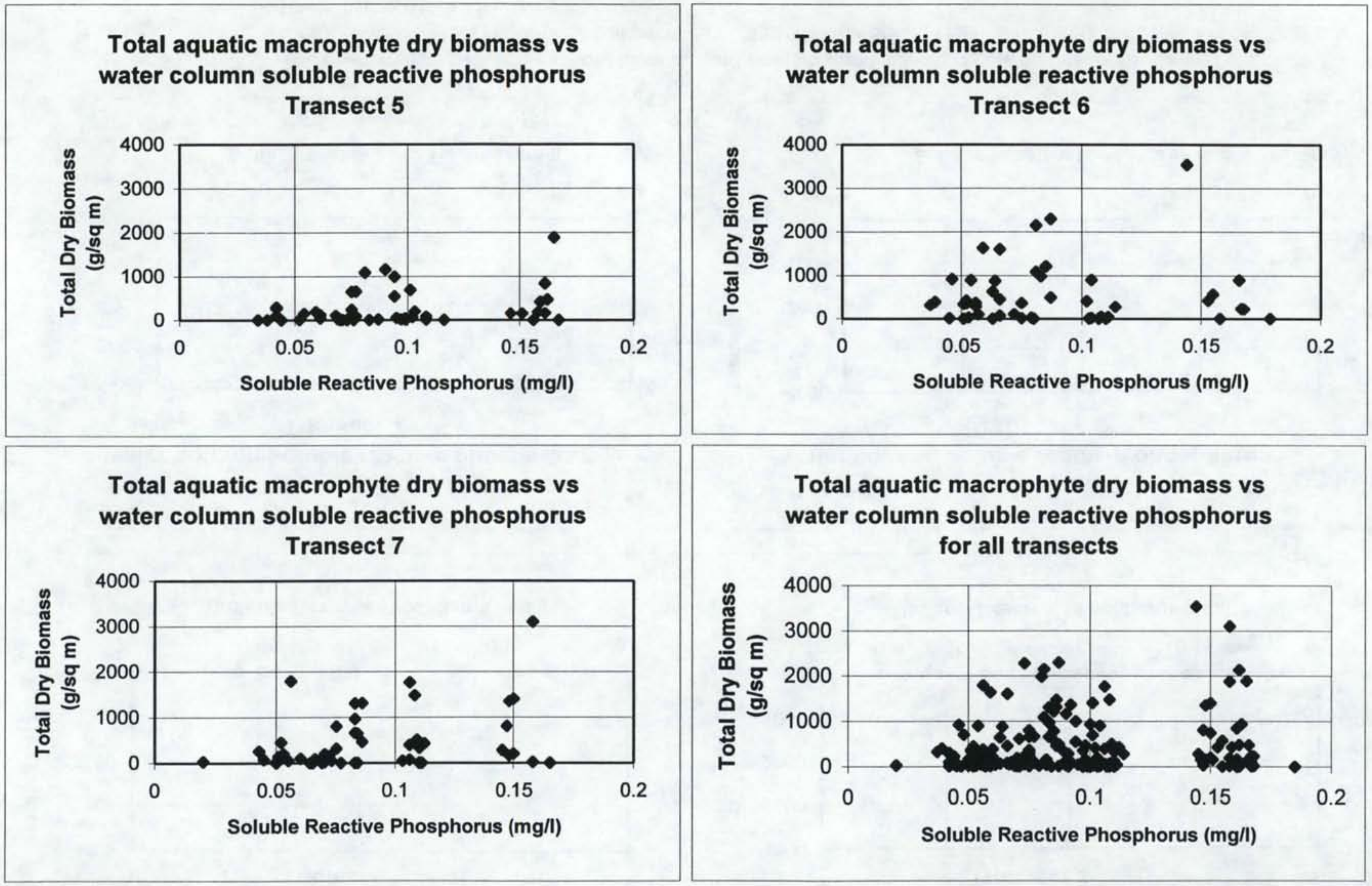


Figure 30 (continued). The relationships between total dry biomass and water column soluble reactive phosphorus plotted separately for all transects (1 - 7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

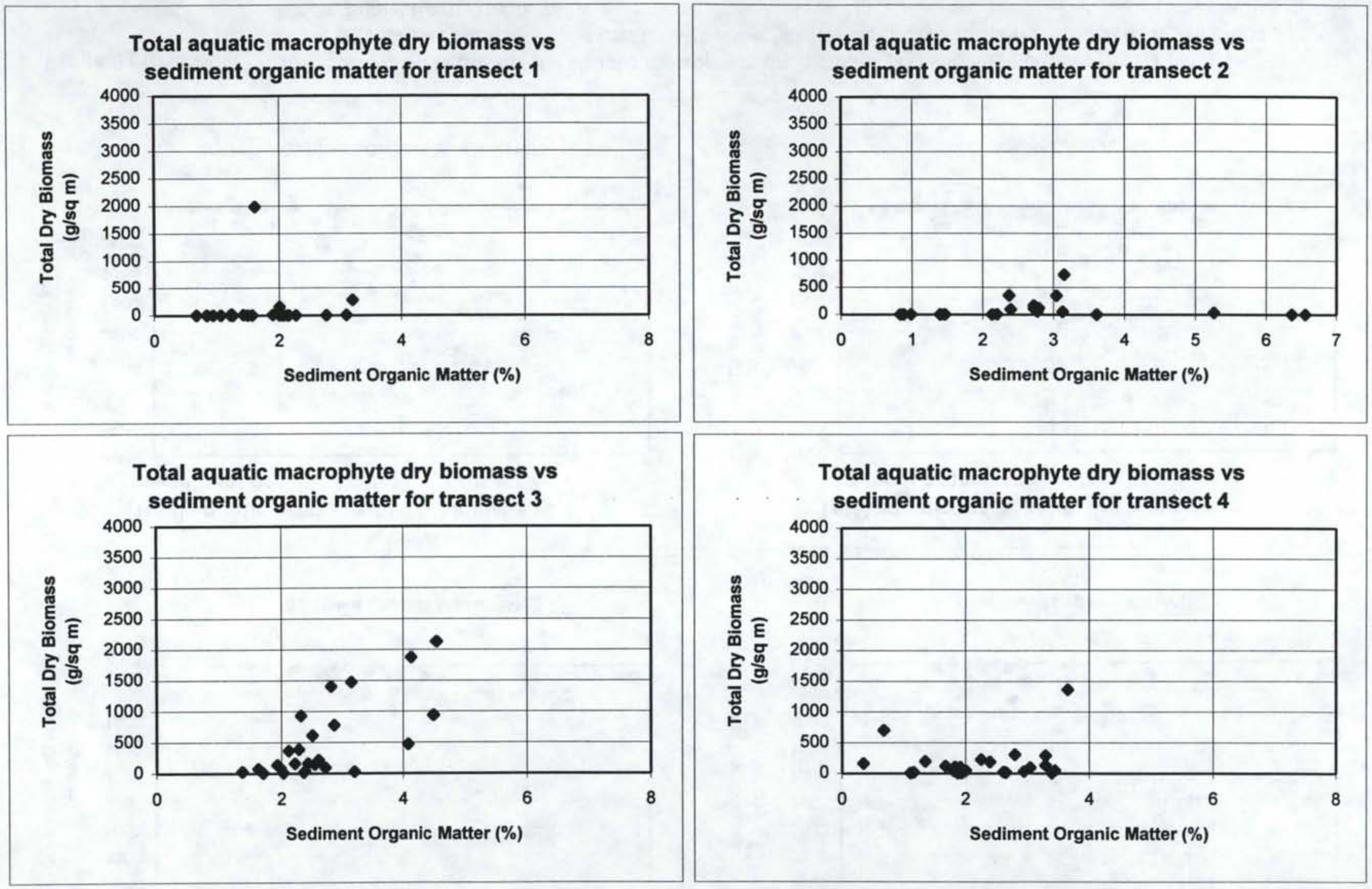


Figure 31. The relationship between total aquatic macrophyte dry biomass and sediment organic matter plotted separately for each transect (1-7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

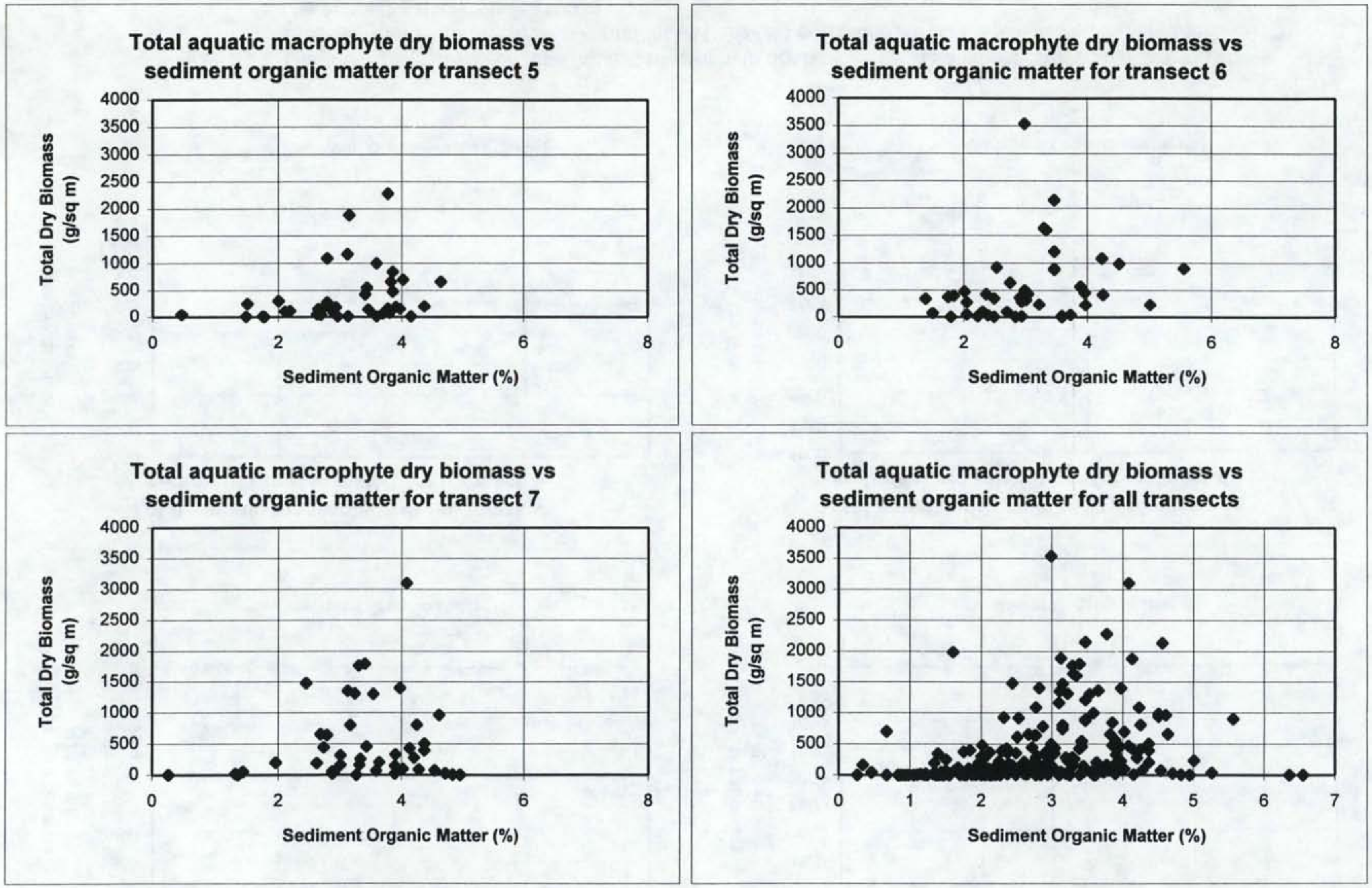


Figure 31 (continued). The relationship between total aquatic macrophyte dry biomass and sediment organic matter plotted separately for each transect (1-7) and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

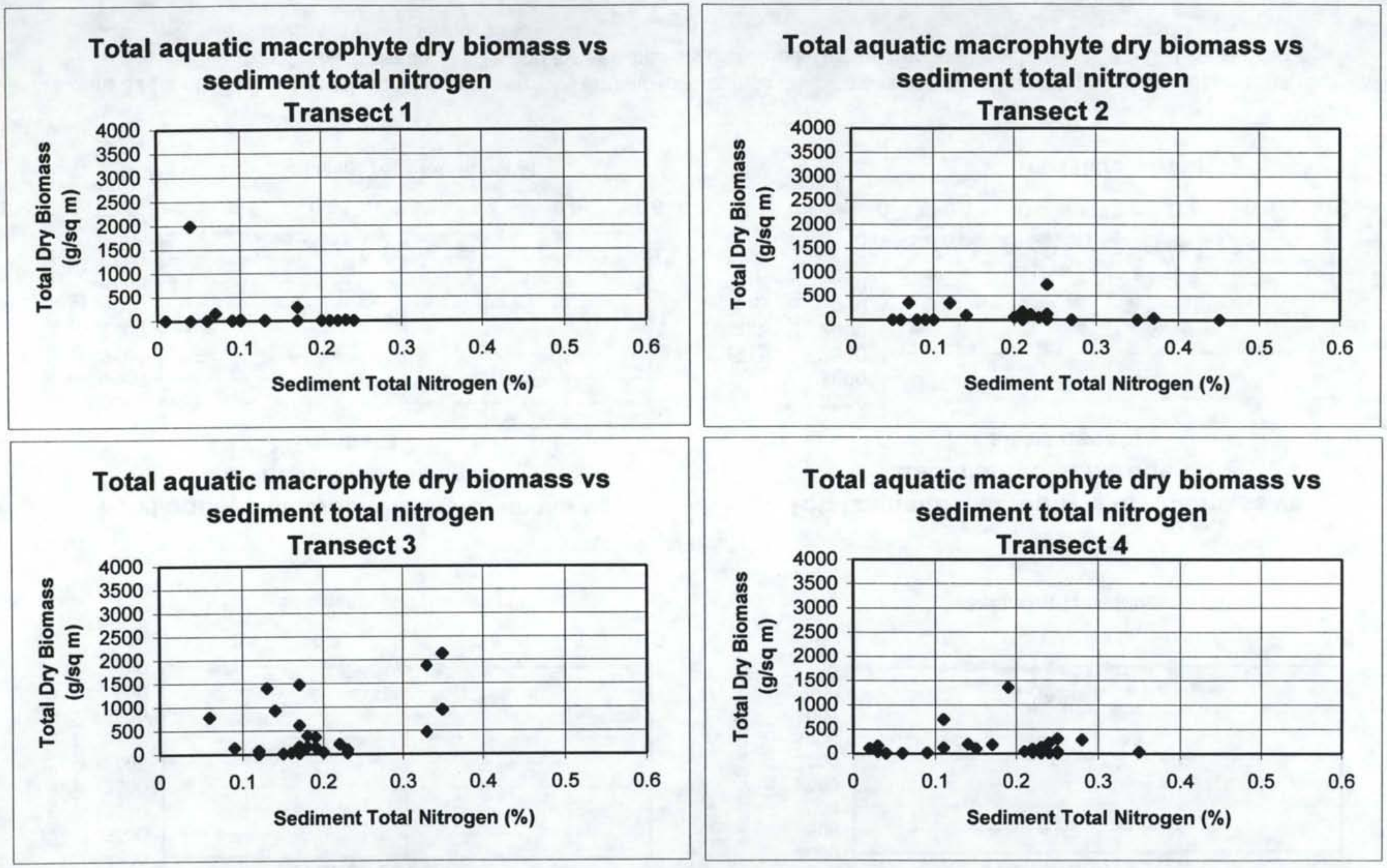
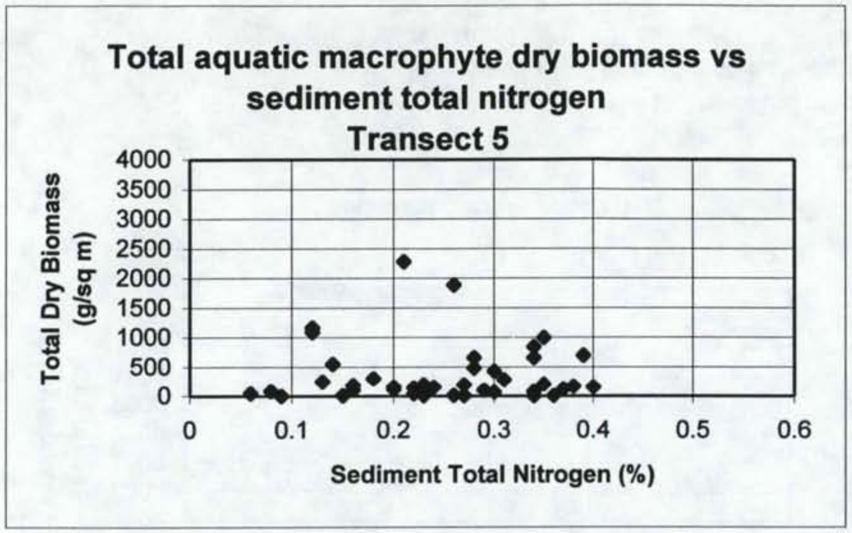
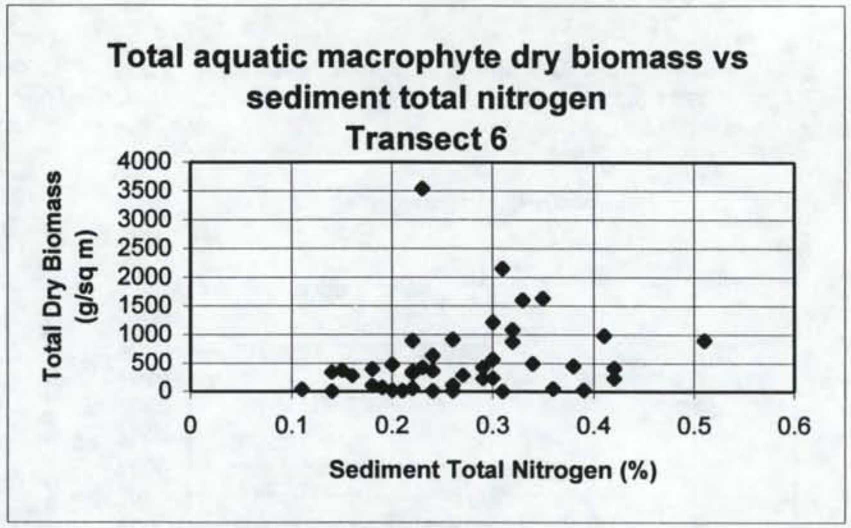
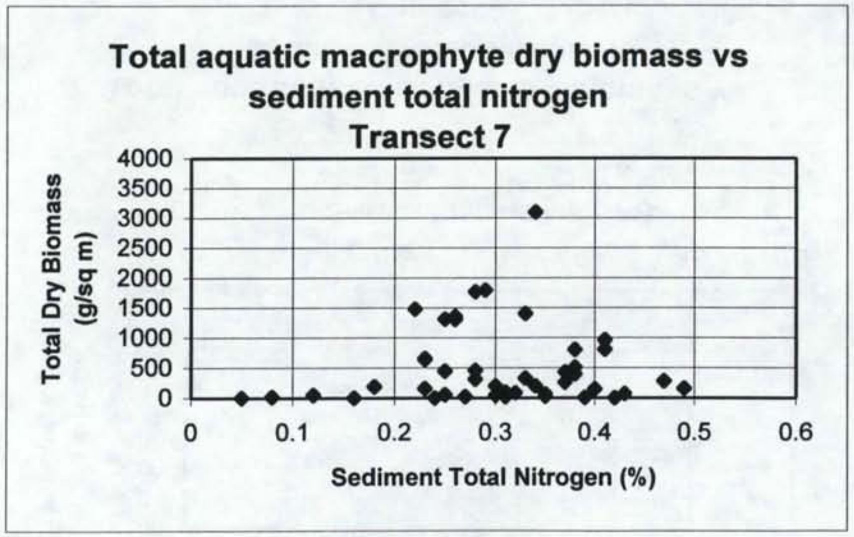


Figure 32. The relationship between total aquatic macrophyte dry biomass and sediment total nitrogen plotted separately for all transects (1 - 7), and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.







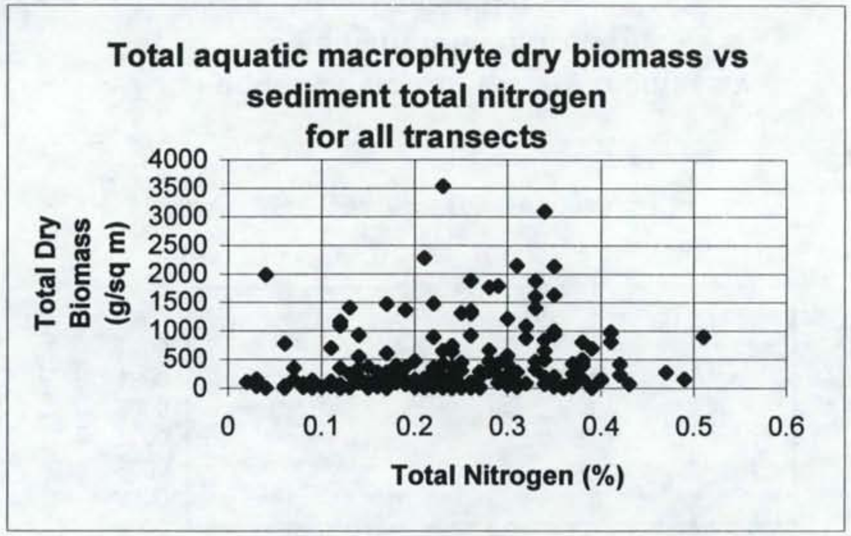


Figure 32 (continued). The relationship between total aquatic macrophyte dry biomass and sediment total nitrogen plotted separately for all transects (1 - 7), and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

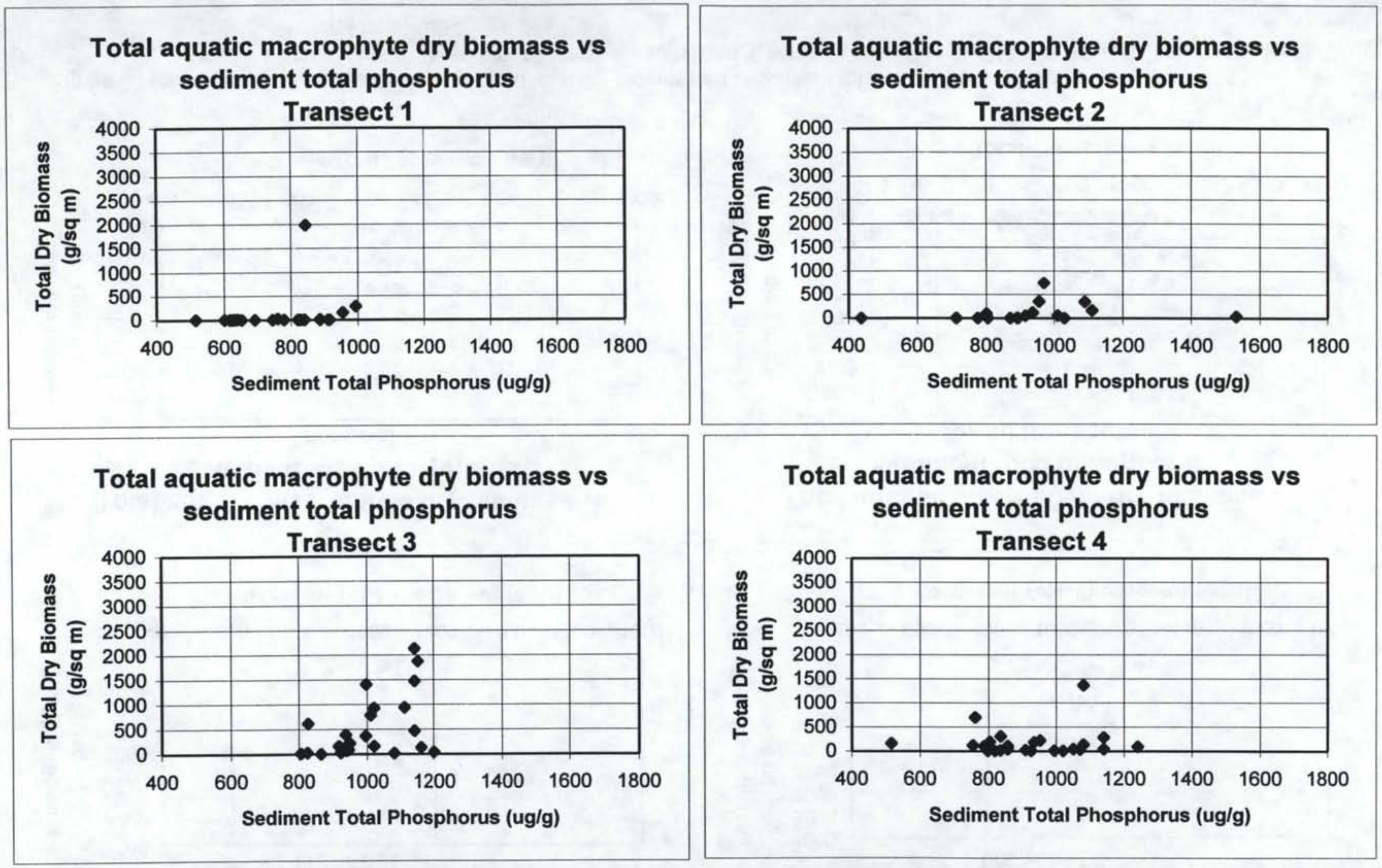


Figure 33. The relationship between total dry biomass and sediment total phosphorus plotted separately for all transects (1 - 7), and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

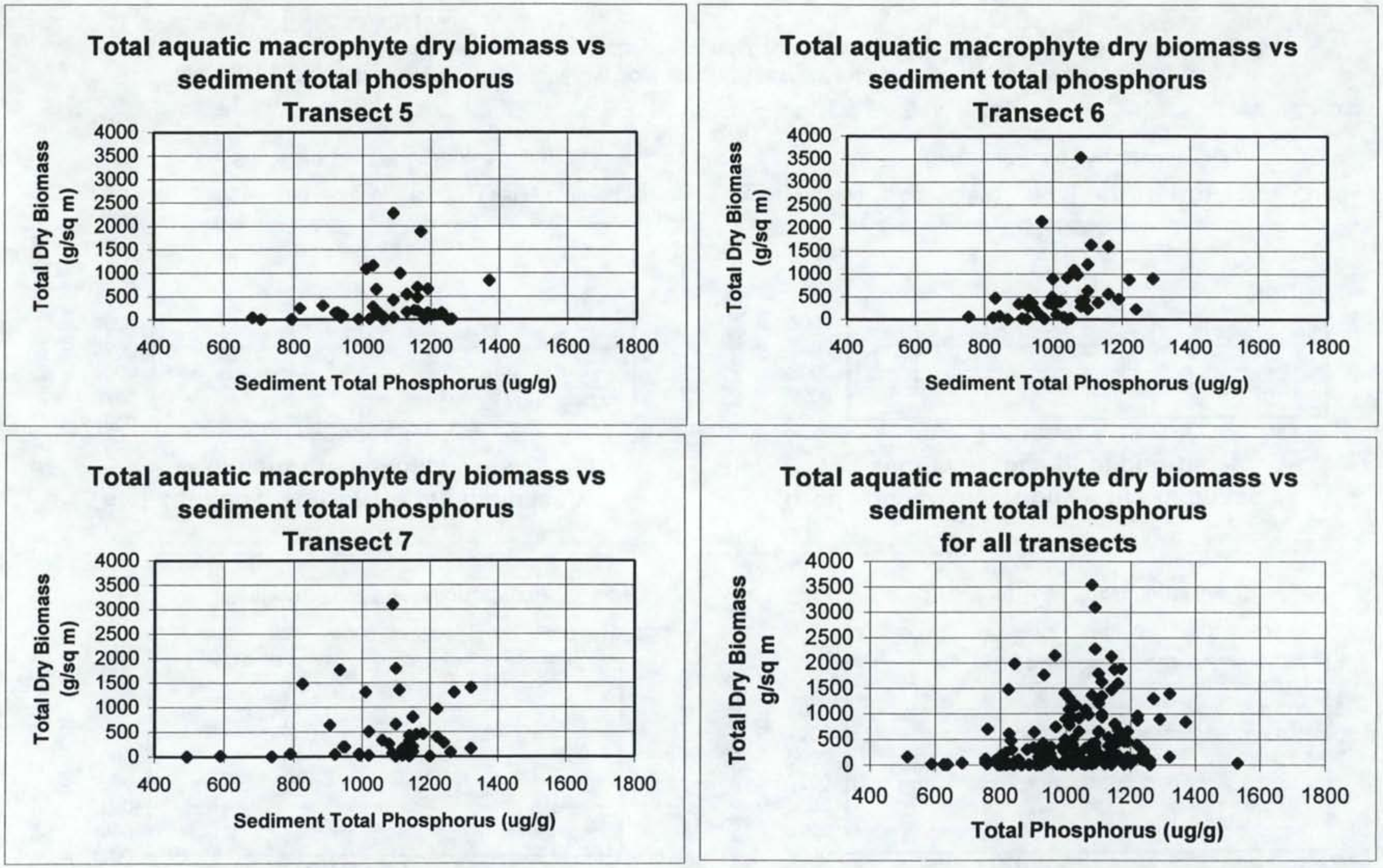


Figure 33 (continued). The relationship between total dry biomass and sediment total phosphorus plotted separately for all transects (1 - 7), and for all transects combined, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

```
            Plot of CAN2*CAN1.  Symbol is value of TSCT.
       (NOTE: 88 obs had missing values.  56 obs hidden.)
CAN2 |
   5 +
     |
     |  1 1*   1                            5          2            6
     |    1      1                    4            5  7     7   656           7
     |          2        21     2    7     7   7 5765  57777 7      7    6
   0 +              1        22  1 232243332 565366635635  666567     6    7
     |                1         3   44 3   3 3334 5 57635 65    6 6
     |                       4    4 444   4445 3 4     5 5         66
     |                            4       4                     6
     |
  -5 +                                       4
     -+-------------+-------------+--------------+-------------+--------------+-
     -6            -4            -2              0             2              4

                                          CAN1
```

Figure 34. Multivariate canonical plots of 1993 Crystal Springs data showing transect relationships, all months combined.

MULTIVARIATE PLOTS OF 1993 CRYSTAL SPRINGS DATA SHOWING TRANSECT RELATIONSHIPS

```
----------------------------------- MONTH=8 ------------------------------------

                  Plot of CAN2*CAN1.  Symbol is value of TSCT.
CAN2  (NOTE: 14 obs had missing values.  4 obs hidden.)
  10 +
     |
     |                                              4 4
   5 +               1                                  4
     |                1                                4             66 6    6
     |                                          3                      6
   0 +                                         333                     6
     |    22                                    777   7
     |                                        7 777  55     5
  -5 +                                              5  5  5
     -+-----------+----------+----------+----------+----------+-----------+----------+-
     -20         -15        -10         -5          0          5          10         15
```

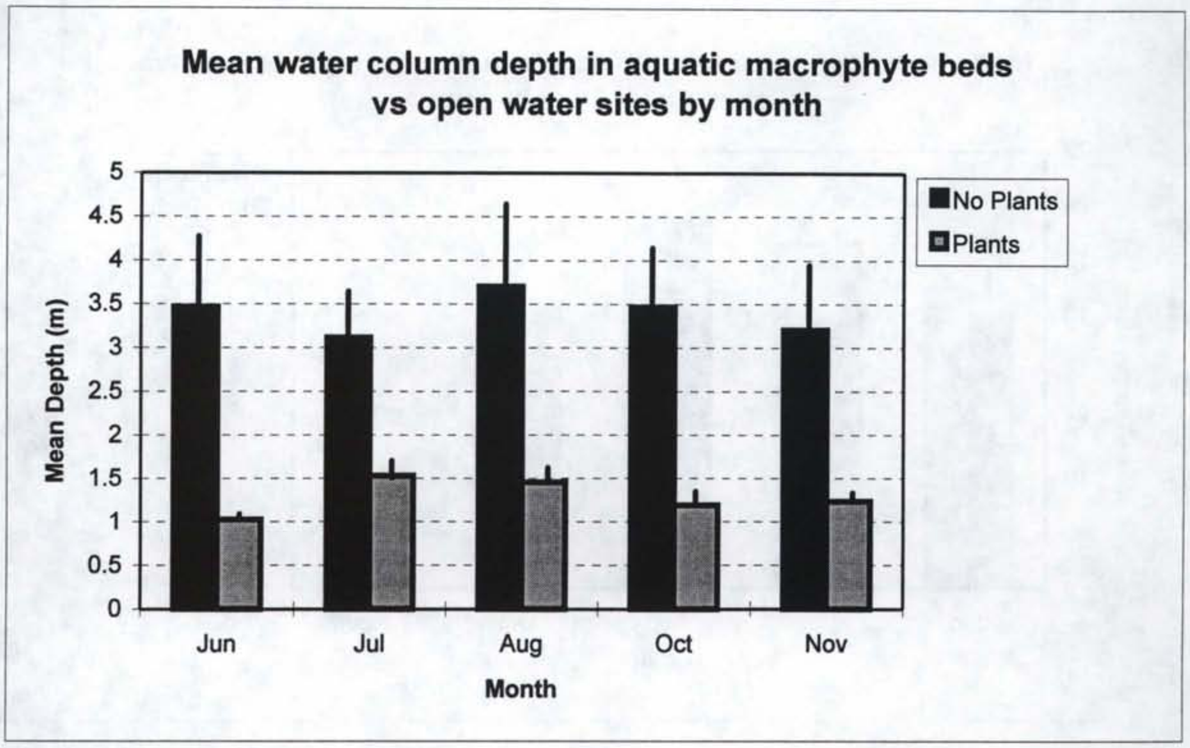
```
----------------------------------- MONTH=10 -----------------------------------

                 Plot of CAN2*CAN1.  Symbol is value of TSCT.
      (NOTE: 10 obs had missing values.  6 obs hidden.)
CAN2 |
  10 +                   1
     |
     |          2    1      1                                           6 666
     |           2      2                     3     3         3 3         56
   0 +                                             3           5555         55
     |                                  4   4  4                        5
     |                                  4 7   774 7   7
     |
 -10 +
     ---+--------+--------+--------+--------+--------+--------+--------+--------+--
      -10       -8       -6       -4       -2        0        2        4        6
```

```
----------------------------------- MONTH=11 -----------------------------------

                 Plot of CAN2*CAN1.  Symbol is value of TSCT.
     (NOTE: 13 obs had missing values.  7 obs hidden.)
CAN2 |
   5 +                                                            6   6
     |                               3                             66 66
     |              2   2                  3                            6
     |                                       3
   0 +                                   3   5   55
     |                              3       55
     |        4      4   4 4                                                 7  7
     |          4                                                       7    7  7
  -5 +                                                                       7
     -+---------------+---------------+---------------+---------------+------------+-
     -15             -10              -5               0               5           10
```

Figure 35. Multivariate plots of 1993 Crystal Springs data showing transect relationships, months 8, 10, & 11.



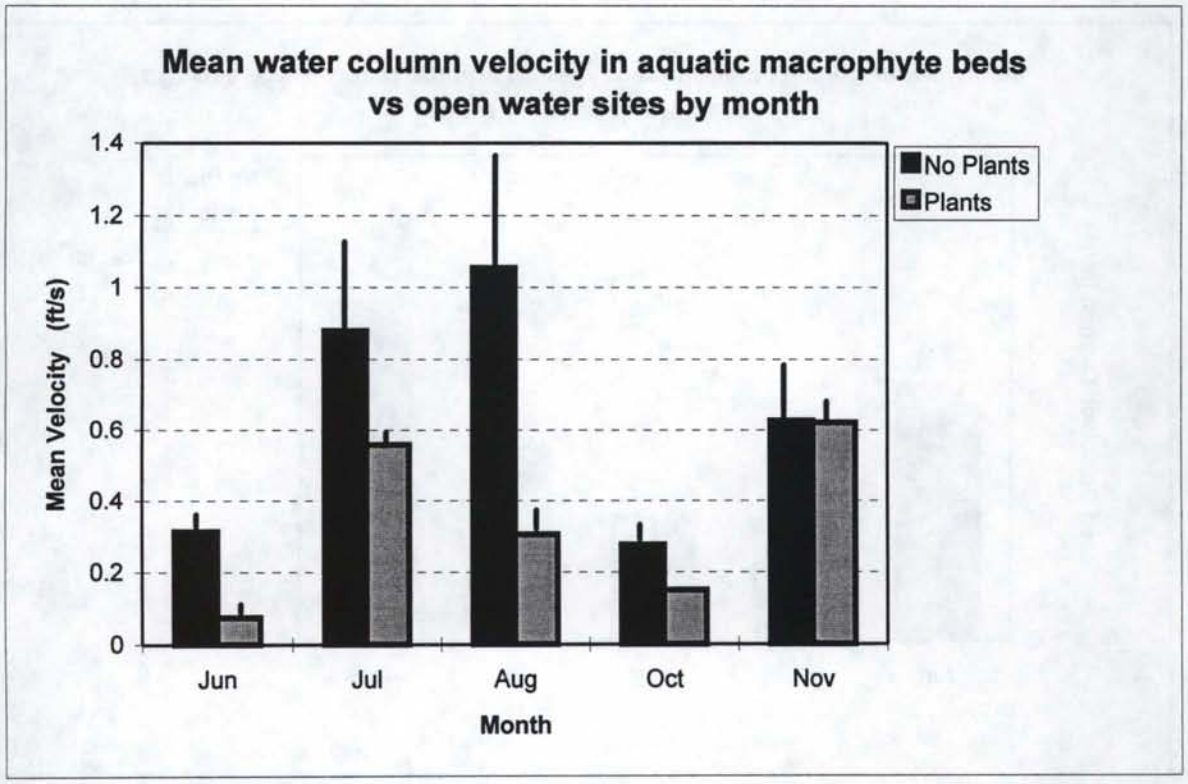
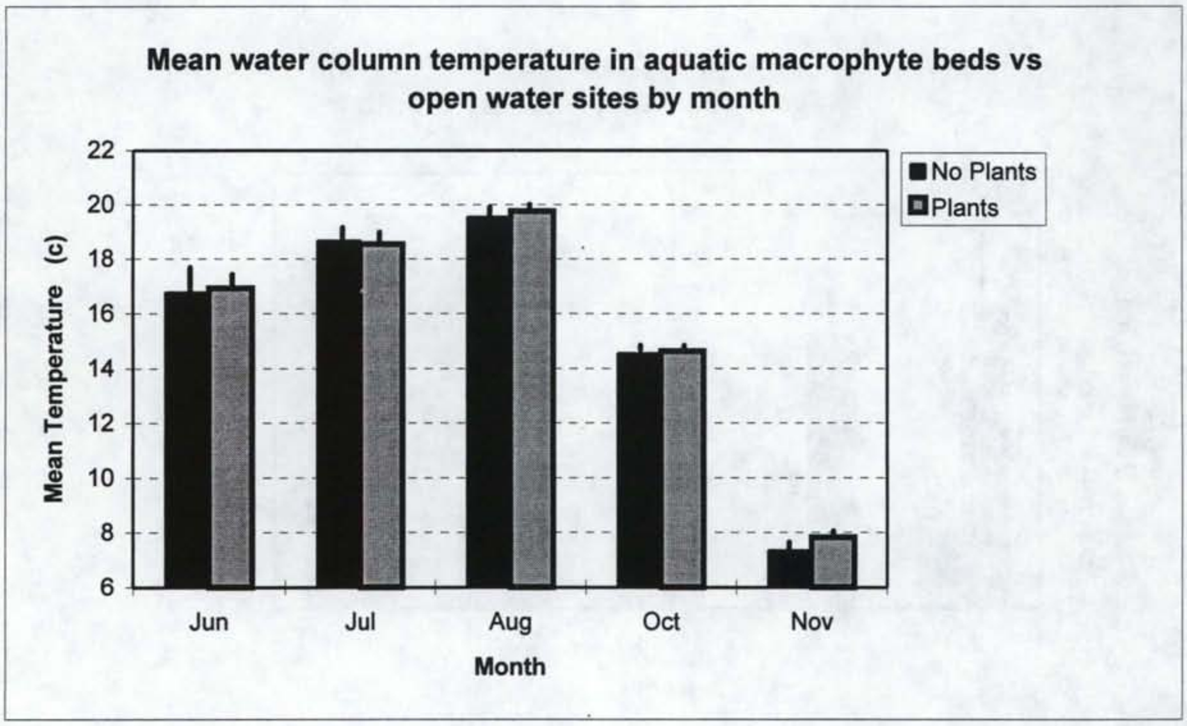


Figure 36. Mean water column depth and velocity with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.



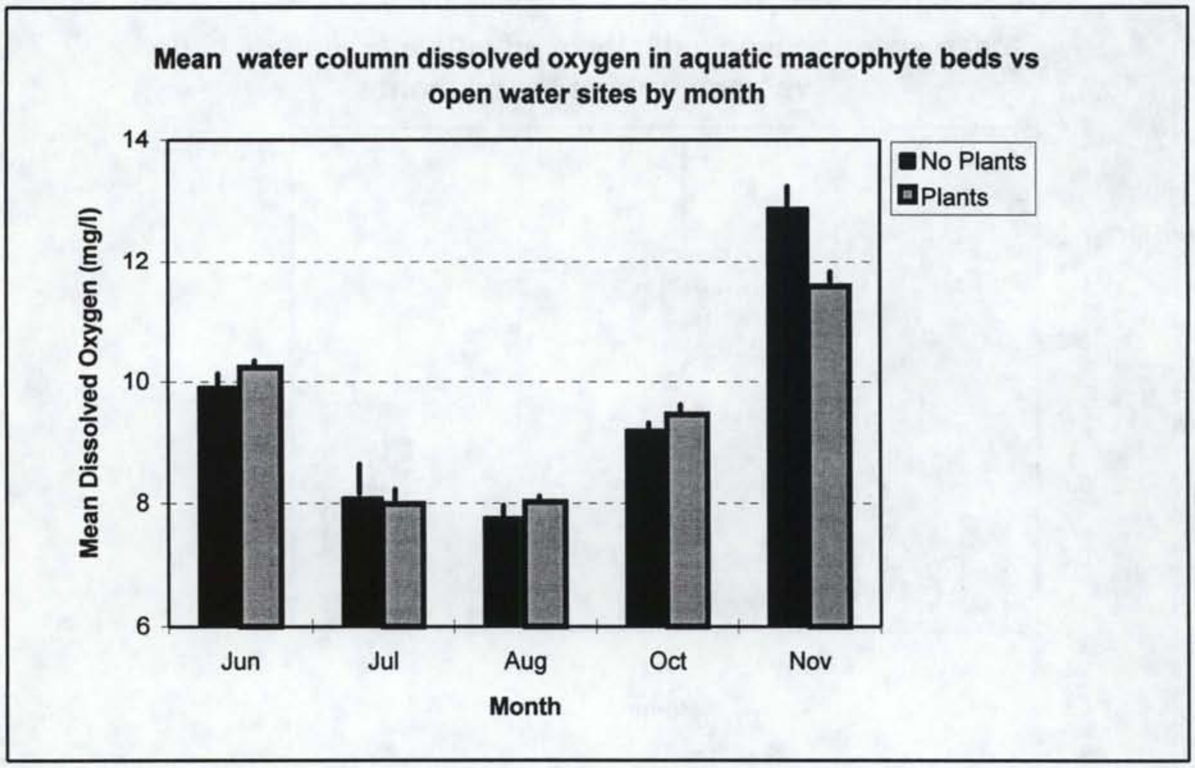
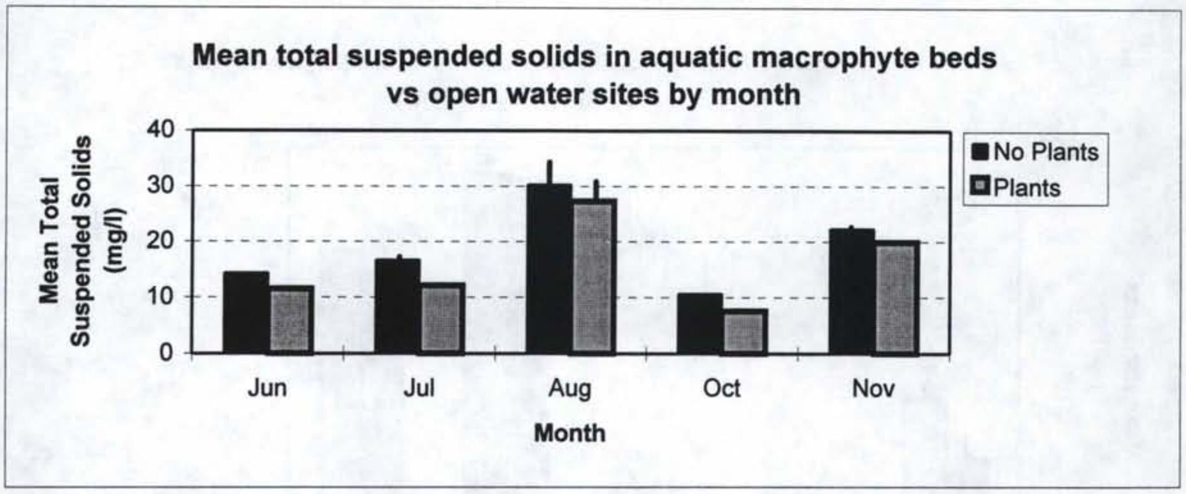
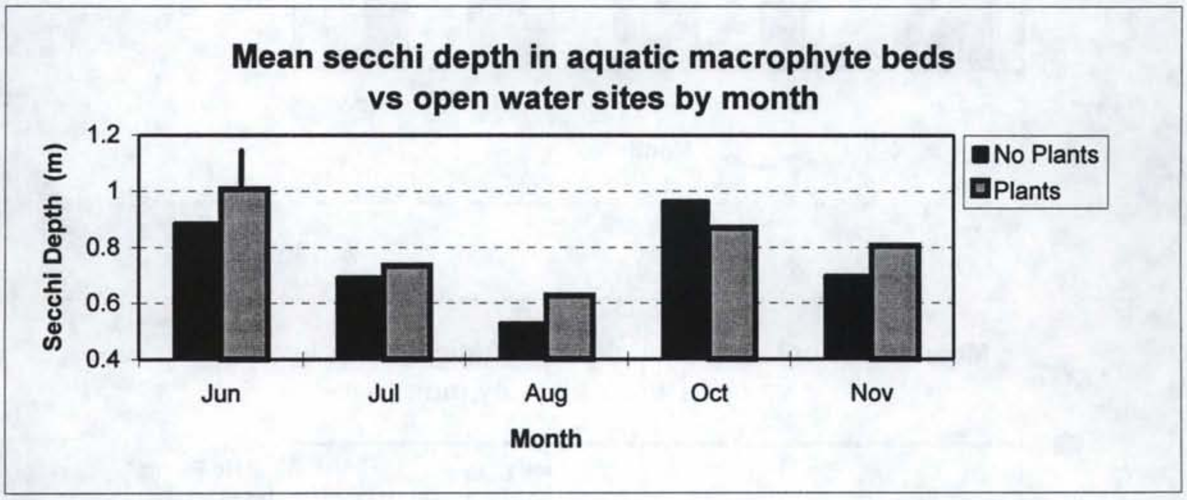


Figure 37. Mean water column temperature and mean dissolved oxygen with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.





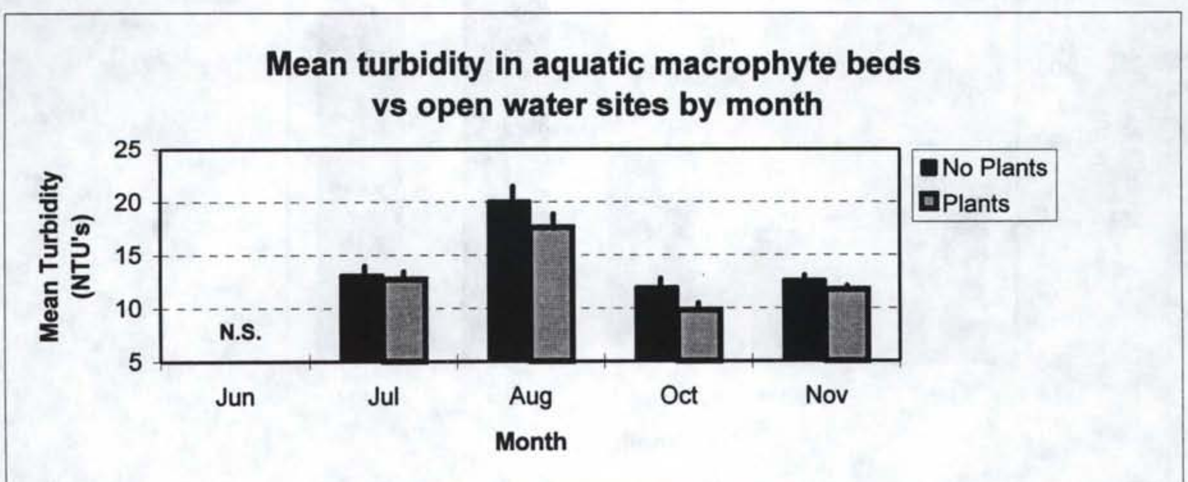
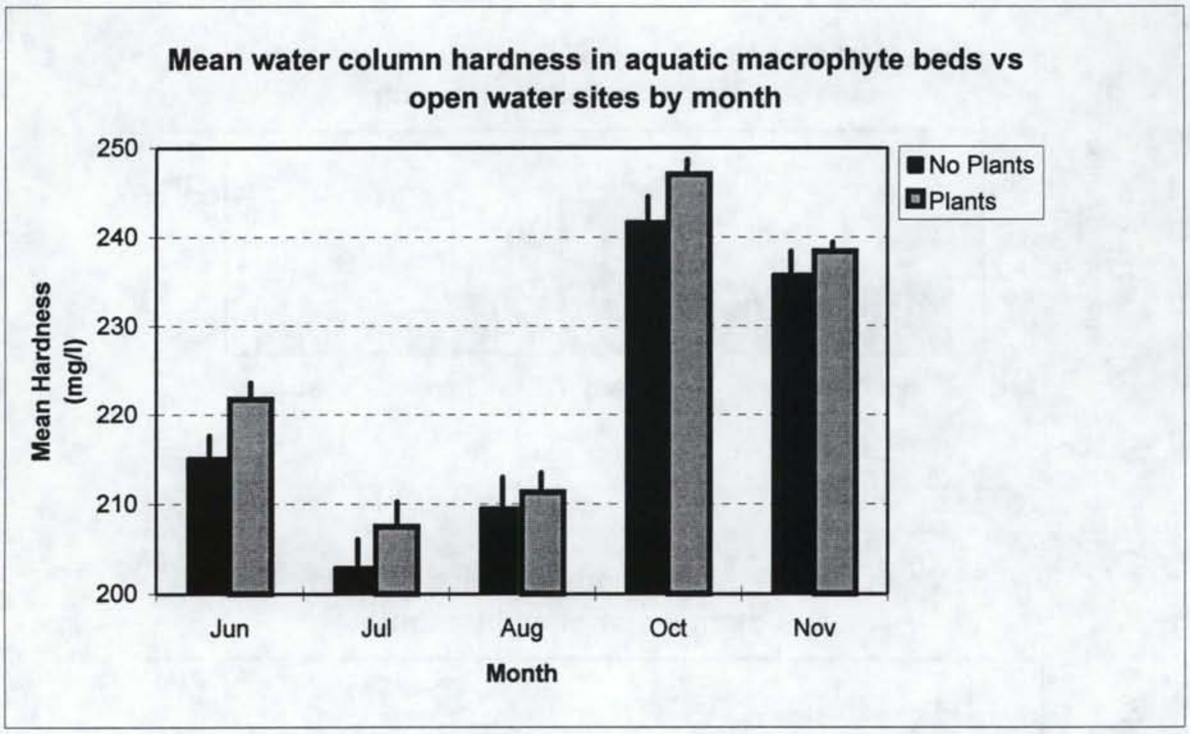


Figure 38. Mean water column total suspended solids, secchi depth, and turbidity, with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993. (N.S.= not sampled)



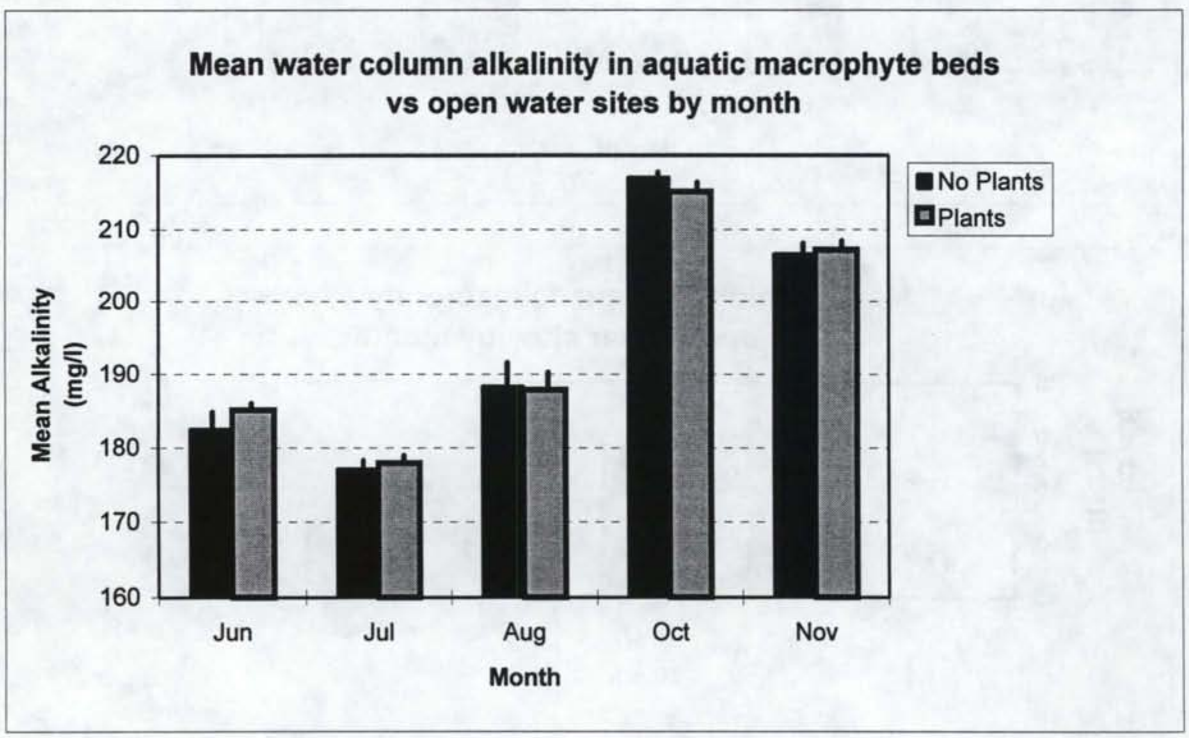
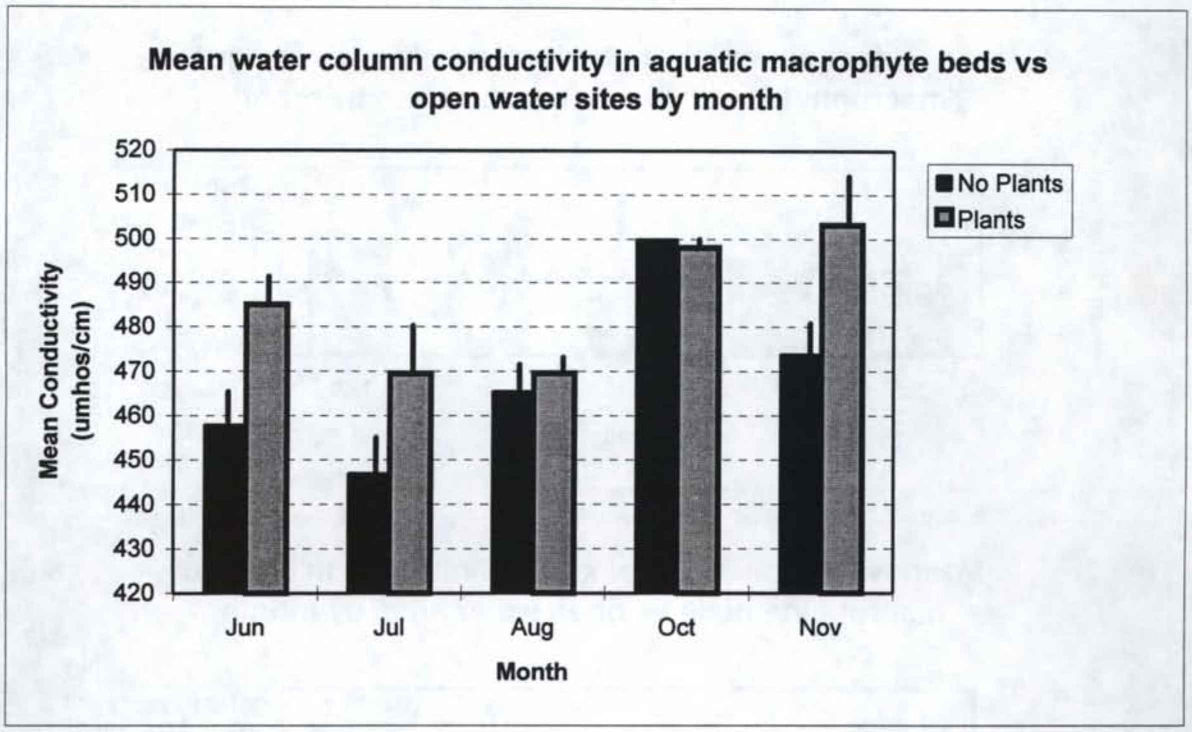


Figure 39. Mean water column hardness and alkalinity with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.



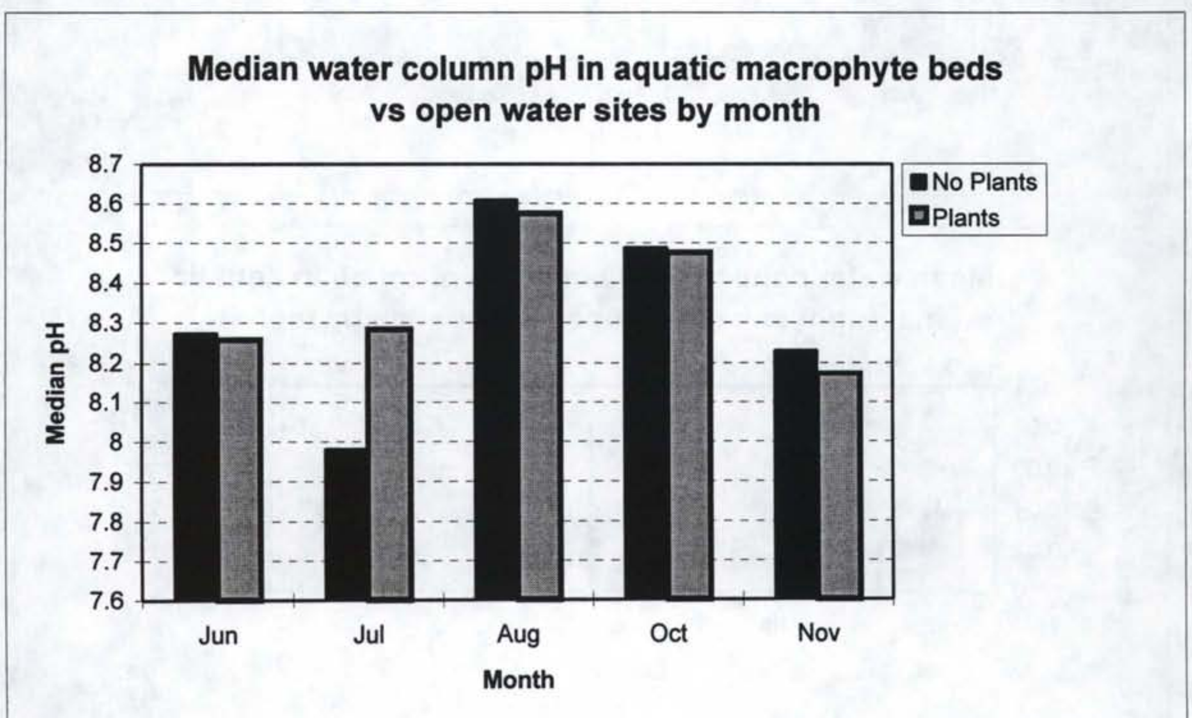
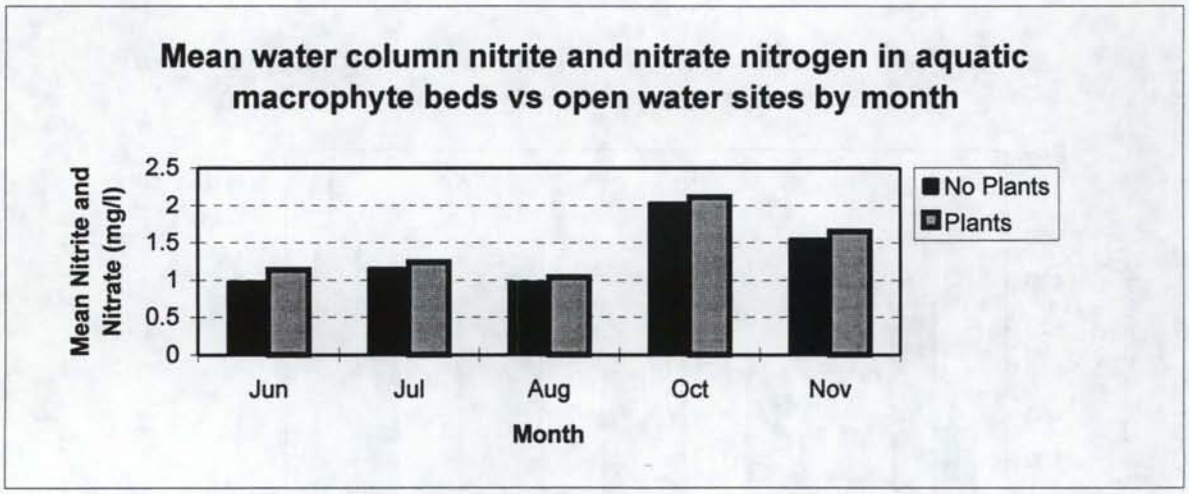
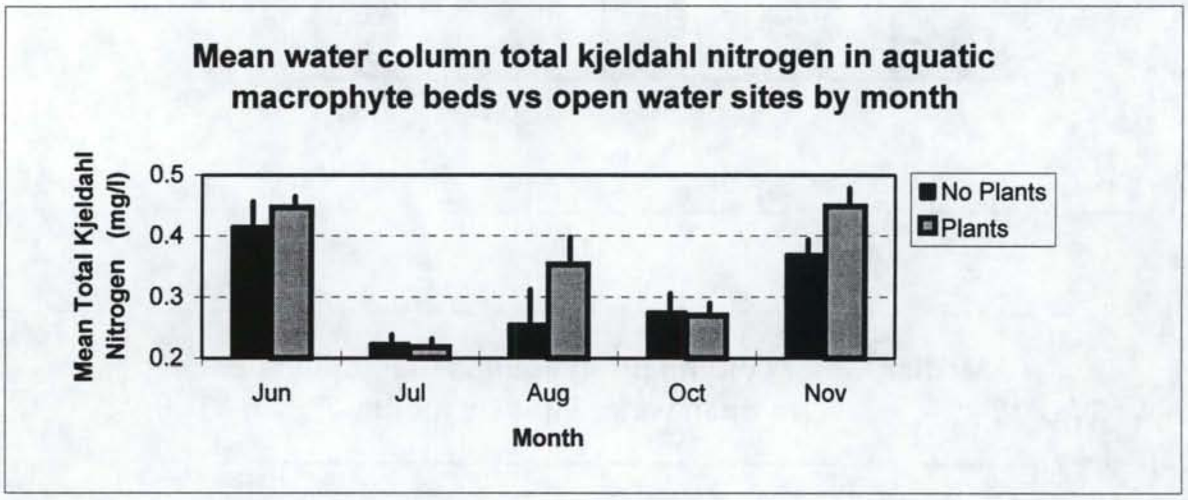


Figure 40. Mean water column conductivity with standard errors and median pH plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.





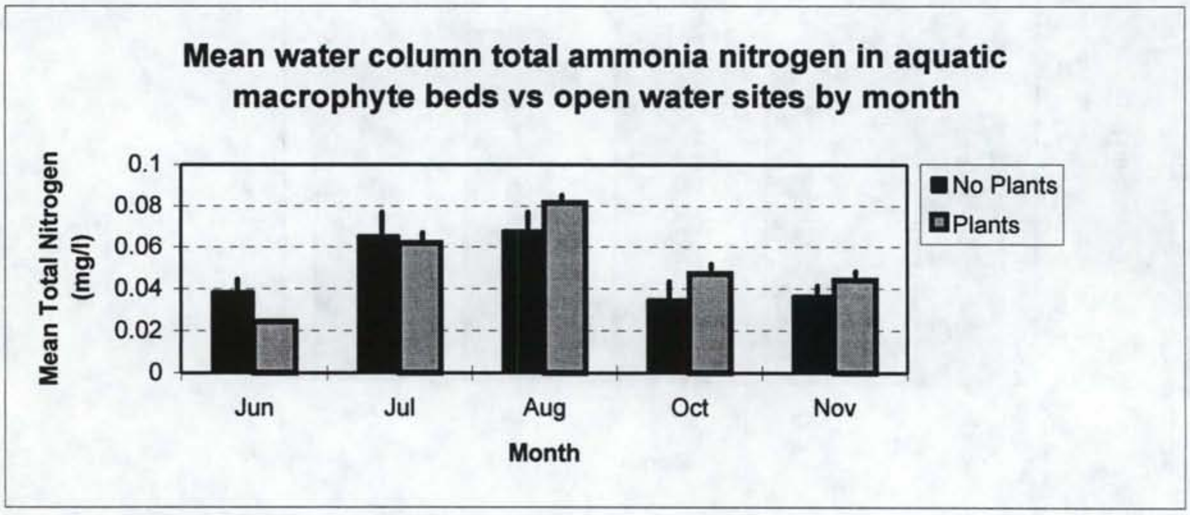
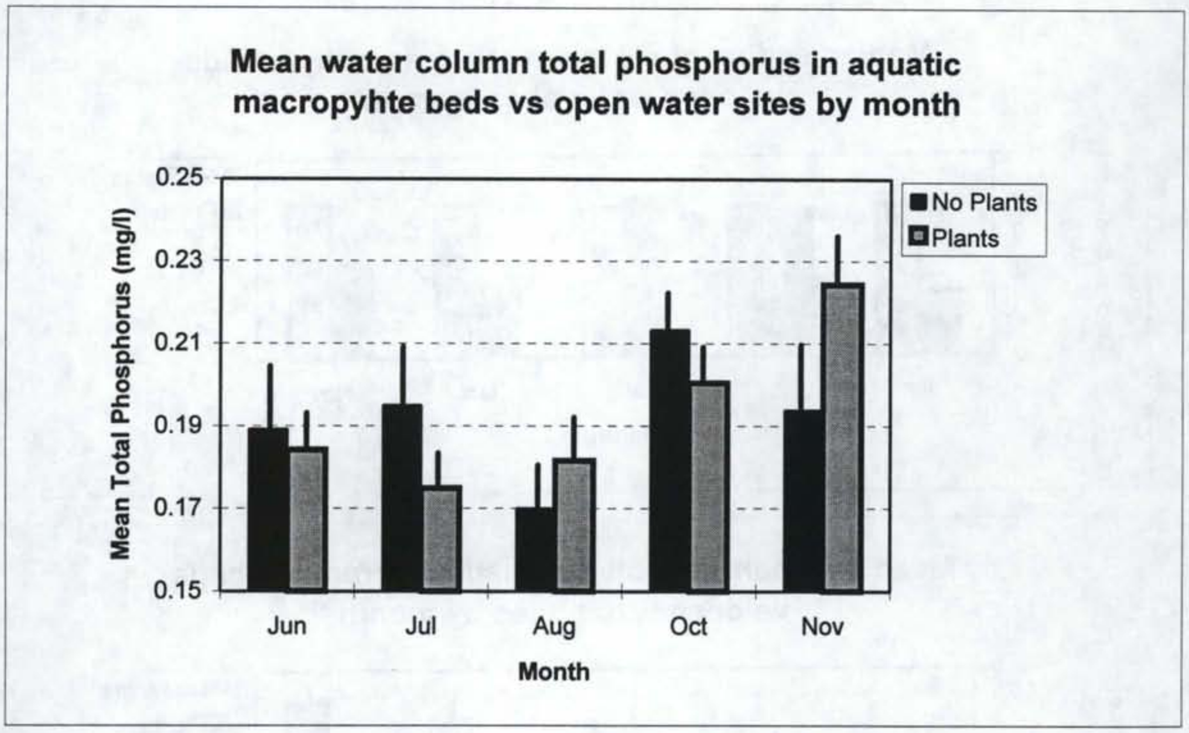


Figure 41. Mean water column nitrite and nitrate nitrogen, total kjeldahl nitrogen, and total ammonia nitrogen with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.



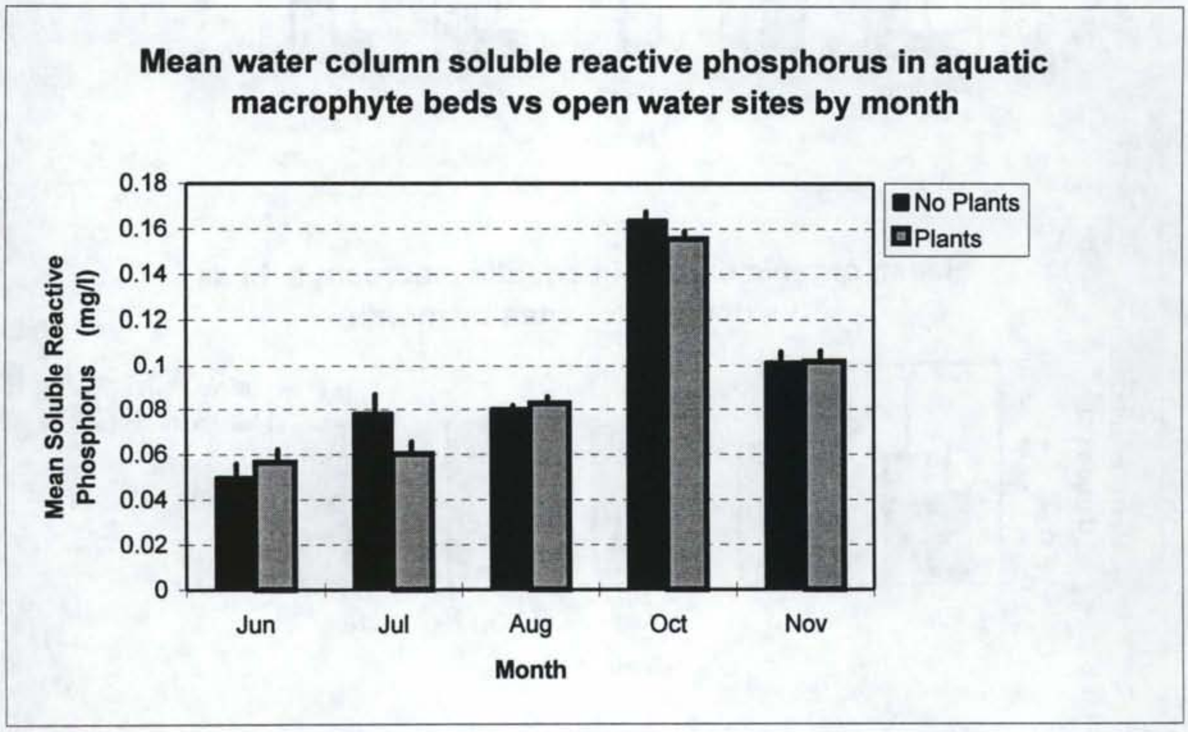


Figure 42. Mean water column total phosphorus and soluble reactive phosphorus with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

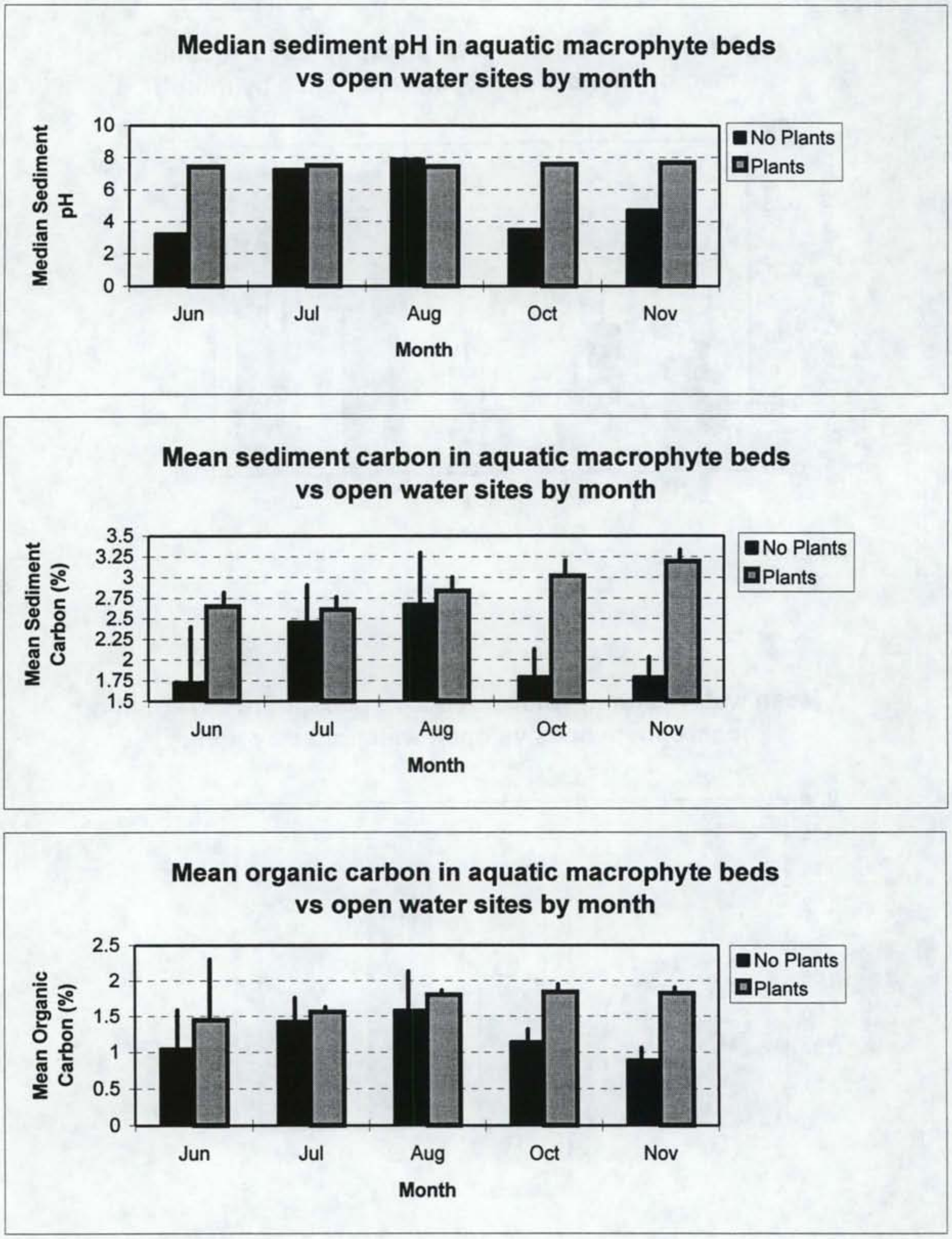


Figure 43. Median sediment pH, sediment carbon, and organic carbon with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

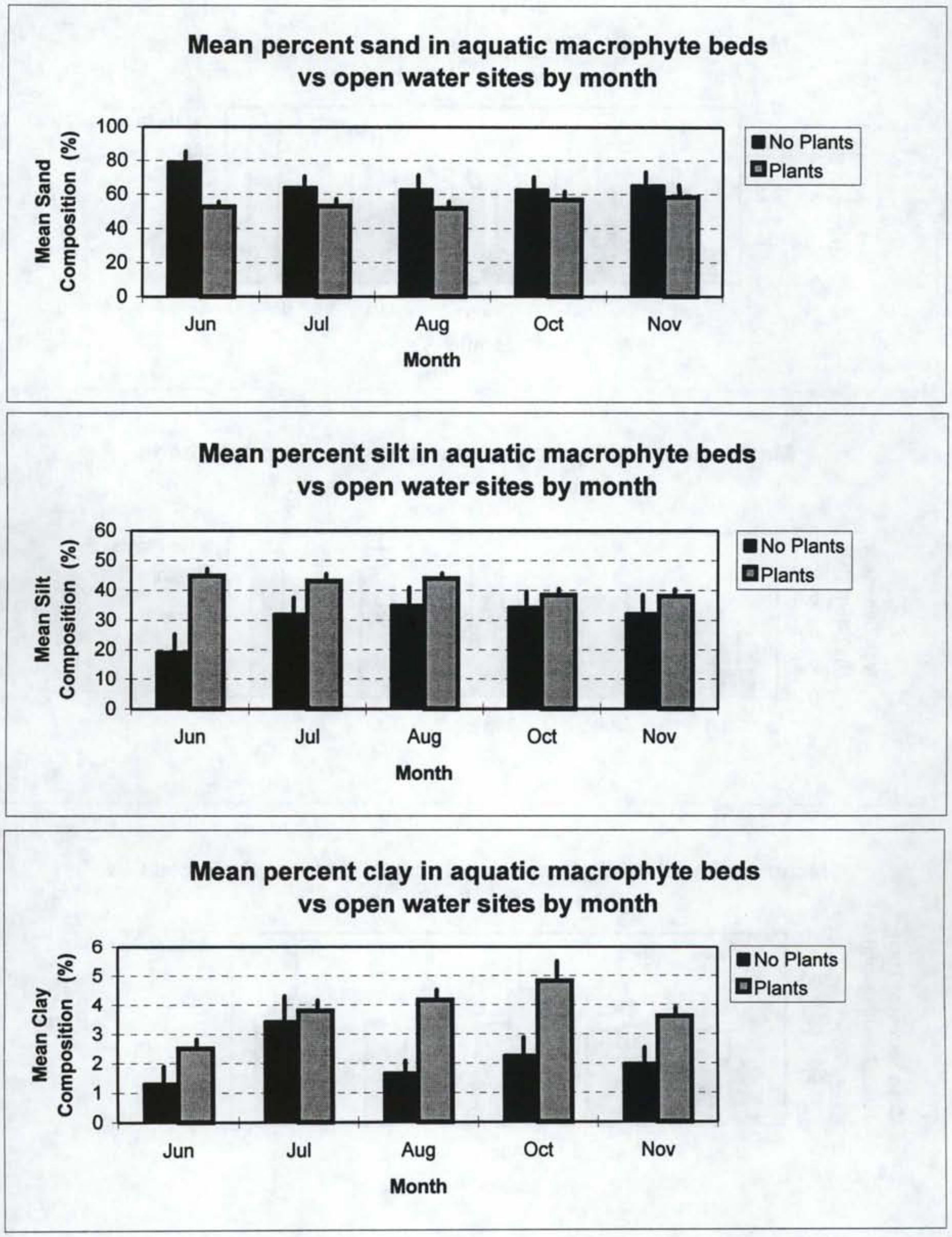


Figure 44. Mean percent sand, silt, and clay sediment composition with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (Rm 599.5-601.3), Middle Snake River, Idaho, 1993.

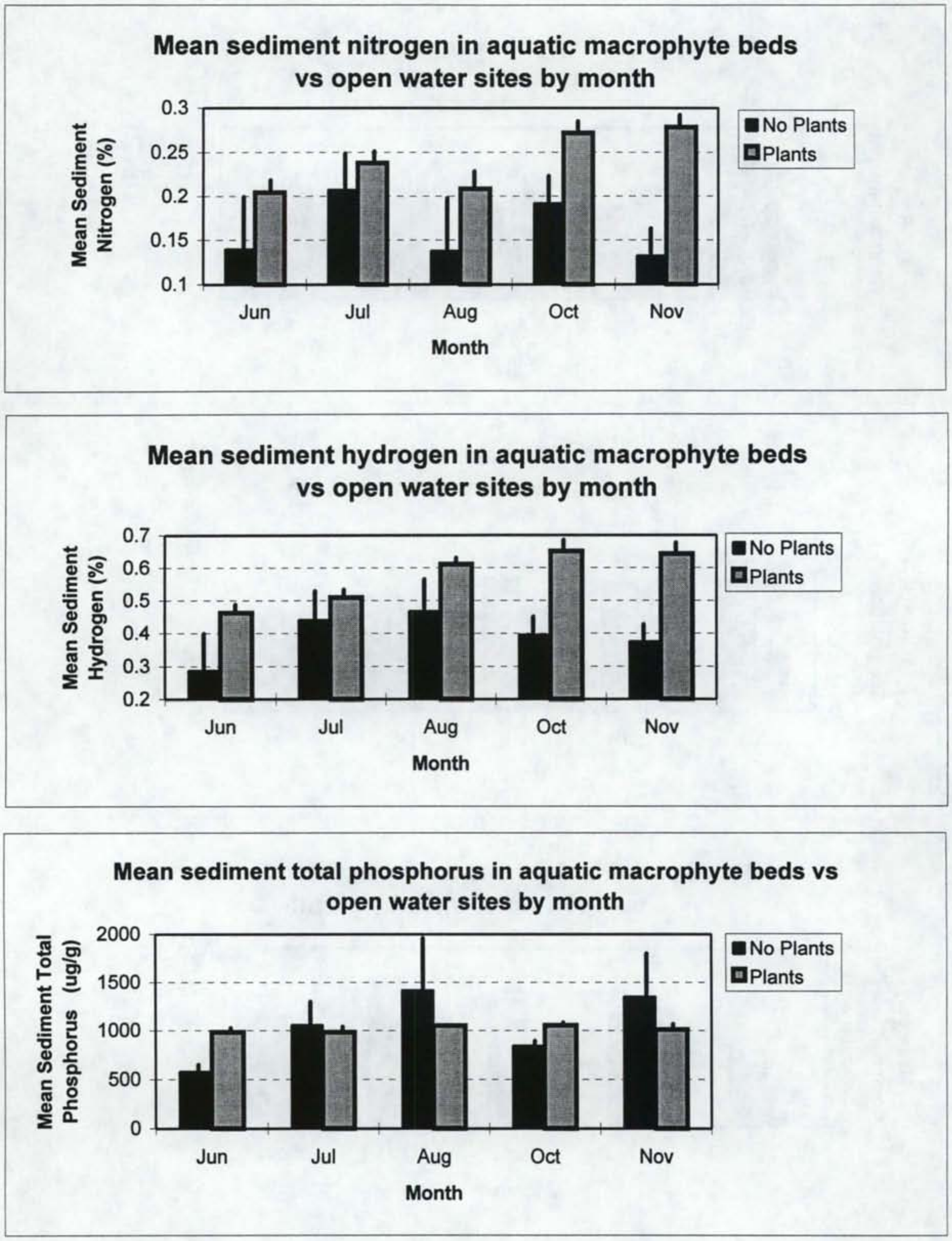


Figure 45. Mean sediment nitrogen, mean sediment hydrogen, and mean sediment total phosphorus with standard errors plotted by month for sites located in aquatic macrophyte beds and open water sites, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

TABLES

Table 1. List of transect locations for the Mid Snake River Nutrient and Productivity Assessment, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Sample Sites	River Mile	Location
1	1-5	601.0	Due north of the large rock bluff on the left bank*, marked with orange rebar. Sample sites spaced 20 meters apart.
2	1-5	600.6	Across channel from Clear Springs. Sample sites spaced 20 meters apart.
3	1-5	600.3	From the right side of the island 50 meters into the channel. Sample sites spaced 10 meters apart.
4	1-5	600.3	Left channel, midway down the island. Sample sites spaced 10 meters apart.
5	1-10	600.2	Bottom end Magic Valley Steelhead Hatchery on left bank near boat ramp. Sample sites spaced 20 meters apart on a 90 degree angle to shore.
6	1-10	600.1	Located 100 meters downstream from Transect 5. Sample sites spaced 20 meters apart.
7	1-10	600.0	Located 100 meters downstream from transect 6. Sample sites spaced 15 meters apart.

* Bank reference when facing downstream.

Table 2. Results summary for water quality QA/QC, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Variable	Duplicated Samples				Blank Samples					
		% Relative Range (Difference)			Total	Exceeding MDL				
	Pairs	Mean	Std. Err.	95% C.I.	Obs.	MDL	No.	%	Mean	Units
Ammonia - N	19	35.0	8.01	± 16.76	18	0.005	10	55.6	0.009	mg-N/l
Nitrite & Nitrate - N	19	1.5	0.32	± 0.67	18	0.005	7	38.9	0.006	mg-N/l
Total Kjeldahl Nitrogen - N	19	20.3	4.72	± 9.88	18	0.05	1	5.6	0.050	mg-N/l
Total Phosphorus - P	19	12.5	2.49	± 5.21	18	0.05	7	38.9	0.063	mg-P/l
Soluble Reactive Phosphorus - P	20	12.5	2.78	± 5.80	18	0.005	9	50.0	0.017	mg-P/l
Total Hardness	20	0.6	0.18	± 0.38	18	4.0	0	0	NA	mg/l
Total Alkalinity	20	0.6	0.31	± 0.65	18	20.0	0	0	NA	mg/l
Turbidity	20	6.4	2.95	± 6.15	18	2.0	6	33.3	2.20	NTU
Total Suspended Solids	20	4.0	1.25	± 2.61	18	1.0	1	5.6	2.00	mg/l
Chlorophyll *a*	10	13.0	3.83	± 8.53	8	1.0	2.00	25.0	16.18	µg/l

Variable	Spiked Samples			
		% Recovery		
	Obs.	Mean	Std. Err.	95% C.I.
Ammonia - N	8	94.60	1.95	± 4.64
Nitrite & Nitrate - N	8	98.54	1.91	± 4.55
Total Kjeldahl Nitrogen - N	8	100.05	8.77	± 20.87
Soluble Reactive Phosphorus - P	8	92.60	3.17	± 7.56
Total Phosphorus - P	8	103.50	5.78	± 13.76
Total Suspended Solids	8	94.20	0.96	± 2.29

Table 3. Daily water discharge, cubic feet per second, of mainstem Snake River recorded at river mile 596.8, six miles northeast of Buhl, ID. for period October 1, 1992 through December 31, 1993. Data extracted from USGS Water Data Reports ID-93-1 and ID-94-1 (USGS 1993 and 1994).

	Month (October 1992 - December 1993)														
Date	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1890	2840	1990	1860	1920	1730	2120	1820	5120	1940	3300	2340	2410	2240	3660
2	1880	2650	2170	2120	1950	1910	2110	1820	5190	1930	3640	2330	2420	2510	3750
3	2040	2350	2190	2200	1940	1950	2080	1840	3370	1990	3840	2330	2470	3180	3740
4	2030	2220	3100	2070	1620	1590	2110	1910	2430	2010	3830	2300	2480	3120	3830
5	2050	2130	2240	2250	1560	1580	2050	2020	2300	2020	3650	2290	2430	3030	3920
6	2040	2250	1900	2970	1820	1900	2040	2010	2920	1970	4500	2310	2440	3210	3910
7	2020	2260	2140	3370	1880	2020	2020	1980	9730	1920	4680	2290	2460	3220	3910
8	2000	2200	2760	3290	1900	2020	2010	2010	13600	1920	4710	2270	2530	3110	3820
9	2010	2570	2140	3160	1910	1810	2020	2020	14700	1910	4700	2290	2550	3050	4030
10	1970	2350	1880	3110	2090	1790	2030	1970	15000	1880	4650	2330	2530	3010	4290
11	1980	2220	2510	3040	2170	1970	2100	1920	15000	2340	4710	2360	2500	2990	4300
12	1990	2020	2370	2810	2080	2060	2190	1930	14400	3420	4670	2380	2470	3020	4380
13	1950	1960	1960	2710	2010	2260	1910	1980	15500	3310	3850	2460	2420	3010	4250
14	1950	2870	1760	2790	1900	2120	1860	2210	14700	3350	3740	2500	2450	2990	4350
15	1960	2720	2520	2760	1760	2010	1800	2230	13500	3340	3040	2490	2430	2960	4350
16	1930	2160	2640	2320	1710	2100	1980	2200	11000	3380	2400	2480	2430	2960	4270
17	1970	2020	2700	1980	1680	2350	1980	2150	5760	3390	2270	2430	2480	2970	4260
18	2050	1910	3380	1970	1690	3070	1680	2020	4530	3430	2220	2440	2470	2970	4290
19	2030	1860	2850	1970	1830	3050	1640	2170	5580	3510	2190	2470	2440	2930	4330
20	2040	2300	2840	1930	2060	2600	1620	5280	5240	3490	2180	2480	2510	3030	4320
21	2400	2520	2850	1730	1960	2180	1620	5070	4540	3490	2220	2470	4080	3610	4310
22	2440	1980	3190	1690	1940	2150	1630	5060	3930	3500	2260	2480	4870	3950	4290
23	2350	1860	2840	1710	1950	2150	1660	3820	2980	3710	2280	2510	3200	3830	4260
24	2350	1820	2500	1880	2110	2200	1660	3430	2490	3800	2220	2510	2680	3790	4240
25	2300	1950	2330	1940	2060	2210	1740	2450	2420	3770	2230	2460	2450	3720	4250
26	2320	2540	1840	1920	1870	2220	1760	2060	2500	3820	2240	2450	2740	3870	4260
27	2360	2480	1700	1920	1830	2340	1840	1980	2280	3750	2270	2450	2590	3880	4260
28	2700	2270	1710	1920	1550	2370	1860	1970	2080	3670	2300	2430	2490	3810	4250
29	2910	2030	1710	1920	-	2280	1830	2110	2000	3610	2310	2400	2290	3720	4230
30	3020	1980	1730	1890	-	2220	1810	4810	1970	3560	2340	2420	2280	3660	4240
31	3000	-	2090	1900	-	2140	-	4280	-	3560	2330	-	2300	-	4240
Total	67930	67290	72530	71100	52750	66350	56760	80530	206760	92690	97770	72150	81290	97350	128790
Mean	2191	2243	2340	2294	1884	2140	1892	2598	6892	2990	3154	2405	2622	3245	4155
Max	3020	2870	3380	3370	2170	3070	2190	5280	15500	3820	4710	2510	4870	3950	4380
Min	1880	1820	1700	1690	1550	1580	1620	1820	1970	1880	2180	2270	2280	2240	3660
Ac-FT	134700	133500	143900	141000	104600	131600	112600	159700	410100	183900	193900	143100	161200	193100	255500

Table 4. Annual mean daily flow, annual mean monthly flow (June - September), and total annual flow of mainstem Snake River recorded at river mile 596.8, six miles northeast of Buhl, ID for water years 1984 through 1994. Data extracted from USGS Water Data Reports ID-93-1 and ID-94-1 (USGS 1993 and 1994)

Water Year	Annual Mean Daily Flow (cubic feet/sec)	Annual Mean Monthly Flow June-Sept (cubic feet/sec)	Total Annual Flow (acre feet)
1984	11,620	9,091	8,433,000
1985	8,625	3,579	6,245,000
1986	9,065	6,363	6,563,000
1987	5,601	2,913	4,055,000
1988	2,495	2,616	1,812,000
1989	2,404	2,753	1,741,000
1990	2,380	2,431	1,723,000
1991	2,341	2,512	1,695,000
1992	2,116	3,710	1,536,000
1993	2,752	3,860	1,993,000
1994	3,232	2,848	2,340,000

Mean total annual flow for period of record (1947 - 1994) is 3,678,000 acre ft/yr.

Mean total annual flow for drought years (1988 - 1994) is 1,834,286 acre ft/yr.

Table 5. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column depth, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN DEPTH m					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0.5	7.5	4.7	1.5	7.7	1.7
June	2	5	1.1	2.6	1.9	0.3	2.4	1.3
June	3	5	0.7	1.1	0.8	0.1	1.0	0.7
June	4	5	0.6	1.6	1.1	0.2	1.5	0.8
June	5	10	0.8	2.0	1.3	0.2	1.6	1.0
June	6	10	0.4	2.9	1.1	0.2	1.5	0.6
June	7	10	0.8	2.8	1.5	0.2	1.9	1.0
July	1	5	0.8	7.4	4.8	1.1	6.9	2.6
July	2	5	1.5	3.6	2.4	0.4	3.2	1.7
July	3	5	0.9	1.1	1.0	0.0	1.1	0.9
July	4	5	0.9	1.9	1.6	0.2	2.0	1.2
July	5	10	1.0	3.5	1.7	0.3	2.2	1.1
July	6	10	0.8	2.5	1.4	0.2	1.8	1.0
July	7	10	1.1	3.0	1.5	0.2	1.9	1.2
August	1	5	0.8	8.1	4.7	1.5	7.7	1.7
August	2	5	1.5	3.4	2.6	0.4	3.3	1.8
August	3	5	0.9	1.6	1.2	0.1	1.5	0.9
August	4	5	0.9	2.0	1.6	0.2	1.9	1.2
August	5	10	1.2	3.2	1.7	0.2	2.2	1.2
August	6	10	1.1	2.5	1.4	0.2	1.8	1.1
August	7	10	0.8	3.0	1.4	0.2	1.8	1.0
October	1	5	0.5	7.3	4.5	1.1	6.7	2.3
October	2	5	1.0	3.3	2.1	0.5	3.0	1.3
October	3	5	0.7	1.2	0.9	0.1	1.1	0.7
October	4	5	0.6	1.6	1.2	0.2	1.5	0.8
October	5	10	0.6	2.1	1.2	0.2	1.5	0.9
October	6	10	0.7	2.7	1.2	0.2	1.5	0.8
October	7	10	0.6	3.2	1.3	0.3	1.8	0.8
November	1	5	0.5	7.9	4.7	1.4	7.4	2.1
November	2	5	1.0	3.1	2.2	0.4	2.9	1.4
November	3	5	0.8	1.1	0.9	0.1	1.0	0.8
November	4	5	0.8	1.6	1.4	0.1	1.6	1.1
November	5	10	0.8	3.6	1.6	0.3	2.2	1.0
November	6	10	0.5	2.6	1.2	0.2	1.6	0.8
November	7	10	1.0	2.4	1.4	0.2	1.7	1.1

Table 6. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column velocity, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN VELOCITY ft/s					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0	0.43	0.19	0.09	0.36	0.01
June	2	5	0.16	0.40	0.30	0.05	0.40	0.20
June	3	5	0.05	0.05	0.05	0	0.05	0.05
June	4	5	0.05	0.05	0.05	0	0.05	0.05
June	5	10	-	-	-	-	-	-
June	6	10	-	-	-	-	-	-
June	7	10	-	-	-	-	-	-
July	1	5	0	0.43	0.14	0.08	0.30	0
July	2	5	0.08	0.75	0.39	0.15	0.67	0.10
July	3	5	0.28	0.85	0.44	0.11	0.65	0.23
July	4	5	0.05	1.35	0.89	0.24	1.35	0.43
July	5	10	0.20	2.00	0.84	0.19	1.22	0.47
July	6	10	0.15	2.50	0.72	0.24	1.18	0.25
July	7	10	0.20	2.00	0.72	0.18	1.07	0.37
August	1	5	0	0.20	0.11	0.05	0.20	0.02
August	2	5	0	0.70	0.19	0.13	0.45	0
August	3	5	0	0.55	0.14	0.10	0.34	0
August	4	5	0.10	2.50	1.15	0.41	1.94	0.36
August	5	10	0	2.15	0.58	0.25	1.07	0.09
August	6	10	0	2.60	0.57	0.29	1.13	0.01
August	7	10	0.05	1.90	0.34	0.18	0.69	0
October	1	5	0.02	0.10	0.06	0.01	0.09	0.03
October	2	5	0	0.25	0.11	0.05	0.21	0.01
October	3	5	0.02	0.20	0.09	0.03	0.16	0.03
October	4	5	0.15	0.55	0.26	0.08	0.40	0.11
October	5	10	0.02	0.40	0.19	0.04	0.26	0.12
October	6	10	0.05	0.55	0.22	0.04	0.30	0.13
October	7	10	0.10	0.45	0.19	0.03	0.25	0.13
November	1	5	0	0.40	0.23	0.08	0.38	0.08
November	2	5	0	0.50	0.18	0.09	0.35	0.01
November	3	5	0.60	0.85	0.70	0.05	0.79	0.61
November	4	5	0.35	1.35	0.79	0.17	1.12	0.46
November	5	10	0.30	1.50	0.58	0.11	0.79	0.37
November	6	10	0.41	1.55	0.83	0.09	1.01	0.64
November	7	10	0.25	1.25	0.76	0.09	0.94	0.58

Table 7. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column total suspended solids, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN TOTAL SUSPENDED SOLIDS mg/l					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	16	23	18.8	1.36	21.5	16.1
June	2	5	12	15	14.0	0.63	15.2	12.8
June	3	5	12	14	13.2	0.37	13.9	12.5
June	4	5	12	14	13.0	0.32	13.6	12.4
June	5	10	6	15	10.9	0.86	12.6	9.2
June	6	10	2	16	10.6	1.27	13.1	8.1
June	7	10	0	17	10.0	1.45	12.8	7.2
July	1	5	14	19	16.8	0.86	18.5	15.1
July	2	5	14	21	16.8	1.32	19.4	14.2
July	3	5	5	10	7.4	0.87	9.1	5.7
July	4	5	13	22	17.8	1.53	20.8	14.8
July	5	10	8	26	14.4	1.67	17.7	11.1
July	6	10	6	17	11.4	1.15	13.6	9.2
July	7	10	0	22	10.8	2.40	15.5	6.1
August	1	5	17	29	25.6	2.27	30.1	21.1
August	2	5	19	29	23.8	2.18	28.1	19.5
August	3	5	7	16	9.8	1.62	13.0	6.6
August	4	5	19	76	31.4	11.16	53.3	9.5
August	5	10	11	146	38.5	12.94	63.9	13.1
August	6	10	9	121	34.6	10.47	55.1	14.1
August	7	10	6	75	21.1	6.32	33.5	8.7
October	1	5	14	15	14.4	0.24	14.9	13.9
October	2	5	6	24	14.8	3.73	22.1	7.5
October	3	5	8	11	9.2	0.58	10.3	8.1
October	4	5	7	12	9.2	0.86	10.9	7.5
October	5	10	3	9	6.0	0.60	7.2	4.8
October	6	10	1	9	5.7	0.76	7.2	4.2
October	7	10	0	13	5.4	1.02	7.4	3.4
November	1	5	24	28	25.2	0.80	26.8	23.6
November	2	5	18	24	21.6	1.17	23.9	19.3
November	3	5	19	24	20.4	0.93	22.2	18.6
November	4	5	18	20	18.8	0.37	19.5	18.1
November	5	10	13	27	19.7	1.27	22.2	17.2
November	6	10	13	29	21.9	1.62	25.1	18.7
November	7	10	13	24	18.0	1.20	20.4	15.6

Table 8. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column turbidity, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN TURBIDITY NTU					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	-	-	-	-	-	-
June	2	5	-	-	-	-	-	-
June	3	5	-	-	-	-	-	-
June	4	5	-	-	-	-	-	-
June	5	10	-	-	-	-	-	-
June	6	10	-	-	-	-	-	-
June	7	10	-	-	-	-	-	-
July	1	5	14.0	15.0	14.7	0.2	15.1	14.3
July	2	5	11.5	16.0	14.3	0.8	15.8	12.8
July	3	5	11.0	13.0	11.9	0.4	12.7	11.1
July	4	5	13.5	15.5	14.8	0.3	15.5	14.1
July	5	10	7.8	20.0	13.7	1.1	15.9	11.6
July	6	10	6.5	20.0	13.8	1.2	16.1	11.4
July	7	10	1.4	15.0	8.7	1.2	11.1	6.3
August	1	5	21.5	25.0	22.8	0.6	24.0	21.6
August	2	5	16.0	30.0	21.8	2.3	26.3	17.3
August	3	5	12.0	18.0	15.0	1.1	17.2	12.8
August	4	5	16.0	52.0	25.9	6.6	38.8	13.0
August	5	10	8.8	21.0	13.0	1.1	15.1	10.9
August	6	10	7.0	56.0	18.9	4.6	28.0	9.8
August	7	10	9.5	28.0	16.0	1.8	19.5	12.4
October	1	5	12.0	14.0	13.2	0.4	13.9	12.5
October	2	5	9.0	14.0	12.0	1.0	14.1	9.9
October	3	5	10.0	13.0	11.0	0.5	12.1	9.9
October	4	5	10.0	13.0	11.4	0.5	12.4	10.4
October	5	10	9.0	12.0	10.4	0.3	11.0	9.8
October	6	10	4.0	13.0	8.4	0.7	9.8	6.9
October	7	10	4.0	12.0	8.6	0.6	9.8	7.4
November	1	5	13.0	15.0	14.0	0.3	14.6	13.4
November	2	5	11.0	14.0	12.6	0.5	13.6	11.6
November	3	5	12.0	13.0	12.2	0.2	12.6	11.8
November	4	5	11.0	12.0	11.8	0.2	12.2	11.4
November	5	10	6.5	15.0	11.6	0.9	13.3	9.9
November	6	10	9.5	15.0	12.4	0.6	13.6	11.1
November	7	10	8.0	13.5	10.6	0.6	11.8	9.4

Table 9. Minimum, maximum, mean, standard error, and 95% confidence intervals for secchi depth, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SECCHI DEPTH m					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0.6	0.9	0.7	1.14	3.0	0
June	2	5	0.5	0.9	0.7	0.07	0.9	0.6
June	3	5	0.7	0.9	0.8	0.04	0.9	0.7
June	4	5	0.6	1.0	0.9	0.07	1.0	0.7
June	5	6	0.8	1.0	0.9	0.02	1.0	0.9
June	6	4	0.8	0.9	0.9	0.06	1.0	0.7
June	7	6	0.9	1.1	1.0	0.06	1.1	0.9
July	1	5	0.6	0.8	0.7	0.05	0.8	0.6
July	2	5	0.5	0.7	0.6	0.04	0.7	0.5
July	3	5	0.7	0.9	0.8	0.04	0.9	0.7
July	4	5	0.5	0.7	0.7	0.04	0.7	0.6
July	5	10	0.6	0.8	0.7	0.02	0.8	0.7
July	6	10	0.5	0.9	0.7	0.03	0.7	0.6
July	7	9	0.7	1.0	0.8	0.08	1.0	0.7
August	1	5	0.5	0.6	0.5	0.02	0.6	0.5
August	2	5	0.5	0.6	0.6	0.02	0.6	0.5
August	3	5	0.5	0.8	0.7	0.05	0.8	0.6
August	4	5	0.5	0.7	0.6	0.04	0.7	0.6
August	5	10	0.3	0.9	0.6	0.06	0.7	0.5
August	6	10	0.3	0.9	0.6	0.06	0.7	0.5
August	7	9	0.3	0.9	0.6	0.06	0.7	0.5
October	1	4	0.8	0.9	0.8	0.07	1.0	0.7
October	2	5	0.9	1.2	1.0	0.06	1.1	0.9
October	3	1*	1.1	1.1	1.1	-	-	-
October	4	4	0.8	1.0	0.9	0.07	1.0	0.8
October	5	5	0.9	1.1	1.0	0.05	1.1	0.9
October	6	5	0.9	1.1	0.9	0.04	1.0	0.9
October	7	3	0.8	1.1	1.0	0.05	1.1	0.9
November	1	4	0.6	0.7	0.6	0.03	0.7	0.6
November	2	5	0.7	0.9	0.8	0.04	0.8	0.7
November	3	5	0.7	0.8	0.7	0.02	0.8	0.7
November	4	4	0.7	0.8	0.8	0.02	0.8	0.7
November	5	9	0.7	1.0	0.8	0.02	0.9	0.8
November	6	6	0.8	0.8	0.8	0.03	0.9	0.7
November	7	10	0.8	1.2	0.9	0.04	0.9	0.8

* When n < 3 standard error and confidence intervals not calculated.

Table 10. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column temperature, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN TEMPERATURE °C					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	15.8	16.4	16.0	0.10	16.2	15.8
June	2	5	15.6	16.4	16.0	0.13	16.2	15.7
June	3	5	16.4	16.6	16.5	0.03	16.6	16.4
June	4	5	16.5	16.7	16.6	0.03	16.6	16.5
June	5	10	16.7	17.6	17.1	0.09	17.3	17.0
June	6	10	15.0	17.9	17.1	0.26	17.6	16.6
June	7	10	14.7	18.9	17.7	0.37	18.4	17.0
July	1	5	19.0	19.2	19.0	0.04	19.1	19.0
July	2	5	18.4	20.0	19.3	0.29	19.9	18.7
July	3	5	19.0	19.6	19.2	0.11	19.4	19.0
July	4	5	18.7	18.9	18.8	0.04	18.9	18.7
July	5	10	17.8	19.0	18.5	0.15	18.8	18.2
July	6	10	17.8	19.2	18.6	0.15	18.9	18.3
July	7	10	15.0	18.3	17.6	0.31	18.2	17.0
August	1	5	19.0	19.5	19.4	0.10	19.6	19.2
August	2	5	19.0	19.5	19.3	0.11	19.5	19.0
August	3	5	19.0	20.5	19.9	0.24	20.4	19.4
August	4	5	19.7	20.0	19.9	0.07	20.1	19.8
August	5	10	18.5	20.8	19.8	0.20	20.2	19.4
August	6	10	19.5	21.8	20.6	0.23	21.0	20.1
August	7	10	18.0	20.0	19.0	0.20	19.4	18.6
October	1	5	14.2	14.5	14.3	0.07	14.5	14.2
October	2	5	14.3	15.0	14.6	0.11	14.8	14.4
October	3	5	15.0	15.5	15.2	0.11	15.4	15.0
October	4	5	14.0	14.0	14.0	0	14.0	14.0
October	5	10	14.7	15.8	15.1	0.11	15.3	14.9
October	6	10	14.0	15.0	14.9	0.10	15.1	14.7
October	7	10	14.0	14.5	14.1	0.05	14.1	14.0
November	1	5	6.8	6.9	6.8	0.01	6.8	6.8
November	2	5	6.8	8.8	7.4	0.37	8.2	6.7
November	3	5	7.3	7.4	7.4	0.02	7.4	7.3
November	4	5	6.9	7.5	7.2	0.10	7.4	7.0
November	5	10	6.9	11.3	7.9	0.41	8.7	7.1
November	6	10	7.0	9.4	7.9	0.22	8.3	7.4
November	7	10	7.0	9.5	8.3	0.28	8.8	7.7

Table 11. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column dissolved oxygen, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN DISSOLVED OXYGEN mg/l					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	9.2	9.5	9.3	0.05	9.4	9.2
June	2	5	9.5	10.1	9.7	0.10	9.9	9.5
June	3	5	10.2	10.2	10.2	0.01	10.2	10.1
June	4	5	10.2	10.4	10.2	0.03	10.3	10.2
June	5	10	10.0	11.4	10.6	0.12	10.8	10.3
June	6	10	9.8	10.2	9.9	0.05	10.0	9.9
June	7	10	10.5	11.0	10.5	0.05	10.6	10.5
July	1	5	6.2	11.9	7.7	1.07	9.8	5.6
July	2	5	5.7	6.8	6.3	0.19	6.6	5.9
July	3	5	6.7	7.1	6.9	0.06	7.0	6.7
July	4	5	6.3	7.0	6.7	0.11	6.9	6.5
July	5	10	7.9	9.6	9.1	0.16	9.4	8.8
July	6	10	7.2	8.9	8.4	0.16	8.7	8.0
July	7	10	8.5	9.3	8.9	0.06	9.1	8.8
August	1	5	7.3	8.0	7.6	0.12	7.8	7.3
August	2	5	7.1	7.5	7.4	0.08	7.5	7.2
August	3	5	8.2	9.0	8.6	0.16	8.9	8.3
August	4	5	8.0	8.2	8.1	0.03	8.2	8.0
August	5	10	7.3	8.4	7.7	0.11	7.9	7.4
August	6	10	8.0	9.0	8.5	0.12	8.8	8.3
August	7	10	7.4	8.4	7.8	0.08	8.0	7.7
October	1	5	8.8	9.0	8.9	0.04	9.0	8.9
October	2	5	8.7	10.7	9.2	0.36	9.9	8.5
October	3	5	9.1	9.9	9.4	0.15	9.6	9.1
October	4	5	9.2	9.3	9.3	0.03	9.3	9.2
October	5	10	8.9	10.4	9.5	0.17	9.8	9.2
October	6	10	9.0	9.5	9.2	0.06	9.3	9.1
October	7	10	9.7	10.9	10.0	0.11	10.2	9.8
November	1	5	12.9	13.5	13.3	0.11	13.5	13.1
November	2	5	12.6	13.6	13.2	0.19	13.6	12.8
November	3	5	11.3	12.2	11.8	0.14	12.1	11.5
November	4	5	11.2	12.1	11.8	0.15	12.1	11.4
November	5	10	7.5	14.8	11.8	0.66	13.1	10.5
November	6	10	10.4	12.8	11.7	0.28	12.2	11.1
November	7	10	10.5	12.0	11.1	0.17	11.4	10.7

Table 12. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column hardness, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN HARDNESS mg/l					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	204	212	207	1.62	210	204
June	2	5	204	230	217	4.84	226	207
June	3	5	212	220	215	1.50	218	212
June	4	5	210	216	214	1.17	216	211
June	5	10	214	240	220	2.40	225	215
June	6	10	214	244	225	2.92	230	219
June	7	10	216	252	230	3.48	237	223
July	1	5	194	208	199	2.42	204	194
July	2	5	188	214	200	4.35	208	191
July	3	5	200	206	202	1.26	204	200
July	4	5	198	206	203	1.50	206	200
July	5	10	190	228	207	3.61	214	200
July	6	10	200	228	209	2.91	214	203
July	7	10	198	250	215	4.68	224	205
August	1	5	202	208	204	1.17	207	202
August	2	5	204	220	208	3.04	214	202
August	3	5	212	216	214	0.98	216	212
August	4	5	216	218	216	0.40	217	216
August	5	10	198	222	207	2.09	211	203
August	6	10	202	224	209	2.19	214	205
August	7	10	210	228	217	2.17	221	213
October	1	5	238	240	240	0.40	240	239
October	2	5	236	258	245	4.50	254	236
October	3	5	244	250	246	1.17	249	244
October	4	5	242	244	243	0.49	244	242
October	5	10	240	256	245	1.58	248	242
October	6	10	238	254	248	1.53	251	245
October	7	10	238	260	251	2.11	255	247
November	1	5	226	236	232	1.90	236	228
November	2	5	232	246	238	2.79	244	233
November	3	5	234	244	238	1.94	241	234
November	4	5	230	236	234	1.17	236	231
November	5	10	232	252	239	1.81	242	235
November	6	10	232	248	239	1.34	242	236
November	7	10	234	246	240	1.56	243	237

Table 13. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column alkalinity (as CACO3), Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN ALKALINITY (CACO3) mg/l					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	177	199	183	4.13	191	175
June	2	5	180	199	190	3.31	196	183
June	3	5	180	199	186	3.37	192	179
June	4	5	178	195	183	3.09	189	177
June	5	10	178	189	184	1.30	186	181
June	6	10	179	187	184	0.65	185	182
June	7	10	180	190	185	0.81	186	183
July	1	5	172	175	174	0.58	175	173
July	2	5	167	180	175	2.42	180	171
July	3	5	170	180	176	1.81	179	172
July	4	5	176	180	178	0.66	180	177
July	5	10	175	186	179	0.95	181	177
July	6	10	176	185	179	0.94	181	177
July	7	10	176	183	179	0.72	181	178
August	1	5	186	190	188	0.73	190	187
August	2	5	188	190	189	0.37	190	188
August	3	5	178	188	186	1.94	189	182
August	4	5	189	199	192	1.77	196	189
August	5	10	178	224	190	4.49	199	181
August	6	10	180	191	186	1.08	188	184
August	7	10	178	202	187	1.93	190	183
October	1	5	216	219	217	0.51	218	216
October	2	5	216	219	218	0.60	219	216
October	3	5	214	217	216	0.49	217	215
October	4	5	213	218	216	0.87	218	215
October	5	10	215	216	216	0.16	216	215
October	6	10	193	219	214	2.35	219	209
October	7	10	201	218	214	1.56	217	211
November	1	5	205	209	207	0.68	208	205
November	2	5	207	209	208	0.37	209	207
November	3	5	207	210	208	0.51	209	207
November	4	5	206	209	208	0.51	209	207
November	5	10	206	208	207	0.22	208	207
November	6	10	205	209	206	0.45	207	205
November	7	10	206	208	207	0.26	207	206

Table 14. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column conductivity, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			WATER COLUMN CONDUCTIVITY µmhos					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	410	450	430	7.07	444	416
June	2	5	450	490	462	7.35	476	448
June	3	5	460	480	472	3.74	479	465
June	4	5	460	470	466	2.45	471	461
June	5	10	440	500	467	4.67	476	458
June	6	10	460	550	497	9.43	515	478
June	7	10	480	550	514	10.02	534	494
July	1	5	440	450	445	1.58	448	442
July	2	5	450	465	454	2.91	459	448
July	3	5	440	455	450	2.74	455	445
July	4	5	450	450	450	0	450	450
July	5	10	380	470	446	7.63	461	431
July	6	10	450	800	497	33.90	563	431
July	7	10	460	600	478	13.89	505	451
August	1	5	460	470	464	1.87	468	460
August	2	5	470	490	478	3.74	485	471
August	3	5	460	460	460	0	460	460
August	4	5	460	470	462	2.00	466	458
August	5	10	430	495	463	5.49	474	452
August	6	10	370	500	469	11.55	491	446
August	7	10	430	500	480	5.96	492	468
October	1	5	500	500	500	0	500	500
October	2	5	420	500	484	16.00	515	453
October	3	5	500	500	500	0	500	500
October	4	5	500	500	500	0	500	500
October	5	10	500	500	500	0	500	500
October	6	10	500	500	500	0	500	500
October	7	10	500	500	500	0	500	500
November	1	5	450	450	450	0	450	450
November	2	5	400	500	480	20.00	519	441
November	3	5	400	580	508	30.56	568	448
November	4	5	550	650	610	18.71	647	573
November	5	10	480	500	496	2.67	501	491
November	6	10	470	500	474	3.06	480	468
November	7	10	470	500	484	4.76	493	475

Table 16. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column total nitrite and nitrate nitrogen, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

WATER COLUMN NITRITE AND NITRATE NITROGEN
mg/l

MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0.79	0.82	0.81	0.01	0.82	0.79
June	2	5	0.83	1.29	0.98	0.09	1.16	0.80
June	3	5	1.01	1.09	1.03	0.02	1.06	1.00
June	4	5	0.85	0.99	0.95	0.03	1.00	0.89
June	5	10	0.92	1.45	1.08	0.05	1.18	0.99
June	6	10	1.04	1.71	1.23	0.06	1.36	1.11
June	7	10	1.05	1.73	1.30	0.06	1.42	1.18
July	1	5	1.06	1.09	1.07	0.01	1.09	1.06
July	2	5	1.07	1.41	1.18	0.06	1.30	1.05
July	3	5	1.17	1.20	1.18	0.01	1.19	1.17
July	4	5	1.13	1.15	1.14	0	1.15	1.13
July	5	10	1.10	1.59	1.25	0.04	1.34	1.17
July	6	10	1.13	1.59	1.28	0.05	1.37	1.18
July	7	10	1.07	1.85	1.30	0.07	1.44	1.16
August	1	5	0.83	0.93	0.89	0.02	0.92	0.86
August	2	5	0.90	1.17	0.98	0.05	1.08	0.88
August	3	5	1.07	1.22	1.13	0.03	1.18	1.08
August	4	5	1.04	1.14	1.10	0.02	1.14	1.07
August	5	10	0.69	1.25	0.91	0.05	1.00	0.82
August	6	10	0.85	1.39	1.01	0.06	1.12	0.90
August	7	10	0.89	1.47	1.16	0.06	1.28	1.03
October	1	5	1.98	2.00	1.99	0	1.99	1.98
October	2	5	1.94	2.32	2.09	0.08	2.24	1.94
October	3	5	2.07	2.14	2.11	0.01	2.14	2.08
October	4	5	2.05	2.09	2.07	0.01	2.09	2.05
October	5	10	1.97	2.20	2.08	0.02	2.12	2.04
October	6	10	2.02	2.28	2.16	0.02	2.20	2.11
October	7	10	1.95	2.24	2.13	0.03	2.19	2.06
November	1	5	1.42	1.44	1.43	0.00	1.44	1.42
November	2	5	1.45	1.73	1.55	0.06	1.66	1.44
November	3	5	1.56	1.61	1.59	0.01	1.61	1.56
November	4	5	1.46	1.56	1.50	0.02	1.54	1.47
November	5	10	1.49	1.87	1.65	0.03	1.71	1.59
November	6	10	1.56	1.92	1.70	0.03	1.77	1.64
November	7	10	1.59	1.90	1.75	0.03	1.82	1.69

Table 17. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column total kjeldahl nitrogen, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

WATER COLUMN TOTAL KJELDAHL NITROGEN
mg/l

MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0.20	0.65	0.37	0.08	0.52	0.22
June	2	5	0.22	0.41	0.33	0.03	0.40	0.26
June	3	5	0.32	0.53	0.41	0.03	0.47	0.34
June	4	5	0.37	0.51	0.43	0.03	0.48	0.37
June	5	10	0.40	0.61	0.51	0.02	0.55	0.47
June	6	10	0	0.67	0.46	0.06	0.59	0.33
June	7	10	0.09	0.67	0.46	0.06	0.58	0.34
July	1	5	0.09	0.31	0.21	0.04	0.29	0.14
July	2	5	0.18	0.28	0.22	0.02	0.26	0.19
July	3	5	0.12	0.37	0.25	0.04	0.34	0.16
July	4	5	0.14	0.42	0.27	0.05	0.37	0.17
July	5	10	0.11	0.33	0.23	0.03	0.28	0.17
July	6	10	0.16	0.24	0.21	0.01	0.23	0.19
July	7	10	0	0.33	0.18	0.03	0.24	0.12
August	1	5	0	0.20	0.11	0.04	0.20	0.02
August	2	5	0.10	0.17	0.15	0.01	0.18	0.13
August	3	5	0.15	0.33	0.24	0.03	0.31	0.18
August	4	5	0.26	0.55	0.36	0.05	0.46	0.26
August	5	10	0.14	1.58	0.52	0.18	0.87	0.17
August	6	10	0.15	0.83	0.38	0.07	0.52	0.25
August	7	10	0.12	0.82	0.34	0.06	0.45	0.22
October	1	5	0.09	0.52	0.31	0.08	0.46	0.15
October	2	5	0.17	1.05	0.42	0.16	0.73	0.10
October	3	5	0.15	0.30	0.24	0.03	0.30	0.18
October	4	5	0.26	0.40	0.33	0.02	0.37	0.28
October	5	10	0.07	0.32	0.22	0.03	0.27	0.17
October	6	10	0.06	0.43	0.29	0.04	0.36	0.22
October	7	10	0	0.30	0.21	0.03	0.27	0.15
November	1	5	0.24	0.35	0.30	0.02	0.34	0.27
November	2	5	0.25	0.40	0.33	0.02	0.38	0.28
November	3	5	0.14	0.45	0.29	0.05	0.40	0.19
November	4	5	0.17	0.68	0.42	0.08	0.59	0.26
November	5	10	0.29	0.79	0.41	0.05	0.50	0.32
November	6	10	0.22	0.91	0.59	0.08	0.74	0.43
November	7	10	0.23	0.65	0.47	0.04	0.56	0.39

Table 18. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column total ammonia nitrogen, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

WATER COLUMN TOTAL AMMONIA NITROGEN
mg/l

MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0.03	0.07	0.05	0.01	0.07	0.04
June	2	5	0.03	0.08	0.05	0.01	0.07	0.03
June	3	5	0.03	0.05	0.04	0	0.04	0.04
June	4	5	0.01	0.04	0.02	0	0.02	0.02
June	5	10	0.01	0.03	0.02	0	0.02	0.02
June	6	10	0	0.03	0.02	0	0.02	0.02
June	7	10	0	0.04	0.02	0	0.02	0.02
July	1	5	0	0.05	0.02	0.01	0.04	0
July	2	5	0.01	0.12	0.05	0.02	0.09	0.02
July	3	5	0.04	0.10	0.07	0.01	0.09	0.04
July	4	5	0.03	0.09	0.05	0.01	0.07	0.03
July	5	10	0.03	0.09	0.06	0.01	0.07	0.04
July	6	10	0.01	0.11	0.08	0.01	0.10	0.06
July	7	10	0.04	0.14	0.08	0.01	0.10	0.06
August	1	5	0.04	0.06	0.05	0	0.05	0.05
August	2	5	0.04	0.09	0.05	0.01	0.07	0.04
August	3	5	0.08	0.12	0.10	0.01	0.11	0.08
August	4	5	0.07	0.09	0.08	0	0.08	0.08
August	5	10	0.06	0.09	0.07	0	0.07	0.07
August	6	10	0.06	0.11	0.08	0	0.08	0.08
August	7	10	0.06	0.14	0.10	0.01	0.12	0.09
October	1	5	0.01	0.02	0.02	0	0.02	0.02
October	2	5	0.02	0.16	0.06	0.03	0.12	0.01
October	3	5	0.04	0.06	0.05	0	0.05	0.05
October	4	5	0.02	0.04	0.03	0	0.03	0.03
October	5	10	0.02	0.08	0.05	0.01	0.06	0.04
October	6	10	0	0.09	0.05	0.01	0.07	0.03
October	7	10	0	0.08	0.05	0.01	0.06	0.03
November	1	5	0.02	0.02	0.02	0	0.02	0.02
November	2	5	0.02	0.08	0.04	0.01	0.07	0.02
November	3	5	0.04	0.04	0.04	0	0.04	0.04
November	4	5	0.02	0.03	0.03	0	0.03	0.03
November	5	10	0.03	0.06	0.04	0	0.04	0.04
November	6	10	0.03	0.07	0.04	0	0.04	0.04
November	7	10	0.05	0.07	0.06	0	0.06	0.06

Table 19. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column total phosphorus, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

WATER COLUMN TOTAL PHOSPHORUS
mg/l

MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0.14	0.21	0.17	0.01	0.20	0.15
June	2	5	0.18	0.25	0.21	0.01	0.23	0.18
June	3	5	0.18	0.25	0.21	0.01	0.24	0.18
June	4	5	0.19	0.25	0.22	0.01	0.24	0.19
June	5	10	0.12	0.20	0.15	0.01	0.16	0.13
June	6	10	0.11	0.24	0.19	0.01	0.21	0.16
June	7	10	0.05	0.26	0.19	0.02	0.22	0.16
July	1	5	0.11	0.19	0.16	0.01	0.19	0.13
July	2	5	0.11	0.22	0.14	0.02	0.18	0.10
July	3	5	0.16	0.23	0.20	0.01	0.23	0.17
July	4	5	0.19	0.23	0.21	0.01	0.22	0.19
July	5	10	0.15	0.25	0.20	0.01	0.22	0.18
July	6	10	0.11	0.20	0.15	0.01	0.17	0.13
July	7	10	0.05	0.25	0.19	0.02	0.22	0.15
August	1	5	0.15	0.20	0.16	0.01	0.18	0.15
August	2	5	0.16	0.18	0.17	0	0.18	0.17
August	3	5	0.14	0.20	0.16	0.01	0.18	0.14
August	4	5	0.13	0.24	0.16	0.02	0.20	0.12
August	5	10	0.14	0.51	0.22	0.04	0.30	0.15
August	6	10	0.11	0.33	0.19	0.02	0.23	0.15
August	7	10	0.10	0.25	0.15	0.01	0.18	0.12
October	1	5	0.23	0.28	0.26	0.01	0.27	0.24
October	2	5	0.23	0.34	0.28	0.02	0.32	0.24
October	3	5	0.21	0.25	0.24	0.01	0.25	0.22
October	4	5	0.15	0.22	0.19	0.01	0.21	0.16
October	5	10	0.14	0.22	0.19	0.01	0.20	0.17
October	6	10	0.11	0.21	0.17	0.01	0.18	0.15
October	7	10	0.12	0.24	0.18	0.01	0.21	0.16
November	1	5	0.11	0.14	0.13	0.01	0.14	0.12
November	2	5	0.21	0.35	0.26	0.02	0.30	0.21
November	3	5	0.15	0.27	0.22	0.02	0.26	0.18
November	4	5	0.11	0.22	0.17	0.02	0.22	0.13
November	5	10	0.09	0.25	0.17	0.02	0.20	0.14
November	6	10	0.24	0.41	0.29	0.02	0.32	0.26
November	7	10	0.19	0.28	0.23	0.01	0.26	0.21

Table 20. Minimum, maximum, mean, standard error, and 95% confidence intervals for water column soluble reactive phosphorus, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

WATER COLUMN SOLUBLE REACTIVE PHOSPHORUS
mg/l

MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	5	0.04	0.06	0.05	0	0.05	0.04
June	2	5	0.04	0.07	0.05	0	0.06	0.04
June	3	5	0.05	0.06	0.06	0	0.06	0.05
June	4	5	0.04	0.06	0.05	0	0.06	0.04
June	5	10	0.03	0.10	0.05	0.01	0.07	0.04
June	6	10	0.04	0.06	0.05	0	0.06	0.05
June	7	10	0.05	0.11	0.07	0.01	0.08	0.06
July	1	5	0.06	0.10	0.08	0.01	0.09	0.07
July	2	5	0.06	0.10	0.07	0.01	0.09	0.06
July	3	5	0.06	0.07	0.06	0	0.07	0.06
July	4	5	0.05	0.08	0.07	0	0.07	0.06
July	5	10	0.04	0.12	0.07	0.01	0.08	0.06
July	6	10	0.05	0.07	0.06	0	0.06	0.06
July	7	10	0.02	0.07	0.05	0	0.06	0.05
August	1	5	0.07	0.08	0.08	0	0.08	0.07
August	2	5	0.08	0.10	0.09	0	0.09	0.08
August	3	5	0.09	0.11	0.10	0	0.10	0.09
August	4	5	0.08	0.09	0.09	0	0.09	0.08
August	5	10	0.07	0.09	0.08	0	0.08	0.07
August	6	10	0.06	0.09	0.08	0	0.08	0.07
August	7	10	0.07	0.09	0.08	0	0.09	0.08
October	1	5	0.16	0.19	0.17	0	0.17	0.17
October	2	5	0.15	0.17	0.16	0	0.16	0.15
October	3	5	0.16	0.17	0.16	0	0.17	0.16
October	4	5	0.16	0.17	0.16	0	0.17	0.16
October	5	10	0.15	0.17	0.16	0	0.16	0.15
October	6	10	0.09	0.18	0.15	0.01	0.17	0.14
October	7	10	0.09	0.17	0.15	0.01	0.16	0.13
November	1	5	0.10	0.10	0.10	0	0.10	0.09
November	2	5	0.10	0.11	0.10	0	0.11	0.10
November	3	5	0.10	0.10	0.10	0	0.10	0.09
November	4	5	0.09	0.10	0.09	0	0.10	0.09
November	5	10	0.08	0.11	0.10	0	0.10	0.09
November	6	10	0.10	0.11	0.11	0	0.11	0.10
November	7	10	0.10	0.11	0.11	0	0.11	0.10

Table 21. Aquatic macrophyte species, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Species	Abbreviation
Ceratophyllaceae	
Ceratophyllum demersum L.	C. DEME
Characeae	
Chara spp.	CHARA
Epiphyton	
Hydrodictyon	HYDRO
Cladophora	CLADO
Hydrocharitaceae	
Elodea canadensis Rich. in Michx.	E. CANA
E. nuttalii (Planch.) St. John	E. NUTT
Haloragaceae	
Myriophyllum spicatum L. var. *exalbescens* (Fern.) Jeps.	M. SPEX
Najadaceae	
Najas flexilis (Willd.) Rost. and Schmidt	N. FLEX
Potamogetonaceae	
Potamogeton crispus L.	P. CRIS
P. foliosus Raf.	P. FOLI
P. pectinatus L.	P. PECT
Ranunculaceae	
Ranunculus spp.	RANUN
Others	
Drepanocladus spp.	DREPAN
Lemna spp.	LEMNA

Table 22. Minimum, maximum, mean, standard error, and 95% confidence intervals for total wet aquatic macrophyte biomass, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			TOTAL WET AQUATIC MACROPHYTE BIOMASS g/m^2					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	2*	113	238	176	-	-	-
June	2	2	51	2,380	1,215	-	-	-
June	3	5	610	4,591	2,073	686	3,419	728
June	4	5	561	6,931	2,595	1,131	4,813	378
June	5	7	72	4,091	1,904	570	3,022	786
June	6	9	332	13,189	4,321	1,254	6,778	1,863
June	7	8	145	6,115	1,518	699	2,888	147
July	1	2	15	45	30	-	-	-
July	2	2	464	794	629	-	-	-
July	3	5	48	3,067	1,554	540	2,612	496
July	4	5	58	1,257	669	248	1,156	182
July	5	8	62	2,249	904	258	1,409	398
July	6	9	61	12,638	4,843	1,638	8,054	1,633
July	7	7	161	8,341	1,868	1,102	4,029	0
August	1	3	1,176	14,841	6,005	4,424	14,677	0
August	2	2	2,170	2,688	2,429	-	-	-
August	3	5	1,120	10,694	6,858	1,725	10,239	3,476
August	4	4	21	8,281	2,290	2,001	6,211	0
August	5	9	22	21,522	5,851	2,206	10,174	1,528
August	6	9	40	10,870	5,220	1,263	7,695	2,746
August	7	8	1,432	12,093	4,941	1,154	7,202	2,680
October	1	3	6	37	24	9	42	6
October	2	3	266	4,315	1,691	1,314	4,266	0
October	3	5	89	12,222	5,544	2,447	10,341	747
October	4	5	21	549	231	122	469	0
October	5	8	680	10,583	2,761	1,158	5,030	492
October	6	8	1,043	15,052	4,834	1,950	8,656	1,012
October	7	9	79	14,824	5,375	1,694	8,696	2,054
November	1	0	-	-	-	-	-	-
November	2	2	451	1,109	780	-	-	-
November	3	5	18	2,133	558	400	1,343	0
November	4	5	12	2,252	665	417	1,484	0
November	5	9	5	4,985	1,127	603	2,310	0
November	6	8	38	4,356	1,110	580	2,246	0
November	7	8	272	11,409	3,862	1,471	6,746	978

* When N is less than 3, standard error and confidence intervals were not calculated.

Table 23. Minimum, maximum, mean, standard error, and 95% confidence intervals for total dry aquatic macrophyte biomass, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			TOTAL DRY AQUATIC MACROPHYTE BIOMASS g/m²					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	2*	10	20	15	-	-	-
June	2	2	4	121	63	-	-	-
June	3	5	38	363	158	57	268	47
June	4	5	44	700	255	116	482	29
June	5	7	8	303	148	41	228	68
June	6	9	32	894	345	81	503	187
June	7	8	4	446	118	51	218	19
July	1	2	4	8	6	-	-	-
July	2	2	50	94	72	-	-	-
July	3	5	9	612	273	104	477	68
July	4	5	12	304	130	53	233	27
July	5	8	10	280	127	30	185	68
July	6	9	14	1,633	651	207	1,056	246
July	7	7	22	1,791	359	241	831	0
August	1	3	154	1,985	806	590	1,963	0
August	2	2	347	352	350	-	-	-
August	3	5	133	1,472	943	242	1,418	468
August	4	4	4	1,363	378	329	1,023	0
August	5	9	7	2,277	721	242	1,195	247
August	6	9	10	2,148	800	224	1,239	361
August	7	8	158	1,303	661	129	915	407
October	1	3	2	10	5	3	10	0
October	2	3	33	742	296	224	735	0
October	3	5	25	2,131	1,012	437	1,869	155
October	4	5	5	160	56	31	116	0
October	5	8	153	1,886	536	211	949	124
October	6	8	228	3,537	1,002	437	1,858	146
October	7	9	18	3,100	957	326	1,596	318
November	1	0	-	-	-	-	-	-
November	2	2	57	167	112	-	-	-
November	3	5	3	468	119	88	292	0
November	4	5	3	286	95	53	199	0
November	5	9	4	996	234	120	469	0
November	6	8	4	899	214	112	433	0
November	7	8	44	1,764	626	226	1,069	182

* When N is less than 3, standard error and confidence intervals were not calculated.

Table 24. Linear models mean separation of aquatic macrophyte dry biomass by transect for June, July, August, October, and November, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Month	Duncan Grouping			Mean Dry Biomass (g/m²)	n	Transect
June		A		344.7	9	6
		A		255.5	5	4
	B	A		157.5	5	3
	B	A		147.8	7	5
	B	A	C	118.4	8	7
	B		C	62.8	2	2
			C	14.8	2	1

Month	Duncan Grouping		Mean Dry Biomass (g/m²)	n	Transect
July		A	650.9	9	6
		A	358.5	7	7
		A	272.7	5	3
		A	129.7	5	4
		A	126.6	8	5
		A	72.3	2	2
	B		6.1	2	1

Month	Duncan Grouping	Mean Dry Biomass (g/m²)	n	Transect
August	A*	942.6	5	3
	A	806.0	3	1
	A	799.9	9	6
	A	721.4	9	5
	A	661.0	8	7
	A	377.6	4	4
	A	349.5	2	2

*There was no significant difference detected in aquatic macrophyte dry biomass between transects in August.

Table 24. Linear models mean separation of aquatic macrophyte dry biomass by transect for June, July, August, October, and November, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Month	Duncan Grouping			Mean Dry Biomass (g/m^2)	n	Transect
October		A		1012.3	5	3
		A		1000.1	9	6
		A		957.1	9	7
		A		536.5	8	5
	B	A		295.6	3	2
	B		C	56.3	5	4
			C	4.7	3	1

Month	Duncan Grouping	Mean Dry Biomass (g/m^2)	n	Transect
November	A*	625.5	8	7
	A	233.6	9	5
	A	214.1	8	6
	A	119.2	5	3
	A	111.7	2	2
	A	95.1	5	4

*There was no significant difference detected in aquatic macrophyte dry biomass between transects in November.

Table 25. Means, standard deviations, and confidence intervals for macrophyte nutrients, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Sample Type	Date	Simple Statistics	n	Phosphorus µg/g	Magnesium µg/g	Calcium µg/g	Potassium µg/g	Sulfur µg/g	Sodium µg/g	Carbon %	Hydrogen %	Nitrogen %
Mixed	June	Mean	5	4,420	4,060	62,800	35,400	5,080	9,240	30.4	4.3	2.9
		Std. Dev		84	89	2,588	894	84	89	0.5	0.1	0.1
		+95%		4,524	4,171	66,013	36,510	5,184	9,351	30.9	4.4	3.0
		-95%		4,316	3,949	59,587	34,290	4,976	9,129	29.8	4.2	2.7
P. pectinatus	June	Mean	5	3,680	4,120	15,800	27,600	6,900	10,800	34.4	5.1	2.8
		Std. Dev.		84	110	447	894	122	447	0.4	0.1	0.1
		+95%		3,784	4,256	16,355	28,710	7,052	11,355	34.8	5.2	2.8
		-95%		3,576	3,984	15,245	26,490	6,748	10,245	33.9	5.1	2.7
C. demersum	June	Mean	5	3,720	5,860	15,800	37,200	3,540	5,640	32.8	4.8	3.0
		Std. Dev.		148	152	447	837	167	89	0.4	0	0.1
		+95%		3,904	6,048	16,355	38,239	3,748	5,751	33.3	4.8	3.1
		-95%		3,536	5,672	15,245	36,161	3,332	5,529	32.3	4.8	3.0
P. crispus	June	Mean	5	4,400	1,800	45,400	29,400	4,760	10,680	32.3	4.7	2.8
		Std. Dev.		400	122	17,155	1,949	428	716	0.9	0.2	0.1
		+95%		4,897	1,952	66,698	31,820	5,291	11,568	33.3	4.9	2.9
		-95%		3,903	1,648	24,102	26,980	4,229	9,792	31.2	4.5	2.7
Mixed	July	Mean	5	4,220	3,060	110,000	24,000	6,040	4,260	21.9	2.9	2.6
		Std. Dev.		84	55	7,071	707	114	114	0.3	0	0.2
		+95%		4,324	3,128	118,778	24,878	6,182	4,402	22.2	3.0	2.8
		-95%		4,116	2,992	101,222	23,122	5,898	4,118	21.6	2.9	2.3
Epiphyton	July	Mean	5	3,480	3,680	102,200	17,600	9,900	2,020	23.1	3.2	2.7
		Std. Dev.		110	164	7,759	548	678	45	0.6	0.1	0.1
		+95%		3,616	3,884	111,832	18,280	10,742	2,076	23.8	3.3	2.8
		-95%		3,344	3,476	92,568	16,920	9,058	1,964	22.4	3.1	2.6
P. pectinatus	July	Mean	5	4,160	3,860	15,800	28,400	5,760	8,840	33.4	4.7	3.0
		Std. Dev.		152	114	837	1,342	261	378	0.4	0.1	0.1
		+95%		4,348	4,002	16,839	30,066	6,084	9,309	33.8	4.8	3.0
		-95%		3,972	3,718	14,761	26,734	5,436	8,371	32.9	4.6	2.9

Table 25. Means, standard deviations, and confidence intervals for macrophyte nutrients, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Sample Type	Date	Simple Statistics	n	Phosphorus µg/g	Magnesium µg/g	Calcium µg/g	Potassium µg/g	Sulfur µg/g	Sodium µg/g	Carbon %	Hydrogen %	Nitrogen %
P. crispus	July	Mean	5	4,840	1,960	66,600	25,800	5,140	6,300	38.6	5.2	3.7
		Std. Dev.		114	152	5,177	447	261	122	0.7	0.1	0.1
		+95%		4,982	2,148	73,027	26,355	5,464	6,452	39.5	5.4	3.8
		-95%		4,698	1,772	60,173	25,245	4,816	6,148	37.7	5.1	3.5
C. demersum	July	Mean	5	4,140	3,920	59,800	31,800	4,220	3,800	28.7	4.1	3.4
		Std. Dev.		114	217	4,550	837	84	0	0.6	0.1	0.1
		+95%		4,282	4,189	65,448	32,839	4,324	3,800	29.4	4.2	3.6
		-95%		3,998	3,651	54,152	30,761	4,116	3,800	28.1	4.0	3.3
Mixed	August	Mean	5	3,440	3,360	128,000	21,000	5,480	4,460	23.7	3.1	2.4
		Std. Dev.		89	207	8,367	707	84	114	0.5	0.1	0.1
		+95%		3,551	3,617	138,387	21,878	5,584	4,602	24.4	3.3	2.5
		-95%		3,329	3,103	117,613	20,122	5,376	4,318	23.1	3.0	2.3
P. crispus	August	Mean	5	4,180	624	111,000	16,000	4,960	5,600	31.3	4.3	3.3
		Std. Dev.		217	138	12,369	1,414	365	447	0.9	0.1	0.1
		+95%		4,449	796	126,356	17,756	5,413	6,155	32.4	4.4	3.5
		-95%		3,911	452	95,644	14,244	4,507	5,045	30.2	4.2	3.2
Epiphyton	August	Mean	5	3,720	3,100	52,400	29,800	15,600	1,518	28.1	4.1	3.2
		Std. Dev.		84	187	20,720	447	548	46	0.3	0.1	0
		+95%		3,824	3,332	78,123	30,355	16,280	1,575	28.5	4.2	3.2
		-95%		3,616	2,868	26,677	29,245	14,920	1,461	27.8	4.0	3.1
P. pectinatus	August	Mean	5	4,080	4,040	30,400	28,000	6,540	12,400	33.8	5.0	3.0
		Std. Dev.		84	114	20,182	707	89	548	0.7	0.2	0.1
		+95%		4,184	4,182	55,455	28,878	6,651	13,080	34.6	5.2	3.1
		-95%		3,976	3,898	5,345	27,122	6,429	11,720	32.9	4.8	2.8
C. demersum	August	Mean	5	2,960	3,040	124,000	26,200	4,660	5,080	26.1	3.6	2.6
		Std. Dev.		89	410	8,944	1,483	89	130	0.5	0.1	0.1
		+95%		3,071	3,549	135,104	28,041	4,771	5,242	26.7	3.7	2.6
		-95%		2,849	2,531	112,896	24,359	4,549	4,918	25.5	3.5	2.5

T25 cont.

Table 25. Means, standard deviations, and confidence intervals for macrophyte nutrients, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Sample Type	Date	Simple Statistics	n	Phosphorus µg/g	Magnesium µg/g	Calcium µg/g	Potassium µg/g	Sulfur µg/g	Sodium µg/g	Carbon %	Hydrogen %	Nitrogen %
Mixed	**October**	**Mean**	**5**	3,580	4,540	128,000	23,000	6,780	5,480	24.8	3.3	2.2
		Std. Dev.		130	89	4,472	1,000	164	205	0.5	0.1	0.1
		+95%		3,742	4,651	133,552	24,241	6,984	5,734	25.4	3.4	2.3
		-95%		3,418	4,429	122,448	21,759	6,576	5,226	24.2	3.2	2.1
P. pectinatus	**October**	**Mean**	**5**	3,180	4,880	12,600	24,200	7,560	13,800	35.6	5.3	2.5
		Std. Dev.		45	45	548	447	195	447	0.6	0.1	0.1
		+95%		3,236	4,936	13,280	24,755	7,802	14,355	36.3	5.4	2.6
		-95%		3,124	4,824	11,920	23,645	7,318	13,245	34.8	5.2	2.3
C. demersum	**October**	**Mean**	**5**	3,500	5,060	99,400	38,000	4,920	6,120	28.1	3.8	2.6
		Std. Dev.		71	288	6,580	1,000	110	84	0.3	0.1	0
		+95%		3,588	5,418	107,569	39,241	5,056	6,224	28.5	4.0	2.6
		-95%		3,412	4,702	91,231	36,759	4,784	6,016	27.7	3.7	2.5
Epiphyton	**October**	**Mean**	**5**	3,380	5,480	130,000	16,200	9,260	1,360	22.8	3.4	2.4
		Std. Dev.		148	455	10,000	447	219	55	0.8	0.2	0.1
		+95%		3,564	6,045	142,415	16,755	9,532	1,428	23.8	3.2	2.6
		-95%		3,196	4,915	117,585	15,645	8,988	1,292	21.8	2.9	2.3
P. crispus	**October**	**Mean**	**5**	5,900	2,360	36,000	26,800	5,320	5,860	33.6	4.8	3.6
		Std. Dev.		100	329	26,476	447	84	55	0.7	0.1	0.2
		+95%		6,024	2,768	68,870	27,355	5,424	5,928	34.5	4.9	3.8
		-95%		5,776	1,952	3,130	26,245	5,216	5,792	32.7	4.7	3.5

Table 26. Minimum, maximum, mean, standard error, and 95% confidence intervals for total organic weight, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			TOTAL ORGANIC WEIGHT g/m²					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	2*	7	13	10	-	-	-
June	2	2	4	77	40	-	-	-
June	3	5	27	281	122	45	210	35
June	4	5	28	485	181	80	338	24
June	5	7	7	206	103	28	159	48
June	6	9	25	712	270	64	396	144
June	7	8	3	370	91	42	173	9
July	1	2	4	5	5	-	-	-
July	2	2	30	75	53	-	-	-
July	3	5	7	399	198	71	338	58
July	4	5	6	163	85	30	144	26
July	5	8	7	207	97	23	141	53
July	6	9	10	1,131	464	140	738	190
July	7	7	11	824	189	109	402	0
August	1	3	116	1,441	583	429	1,425	0
August	2	2	210	262	236	-	-	-
August	3	5	115	1,204	729	206	1,133	325
August	4	4	4	1,122	309	271	841	0
August	5	9	7	1,514	529	163	848	210
August	6	9	8	1,078	569	134	832	306
August	7	8	130	1,118	522	108	734	310
October	1	3	0	5	2	1	5	0
October	2	3	23	419	168	126	415	0
October	3	5	15	1,292	623	275	1,162	85
October	4	5	3	77	31	16	63	0
October	5	8	106	1,181	316	129	569	63
October	6	8	130	2,118	576	252	1,071	82
October	7	9	13	1,998	613	215	1,034	191
November	1	0	-	-	-	-	-	-
November	2	2	39	100	70	-	-	-
November	3	5	2	214	60	40	138	0
November	4	5	1	199	63	38	136	0
November	5	9	3	503	125	61	245	5
November	6	8	2	469	111	60	229	0
November	7	8	30	1,034	360	128	610	109

* When N is less than 3, standard error and confidence intervals were not calculated.

Table 27. Minimum, maximum, mean, standard error, and 95% confidence intervals for total ash weight, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			TOTAL ASH WEIGHT g/m²					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	2*	2	6	4	-	-	-
June	2	2	1	44	22	-	-	-
June	3	5	11	82	35	12	59	11
June	4	5	17	215	74	36	145	4
June	5	7	1	97	44	13	70	19
June	6	9	7	182	75	17	107	42
June	7	8	1	78	28	11	50	6
July	1	2	0	2	1	-	-	-
July	2	2	19	20	20	-	-	-
July	3	5	2	213	75	36	146	4
July	4	5	6	142	45	25	94	0
July	5	8	3	73	30	8	44	15
July	6	9	4	557	187	69	322	53
July	7	7	7	966	169	133	431	0
August	1	3	38	544	223	161	539	0
August	2	2	85	142	113	-	-	-
August	3	5	18	316	213	52	315	112
August	4	4	1	241	69	58	182	0
August	5	9	1	763	193	82	353	32
August	6	9	1	1,070	231	109	445	17
August	7	8	28	240	139	28	194	84
October	1	3	1	5	2	2	5	0
October	2	3	11	323	127	98	320	0
October	3	5	9	839	389	165	711	66
October	4	5	2	95	25	18	59	0
October	5	8	41	704	221	85	387	54
October	6	8	83	1,420	426	187	791	60
October	7	9	6	1,102	345	114	569	120
November	1	0	-	-	-	-	-	-
November	2	2	18	67	42	-	-	-
November	3	5	0	254	59	49	155	0
November	4	5	2	87	33	15	63	2
November	5	9	1	493	109	59	224	0
November	6	8	1	430	103	54	209	0
November	7	8	14	730	266	100	462	70

* When N is less than 3, standard error and confidence intervals were not calculated.

Table 28. Minimum, maximum, mean, standard error, and 95% confidence intervals of aquatic macrophyte percent organic content, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

			PERCENT ORGANIC %					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	2*	68	75	71	-	-	-
June	2	2*	65	84	75	-	-	-
June	3	5	70	82	77	2	82	73
June	4	5	64	83	73	4	81	66
June	5	7	60	87	73	3	80	67
June	6	9	70	82	78	1	80	75
June	7	8	56	90	76	4	84	67
July	1	2*	52	95	73	-	-	-
July	2	2*	66	79	72	-	-	-
July	3	5	65	81	70	3	76	64
July	4	5	51	79	67	6	79	55
July	5	8	49	84	71	4	78	63
July	6	9	64	82	74	2	78	69
July	7	7	60	76	70	2	75	66
August	1	3	60	76	70	5	80	60
August	2	2*	74	76	75	-	-	-
August	3	5	66	84	72	3	79	66
August	4	4	80	89	82	2	87	78
August	5	9	67	93	75	3	80	69
August	6	8	66	94	78	2	72	66
August	7	8	69	86	76	2	80	72
October	1	3	30	74	52	8	68	35
October	2	3	55	68	63	4	70	55
October	3	5	51	73	66	4	74	58
October	4	5	41	77	56	7	70	42
October	5	8	48	74	66	3	72	60
October	6	8	47	77	65	4	73	58
October	7	9	50	72	62	3	68	57
November	1	0*	-	-	-	-	-	-
November	2	2*	58	69	63	-	-	-
November	3	5	54	96	71	4	79	63
November	4	5	38	66	54	6	65	42
November	5	9	50	73	61	3	66	56
November	6	8	48	94	65	6	76	54
November	7	8	48	76	65	3	72	59

* When N is less than 3, standard error and confidence intervals were not calculated.

Table 29. Minimum, maximum, mean, standard error, and 95% confidence intervals of monochromatic chlorophyll *a* , Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			MONOCHROMATIC CHLOROPHYLL *a* mg/m³					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
6	1	5	24.9	35.9	30.4	2.33	34.9	25.8
6	2	5	20.5	38.1	28.5	3.05	34.5	22.5
6	3	5	33.3	38.1	36.1	0.95	37.9	34.2
6	4	5	39.4	43.7	41.9	0.81	43.5	40.3
6	5	10	22.1	43.2	34.2	1.97	38.1	30.4
6	6	10	6.7	33.8	28.4	2.63	33.5	23.2
6	7	10	1.0	30.8	20.6	2.75	26.0	15.2
7	1	5	8.5	9.7	9.0	0.24	9.5	8.5
7	2	5	6.8	9.3	8.2	0.45	9.1	7.3
7	3	5	7.7	8.7	8.3	0.18	8.6	7.9
7	4	5	8.0	9.6	8.8	0.28	9.3	8.2
7	5	10	5.0	10.0	8.2	0.50	9.2	7.2
7	6	10	5.2	9.0	7.6	0.32	8.2	7.0
7	7	10	1.1	8.4	6.2	0.62	7.4	5.0
8	1	5	17.7	27.6	20.5	1.89	24.2	16.8
8	2	5	11.9	20.4	15.8	1.68	19.1	12.5
8	3	5	12.4	17.6	14.2	1.17	16.5	11.9
8	4	5	6.6	73.9	31.6	14.77	60.5	2.6
8	5	10	6.7	31.6	17.1	2.94	22.8	11.3
8	6	10	0.3	47.8	22.2	4.88	31.8	12.7
8	7	10	9.8	43.6	16.9	3.15	23.1	10.7
10	1	5	4.7	6.6	5.7	0.34	6.3	5.0
10	2	5	2.7	11.3	6.1	1.45	8.9	3.2
10	3	5	3.9	4.5	4.2	0.10	4.4	4.0
10	4	5	3.6	5.1	4.2	0.27	4.7	3.7
10	5	10	3.1	8.0	4.7	0.39	5.5	4.0
10	6	10	0.7	7.4	3.9	0.56	5.0	2.8
10	7	10	2.0	4.7	3.3	0.26	3.8	2.8
11	1	5	82.9	91.4	87.0	1.38	89.7	84.3
11	2	5	68.8	87.2	78.8	3.25	85.2	72.5
11	3	5	67.6	74.6	69.9	1.28	72.4	67.4
11	4	5	70.4	81.7	76.1	1.82	79.6	72.5
11	5	10	42.9	82.9	70.1	4.91	79.7	60.5
11	6	10	59.3	81.1	73.8	2.54	78.8	68.8
11	7	10	64.9	171.6	101.0	12.37	125.2	76.8

Table 30A. Sediment trap collection, minimum, maximum, mean, standard error, 95% confidence intervals, and percent change through CSR and AMB, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

				SEDIMENT TRAP COLLECTION RATES g/sq m/day							
COLLECTION DATE	RIVER MILE	LOCATION	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.	SEDIMENTATION CHANGES THROUGH CSR %	SEDIMENTATION CHANGES THROUGH AMB %
11-Jul-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	335.2	407.6	383.7	13.2	409.5	357.9	0	---
11-Jul-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	314.4	335.6	326.0	4.2	334.2	317.9	-15	0
11-Jul-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	577.7	922.3	707.0	32.3	770.4	643.7	84	117
24-Jul-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	934.8	1,091.2	1,041.2	28.4	1,096.9	985.5	0	---
24-Jul-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	1,175.0	1,296.0	1,232.8	24.8	1,281.5	1,184.2	18	0
24-Jul-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	350.0	438.9	389.5	8.3	405.7	373.4	-63	-68
24-Jul-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	674.8	953.2	759.1	28.4	814.7	703.4	-27	-38
07-Aug-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	560.1	636.8	587.4	13.0	612.9	561.9	0	---
07-Aug-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	1,064.3	1,633.9	1,447.6	102.4	1,648.3	1,247.0	146	0
07-Aug-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	185.4	367.2	262.2	16.9	295.2	229.2	-55	-82
07-Aug-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	1,314.3	2,438.5	1,690.3	130.5	1,946.0	1,434.5	188	17
21-Aug-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	297.0	343.0	309.7	8.5	326.3	293.1	0	---
21-Aug-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	626.2	650.7	644.5	4.6	653.6	635.4	108	0
21-Aug-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	225.8	866.7	513.8	93.5	697.0	330.6	66	-20
21-Aug-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	929.2	1,428.2	1,228.3	52.4	1,331.1	1,125.6	297	91
04-Sep-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	4	124.0	140.7	133.0	3.4	139.7	126.3	0	---
04-Sep-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	226.2	238.3	233.5	2.0	237.5	229.5	76	0
04-Sep-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	128.4	283.1	223.8	18.7	260.5	187.2	68	-4
04-Sep-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	359.3	453.6	401.4	11.1	423.2	379.6	202	72
18-Sep-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	248.3	261.3	254.9	2.7	260.3	249.5	0	---
18-Sep-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	4	161.7	192.1	178.3	6.8	191.7	165.0	-30	0
18-Sep-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	233.2	372.4	289.3	15.2	319.1	259.4	13	62
18-Sep-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	378.9	444.3	400.2	5.8	411.5	388.9	57	124
04-Oct-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	85.8	122.7	99.8	6.4	112.3	87.3	0	---
04-Oct-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	96.8	120.4	110.6	4.3	119.0	102.1	11	0
04-Oct-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	106.8	151.2	128.1	4.2	136.3	119.8	28	16
04-Oct-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	71.1	167.1	126.3	13.9	153.4	99.1	26	14
16-Oct-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	170.6	189.0	178.4	3.7	185.6	171.2	0	---
16-Oct-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	112.4	131.2	124.4	3.5	131.2	117.6	-30	0
16-Oct-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	68.5	113.2	89.2	4.8	98.5	79.8	-50	-28
16-Oct-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	82.6	140.0	107.0	4.6	115.9	98.0	-40	-14
30-Oct-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	5	180.2	199.9	190.1	3.8	197.5	182.6	0	---
30-Oct-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	4	164.8	216.3	189.5	10.6	210.3	168.7	0	0
30-Oct-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	50.6	274.8	156.2	22.8	200.8	111.6	-18	-18
30-Oct-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	10	37.5	182.5	99.4	16.3	131.3	67.4	-48	-48
13-Nov-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	4	200.2	240.6	215.3	9.1	233.2	197.4	0	---
13-Nov-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	5	198.9	274.5	224.0	13.1	249.7	198.4	4	0
13-Nov-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	10	183.2	383.8	269.7	25.5	319.6	219.7	25	20
13-Nov-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	9	217.4	373.9	290.3	18.8	327.2	253.4	35	30

Table 30B. Sediment trap sediment nutrient data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

COLLECTION DATE	RIVER MILE	LOCATION	n	PLANT AVAILABLE P ug/g	PLANT AVAILABLE K ug/g	ORGANIC CARBON %	ORGANIC MATTER %	CARBON %	HYDROGEN %	NITROGEN %
11-Jul-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	89.9	344	3.5	6.0	5.0	0.8	0.3
11-Jul-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	84.6	333			4.8	0.8	0.3
11-Jul-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	92.5	270	1.7	3.0	3.4	0.6	0.2
24-Jul-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	58.1	227	3.2	5.5	4.4	0.8	0.3
24-Jul-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	53.6	227			4.4	0.8	0.3
24-Jul-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	94.6	275	2.0	3.5	3.8	0.7	0.2
24-Jul-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	93.8	274	2.1	3.6	3.7	0.7	0.3
07-Aug-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	182.0	516	2.0	3.5	4.0	0.8	0.3
07-Aug-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	45.8	197			4.8	0.9	0.3
07-Aug-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	143.5	328	2.2	3.7	4.0	0.9	0.3
07-Aug-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	72.4	200	1.8	3.0	3.5	0.7	0.2
21-Aug-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	132.0	320	2.2	3.8	4.5	0.8	0.3
21-Aug-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	75.0	235			3.7	0.7	0.3
21-Aug-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	104.3	280	1.2	2.1	3.0	0.6	0.2
21-Aug-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	63.7	223	2.3	3.9	3.5	0.6	0.2
04-Sep-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	156.0	417	2.2	3.9	4.5	0.9	0.3
04-Sep-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	124.0	309			4.4	0.9	0.3
04-Sep-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	206.5	442	2.9	4.9	4.3	1.0	0.4
04-Sep-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	92.2	311	2.1	3.7	3.9	0.8	0.3
18-Sep-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	139.0	287	2.4	4.1	4.6	0.9	0.3
18-Sep-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	165.0	320			4.9	0.9	0.3
18-Sep-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	164.0	317	2.4	4.1	3.6	0.8	0.3
18-Sep-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	122.5	325	2.4	4.1	4.2	0.8	0.3
04-Oct-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	813.0	1,600			9.5	1.5	0.9
04-Oct-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	189.0	433	3.0	5.1	5.2	1.0	0.4
04-Oct-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	230.5	677	2.6	4.5	4.6	1.0	0.4
04-Oct-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	199.0	522	2.8	4.8	5.0	1.0	0.4
16-Oct-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	222.0	562			7.3	1.3	0.6
16-Oct-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	191.0	299	3.8	6.5	6.0	1.1	0.6
16-Oct-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	413.5	1,630	2.7	4.7	6.9	1.2	0.6
16-Oct-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	255.5	926	3.5	6.0	5.3	1.1	0.5
30-Oct-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	263.0	517			5.9	1.1	0.5
30-Oct-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	249.0	597	3.6	6.2	5.6	1.0	0.4
30-Oct-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	199.0	698	2.6	4.5	4.4	1.0	0.4
30-Oct-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	299.0	1,153	3.1	5.4	5.4	1.0	0.5
13-Nov-93	600.9	.1 RM below TR#1 above ag & hatchery returns in CSR, 30m off RBk	1	159.0	471			3.7	0.7	0.3
13-Nov-93	600.5	.1 RM below TR#2, below hatchery outflow and 40m off the RBk	1	255.0	626	3.1	5.3	5.6	0.9	0.4
13-Nov-93	600.2	TR#5, middle of AMB, mid-channel 60m off of LBk	2	153.5	618	2.3	3.9	3.4	0.8	0.3
13-Nov-93	600.0	TR#7, bottom of AMB, mid-channel 50m off of LBk	2	204.0	632	2.5	4.3	4.1	0.8	0.3

Table 30C. Mean sediment total phosphorus, plant-available phosphorus and potassium, organic carbon, organic matter, carbon, hydrogen, and nitrogen deposited in Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

						Nutrient Analysis of Sediment Trap Samples								Rates of Nutrient Accrual g/m2/day							
Collection Date	River Mile	Sediment n	Number of Days Trap in Place	Mean Sedimentation Rate g/m2/day	Nutrient n	Total P ug/g	Plant Available P ug/g	Plant Available K ug/g	Organic Carbon %	Organic Matter %	C %	H %	N %	Total P	Plant Available P	Plant Available K	Organic Carbon	Organic Matter	C	H	N
11-Jul-93	600.9	5	14	384	1	1,120	90	344	3.5	6.0	5.0	0.8	0.3	0.43	0.03	0.13	13.28	22.83	19.30	3.11	1.07
24-Jul-93	600.9	5	14	1,041	1	724	58	227	3.2	5.5	4.4	0.8	0.3	0.75	0.06	0.24	33.42	57.47	45.71	8.33	2.92
07-Aug-93	600.9	10	14	587	1	2,267	182	516	2.0	3.5	4.0	0.8	0.3	1.33	0.11	0.30	11.98	20.62	23.61	4.46	1.59
21-Aug-93	600.9	5	14	310	1	1,644	132	320	2.2	3.8	4.5	0.8	0.3	0.51	0.04	0.10	6.87	11.83	13.87	2.45	0.84
04-Sep-93	600.9	5	14	133	1	1,943	156	417	2.2	3.9	4.5	0.9	0.3	0.26	0.02	0.06	2.98	5.12	5.97	1.17	0.41
18-Sep-93	600.9	10	14	255	1	1,731	139	287	2.4	4.1	4.6	0.9	0.3	0.44	0.04	0.07	6.09	10.48	11.68	2.29	0.74
04-Oct-93	600.9	10	14	100	1	10,125	813	1,600			9.5	1.5	0.9	1.01	0.08	0.16			9.46	1.51	0.92
16-Oct-93	600.9	5	13	178	1	2,765	222	562			7.3	1.3	0.6	0.49	0.04	0.10			13.08	2.25	1.02
30-Oct-93	600.9	5	13	190	1	3,275	263	517			5.9	1.1	0.5	0.62	0.05	0.10			11.23	2.15	0.95
13-Nov-93	600.9	10	13	215	1	1,980	159	471			3.7	0.7	0.3	0.43	0.03	0.10			7.86	1.55	0.58
11-Jul-93	600.5	10	13	326	1	1,054	85	333			4.8	0.8	0.3	0.34	0.03	0.11			15.75	2.67	1.01
24-Jul-93	600.5	5	14	1,233	1	668	54	227			4.4	0.8	0.3	0.82	0.07	0.28			54.37	9.86	3.58
07-Aug-93	600.5	5	14	1,448	1	570	46	197			4.8	0.9	0.3	0.83	0.07	0.29			70.07	12.45	4.63
21-Aug-93	600.5	10	14	644	1	934	75	235			3.7	0.7	0.3	0.60	0.05	0.15			23.78	4.70	1.80
04-Sep-93	600.5	10	14	234	1	1,544	124	309			4.4	0.9	0.3	0.36	0.03	0.07			10.27	2.05	0.72
18-Sep-93	600.5	5	14	178	1	2,055	165	320			4.9	0.9	0.3	0.37	0.03	0.06			8.65	1.62	0.59
04-Oct-93	600.5	4	14	111	1	2,354	189	433	3.0	5.1	5.2	1.0	0.4	0.26	0.02	0.05	3.27	5.63	5.74	1.11	0.44
16-Oct-93	600.5	10	14	124	1	2,379	191	299	3.8	6.5	6.0	1.1	0.6	0.30	0.02	0.04	4.72	8.11	7.43	1.36	0.72
30-Oct-93	600.5	10	14	189	1	3,101	249	597	3.6	6.2	5.6	1.0	0.4	0.59	0.05	0.11	6.80	11.69	10.67	1.86	0.83
13-Nov-93	600.5	4	14	224	1	3,176	255	626	3.1	5.3	5.6	0.9	0.4	0.71	0.06	0.14	6.95	11.94	12.64	1.99	0.94
11-Jul-93	600.2	5	14	707	2	1,152	93	270	1.7	3.0	3.4	0.6	0.2	0.81	0.07	0.19	12.09	20.86	24.15	4.24	1.48
24-Jul-93	600.2	10	14	390	2	1,178	95	275	2.0	3.5	3.8	0.7	0.2	0.46	0.04	0.11	7.91	13.56	14.74	2.90	0.95
07-Aug-93	600.2	10	14	262	2	1,787	144	328	2.2	3.7	4.0	0.9	0.3	0.47	0.04	0.09	5.69	9.81	10.36	2.24	0.73
21-Aug-93	600.2	5	16	514	2	1,298	104	280	1.2	2.1	3.0	0.6	0.2	0.67	0.05	0.14	6.37	10.89	15.57	3.11	1.05
04-Sep-93	600.2	5	16	224	2	2,572	207	442	2.9	4.9	4.3	1.0	0.4	0.58	0.05	0.10	6.42	11.03	9.57	2.23	0.82
18-Sep-93	600.2	10	16	289	2	2,042	164	317	2.4	4.1	3.6	0.8	0.3	0.59	0.05	0.09	6.86	11.80	10.47	2.24	0.82
04-Oct-93	600.2	10	16	128	2	2,871	231	677	2.6	4.5	4.6	1.0	0.4	0.37	0.03	0.09	3.33	5.73	5.89	1.26	0.53
16-Oct-93	600.2	5	12	89	2	5,150	414	1,630	2.7	4.7	6.9	1.2	0.6	0.46	0.04	0.15	2.43	4.19	6.12	1.05	0.57
30-Oct-93	600.2	5	12	156	2	2,478	199	698	2.6	4.5	4.4	1.0	0.4	0.39	0.03	0.11	4.12	7.09	6.86	1.48	0.57
13-Nov-93	600.2	10	12	270	2	1,912	154	618	2.3	3.9	3.4	0.8	0.3	0.52	0.04	0.17	6.12	10.52	9.24	2.06	0.81
24-Jul-93	600.0	10	12	759	2	1,168	94	274	2.1	3.6	3.7	0.7	0.3	0.89	0.07	0.21	15.86	27.33	27.86	5.43	1.90
07-Aug-93	600.0	4	14	1,690	2	901	72	200	1.8	3.0	3.5	0.7	0.2	1.52	0.12	0.34	29.75	51.22	59.92	11.49	3.63
21-Aug-93	600.0	5	14	1,228	2	793	64	223	2.3	3.9	3.5	0.6	0.2	0.97	0.08	0.27	28.13	48.40	42.81	7.37	2.64
04-Sep-93	600.0	10	14	401	2	1,148	92	311	2.1	3.7	3.9	0.8	0.3	0.46	0.04	0.12	8.59	14.77	15.55	3.01	1.08
18-Sep-93	600.0	10	14	400	2	1,526	123	325	2.4	4.1	4.2	0.8	0.3	0.61	0.05	0.13	9.56	16.45	16.63	3.10	1.20
04-Oct-93	600.0	5	14	126	2	2,478	199	522	2.8	4.8	5.0	1.0	0.4	0.31	0.03	0.07	3.50	6.01	6.29	1.30	0.52
16-Oct-93	600.0	4	14	107	2	3,182	256	926	3.5	6.0	5.3	1.1	0.5	0.34	0.03	0.10	3.73	6.42	5.64	1.13	0.51
30-Oct-93	600.0	10	14	99	2	3,724	299	1,153	3.1	5.4	5.4	1.0	0.5	0.37	0.03	0.11	3.11	5.35	5.40	1.01	0.46
13-Nov-93	600.0	9	14	290	2	2,541	204	632	2.5	4.3	4.1	0.8	0.3	0.74	0.06	0.18	7.17	12.34	11.96	2.44	1.00

Table 31. Minimum, maximum, mean, standard error, and 95% confidence intervals of trichromatic chlorophyll *a* , Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

TRICHROMATIC CHLOROPHYLL *a*
mg/m^3

MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
6	1	5	28.0	38.5	33.4	2.22	37.8	29.1
6	2	5	23.6	41.5	31.6	3.07	37.6	25.6
6	3	5	36.4	42.9	39.4	1.12	41.6	37.2
6	4	5	42.6	46.4	45.2	0.73	46.6	43.7
6	5	10	26.8	48.2	38.8	2.06	42.9	34.8
6	6	10	7.4	40.3	32.8	3.11	38.9	26.7
6	7	10	1.3	34.6	23.6	3.05	29.6	17.6
7	1	5	11.0	12.2	11.6	0.19	11.9	11.2
7	2	5	9.1	11.8	10.7	0.45	11.6	9.8
7	3	5	9.5	11.5	10.5	0.34	11.1	9.8
7	4	5	10.0	12.1	11.2	0.43	12.1	10.4
7	5	10	6.9	11.4	9.7	0.44	10.6	8.9
7	6	10	6.6	10.9	9.6	0.39	10.4	8.8
7	7	10	1.2	10.2	8.3	0.85	9.9	6.6
8	1	5	21.1	33.7	24.5	2.40	29.2	19.8
8	2	5	15.0	25.9	19.5	1.98	23.4	15.6
8	3	5	14.3	20.3	16.5	1.33	19.1	13.9
8	4	5	8.2	92.4	40.1	19.02	77.4	2.8
8	5	10	8.6	39.2	21.3	3.66	28.4	14.1
8	6	10	1.6	71.5	29.5	7.28	43.8	15.2
8	7	10	11.5	54.2	20.5	4.01	28.4	12.6
10	1	5	6.7	8.3	7.4	0.34	8.0	6.7
10	2	5	3.7	13.7	7.9	1.65	11.1	4.7
10	3	5	5.3	6.3	5.9	0.20	6.3	5.5
10	4	5	5.2	6.6	5.9	0.23	6.4	5.5
10	5	10	4.8	9.7	6.2	0.44	7.0	5.3
10	6	10	1.6	8.9	5.4	0.65	6.6	4.1
10	7	10	2.4	6.7	4.8	0.41	5.6	4.0
11	1	5	92.6	97.9	95.1	0.84	96.7	93.4
11	2	5	75.2	97.2	87.3	3.72	94.6	80.0
11	3	5	73.7	80.7	75.9	1.24	78.3	73.5
11	4	5	78.5	87.4	83.3	1.44	86.1	80.5
11	5	10	48.3	92.1	78.0	5.01	87.8	68.2
11	6	10	66.1	89.0	81.0	2.79	86.5	75.6
11	7	10	61.4	95.1	80.2	3.72	87.4	72.9

Table 32. Sediment depth measurements taken every 5m on a river cross section, Crystal Springs Reach (RM 600.9), Middle Snake River, Idaho, September 16, 1993.

				Sediment Depth m		
Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
5	organic layer	1.28	1.28	1.28	0.06	1.34
	sand-silt	2.56				
	rock	2.62				
10	organic layer	1.95	1.95	0.73	0.12	0.85
	sand-silt	2.68				
	rock	2.80				
15	organic layer	2.65	2.65	0.79	0.24	1.04
	sand-silt	3.44				
	rock	3.69				
20	organic layer	3.51	3.51	0.43	0.12	0.55
	sand-silt	3.93				
	rock	4.05				
25	organic layer	3.96	3.96	0.37	0.15	0.52
	sand-silt	4.33				
	rock	4.48				
30	organic layer	4.11	4.11	0.46	0.76	1.22
	sand-silt	4.57				
	rock	5.33				
35	organic layer	4.36	4.36	0.58	0.70	1.28
	sand-silt	4.94				
	rock	5.64				
40	organic layer	4.69	4.69	0.64	0.30	0.94
	sand-silt	5.33				
	rock	5.64				
45	organic layer	4.88	4.88	0.46	0.30	0.76
	sand-silt	5.33				
	rock	5.64				
50	organic layer	5.49	5.49	0.15	0	0.15
	rock	5.64				
55	organic layer	5.64	5.64	0.03	0.03	0.06
	sand-silt	5.67				
	rock	5.70				
60	organic layer	5.64	5.64	0.03	0.03	0.06
	sand-silt	5.67				
	rock	5.70				
65	rock	4.57	4.57	0	0	0
70	rock	3.20	3.20	0	0	0
75	rock	3.29	3.29	0	0	0
80	organic layer	2.68	2.68	0.40	0	0.40
	rock	3.08				
85	rock	0.61	0.61	0	0	0
90	rock	0.61	0.61	0	0	0

Table 32. Sediment depth measurements taken every 5m on a river cross section, Crystal Springs Reach (RM 600.9), Middle Snake River, Idaho, September 16, 1993.

Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Sediment Depth m Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
95	rock	0.46	0.46	0	0	0
100	rock	0.46	0.46	0	0	0
105	sand-silt	0.76	0.76	0	0.03	0.03
	rock	0.79				
110	organic layer	0.55	0.55	1.43	0	1.43
	rock	1.98				
Means:			2.97	0.35	0.13	0.48

Table 33. Sediment depth measurements taken every 5m on a cross section, Crystal Springs Reach (RM 600.5), Middle Snake River, Idaho, September 16,1993.

				Sediment Depth m		
Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
5	organic layer	0.91	0.91	0.49	0.12	0.61
	sand-silt	1.40				
	rock	1.52				
10	organic layer	1.83	1.83	0.55	0.15	0.70
	sand-silt	2.38				
	rock	2.53				
15	organic layer	1.83	1.83	0.18	0.24	0.43
	sand-silt	2.01				
	rock	2.26				
20	organic layer	2.56	2.56	0.21	0.46	0.67
	sand-silt	2.77				
	rock	3.23				
25	organic layer	2.29	2.29	0.30	0.76	1.07
	sand-silt	2.59				
	rock	3.35				
30	organic layer	2.59	2.59	0.27	0.58	0.85
	sand-silt	2.87				
	rock	3.44				
35	organic layer	2.44	2.44	0.40	1.13	1.52
	sand-silt	2.83				
	rock	3.96				
40	organic layer	1.74	1.74	1.07	1.58	2.65
	sand-silt	1.95				
	organic layer	2.32				
	sand-silt	3.17				
	rock	4.39				
45	organic layer	1.55	1.55	0.70	2.23	2.93
	sand-silt	1.95				
	organic layer	2.38				
	sand-silt	2.68				
	rock	4.48				
50	organic layer	1.83	1.83	2.07	0	2.07
	rock	3.90				
55	organic layer	1.68	1.68	1.22	0.88	2.10
	sand-silt	1.95				
	organic layer	2.83				
	rock	3.78				
60	organic layer	1.83	1.83	0.49	0.15	0.64
	sand-silt	2.01				
	organic layer	2.13				
	sand-silt	2.44				
	rock	2.47				
65	sand-silt	2.04	2.04	0	0.12	0.12
	rock	2.16				
70	sand-silt	2.38	2.38	0	1.28	1.28

T33 cont.

Table 33. Sediment depth measurements taken every 5m on a cross section, Crystal Springs Reach (RM 600.5), Middle Snake River, Idaho, September 16,1993.

Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Sediment Depth m Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
	rock	3.66				
75	sand-silt	2.74	2.74	0.03	1.77	1.80
	organic layer	4.51				
	rock	4.54				
80	sand-silt	2.80	2.80	0	1.77	1.77
	rock	4.57				
85	sand-silt	2.90	2.90	0	1.16	1.16
	rock	4.05				
90	sand-silt	3.02	3.02	0.46	1.10	1.55
	organic layer	4.11				
	rock	4.57				
95	sand-silt	3.05	3.05	0	1.34	1.34
	rock	4.39				
100	sand-silt	3.20	3.20	0	0.52	0.52
	rock	3.72				
105	sand-silt	3.35	3.35	0	0.91	0.91
	rock	4.27				
110	sand-silt	3.35	3.35	0	0.98	0.98
	rock	4.33				
115	sand-silt	2.99	2.99	0	0.03	0.03
	rock	3.02				
120	sand-silt	2.77	2.77	0	0.09	0.09
	rock	2.87				
125	rock	2.74	2.74	0	0	0
130	rock	2.62	2.62	0	0	0
135	sand-silt	2.62	2.62	0	0.06	0.06
	rock	2.68				
140	organic layer	2.32	2.32	0.12	0.12	0.24
	sand-silt	2.44				
	rock	2.56				
145	organic layer	2.04	2.04	0.15	0.03	0.18
	sand-silt	2.19				
	rock	2.23				
150	organic layer	1.77	1.77	0.37	0.30	0.67
	sand-silt	2.13				
	rock	2.44				
155	organic layer	0.85	0.85	1.31	0.12	1.43
	sand-silt	2.16				
	rock	2.29				
160	organic layer	0.18	0.18	2.01	0.06	2.07
	sand-silt	2.19				
	rock	2.26				
Means:			2.35	0.40	0.65	1.05

Table 34. Sediment depth measurements taken every 5m on a cross-section, Crystal Springs Reach (RM 600.2), Middle Snake River, Idaho, September 16, 1993.

Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Sediment Depth m: Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
5	organic layer	1.31	1.31	0.15	0	0.15
	rock	1.46				
10	rock	1.89	1.89	0	0	0
15	rock	2.01	2.01	0	0	0
20	rock	2.32	2.32	0	0	0
25	rock	2.53	2.53	0	0	0
30	rock	2.41	2.41	0	0	0
35	organic layer	1.68	1.68	0.24	0	0.24
	rock	1.92				
40	organic layer	1.28	1.28	0.27	0.21	0.49
	sand-silt	1.55				
	rock	1.77				
45	organic layer	1.07	1.07	0.49	0.18	0.67
	sand-silt	1.55				
	rock	1.74				
50	organic layer	0.85	0.85	0.67	0.30	0.98
	sand-silt	1.52				
	rock	1.83				
55	organic layer	0.91	0.91	0.37	0.03	0.40
	sand-silt	1.28				
	rock	1.31				
60	organic layer	1.07	1.07	0.03	0.03	0.06
	sand-silt	1.10				
	rock	1.13				
65	organic layer	0.91	0.91	0.21	0.03	0.24
	sand-silt	1.13				
	rock	1.16				
70	organic layer	0.98	0.98	0.09	0.03	0.12
	sand-silt	1.07				
	rock	1.10				
75	organic layer	0.85	0.85	0.15	0.09	0.24
	sand-silt	1.01				
	rock	1.10				
80	organic layer	0.85	0.85	0.06	0.09	0.15
	sand-silt	0.91				
	rock	1.01				
85	organic layer	0.85	0.85	0.06	0.06	0.12
	sand-silt	0.91				
	rock	0.98				

Table 34. Sediment depth measurements taken every 5m on a cross-section, Crystal Springs Reach (RM 600.2), Middle Snake River, Idaho, September 16, 1993.

				Sediment Depth m		
Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
90	organic layer	0.79	0.79	0.03	0.12	0.15
	sand-silt	0.82				
	rock	0.94				
95	organic layer	0.73	0.73	0.03	0.03	0.06
	sand-silt	0.76				
	rock	0.79				
100	organic layer	0.67	0.67	0.03	0.15	0.18
	sand-silt	0.70				
	rock	0.85				
105	organic layer	0.67	0.67	0.15	0.03	0.18
	sand-silt	0.82				
	rock	0.85				
110	organic layer	0.79	0.79	0.03	0.03	0.06
	sand-silt	0.82				
	rock	0.85				
115	organic layer	0.73	0.73	0.09	0.06	0.15
	sand-silt	0.82				
	rock	0.88				
120	organic layer	0.70	0.70	0.09	0.03	0.12
	sand-silt	0.79				
	rock	0.82				
125	organic layer	0.82	0.82	0.03	0.09	0.12
	sand-silt	0.85				
	rock	0.94				
130	organic layer	0.91	0.91	0.12	0.06	0.18
	sand-silt	1.04				
	rock	1.10				
135	organic layer	0.91	0.91	0.24	0.06	0.30
	sand-silt	1.16				
	rock	1.22				
140	sand-silt	1.22	1.22	0	0.06	0.06
	rock	1.28				
145	sand-silt	1.16	1.16	0	0.09	0.09
	rock	1.25				
150	rock	1.13	1.13	0	0	0
155	rock	2.10	2.10	0	0	0
160	organic layer	2.74	2.74	0.61	0.24	0.85
	sand-silt	3.35				
	rock	3.60				

Table 34. Sediment depth measurements taken every 5m on a cross-section, Crystal Springs Reach (RM 600.2), Middle Snake River, Idaho, September 16, 1993.

				Sediment Depth m		
Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
165	sand-silt	2.35	2.35	0	0.09	0.09
	rock	2.44				
170	sand-silt	1.89	1.89	0	0.67	0.67
	rock	2.56				
175	organic layer	1.89	1.89	0	0	0
	rock	2.59				
180	organic layer	0.85	0.85	0.67	0.12	0.79
	sand-silt	1.52				
	rock	1.65				
185	organic layer	0.61	0.61	0.09	0.18	0.27
	sand-silt	0.70				
	rock	0.88				
190	organic layer	0.58	0.58	0.15	0.18	0.34
	sand-silt	0.73				
	rock	0.91				
195	organic layer	0.64	0.64	0.12	0.12	0.24
	sand-silt	0.76				
	rock	0.88				
200	sand-silt	0.61	0.61	0	0.27	0.27
	rock	0.88				
205	sand-silt	0.46	0.46	0	0.15	0.15
	rock	0.61				
210	organic layer	0.34	0.34	0.03	0.37	0.40
	sand-silt	0.37				
	rock	0.73				
215	organic layer	0.43	0.43	0.06	0.24	0.30
	sand-silt	0.49				
	rock	0.73				
Means:			1.17	0.13	0.11	0.23

Table 35. Sediment depth measurements taken every 5m on a cross-section, Crystal Springs Reach (RM 600.0), Middle Snake River, Idaho, September 16, 1993.

				Sediment Depth m		
Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
5	organic layer	1.07	1.07	0.15	0.91	1.07
	sand-silt	1.22				
	rock	2.13				
10	rock	3.20	3.20	0	0	0
15	rock	2.90	2.90	0	0	0
20	rock	3.05	3.05	0	0	0
25	rock	2.29	2.29	0	0	0
30	rock	3.35	3.35	0	0	0
35	rock	3.14	3.14	0	0	0
40	rock	2.59	2.59	0	0	0
45	rock	2.29	2.29	0	0	0
50	organic layer	1.68	1.68	0.30	0	0.30
	rock	1.98				
55	organic layer	1.52	1.52	0.21	0	0.21
	rock	1.74				
60	organic layer	1.16	1.16	0.12	0	0.12
	rock	1.28				
65	organic layer	1.07	1.07	0.21	0	0.21
	rock	1.28				
70	organic layer	1.01	1.01	0.30	0	0.30
	rock	1.31				
75	organic layer	0.98	0.98	0.30	0	0.30
	rock	1.28				
80	organic layer	1.01	1.01	0.34	0	0.34
	rock	1.34				
85	organic layer	1.01	1.01	0.30	0	0.30
	rock	1.31				
90	organic layer	1.40	1.40	0.21	0	0.21
	rock	1.62				
95	organic layer	1.77	1.77	0.55	0	0.55
	rock	2.32				
100	organic layer	2.13	2.13	0.43	0	0.43
	rock	2.56				
105	organic layer	2.44	2.44	0.40	0	0.40
	rock	2.83				
110	organic layer	2.44	2.44	0.30	0	0.30
	rock	2.74				
115	organic layer	2.29	2.29	0.30	0	0.30
	rock	2.59				
120	organic layer	1.83	1.83	0.34	0	0.34
	rock	2.16				
125	organic layer	1.77	1.77	0.27	0	0.27

T35 cont.

Table 35. Sediment depth measurements taken every 5m on a cross-section, Crystal Springs Reach (RM 600.0), Middle Snake River, Idaho, September 16, 1993.

Meters From Left Bank m	Sediment Type	Surface to Sediment m	Water Column Depth m	Sediment Depth m Thickness of Organic Layer m	Thickness of Sand-Silt m	Total Thickness of Sediment m
	rock	2.04				
130	organic layer	1.71	1.71	0.18	0	0.18
	rock	1.89				
135	organic layer	1.74	1.74	0.18	0	0.18
	rock	1.92				
140	organic layer	1.28	1.28	0.03	0	0.03
	rock	1.31				
Means:			1.93	0.19	0.03	0.23

Table 36. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent sand, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SAND %					
MONTH	**TRANSECT**	**n**	**MINIMUM**	**MAXIMUM**	**MEAN**	**S.E.**	**UPPER 95% C.I.**	**LOWER 95% C.I.**
June	1	4	45.6	92.8	71.9	9.8	91.2	52.6
June	2	4	37.6	77.6	52.1	9.5	70.7	33.5
June	3	5	47.6	61.6	54.0	2.6	59.0	49.0
June	4	5	41.6	77.6	62.2	6.3	74.5	49.9
June	5	8	43.6	79.6	54.1	4.2	62.4	45.8
June	6	9	41.6	61.6	54.7	2.4	59.4	50.0
June	7	9	35.6	92.8	52.6	6.4	65.1	40.1
July	1	5	35.6	77.8	65.0	7.5	79.6	50.3
July	2	4	41.6	75.8	60.2	9.1	77.9	42.4
July	3	5	33.6	55.6	47.6	3.7	54.8	40.4
July	4	5	41.6	57.6	49.6	3.3	56.2	43.0
July	5	9	41.6	88.8	54.6	4.5	63.5	45.7
July	6	9	45.6	79.8	55.2	3.2	61.5	48.8
July	7	9	47.6	75.6	54.8	2.8	60.3	49.3
August	1	5	39.6	84.8	56.2	7.8	71.6	40.9
August	2	4	39.6	69.6	57.6	6.7	70.7	44.5
August	3	5	33.6	59.6	50.8	4.8	60.3	41.3
August	4	4	47.6	73.6	60.1	6.7	73.2	47.0
August	5	8	37.6	59.6	53.1	2.7	58.4	47.8
August	6	8	45.6	57.6	50.5	1.3	53.2	47.9
August	7	9	43.6	61.6	50.2	1.8	53.7	46.8
October	1	5	38.0	74	57.6	7.1	71.5	43.7
October	2	4	44.0	74	52.5	7.2	66.6	38.4
October	3	5	48.0	58	52.6	2.1	56.8	48.4
October	4	5	40.0	97	64.6	11.0	86.1	43.1
October	5	8	42.0	63.6	51.7	2.5	56.6	46.7
October	6	9	45.6	84	58.8	4.1	67.0	50.7
October	7	9	51.6	92	59.0	4.5	67.8	50.2
November	1	5	37.2	71.2	56.4	6.8	69.7	43.1
November	2	5	43.2	89.6	65.7	10.3	86.0	45.4
November	3	5	55.2	75.2	62.8	3.4	69.4	56.2
November	4	5	53.2	71.2	58.8	3.4	65.5	52.1
November	5	9	47.2	75.2	57.0	2.9	62.7	51.2
November	6	8	55.2	65.2	60.2	1.1	62.4	58.0
November	7	8	49.2	69.2	58.5	2.4	63.2	53.7

Table 37. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent silt, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SILT %					
MONTH	**TRANSECT**	**n**	**MINIMUM**	**MAXIMUM**	**MEAN**	**S.E.**	**UPPER 95% C.I.**	**LOWER 95% C.I.**
June	1	4	7	52	26.8	9.5	45.3	8.2
June	2	4	20	60	45.0	9.3	63.1	26.9
June	3	5	38	52	45.2	2.6	50.3	40.1
June	4	5	20	56	35.6	6.2	47.8	23.4
June	5	8	20	54	43.5	4.0	51.3	35.7
June	6	9	36	56	43.0	2.4	47.7	38.3
June	7	9	7	60	43.9	6.0	55.7	32.1
July	1	5	21	60	33.0	6.9	46.5	19.5
July	2	4	21	54	36.8	8.8	54.1	19.4
July	3	5	40	62	48.8	3.6	55.9	41.7
July	4	5	36	56	42.8	4.0	50.6	35.0
July	5	9	10	56	42.2	4.4	50.9	33.5
July	6	9	18	52	41.3	3.1	47.5	35.2
July	7	9	22	50	41.4	2.7	46.8	36.1
August	1	5	14	58	41.2	7.5	56.0	26.4
August	2	4	30	56	40.5	6.0	52.3	28.7
August	3	5	38	64	46.0	4.7	55.2	36.8
August	4	4	26	50	37.5	6.1	49.5	25.5
August	5	8	34	56	42.5	2.7	47.7	37.3
August	6	8	38	48	43.5	1.3	46.0	41.0
August	7	9	36	54	45.6	1.8	49.1	42.0
October	1	5	26	58	40.4	6.6	53.4	27.4
October	2	4	24	52	44.5	6.8	57.9	31.1
October	3	5	36	52	43.4	2.7	48.6	38.2
October	4	5	3	54	32.6	9.8	51.9	13.3
October	5	8	30	52	42.5	2.8	47.9	37.1
October	6	9	14	46	34.8	3.3	41.3	28.3
October	7	9	8	46	35.8	3.8	43.2	28.4
November	1	5	28	60	41.2	6.6	54.1	28.3
November	2	5	10	52	31.6	9.4	50.0	13.2
November	3	5	20	42	34.4	3.8	41.9	26.9
November	4	5	28	44	38.8	3.1	44.8	32.8
November	5	9	24	48	38.7	2.9	44.4	32.9
November	6	8	30	42	35.3	1.5	38.2	32.3
November	7	8	30	50	38.8	2.4	43.5	34.0

Table 38. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent clay, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			CLAY %					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	4	0.2	2.4	1.4	0.6	2.5	0.2
June	2	4	2.4	4.4	2.9	0.5	3.9	1.9
June	3	5	0.4	2.4	0.8	0.4	1.6	0.0
June	4	5	0.4	3.4	2.2	0.5	3.2	1.2
June	5	8	0.4	4.4	2.4	0.5	3.4	1.4
June	6	9	1.4	2.4	2.3	0.1	2.5	2.1
June	7	9	0.2	8.4	3.5	0.9	5.3	1.7
July	1	5	1.2	4.4	2.0	0.6	3.3	0.8
July	2	4	2.4	4.4	3.1	0.5	4.0	2.2
July	3	5	2.4	4.4	3.6	0.5	4.6	2.6
July	4	5	2.4	10.4	7.6	1.7	11.0	4.2
July	5	9	1.2	4.4	3.2	0.4	4.0	2.3
July	6	9	2.2	6.4	3.5	0.6	4.7	2.3
July	7	9	0.4	8.4	3.7	0.7	5.2	2.3
August	1	5	1.2	4.4	2.6	0.5	3.6	1.5
August	2	4	0.4	4.4	1.9	1.0	3.8	0.0
August	3	5	0.4	6.4	3.2	1.0	5.2	1.2
August	4	4	0.4	6.4	2.4	1.4	5.2	0.0
August	5	8	2.4	6.4	4.4	0.5	5.4	3.4
August	6	8	2.4	10.4	6.0	0.9	7.8	4.2
August	7	9	2	8.0	4.2	0.7	5.7	2.8
October	1	5	0	4.0	2.0	0.6	3.2	0.8
October	2	4	2	6.0	3.0	1.0	5.0	1.0
October	3	5	0	6.0	4.0	1.3	6.5	1.5
October	4	5	0	8.0	2.8	1.5	5.7	0.0
October	5	8	0	10.0	5.9	1.0	7.7	4.0
October	6	9	1	12.4	6.4	1.2	8.8	4.0
October	7	9	0	10.4	5.2	1.2	7.6	2.8
November	1	5	0.8	4.8	2.4	0.7	3.9	0.9
November	2	5	0.4	4.8	2.7	0.9	4.6	0.9
November	3	5	0.8	4.8	2.8	0.6	4.0	1.6
November	4	5	0.8	4.8	2.4	0.7	3.9	0.9
November	5	9	0.8	6.8	4.4	0.7	5.8	2.9
November	6	8	2.8	8.8	4.6	1.0	6.4	2.7
November	7	8	0.8	6.8	2.8	0.8	4.3	1.3

Table 39. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent sediment organic carbon, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SEDIMENT ORGANIC CARBON %					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	4	0.39	1.10	0.7	0.2	1.0	0.4
June	2	4	0.48	3.81	1.6	0.7	3.0	0.2
June	3	5	0.94	1.42	1.3	0.1	1.4	1.1
June	4	5	0.39	1.31	0.9	0.2	1.2	0.6
June	5	8	0.87	2.16	1.5	0.2	1.8	1.2
June	6	9	0.81	2.02	1.4	0.1	1.7	1.2
June	7	9	0.15	2.81	1.7	0.3	2.3	1.2
July	1	5	0.61	1.61	0.9	0.2	1.3	0.6
July	2	4	0.57	2.10	1.5	0.3	2.1	0.8
July	3	5	1.18	1.52	1.4	0.1	1.5	1.3
July	4	5	1.11	2.00	1.5	0.1	1.8	1.2
July	5	9	0.27	2.04	1.4	0.2	1.8	1.0
July	6	9	0.87	2.30	1.6	0.1	1.8	1.3
July	7	9	0.79	2.88	2.1	0.2	2.5	1.7
August	1	5	0.39	1.86	1.1	0.2	1.6	0.6
August	2	4	0.82	3.70	1.9	0.6	3.1	0.7
August	3	5	1.12	1.83	1.5	0.1	1.8	1.3
August	4	4	1.05	2.12	1.3	0.3	1.8	0.8
August	5	8	1.61	2.70	2.1	0.1	2.3	1.8
August	6	8	1.69	2.62	2.1	0.1	2.3	1.9
August	7	9	1.55	2.68	1.9	0.1	2.1	1.7
October	1	5	0.54	1.80	1.1	0.2	1.5	0.7
October	2	4	0.85	3.06	1.8	0.5	2.7	0.9
October	3	5	1.58	2.65	2.2	0.2	2.6	1.8
October	4	5	0.20	1.97	1.1	0.3	1.7	0.4
October	5	8	1.57	2.31	2.1	0.1	2.3	1.9
October	6	9	1.04	2.91	1.9	0.2	2.3	1.5
October	7	9	0.77	2.47	1.9	0.2	2.3	1.5
November	1	5	0.49	1.32	0.9	0.2	1.2	0.6
November	2	5	0.51	1.61	1.2	0.2	1.6	0.7
November	3	5	0.79	2.37	1.3	0.3	1.9	0.8
November	4	5	1.12	1.91	1.6	0.1	1.9	1.3
November	5	9	0.86	2.54	2.0	0.2	2.3	1.6
November	6	8	1.19	3.23	1.9	0.2	2.4	1.4
November	7	8	1.42	2.54	2.1	0.1	2.4	1.8

Table 40. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent sediment organic matter, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SEDIMENT ORGANIC MATTER %					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	4	0.67	1.89	1.2	0.3	1.7	0.6
June	2	4	0.83	6.55	2.8	1.2	5.1	0.4
June	3	5	1.62	2.44	2.2	0.1	2.4	1.9
June	4	5	0.67	2.25	1.6	0.3	2.1	1.0
June	5	8	1.50	3.72	2.6	0.3	3.2	2.1
June	6	9	1.39	3.47	2.4	0.2	2.9	2.0
June	7	9	0.26	4.83	3.0	0.5	3.9	2.0
July	1	5	1.05	2.77	1.6	0.3	2.2	1.0
July	2	4	0.98	3.61	2.5	0.6	3.7	1.4
July	3	5	2.03	2.61	2.4	0.1	2.6	2.2
July	4	5	1.91	3.44	2.6	0.3	3.1	2.1
July	5	9	0.46	3.51	2.4	0.3	3.0	1.8
July	6	9	1.50	3.96	2.7	0.2	3.2	2.2
July	7	9	1.36	4.95	3.6	0.4	4.3	2.9
August	1	5	0.67	3.20	1.9	0.4	2.7	1.1
August	2	4	1.41	6.36	3.3	1.1	5.4	1.2
August	3	5	1.93	3.15	2.6	0.2	3.0	2.2
August	4	4	1.81	3.65	2.3	0.5	3.2	1.4
August	5	8	2.77	4.64	3.6	0.2	4.0	3.1
August	6	8	2.91	4.51	3.6	0.2	4.0	3.2
August	7	9	2.67	4.61	3.3	0.2	3.6	2.9
October	1	5	0.93	3.10	1.9	0.4	2.6	1.2
October	2	4	1.46	5.26	3.1	0.8	4.7	1.6
October	3	5	2.72	4.56	3.8	0.4	4.5	3.1
October	4	5	0.34	3.39	1.8	0.6	3.0	0.6
October	5	8	2.70	3.97	3.6	0.2	3.9	3.3
October	6	9	1.79	5.01	3.3	0.3	3.9	2.6
October	7	9	1.32	4.25	3.3	0.3	3.9	2.6
November	1	5	0.84	2.27	1.6	0.3	2.1	1.1
November	2	5	0.88	2.77	2.0	0.4	2.7	1.3
November	3	5	1.36	4.08	2.3	0.5	3.2	1.4
November	4	5	1.93	3.29	1.6	0.3	2.1	1.1
November	5	9	1.48	4.37	3.4	0.3	3.9	2.8
November	6	8	2.05	5.56	3.2	0.4	4.1	2.4
November	7	8	2.44	4.37	3.6	0.2	4.1	3.1

Table 41. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent carbon, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SEDIMENT CARBON %					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	4	1.24	2.68	1.7	0.3	2.4	1.0
June	2	4	1.17	4.93	2.6	0.8	4.1	1.1
June	3	5	1.88	2.45	2.2	0.1	2.4	2.0
June	4	5	1.32	2.78	2.1	0.3	2.7	1.6
June	5	8	1.51	3.66	2.6	0.2	3.1	2.1
June	6	9	1.86	3.47	2.5	0.2	2.9	2.1
June	7	9	0.29	4.71	3.0	0.5	3.9	2.1
July	1	5	1.22	2.67	1.6	0.3	2.1	1.1
July	2	4	0.69	2.99	2.1	0.5	3.2	1.1
July	3	5	2.20	2.65	2.4	0.1	2.6	2.3
July	4	5	1.55	3.25	2.4	0.3	3.0	1.8
July	5	9	0.56	3.93	2.5	0.4	3.2	1.9
July	6	9	1.26	3.60	2.7	0.2	3.2	2.3
July	7	9	2.42	4.39	3.4	0.2	3.8	3.1
August	1	5	1.33	3.23	2.2	0.3	2.8	1.6
August	2	4	1.82	4.95	3.1	0.7	4.4	1.8
August	3	5	2.18	2.97	2.5	0.2	2.8	2.2
August	4	4	1.03	3.61	1.9	0.6	3.1	0.8
August	5	8	1.79	4.39	2.9	0.3	3.5	2.3
August	6	8	2.74	4.14	3.4	0.1	3.7	3.1
August	7	9	2.32	3.78	2.9	0.2	3.3	2.6
October	1	5	0.82	2.52	1.8	0.3	2.4	1.2
October	2	4	1.34	4.25	2.9	0.6	4.1	1.7
October	3	5	2.72	4.03	3.5	0.3	4.1	2.9
October	4	5	0.60	3.23	1.8	0.5	2.8	0.7
October	5	8	2.55	4.11	3.4	0.2	3.7	3.0
October	6	9	1.16	4.44	2.9	0.3	3.5	2.3
October	7	9	1.17	4.29	3.4	0.3	4.1	2.8
November	1	5	1.06	2.76	1.9	0.3	2.6	1.3
November	2	5	0.74	3.13	2.2	0.4	3.0	1.3
November	3	5	1.98	3.90	2.4	0.4	3.1	1.7
November	4	5	2.43	3.44	3.0	0.2	3.4	2.6
November	5	9	1.97	3.96	3.3	0.2	3.7	2.8
November	6	8	2.15	5.01	3.4	0.3	4.1	2.7
November	7	8	2.40	4.25	3.5	0.2	3.9	3.1

Table 42. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent sediment nitrogen, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SEDIMENT NITROGEN %					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	4	0.06	0.23	0.1	0.0	0.2	0.0
June	2	4	0.09	0.45	0.2	0.1	0.4	0.1
June	3	5	0.12	0.2	0.2	0.0	0.2	0.1
June	4	5	0.11	0.24	0.2	0.0	0.2	0.1
June	5	8	0.09	0.29	0.2	0.0	0.2	0.2
June	6	9	0.11	0.27	0.2	0.0	0.2	0.2
June	7	9	0.05	0.39	0.2	0.0	0.3	0.2
July	1	5	0.06	0.22	0.1	0.0	0.2	0.1
July	2	4	0.06	0.27	0.2	0.0	0.3	0.1
July	3	5	0.15	0.22	0.2	0.0	0.2	0.2
July	4	5	0.15	0.25	0.2	0.0	0.3	0.2
July	5	9	0.06	0.37	0.2	0.0	0.3	0.2
July	6	9	0.19	0.38	0.3	0.0	0.3	0.2
July	7	9	0.16	0.43	0.3	0.0	0.4	0.3
August	1	5	0.01	0.17	0.1	0.0	0.1	0.0
August	2	4	0.05	0.35	0.1	0.1	0.3	0.0
August	3	5	0.06	0.17	0.1	0.0	0.2	0.1
August	4	4	0.02	0.19	0.1	0.0	0.1	0.0
August	5	8	0.08	0.36	0.2	0.0	0.3	0.1
August	6	8	0.24	0.41	0.3	0.0	0.4	0.3
August	7	9	0.23	0.41	0.3	0.0	0.3	0.2
October	1	5	0.09	0.24	0.2	0.0	0.2	0.1
October	2	4	0.21	0.37	0.3	0.0	0.3	0.2
October	3	5	0.23	0.35	0.3	0.0	0.4	0.2
October	4	5	0.03	0.25	0.1	0.0	0.2	0.0
October	5	8	0.2	0.4	0.3	0.0	0.3	0.3
October	6	9	0.14	0.42	0.3	0.0	0.3	0.2
October	7	9	0.08	0.49	0.3	0.0	0.4	0.2
November	1	5	0.06	0.2	0.1	0.0	0.2	0.1
November	2	5	0.08	0.27	0.2	0.0	0.2	0.1
November	3	5	0.12	0.33	0.2	0.0	0.3	0.1
November	4	5	0.22	0.35	0.6	0.0	0.6	0.5
November	5	9	0.15	0.39	0.3	0.0	0.3	0.2
November	6	8	0.16	0.51	0.3	0.0	0.4	0.2
November	7	8	0.22	0.38	0.3	0.0	0.4	0.3

Table 43. Minimum, maximum, mean, standard error, and 95% confidence intervals for percent sediment hydrogen, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SEDIMENT HYDROGEN %					
MONTH	TRANSECT	n	MINIMUM	MAXIMUM	MEAN	S.E.	UPPER 95% C.I.	LOWER 95% C.I.
June	1	4	0.18	0.46	0.3	0.1	0.4	0.2
June	2	4	0.19	0.84	0.4	0.1	0.7	0.2
June	3	5	0.3	0.44	0.4	0.0	0.4	0.3
June	4	5	0.24	0.49	0.4	0.1	0.5	0.3
June	5	8	0.22	0.64	0.5	0.0	0.5	0.4
June	6	9	0.31	0.54	0.4	0.0	0.5	0.4
June	7	9	0.08	0.84	0.5	0.1	0.7	0.4
July	1	5	0.23	0.54	0.3	0.1	0.4	0.2
July	2	4	0.18	0.59	0.4	0.1	0.6	0.2
July	3	5	0.41	0.51	0.5	0.0	0.5	0.4
July	4	5	0.38	0.74	0.5	0.1	0.7	0.4
July	5	9	0.18	0.69	0.5	0.1	0.6	0.4
July	6	9	0.24	0.66	0.5	0.0	0.6	0.4
July	7	9	0.33	0.82	0.6	0.0	0.7	0.5
August	1	5	0.2	0.64	0.4	0.1	0.6	0.3
August	2	4	0.3	0.82	0.6	0.1	0.8	0.4
August	3	5	0.42	0.56	0.5	0.0	0.6	0.5
August	4	4	0.3	0.72	0.4	0.1	0.6	0.3
August	5	8	0.5	0.92	0.7	0.0	0.8	0.6
August	6	8	0.56	0.91	0.7	0.0	0.8	0.7
August	7	9	0.42	0.85	0.6	0.0	0.7	0.5
October	1	5	0.26	0.59	0.4	0.1	0.5	0.3
October	2	4	0.27	0.77	0.6	0.1	0.8	0.4
October	3	5	0.54	0.9	0.7	0.1	0.9	0.6
October	4	5	0.13	0.74	0.4	0.1	0.6	0.2
October	5	8	0.49	0.99	0.7	0.1	0.8	0.6
October	6	9	0.33	0.98	0.7	0.1	0.8	0.5
October	7	9	0.2	0.93	0.7	0.1	0.9	0.6
November	1	5	0.25	0.58	0.4	0.1	0.5	0.3
November	2	5	0.16	0.78	0.5	0.1	0.7	0.3
November	3	5	0.33	0.76	0.5	0.1	0.6	0.3
November	4	5	0.46	0.71	0.6	0.0	0.7	0.5
November	5	9	0.31	0.88	0.7	0.1	0.8	0.5
November	6	8	0.45	0.94	0.7	0.1	0.8	0.5
November	7	8	0.46	0.93	0.7	0.1	0.8	0.6

Table 44. Minimum, maximum, mean, standard error, and 95% confidence intervals for total sediment phosphorus, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

			SEDIMENT TOTAL PHOSPHORUS µg/g					
MONTH	**TRANSECT**	**n**	**MINIMUM**	**MAXIMUM**	**MEAN**	**S.E.**	**UPPER 95% C.I.**	**LOWER 95% C.I.**
June	1	4	516	887	735	78	888	582
June	2	4	279	936	742	150	1,036	448
June	3	5	917	1,200	1,014	50	1,112	916
June	4	5	754	1,050	864	59	979	749
June	5	8	706	1,210	966	58	1,079	852
June	6	9	825	1,130	989	30	1,048	930
June	7	9	493	1,260	1,006	79	1,161	850
July	1	5	600	915	678	59	795	562
July	2	4	436	2,710	1,215	509	2,212	218
July	3	5	805	949	891	31	952	830
July	4	5	786	1,140	938	62	1,060	816
July	5	9	682	1,250	1,060	59	1,176	944
July	6	9	844	1,190	1,040	37	1,113	966
July	7	9	737	1,200	1,060	46	1,149	971
August	1	5	616	993	847	66	976	718
August	2	4	775	3,770	1,648	710	3,040	255
August	3	5	997	1,160	1,065	35	1,134	997
August	4	4	818	1,080	903	60	1,020	785
August	5	8	941	1,260	1,086	37	1,158	1,015
August	6	8	939	1,220	1,050	31	1,111	990
August	7	9	904	1,270	1,132	34	1,198	1,065
October	1	5	622	911	780	62	901	658
October	2	4	804	1,530	1,060	161	1,375	745
October	3	5	922	1,150	1,052	50	1,151	954
October	4	5	515	1,240	907	119	1,140	674
October	5	8	1,090	1,370	1,188	30	1,246	1,129
October	6	9	832	1,240	1,040	45	1,127	952
October	7	9	589	1,320	1,086	76	1,234	938
November	1	5	650	838	748	36	819	677
November	2	5	870	5,170	1,838	834	3,472	204
November	3	5	824	1,140	971	61	1,090	852
November	4	5	797	1,140	999	63	1,123	875
November	5	9	793	1,200	1,046	43	1,130	962
November	6	8	754	1,290	980	56	1,089	871
November	7	8	825	1,220	1,026	46	1,115	937

APPENDICES

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
1	1	Jun-24-93	0	1.4	16.1	9.4	0	0.6	410	7.9	-	7.1
			1.0		15.9	9.2	0					
			1.3		15.9	9.2						
1	2	Jun-24-93	0	7.5	15.9	9.3	0.3	0.9	430	8.0	-	-
			1.0		15.9	9.2	0.4					
			2.0		15.8	9.1						
1	3	Jun-24-93	0	7.0	15.8	9.3	0.5	0.8	440	7.8	-	-
			1.0		15.8	9.4	0.4					
			2.0		15.8	9.4						
1	4	Jun-24-93	0	7.0	15.9	9.6	0.1	0.9	420	7.9	-	7.6
			1.0		15.9	9.5	0.2					
			2.0		15.9	9.4						
1	5	Jun-24-93	0	0.5	16.3	9.4	0	0.5	450	7.6	-	7.5
			0.4		16.4	9.3	0					
2	1	Jun-24-93	0	1.3	16.4	10.1	0.2	0.5	460	7.9	-	7.5
			1.2		16.4	10.0	0.2					
2	2	Jun-24-93	0	1.1	16.0	9.6	0.4	0.7	450	7.7	-	7.0
			1.0		16.0	9.6	0.3					
2	3	Jun-24-93	0	2.2	16.1	9.6	0.3	0.9	450	8.2	-	7.5
			1.0		16.1	9.5	0.5					
			2.0		16.0	9.3						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
2	4	Jun-24-93	0	2.6	15.6	9.4	0.5	0.9	460	8.1	-	-
			1.0		15.6	9.6	0.3					
			2.0		15.6	9.5						
2	5	Jun-24-93	0	2.2	15.9	9.9	0.2	0.7	490	8.0	-	7.7
			1.0		15.9	9.8	0.1					
			2.0		15.8	9.5						
3	1	Jun-24-93	0	0.7	16.5	10.3	0.1	0.7	480	8.4	-	7.3
			0.6		16.5	10.0	0.1					
3	2	Jun-24-93	0	0.8	16.6	10.3	0.1	0.8	470	8.5	-	7.3
			0.7		16.6	10.0	0.1					
3	3	Jun-24-93	0	0.7	16.5	10.3	0.1	0.7	460	8.3	-	7.2
			0.6		16.5	10.0	0.1					
3	4	Jun-24-93	0	0.9	16.4	10.3	0.1	0.9	470	8.3	-	7.0
			0.8		16.5	10.0	0.1					
3	5	Jun-24-93	0	1.1	16.4	10.3	0.1	0.9	480	8.4	-	7.4
			1.0		16.4	10.1	0.1					
4	1	Jun-24-93	0.0	0.6	16.6	10.2	0.1	0.6	470	8.4	-	7.3
			0.5		16.6	10.2	0.1					
4	2	Jun-24-93	0	1.0	16.5	10.2	0.1	0.9	460	8.4	-	7.2
			1.0		16.5	10.2	0.1					
4	3	Jun-24-93	0	1.2	16.5	10.2	0.1	1.0	470	8.3	-	7.9
			1.0		16.5	10.1	0.1					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
4	4	Jun-24-93	0	1.3	16.6	10.2	0.1	0.9	470	8.5	-	7.8
			1.0		16.5	10.2	0.1					
4	5	Jun-24-93	0	1.6	16.6	10.4	0.1	0.9	460	8.5	-	7.2
			1.0		16.7	10.3	0.1					
5	1	Jun-25-93	0	2.1	17.0	9.9	-	0.8	460	8.5	-	-
			1.0		17.0	10.5						
			2.0		17.1	10.6						
5	2	Jun-25-93	0	2.0	17.1	10.7	-	1.0	460	8.6	-	-
			1.0		17.1	10.7						
			1.9		17.1	10.7						
5	3	Jun-25-93	0	1.1	17.1	10.2	-	0.9	465	8.5	-	7.5
			1.0		17.7	9.8						
5	4	Jun-25-93	0	1.1	17.6	10.4	-	>1.1	465	8.5	-	7.6
			1.0		17.5	10.4						
5	5	Jun-25-93	0	2.0	17.6	10.8	-	0.9	470	8.6	-	7.0
			1.0		17.5	10.8						
			1.9		17.2	10.8						
5	6	Jun-25-93	0	0.9	17.2	11.4	-	>0.9	470	8.5	-	7.2
			0.8		17.1	11.4						
5	7	Jun-25-93	0	1.1	17.2	10.8	-	0.9	470	8.4	-	7.5
			1.0		17.2	10.8						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
5	8	Jun-25-93	0	0.9	17.1	10.6	-	>0.9	440	8.5	-	7.5
			0.8		17.1	10.7						
5	9	Jun-25-93	0	1.6	16.8	10.4	-	1.0	470	8.4	-	7.0
			1.0		16.8	10.4						
			1.5		16.8	10.4						
5	10	Jun-25-93	0	1.0	16.7	10.4	-	>1.0	500	8.2	-	7.0
			0.9		16.6	10.4						
6	1	Jun-26-93	0	2.9	17.4	9.9	-	0.9	460	8.4	-	-
			1.0		17.4	9.7						
			2.0		17.4	9.7						
6	2	Jun-26-93	0	1.1	17.8	10.2	-	0.8	480	8.3	-	8.0
			1.0		17.9	10.2						
6	3	Jun-26-93	0	0.8	17.6	9.8	-	>0.8	480	8.4	-	8.1
			0.7		17.6	9.8						
6	4	Jun-26-93	0	0.9	17.7	10.1	-	0.8	490	8.2	-	7.8
			0.8		17.7	10.1						
6	5	Jun-26-93	0	0.7	17.5	10.1	-	>0.7	490	8.4	-	7.6
			0.6		17.5	10.0						
6	6	Jun-26-93	0	0.7	17.5	10.0	-	>0.7	480	8.0	-	7.5
			0.6		17.4	9.9						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
6	7	Jun-26-93	0	1.0	17.1	9.9	-	0.9	490	8.4	-	7.6
			0.9		17.1	9.8						
6	8	Jun-26-93	0	1.0	16.9	9.9	-	>1.0	495	8.4	-	7.7
			1.0		16.9	9.6						
6	9	Jun-26-93	0	0.4	16.8	10.0	-	>0.4	550	8.0	-	7.2
			0.3		16.8	10.0						
6	10	Jun-26-93	0	1.0	15.0	10.0	-	>1.0	550	7.8	-	7.2
			0.9		15.0	10.0						
7	1	Jun-26-93	0	2.8	18.5	10.5	-	0.9	480	8.7	-	-
			1.0		18.4	10.5						
			2.0		18.4	10.5						
7	2	Jun-26-93	0	2.5	18.7	10.7	-	1.0	480	8.6	-	9.0
			1.0		18.7	10.5						
			2.0		18.7	10.5						
7	3	Jun-26-93	0	1.5	18.8	10.6	-	1.0	490	8.5	-	7.5
			1.0		18.9	10.5						
7	4	Jun-26-93	0	1.0	18.1	10.5	-	>1.0	500	8.3	-	7.7
			0.9		17.9	10.5						
7	5	Jun-26-93	0	1.1	17.9	10.5	-	1.0	550	8.2	-	7.7
			1.0		17.8	10.4						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
7	6	Jun-26-93	0	0.8	17.8	10.5	-	>0.8	550	8.3	-	7.5
			0.7		17.7	10.5						
7	7	Jun-26-93	0	0.9	17.7	10.5	-	>0.9	550	8.1	-	7.8
			0.8		17.6	10.5						
7	8	Jun-26-93	0	1.2	17.7	10.5	-	1.1	550	8.3	-	7.5
			1.0		17.6	10.4						
7	9	Jun-26-93	0	1.4	17.6	10.5	-	1.1	500	8.0	-	7.2
			1.0		17.5	10.5						
7	10	Jun-26-93	0	1.5	14.7	11.0	-	>1.5	490	8.0	-	7.0
			1.0		14.7	10.9						
1	1	Jul-22-93	0	4.5	19.0	9.1	0	0.8	440	7.4	15.0	7.1
			1.0		19.0	10.6	0					
			2.0		19.0	12.4						
			3.0		19.0	13.7						
			4.0		19.0	13.7						
1	2	Jul-22-93	0	6.0	19.9	6.7	0	0.6	450	7.7	15.0	7.2
			1.0		19.5	6.6	0.1					
			2.0		19.0	6.2						
			3.0		19.0	5.4						
			4.0		19.0	5.7						
			5.0		19.0	6.3						
			5.9		19.0	6.7						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
1	3	Jul-22-93	0	7.4	19.0	6.9	0.4	0.8	445	8.0	15.0	7.4
			1.0		19.0	6.9	0.5					
			2.0		19.0	7.1						
			3.0		19.0	7.1						
			4.0		19.0	7.2						
			5.0		19.0	6.7						
			6.0		19.0	6.9						
			7.0		19.0	6.8						
1	4	Jul-22-93	0	5.2	19.0	6.7	0.1	0.6	445	8.0	14.5	7.4
			1.0		19.0	6.5	0.3					
			2.0		19.0	6.7						
			3.0		19.0	6.9						
			4.0		19.0	7.3						
1	5	Jul-22-93	0	0.8	19.0	6.6	0	0.6	445	8.0	14.0	7.6
			0.7		19.0	6.2	0					
2	1	Jul-22-93	0	1.7	20.0	6.8	0.2	0.6	450	7.9	14.0	6.9
			1.0		19.5	6.4	0					
			1.5		19.0	4.0						
2	2	Jul-22-93	0	1.5	19.5	6.5	0.2	0.6	450	7.8	16.0	7.0
			1.0		20.0	6.6	0.1					
2	3	Jul-22-93	0	2.9	20.0	6.2	0.8	0.7	450	7.8	15.5	7.2
			1.0		20.0	6.1	0.7					
			2.0		19.9	6.1						
			2.8		19.9	6.0						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
2	4	Jul-22-93	0	3.6	18.9	6.1	0.8	0.5	453	7.7	14.5	-
			1.0		18.9	7.3	0.7					
			2.0		18.9	7.3						
			3.0		18.9	6.8						
			3.5		19.0	6.7						
2	5	Jul-22-93	0	2.5	18.9	6.7	0.3	0.7	465	7.8	11.5	7.1
			1.0		18.5	6.6	0.2					
			2.0		18.0	6.7						
			2.4		18.0	4.4						
3	1	Jul-22-93	0	1.0	19.3	6.8	0.4	0.9	440	8.0	11.0	7.2
			0.9		19.9	7.0	0.2					
3	2	Jul-22-93	0	1.0	19.0	7.1	0.5	0.9	450	8.0	11.0	7.3
			0.9		19.3	6.6	0.2					
3	3	Jul-22-93	0	1.1	19.0	7.0	0.5	0.7	450	8.2	12.0	7.5
			1.0		19.3	7.2	0.5					
3	4	Jul-22-93	0	0.9	19.0	6.8	0.2	0.8	455	8.5	12.5	7.7
			0.8		19.0	6.8	0.4					
3	5	Jul-22-93	0	1.1	19.0	6.7	0.9	0.8	455	8.7	13.0	8.1
			1.0		18.9	6.8	0.8					
4	1	Jul-22-93	0	0.9	18.9	6.7	0.1	0.7	450	8.7	13.5	8.1
			0.8		18.9	6.6	0.1					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
4	2	Jul-22-93	0	1.6	19.0	6.7	1.4	0.7	450	9.0	15.0	8.6
			1.0		18.9	6.9	1.3					
			1.5		18.9	7.5						
4	3	Jul-22-93	0	1.8	18.8	6.7	0.7	0.5	450	8.7	15.0	8.4
			1.0		18.8	6.7	0.8					
			1.7		18.7	6.8						
4	4	Jul-22-93	0	1.9	18.8	6.7	1.2	0.7	450	8.6	15.0	8.4
			1.0		18.8	6.6	1.0					
			1.8		18.8	6.8						
4	5	Jul-22-93	0	1.8	18.7	6.2	1.2	0.7	450	8.7	15.5	8.4
			1.0		18.7	6.2	1.3					
			1.7		18.7	6.6						
5	1	Jul-23-93	0	2.7	17.5	8.7	2.1	0.6	380	8.2	7.8	-
			1.0		18.0	9.0	1.9					
			2.0		18.0	9.1	2.0					
			2.5		18.0	9.1	2.0					
5	2	Jul-23-93	0	1.9	18.0	9.2	1.2	0.6	450	8.2	20.0	7.8
			1.0		18.0	9.1	1.5					
			1.5		18.0	9.4	1.5					
5	3	Jul-23-93	0	1.1	19.0	9.2	1.0	0.7	450	8.2	18.0	7.6
			1.0		18.5	9.5	0.3					
5	4	Jul-23-93	0	1.0	18.5	9.5	0.7	0.8	450	8.3	13.5	7.8
			0.9		18.5	9.5	0.6					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
5	5	Jul-23-93	0	1.0	19.0	9.3	-	0.7	450	8.6	11.5	7.1
			0.9		19.0	9.5						
5	6	Jul-23-93	0	2.2	19.0	9.5	0.5	0.8	450	8.2	13.5	7.0
			1.0		18.5	9.8	0.4					
			2.0		18.5	9.5						
5	7	Jul-23-93	0	1.0	19.0	8.6	0.3	0.7	450	8.3	15.5	7.1
			0.9		19.0	8.6	0.2					
5	8	Jul-23-93	0	1.3	19.0	9.0	0.2	0.7	450	8.3	14.0	7.1
			1.0		19.0	9.0	0.2					
5	9	Jul-23-93	0	3.5	19.0	8.6	1.2	0.7	460	8.2	12.5	7.1
			1.0		18.5	9.0	1.0					
			2.0		18.0	9.5						
			3.0		17.8	9.7						
5	10	Jul-23-93	0	1.1	18.0	7.8	1.2	0.8	470	8.2	11.0	7.3
			1.0		17.5	8.0	0.7					
6	1	Jul-23-93	0	2.5	19.5	7.0	2.5	0.7	450	8.3	20.0	-
			1.0		19.0	7.3	2.5					
			2.0		19.0	7.4						
6	2	Jul-23-93	0	2.5	19.0	8.3	0.5	0.6	450	8.4	14.0	7.1
			1.0		19.0	8.6	0.6					
			2.0		19.0	8.6						
			2.4		19.0	8.6						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
6	3	Jul-23-93	0	1.1	19.0	8.5	0.3	0.6	800	8.3	15.0	7.1
			1.0		19.0	8.6	0.3					
6	4	Jul-23-93	0	1.3	19.0	7.5	0.2	0.6	460	8.2	14.0	7.0
			1.0		18.0	8.2	0.2					
6	5	Jul-23-93	0	1.0	19.0	8.2	0.1	0.6	460	8.2	11.0	8.2
			0.9		18.5	8.3	0.2					7.1
6	6	Jul-23-93	0	1.0	19.0	8.5	0.3	0.5	460	8.3	6.5	7.2
			0.9		18.0	9.3	0.2					7.1
6	7	Jul-23-93	0	1.2	19.0	8.5	0.4	0.6	460	8.2	17.0	7.4
			1.0		19.0	9.0	0.2					7.1
6	8	Jul-23-93	0	1.5	19.0	8.3	1.6	0.7	460	8.2	15.5	7.6
			1.0		18.0	8.5	1.5					
			1.4		18.0	8.6						
												7.3
6	9	Jul-23-93	0	0.8	18.0	8.2	0.9	0.7	480	8.2	14.0	7.3
			0.7		18.0	8.3	0.7					
6	10	Jul-23-93	0	1.3	18.0	8.7	0.7	0.9	490	8.2	10.5	7.4
			1.0		17.5	8.9	0.4					
7	1	Jul-24-93	0	3.0	18.0	9.0	2.0	0.7	460	8.2	9.0	7.1
			1.0		18.0	9.0	2.0					
			2.0		18.0	9.5						
			2.9		18.0	9.5						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
7	2	Jul-24-93	0	2.1	19.0	9.0	0.7	1.0	470	8.2	7.5	6.9
			1.0		18.0	9.0	0.8					
			2.0		18.0	8.9						
7	3	Jul-24-93	0	1.4	18.0	8.9	0.5	0.7	460	8.2	7.4	7.4
			1.0		18.0	8.9	0.2					
			1.3		18.0	8.9						
7	4	Jul-24-93	0	1.4	18.0	9.0	0.7	0.7	460	8.3	13.0	7.4
			1.0		18.0	8.6	0.5					
			1.3		18.0	8.0						
7	5	Jul-24-93	0	1.3	18.0	8.9	0.3	0.7	460	8.2	15.0	7.2
			1.2		18.0	9.0	0.3					
			1.2		18.0	9.0						
7	6	Jul-24-93	0	1.1	18.0	9.1	1.3	0.7	460	8.2	8.8	7.7
			1.0		18.0	8.8	1.2					
7	7	Jul-24-93	0	1.3	18.0	9.2	0.4	0.8	460	8.2	7.2	7.6
			1.0		18.0	8.8	0.2					
			1.2		18.0	8.6						
7	8	Jul-24-93	0	1.2	18.0	9.2	0.4	1.0	460	8.2	12.0	7.6
			1.0		18.0	9.2	0.4					
7	9	Jul-24-93	0	1.1	17.0	9.0	1.1	1.0	490	8.2	5.9	7.0
			1.0		17.0	8.6	1.0					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
7	10	Jul-24-93	0	1.5	15.0	8.8	0.2	>1.5	600	8.2	1.4	7.3
			1.0		15.0	8.8	0.2					
			1.4		15.0	8.8						
1	1	Aug-15-93	0	1.6	19.0	7.4	0	0.6	465	8.6	21.5	7.7
			1.0		19.0	7.2	0					
			1.5		19.0	7.2						
1	2	Aug-15-93	0	8.0	19.5	7.8	0.2	0.5	460	8.6	23.0	8.2
			1.0		19.5	7.8	0.2					
			2.0		19.5	7.8						
			3.0		19.5	7.6						
			4.0		19.5	7.6						
			5.0		19.5	7.6						
			6.0		19.5	7.4						
			7.0		19.5	7.4						
			7.9		19.5	7.0						
1	3	Aug-15-93	0	8.1	19.5	7.6	0.2	0.5	465	8.7	22.5	7.8
			1.0		19.5	7.6	0.2					
			2.0		19.5	7.6						
			3.0		19.5	7.6						
			4.0		19.5	7.6						
			5.0		19.5	7.5						
			6.0		19.5	7.5						
			7.0		19.5	7.5						
			8.0		19.5	7.5						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transcect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
1	4	Aug-15-93	0	5.0	19.5	7.4	0.2	0.6	470	8.6	25.0	8.0
			1.0		19.5	7.4	0.1					
			2.0		19.5	7.4						
			3.0		19.5	7.4						
			4.0		19.5	7.4						
			4.9		19.5	7.2						
1	5	Aug-15-93	0	0.8	19.5	8.4	0	0.5	460	8.9	22.0	7.8
			0.7		19.5	7.6	0					
2	1	Aug-15-93	0	1.8	19.5	7.2	0	0.6	470	8.9	30.0	7.7
			1.0		19.5	7.2	0					
			1.7		19.5	6.8						
2	2	Aug-15-93	0	1.5	19.0	7.4	0	0.6	480	8.9	16.0	7.6
			1.0		19.5	7.4	0					
			1.4		19.5	7.4						
2	3	Aug-15-93	0	2.9	19.5	7.4	0.1	0.5	480	8.7	22.0	8.2
			1.0		19.5	7.4	0.2					
			2.0		19.5	7.4						
			2.8		19.5	7.4						
2	4	Aug-15-93	0	3.4	19.0	7.6	0.7	0.6	470	8.7	21.5	no sediment
			1.0		19.0	7.6						
			2.0		19.0	7.4						
			3.0		19.0	7.4						
			3.3		19.0	7.4						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
2	5	Aug-15-93	0	3.3	19.0	7.6	0.1	0.6	490	8.6	19.5	7.8
			1.0		19.0	7.6	0.1					
			2.0		19.0	7.6						
			3.0		19.0	7.4						
			3.2		19.0	7.2						
3	1	Aug-15-93	0	1.0	21.0	9.2	0	0.7	460	8.9	12.0	7.5
			1.0		20.0	8.6	0					
3	2	Aug-15-93	0	0.9	20.0	9.0	0	0.8	460	8.9	13.0	7.5
			0.8		20.0	9.0	0.1					
3	3	Aug-15-93	0	1.0	20.0	8.8	0	0.6	460	8.8	18.0	7.4
			0.9		20.0	8.7	0					
3	4	Aug-15-93	0	1.5	20.0	8.5	0.1	0.5	460	8.7	15.0	7.2
			1.0		20.0	8.5	0.1					
			1.4		20.0	8.0						
3	5	Aug-15-93	0	1.6	19.0	8.2	0.5	0.7	460	8.6	17.0	7.6
			1.0		19.0	8.2	0.6					
			1.5		19.0	8.2						
4	1	Aug-15-93	0	0.9	20.0	8.2	0.1	0.5	470	8.6	52.0	7.4
			0.8		20.0	8.2	0.1					
4	2	Aug-15-93	0	1.7	20.0	8.2	0.5	0.7	460	8.6	21.0	8.0
			1.0		19.5	8.1	0.7					
			1.6		19.5	8.0						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
4	3	Aug-15-93	0	1.6	20.0	8.0	1.1	0.6	460	8.7	21.5	7.8
			1.0		20.0	8.0	1.2					
			1.5		20.0	8.0						
4	4	Aug-15-93	0	1.6	20.0	8.2	1.5	0.7	460	8.7	19.0	7.8
			1.0		20.0	8.0	1.3					
			1.5		20.0	8.0						
4	5	Aug-15-93	0	2.0	20.0	8.2	2.6	0.7	460	8.7	16.0	-
			1.0		20.0	8.1	2.4					
			1.9		20.0	8.0						
5	1	Aug-13-93	0	2.9	20.0	7.6	2.1	0.6	450	8.4	8.8	-
			1.0		20.0	7.5	2.2					
			2.0		20.0	7.5						
			2.8		20.0	7.5						
5	2	Aug-13-93	0	1.9	20.0	7.6	1.8	0.7	455	8.5	9.9	-
			1.0		20.0	7.5	1.1					
			1.8		20.0	7.5						
5	3	Aug-13-93	0	1.2	20.0	7.6	0.1	0.3	460	8.7	11.5	7.7
			1.0		20.0	7.2	0.1					
			1.1		20.0	7.1						
5	4	Aug-13-93	0	1.2	20.0	8.0	0	0.4	460	8.6	14.0	6.9
			1.0		20.0	8.0	0					
			1.1		20.0	8.0						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
5	5	Aug-13-93	0	1.5	21.5	9.0	0	0.5	430	8.4	21.0	7.6
			1.0		21.0	7.8	0					
			1.4		20.0	5.0						
5	6	Aug-13-93	0	1.3	20.0	8.0	0.1	0.8	465	8.4	13.0	7.2
			1.0		20.0	7.6	0.1					
			1.2		20.0	7.6						
5	7	Aug-13-93	0	1.2	20.0	8.0	0.2	0.7	465	8.9	14.5	7.4
			1.0		19.8	7.4	0					
			1.1		19.8	7.2						
5	8	Aug-13-93	0	1.3	20.0	7.8	0	0.5	470	8.4	12.0	7.1
			1.0		20.0	7.6	0					
			1.2		20.0	6.8						
5	9	Aug-13-93	0	3.2	19.0	8.0	1.7	0.7	480	8.4	14.0	6.6
			1.0		19.0	8.0	1.1					
			2.0		19.0	8.0						
			3.0		19.0	8.0						
			3.1		19.0	8.0						
5	10	Aug-13-93	0	1.2	18.5	8.4	0.9	0.9	495	8.4	11.0	7.1
			1.0		18.5	8.4	0.2					
			1.1		18.5	8.4						
6	1	Aug-13-93	0	2.5	20.5	8.4	2.6	0.5	460	8.4	18.5	-
			1.0		20.5	8.4	2.6					
			2.0		20.5	8.4						
			2.4		20.5	8.4						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
6	2	Aug-13-93	0	2.3	20.5	9.2	1.2	0.7	470	8.5	7.0	7.7
			1.0		20.5	8.8	1.2					
			2.0		20.5	8.6						
			2.2		20.5	8.6						
6	3	Aug-13-93	0	1.3	21.0	9.0	0.1	0.8	470	8.5	7.3	7.2
			1.0		21.0	9.0	0					
			1.2		21.0	9.0						
6	4	Aug-13-93	0	1.2	21.0	9.0	0	0.3	490	8.5	16.0	7.3
			1.0		21.0	9.0	0					
			1.1		20.5	8.8						
6	5	Aug-13-93	0	1.2	21.0	8.6	0	0.4	370	8.6	10.5	6.4
			1.0		21.0	8.0	0					
			1.1		21.0	8.0						
6	6	Aug-13-93	0	1.1	21.0	8.0	0	0.4	480	8.6	56.0	7.6
			1.0		21.0	8.0	0					
6	7	Aug-13-93	0	1.1	23.0	8.2	0	0.5	475	8.5	30.0	7.4
			1.0		20.5	8.2	0					
6	8	Aug-13-93	0	1.3	20.0	8.4	2.0	0.5	480	8.4	18.0	-
			1.0		20.0	8.4	1.1					
			1.2		20.0	8.4						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
6	9	Aug-13-93	0	1.2	19.5	8.4	0.3	0.8	490	8.4	14.5	7.4
			1.0		19.5	8.4	0.1					
			1.1		19.5	8.4						
6	10	Aug-13-93	0	1.1	19.5	9.0	0.1	0.9	500	8.4	11.0	7.4
			1.0		19.5	9.0	0.1					
7	1	Aug-14-93	0	3.0	20.0	8.4	1.5	0.5	430	8.5	21.5	-
			1.0		20.0	8.4	2.3					
			2.0		20.0	8.4						
			2.9		20.0	8.4						
7	2	Aug-14-93	0	1.9	19.5	8.0	0.5	0.9	480	8.5	11.5	7.4
			1.0		19.5	7.8	0.5					
			1.8		19.5	7.4						
7	3	Aug-14-93	0	1.2	19.5	8.2	0.1	0.6	480	8.5	10.0	7.4
			1.0		19.5	7.6	0					
			1.1		19.5	6.4						
7	4	Aug-14-93	0	1.2	19.5	8.2	0.1	0.6	480	8.5	14.5	7.4
			1.0		19.5	7.8	0					
			1.1		19.5	7.2						
7	5	Aug-14-93	0	1.2	19.0	7.8	0.1	0.5	480	8.4	17.0	7.2
			1.0		19.0	7.8	0					
			1.1		19.0	7.8						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
7	6	Aug-14-93	0	1.2	19.0	8.0	0.8	0.6	480	8.4	18.0	7.7
			1.0		19.0	8.0	0					
			1.1		19.0	8.0						
7	7	Aug-14-93	0	1.2	18.5	8.0	0.3	0.7	490	8.4	13.0	7.4
			1.0		18.5	8.0	0					
			1.1		18.5	7.6						
7	8	Aug-14-93	0	0.9	18.5	7.8	0.1	0.3	490	8.8	28.0	7.6
			0.8		18.5	7.8	0					
7	9	Aug-14-93	0	0.8	18.5	7.8	0.3	>0.8	490	8.4	16.5	7.6
			0.7		18.5	7.8	0					
7	10	Aug-14-93	0	1.2	18.0	7.8	0.1	0.9	500	8.4	9.5	7.6
			1.0		18.0	7.8	0					
			1.1		18.0	7.8						
1	1	Oct-2-93	0	4.2	15.0	8.8	0.1	0.8	500	8.4	13.0	7.8
			1.0		15.0	9.0	0.1					
			2.0		14.0	9.2						
			3.0		14.0	9.0						
1	2	Oct-2-93	0	5.8	15.0	8.5	0.1	0.9	500	8.6	12.0	7.9
			1.0		15.0	8.8	0.1					
			2.0		14.0	8.8						
			3.0		14.0	9.0						
			4.0		14.0	9.0						
			5.0		14.0	9.2						
			5.7		14.0	9.2						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
1	3	Oct-2-93	0	7.3	15.0	8.6	0	0.9	500	8.6	14.0	8.1
			1.0		15.0	8.8	0					
			2.0		14.0	8.8						
			3.0		14.0	9.0						
			4.0		14.0	9.2						
			5.0		14.0	9.2						
			6.0		14.0	9.2						
			7.0		14.0	9.0						
1	4	Oct-2-93	0	4.6	15.0	8.0	0.1	0.8	500	8.4	13.0	7.9
			1.0		14.0	9.0	0.1					
			2.0		14.0	9.0						
			3.0		14.0	9.2						
			4.0		14.0	9.2						
			4.5		14.0	9.0						
1	5	Oct-2-93	0	0.5	15.0	8.6	0.1	>0.5	500	8.6	14.0	7.8
			0.4		14.0	9.0	0.1					
2	1	Oct-2-93	0	1.3	15.0	11.0	0	0.9	420	8.8	13.0	7.6
			1.0		14.0	10.3	0					
2	2	Oct-2-93	0	1.0	15.0	9.0	0	0.9	500	8.6	14.0	7.8
			0.9		15.0	9.2	0.1					
2	3	Oct-2-93	0	3.3	16.0	8.4	0.3	0.9	500	8.6	14.0	8.0
			1.0		14.5	9.0	0.2					
			2.0		14.0	9.2						
			3.0		14.0	9.2						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
2	4	Oct-2-93	0	3.0	15.0	8.6	0.2	1.2	500	8.4	10.0	-
			1.0		14.0	8.8	0.2					
2	5	Oct-2-93	0	2.1	15.0	8.6	0.1	1.0	500	8.2	9.0	7.4
			1.0		14.0	8.8	0.1					
			2.0		14.0	9.0						
3	1	Oct-2-93	0	0.7	16.0	9.2	0.2	>0.7	500	8.7	11.0	7.4
			0.6		15.0	9.0	0.2					
3	2	Oct-2-93	0	0.8	15.0	9.2	0.1	>0.8	500	8.5	11.0	7.4
			0.7		15.0	9.6	0.1					
3	3	Oct-2-93	0	0.9	15.0	9.8	0.0	>0.9	500	8.6	13.0	7.6
			0.8		15.0	10.0	0.0					
3	4	Oct-2-93	0	0.9	15.0	9.2	0.1	>0.9	500	8.4	10.0	7.4
			0.8		15.0	9.4	0					
3	5	Oct-2-93	0	1.2	15.0	8.8	0.2	1.1	500	8.7	10.0	7.7
			1.0		15.5	9.2	0.1					
			1.1		15.5	9.2						
4	1	Oct-3-93	0	0.6	14.0	9.4	0.2	>0.6	500	8.3	11.0	7.1
			0.5		14.0	9.0	0.1					
4	2	Oct-3-93	0	1.0	14.0	9.2	0.2	0.9	500	8.4	11.0	7.8
			0.9		14.0	9.4	0.2					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
4	3	Oct-3-93	0	1.2	14.0	9.2	0.2	1.0	500	8.4	10.0	7.5
			1.0		14.0	9.4	0.1					
4	4	Oct-3-93	0	1.6	14.0	9.2	0.3	0.8	500	8.5	12.0	7.8
			1.0		14.0	9.2	0.2					
			1.5		14.0	9.2						
4	5	Oct-3-93	0	1.5	14.0	9.2	0.6	0.9	500	8.4	13.0	7.9
			1.0		14.0	9.4	0.5					
			1.4		14.0	9.4						
5	1	Oct-3-93	0	2.1	15.0	9.0	0.4	1.0	500	8.4	12.0	-
			1.0		14.5	9.4	0.4					
			2.0		14.5	9.4						
5	2	Oct-3-93	0	2.0	15.0	9.2	0.4	1.0	500	8.4	11.0	-
			1.0		14.5	9.4	0.3					
			1.9		14.5	9.4						
5	3	Oct-3-93	0	0.8	16.0	10.0	0.0	>0.8	500	8.6	11.0	7.2
			0.7		15.5	10.2	0.0					
5	4	Oct-3-93	0	0.6	15.0	9.8	0.1	>0.6	500	8.6	10.0	7.4
			0.5		15.0	11.0	0.1					
5	5	Oct-3-93	0	1.0	16.0	9.2	0.1	0.9	500	8.6	11.0	7.3
			0.9		15.0	9.2	0.1					
5	6	Oct-3-93	0	1.2	15.0	10.2	0.3	1.1	500	8.6	10.0	7.6
			1.0		15.0	10.2	0.1					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
5	7	Oct-3-93	0	0.9	15.0	9.4	0.2	>0.9	500	8.6	9.0	7.3
			0.8		15.0	9.6	0.2					
5	8	Oct-3-93	0	0.9	15.0	9.0	0.2	>0.9	500	8.6	10.0	7.4
			0.8		15.0	9.0	0.2					
5	9	Oct-3-93	0	1.7	15.5	8.6	0.3	1.1	500	8.4	11.0	7.1
			1.0		15.0	9.0	0.2					
			1.6		15.0	9.2						
5	10	Oct-3-93	0	0.8	15.0	9.0	0.1	>0.8	500	8.6	9.0	7.4
			0.7		15.0	9.2	0.1					
6	1	Oct-3-93	0	2.7	15.0	9.2	0.5	0.9	500	8.6	13.0	-
			1.0		15.0	9.4	0.6					
			2.0		15.0	9.6						
			2.6		15.0	9.6						
6	2	Oct-3-93	0	1.8	15.0	9.2	0.2	1.1	500	8.6	10.0	8.0
			1.0		15.0	9.4	0.3					
			1.7		15.0	9.8						
6	3	Oct-3-93	0	1.0	15.0	9.0	0.3	0.9	500	8.6	8.0	7.7
			0.9		15.0	9.2	0.2					
6	4	Oct-3-93	0	0.9	15.0	9.2	0.2	>0.9	500	8.6	8.0	8.0
			0.8		15.0	9.2	0.2					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
6	5	Oct-3-93	0	1.0	15.0	9.2	0.1	0.9	500	8.6	9.0	7.7
			0.9		15.0	9.4	0.1					
6	6	Oct-3-93	0	0.7	15.0	9.0	0.3	>0.7	500	8.6	9.0	7.6
			0.6		15.0	9.0	0.2					
6	7	Oct-3-93	0	0.7	15.0	9.0	0.2	>0.7	500	8.6	9.0	7.5
			0.6		15.0	9.0	0.1					
6	8	Oct-3-93	0	1.0	15.0	9.2	0.3	0.9	500	8.5	8.0	7.8
			0.9		15.0	9.2	0.1					
6	9	Oct-3-93	0	0.8	15.0	9.0	0.3	>0.8	500	8.4	6.0	7.8
			0.7		15.0	9.0	0.1					
6	10	Oct-3-93	0	0.9	14.0	9.2	0.1	>0.9	500	8.5	4.0	7.6
			0.8		14.0	9.2	0					
7	1	Oct-4-93	0	3.2	14.0	9.8	0.5	0.8	500	8.2	12.0	-
			1.0		14.0	9.8	0.4					
			2.0		14.0	9.8						
			3.0		14.0	9.8						
7	2	Oct-4-93	0	2.3	14.0	9.8	0.2	1.1	500	8.2	9.0	7.7
			1.0		14.0	9.6	0.2					
			2.0		14.0	9.6						
7	3	Oct-4-93	0	1.5	14.0	10.0	0.2	1.0	500	8.3	9.0	7.7
			1.0		14.0	9.8	0.2					
			1.4		14.0	9.8						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
7	4	Oct-4-93	0	0.8	14.0	10.2	0.2	>0.8	500	8.3	9.0	7.7
			0.7		14.0	10.0	0.1					
7	5	Oct-4-93	0	1.0	14.0	10.0	0.2	>1.0	500	8.3	10.0	7.6
			0.9		14.0	10.0	0.1					
7	6	Oct-4-93	0	0.9	15.0	9.8	0.1	>0.9	500	8.4	9.0	7.5
			0.8		14.0	9.8	0.1					
7	7	Oct-4-93	0	1.0	14.0	10.0	0.2	>1.0	500	8.2	8.0	7.7
			0.9		14.0	9.8	0.1					
7	8	Oct-4-93	0	0.8	14.0	9.8	0.2	>0.8	500	8.2	8.0	7.3
			0.7		14.0	10.0	0.1					
7	9	Oct-4-93	0	0.6	14.0	10.0	0.3	>0.6	500	8.2	8.0	7.5
			0.5		14.0	10.4	0.2					
7	10	Oct-4-93	0	1.1	14.0	10.8	0.1	>1.1	500	8.4	4.0	7.8
			1.0		14.0	11.0	0.1					
1	1	Nov-15-93	0	3.0	6.8	13.0	0	0.7	450	8.1	14.0	8.0
			1.0		6.8	13.1	0					
			2.0		6.8	13.9						
			3.0		6.7	14.0						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
1	2	Nov-15-93	0	7.9	6.9	12.2	0.3	0.6	450	8.1	14.0	7.8
			1.0		6.8	12.6	0.3					
			2.0		6.8	13.2						
			3.0		6.8	14.0						
			4.0		6.8	14.0						
			5.0		6.8	14.0						
			6.0		6.8	14.0						
			7.0		6.8	14.0						
			7.8		6.8	14.0						
1	3	Nov-15-93	0	7.1	6.9	12.4	0.3	0.6	450	8.1	15.0	7.6
			1.0		6.8	12.6	0.5					
			2.0		6.8	13.1						
			3.0		6.8	13.9						
			4.0		6.8	14.0						
			5.0		6.8	14.1						
			6.0		6.8	14.1						
			7.0		6.8	14.1						
1	4	Nov-15-93	0	5.2	6.8	12.5	0.3	0.6	450	8.1	14.0	7.8
			1.0		6.8	13.0	0.4					
			2.0		6.8	13.3						
			3.0		6.8	13.6						
			4.0		6.8	14.0						
			5.0		6.8	14.0						
1	5	Nov-15-93	0	0.5	6.9	12.6	0.1	>0.5	450	8.1	13.0	8.1
			0.4		6.8	13.1	0.1					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
2	1	Nov-15-93	0	1.7	6.8	13.0	0.1	0.7	400	8.2	13.0	7.5
			1.0		6.8	13.6	0.1					
			1.6		6.8	14.0						
2	2	Nov-15-93	0	1.0	6.8	12.8	0.1	0.7	500	8.1	13.0	7.5
			0.9		6.8	13.1	0.1					
2	3	Nov-15-93	0	3.0	7.1	13.2	0.2	0.7	500	8.1	14.0	7.8
			1.0		7.2	13.4	0.2					
			2.0		7.2	13.8						
			2.9		7.2	14.1						
2	4	Nov-15-93	0	3.1	7.9	12.9	0.4	0.8	500	8.0	12.0	7.1
			1.0		7.7	13.1	0.6					
			2.0		7.5	13.3						
			3.0		7.5	13.5						
2	5	Nov-15-93	0	2.0	8.8	12.6	0	0.9	500	8.2	11.0	7.8
			1.0		8.8	12.6	0					
			1.9		8.8	12.6						
3	1	Nov-16-93	0	0.8	7.3	11.3	0.7	0.7	400	8.4	12.0	7.8
			0.8		7.3	11.2	0.5					
3	2	Nov-16-93	0	0.9	7.4	11.7	1.0	0.7	500	8.4	13.0	7.6
			0.8		7.4	11.9	0.7					
3	3	Nov-16-93	0	0.8	7.4	12.1	0.9	0.7	510	8.4	12.0	7.6
			0.7		7.4	12.2	0.5					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
3	4	Nov-16-93	0	0.9	7.4	12.0	0.9	0.7	550	8.5	12.0	7.8
			0.8		7.4	12.0	0.6					
3	5	Nov-16-93	0	1.1	7.4	11.8	0.8	0.8	580	8.4	12.0	7.6
			1.0		7.3	11.9	0.4					
4	1	Nov-16-93	0	0.8	7.5	11.8	1.0	>0.8	650	8.6	12.0	7.4
			0.7		7.5	11.6	0.5					
4	2	Nov-16-93	0	1.4	7.3	12.0	0.9	0.8	600	8.4	11.0	7.6
			1.3		7.2	11.9	0.3					
4	3	Nov-16-93	0	1.5	7.1	11.9	0.7	0.8	550	8.4	12.0	7.6
			1.3		7.1	11.7	0.0					
4	4	Nov-16-93	0	1.5	7.0	11.4	1.1	0.7	600	8.4	12.0	7.6
			1.4		7.1	11.0	0.7					
4	5	Nov-16-93	0	1.6	6.9	12.1	1.7	0.8	650	-	12.0	8.2
			1.5		6.9	12.0	1.0					
5	1	Nov-16-93	0	2.4	7.0	14.8	1.4	0.8	500	8.4	13.0	-
			1.0		6.9	14.8	1.5					
			2.0		6.9	14.8						
			2.3		6.9	14.8						
5	2	Nov-16-93	0	0.9	7.3	12.7	0.5	0.8	500	8.3	13.0	7.4
			0.8		7.3	13.2	0.4					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
5	3	Nov-16-93	0	1.1	7.6	12.5	0.6	0.8	500	8.3	13.0	7.4
			1.0		7.2	13.1	0.5					
5	4	Nov-16-93	0	0.8	7.6	13.0	0.5	0.7	500	8.4	15.0	7.1
			0.7		7.5	13.1	0.4					
5	5	Nov-16-93	0	2.7	7.6	12.6	0.6	0.8	500	8.3	13.0	7.4
			1.0		7.6	12.8	0.5					
			2.0		7.6	12.9						
			2.6		7.5	13.1						
5	6	Nov-17-93	0	1.5	7.4	12.1	0.6	0.8	500	8.6	12.0	7.6
			1.4		7.4	12.4	0.1					
5	7	Nov-17-93	0	0.8	7.4	11.5	0.7	>0.8	480	8.6	6.5	8.0
			0.7		7.4	11.6	0.1					
5	8	Nov-17-93	0	1.0	7.4	7.4	0.8	0.8	500	8.5	13.5	7.7
			0.9		7.4	11.3	0.5					
5	9	Nov-17-93	0	1.1	11.3	7.5	0.9	0.8	480	8.6	9.0	8.0
			1.0		11.3	7.5	0.3					
5	10	Nov-17-93	0	3.6	8.9	11.2	0.4	1.0	500	8.5	8.0	7.4
			1.0		9.0	11.1	0.2					
6	1	Nov-17-93	0	2.6	7.0	12.5	1.5	0.8	470	8.6	12.0	-
			1.0		7.0	12.8	1.6					
			2.0		7.0	12.9						
			2.5		6.9	13.1						

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
6	2	Nov-17-93	0	2.2	7.4	12.7	0.8	0.8	470	8.4	9.5	7.8
			1.0		7.4	12.7	0.9					
			2.0		7.4	12.8						
6	3	Nov-17-93	0	1.1	7.6	12.6	0.8	0.8	480	8.4	12.0	7.1
			1.0		7.6	12.7	0.7					
6	4	Nov-17-93	0	0.8	7.7	12.3	0.7	>0.8	470	8.4	13.5	8.0
			0.7		7.6	12.4	0.7					
6	5	Nov-17-93	0	1.0	7.7	11.2	0.9	0.8	470	8.4	15.0	7.7
			0.9		7.7	11.4	0.7					
6	6	Nov-17-93	0	0.9	7.7	11.2	0.1	0.8	470	8.4	15.0	7.7
			0.8		7.7	11.4	0.7					
6	7	Nov-17-93	0	0.8	7.7	11.2	1.0	>0.8	470	8.3	14.0	7.7
			0.7		7.7	11.3	0.6					
6	8	Nov-17-93	0	1.2	7.8	11.5	0.7	0.8	470	8.4	12.0	7.6
			1.0		7.8	11.6	0.6					
6	9	Nov-17-93	0	0.9	8.8	10.6	0.9	>0.9	470	8.4	10.5	8.0
			0.8		8.8	10.6	0.7					
6	10	Nov-17-93	0	0.5	9.4	10.4	1.0	>0.5	500	8.5	10.0	-
			0.4		9.4	10.4	0.9					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
7	1	Nov-17-93	0	2.4	7.0	11.8	1.2	0.8	470	8.4	9.0	-
			1.0		7.0	12.0	1.3					
			2.3		6.9	12.2						
7	2	Nov-17-93	0	2.0	7.6	11.5	1.1	0.8	470	8.3	13.5	-
			1.0		7.5	11.6	1.0					
			1.9		7.4	11.7						
7	3	Nov-17-93	0	1.1	7.7	11.5	1.1	0.8	470	8.3	13.0	7.6
			1.0		7.7	11.5	0.9					
7	4	Nov-17-93	0	1.1	7.7	11.4	0.8	0.8	470	8.3	11.5	7.8
			1.0		7.7	11.5	0.6					
7	5	Nov-17-93	0	1.1	7.7	10.9	0.4	0.8	470	8.4	9.0	7.8
			1.0		7.7	11.1	0.4					
7	6	Nov-17-93	0	1.3	8.5	11.0	0.8	0.8	490	8.4	11.0	7.8
			1.0		8.5	11.0	0.6					
7	7	Nov-17-93	0	1.0	8.8	10.9	0.7	0.9	500	8.4	12.0	7.8
			0.9		8.8	10.9	0.6					
7	8	Nov-17-93	0	1.0	9.0	10.5	0.8	0.9	500	8.3	9.5	7.6
			0.9		9.0	10.5	0.7					
7	9	Nov-17-93	0	1.1	9.4	10.5	0.3	0.9	500	8.3	9.5	8.2
			1.0		9.4	10.5	0.2					

Appendix Table A. Physical and chemical water quality, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Sample Depth m	Water Depth m	Water Temp C	Dissolved Oxygen mg/l	Velocity ft/s	Secchi Depth m	Conductivity umhos/cm	Water pH	Turbidity NTU	Sediment pH
7	10	Nov-17-93	0	1.6	9.5	10.5	1.0	1.2	500	8.6	8.0	8.2
			1.0		9.5	10.5	0.7					
			1.5		9.5	10.5						

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
	1	Jun-27-93	<0.005	1.01	0.42	0.17	0.058	216	182	14
	1dup		0.014	0.95	0.52	0.20	0.061	212	181	13
	2		0.245	2.14	1.06	0.25	0.090	222	203	4
	3		0.086	1.72	0.58	0.17	0.091	256	177	7
	4		0.092	2.13	0.53	0.11	0.100	268	196	<1
	5		0.017	1.25	0.57	0.15	0.074	228	185	16
	1	Jun-23-93	0.035	0.69	0.45	0.13	0.032	202	176	20
	1dup		0.044	0.69	0.49	0.17	0.044	202	176	21
	2		0.088	0.99	0.42	0.12	0.031	216	181	16
	3		0.305	2.20	1.10	0.15	0.095	256	202	7
	4		0.118	1.53	0.52	0.11	0.052	236	190	9
	5		0.120	2.20	0.42	0.09	0.078	264	192	1
1	1	Jun-24-93	0.035	0.80	0.65	0.14	0.042	204	199	23
1	2		0.060	0.82	0.38	0.14	0.051	204	180	17
1	3		0.064	0.81	0.30	0.20	0.042	206	177	17
1	4		0.072	0.82	0.20	0.18	0.057	210	178	16
1	5		0.032	0.79	0.30	0.21	0.053	212	179	21
2	1	Jun-24-93	0.043	0.84	0.41	0.20	0.059	212	188	15
2	2		0.033	0.84	0.38	0.18	0.047	204	195	15
2	3		0.065	0.83	0.22	0.22	0.042	212	180	15
2	4		0.037	1.11	0.29	0.19	0.066	226	199	13
2	5		0.078	1.29	0.36	0.25	0.052	230	187	12

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
3	1	Jun-24-93	0.041	1.01	0.32	0.18	0.050	212	199	14
3	2		0.046	1.02	0.53	0.22	0.063	212	183	13
3	3		0.030	1.01	0.39	0.25	0.051	214	184	12
3	4		0.044	1.01	0.40	0.18	0.057	216	180	13
3	5		0.036	1.09	0.40	0.23	0.056	220	183	14
4	1	Jun-24-93	0.025	0.99	0.39	0.25	0.059	216	195	13
4	1dup		0.032	0.99	0.39	0.19	0.054	214	183	13
4	1blk		0.009	0.01	<0.05	0.05	<0.005	<4	<1	<1
4	2		0.036	0.98	0.51	0.20	0.044	216	181	13
4	3		0.021	0.99	0.47	0.23	0.048	214	180	12
4	4		0.019	0.92	0.39	0.19	0.058	210	180	14
4	5		0.010	0.85	0.37	0.21	0.044	212	178	13
5	1	Jun-25-93	0.017	0.92	0.61	0.20	0.038	216	183	15
5	2		0.013	0.99	0.56	0.15	0.044	216	179	15
5	3		0.017	1.03	0.55	0.19	0.075	220	185	12
5	4		0.013	1.02	0.43	0.15	0.034	216	178	9
5	5		0.017	1.02	0.40	0.13	0.052	216	184	10
5	6		0.015	1.04	0.53	0.13	0.060	214	178	10
5	7		0.009	1.07	0.48	0.12	0.042	220	186	10
5	8		0.013	1.09	0.48	0.13	0.059	218	188	12
5	9		0.034	1.21	0.52	0.12	0.099	224	187	10
5	10		0.031	1.45	0.52	0.15	0.042	240	189	6

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
6	1	Jun-26-93	0.013	1.04	0.57	0.11	0.051	214	182	16
6	1dup		0.007	1.03	0.63	0.16	0.057	220	183	15
6	1blk		0.005	<0.005	<0.5	<0.05	<0.005	4	<1	<1
6	2		0.015	1.07	0.41	0.21	0.051	216	184	13
6	3		0.022	1.11	0.50	0.20	0.053	220	184	10
6	4		0.022	1.12	0.67	0.16	0.056	220	183	10
6	5		0.030	1.14	0.62	0.20	0.052	220	184	12
6	6		0.020	1.14	0.44	0.20	0.037	220	183	15
6	7		0.016	1.27	0.44	0.24	0.057	228	184	11
6	8		0.017	1.33	0.29	0.23	0.054	232	185	10
6	9		0.027	1.41	0.66	0.19	0.056	232	187	7
6	10		<0.005	1.71	<0.05	0.11	0.039	244	179	2
7	1	Jun-25-93	0.017	1.05	0.63	0.26	0.077	216	183	13
7	2		0.015	1.09	0.44	0.22	0.050	216	185	14
7	3		0.014	1.11	0.24	0.19	0.070	222	185	10
7	4		0.016	1.24	0.63	0.20	0.060	228	190	17
7	5		0.021	1.30	0.67	0.21	0.073	228	184	11
7	6		0.025	1.31	0.45	0.19	0.055	230	186	11
7	7		0.034	1.34	0.32	0.21	0.110	232	184	9
7	8		0.027	1.38	0.48	0.20	0.050	240	186	8
7	9		0.037	1.45	0.64	0.17	0.066	236	186	7
7	10		<0.005	1.73	0.09	0.05	0.052	252	180	<1

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
	1	Jul-22-93	0.071	1.12	0.11	0.23	0.065	146	177	25
	1dup		0.045	1.11	0.06	0.24	0.103	196	176	25
	1blk		<.005	<.005	<.05	<.05	0.067	<4	<1	2
	2		0.071	1.23	<.05	0.23	0.073	206	178	27
	3		0.576	2.28	0.66	0.25	0.073	250	200	6
	4		0.100	1.75	0.21	0.24	0.062	234	187	11
	5		0.400	2.39	0.35	0.13	-	262	197	<1
1	1	Jul-22-93	0.028	1.06	0.18	0.19	0.090	208	173	17
1	2		0.006	1.09	0.20	0.19	0.075	200	174	18
1	3		<.005	1.09	0.31	0.16	0.100	196	175	16
1	4		0.046	1.06	0.28	0.15	0.081	194	175	19
1	5		0.025	1.06	0.09	0.11	0.057	198	172	14
2	1	Jul-22-93	0.006	1.10	0.23	0.11	0.067	194	178	14
2	2		0.019	1.10	0.19	0.15	0.057	200	167	18
2	3		0.055	1.07	0.23	0.11	0.100	188	173	21
2	4		0.074	1.20	0.28	0.11	0.068	202	179	17
2	5		0.118	1.41	0.18	0.22	0.082	214	180	14

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
3	1	Jul-22-93	0.047	1.17	0.18	0.16	0.071	200	170	5
3	2		0.037	1.17	0.12	0.18	0.056	200	174	6
3	3		0.080	1.17	0.30	0.22	0.059	206	175	8
3	4		0.101	1.20	0.37	0.23	0.060	204	180	8
3	5		0.071	1.19	0.28	0.21	0.060	200	179	10
4	1	Jul-22-93	0.090	1.15	0.18	0.21	0.052	202	178	13
4	1dup		0.030	1.15	0.18	0.22	0.077	204	180	16
4	1blk		<.005	0.01	0.05	0.05	0.016	<4	<1	<1
4	2		0.056	1.14	0.30	0.21	0.077	206	179	19
4	3		0.028	1.14	0.32	0.20	0.055	202	180	19
4	4		0.057	1.13	0.14	0.19	0.070	198	178	16
4	5		0.043	1.13	0.42	0.23	0.072	206	176	22
5	1	Jul-22-93	0.037	1.10	0.11	0.25	0.116	198	178	17
5	2		0.041	1.24	0.27	0.24	0.087	208	177	26
5	3		0.071	1.18	0.32	0.23	0.068	214	175	17
5	4		0.071	1.17	0.33	0.20	0.061	202	179	9
5	5		0.061	1.20	0.24	0.20	0.054	202	178	8
5	6		0.043	1.20	0.29	0.20	0.070	202	179	10
5	7		0.025	1.23	0.31	0.21	0.042	204	178	13
5	8		0.083	1.22	0.14	0.17	0.075	190	179	15
5	9		0.094	1.38	0.12	0.17	0.061	222	182	17
5	10		0.056	1.59	0.16	0.15	0.063	228	186	12

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
6	1	Jul-23-93	0.074	1.13	0.23	0.20	0.063	200	177	15
6	1dup		0.045	1.12	0.11	0.18	0.078	200	177	15
6	1blk		<.005	<.005	<.05	<.05	<.005	<4	<1	<1
6	2		0.097	1.18	0.24	0.19	0.045	204	176	9
6	3		0.113	1.20	0.18	0.14	0.046	202	177	8
6	4		-	-	-	-	0.066	204	178	8
6	5		0.099	1.21	0.20	0.13	0.059	200	177	11
6	6		0.070	1.23	0.19	0.14	0.052	206	178	12
6	7		0.014	1.21	0.23	0.15	0.072	208	177	15
6	8		0.071	1.31	0.24	0.15	0.066	216	180	17
6	9		0.089	1.42	0.19	0.15	0.066	218	183	13
6	10		0.090	1.59	0.16	0.11	0.063	228	185	6
7	1	Jul-23-93	0.067	1.07	0.22	0.23	0.069	198	178	20
7	2		0.050	1.19	0.21	0.18	0.043	206	179	4
7	3		0.047	1.17	0.17	0.19	0.056	208	178	5
7	4		0.042	1.19	0.05	0.17	0.051	204	176	10
7	5		0.070	1.20	0.18	0.17	0.053	206	178	17
7	6		0.100	1.20	0.16	0.25	0.065	212	178	22
7	7		0.117	1.28	0.20	0.23	0.070	218	179	16
7	8		0.140	1.35	0.33	0.24	0.064	220	182	10
7	9		0.097	1.49	0.30	0.18	0.045	224	183	4
7	10		0.062	1.85	<.05	0.05	0.020	250	182	<1

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
	1	Jul-25-93	-	-	-	-	0.056	204	176	12
	1dup		0.042	1.10	0.29	0.23	0.068	200	176	13
	1blk		<.005	<.005	<.05	0.06	<0.005	<4	<1	<1
	2		0.040	1.25	0.40	0.23	0.058	210	179	18
	3		0.455	2.31	0.47	0.29	0.106	256	199	4
	4		0.127	1.62	0.24	0.18	0.060	234	168	10
	5		0.328	2.44	0.37	0.16	0.048	274	199	<1
	1	Aug-14-93	0.037	0.86	0.08	0.14	0.066	198	186	31
	1dup		0.037	0.83	0.11	0.15	0.065	196	186	31
	1blk		0.011	0.01	<.05	<.05	<.005	<4	<1	<1
	2		0.078	1.07	0.14	0.15	0.080	208	190	29
	3		0.465	2.22	0.53	0.18	0.106	250	208	7
	4		0.230	1.84	0.22	0.15	0.078	246	197	10
	5		0.079	2.35	0.19	0.12	0.096	268	203	<1
1	1	Aug-15-93	0.042	0.90	0.20	0.15	0.074	206	190	17
1	2		0.061	0.90	0.18	0.15	0.081	208	187	25
1	3		0.043	0.93	<0.05	0.16	0.074	202	189	29
1	4		0.044	0.90	<0.05	0.16	0.080	204	189	29
1	5		0.043	0.83	0.16	0.20	0.082	202	186	28

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
2	1	Aug-15-93	0.043	0.90	0.16	0.18	0.097	204	190	29
2	2		0.039	0.91	0.17	0.17	0.089	205	189	19
2	3		0.046	0.95	0.17	0.18	0.086	204	189	29
2	4		0.054	0.97	0.16	0.18	0.078	208	188	22
2	5		0.088	1.17	0.10	0.16	0.081	220	190	20
3	1	Aug-15-93	0.116	1.10	0.15	0.16	0.100	212	186	8
3	2		0.098	1.07	0.33	0.14	0.101	216	188	7
3	3		0.083	1.11	0.18	0.20	0.085	212	188	8
3	4		0.084	1.13	0.27	0.14	0.086	216	188	10
3	5		0.097	1.22	0.29	0.16	0.110	216	178	16
4	1	Aug-15-93	0.072	1.12	0.55	0.24	0.092	216	199	76
4	1dup		0.090	1.15	0.55	0.25	0.086	216	199	83
4	1blk		0.009	<.005	<.05	<.05	0.010	<4	<1	<1
4	2		0.088	1.14	0.38	0.16	0.092	218	192	22
4	3		0.082	1.13	0.31	0.14	0.084	216	190	19
4	4		0.078	1.09	0.29	0.14	0.082	216	191	20
4	5		0.078	1.04	0.26	0.13	0.083	216	189	20

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
5	1	Aug-13-93	0.056	0.81	0.25	0.18	0.076	204	183	29
5	2		0.061	0.85	0.37	0.17	0.069	202	184	24
5	3		0.067	0.93	1.58	0.51	0.094	206	207	146
5	4		0.064	0.89	0.33	0.21	0.081	204	187	36
5	5		0.088	0.69	1.57	0.35	0.090	198	178	66
5	6		0.069	0.91	0.17	0.15	0.077	204	184	11
5	7		0.061	0.88	0.31	0.14	0.077	208	224	14
5	8		0.060	0.91	0.28	0.19	0.073	210	182	20
5	9		0.079	1.01	0.14	0.18	0.071	212	185	24
5	10		0.093	1.25	0.16	0.16	0.075	222	188	15
6	1	Aug-13-93	0.060	0.85	0.26	0.15	0.080	202	183	26
6	1dup		0.057	0.84	0.28	0.18	0.073	202	184	24
6	1blk		0.007	<.005	<.05	<.05	<.005	<4	1	<1
6	2		0.086	0.90	0.23	0.16	0.079	202	180	18
6	3		0.068	0.90	0.15	0.16	0.075	206	183	10
6	4		0.074	0.95	0.54	0.23	0.087	208	187	48
6	5		0.092	0.94	0.62	0.20	0.081	206	184	32
6	6		0.089	0.96	0.83	0.33	0.083	212	191	121
6	7		0.078	0.99	0.39	0.23	0.081	208	186	44
6	8		0.084	1.00	0.18	0.18	0.075	208	185	23
6	9		0.107	1.28	0.25	0.17	0.064	218	188	15
6	10		0.108	1.39	0.36	0.11	0.085	224	190	9

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
7	1	Aug-14-93	0.062	0.89	0.36	0.16	0.084	210	184	28
7	2		0.092	1.00	0.35	0.17	0.084	210	184	8
7	3		0.079	1.03	0.12	0.16	0.075	210	185	12
7	4		0.080	1.02	0.24	0.13	0.075	214	185	14
7	5		0.090	1.05	0.38	0.15	0.086	218	185	21
7	6		0.100	1.10	0.29	0.13	0.083	210	186	19
7	7		0.122	1.32	0.27	0.12	0.083	224	188	14
7	8		0.133	1.30	0.82	0.25	0.083	222	202	75
7	9		0.123	1.40	0.27	0.13	0.083	222	178	14
7	10		0.135	1.47	0.29	0.10	0.072	228	188	6
	1	Aug-16-93	0.055	1.12	0.23	0.22	0.088	216	192	28
	1dup		0.059	1.15	0.14	0.17	0.084	216	193	29
	1blk		0.011	<.005	<.05	<.05	<.005	<4	1	<1
	2		0.098	1.53	0.16	0.12	0.081	240	194	14
	3		0.435	2.40	0.58	0.16	0.125	260	207	10
	4		0.200	1.86	0.31	0.14	0.097	248	199	12
	5		0.270	2.51	0.28	0.11	0.108	268	203	1

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
	1	Oct-1-93	0.025	2.10	0.40	0.22	0.244	244	218	16
	1dup		0.033	2.13	0.37	0.26	0.225	244	218	16
	1blk		<.005	0.01	<.05	<.05	0.006	2	1	<1
	2		0.064	2.19	0.41	0.22	0.162	254	215	8
	3		0.339	2.73	0.85	0.24	0.144	266	219	5
	4		0.181	2.47	0.41	0.19	0.142	266	214	4
	5		0.273	2.50	0.37	0.19	0.131	264	208	2
1	1	Oct-2-93	0.021	2.00	0.21	0.26	0.185	240	219	14
1	2		0.013	1.98	0.45	0.28	0.168	240	218	14
1	3		0.018	1.98	0.26	0.23	0.170	238	217	15
1	4		0.021	1.98	0.52	0.24	0.161	240	216	14
1	5		0.019	1.99	0.09	0.27	0.167	240	217	15
2	1	Oct-2-93	0.020	1.94	1.05	0.34	0.150	238	216	24
2	2		0.024	1.98	0.33	0.31	0.165	240	219	23
2	3		0.023	1.97	0.17	0.26	0.165	236	217	13
2	4		0.100	2.23	0.26	0.23	0.149	254	217	6
2	5		0.155	2.32	0.28	0.25	0.147	258	219	8
3	1	Oct-2-93	0.039	2.09	0.28	0.25	0.167	246	216	10
3	2		0.044	2.07	0.15	0.24	0.167	244	217	9
3	3		0.051	2.12	0.19	0.25	0.163	250	216	11
3	4		0.049	2.13	0.29	0.23	0.162	248	216	8
3	5		0.055	2.14	0.30	0.21	0.158	244	214	8

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
4	1	Oct-3-93	0.039	2.09	0.26	0.22	0.162	242	217	10
4	1dup		0.037	2.09	0.34	0.21	0.154	242	217	10
4	1blk		<0.005	0.01	<0.05	<0.05	0.005	2	<1	<1
4	2		0.038	2.09	0.40	0.15	0.161	244	213	9
4	3		0.035	2.09	0.35	0.18	0.167	244	217	7
4	4		0.034	2.05	0.30	0.19	0.168	242	217	8
4	5		0.015	2.05	0.33	0.19	0.155	242	218	12
5	1	Oct-3-93	0.021	1.97	0.29	0.20	0.156	242	216	9
5	2		0.046	2.07	0.24	0.19	0.167	242	216	9
5	3		0.040	2.04	0.27	0.16	0.165	240	216	6
5	4		0.025	2.02	0.07	0.18	0.159	240	215	5
5	5		0.037	2.06	0.14	0.20	0.161	242	216	6
5	6		0.037	2.08	0.10	0.19	0.151	242	216	3
5	7		0.057	2.11	0.25	0.14	0.158	246	216	6
5	8		0.057	2.12	0.32	0.19	0.162	248	215	6
5	9		0.067	2.15	0.26	0.22	0.161	248	215	6
5	10		0.080	2.20	0.24	0.19	0.146	256	215	4

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
6	1	Oct-3-93	0.024	2.06	0.35	0.19	0.179	238	219	9
6	1dup		0.026	2.02	0.33	0.19	0.166	240	219	9
6	1blk		<0.005	0.01	<0.05	<0.05	0.020	<1	<1	<1
6	2		0.043	2.14	0.23	0.17	0.158	248	216	8
6	3		0.036	2.15	0.15	0.21	0.166	248	216	4
6	4		0.053	2.18	0.31	0.16	0.167	246	217	5
6	5		0.056	2.17	0.43	0.16	0.168	246	217	7
6	6		0.059	2.19	0.37	0.20	0.167	244	216	8
6	7		0.066	2.13	0.31	0.16	0.155	248	215	6
6	8		0.086	2.24	0.35	0.16	0.153	254	214	5
6	9		0.091	2.28	0.37	0.11	0.144	254	215	4
6	10		<0.005	2.02	0.06	0.13	0.087	252	193	1
7	1	Oct-4-93	0.027	1.95	0.24	0.17	0.165	238	218	13
7	2		0.036	2.05	0.29	0.12	0.158	244	218	5
7	3		0.038	2.10	0.16	0.14	0.158	246	217	4
7	4		0.051	2.16	0.14	0.17	0.148	252	216	6
7	5		0.056	2.13	0.30	0.24	0.147	252	216	6
7	6		0.060	2.19	0.28	0.24	0.150	252	216	6
7	7		0.075	2.23	0.21	0.22	0.150	260	214	6
7	8		0.056	2.22	0.26	0.18	0.148	256	214	4
7	9		0.066	2.24	0.22	0.23	0.145	258	214	4
7	10		<0.005	2.00	<0.05	0.13	0.086	252	201	<1

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
	1	Oct-4-93	0.016	1.80	<0.05	0.28	0.146	236	218	9
	1dup		0.010	1.82	<.05	0.28	0.140	238	218	9
	1blk		<0.005	0.01	<0.05	0.05	0.005	2	3	<1
	2		0.046	2.06	0.19	0.30	0.143	248	218	12
	3		0.341	2.54	0.65	0.29	0.150	266	218	4
	4		0.210	2.40	0.12	0.22	0.133	264	216	6
	5		0.219	2.46	0.31	0.21	0.134	264	208	1
	1	Nov-15-93	0.030	1.48	0.39	0.25	0.103	236	205	26
	1dup		0.024	1.46	0.45	0.23	0.097	238	206	23
	1blk		0.010	<.005	<.05	0.08	0.006	<4	<1	<1
	2		0.060	1.72	1.41	0.35	0.113	240	207	62
	3		0.361	2.60	0.56	0.25	0.136	268	217	6
	4		0.170	1.97	0.54	0.26	0.100	254	213	17
	5		0.252	2.62	0.28	0.16	0.112	270	212	<1
1	1	Nov-15-93	0.019	1.44	0.24	0.12	0.095	230	207	24
1	2		0.022	1.43	0.33	0.13	0.101	236	206	26
1	3		0.021	1.43	0.35	0.14	0.098	236	206	28
1	4		0.021	1.42	0.28	0.11	0.095	226	205	24
1	5		0.022	1.44	0.32	0.13	0.102	232	209	24

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
2	1	Nov-15-93	0.022	1.45	0.35	0.35	0.100	232	209	20
2	2		0.020	1.45	0.33	0.21	0.098	236	208	24
2	3		0.030	1.50	0.25	0.23	0.097	234	207	24
2	4		0.063	1.64	0.40	0.23	0.103	244	208	22
2	5		0.083	1.73	0.32	0.26	0.113	246	207	18
3	1	Nov-15-93	0.043	1.56	0.36	0.15	0.097	234	207	20
3	2		0.038	1.61	0.45	0.25	0.098	234	209	24
3	3		0.043	1.61	0.30	0.24	0.098	236	210	19
3	4		0.040	1.59	0.14	0.27	0.098	240	208	20
3	5		0.044	1.56	0.21	0.21	0.099	244	208	19
4	1	Nov-16-93	0.034	1.56	0.68	0.14	0.101	236	209	20
4	1dup		0.037	1.58	0.58	0.17	0.093	238	208	20
4	1blk		0.008	<.005	<.05	0.07	<.005	<4	1	<1
4	2		0.033	1.53	0.17	0.19	0.090	236	207	19
4	3		0.027	1.49	0.41	0.21	0.091	234	208	18
4	4		0.026	1.47	0.38	0.11	0.091	230	208	18
4	5		0.020	1.46	0.48	0.22	0.090	232	206	19

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
5	1	Nov-16-93	0.029	1.49	0.30	0.12	0.083	232	207	21
5	2		0.027	1.63	0.39	0.21	0.094	242	206	21
5	3		0.045	1.65	0.33	0.20	0.095	240	208	21
5	4		0.044	1.65	0.37	0.14	0.097	238	208	27
5	5		0.050	1.62	0.43	0.19	0.099	240	207	24
5	6		0.038	1.65	0.31	0.12	0.102	236	208	17
5	7		0.038	1.64	0.39	0.19	0.108	232	208	16
5	8		0.044	1.64	0.29	0.09	0.103	236	207	18
5	9		0.042	1.65	0.79	0.21	0.101	238	207	19
5	10		0.058	1.87	0.46	0.25	0.108	252	208	13
6	1	Nov-17-93	0.025	1.56	0.72	0.29	0.107	232	205	21
6	1dup		0.032	1.54	0.53	0.31	0.104	232	205	21
6	1blk		0.008	<.005	<.05	0.08	<.005	<4	1	<1
6	2		0.038	1.64	0.56	0.41	0.104	236	205	20
6	3		0.038	1.68	0.47	0.32	0.103	238	205	21
6	4		0.049	1.68	0.28	0.28	0.107	238	207	29
6	5		0.042	1.66	0.56	0.29	0.102	236	206	26
6	6		0.046	1.68	0.87	0.28	0.111	240	206	25
6	7		0.046	1.67	0.22	0.26	0.108	240	205	28
6	8		0.049	1.70	0.88	0.24	0.114	240	207	20
6	9		0.068	1.84	0.91	0.26	0.104	242	209	16
6	10		0.043	1.92	0.40	0.25	0.110	248	208	13

Appendix Table B. Water chemistry data, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Total Ammonia as N (mg/l)	Nitrite Nitrate as N (mg/l)	Total Kjeldahl Nitrogen as N (mg/l)	Total Phosphorus as P (mg/l)	Soluble Reactive Phosphorus as P (mg/l)	Hardness as CaCO3 (mg/l)	Alkalinity as CaCO3 (mg/l)	Total Suspended Solids (mg/l)
7	1	Nov-17-93	0.053	1.59	0.52	0.23	0.110	236	206	21
7	2		0.048	1.67	0.38	0.28	0.111	234	207	24
7	3		0.047	1.67	0.38	0.28	0.103	234	206	23
7	4		0.053	1.68	0.23	0.27	0.106	236	206	19
7	5		0.059	1.68	0.38	0.26	0.112	240	206	18
7	6		0.065	1.78	0.65	0.22	0.108	242	207	17
7	7		0.061	1.81	0.51	0.19	0.110	246	208	16
7	8		0.060	1.88	0.59	0.21	0.106	242	207	16
7	9		0.066	1.94	0.43	0.19	0.109	246	208	13
7	10		0.064	1.88	0.65	0.19	0.106	246	206	13
	1	Nov-17-93	0.044	1.49	0.69	0.14	0.107	232	205	37
	1dup		0.027	1.50	0.91	0.14	0.103	232	204	37
	1blk		0.013	<.005	<.05	<.05	0.018	<4	<1	<1
	2		0.063	1.73	1.35	0.29	0.114	240	207	85
	3		0.252	2.18	1.10	0.34	0.136	246	211	16
	4		0.203	2.08	0.70	0.17	0.104	258	209	14
	5		0.283	2.62	0.31	0.23	0.118	276	211	2

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
1	1	June-24-93	35.1	3.6	38.4
1	2		35.9	2.2	38.5
1	3		24.9	3.5	28.0
1	4		25.3	6.2	29.1
1	5		30.7	2.8	33.3
2	1	June-24-93	38.1	3.9	41.5
2	2		31.2	2.6	33.9
2	3		20.5	7.1	23.6
2	4		29.0	5.6	32.0
2	5		23.8	5.0	27.1
3	1	June-24-93	38.1	4.4	40.4
3	2		34.7	3.1	37.7
3	3		33.3	4.1	36.4
3	4		38.1	6.0	42.9
3	5		36.0	4.3	39.8
4	1	June-24-93	42.6	3.4	46.1
4	1dup		38.1	4.8	42.3
4	2		43.2	2.4	46.2
4	3		39.4	2.8	42.6
4	4		43.7	1.8	46.4
4	5		40.7	4.2	44.5
5	1	June-26-93	43.2	7.4	48.2
5	2		37.2	9.8	44.3
5	3		37.1	6.7	41.0
5	4		33.5	5.5	37.8
5	5		28.5	9.2	32.6
5	6		41.4	5.0	45.3
5	7		35.0	5.9	39.8
5	8		29.9	8.3	33.5
5	9		34.1	8.3	39.2
5	10		22.1	10.5	26.8

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
6	1	June-26-93	33.8	8.6	40.3
6	1dup		34.0	10.7	41.5
6	2		32.8	8.5	38.8
6	3		32.1	6.8	37.2
6	4		33.0	6.6	37.8
6	5		32.5	6.4	37.2
6	6		33.2	7.1	38.7
6	7		26.5	8.0	32.0
6	8		29.3	4.4	32.1
6	9		23.7	5.0	26.8
6	10		6.7	1.0	7.4
7	1	June-26-93	30.8	5.3	34.6
7	2		25.6	4.2	28.8
7	3		28.4	6.7	32.4
7	4		28.5	4.4	31.9
7	5		15.3	3.6	17.7
7	6		20.0	5.7	22.9
7	7		17.6	5.8	20.7
7	8		20.9	12.7	23.9
7	9		18.0	9.9	21.6
7	10		1.0	0.8	1.3
1	1	July-22-93	8.6	5.1	11.0
1	2		8.8	5.7	11.6
1	3		9.4	4.9	12.2
1	4		8.5	5.2	11.5
1	5		9.7	3.0	11.6
2	1	July-22-93	9.1	6.1	11.8
2	2		7.8	4.4	10.5
2	3		8.0	5.5	11.1
2	4		9.3	2.8	10.9
2	5		6.8	3.4	9.1
3	1	July-22-93	8.4	2.2	9.5
3	2		7.7	4.5	10.1
3	3		8.1	4.8	10.4
3	4		8.3	4.5	10.8
3	5		8.7	5.3	11.5

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
4	1	July-22-93	8.0	4.5	10.4
4	1D		7.9	4.0	10.1
4	1B		0.4	1.6	0.5
4	2		8.8	5.0	11.5
4	3		9.1	9.4	12.1
4	4		9.6	6.9	12.0
4	5		8.4	3.1	10.0
5	1	July-23-93	6.6	2.9	8.1
5	2		8.8	3.4	11.0
5	3		7.3	6.3	11.4
5	4		9.2	0.9	9.5
5	5		9.7	2.3	10.9
5	6		9.1	0.9	9.7
5	7		10.0	1.2	10.5
5	8		9.0	1.9	10.1
5	9		7.6	3.3	9.3
5	10		5.0	3.5	6.9
6	1	July-23-93	8.2	4.2	10.4
6	1D		8.5	5.2	11.4
6	1B		0.1	3.1	0.6
6	2		7.7	4.8	9.6
6	3		7.9	4.5	10.4
6	4		7.6	3.3	9.6
6	5		9.0	1.3	10.0
6	6		7.5	3.1	9.8
6	7		8.3	5.0	10.9
6	8		7.4	4.6	10.0
6	9		7.2	2.1	8.5
6	10		5.2	2.9	6.6

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
7	1	July-24-93	5.9	8.3	10.0
7	2		7.0	4.8	9.3
7	3		6.6	5.1	9.0
7	4		6.9	5.2	9.7
7	5		8.4	2.2	9.4
7	6		7.1	4.7	10.2
7	7		7.0	4.2	8.6
7	8		6.5	4.2	8.7
7	9		5.3	2.3	6.6
7	10		1.1	0.8	1.2
1	1	August-15-93	17.8	6.7	21.6
1	2		17.7	5.8	21.3
1	3		21.2	6.8	24.8
1	4		27.6	10.1	33.7
1	5		18.1	4.1	21.1
2	1	August-15-93	12.1	5.0	15.0
2	2		11.9	7.4	16.1
2	3		20.4	9.3	25.9
2	4		18.2	10.1	21.6
2	5		16.4	6.1	18.9
3	1	August-15-93	17.6	4.7	20.3
3	3		12.4	3.4	14.3
3	4		12.9	4.6	15.1
3	5		14.1	6.5	16.4
4	1	August-15-93	73.9	29.7	92.4
4	1D		51.1	14.9	61.1
4	1B		11.3	3.3	13.3
4	2		7.9	1.9	9.1
4	3		60.9	30.0	80.6
4	4		6.6	2.5	8.2
4	5		8.5	3.8	10.4

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
5	1	August-13-93	6.7	3.3	8.6
5	2		9.5	6.7	11.7
5	3		10.1	5.4	12.8
5	4		16.9	5.7	20.8
5	5		31.6	13.9	39.2
5	6		21.0	9.2	26.9
5	7		0.0	28.4	2.8
5	8		10.9	4.6	13.2
5	9		17.6	7.8	22.2
5	10		29.2	12.6	36.0
6	1	August-13-93	47.7	32.5	68.3
6	1D		28.2	8.8	33.9
6	1B		21.0	16.3	31.2
6	2		23.5	6.6	27.4
6	3		18.6	11.8	24.3
6	4		24.6	7.8	28.6
6	5		11.3	3.5	13.5
6	6		24.6	12.3	30.6
6	7		12.8	12.8	15.9
6	8		0.3	5.6	1.6
6	9		11.2	3.5	13.7
6	10		47.8	40.5	71.5
7	1	August-14-93	43.6	15.3	54.2
7	2		20.3	14.2	26.6
7	3		19.0	6.3	22.5
7	4		10.0	8.0	11.5
7	5		14.1	3.6	16.3
7	6		13.4	5.3	15.5
7	7		13.5	4.0	16.0
7	8		12.7	8.1	15.4
7	9		9.8	10.8	12.1
7	10		12.5	4.4	15.0
1	1	October-2-93	6.6	2.9	8.1
1	2		5.7	16.2	6.9
1	3		4.7	5.6	6.8
1	4		5.3	4.7	6.7
1	5		6.1	11.2	8.3

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
2	1	October-2-93	11.3	6.0	13.7
2	2		6.3	7.0	8.6
2	3		5.6	2.9	7.2
2	4		4.5	7.2	6.3
2	5		2.7	3.4	3.7
3	1	October-2-93	4.5	5.3	6.2
3	2		3.9	4.2	5.5
3	3		4.2	4.1	6.1
3	4		4.2	5.4	6.3
3	5		4.3	2.5	5.3
4	1	October-3-93	5.1	4.7	6.6
4	1D		5.1	3.9	6.5
4	1B		0.4	2.0	0.6
4	2		3.6	6.5	6.0
4	3		3.8	4.0	5.2
4	4		4.4	3.8	5.9
4	5		4.2	4.5	5.9
5	1	October-3-93	4.8	3.4	6.7
5	2		4.2	3.4	5.6
5	3		4.6	4.4	6.2
5	4		4.6	5.4	6.2
5	5		4.8	3.6	6.2
5	6		3.1	6.8	4.8
5	7		8.0	11.9	9.7
5	8		4.2	2.7	5.2
5	9		4.7	3.0	5.7
5	10		4.6	7.0	5.1

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
6	1	October-3-93	5.4	5.8	7.4
6	1D		5.0	7.8	7.3
6	1B		0.5	6.5	1.0
6	2		4.7	5.6	6.8
6	3		2.8	4.1	4.1
6	4		4.2	2.3	5.2
6	5		3.9	5.2	5.8
6	6		7.4	7.8	8.9
6	7		3.6	5.8	5.5
6	8		0.7	4.2	1.6
6	9		2.9	2.7	3.9
6	10		3.6	3.5	4.5
7	1	October-3-93	4.3	5.3	6.4
7	2		3.4	4.6	5.0
7	3		4.7	5.9	6.7
7	4		3.1	5.8	5.1
7	5	October-4-93	3.6	6.7	5.7
7	6		3.1	2.3	4.1
7	7		2.8	4.1	3.9
7	8		3.5	3.5	4.5
7	9		2.2	5.6	3.9
7	10		2.0	2.1	2.4
1	1	November-16-93	91.4	6.8	95.3
1	2		88.0	14.6	97.9
1	3		82.9	16.3	92.6
1	4		86.9	11.7	94.6
1	5		86.0	12.7	95.1
2	1	November-15-93	87.2	15.8	97.2
2	2		81.8	15.1	90.9
2	3		82.1	12.4	89.5
2	4		74.3	15.8	83.7
2	5		68.8	10.1	75.2
3	1	November-16-93	74.6	9.9	80.7
3	2		70.3	8.6	75.4
3	3		67.7	11.9	74.9
3	4		69.4	8.2	74.8
3	5		67.6	7.4	73.7

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
4	1	November-16-93	70.4	15.6	78.5
4	1D		74.1	11.0	80.6
4	1B		0.7	3.0	1.1
4	2		76.9	6.2	82.7
4	3		81.7	8.0	87.4
4	4		75.3	12.3	83.4
4	5		76.0	16.9	84.4
5	1	November-16-93	82.6	15.8	92.0
5	2		82.9	15.3	92.1
5	3		76.3	15.3	86.1
5	4		81.4	16.0	91.0
5	5		82.2	6.9	86.5
5	6		76.0	23.2	82.4
5	7		73.7	11.3	81.1
5	8		42.9	9.1	48.3
5	9		57.6	6.3	62.4
5	10		45.7	19.7	57.9
6	1	November-17-93	79.8	14.1	89.0
6	1D		88.6	6.8	94.9
6	1B		0.9	1.1	1.0
6	2		81.1	10.6	88.2
6	3		74.6	10.1	80.7
6	4		81.1	9.1	87.2
6	5		76.9	13.9	86.8
6	6		80.2	14.0	88.8
6	7		75.7	9.8	82.9
6	8		63.3	9.9	70.2
6	9		66.1	4.2	70.4
6	10		59.3	10.3	66.1

Appendix Table C. Monochromatic chlorophyll *a* , trichromatic chlorophyll *a* , and pheophyton, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Monochromatic Chlorophyll *a* mg/cu. m	Pheophyton mg/cu. m	Trichromatic Chlorophyll *a* mg/cu. m
7	1	November-17-93	87.1	11.3	95.1
7	2		80.2	18.0	92.3
7	3		84.0	13.8	92.5
7	4		76.3	7.6	82.9
7	5		78.4	13.8	87.3
7	6		70.8	12.1	78.5
7	7		64.9	11.9	72.2
7	8		171.6	-	73.5
7	9		153.2	-	66.0
7	10		143.6	-	61.4

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
1	1	Jun-24-93	*C. deme*	103.0	8.4	2.1	75.1		87.6
			P. cris	10.0	1.2	0.3	74.5	9.6	12.4
1	5	Jun-24-93	*P. pect*	238.1	19.9	6.4	67.6	19.9	100.0
2	1	Jun-24-93	*E. cana*	1,629.1	79.8	30.8	61.3		65.8
			C. deme	750.5	41.5	13.1	68.4	121.3	34.2
2	2	Jun-24-93	*P. cris*	50.7	4.3	0.7	84.4	4.3	100.0
3	1	Jun-24-93	*P. cris*	299.8	16.9	3.3	80.3		10.6
			C. deme	273.7	15.9	2.8	82.4		10.0
			P. pect	1,441.1	126.4	19.6	84.5	159.2	79.4
3	2	Jun-24-93	*C. deme*	92.6	5.5	1.2	78.2		7.9
			P. cris	1,011.7	64.4	19.8	69.3	69.9	92.1
3	3	Jun-24-93	*P. cris*	108.2	9.2	1.3	85.6		2.5
			P. pect	4,482.8	353.5	80.7	77.2	362.7	97.5
3	4	Jun-24-93	*C. deme*	1,219.3	87.5	26.4	69.8		55.5
			P. cris	827.9	70.0	9.7	86.1	157.5	44.5
3	5	Jun-24-93	*P. cris*	610.1	38.3	11.4	70.2	38.3	100.0
4	1	Jun-24-93	*P. pect*	1,549.8	165.3	30.4	81.6		85.0
			P. cris	476.6	29.2	6.0	79.5	194.6	15.0
4	2	Jun-24-93	*P. cris*	109.1	6.9	1.5	77.6		15.5
			P. pect	225.3	17.3	6.1	64.5		39.1
			C. deme	226.3	20.1	9.0	55.4	44.3	45.4
4	3	Jun-24-93	*P. pect*	6,900.0	696.9	215.3	69.1		99.5
			P. cris	31.3	3.6	0.1	96.3	700.5	0.5
4	4	Jun-24-93	*P. pect*	1,078.7	116.1	40.4	65.2		99.9
			P. cris	3.1	0.1	0.1	63.6	116.2	0.1
4	5	Jun-24-93	*P. pect*	2,036.5	179.2	51.4	71.3		80.8
			P. cris	65.7	25.2	5.7	77.3		11.4
			C. deme	273.4	17.3	5.1	70.6	221.7	7.8
5	3	Jun-25-93	*P. cris*	231.0	10.9	2.6	76.0		4.4
			C. deme	3,860.2	237.1	55.7	76.5	248.0	95.6
5	5	Jun-25-93	*P. cris*	72.1	7.6	1.0	87.5	7.6	100.0
5	6	Jun-25-93	*P. cris*	1,447.9	142.8	47.8	66.6	142.8	100.0
5	7	Jun-25-93	*P. cris*	2,674.8	233.9	81.0	65.4		77.2

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
			C. deme	993.2	69.1	15.9	77.0	303.0	22.8
5	8	Jun-25-93	*P. cris*	562.5	55.0	27.1	50.6		28.2
			P. pect	1,558.3	136.5	45.1	67.0		70.0
			C. deme	48.6	3.4	1.3	61.7	195.0	1.8
5	9	Jun-25-93	*Drepan*	21.4	1.3	0.4	71.4		3.3
			P. cris	520.0	37.6	11.1	70.4		93.7
			C. deme	24.4	1.2	0.3	77.6	40.1	3.0
5	10	Jun-25-93	*P. cris*	447.3	40.5	6.9	83.1		41.2
			C. deme	140.9	9.0	2.4	73.8		9.2
			P. pect	728.0	48.8	12.1	75.2	98.4	49.6
6	1	Jun-26-93	*P. cris*	130.9	8.0	2.2	72.3		2.3
			C. deme	4,179.8	334.9	82.8	75.3	342.9	97.7
6	2	Jun-26-93	*P. cris*	108.9	12.7	2.1	83.2		40.2
			C. deme	223.3	18.9	4.9	74.1	31.6	59.8
6	4	Jun-26-93	*C. deme*	2,856.3	187.9	35.4	81.2		65.2
			P. cris	1,516.3	100.3	25.9	74.2	288.1	34.8
6	5	Jun-26-93	*P. cris*	639.1	62.8	14.8	76.4		17.8
			C. deme	34.6	1.9	0.4	76.7		0.5
			P. pect	2,123.7	288.4	51.2	82.2	353.2	81.7
6	6	Jun-26-93	*P. cris*	585.4	53.8	15.8	70.6		16.7
			C. deme	413.2	33.0	11.7	64.5		10.2
			P. pect	1,867.3	235.6	62.2	73.6	322.3	73.1
6	7	Jun-26-93	*C. deme*	520.8	40.6	10.7	73.6		41.1
			P. pect	273.3	27.0	5.6	79.2		27.3
			P. cris	151.0	31.1	2.2	93.1	98.6	31.6
6	8	Jun-26-93	*P. cris*	2,675.8	167.8	37.6	77.6		18.8
			P. pect	3,881.3	271.5	58.7	78.4		30.4
			C. deme	6,631.5	454.2	85.3	81.2	893.6	50.8
6	9	Jun-26-93	*P. pect*	4,088.4	374.2	85.8	77.1	374.2	100.0
6	10	Jun-26-93	*P. pect*	5,887.7	384.6	74.4	80.6		96.7
			P. cris	97.5	13.0	2.2	83.4	397.6	3.3
7	3	Jun-26-93	*C. deme*	790.6	54.7	15.1	72.4		28.8
			P. cris	1,433.1	135.3	63.2	53.3	190.0	71.2
7	4	Jun-26-93	*P. cris*	289.8	23.4	5.6	76.1		24.0
			C. deme	1,113.0	74.3	16.9	77.3	97.7	76.0

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
7	5	Jun-26-93	*P. pect*	53.1	2.5	1.1	56.8		5.0
			P. cris	620.7	48.2	21.9	54.6	50.7	95.0
7	6	Jun-26-93	*C. deme*	120.1	7.4	2.5	66.3		14.0
			P. cris	668.7	45.8	9.2	79.9	53.2	86.0
7	7	Jun-26-93	*P. cris*	182.6	4.4	1.0	76.6	4.4	100.0
7	8	Jun-26-93	*P. cris*	145.5	20.7	2.0	90.3	20.7	100.0
7	9	Jun-26-93	*P. cris*	608.7	85.1	8.8	89.7	85.1	100.0
7	10	Jun-26-93	*P. cris*	468.6	26.4	5.3	80.0		5.9
			C. deme	5,646.8	419.2	70.2	83.2	445.6	94.1
1	3	Jul-22-93	*P. cris*	14.5	4.4	0.2	95.1	4.4	100.0
1	5	Jul-22-93	*E. cana*	4.5	0.3	0.2	39.4		3.7
			Epiph	6.1	1.4	0.9	38.3		18.4
			P. pect	34.2	6.2	1.4	77.7	7.9	77.9
2	1	Jul-22-93	*C. deme*	247.2	21.3	4.6	78.3		42.2
			Epiph	183.9	27.1	15.0	44.4		53.6
			P. cris	19.9	1.4	0.5	64.4		2.8
			E. nutt	13.2	0.7	0.2	75.2	50.5	1.4
2	2	Jul-22-93	*P.pect*	80.7	5.8	1.1	81.5		6.2
			P. cris	18.5	0.8	0.2	76.0		0.9
			C. deme	694.8	87.6	17.6	79.9	94.2	93.0
3	1	Jul-22-93	*P. pect*	3,067.4	612.0	212.8	65.2	612.0	100.0
3	2	Jul-22-93	*P. pect*	758.8	134.0	33.7	74.9		92.9
			C. deme	83.9	8.9	1.8	79.8		6.2
			Epiph	8.9	1.3	0.7	48.8	144.2	0.9
3	3	Jul-22-93	Epiph	2.6	0.3	0.1	65.7		3.4
			C. deme	18.4	2.1	0.4	80.5		23.7
			P. pect	27.0	6.6	1.8	72.2	9.0	72.9
3	4	Jul-22-93	*P. cris*	123.0	17.2	3.8	77.9		4.5
			P. pect	2,296.0	368.7	61.3	83.4	385.9	95.5
3	5	Jul-22-93	*P. cris*	30.1	6.5	3.6	45.4		3.1
			C. deme	56.0	7.0	1.6	76.3		3.3
			P. pect	1,298.8	198.8	52.9	73.4	212.2	93.6
4	1	Jul-22-93	*P. pect*	1,241.1	301.3	140.0	53.5		99.0
			C. deme	15.4	3.2	1.6	48.9	304.4	1.0

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
4	2	Jul-22-93	*P. cris*	5.4	0.9	0.2	74.1		0.9
			P. pect	581.5	102.4	25.4	75.2	103.3	99.1
4	3	Jul-22-93	*P. cris*	218.5	44.4	9.4	78.8	44.4	100.0
4	4	Jul-22-93	Epiph	3.4	0.4	0.2	53.9		3.3
			P. cris	54.8	11.5	5.5	52.0	11.9	96.7
4	5	Jul-22-93	*P. pect*	856.2	133.5	27.0	79.8		72.3
			C. deme	346.6	47.0	12.7	73.1		25.4
			P. cris	20.2	4.2	0.9	77.7	184.7	2.3
5	2	Jul-23-93	*P. cris*	5.1	0.5	0.1	71.8		5.3
			P. pect	56.9	9.3	2.7	71.0	9.8	94.7
5	3	Jul-23-93	*P. cris*	60.8	8.1	2.5	69.1		7.7
			P. pect	621.8	97.5	20.3	79.2	105.6	92.3
5	4	Jul-23-93	Epiph	41.3	13.7	10.1	26.2		33.2
			P. pect	175.8	27.5	7.8	71.7	41.2	66.8
5	5	Jul-23-93	*P. cris*	54.2	6.9	1.3	81.3		4.5
			Epiph	9.8	2.2	1.3	40.3		1.4
			P. pect	917.2	144.9	36.0	75.2	154.0	94.1
5	7	Jul-23-93	*P. cris*	129.2	18.7	3.4	81.6		6.7
			C. deme	2,003.7	229.9	51.7	77.5		82.1
			Epiph	115.7	31.3	18.1	42.3	279.9	11.2
5	8	Jul-23-93	*P. cris*	229.4	27.8	4.8	82.8		24.4
			C. deme	702.5	86.3	16.3	81.1	114.2	75.6
5	9	Jul-23-93	*P. cris*	490.6	122.5	20.1	83.6	122.5	100.0
5	10	Jul-23-93	*P. cris*	560.6	44.2	7.9	82.2		23.9
			Epiph	121.8	11.2	4.4	60.5		6.1
			P. pect	932.5	129.7	27.8	78.5	185.1	70.1
6	2	Jul-23-93	*C. deme*	42.0	8.9	2.6	70.3		64.6
			P. cris	18.8	4.9	1.1	76.6	13.8	35.4
6	3	Jul-23-93	*C. deme*	7,063.6	787.5	161.8	79.5		85.8
			P. cris	23.4	3.1	0.4	87.7		0.3
			Epiph	321.0	77.5	39.4	49.2		8.4
			P. pect	365.5	50.1	9.4	81.2	918.2	5.5

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
6	4	Jul-23-93	*P. cris*	692.7	91.5	17.5	80.9		5.7
			Epiph	1,164.7	244.8	132.2	46.0		15.3
			C. deme	10,781.0	1,265.1	406.9	67.8	1601.4	79.0
6	5	Jul-23-93	Epiph	1,039.1	238.4	113.6	52.3		14.6
			P. cris	76.9	11.3	1.7	85.0		0.7
			C. deme	11,168.3	1,383.5	386.8	72.0	1633.2	84.7
6	6	Jul-23-93	*P. cris*	299.9	42.5	7.7	81.8		10.0
			P. pect	2,399.6	383.7	94.3	75.4	426.2	90.0
6	7	Jul-23-93	*P. cris*	14.7	2.5	0.5	81.5		2.4
			C. deme	756.0	102.2	21.8	78.7	104.7	97.6
6	8	Jul-23-93	*P. fibr*	536.9	69.1	16.7	75.9		98.8
			C. deme	5.6	0.8	0.4	51.4	69.9	1.2
6	9	Jul-23-93	Epiph	1,026.5	201.8	86.0	57.4		44.4
			P. pect	1,427.2	252.9	59.5	76.5	454.7	55.6
6	10	Jul-23-93	*P. cris*	78.0	6.3	1.0	84.3		1.0
			P. pect	4,288.0	629.3	124.1	80.3	635.6	99.0
7	2	Jul-24-93	Epiph	798.2	163.3	70.9	56.6		64.0
			C. deme	10.4	1.3	0.3	77.7		0.5
			P. cris	681.6	90.5	14.4	84.1	255.1	35.5
7	3	Jul-24-93	Epiph	7,328.8	1,673.2	946.3	43.4		93.4
			C. deme	915.6	100.6	18.1	82.0		5.6
			P. cris	96.5	17.0	2.0	88.2	1790.8	0.9
7	4	Jul-24-93	Epiph	487.6	96.1	41.1	57.3		67.5
			C. deme	370.8	38.2	6.0	84.3		26.8
			P. cris	85.1	8.1	1.4	82.4	142.4	5.7
7	5	Jul-24-93	*P. cris*	160.5	18.6	2.1	88.5		9.2
			C. deme	1,298.1	153.9	27.8	82.0		76.6
			Epiph	127.8	26.8	12.1	54.9		13.3
			E. cana	21.8	1.7	0.4	78.4	200.9	0.8
7	7	Jul-24-93	*P. cris*	95.2	16.2	9.3	42.8		72.1
			C. deme	38.3	3.8	1.1	70.2		17.0
			P. pect	27.0	2.5	0.6	74.2	22.5	10.9
7	9	Jul-24-93	Epiph	8.1	1.8	1.1	38.8		2.5
			C. deme	32.7	5.7	1.3	76.9		8.0
			P. cris	317.1	64.6	22.6	65.1	72.2	89.5

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
7	10	Jul-24-93	*C. deme*	31.0	4.2	1.0	76.4		16.5
			P. fibr	145.9	21.4	5.8	72.7	25.6	83.5
1	1	Aug-15-93	*C. deme*	1,992.0	278.7	85.3	69.4		99.8
			E. cana	6.8	0.7	0.1	79.9	279.4	0.2
1	4	Aug-15-93	Epiph	161.3	47.1	24.9	47.0		2.4
			P. pect	14,679.7	1,937.6	518.9	73.2	1984.7	97.6
1	5	Aug-15-93	Epiph	440.4	47.4	10.3	78.3		30.7
			P. pect	735.8	106.7	28.2	73.6	154.0	69.3
2	1	Aug-15-93	*C. deme*	1,064.5	102.8	17.8	82.7		29.2
			Epiph	1,025.2	243.3	123.3	49.3		69.1
			P. pect	8.8	0.7	0.1	83.0		0.2
			P. cris	72.0	5.1	1.0	80.8	352.0	1.5
2	2	Aug-15-93	*P. cris*	53.5	7.2	1.7	76.5		2.1
			C. deme	2,634.0	339.9	82.9	75.6	347.0	97.9
3	1	Aug-15-93	Epiph	226.9	61.5	31.2	49.3		6.6
			P. cris	966.9	140.8	26.8	81.0		15.2
			P. pect	6,270.3	724.8	152.4	79.0	927.1	78.2
3	2	Aug-15-93	Epiph	326.1	89.9	43.5	51.6		6.4
			P. cris	303.6	46.7	6.6	85.9		3.3
			P. pect	9,187.0	1,266.1	206.1	83.7	1402.7	90.3
3	3	Aug-15-93	Epiph	1,622.8	374.2	217.4	41.9		48.1
			P. cris	436.8	51.7	9.4	81.7		6.6
			C. deme	3,133.8	352.7	88.8	74.8	778.6	45.3
3	4	Aug-15-93	*P. cris*	37.7	7.0	1.1	84.7		0.5
			P. pect	10,646.5	1,462.9	265.8	81.8		99.4
			C. deme	8.5	1.7	0.4	75.3		0.1
			Epiph	1.0	0.1	0.1	29.2	1471.7	0.0
3	5	Aug-15-93	*P. cris*	20.1	3.1	0.6	82.2		2.3
			P. pect	1,100.3	129.8	17.5	86.5	132.9	97.7
4	1	Aug-15-93	*C. deme*	586.9	78.6	15.5	80.3		5.8
			P. cris	5.2	0.8	0.2	76.4		0.1
			P. pect	7,689.2	1,283.7	225.7	82.4	1363.1	94.2
4	2	Aug-15-93	*P. pect*	74.8	14.7	2.0	86.6		13.9
			P. cris	3.0	0.4	0.1	80.2		0.3
			C. deme	526.2	90.8	24.9	72.6	105.8	85.8

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
4	3	Aug-15-93	*P. cris*	20.6	4.5	0.5	88.7	4.5	100.0
4	4	Aug-15-93	*P. pect*	253.3	37.1	7.1	80.9	37.1	100.0
5	2	Aug-13-93	*P. pect*	113.4	14.1	2.6	81.2		95.1
			P. cris	5.7	0.7	0.3	65.2	14.9	4.9
5	3	Aug-13-93	Epiph	8.3	0.1	0.1	44.0		0.0
			C. deme	4,121.2	505.2	95.0	81.2		92.6
			P. pect	253.7	40.3	7.1	82.5	545.7	7.4
5	4	Aug-13-93	*C. deme*	313.2	40.7	9.2	77.3		3.7
			P. pect	6,694.5	1,048.2	234.1	77.7	1089.0	96.3
5	5	Aug-13-93	*P. cris*	191.9	24.2	4.5	81.5		2.1
			Epiph	601.3	133.0	70.1	47.3		11.4
			C. deme	7,830.9	1,006.3	293.1	70.9	1163.4	86.5
5	6	Aug-13-93	Epiph	208.0	49.2	22.1	55.0		7.5
			P. cris	1,490.4	207.9	34.2	83.5		31.6
			C. deme	3,122.1	401.4	92.2	77.0	658.4	61.0
5	7	Aug-13-93	*C. deme*	228.4	19.0	3.0	84.0		23.4
			P. pect	363.1	33.3	4.6	86.0		41.0
			Epiph	159.1	24.3	10.4	57.0		30.0
			P. cris	64.7	4.5	0.7	84.2	81.1	5.6
5	8	Aug-13-93	Epiph	315.3	62.3	28.7	54.0		2.7
			P. cris	36.2	6.7	1.1	83.6		0.3
			C. deme	16,628.6	2,208.2	733.1	66.8	2277.2	97.0
5	9	Aug-13-93	*P. cris*	21.9	7.4	0.5	93.2	7.4	100.0
5	10	Aug-13-93	Epiph	8.0	1.6	0.6	60.3		0.2
			C. deme	5,335.2	653.7	86.5	86.8	655.3	99.8
6	2	Aug-13-93	*P. cris*	69.0	21.8	1.2	94.5	21.8	100.0
6	3	Aug-13-93	Epiph	282.7	74.4	32.0	57.0		20.3
			C. deme	2,046.2	289.6	50.8	82.5		78.9
			P. cris	17.5	2.8	0.5	82.1	366.8	0.8
6	4	Aug-13-93	*P. cris*	728.0	92.3	15.4	83.3		18.6
			P. pect	3,642.0	331.2	53.4	83.9		66.6
			Epiph	229.7	35.6	16.3	54.2		7.2
			C. deme	475.7	37.9	7.5	80.2	497.0	7.6

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
6	5	Aug-13-93	*P. cris*	474.5	56.1	13.2	76.5		2.6
			Epiph	5,676.6	1,503.0	905.0	39.8		70.0
			C. deme	3,084.2	403.8	107.4	73.4		18.8
			P. pect	1,634.8	184.7	44.5	75.9	2147.7	8.6
6	6	Aug-13-93	Epiph	278.8	63.4	33.5	47.1		6.4
			N. flex	13.1	1.0	0.1	88.6		0.1
			C. deme	1,888.5	225.3	44.9	80.1		22.9
			P. pect	4,426.6	693.1	135.3	80.5	982.9	70.5
6	7	Aug-13-93	*P. pect*	2,508.9	351.0	64.3	81.7		32.4
			P. cris	865.0	110.5	19.5	82.3		10.2
			Epiph	1,360.2	245.5	82.0	66.6		22.6
			C. deme	3,171.0	377.2	74.5	80.3	1084.3	34.8
6	8	Aug-13-93	*P. cris*	40.1	9.7	1.9	80.2	9.7	100.0
6	9	Aug-13-93	*P. cris*	184.9	28.8	7.2	75.0		3.3
			C. deme	5,192.2	847.8	138.0	83.7	876.6	96.7
6	10	Aug-13-93	*P. pect*	8,690.6	1,212.4	231.7	80.9	1212.4	100.0
7	2	Aug-14-93	Epiph	605.0	133.3	53.8	59.6		20.8
			C. deme	4,220.0	507.2	107.7	78.8	640.5	79.2
7	3	Aug-14-93	*P. cris*	119.6	19.3	3.4	82.2		2.4
			Epiph	1,665.8	317.3	134.9	57.5		39.7
			C. deme	3,768.4	463.0	102.0	78.0	799.6	57.9
7	4	Aug-14-93	*P. cris*	132.3	25.0	3.6	85.7		8.0
			C. deme	2,400.0	262.7	51.8	80.3		83.8
			Epiph	124.9	26.0	8.9	65.6	313.7	8.3
7	5	Aug-14-93	*P. cris*	2,123.1	302.2	46.6	84.6		66.1
			Epiph	576.5	151.0	54.7	63.8		33.0
			C. deme	44.0	4.3	0.7	84.3	457.4	0.9
7	6	Aug-14-93	*C. deme*	6.1	1.3	0.3	76.1		0.2
			P. pect	4,573.8	653.6	95.8	85.3	654.9	99.8
7	7	Aug-14-93	*C. deme*	11,341.7	1,200.2	171.8	85.7		92.1
			P. cris	554.5	75.5	9.6	87.3		5.8
			P. pect	191.4	26.4	2.7	89.6		2.0
			Epiph	5.2	0.6	0.1	82.3	1302.6	0.0
7	9	Aug-14-93	Epiph	12.9	2.0	0.7	63.5		0.2
			P. pect	5,631.3	960.0	235.4	75.5	962.0	99.8

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
7	10	Aug-14-93	*C. deme*	1,038.7	123.9	19.8	84.1		78.6
			P. cris	257.1	19.5	3.0	84.7		12.4
			N. flex	12.7	0.1	0.0	62.5		0.1
			E. nutt	41.7	1.9	0.5	72.5		1.2
			Epiph	81.6	12.2	4.4	64.0	157.6	7.7
1	1	Oct-2-93	*C. deme*	28.0	2.5	0.7	73.9	2.5	100.0
1	4	Oct-2-93	*E. nutt*	6.2	1.5	1.1	30.0	1.5	100.0
1	5	Oct-2-93	Epiph	13.9	5.8	4.4	24.5		56.6
			P. pect	23.1	4.4	1.0	76.9	10.2	43.4
2	1	Oct-2-93	Epiph	1,145.5	345.2	214.6	37.8		46.6
			C. deme	3,169.5	396.3	108.0	72.8	741.5	53.4
2	2	Oct-2-93	Epiph	250.0	68.4	37.2	45.6		61.1
			C. deme	158.0	28.0	7.3	74.0		25.0
			P. cris	84.0	15.5	3.6	76.5	111.9	13.8
2	5	Oct-2-93	*P. pect*	144.6	17.0	4.6	72.6		50.8
			Epiph	121.3	16.4	6.1	62.7	33.4	49.2
3	1	Oct-2-93	Epiph	52.8	15.1	8.2	45.5		61.3
			P. cris	36.3	9.5	1.1	88.4	24.6	38.7
3	2	Oct-2-93	Epiph	138.0	41.2	21.9	46.7		44.2
			C. deme	150.2	25.5	5.1	80.1		27.4
			P. pect	265.7	26.4	5.4	79.4	93.2	28.4
3	3	Oct-2-93	*P. cris*	49.9	10.8	0.7	93.9		1.2
			P. pect	315.0	43.6	11.8	72.9		4.7
			Epiph	1,802.9	520.7	312.4	40.0		55.6
			C. deme	2,664.8	361.0	90.7	74.9	936.2	38.6
3	4	Oct-2-93	Epiph	1,661.1	521.6	357.6	31.5		24.5
			C. deme	8,359.9	1,609.4	481.9	70.1	2131.0	75.5
3	5	Oct-2-93	*C. deme*	1,431.5	145.7	34.1	76.6		7.8
			P. pect	1,283.8	140.7	30.6	78.2		7.5
			P. cris	4,259.7	527.4	75.8	85.6		28.1
			Epiph	5,247.0	1,062.6	506.6	52.3	1876.3	56.6
4	1	Oct-3-93	*C. deme*	15.7	2.4	1.2	50.9		48.6
			Epiph	9.5	2.6	0.4	84.4	5.0	51.4
4	2	Oct-3-93	Epiph	507.2	160.0	94.7	40.8	160.0	100.0

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
4	3	Oct-3-93	*P. cris*	222.2	35.6	4.0	88.7		38.6
			Epiph	3.0	0.8	0.3	61.3		0.9
			P. pect	323.6	55.7	10.7	80.8	92.1	60.5
4	4	Oct-3-93	*P. cris*	12.7	3.7	1.1	70.7		20.0
			Epiph	38.6	14.8	9.4	36.4	18.5	80.0
4	5	Oct-3-93	Epiph	4.0	1.7	1.5	16.3		29.3
			M. spex	16.8	4.2	1.4	67.1	6.0	70.7
5	3	Oct-3-93	Epiph	1,607.4	479.6	288.3	39.9		25.4
			P. cris	7.0	2.0	1.4	32.3		0.1
			P. pect	8,968.7	1,404.1	414.7	70.5	1885.8	74.5
5	4	Oct-3-93	Epiph	217.3	68.6	39.4	42.5		16.2
			P. pect	2,098.7	353.7	117.1	66.9		83.3
			E. nutt	4.1	0.8	0.3	67.7		0.2
			C. deme	6.6	1.5	0.5	63.8	424.6	0.3
5	5	Oct-3-93	*C. deme*	101.6	15.7	2.6	83.7		9.5
			Epiph	201.3	55.6	30.7	44.9		33.8
			P. pect	549.2	87.3	20.8	76.1		53.1
			P. cris	30.4	5.9	0.8	86.4	164.5	3.6
5	6	Oct-3-93	Epiph	95.2	24.1	12.8	47.1		15.8
			P. pect	656.9	77.5	18.3	76.3		50.8
			C. deme	398.1	48.3	11.8	75.6		31.7
			P. cris	10.1	2.6	0.1	95.4	152.6	1.7
5	7	Oct-3-93	*C. deme*	122.5	17.9	4.8	73.5		9.4
			Epiph	689.9	147.2	76.6	48.0		77.2
			P. cris	159.6	24.8	3.0	87.8		13.0
			E. cana	3.4	0.8	0.5	37.3	190.8	0.4
5	8	Oct-3-93	Epiph	1,818.2	379.6	207.1	45.5		79.3
			C. deme	513.2	70.4	13.0	81.6		14.7
			P. pect	244.7	28.1	5.7	79.7		5.9
			P. cris	2.6	0.5	0.2	63.2	478.5	0.1
5	9	Oct-3-93	*C. deme*	203.7	39.6	6.3	84.0		4.7
			Epiph	2,689.6	799.8	446.5	44.2		95.0
			P. cris	10.8	2.3	0.2	90.8	841.7	0.3
5	10	Oct-3-93	*P. cris*	446.7	93.0	14.8	84.1		60.7
			Epiph	126.2	40.9	21.9	46.5		26.7
			C. deme	107.0	19.3	4.1	78.8	153.2	12.6

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
			P. cris	730.2	96.0	16.1	83.2		6.9
			C. deme	5,245.5	771.5	154.0	80.0	1398.8	55.2
7	7	Oct-4-93	*P. cris*	459.9	77.3	33.9	56.2		39.1
			Epiph	512.0	120.2	68.0	43.5	197.5	60.9
7	8	Oct-4-93	*C. deme*	2,777.1	313.4	63.8	79.6		23.2
			C. deme	5,407.4	674.8	146.2	78.3		50.0
			Epiph	1,294.9	289.0	165.0	42.9		21.4
			P. pect	588.3	66.6	15.0	77.5		4.9
			P. cris	95.3	7.0	1.3	81.5	1350.8	0.5
7	9	Oct-4-93	Epiph	252.1	49.2	19.9	59.5		17.8
			C. deme	575.9	66.8	10.9	83.7		24.1
			P. cris	416.2	48.7	11.3	76.7		17.6
			P. pect	619.5	112.3	38.8	65.4	277.0	40.5
7	10	Oct-4-93	Epiph	1,489.5	440.3	278.0	36.9		33.6
			P. cris	281.9	39.6	6.5	83.5		3.0
			C. deme	1,051.3	157.9	30.0	81.0		12.1
			E. cana	25.8	3.2	0.7	78.1		0.2
			P. pect	4,476.6	668.9	199.2	70.2	1309.8	51.1
2	1	Nov-15-93	*C. deme*	422.0	47.2	12.5	73.6		83.2
			Epiph	28.7	9.5	5.5	42.6	56.7	16.8
2	2	Nov-15-93	Epiph	438.4	101.8	51.5	49.4		61.0
			C. deme	568.6	56.2	13.1	76.7		33.7
			P. cris	78.9	7.1	1.4	80.3		4.3
			E. nutt	22.7	1.7	0.5	68.8	166.8	1.0
3	1	Nov-16-93	*P. cris*	18.3	2.5	0.1	96.0	2.5	100.0
3	2	Nov-16-93	*P. cris*	62.5	9.8	1.7	82.4		12.0
			C. deme	174.8	28.0	4.9	82.3		34.2
			Epiph	199.3	44.1	16.7	62.1	81.8	53.9
3	3	Nov-16-93	*C. deme*	757.9	94.6	26.3	72.2		20.2
			Epiph	1,330.6	369.9	226.9	38.7		79.1
			P. cris	44.8	3.3	0.5	84.3	467.8	0.7
3	4	Nov-16-93	*C. deme*	40.4	7.7	2.7	65.0		29.5
			Epiph	63.0	18.4	10.5	42.9	26.1	70.5
3	5	Nov-16-93	*P. pect*	97.1	17.9	6.3	64.7	17.9	100.0
4	1	Nov-16-93	Epiph	78.7	12.9	8.7	32.6		57.9

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
6	3	Oct-3-93	*E. cana*	23.9	1.0	0.3	68.7		0.1
			P. pect	92.7	10.6	2.5	76.8		1.2
			C. deme	586.2	75.0	16.9	77.4		8.4
			Epiph	4,048.1	794.4	350.9	55.8		88.7
6	3	Oct-3-93	*P. cris*	145.9	15.0	3.4	77.3	896.0	1.7
6	4	Oct-3-93	Epiph	354.7	114.2	67.9	40.5		48.6
			P. pect	738.2	118.4	31.4	73.4		50.3
			P. cris	14.2	2.6	0.3	87.8	235.2	1.1
6	5	Oct-3-93	*C. deme*	1,216.1	217.2	75.7	65.2		95.3
			Epiph	22.6	10.8	7.8	28.2	228.0	4.7
6	6	Oct-3-93	Epiph	580.3	159.7	84.7	47.0		69.7
			P. cris	10.5	3.9	0.2	95.7		1.7
			C. deme	452.2	65.7	14.6	77.8	229.3	28.7
6	7	Oct-3-93	Epiph	1,512.3	437.2	238.8	45.4		77.1
			C. deme	228.2	42.6	7.5	82.5		7.5
			M spex	870.7	87.3	18.8	78.5	567.1	15.4
6	8	Oct-3-93	*P. cris*	499.2	58.0	10.3	82.1		13.5
			Epiph	837.6	194.1	77.0	60.3		45.1
			C. deme	271.7	40.4	6.3	84.5		9.4
			P. pect	1,021.1	137.7	23.8	82.7	430.1	32.0
6	9	Oct-3-93	Epiph	5,711.0	1,512.9	906.5	40.1		42.8
			P. cris	57.8	7.4	1.1	84.6		0.2
			P. pect	9,282.7	2,017.2	512.2	74.6	3537.5	57.0
6	10	Oct-3-93	Epiph	473.7	173.9	123.2	29.1		7.6
			P. pect	11,412.1	2,081.1	970.8	53.4		90.6
			E. nutt	267.4	43.1	14.0	67.4	2298.1	1.9
7	2	Oct-3-93	Epiph	9.3	2.9	1.7	41.5		15.9
			P. cris	69.6	15.2	3.9	74.5	18.1	84.1
7	3	Oct-3-93	*C. deme*	10,584.6	2,011.7	409.3	79.7		64.9
			Epiph	4,239.9	1,088.0	692.7	36.3	3099.8	35.1
7	4	Oct-3-93	Epiph	115.4	31.0	20.6	33.6		19.7
			C. deme	827.3	126.4	37.8	70.1	157.4	80.3
7	5	Oct-4-93	Epiph	2,551.8	652.0	390.4	40.1		81.0
			C. deme	1,289.7	152.7	34.5	77.4	804.7	19.0
7	6	Oct-4-93	Epiph	2,389.4	531.4	251.8	52.6		38.0

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
			C. deme	61.8	5.6	2.2	60.8		25.4
			P. pect	35.2	3.7	0.9	77.0	22.2	16.7
4	2	Nov-16-93	*P. cris*	329.8	52.7	14.2	73.1		39.7
			C. deme	292.1	43.5	12.2	72.1		32.8
			Epiph	141.3	36.6	17.5	52.1	132.8	27.5
4	3	Nov-16-93	*P. cris*	1,713.5	186.6	39.7	78.7		65.1
			Epiph	538.1	99.9	47.7	52.3	286.5	34.9
4	4	Nov-16-93	Epiph	12.0	3.1	1.9	38.3	3.1	100.0
4	5	Nov-16-93	Epiph	124.5	30.8	17.9	41.6	30.8	100.0
5	2	Nov-16-93	*C. deme*	3,620.6	514.2	148.1	71.2		51.6
			Epiph	1,364.0	481.9	344.8	28.5	996.1	48.4
5	3	Nov-16-93	Epiph	197.9	43.1	20.4	52.7		92.0
			P. pect	27.1	3.2	0.6	81.6		6.9
			P. cris	4.4	0.5	0.1	83.6	46.8	1.0
5	4	Nov-16-93	*C. deme*	4.4	0.4	0.1	72.9		3.3
			P. pect	104.6	11.1	3.9	65.0	11.5	96.7
5	5	Nov-16-93	*P. cris*	24.5	2.2	0.9	60.2		27.1
			C. deme	6.6	0.5	0.2	56.9		5.7
			Epiph	24.1	5.4	3.6	32.0	8.0	67.2
5	6	Nov-17-93	Epiph	94.8	30.0	17.8	40.7		47.2
			C. deme	196.9	33.2	6.9	79.2		52.2
			P. cris	3.2	0.3	0.1	80.5	63.6	0.5
5	7	Nov-17-93	*P. cris*	21.1	2.7	0.5	80.1		66.7
			C. deme	27.6	1.0	0.4	62.9		24.4
			Epiph	4.6	0.4	0.3	24.7	4.0	8.9
5	8	Nov-17-93	Epiph	635.7	144.2	75.1	47.9		71.6
			C. deme	365.4	57.3	11.3	80.2	201.4	28.4
5	9	Nov-17-93	*C. deme*	1,397.6	181.5	42.6	76.5		26.1
			Epiph	2,015.8	513.0	277.8	45.8	694.5	73.9
5	10	Nov-17-93	*P. cris*	513.4	60.8	14.7	75.8		80.0
			C. deme	8.6	0.3	0.1	55.2		0.3
			Epiph	86.9	15.0	7.0	53.0	76.0	19.7
6	2	Nov-17-93	Epiph	82.2	14.6	6.8	53.2		87.6

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
			P. cris	26.6	1.8	0.4	78.7		10.5
			C. deme	5.5	0.3	0.2	47.8	16.6	1.8
6	3	Nov-17-93	*C. deme*	47.7	3.8	1.2	68.9	3.8	100.0
6	4	Nov-17-93	*P. cris*	30.8	2.9	1.2	59.9		80.0
			Epiph	7.2	0.7	0.5	36.4	3.7	20.0
6	5	Nov-17-93	Epiph	1,009.5	198.0	93.4	52.8		47.5
			P. cris	75.6	7.8	1.0	87.3		1.9
			P. pect	26.1	1.1	0.2	78.1		0.3
			C. deme	1,882.5	209.8	48.7	76.8	416.7	50.4
6	6	Nov-17-93	*C. deme*	207.4	36.8	13.4	63.4		83.4
			Epiph	24.3	7.3	4.4	40.1	44.1	16.6
6	7	Nov-17-93	Epiph	159.0	27.3	12.7	53.4		55.9
			C. deme	168.2	17.1	3.4	80.2		35.0
			P. cris	29.4	4.5	0.4	90.9	48.8	9.2
6	8	Nov-17-93	*P. cris*	29.1	6.1	1.7	71.9		2.2
			Epiph	713.6	273.4	206.3	24.6	279.5	97.8
6	9	Nov-17-93	*P. cris*	55.6	3.3	1.2	64.4		0.4
			C. deme	1,498.4	189.9	42.0	77.9		21.1
			Epiph	2,801.6	706.2	387.1	45.2	899.4	78.5
7	3	Nov-17-93	*C. deme*	230.1	33.5	10.0	70.2		75.6
			Epiph	28.6	7.2	3.7	48.4		16.3
			P. cris	13.7	3.6	0.5	86.6	44.3	8.1
7	4	Nov-17-93	*P. cris*	108.8	20.2	4.2	79.2		30.4
			C. deme	96.1	16.4	5.4	67.0		24.6
			Epiph	122.1	29.8	16.0	46.4	66.4	44.9
7	5	Nov-17-93	Epiph	1,846.2	417.9	236.9	43.3		97.8
			P. cris	38.3	4.2	1.1	73.8		1.0
			P. pect	60.7	4.7	1.2	74.0		1.1
			E. nutt	10.7	0.5	0.2	51.0	427.2	0.1
7	6	Nov-17-93	*C. deme*	7,849.7	998.6	344.9	65.5		67.6
			Epiph	1,483.4	479.3	337.0	29.7	1477.9	32.4
7	7	Nov-17-93	Epiph	839.9	155.6	64.8	58.4		47.4
			C. deme	1,779.8	170.0	30.6	82.0		51.8
			P. cris	25.6	2.6	0.3	88.5	328.1	0.8
7	8	Nov-17-93	*P. cris*	73.7	9.0	1.0	88.9		2.3

Appendix Table D. Wet and dry biomass, ash weight, percent organics, and percent composition for aquatic macrophytes, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Species	Wet Biomass g/sq m	Dry Biomass g/sq m	Ash Weight g/sq m	Species Percent Organics %	Total Dry Biomass g/sq m	Species Percent Composition %
			Epiph	1,506.5	282.9	121.5	57.0		72.1
			C. deme	845.2	100.6	18.0	82.1	392.5	25.6
7	9	Nov-17-93	*C. deme*	1,187.3	190.7	41.8	78.1		37.9
			Epiph	1,329.7	311.7	156.3	49.9		61.9
			E. cana	2.9	0.3	0.2	53.3		0.1
			P. cris	7.6	0.8	0.2	71.3	503.6	0.2
7	10	Nov-17-93	*N. flex*	169.1	16.9	4.0	76.6		1.0
			Epiph	1,683.1	523.0	353.1	32.5		29.6
			E. cana	30.4	3.5	1.2	64.0		0.2
			P. cris	12.6	2.9	0.3	90.9		0.2
			C. deme	9,514.3	1,218.1	371.6	69.5	1764.3	69.0

Appendix Table E. Nutrient analysis of aquatic macrophytes, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Macrophyte	Date	Replicate	Phosphorus µg/g	Magnesium µg/g	Calcium µg/g	Potassium µg/g	Sulfur µg/g	Sodium µg/g	Carbon %	Hydrogen %	Nitrogen %
Mixed	June	1	4,300	3,900	61,000	35,000	5,200	9,300	30.4	4.3	2.8
		2	4,400	4,100	66,000	35,000	5,000	9,100	30.0	4.2	2.8
		3	4,400	4,100	62,000	37,000	5,000	9,300	29.9	4.2	2.9
		4	4,500	4,100	60,000	35,000	5,100	9,200	30.6	4.3	3.0
		5	4,500	4,100	65,000	35,000	5,100	9,300	31.0	4.4	2.9
P. pectinatus	June	1	3,600	4,200	16,000	27,000	6,900	10,000	33.9	5.2	2.9
		2	3,700	4,000	15,000	27,000	6,900	11,000	34.1	5.1	2.7
		3	3,600	4,000	16,000	27,000	6,700	11,000	34.8	5.2	2.8
		4	3,800	4,200	16,000	29,000	7,000	11,000	34.6	5.1	2.7
		5	3,700	4,200	16,000	28,000	7,000	11,000	34.4	5.1	2.7
	June	1	3,900	5,900	16,000	38,000	3,400	5,700	33.3	4.8	3.0
		2	3,700	5,800	16,000	36,000	3,400	5,500	32.6	4.8	3.0
C. demersum		3	3,500	6,100	16,000	37,000	3,800	5,700	32.9	4.8	3.0
		4	3,700	5,700	15,000	37,000	3,500	5,600	32.9	4.8	3.1
		5	3,800	5,800	16,000	38,000	3,600	5,700	32.3	4.8	3.1
P. crispus	June	1	4,500	1,700	57,000	30,000	5,000	11,000	32.9	4.8	2.9
		2	4,500	1,700	52,000	30,000	4,900	11,000	31.6	4.5	2.7
		3	4,600	1,800	52,000	30,000	4,900	11,000	33.3	4.9	2.9
		4	4,700	1,800	51,000	31,000	5,000	11,000	31.2	4.5	2.7
		5	3,700	2,000	15,000	26,000	4,000	9,400	32.3	4.7	2.8
Mixed	July	1	4,300	3,100	110,000	25,000	6,100	4,400	22.1	3.0	2.5
		2	4,300	3,000	100,000	24,000	6,000	4,300	21.6	2.9	2.5
		3	4,200	3,000	110,000	24,000	6,000	4,300	21.6	2.9	2.5
		4	4,200	3,100	120,000	24,000	6,200	4,200	22.1	2.9	2.9
		5	4,100	3,100	110,000	23,000	5,900	4,100	22.0	2.9	2.5

Appendix Table E. Nutrient analysis of aquatic macrophytes, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Macrophyte	Date	Replicate	Phosphorus µg/g	Magnesium µg/g	Calcium µg/g	Potassium µg/g	Sulfur µg/g	Sodium µg/g	Carbon %	Hydrogen %	Nitrogen %
Epiphyton	July	1	3,300	3,700	110,000	17,000	10,000	2,000	22.3	3.1	2.7
		2	3,500	3,800	99,000	18,000	9,200	2,000	23.4	3.3	2.7
		3	3,500	3,700	110,000	18,000	11,000	2,100	22.9	3.2	2.7
		4	3,600	3,800	92,000	18,000	9,700	2,000	22.9	3.1	2.7
		5	3,500	3,400	100,000	17,000	9,600	2,000	23.8	3.3	2.9
P. pectinatus	July	1	4,200	3,800	16,000	27,000	5,900	8,400	33.8	4.8	2.9
		2	3,900	3,700	16,000	27,000	5,300	8,500	33.7	4.8	3.0
		3	4,200	3,900	17,000	29,000	5,900	9,200	33.2	4.7	3.0
		4	4,300	3,900	15,000	30,000	5,900	9,200	32.9	4.6	3.0
		5	4,200	4,000	15,000	29,000	5,800	8,900	33.2	4.7	2.9
P. crispus	July	1	5,000	1,800	61,000	26,000	5,000	6,300	37.7	5.1	3.5
		2	4,900	1,800	63,000	26,000	5,000	6,200	39.3	5.3	3.7
		3	4,800	2,000	71,000	26,000	5,000	6,300	39.1	5.3	3.7
		4	4,800	2,100	73,000	25,000	5,100	6,200	39.0	5.3	3.7
		5	4,700	2,100	65,000	26,000	5,600	6,500	38.0	5.2	3.7
C. demersum	July	1	4,300	4,300	55,000	33,000	4,300	3,800	28.9	4.2	3.5
		2	4,000	3,800	64,000	31,000	4,100	3,800	28.5	4.1	3.4
		3	4,100	3,800	65,000	32,000	4,200	3,800	28.8	4.0	3.4
		4	4,200	3,900	56,000	32,000	4,300	3,800	28.0	4.0	3.3
		5	4,100	3,800	59,000	31,000	4,200	3,800	29.5	4.2	3.6
Mixed	August	1	3,400	3,500	130,000	22,000	5,400	4,600	23.6	3.1	2.4
		2	3,400	3,100	120,000	21,000	5,500	4,400	24.6	3.3	2.6
		3	3,400	3,200	120,000	20,000	5,400	4,300	23.6	3.1	2.4
		4	3,600	3,600	140,000	21,000	5,600	4,500	23.3	3.0	2.3
		5	3,400	3,400	130,000	21,000	5,500	4,500	23.5	3.0	2.4

Appendix Table E. Nutrient analysis of aquatic macrophytes, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Macrophyte	Date	Replicate	Phosphorus µg/g	Magnesium µg/g	Calcium µg/g	Potassium µg/g	Sulfur µg/g	Sodium µg/g	Carbon %	Hydrogen %	Nitrogen %
P. crispus	August	1	4,100	590	120,000	15,000	4,900	5,500	31.9	4.3	3.4
		2	4,200	610	120,000	15,000	5,000	5,300	32.4	4.4	3.5
		3	4,200	860	99,000	17,000	5,400	5,900	30.9	4.2	3.3
		4	4,500	560	120,000	18,000	5,100	6,200	30.9	4.3	3.2
		5	3,900	500	96,000	15,000	4,400	5,100	30.2	4.2	3.3
Epiphyton	August	1	3,700	2,800	68,000	30,000	16,000	1,600	28.3	4.1	3.2
		2	3,800	3,100	61,000	30,000	16,000	1,500	28.4	4.2	3.2
		3	3,700	3,300	16,000	30,000	15,000	1,500	28.3	4.2	3.2
		4	3,600	3,100	59,000	29,000	15,000	1,500	27.7	4.0	3.1
		5	3,800	3,200	58,000	30,000	16,000	1,490	28.0	4.1	3.2
P. Pectinatus	August	1	4,100	4,100	53,000	28,000	6,600	12,000	34.6	5.2	3.1
		2	4,200	4,000	16,000	28,000	6,600	13,000	34.1	5.1	2.9
		3	4,000	4,200	52,000	27,000	6,500	12,000	32.8	4.8	2.8
		4	4,000	3,900	16,000	28,000	6,400	12,000	33.4	4.9	3.0
		5	4,100	4,000	15,000	29,000	6,600	13,000	33.9	5.0	3.0
C. demersum	August	1	2,900	2,400	140,000	24,000	4,700	4,900	25.7	3.5	2.5
		2	2,900	3,000	120,000	26,000	4,700	5,100	26.3	3.6	2.6
		3	3,000	3,400	120,000	28,000	4,700	5,200	26.6	3.7	2.5
		4	3,100	3,400	120,000	27,000	4,700	5,200	25.5	3.5	2.6
		5	2,900	3,000	120,000	26,000	4,500	5,000	26.3	3.6	2.6
Mixed	October	1	3,700	4,700	130,000	24,000	6,900	5,700	25.5	3.4	2.3
		2	3,700	4,500	130,000	24,000	7,000	5,700	24.7	3.3	2.2
		3	3,400	4,500	130,000	22,000	6,700	5,300	24.3	3.2	2.2
		4	3,600	4,500	130,000	23,000	6,700	5,400	24.5	3.3	2.1
		5	3,500	4,500	120,000	22,000	6,600	5,300	25.1	3.3	2.3

Appendix Table E. Nutrient analysis of aquatic macrophytes, Crystal Springs Reach (RM 599.5 - 601.3), Middle Snake River, Idaho, 1993.

Macrophyte	Date	Replicate	Phosphorus µg/g	Magnesium µg/g	Calcium µg/g	Potassium µg/g	Sulfur µg/g	Sodium µg/g	Carbon %	Hydrogen %	Nitrogen %
P. Pectinatus	October	1	3,200	4,900	13,000	24,000	7,500	14,000	35.7	5.3	2.4
		2	3,100	4,900	13,000	24,000	7,300	13,000	35.9	5.4	2.4
		3	3,200	4,900	12,000	25,000	7,800	14,000	36.3	5.4	2.6
		4	3,200	4,800	13,000	24,000	7,500	14,000	35.2	5.3	2.4
		5	3,200	4,900	12,000	24,000	7,700	14,000	34.7	5.2	2.5
C. demersum	October	1	3,500	5,100	99,000	39,000	4,900	6,200	28.4	4.0	2.6
		2	3,600	5,400	93,000	39,000	5,100	6,200	27.6	3.7	2.6
		3	3,500	4,600	110,000	38,000	4,900	6,100	28.2	3.9	2.6
		4	3,400	5,100	95,000	37,000	4,900	6,000	28.2	3.8	2.5
		5	3,500	5,100	100,000	37,000	4,800	6,100	27.9	3.7	2.6
Epiphyton	October	1	3,600	5,600	120,000	17,000	9,500	1,400	22.1	2.9	2.3
		2	3,300	5,300	120,000	16,000	9,100	1,300	23.5	3.2	2.5
		3	3,200	6,200	140,000	16,000	9,100	1,300	23.7	3.2	2.5
		4	3,400	5,000	130,000	16,000	9,100	1,400	22.9	3.0	2.5
		5	3,400	5,300	140,000	16,000	9,500	1,400	21.9	2.9	2.3
P. crispus	October	1	5,900	2,600	17,000	27,000	5,400	5,800	33.2	4.8	3.5
		2	5,800	2,600	16,000	26,000	5,300	5,800	33.0	4.8	3.6
		3	5,800	2,600	17,000	27,000	5,300	5,900	33.2	4.7	3.7
		4	6,000	2,000	65,000	27,000	5,200	5,900	33.7	4.7	3.6
		5	6,000	2,000	65,000	27,000	5,400	5,900	34.8	4.9	3.9

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
1	1	Jun-24-93	45.6	2.4	52	silt loam	1.1	1.9	2.7	0.5	0.2	887
1	2		-	-	-	-	-	-	-	-	-	-
1	3		92.8	0.2	7	sand	0.5	0.8	1.2	0.2	0.1	516
1	4		77.6	2.4	20	loamy sand	0.4	0.7	1.3	0.2	0.1	778
1	5		71.6	0.4	28	loamy sand	0.7	1.2	1.7	0.3	0.1	759
2	1	Jun-24-93	37.6	2.4	60	silt loam	1.6	2.8	3.1	0.5	0.2	936
2	2		37.6	4.4	58	silt loam	1.3	2.2	2.9	0.5	0.2	890
2	3		77.6	2.4	20	loamy sand	0.5	0.8	1.2	0.2	0.1	713
2	4		-	-	-	-	0.8	1.4	1.1	0.2	0.1	892
2	5		55.6	2.4	42	sandy loam	3.8	6.6	4.9	0.8	0.5	279
3	1	Jun-24-93	47.6	0.4	52	silt loam	1.3	2.2	2.2	0.4	0.2	917
3	2		61.6	0.4	38	sandy loam	0.9	1.6	1.9	0.3	0.1	938
3	3		49.6	0.4	50	sandy loam	1.2	2.1	2.3	0.4	0.2	996
3	4		57.6	0.4	42	sandy loam	1.4	2.4	2.3	0.4	0.2	1,020
3	5		53.6	2.4	44	sandy loam	1.4	2.4	2.5	0.4	0.2	1,200
4	1	Jun-24-93	63.6	0.4	36	sandy loam	0.8	1.3	2.0	0.3	0.1	803
4	2		56.6	3.4	40	sandy loam	1.2	2.0	2.8	0.5	0.2	1,050
4	3		71.6	2.4	26	sandy loam	0.4	0.7	1.8	0.3	0.1	760
4	4		77.6	2.4	20	loamy sand	1.0	1.7	1.3	0.2	0.1	754
4	5		41.6	2.4	56	silt loam	1.3	2.3	2.7	0.5	0.2	952

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

			Particle Size Distribution			Texture	OC	OM	C	H	N	TP
Transect	Site	Date	% Sand	% Clay	% Silt	USDA 1950	%	%	%	%	%	ug/g
5	1	Jun-25-93	-	-	-	-	-	-	-	-	-	-
5	2		-	-	-	-	-	-	-	-	-	-
5	3		61.6	0.4	38	sandy loam	0.9	1.5	2.0	0.4	0.1	817
5	4		79.6	0.4	20	loamy sand	1.0	1.8	1.5	0.2	0.1	706
5	5		49.6	4.4	46	sandy loam	1.7	2.9	2.9	0.5	0.2	1,060
5	6		43.6	2.4	54	silt loam	2.0	3.4	2.8	0.5	0.2	919
5	7		47.6	2.4	50	sandy loam	1.2	2.0	2.3	0.4	0.2	882
5	8		45.6	2.4	52	silt loam	1.6	2.8	2.8	0.5	0.2	1,040
5	9		47.6	2.4	50	sandy loam	1.6	2.7	2.8	0.5	0.2	1,090
5	10		57.6	4.4	38	sandy loam	2.2	3.7	3.7	0.6	0.3	1,210
6	1	Jun-26-93	-	-	-	-	-	-	-	-	-	-
6	2		59.6	2.4	38	sandy loam	0.8	1.4	1.9	0.3	0.1	901
6	3		59.6	1.4	39	sandy loam	1.4	2.4	1.9	0.3	0.1	825
6	4		53.6	2.4	44	sandy loam	1.7	2.9	3.5	0.5	0.3	1,080
6	5		43.6	2.4	54	silt loam	1.5	2.5	2.4	0.5	0.2	987
6	6		41.6	2.4	56	silt loam	1.8	3.0	2.8	0.5	0.2	1,000
6	7		57.6	2.4	40	sandy loam	1.6	2.7	2.5	0.5	0.2	961
6	8		61.6	2.4	36	sandy loam	2.0	3.5	3.3	0.5	0.2	999
6	9		57.6	2.4	40	sandy loam	1.0	1.8	2.1	0.4	0.2	1,130
6	10		57.6	2.4	40	sandy loam	1.1	1.8	2.3	0.4	0.2	1,020

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
7	1	Jun-26-93	-	-	-	-	-	-	-	-	-	-
7	2		92.8	0.2	7	sand	0.2	0.3	0.3	0.1	0.1	493
7	3		43.6	0.4	56	silt loam	1.5	2.6	2.7	0.5	0.2	949
7	4		45.6	6.4	48	sandy loam	2.3	4.0	4.3	0.7	0.3	1,150
7	5		77.6	2.4	20	loamy sand	0.8	1.4	1.8	0.3	0.1	790
7	6		45.6	2.4	52	silt loam	1.7	2.9	3.0	0.5	0.3	991
7	7		45.6	8.4	46	laom	2.8	4.8	4.7	0.8	0.4	1,140
7	8		35.6	4.4	60	silt loam	2.3	3.9	3.5	0.7	0.3	1,120
7	9		43.6	4.4	52	silt loam	2.5	4.3	4.1	0.7	0.3	1,260
7	10		43.6	2.4	54	silt loam	1.6	2.7	2.7	0.5	0.3	1,160
1	1	Jul-22-93	35.6	4.4	60	silt loam	1.6	2.8	2.7	0.5	0.2	915
1	2		77.8	1.2	21	loamy sand	0.6	1.1	1.2	0.2	0.1	600
1	3		70.8	2.2	27	sandy loam	0.7	1.2	1.3	0.3	0.1	633
1	4		70.8	1.2	28	sandy loam	0.9	1.6	1.6	0.3	0.1	617
1	5		69.8	1.2	29	sandy loam	0.8	1.4	1.3	0.2	0.1	626
2	1	Jul-22-93	41.6	4.4	54	silt loam	1.8	3.1	3.0	0.6	0.2	914
2	2		47.6	2.4	50	sandy loam	1.4	2.4	1.9	0.4	0.1	800
2	3		75.6	2.4	22	loamy sand	0.6	1.0	0.7	0.2	0.1	436
2	4		-	-	-	-	-	-	-	-	-	-
2	5		75.8	3.2	21	loamy sand	2.1	3.6	2.8	0.5	0.3	2,710

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

			Particle Size Distribution			Texture	OC	OM	C	H	N	TP
Transect	Site	Date	% Sand	% Clay	% Silt	USDA 1950	%	%	%	%	%	ug/g
3	1	Jul-22-93	33.6	4.4	62	silt loam	1.5	2.5	2.5	0.5	0.2	827
3	2		49.6	2.4	48	sandy loam	1.5	2.6	2.5	0.5	0.2	937
3	3		55.6	4.4	40	sandy loam	1.2	2.0	2.2	0.4	0.2	805
3	4		49.6	2.4	48	sandy loam	1.3	2.3	2.4	0.4	0.2	937
3	5		49.6	4.4	46	sandy loam	1.5	2.6	2.7	0.5	0.2	949
4	1	Jul-22-93	41.6	2.4	56	silt loam	1.6	2.8	2.8	0.5	0.3	835
4	2		57.6	4.4	38	sandy loam	1.1	1.9	1.6	0.4	0.2	786
4	3		41.6	10.4	48	loam	2.0	3.4	3.3	0.7	0.3	1,140
4	4		53.6	10.4	36	sandy loam	1.5	2.7	2.6	0.6	0.2	994
4	5		53.6	10.4	36	sandy loam	1.4	2.4	1.8	0.5	0.2	934
5	1	Jul-23-93	-	-	-	-	-	-	-	-	-	-
5	2		51.6	4.4	44	sandy loam	1.0	1.8	1.9	0.4	0.2	1,180
5	3		53.6	4.4	42	sandy loam	1.2	2.1	2.2	0.4	0.2	1,040
5	4		88.8	1.2	10	sand	0.3	0.5	0.6	0.2	0.1	682
5	5		45.6	2.4	52	silt loam	1.5	2.6	2.5	0.5	0.2	925
5	6		55.6	4.4	40	sandy loam	2.0	3.5	3.9	0.7	0.3	1,250
5	7		47.6	2.4	50	sandy loam	1.6	2.8	3.2	0.6	0.3	1,030
5	8		51.6	2.4	46	sandy loam	1.3	2.2	2.5	0.5	0.2	1,040
5	9		55.6	4.4	40	sandy loam	2.0	3.5	3.9	0.7	0.4	1,230
5	10		41.6	2.4	56	silt loam	1.7	2.9	2.1	0.4	0.2	1,160

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
6	1	Jul-23-93	-	-	-	-	-	-	-	-	-	-
6	2		53.6	2.4	44	sandy loam	1.3	2.2	2.8	0.5	0.2	974
6	3		51.6	2.4	46	sandy loam	1.5	2.5	2.9	0.5	0.3	1,040
6	4		51.6	4.4	44	sandy loam	1.9	3.3	3.6	0.7	0.3	1,160
6	5		49.6	6.4	44	sandy loam	1.9	3.3	3.5	0.7	0.4	1,110
6	6		55.6	2.4	42	sandy loam	1.4	2.4	2.3	0.5	0.2	930
6	7		55.6	2.4	42	sandy loam	1.3	2.3	2.5	0.5	0.3	1,010
6	8		79.8	2.2	18	loamy sand	0.9	1.5	1.3	0.2	0.2	844
6	9		53.6	6.4	40	sandy loam	2.3	4.0	2.8	0.7	0.4	1,190
6	10		45.6	2.4	52	silt loam	1.6	2.8	2.8	0.5	0.2	1,100
7	1	Jul-24-93	-	-	-	-	-	-	-	-	-	-
7	2		49.6	0.4	50	silt loam	1.9	3.3	3.4	0.6	0.4	1,080
7	3		49.6	2.4	48	sandy loam	2.0	3.4	3.1	0.6	0.3	1,100
7	4		51.6	4.4	44	sandy loam	2.3	3.9	3.4	0.7	0.4	1,120
7	5		53.6	4.4	42	sandy loam	2.1	3.6	3.3	0.6	0.3	1,150
7	6		75.6	2.4	22	loamy sand	0.8	1.4	2.4	0.3	0.2	737
7	7		57.6	4.4	38	sandy loam	1.7	2.9	3.1	0.5	0.3	1,020
7	8		47.6	8.4	44	loam	2.9	5.0	4.4	0.8	0.4	1,200
7	9		55.6	4.4	40	sandy loam	2.6	4.5	3.9	0.7	0.4	1,140
7	10		52.6	2.4	45	sandy loam	2.7	4.7	3.8	0.7	0.4	993

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
1	1	Aug-15-93	49.6	4.4	46	sandy loam	1.9	3.2	3.2	0.6	0.2	993
1	2		47.6	2.4	50	silt loam	1.2	2.0	2.2	0.5	0.0	828
1	3		84.8	1.2	14	loamy sand	0.4	0.7	1.3	0.2	0.0	616
1	4		59.6	2.4	38	sandy loam	0.9	1.6	1.8	0.4	0.0	844
1	5		39.6	2.4	58	silt loam	1.2	2.0	2.3	0.4	0.1	954
2	1	Aug-15-93	55.6	0.4	44	sandy loam	1.4	2.4	2.6	0.5	0.1	955
2	2		39.6	4.4	56	silt loam	1.8	3.0	3.1	0.7	0.1	1,090
2	3		65.6	2.4	32	sandy loam	0.8	1.4	1.8	0.3	0.1	775
2	4		-	-	-	-	-	-	-	-	-	-
2	5		69.6	0.4	30	sandy loam	3.7	6.4	5.0	0.8	0.4	3,770
3	1	Aug-15-93	33.6	2.4	64	silt loam	1.4	2.3	2.5	0.5	0.1	1,020
3	2		47.6	6.4	46	sandy loam	1.6	2.8	2.8	0.5	0.1	997
3	3		59.6	0.4	40	sandy loam	1.7	2.9	2.2	0.5	0.1	1,010
3	4		53.6	4.4	42	sandy loam	1.8	3.2	3.0	0.6	0.2	1,140
3	5		59.6	2.4	38	sandy loam	1.1	1.9	2.2	0.4	0.1	1,160
4	1	Aug-15-93	47.6	6.4	46	sandy loam	2.1	3.7	3.6	0.7	0.2	1,080
4	2		69.6	2.4	28	sandy loam	1.1	1.8	1.1	0.4	0.0	856
4	3		73.6	0.4	26	loamy sand	1.1	1.9	1.0	0.3	0.0	818
4	4		49.6	0.4	50	sandy loam	1.1	1.8	2.0	0.4	0.0	856
4	5		-	-	-	-	-	-	-	-	-	-

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
5	1	Aug-13-93	-	-	-	-	-	-	-	-	-	-
5	2		-	-	-	-	-	-	-	-	-	-
5	3		37.6	6.4	56	silt loam	2.0	3.4	2.5	0.6	0.1	1,130
5	4		59.6	4.4	36	sandy loam	1.6	2.8	2.1	0.6	0.1	1,010
5	5		49.6	4.4	46	sandy loam	1.8	3.1	2.6	0.6	0.1	1,030
5	6		59.6	6.4	34	sandy loam	2.7	4.6	4.4	0.9	0.3	1,190
5	7		47.6	2.4	50	silt loam	1.7	2.9	1.8	0.5	0.1	941
5	8		57.6	2.4	40	sandy loam	2.2	3.8	3.0	0.7	0.2	1,090
5	9		55.6	4.4	40	sandy loam	2.4	4.2	3.7	0.8	0.4	1,260
5	10		57.6	4.4	38	sandy loam	2.2	3.8	3.5	0.7	0.3	1,040
6	1	Aug-13-93	-	-	-	-	-	-	-	-	-	-
6	2		49.6	10.4	40	loam	2.1	3.6	3.5	0.8	0.4	1,050
6	3		51.6	2.4	46	sandy loam	1.7	2.9	2.7	0.6	0.2	939
6	4		51.6	4.4	44	sandy loam	1.7	3.0	3.4	0.7	0.3	997
6	5		47.6	6.4	46	sandy loam	2.0	3.5	3.4	0.7	0.3	967
6	6		53.1	6.9	40	sandy loam	2.6	4.5	4.1	0.9	0.4	1,070
6	7		45.6	8.4	46	loam	2.5	4.2	3.8	0.8	0.3	1,060
6	8		-	-	-	-	-	-	-	-	-	-
6	9		47.6	4.4	48	sandy loam	2.0	3.5	3.4	0.7	0.3	1,220
6	10		57.6	4.4	38	sandy loam	2.0	3.5	3.2	0.6	0.3	1,100

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

			Particle Size Distribution			Texture	OC	OM	C	H	N	TP
Transect	**Site**	**Date**	**% Sand**	**% Clay**	**% Silt**	**USDA 1950**	**%**	**%**	**%**	**%**	**%**	**ug/g**
7	1	Aug-14-93	-	-	-	-	-	-	-	-	-	-
7	2		43.6	2.4	54	silt loam	1.6	2.8	2.3	0.4	0.2	904
7	3		49.6	6.4	44	sandy loam	1.8	3.2	3.5	0.8	0.4	1,150
7	4		51.6	6.4	42	sandy loam	1.7	3.0	2.7	0.6	0.3	1,140
7	5		45.6	4.4	50	silt loam	2.0	3.4	2.5	0.6	0.3	1,180
7	6		61.6	2.4	36	sandy loam	1.6	2.7	2.3	0.5	0.2	1,100
7	7		48.0	4.0	48	sandy loam	2.1	3.5	3.5	0.7	0.3	1,270
7	8		48.0	2.0	50	silt loam	1.9	3.3	3.2	0.6	0.2	1,100
7	9		50.0	8.0	42	loam	2.7	4.6	3.8	0.9	0.4	1,220
7	10		54.0	2.0	44	sandy loam	1.7	3.0	2.7	0.5	0.2	1,120
1	1	Oct-2-93	38.0	4.0	58	silt loam	1.8	3.1	2.1	0.6	0.2	911
1	2		44.0	2.0	54	silt loam	1.2	2.1	2.5	0.5	0.2	887
1	3		70.0	2.0	28	sandy loam	0.5	0.9	0.8	0.3	0.1	622
1	4		62.0	2.0	36	sandy loam	1.2	2.1	2.1	0.4	0.2	840
1	5		74.0	0	26	loamy sand	0.8	1.4	1.5	0.3	0.1	638
2	1	Oct-2-93	44.0	6.0	50	silt loam	1.8	3.2	3.3	0.7	0.2	969
2	2		46.0	2.0	52	silt loam	1.6	2.7	2.8	0.6	0.2	936
2	3		74.0	2.0	24	loamy sand	0.9	1.5	1.3	0.3	0.2	804
2	4		-	-	-	-	-	-	-	-	-	-
2	5		46.0	2.0	52	silt loam	3.1	5.3	4.3	0.8	0.4	1,530

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
3	1	Oct-2-93	48.0	0	52	silt loam	1.9	3.2	2.7	0.5	0.2	922
3	2		57.0	2.0	41	sandy loam	1.6	2.7	2.8	0.6	0.2	940
3	3		58.0	6.0	36	sandy loam	2.6	4.5	4.0	0.9	0.4	1,110
3	4		48.0	6.0	46	sandy loam	2.7	4.6	4.0	0.9	0.4	1,140
3	5		52.0	6.0	42	sandy loam	2.4	4.1	3.9	0.8	0.3	1,150
4	1	Oct-3-93	42.0	4.0	54	silt loam	2.0	3.4	2.9	0.6	0.3	925
4	2		97.0	0	3	sand	0.2	0.3	0.6	0.1	0.0	515
4	3		40.0	8.0	52	silt loam	1.8	3.0	3.2	0.7	0.2	1,240
4	4		80.0	2.0	18	loamy sand	0.7	1.2	1.3	0.3	0.1	834
4	5		64.0	0	36	sandy loam	0.6	1.1	0.8	0.3	0.1	1,020
5	1	Oct-3-93	-	-	-	-	-	-	-	-	-	-
5	2		-	-	-	-	-	-	-	-	-	-
5	3		45.6	6.4	48	silt loam	1.8	3.1	3.2	0.6	0.3	1,170
5	4		52.0	6.0	42	sandy loam	2.0	3.4	3.3	0.7	0.3	1,090
5	5		63.6	6.4	30	sandy loam	2.2	3.8	3.6	0.8	0.4	1,130
5	6		58.0	10.0	32	sandy loam	2.3	4.0	4.1	1.0	0.4	1,230
5	7		52.0	6.0	42	sandy loam	2.3	3.9	3.7	0.8	0.3	1,160
5	8		42.0	6.0	52	silt loam	2.2	3.9	2.8	0.8	0.3	1,160
5	9		46.0	6.0	48	sandy loam	2.2	3.9	3.8	0.7	0.3	1,370
5	10		54.0	0	46	sandy loam	1.6	2.7	2.6	0.5	0.2	1,190

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
1	1	Nov-15-93	37.2	2.8	60	silt loam	1.3	2.3	2.8	0.6	0.2	820
1	2		63.2	4.8	32	sandy loam	1.3	2.2	2.5	0.5	0.1	838
1	3		43.2	2.8	54	silt loam	0.9	1.5	2.0	0.4	0.1	744
1	4		67.2	0.8	32	sandy loam	0.7	1.2	1.4	0.3	0.1	690
1	5		71.2	0.8	28	loamy sand	0.5	0.8	1.1	0.3	0.1	650
2	1	Nov-15-93	43.2	4.8	52	silt loam	1.6	2.8	3.0	0.7	0.2	1,010
2	2		43.2	4.8	52	silt loam	1.6	2.7	3.1	0.8	0.2	1,110
2	3		63.2	2.8	34	sandy loam	0.8	1.4	1.7	0.4	0.1	870
2	4		89.6	0.4	10	sand	0.5	0.9	0.7	0.2	0.1	1,030
2	5		89.2	0.8	10	sand	1.2	2.1	2.2	0.4	0.3	5,170
3	1	Nov-16-93	61.2	0.8	38	sandy loam	1.0	1.7	2.0	0.4	0.1	865
3	2		63.2	2.8	34	sandy loam	1.2	2.0	2.1	0.4	0.2	945
3	3		55.2	2.8	42	sandy loam	2.4	4.1	3.9	0.8	0.3	1,140
3	4		75.2	4.8	20	loamy sand	0.8	1.4	2.0	0.3	0.2	824
3	5		59.2	2.8	38	sandy loam	1.4	2.4	2.0	0.5	0.2	1,080
4	1	Nov-16-93	55.2	0.8	44	sandy loam	1.5	2.6	2.7	0.5	0.2	908
4	2		61.2	2.8	36	sandy loam	1.9	3.3	3.0	0.7	0.2	1,080
4	3		53.2	2.8	44	sandy loam	1.9	3.3	3.4	0.7	0.3	1,140
4	4		71.2	0.8	28	loamy sand	1.1	1.9	2.4	0.5	0.2	797
4	5		53.2	4.8	42	sandy loam	1.7	2.9	3.4	0.6	0.4	1,070

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

Transect	Site	Date	Particle Size Distribution % Sand	% Clay	% Silt	Texture USDA 1950	OC %	OM %	C %	H %	N %	TP ug/g
5	1	Nov-16-93	-	-	-	-	-	-	-	-	-	-
5	2		47.2	4.8	48	sandy loam	2.1	3.6	3.6	0.7	0.4	1,110
5	3		51.2	2.8	46	sandy loam	1.5	2.6	2.6	0.5	0.2	935
5	4		53.2	4.8	42	sandy loam	2.1	3.6	3.4	0.7	0.3	1,020
5	5		49.2	2.8	48	sandy loam	1.8	3.1	3.0	0.6	0.3	987
5	6		63.2	6.8	30	sandy loam	2.1	3.7	3.6	0.8	0.3	1,060
5	7		75.2	0.8	24	loamy sand	0.9	1.5	2.0	0.3	0.2	793
5	8		63.2	6.8	30	sandy loam	2.5	4.4	4.0	0.9	0.4	1,150
5	9		55.2	6.8	38	sandy loam	2.3	4.0	3.9	0.8	0.4	1,160
5	10		55.2	2.8	42	sandy loam	2.2	3.8	3.4	0.7	0.3	1,200
6	1	Nov-17-93	-	-	-	-	-	-	-	-	-	-
6	2		59.2	2.8	38	sandy loam	1.7	2.9	2.7	0.6	0.2	910
6	3		57.2	2.8	40	sandy loam	1.5	2.5	2.8	0.6	0.2	923
6	4		55.2	2.8	42	sandy loam	1.7	2.8	3.8	0.6	0.3	924
6	5		61.2	8.8	30	sandy loam	2.5	4.3	4.3	0.9	0.4	1,080
6	6		59.2	8.8	32	sandy loam	2.2	3.7	3.9	0.8	0.4	1,030
6	7		65.2	2.8	32	sandy loam	1.2	2.1	2.7	0.5	0.2	754
6	8		61.2	4.8	34	sandy loam	1.2	2.1	2.2	0.5	0.2	928
6	9		63.2	2.8	34	sandy loam	3.2	5.6	5.0	0.9	0.5	1,290
6	10		-	-	-	-	-	-	-	-	-	-

Appendix Table F. Particle size distributions, texture, organic carbon (OC), organic matter (OM), carbon (C), hydrogen (H), nitrogen (N), and total phosphorus (TP) for sediments, Crystal Springs Reach (RM 599.5-601.3), Middle Snake River, Idaho, 1993.

			Particle Size Distribution			Texture	OC	OM	C	H	N	TP
Transect	Site	Date	% Sand	% Clay	% Silt	USDA 1950	%	%	%	%	%	ug/g
6	1	Oct-3-93	53.6	4.4	42	sandy loam	2.1	3.6	3.2	0.6	0.3	1,040
6	2		74.0	1.0	25	loamy sand	1.0	1.8	1.2	0.3	0.1	868
6	3		84.0	2.0	14	loamy sand	1.2	2.0	1.8	0.5	0.2	832
6	4		53.6	6.4	40	sandy loam	1.9	3.2	2.9	0.6	0.3	946
6	5		50.0	10.0	40	loam	2.3	4.0	3.4	0.9	0.3	1,100
6	6		53.6	12.4	34	sandy loam	2.9	5.0	4.4	1.0	0.4	1,240
6	7		45.6	8.4	46	loam	2.3	3.9	3.5	0.8	0.3	1,160
6	8		61.6	6.4	32	sandy loam	1.8	3.0	2.9	0.6	0.3	1,090
6	9		53.6	6.4	40	sandy loam	1.7	3.0	2.9	0.6	0.2	1,080
6	10											
7	1	Oct-4-93	-	-	-	-	-	-	-	-	-	-
7	2		92.0	0	8	sand	0.8	1.3	1.2	0.2	0.1	589
7	3		52.0	8.0	40	sandy loam	2.4	4.1	3.8	0.8	0.3	1,090
7	4		51.6	10.4	38	loam	1.9	3.3	4.2	0.9	0.5	1,320
7	5		52.0	10.0	38	sandy loam	2.5	4.3	4.1	0.9	0.4	1,150
7	6		58.0	4.0	38	sandy loam	2.3	4.0	3.9	0.8	0.3	1,320
7	7		68.0	2.0	30	sandy loam	1.1	2.0	2.7	0.5	0.3	944
7	8		54.0	4.0	42	sandy loam	1.8	3.1	3.3	0.7	0.3	1,110
7	9		51.6	6.4	42	sandy loam	2.4	4.2	4.3	0.8	0.5	1,240
7	10		52.0	2.0	46	sandy loam	1.9	3.2	3.3	0.7	0.3	1,010