

Benthic macroinvertebrate assessment of several small streams-
1987 Santa Fe National Forest Plan
1990 Survey, (second year, Spring and Fall)

by
Gerald Z. Jacobi
Environmental Science
New Mexico Highlands University
Las Vegas, New Mexico 87701

submitted to
Santa Fe National Forest
Supervisor's Office, P. O. Box 1689
Santa Fe, New Mexico 87504

September 1, 1992

Contract # 43-8379-1-0155

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for 1990

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Introduction:

This benthic macroinvertebrate survey represents the second year of sampling (twice a year, spring and fall) of a long-term monitoring program designed to 1) evaluate aquatic ecosystems by establishing baseline biological conditions and 2) to monitor the effects of selected management programs on aquatic ecosystems as described in the Santa Fe National Forest Plan (Santa Fe National Forest, 1987). Six streams - Santa Fe River, Cow Creek, Rio Frijoles, Rio Guaje, Rio Puerco, and Rio de las Vacas - were selected to provide baseline information on the health of aquatic ecosystems and four streams - Rio del Oso, East Fork Jemez River, Holy Ghost Creek, and Rio en Medio - were selected to monitor the effects of forest management activities, e.g., respectively, cattle exclosures, pumice mining, USFS remodeled campground, and Santa Fe Ski Basin parking lot runoff.

Study Locations:

The ten stream locations along with their watershed management plans according to the 1987 Forest Management Plan are listed in the initial report to the Santa Fe National Forest Supervisor's Office (Jacobi, 1989). The general locations, in brief are:

Sangre de Cristo Mountains -

1. Santa Fe River: above the uppermost reservoir near the old weather station;
2. Rio Frijoles: approximately 800m upstream from the Pecos Wilderness Boundary;
3. Upper Cow Creek: approximately 100m upstream from the uppermost stream road crossing (USFS Road 645);
4. Holy Ghost Creek: above and below the new USFS campground;
5. Rio en Medio: (1) above the Santa Fe Ski Basin triple lift, (2) below the parking lot, (3) and approximately 2 mi downstream at the USFS boundary above Aspen Ranch.

Jemez Mountains -

6. Rio Guaje: approximately 100m upstream from the uppermost reservoir;
7. Rio de Las Vacas: approximately 100m upstream from the fish barrier in the San Pedro Parks Wilderness;
8. Rio Puerco: 400m upstream from the Rio Puerco Campground in the Chama River drainage;
9. Rio del Oso: two locations, within and below an exclosure;
10. East Fork Jemez River: two locations, upstream near Las Conchas Campground, and downstream below the Copar mining location.

Methods and Materials:

Collection locations were selected on rubble/gravel substrates in riffle sections of streams which were subjectively determined to be the best habitat for that section.

Three quantitative benthic macroinvertebrate samples were collected at each location in the spring prior to snow melt runoff

and late fall prior to the onset of winter. A modified Hess circular sampler was used for sampling (Jacobi, 1978). Samples from each location and sampling time were stored separately in 70% ethyl alcohol for transport to the laboratory at NMHU. Organisms were separated from the debris into like taxa for later identification. Identification was accomplished using a B&L Stereozoom dissecting binocular scope. References used to compile the taxonomic lists for each location included Merritt and Cummins, 1984; Baumann et al, 1977; Wiggins, 1977; and Edmunds, et al., 1976.

Data Analysis:

Metrics found in the new "Rapid Bioassessment Protocols for use in streams and rivers" by the USEPA (Plafkin et al., 1989) were used in modified form during this assessment. Seven metrics were selected as indices of comparison because individual taxa as well as total communities respond to stress (flow regime, sediment loading, organic and toxic pollutants, thermal variation, etc.) in different ways. The selected metrics, which encompass a wide range of benthic macroinvertebrate sensitivity to environmental perturbation, included:

1. Standing crop (macroinvertebrate density, no./m²);
2. Taxa richness (number of taxa per study location);
3. BCI (CTQ_d - community tolerance dominance quotient from Winget and Mangum, 1979);
4. EPT/EPT + Chironomidae (total number of organisms in Ephemeroptera, Plecoptera, and Trichoptera/EPT + Chironomidae);
5. EPT Index (the number of EPT taxa present);
6. Community loss (the number of taxa at a reference location

minus the number of common taxa/the number of taxa at the comparison location),

7. Percent dominant taxon (the taxon which contained the greatest number of organisms).

Standing crop comparisons were used because low standing crops generally indicate the presence of toxins or habitat degradation while high standing crops usually indicate organic enrichment from nutrient inputs. Taxa richness (number of taxa) represents the health of the community through a measure of the variety of taxa present. This generally increases with an increase in water quality and habitat diversity (Plafkin, et al, 1989).

A modification of the BCI (biotic condition index) methodology (Winget and Mangum, 1979) for non-organic perturbations, the CTQ_a (community tolerance dominance quotient) value, was used as the basic tolerance metric in the bioassessment protocol instead of the comparison BCI value because of its sensitivity to habitat or water quality alteration. CTQ_a values, which incorporate individual taxa tolerance values, below 60 indicate communities dominated by sensitive organisms while values near 100 indicate a shift towards more tolerant organisms.

The $EPT/EPT + Chironomidae$ abundance metric serves as a measure of community balance. An even distribution of organisms among all four groups (Ephemeroptera - mayflies, Plecoptera - stoneflies, Trichoptera - caddisflies, and Chironomidae - midges) indicates a good biotic condition. A shift towards a lower ratio indicates a disproportionate number of tolerant midges.

The EPT Index represents the number of total different taxa in the three groups. Since representatives are perturbation sensitive taxa, the higher the number, the less perturbation.

Community loss measures the loss of macroinvertebrate taxa between a reference station and the comparison location. The lower the value, the more similarity exists between the two locations (Courtermann and Davies, 1987).

The presence of the most abundant taxon in the total community of macroinvertebrates is expressed in the "percent dominant taxon" index. A community dominated by one or a few taxa would indicate a stressed environment.

The following criteria were used to assign scores for characterizing macroinvertebrate communities at a particular location when compared to a reference location. The reference location was selected to best represent an unperturbed location in the mountain range or was an unperturbed or upstream location when two or more locations on the same stream were studied.

Scoring Criteria				
score:	6	4	2	0
Standing Crop ^(a)	50-150%	35-50% or 150-200%	20-35% or 200-250%	<20% or >250%
No. of Taxa ^(a)	>80%	60-80%	40-60%	<40%
BCI (CTQ _a) ^(b)	>85%	70-85%	50-70%	<50%
EPT/EPT+Chironomidae ^(a)	>75%	50-75%	25-50%	<25%
EPT Index ^(a)	>90%	80-90%	70-80%	<70%
Community Loss ^(c)	<0.5	0.5-1.5	1.5-4.0	>4.0
% Dominant Taxon ^(d)	<20%	20-30%	30-40%	>40%

(^a) score is a ratio of study site to reference site x 100.

(^b) score is a ratio of reference site to study site x 100.

(^c) range of values obtained-comparison to reference station.

(^d) actual % composition for study and reference station.

Results and Discussion:

The calculated values for the seven metrics for the reference location and the comparison location were tabulated from summary tables of macroinvertebrate data from each location and sampling date (Tables 1 - 28 in the appendix) and are presented in Tables 1 - 11). Metric scores were summed and compared to the reference location score and based on the % comparison to the reference location, a biological condition category of "impairment" was assigned. Attributes are explained in Figure 1.

Spring/Summer 1990 -

Sangre de Cristo Mountains.

The Santa Fe River location in the "restricted access" upper Santa Fe watershed was used as a reference location for the benchmark streams in the Sangre de Cristo Mountains. This site would be rated as "nonimpaired"; it contained a diverse fauna dominated by sensitive mayflies, stoneflies, and caddisflies. In contrast, the Rio Frijoles and Cow Creek locations were rated as "slightly impaired". Significant reductions occurred in total taxa and in sensitive EPT taxa (Table 1). The CTQ_a values were excellent (< 58) at all sites indicating that even the "slightly impaired" locations were still dominated by sensitive taxa. The reduced biological condition values for the Rio Frijoles and Cow Creek were an artifact of sampling three months after pre-runoff April sampling had been completed on the Santa Fe River. Sampling in July missed sensitive EPT taxa which has emerged earlier in the year.

Both locations on Holy Ghost Creek above and below the remodeled campground contained similar macroinvertebrate metrics. The

downstream location (2), scored at 90% of the background upstream location, was rated as "nonimpaired" (Table 2). The major difference between the two locations was at the downstream location where the moderately tolerant mayfly *Baetis tricaudatus* accounted for 29% of the total number of organisms.

For the Rio en Medio, both downstream locations, 2 and 3, were rated as "nonimpaired" when compared to the reference location, 1 - upstream. The most downstream location, 3 (at Aspen Ranch) had the highest biological condition rating of the three locations (Table 3). This was due, in part, to its low '% dominant taxon' rating. The location immediately downstream from the ski area parking lot (2) was rated at the lower end of the "nonimpaired" biological condition (Figure 1). This was due to the reduced standing crop (32% of reference) and the high 34% dominant taxon, the moderately tolerant mayfly *B. insignificans*.

Jemez Mountains.

The remote location on the Rio Guaje above the reservoir served as the reference location for the three background study sites in the Jemez Mountains (Table 4). The reference location did not receive the highest rating (only 36 out of a possible 42 points) due to the dominant taxon (43%), the tolerant riffle beetle *Heterlimnus corpulentus*. The Rio Puerco location was "nonimpaired" while the Rio de Las Vacas site was rated as "slightly impaired". The Rio de Las Vacas location contained a reduced EPT taxa and a high (33%) dominant taxon, the moderately sensitive caddisfly larvae of the family Leptoceridae.

Both East Fork Jemez River locations were almost identical in macroinvertebrate composition, abundance, high standing crop, EPT index, and % dominant taxon (Table 5). Location 2, downstream from the Copar mining site, was rated as "nonimpaired" when compared to the upstream location near Las Conchas campground. Both CTQ_a values of 75 indicate though that macroinvertebrate communities were dominated by more tolerant or moderately tolerant taxa rather than sensitive taxa. Water temperature was generally 20° C or greater at both locations; higher than at any other stream locations.

The Rio del Oso, above and within the exclosure, was dry during June, 1990.

Fall (November) -

Sangre de Cristo Mountains.

The Santa Fe River contained a diverse fauna thus again serving as the reference location for the three benchmark stream locations (Table 6). The Rio Frijoles was rated high in all metric scores, receiving a "nonimpaired" rating. Cow Creek was again rated as "slightly impaired" due to a reduction in sensitive EPT taxa.

Both locations on Holy Ghost Creek, above and below the campground, contained almost identical ratings on the bioassessment metrics (Table 7). In fact, both locations had the highest number of taxa and highest numbers of sensitive EPT taxa of all 15 locations sampled during November, 1990. The downstream location was therefore rated as "nonimpaired" compared to the upstream location.

The upstream location on the Rio en Medio, 1 - above the Santa Fe Ski Basin lift, exhibited a high standing crop, number of taxa, and EPT taxa (Table 8). Both downstream locations, 2 - below the ski basin parking lot and 3 - above Aspen Ranch, were rated as "slightly impaired" (65% of reference) during this sampling period. Standing crop at location 2 was only 16% of the reference location value. EPT taxa was also reduced here. At location 3, the sensitive caddisfly *Oligophlebodes* sp. was the dominant taxon, accounting for 38% of the total number of organisms.

Jemez Mountains.

The Rio Guaje served as the reference location in November even though its overall biological condition was lowered slightly due to the caddisfly *Oligophlebodes* sp. which accounted for 33% of the total number of organisms (Table 9). Both the Rio de Las Vacas and Rio Puerco locations were rated as "nonimpaired". Though the Rio de Las Vacas location was at the low end of the "nonimpaired" biological condition (Figure 1) due to the dominance (41%) of Leptoceridae, the macroinvertebrate community was dominated by sensitive taxa (excellent CTQ_a rating of 49.8).

The two East Fork Jemez River locations, similar in their biological condition ratings (36 out of 42), contained the highest standing crops found at any other stream system during sampling in November (Table 10). The reference location was dominated by the tolerant caddisfly *Hydropsyche cockerelli* which accounted for over 50% of the total number of organisms. The downstream location was rated as "nonimpaired".

The Rio del Oso contained water during November; hence, both sampling locations, within and below the exclosure, were sampled. Biota was reduced at both locations; similar biological condition metrics were evident (Table 11). The pioneer colonizing tolerant blackfly (family Simuliidae) accounted for over 50% of the total number of organisms at both locations. Considering the recovery process taking place after the dry summer, the location outside of and below the exclosure was rated as "nonimpaired" when compared to the similar exclosure location. This can be misleading. As indicated in Table 12, the Rio del Oso reference location (1) when compared to the best location in the Jemez Mountain (Rio Guaje), scored 35% of the biological condition of the Rio Guaje. This would result in an overall "moderately impaired" rating for both of the Rio del Oso locations.

Summary:

In spring/summer 1990, all locations were rated as "nonimpaired" in biological condition except for the Rio Frijoles, Cow Creek, and Rio de Las Vacas which were rated as "slightly impaired" when compared to reference locations. No location during this sampling period was rated as "moderately impaired".

In fall 1990, all locations were rated as "nonimpaired" in biological condition except Cow Creek, Rio en Medio 2, and Rio en Medio 3, were rated as "slightly impaired". Both locations on the Rio del Oso, when compared to the Rio Guaje, were rated as "moderately impaired".

BIOASSESSMENT		
<u>% Comp. to Ref. Score^(a)</u>	<u>Biological Condition Category</u>	<u>Attributes</u>
>83%	Nonimpaired	Comparable to the best situation to be expected within an ecoregion. Balanced trophic structure. Optimum community structure (composition and dominance) for stream size and habitat quality.
54-79%	Slightly impaired	Community structure less than expected. Composition (species richness) lower than expected due to loss of some intolerant forms. Percent contribution of tolerant forms increases.
21-50%	Moderately impaired	Fewer species due to loss of most intolerant forms. Reduction in EPT index.
<17%	Severely impaired.	Few species present. If high densities of organisms, then dominated by one or two taxa.
(a) Percentage values obtained that are intermediate to the above ranges will require subjective judgement as to the correct placement. Use of the habitat assessment and physiochemical data may be necessary to aid in the decision process.		

Figure 1. Bioassessment Rating Guide (Plafkin, et al., 1989).

Appendix: Tables 1 - 28

Table 1. Bioassessment of three small streams in the Sangre de Cristo Mountains, Santa Fe National Forest, New Mexico, April/July 1990.

Metric	Stations		
	SFR reference	RF	CC
Calculated Value			
Standing Crop (No./m ²)	3128	2655	2450
No. of Taxa	41	34	22
BCI(CTQ _d)	57.7	56.9	55.7
EPT/EPT + Chiron.	0.64	0.9	0.85
EPT Index	26	18	15
Community Loss	0	0.56	1.31
% Dominant Taxon	24	33	25
Percent of Reference			
Standing Crop (No./m ²)	100	85	78
No. of Taxa	100	83	54
BCI(CTQ _d)	100	100	100
EPT/EPT + Chiron.	100	100	100
EPT Index	100	69	58
Score			
Standing Crop (No./m ²)	6	6	6
No. of Taxa	6	6	2
BCI(CTQ _d)	6	6	6
EPT/EPT + Chiron.	6	6	6
EPT Index	6	0	0
Community Loss	6	4	4
% Dominant Taxon	4	2	4
Biological Condition			
Total	40	30	28
% of Reference	100	75	70
Condition		SI	SI
Sites:		Conditions:	
SFR – Santa Fe River		NI – Nonimpaired	
RF – Rio Frijoles		SI – Slightly Impaired	
CC – Cow Creek		MI – Moderately Impaired	

Table 2. Bioassessment of two locations on Holy Ghost Creek,
Santa Fe National Forest, 23 June 1990.

Metric	Stations	
	1 reference	2
Calculated Value		
Standing Crop (No./m ²)	1761	1740
No. of Taxa	30	27
BCI(CTQ _d)	61.4	62.6
EPT/EPT + Chiron.	0.74	0.8
EPT Index	17	14
Community Loss	0	0.26
% Dominant Taxon	14	29
Percent of Reference		
Standing Crop (No./m ²)	100	99
No. of Taxa	100	90
BCI(CTQ _d)	100	98
EPT/EPT + Chiron.	100	100
EPT Index	100	82
Score		
Standing Crop (No./m ²)	6	6
No. of Taxa	6	6
BCI(CTQ _d)	6	6
EPT/EPT + Chiron.	6	6
EPT Index	6	4
Community Loss	6	6
% Dominant Taxon	6	4
Biological Condition		
Total	42	38
% of Reference	100	90
Condition		NI
Sites: 1 – above campground 2 – below campground Conditions: NI – Nonimpaired SI – Slightly Impaired MI – Moderately Impaired		

Table 3. Bioassessment (modified from Protocol III, USEPA) of the Rio en Medio, Santa Fe National Forest, New Mexico, 23 June 1990.

Metric	Stations		
	1 reference	2	3
Calculated Value			
Standing Crop (No./m ²)	2932	947	1591
No. of Taxa	27	24	29
BCI(CTQ _d)	70.8	51.9	45.7
EPT/EPT + Chiron.	0.7	0.92	0.96
EPT Index	15	16	20
Community Loss	0	0.5	0.41
% Dominant Taxon	24	34	15
Percent of Reference			
Standing Crop (No./m ²)	100	32	54
No. of Taxa	100	89	100
BCI(CTQ _d)	100	100	100
EPT/EPT + Chiron.	100	100	100
EPT Index	100	100	100
Score			
Standing Crop (No./m ²)	6	2	6
No. of Taxa	6	6	6
BCI(CTQ _d)	6	6	6
EPT/EPT + Chiron.	6	6	6
EPT Index	6	6	6
Community Loss	6	6	6
% Dominant Taxon	4	2	6
Biological Condition			
Total	40	34	42
% of Reference	100	85	100
Condition		NI	NI
Sites:		Conditions:	
1 – above ski area		NI – Nonimpaired	
2 – below parking lot		SI – Slightly Impaired	
3 – Aspen Ranch		MI – Moderately Impaired	

Table 4. Bioassessment of three small streams in the Jemez Mountains, Santa Fe National Forest, New Mexico, July 1990.

Metric	Stations		
	RG reference	RV	RP
Calculated Value			
Standing Crop (No./m ²)	2839	1021	3093
No. of Taxa	27	18	30
BCI(CTQ _d)	60.7	61.9	63.2
EPT/EPT + Chiron.	0.9	0.98	0.9
EPT Index	16	10	16
Community Loss	0	1.06	0.47
% Dominant Taxon	43	33	28
Percent of Reference			
Standing Crop (No./m ²)	100	36	109
No. of Taxa	100	67	100
BCI(CTQ _d)	100	98	96
EPT/EPT + Chiron.	100	100	100
EPT Index	100	63	100
Score			
Standing Crop (No./m ²)	6	4	6
No. of Taxa	6	4	6
BCI(CTQ _d)	6	6	6
EPT/EPT + Chiron.	6	6	6
EPT Index	6	0	6
Community Loss	6	4	6
% Dominant Taxon	0	2	4
Biological Condition			
Total	36	26	40
% of Reference	100	72	100
Condition		SI	NI
Sites:		Conditions:	
RG – Rio Guaje		NI – Nonimpaired	
RV – Rio de Las Vacas		SI – Slightly Impaired	
RP – Rio Puerco		MI – Moderately Impaired	

Table 5. Bioassessment of two locations on the East Fork of the Jemez River, Jemez Mountains, Santa Fe National Forest, 7 July 1990.

Metric	Stations	
	1 reference	2
Calculated Value		
Standing Crop (No./m ²)	4836	5441
No. of Taxa	37	42
BCI(CTQ _d)	75.7	75.5
EPT/EPT + Chiron.	0.83	0.9
EPT Index	18	18
Community Loss	0	0.26
% Dominant Taxon	21	21
Percent of Reference		
Standing Crop (No./m ²)	100	113
No. of Taxa	100	100
BCI(CTQ _d)	100	100
EPT/EPT + Chiron.	100	100
EPT Index	100	100
Score		
Standing Crop (No./m ²)	6	6
No. of Taxa	6	6
BCI(CTQ _d)	6	6
EPT/EPT + Chiron.	6	6
EPT Index	6	6
Community Loss	6	6
% Dominant Taxon	4	4
Biological Condition		
Total	40	40
% of Reference	100	100
Condition		NI
Sites:		Conditions:
1 – upstream, near Las Conchas Cpgd.		NI – Nonimpaired
2 – downstream, below Copar Mining site		SI – Slightly Impaired
		MI – Moderately Impaired

Table 6. Bioassessment of three small streams in the Sangre de Cristo Mountains, Santa Fe National Forest, New Mexico, November 1990.

Metric	Stations		
	SFR reference	RF	CC
Calculated Value			
Standing Crop (No./m ²)	1934	1510	2556
No. of Taxa	31	26	24
BCI(CTQ _d)	43.9	41.2	54.8
EPT/EPT + Chiron.	0.91	0.86	0.65
EPT Index	19	19	14
Community Loss	0	0.46	0.83
% Dominant Taxon	24	19	27
Percent of Reference			
Standing Crop (No./m ²)	100	78	132
No. of Taxa	100	84	77
BCI(CTQ _d)	100	100	80
EPT/EPT + Chiron.	100	95	71
EPT Index	100	100	74
Score			
Standing Crop (No./m ²)	6	6	6
No. of Taxa	6	6	4
BCI(CTQ _d)	6	6	4
EPT/EPT + Chiron.	6	6	4
EPT Index	6	6	2
Community Loss	6	6	4
% Dominant Taxon	4	6	4
Biological Condition			
Total	40	42	28
% of Reference	100	100	70
Condition		NI	SI
Sites:		Conditions:	
SFR – Santa Fe River		NI – Nonimpaired	
RF – Rio Frijoles		SI – Slightly Impaired	
CC – Cow Creek		MI – Moderately Impaired	

Table 7. Bioassessment of two locations on Holy Ghost Creek,
Santa Fe National Forest, New Mexico, 11 November 1990.

Metric	Stations	
	1 reference	2
Calculated Value		
Standing Crop (No./m ²)	3092	3358
No. of Taxa	40	41
BCI(CTQ _d)	52	46.5
EPT/EPT + Chiron.	0.81	0.81
EPT Index	24	26
Community Loss	0	0.2
% Dominant Taxon	15	14
Percent of Reference		
Standing Crop (No./m ²)	100	109
No. of Taxa	100	100
BCI(CTQ _d)	100	100
EPT/EPT + Chiron.	100	100
EPT Index	100	100
Score		
Standing Crop (No./m ²)	6	6
No. of Taxa	6	6
BCI(CTQ _d)	6	6
EPT/EPT + Chiron.	6	6
EPT Index	6	6
Community Loss	6	6
% Dominant Taxon	6	6
Biological Condition		
Total	42	42
% of Reference	100	100
Condition		NI
Sites:		Conditions:
1 – above campground		NI – Nonimpaired
2 – below campground		SI – Slightly Impaired
		MI – Moderately Impaired

Table 8. Bioassessment of the Rio en Medio, Santa Fe National Forest, New Mexico, 11 November 1990.

Metric	Stations		
	1 reference	2	3
Calculated Value			
Standing Crop (No./m ²)	4368	686	1109
No. of Taxa	33	22	20
BCI(CTQ _d)	60.6	50.2	41.9
EPT/EPT + Chiron.	0.72	0.91	0.92
EPT Index	18	13	13
Community Loss	0	0.55	1.05
% Dominant Taxon	23	24	38
Percent of Reference			
Standing Crop (No./m ²)	100	16	25
No. of Taxa	100	67	61
BCI(CTQ _d)	100	100	100
EPT/EPT + Chiron.	100	100	100
EPT Index	100	72	72
Score			
Standing Crop (No./m ²)	6	0	2
No. of Taxa	6	4	4
BCI(CTQ _d)	6	6	6
EPT/EPT + Chiron.	6	6	6
EPT Index	6	2	2
Community Loss	6	4	4
% Dominant Taxon	4	4	2
Biological Condition			
Total	40	26	26
% of Reference	100	65	65
Condition		SI	SI

Sites:

- 1 – above ski area
- 2 – below parking lot
- 3 – Aspen Ranch

Conditions:

- NI – Nonimpaired
- SI – Slightly Impaired
- MI – Moderately Impaired

Table 9. Bioassessment of three small streams in the Jemez Mountains, Santa Fe National Forest, New Mexico, November, 1990.

Metric	Stations		
	RG reference	RV	RP
Calculated Value			
Standing Crop (No./m ²)	3591	3386	7107
No. of Taxa	32	25	38
BCI(CTQ _d)	50.4	49.8	61.8
EPT/EPT + Chiron.	0.98	0.99	0.81
EPT Index	16	15	19
Community Loss	0	0.68	0.34
% Dominant Taxon	33	41	12
Percent of Reference			
Standing Crop (No./m ²)	100	94	198
No. of Taxa	100	78	100
BCI(CTQ _d)	100	100	82
EPT/EPT + Chiron.	100	100	83
EPT Index	100	94	100
Score			
Standing Crop (No./m ²)	6	6	6
No. of Taxa	6	4	6
BCI(CTQ _d)	6	6	4
EPT/EPT + Chiron.	6	6	6
EPT Index	6	6	2
Community Loss	6	4	6
% Dominant Taxon	2	0	6
Biological Condition			
Total	38	32	36
% of Reference	100	84	95
Condition		NI	NI
Sites:		Conditions:	
RG – Gio Guaje		NI – Nonimpaired	
RV – Rio de Las Vacas		SI – Slightly Impaired	
RP – Rio Puerco		MI – Moderately Impaired	

Table 10. Bioassessment of two locations on the East Fort of the Jemez River, Jemez Mountains, Santa Fe National Forest, 15 November 90.

Metric	Stations	
	1 reference	2
Calculated Value		
Standing Crop (No./m ²)	15584	8585
No. of Taxa	36	28
BCI(CTQ _d)	72.4	74.4
EPT/EPT + Chiron.	0.92	0.84
EPT Index	17	13
Community Loss	0	0.46
% Dominant Taxon	52	19.9
Percent of Reference		
Standing Crop (No./m ²)	100	55
No. of Taxa	100	78
BCI(CTQ _d)	100	97
EPT/EPT + Chiron.	100	91
EPT Index	100	76
Score		
Standing Crop (No./m ²)	6	6
No. of Taxa	6	4
BCI(CTQ _d)	6	6
EPT/EPT + Chiron.	6	6
EPT Index	6	2
Community Loss	6	6
% Dominant Taxon	0	6
Biological Condition		
Total	36	36
% of Reference	100	100
Condition		NI
Sites:		Conditions:
1 – upstream, near Las Conchas Cpgd.		NI – Nonimpaired
2 – downstream, below Copar mining site		SI – Slightly Impaired
		MI – Moderately Impaired

Table 11. Bioassessment of two locations on the Rio del Oso, Jemez Mountains, Santa Fe National Forest, New Mexico, 1 November 1990.

Metric	Stations	
	1 reference	2
Calculated Value		
Standing Crop (No./m ²)	755	422
No. of Taxa	14	12
BCI(CTQ _d)	85	77.7
EPT/EPT + Chiron.	0.86	0.96
EPT Index	5	6
Community Loss	0	0.67
% Dominant Taxon	55	56
Percent of Reference		
Standing Crop (No./m ²)	100	56
No. of Taxa	100	86
BCI(CTQ _d)	100	100
EPT/EPT + Chiron.	100	100
EPT Index	100	100
Score		
Standing Crop (No./m ²)	6	6
No. of Taxa	6	6
BCI(CTQ _d)	6	6
EPT/EPT + Chiron.	6	6
EPT Index	6	6
Community Loss	6	4
% Dominant Taxon	0	0
Biological Condition		
Total	36	34
% of Reference	100	94
Condition		NI
Sites: 1 – within exclosure 2 – outside exclosure		Conditions: NI – Nonimpaired SI – Slightly Impaired MI – Moderately Impaired

Table 12. Bioassessment of the Rio Guaje and the Rio del Oso, Jemez Mountains, Santa Fe National Forest, New Mexico, November 1990.

Metric	Stations	
	RG reference	RO
Calculated Value		
Standing Crop (No./m ²)	3591	755
No. of Taxa	32	14
BCI(CTQ _d)	50.4	85
EPT/EPT + Chiron.	0.98	0.86
EPT Index	16	5
Community Loss	0	1.71
% Dominant Taxon	33	55
Percent of Reference		
Standing Crop (No./m ²)	100	21
No. of Taxa	100	44
BCI(CTQ _d)	100	59
EPT/EPT + Chiron.	100	88
EPT Index	100	31
Score		
Standing Crop (No./m ²)	6	2
No. of Taxa	6	2
BCI(CTQ _d)	6	2
EPT/EPT + Chiron.	6	6
EPT Index	6	0
Community Loss	6	2
% Dominant Taxon	4	0
Biological Condition		
Total	40	14
% of Reference	100	35
Condition		MI
Sites: RG – Rio Guaje RO – Rio del Oso (in exclosure)		Conditions: NI – Nonimpaired SI – Slightly Impaired MI – Moderately Impaired

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Santa Fe River, above reservoirs, Santa Fe National Forest

Station 1

27 April 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura banksii</i>	4	3	1	8	45	1.653	6	9.92
<i>Zapada</i> sp.	0	2	2	4	23	1.362	16	21.79
<i>Taenionema</i> sp.	0	1	0	1	6	0.778	48	37.35
Perlodidae	1	1	0	2	11	1.041	48	49.99
<i>Kogotus modestus</i>	0	0	1	1	6	0.778	18	14.01
<i>Isoperla</i> sp.	0	0	1	1	6	0.778	48	37.35
Chloroperlidae A	3	1	1	5	28	1.447	24	34.73
<i>Sweltsa</i> sp.	7	6	12	25	142	2.152	24	51.65
<i>Hesperoperla pacifica</i>	7	9	3	19	108	2.033	18	36.60
Ephemeroptera - mayflies								
<i>Ameletus</i> sp.	6	0	2	8	45	1.653	48	79.35
<i>Baetis tricaudatus</i>	0	20	21	41	232	2.365	72	170.32
<i>Baetis insignificans</i>	13	5	6	24	136	2.134	72	153.61
<i>Cinygmula</i> sp.	6	3	7	16	91	1.959	30	58.77
<i>Paraleptophlebia</i> sp.	2	0	0	2	11	1.041	24	24.99
<i>Tricorythodes</i> sp.	0	7	7	14	79	1.898	108	204.94
<i>Drunella doddsi</i>	0	8	0	8	45	1.653	4	6.61
<i>Ephemerella infrequens</i>	33	12	31	76	431	2.634	48	126.45
Trichoptera - caddisflies								
<i>Rhyacophila brunea cpx.</i>	1	1	6	8	45	1.653	18	29.76
<i>Rhyacophila valuma</i>	3	8	9	20	113	2.053	18	36.96
<i>Hydropsyche cockerelli</i>	2	7	4	13	74	1.869	108	201.88
<i>Arctopsyche grandis</i>	0	9	8	17	96	1.982	18	35.68
<i>Limnephilus</i> sp.	1	0	0	1	6	0.778	108	84.04
<i>Oligophlebodes</i> sp.	0	0	1	1	6	0.778	24	18.68
<i>Psychoronia</i> sp.	2	0	1	3	17	1.230	24	29.53
<i>Lepidostoma</i> sp.	0	0	1	1	6	0.778	18	14.01
<i>Micrasema</i> sp.	2	0	4	6	34	1.531	24	36.76
Diptera - true flies								
<i>Dicranota</i> sp.	8	0	4	12	68	1.833	24	43.98
<i>Hexatoma</i> A	0	1	1	2	11	1.041	36	37.49
<i>Maruina</i> sp.	1	0	0	1	6	0.778	36	28.01
<i>Pericoma</i> sp.	1	2	9	12	68	1.833	36	65.97
Simuliidae	0	5	2	7	40	1.602	108	173.02
<i>Eukiefferiella</i> sp.	1	0	1	2	11	1.041	108	112.47
<i>Cricotopus</i> sp.	42	23	70	135	765	2.884	108	311.44
<i>Nostocladus</i> sp.	4	2	2	8	45	1.653	108	178.55
<i>Stempellina</i> sp.	1	1	2	4	23	1.362	108	147.07
<i>Micropsectra</i> sp.	0	3	8	11	62	1.792	108	193.58
Ceratopogonidae	8	0	10	18	102	2.009	108	216.93
Coleoptera - beetles								
<i>Narpus</i> sp.	0	1	0	1	6	0.778	108	84.04
<i>Heterlimnius corpulentus</i>	6	5	0	11	62	1.792	108	193.58
Annelida - segmented worms								
Lumbricidae	1	0	1	2	11	1.041	108	112.47
Arthropoda - other arthropods								
Hydracarina A - mites	1	0	0	1	6	0.778	108	84.04
Totals					3128	62.234	2336	3588.36

Total Taxa 41
 CTQp 50
 CTQa 57
 CTQd 57.7
 BCI 86.72
 Diversity Index 4.20

Stream gradient (% slope): 1.3 - 3.0
 Substrate (composition): rubble
 Sulfate (mg/l SO4): < 50
 Total Alkalinity (mg/l CaCO3): 51

Rio Frijoles at Wilderness Boundary, Santa Fe National Forest
Station 1

17 June 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	1	0	0	1	6	0.778	6	4.67
<i>Pteronarcella badia</i>	0	0	1	1	6	0.778	24	18.68
<i>Isoperla</i> sp.	0	0	3	3	17	1.230	48	59.06
Chloroperlidae A	1	1	1	3	17	1.230	24	29.53
<i>Hesperoperla pacifica</i>	7	9	4	20	113	2.053	18	36.96
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	2	3	3	8	45	1.653	48	79.35
<i>Baetis tricaudatus</i>	23	29	15	67	380	2.580	72	185.74
<i>Rhithrogena</i> sp.	5	6	7	18	102	2.009	21	42.18
<i>Epeorus</i> sp.	10	18	9	37	210	2.322	21	48.77
<i>Paraleptophlebia</i> sp.	1	2	3	6	34	1.531	24	36.76
<i>Drunella grandis</i>	0	1	2	3	17	1.230	24	29.53
<i>Drunella doddsi</i>	0	1	1	2	11	1.041	4	4.17
<i>Ephemerella infrequens</i>	10	17	14	41	232	2.365	48	113.54
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	5	3	2	10	57	1.756	18	31.61
<i>Rhyacophila valuma</i>	0	1	0	1	6	0.778	18	14.01
<i>Hydropsyche venada</i>	14	5	13	32	181	2.258	108	243.83
<i>Lepidostoma</i> sp.	1	0	0	1	6	0.778	18	14.01
<i>Micrasema</i> sp.	1	2	0	3	17	1.230	24	29.53
DIPTERA - true flies								
<i>Dicranota</i> sp.	0	3	1	4	23	1.362	24	32.68
<i>Hexatoma</i> A	0	0	2	2	11	1.041	36	37.49
<i>Holorusia grandis</i>	0	0	1	1	6	0.778	72	56.03
<i>Tipula</i> sp.	5	1	1	7	40	1.602	36	57.67
Blephariceridae	0	0	1	1	6	0.778	2	1.56
Simuliidae	15	122	20	157	890	2.949	108	318.53
<i>Eukiefferiella</i> sp.	2	2	1	5	28	1.447	108	156.29
<i>Cricotopus</i> sp.	7	4	5	16	91	1.959	108	211.58
<i>Nostocladus</i> sp.	0	3	2	5	28	1.447	108	156.29
<i>Chelifera</i> sp.	0	1	0	1	6	0.778	95	73.92
<i>Hemerodromia</i> sp.	1	0	0	1	6	0.778	95	73.92
<i>Protanderus</i> sp.	2	0	1	3	17	1.230	95	116.89
COLEOPTERA - beetles								
<i>Helichus</i> sp.	0	0	1	1	6	0.778	72	56.03
<i>Heterlimnius corpulentus</i>	0	1	3	4	23	1.362	108	147.07
ANNELIDA - segmented worms								
Lumbricidae	1	0	1	2	11	1.041	108	112.47
ARTHROPODA - other arthropods								
Hydracarina A - mites	1	0	0	1	6	0.778	108	84.04
Totals					2655	47.714	1851	2714.38
Total Taxa	34							
CTQp	50							
CTQa	54.4							
CTQd	56.9							
BCI	87.89							
Diversity Index	3.51							
Stream gradient (% slope): 1.3 - 3.0								
Substrate (composition): rubble (smooth)/sanc								
Sulfate (mg/l SO4): < 50								
Total Alkalinity (mg/l CaCO3): 51								

Cow Creek, upper site, Santa Fe National Forest
15 June 1990

Station 1

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Zapada sp.</i>	14	30	1	45	255	2.407	16	38.50
Capniidae	0	2	2	4	23	1.362	32	43.58
Perlodidae	1	0	0	1	6	0.778	48	37.35
<i>Megarcys signata</i>	0	1	0	1	6	0.778	24	18.68
<i>Cultus aestivalis</i>	2	2	2	6	34	1.531	12	18.38
Chloroperlidae A	0	3	2	5	28	1.447	24	34.73
<i>Sweltsa sp.</i>	0	5	3	8	45	1.653	24	39.68
EPHEMEROPTERA - mayflies								
<i>Ameletus sp.</i>	0	0	1	1	6	0.778	48	37.35
<i>Baetis tricaudatus</i>	14	11	14	39	221	2.344	72	168.80
<i>Cinygmula sp.</i>	35	36	35	106	601	2.779	30	83.37
<i>Ephemerella infrequens</i>	7	11	1	19	108	2.033	48	97.60
TRICHOPTERA - caddisflies								
<i>Rhyacophila iranda</i>	17	28	35	80	454	2.657	18	47.83
<i>Rhyacophila hyalinata</i>	3	1	3	7	40	1.602	18	28.84
<i>Glossosoma sp.</i>	5	4	6	15	85	1.929	24	46.31
Limnephilidae	1	2	2	5	28	1.447	108	156.29
DIPTERA - true flies								
Simuliidae	1	2	0	3	17	1.230	108	132.89
<i>Tvetenia sp.</i>	0	7	0	7	40	1.602	108	173.02
<i>Nostocladus sp.</i>	35	17	0	52	295	2.470	108	266.74
<i>Chelifera sp.</i>	0	2	0	2	11	1.041	95	98.93
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	2	9	12	23	130	2.114	108	228.31
ANNELIDA - segmented worms								
Naididae	0	1	0	1	6	0.778	108	84.04
PLATYHELMINTHES - flatworms								
Turbellaria	0	2	0	2	11	1.041	108	112.47
Totals					2450	35.804	1289	1993.68
Total Taxa	22							
CTQp	50							
CTQa	58.6							
CTQd	55.7							
BCI	89.79							
Diversity Index	3.36							
Stream gradient (% slope):						1.3 - 3.0		
Substrate (composition):						rubble		
Sulfate (mg/l SO4):						< 50		
Total Alkalinity (mg/l CaCO3):						127		

Holy Ghost Creek, above campground, Santa Fe National Forest
Station 1

16 June 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
Leuctridae	1	0	0	1	6	0.778	18	14.01
<i>Skwala parallela</i>	2	4	1	7	40	1.602	18	28.84
<i>Diura knowltoni</i>	1	2	0	3	17	1.230	24	29.53
<i>Hesperoperla pacifica</i>	1	3	2	6	34	1.531	18	27.57
EPHEMEROPTERA - mayflies								
<i>Ameletus sp.</i>	0	3	0	3	17	1.230	48	59.06
<i>Baetis tricaudatus</i>	19	12	9	40	227	2.356	72	169.63
<i>Cinygmula sp.</i>	10	4	2	16	91	1.959	30	58.77
<i>Rhithrogena sp.</i>	5	4	2	11	62	1.792	21	37.64
<i>Epeorus sp.</i>	11	2	2	15	85	1.929	21	40.52
<i>Paraleptophlebia sp.</i>	1	4	3	8	45	1.653	24	39.68
<i>Drunella coloradensis</i>	6	0	0	6	34	1.531	18	27.57
<i>Ephemerella infrequens</i>	0	2	0	2	11	1.041	48	49.99
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea cpx.</i>	4	6	5	15	85	1.929	18	34.73
<i>Rhyacophila valuma</i>	1	1	3	5	28	1.447	18	26.05
<i>Polycentropus sp.</i>	0	0	1	1	6	0.778	108	84.04
<i>Oligophlebodes sp.</i>	3	6	2	11	62	1.792	24	43.02
<i>Micrasema sp.</i>	1	2	1	4	23	1.362	24	32.68
DIPTERA - true flies								
<i>Antocha monticola</i>	0	5	12	17	96	1.982	24	47.57
Simuliidae	1	1	6	8	45	1.653	108	178.55
<i>Eukiefferiella sp.</i>	3	7	1	11	62	1.792	108	193.58
<i>Cricotopus sp.</i>	3	4	1	8	45	1.653	108	178.55
<i>Nostocladus sp.</i>	31	3	2	36	204	2.310	108	249.44
<i>Micropsectra sp.</i>	2	12	0	14	79	1.898	108	204.94
Ceratopogonidae	1	3	0	4	23	1.362	108	147.07
<i>Chelifera sp.</i>	0	2	0	2	11	1.041	95	98.93
COLEOPTERA - beetles								
<i>Enochrous sp.</i>	1	1	1	3	17	1.230	72	88.59
<i>Heterlimnius corpulentus</i>	10	12	20	42	238	2.377	108	256.67
ANNELIDA - segmented worms								
Naididae	1	0	0	1	6	0.778	108	84.04
Lumbricidae	4	4	1	9	51	1.708	108	184.42
ARTHROPODA - other arthropods								
Hydracarina A - mites	0	2	0	2	11	1.041	108	112.47
Totals					1761	46.770	1823	2828.13

Total Taxa 30
CTQp 50
CTQa 60.8
CTQd 60.5
BCI 82.69
Diversity Index 4.28

Stream gradient (% slope): 1.3 - 3.0
Substrate (composition): rubble/moss
Sulfate (mg/l SO4): < 50
Total Alkalinity (mg/l CaCO3): 53

Holy Ghost Creek, below campground, Santa Fe National Forest
Station 2

16 June 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	1	0	0	1	6	0.778	6	4.67
<i>Skwala parallela</i>	0	2	0	2	11	1.041	18	18.75
<i>Hesperoperla pacifica</i>	3	4	6	13	74	1.869	18	33.65
EPHEMEROPTERA - mayflies								
<i>Baetis tricaudatus</i>	27	29	32	88	499	2.698	72	194.26
<i>Cinygmula</i> sp.	4	8	6	18	102	2.009	30	60.26
<i>Rhithrogena</i> sp.	0	0	5	5	28	1.447	21	30.39
<i>Epeorus</i> sp.	1	7	5	13	74	1.869	21	39.25
<i>Drunella doddsi</i>	0	1	1	2	11	1.041	4	4.17
<i>Ephemerella infrequens</i>	1	0	0	1	6	0.778	48	37.35
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	4	4	6	14	79	1.898	18	34.16
<i>Rhyacophila valuma</i>	1	0	0	1	6	0.778	18	14.01
<i>Arctopsyche grandis</i>	2	3	1	6	34	1.531	18	27.57
<i>Oligophlebodes</i> sp.	0	4	0	4	23	1.362	24	32.68
<i>Micrasema</i> sp.	7	7	3	17	96	1.982	24	47.57
DIPTERA - true flies								
<i>Antocha monticola</i>	3	7	5	15	85	1.929	24	46.31
<i>Simulium</i> sp.	3	3	3	9	51	1.708	108	184.42
<i>Eukiefferiella</i> sp.	3	1	1	5	28	1.447	108	156.29
<i>Cricotopus</i> sp.	2	6	3	11	62	1.792	108	193.58
<i>Nostocladus</i> sp.	5	8	13	26	147	2.167	108	234.07
<i>Micropsectra</i> sp.	2	1	1	4	23	1.362	108	147.07
Ceratopogonidae	1	0	0	1	6	0.778	108	84.04
<i>Chelifera</i> sp.	6	1	3	10	57	1.756	95	166.81
COLEOPTERA - beetles								
<i>Zaitzevia parvula</i>	1	3	1	5	28	1.447	108	156.29
<i>Narpus</i> sp.	2	3	0	5	28	1.447	108	156.29
<i>Heterlimnius corpulentus</i>	4	11	6	21	119	2.076	108	224.16
ANNELIDA - segmented worms								
Naididae	1	0	0	1	6	0.778	108	84.04
Lumbricidae	7	2	0	9	51	1.708	108	184.42
Totals					1740	41.478	1647	2596.51
Total Taxa	27							
CTQp	50							
CTQa	61							
CTQd	62.6							
BCI	79.87							
Diversity Index	3.88							
				Stream gradient (% slope): 1.3 - 3.0				
				Substrate (composition): rubble/moss				
				Sulfate (mg/l SO4): < 50				
				Total Alkalinity (mg/l CaCO3): 53				

Rio en Medio, above ski area, Santa Fe N. F.
23 June 1990

Station 1

	Q1	Q2	Total #/m2		log x	TQ	log x * TQ
PLECOPTERA - stoneflies							
<i>Amphinemura banksii</i>	9	3	12	102	2.009	6	12.05
<i>Kogotus modestus</i>	8	0	8	68	1.833	18	32.99
<i>Isoperla sp.</i>	1	0	1	9	0.954	48	45.80
EPHEMEROPTERA - mayflies							
<i>Ameletus sp.</i>	0	1	1	9	0.954	48	45.80
<i>Baetis insignificans</i>	17	28	45	383	2.583	72	185.99
<i>Cinygmula sp.</i>	13	8	21	179	2.253	30	67.59
<i>Rhithrogena sp.</i>	0	1	1	9	0.954	21	20.04
<i>Drunella grandis</i>	11	2	13	111	2.045	24	49.09
<i>Ephemerella infrequens</i>	1	1	2	17	1.230	48	59.06
TRICHOPTERA - caddisflies							
<i>Rhyacophila iranda</i>	57	25	82	697	2.843	18	51.18
<i>Rhyacophila valuma</i>	2	0	2	17	1.230	18	22.15
<i>Rhyacophila coloradensis</i>	0	1	1	9	0.954	18	17.18
<i>Rhyacophila hyalinata</i>	2	0	2	17	1.230	18	22.15
Limnephilidae	0	2	2	17	1.230	108	132.89
<i>Limnephilus sp.</i>	1	3	4	34	1.531	108	165.40
DIPTERA - true flies							
Chironomidae C	4	2	6	51	1.708	108	184.42
<i>Cricotopus sp.</i>	4	1	5	43	1.633	108	176.41
<i>Nostocladius sp.</i>	17	21	38	323	2.509	108	270.99
<i>Micropsectra sp.</i>	21	16	37	315	2.498	108	269.82
<i>Paraphaenocladus sp.</i>	5	0	5	43	1.633	108	176.41
Ceratopogonidae	2	1	3	26	1.415	108	152.82
<i>Chelifera sp.</i>	1	4	5	43	1.633	95	155.18
COLEOPTERA - beetles							
<i>Heterlimnius corpulentus</i>	14	17	31	264	2.422	108	261.53
MOLLUSCA - snails/clams							
Sphaeriidae	0	1	1	9	0.954	108	103.06
ANNELIDA - segmented worms							
Naididae	0	1	1	9	0.954	108	103.06
PLATYHELMINTHES - flatworms							
Turbellaria	3	3	6	51	1.708	108	184.42
ARTHROPODA - other arthropods							
Hydracarina A - mites	6	3	9	77	1.886	108	203.74
Totals				2932	44.791	1886	3171.21
Total Taxa 27							
CTQp 50							
CTQa 69.9							
CTQd 70.8							
BCI 70.62							
Diversity Index 3.68							
Stream gradient (% slope): > 3							
Substrate (composition): rubble (smooth)							
Sulfate (mg/l SO4): < 50							
Total Alkalinity (mg/l CaCO3): 13							

Rio en Medio, 200 m. below parking lot, Santa Fe N. F. Station 2
23 June 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura banksii</i>	2	0	2	4	23	1.362	6	8.17
Capniidae	0	1	0	1	6	0.778	32	24.90
<i>Cultus aestivalis</i>	1	0	0	1	6	0.778	12	9.34
EPHEMEROPTERA - mayflies								
<i>Baetis insignificans</i>	19	22	16	57	323	2.509	72	180.66
<i>Cinygmula sp.</i>	2	1	4	7	40	1.602	30	48.06
<i>Epeorus sp.</i>	0	0	2	2	11	1.041	21	21.87
<i>Drunella grandis</i>	3	11	13	27	153	2.185	24	52.43
<i>Drunella doddsi</i>	0	3	3	6	34	1.531	4	6.13
TRICHOPTERA - caddisflies								
<i>Rhyacophila iranda</i>	1	0	1	2	11	1.041	18	18.75
<i>Rhyacophila coloradensis</i>	1	0	1	2	11	1.041	18	18.75
<i>Rhyacophila hyalinata</i>	4	3	4	11	62	1.792	18	32.26
<i>Arctopsyche grandis</i>	0	1	4	5	28	1.447	18	26.05
Limnephilidae	0	0	1	1	6	0.778	108	84.04
<i>Limnephilus sp.</i>	0	1	0	1	6	0.778	108	84.04
<i>Oligophlebodes sp.</i>	0	0	11	11	62	1.792	24	43.02
<i>Micrasema sp.</i>	0	0	3	3	17	1.230	24	29.53
DIPTERA - true flies								
<i>Tipula sp.</i>	0	0	2	2	11	1.041	36	37.49
<i>Cricotopus sp.</i>	0	1	0	1	6	0.778	108	84.04
<i>Nostocladus sp.</i>	5	0	1	6	34	1.531	108	165.40
<i>Micropsectra sp.</i>	0	2	1	3	17	1.230	108	132.89
<i>Paraphaenocladus sp.</i>	0	2	1	3	17	1.230	108	132.89
<i>Chelifera sp.</i>	0	0	3	3	17	1.230	95	116.89
<i>Oreogeton sp.</i>	0	0	4	4	23	1.362	95	129.36
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	3	0	1	4	23	1.362	108	147.07
Totals					947	31.454	1303	1634.02
Total Taxa	24							
CTQp	50							
CTQa	54.3							
CTQd	51.9							
BCI	96.25							
Diversity Index	3.49							
Stream gradient (% slope): > 3								
Substrate (composition): rubble/sand (imb)								
Sulfate (mg/l SO4): < 50								
Total Alkalinity (mg/l CaCO3): 20								

Rio en Medio, at Aspen Ranch, Santa Fe N. F.
23 June 1990

Station 3

	Q1	Q2	Total #/m2		log x	TQ	log x * TQ
PLECOPTERA - stoneflies							
<i>Amphinemura banksii</i>	4	0	4	34	1.531	6	9.19
Capniidae	2	1	3	26	1.415	32	45.28
<i>Megarcys signata</i>	3	0	3	26	1.415	24	33.96
<i>Kogotus modestus</i>	2	1	3	26	1.415	18	25.47
<i>Isoperla</i> sp.	0	1	1	9	0.954	48	45.80
Chloroperlidae B	1	0	1	9	0.954	24	22.90
EPHEMEROPTERA - mayflies							
<i>Baetis insignificans</i>	21	8	29	247	2.393	72	172.27
<i>Cinygmula</i> sp.	2	2	4	34	1.531	30	45.94
<i>Epeorus</i> sp.	2	2	4	34	1.531	21	32.16
<i>Drunella grandis</i>	18	11	29	247	2.393	24	57.42
<i>Drunella doddsi</i>	0	1	1	9	0.954	4	3.82
<i>Ephemerella infrequens</i>	0	2	2	17	1.230	48	59.06
TRICHOPTERA - caddisflies							
<i>Rhyacophila brunea</i> cpx.	4	3	7	60	1.778	18	32.01
<i>Rhyacophila iranda</i>	3	2	5	43	1.633	18	29.40
<i>Rhyacophila valuma</i>	2	8	10	85	1.929	18	34.73
<i>Rhyacophila hyalinata</i>	3	4	7	60	1.778	18	32.01
<i>Arctopsyche grandis</i>	1	6	7	60	1.778	18	32.01
<i>Oligophlebodes</i> sp.	4	18	22	187	2.272	24	54.52
<i>Psychoronia</i> sp.	1	0	1	9	0.954	24	22.90
<i>Micrasema</i> sp.	2	3	5	43	1.633	24	39.20
DIPTERA - true flies							
<i>Bibiocephala grandis</i>	2	1	3	26	1.415	2	2.83
<i>Tvetenia</i> sp.	1	1	2	17	1.230	108	132.89
<i>Cricotopus</i> sp.	0	1	1	9	0.954	108	103.06
<i>Paraphaenocladus</i> sp.	2	1	3	26	1.415	108	152.82
Ceratopogonidae	1	0	1	9	0.954	108	103.06
<i>Chelifera</i> sp.	8	3	11	94	1.973	95	187.45
<i>Hemerodromia</i> sp.	2	2	4	34	1.531	95	145.49
COLEOPTERA - beetles							
<i>Heterlimnius corpulentus</i>	4	5	9	77	1.886	108	203.74
ANNELIDA - segmented worms							
Lumbricidae	3	1	4	34	1.531	108	165.40
Totals				1591	44.366	1353	2026.80

Total Taxa 29
CTQp 50
CTQa 46.7
CTQd 45.7
BCI 109.45
Diversity Index 4.16

Stream gradient (% slope): > 3.0
Substrate (composition): rubble (imb)
Sulfate (mg/l SO4): < 50
Total Alkalinity (mg/l CaCO3): 19

Rio Guaje, above reservoir, Santa Fe National Forest Station 1 2 July 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura sp.</i>	22	3	24	49	278	2.444	6	14.66
<i>Pteronarcella badia</i>	0	0	2	2	11	1.041	24	24.99
<i>Kogotus modestus</i>	0	0	5	5	28	1.447	18	26.05
<i>Isoperla sp.</i>	3	0	0	3	17	1.230	48	59.06
<i>Suwallia sp.</i>	0	0	11	11	62	1.792	24	43.02
EPHEMEROPTERA - mayflies								
<i>Ameletus sp.</i>	3	0	1	4	23	1.362	48	65.36
<i>Baetis tricaudatus</i>	2	2	4	8	45	1.653	72	119.03
<i>Cinygmula sp.</i>	44	17	28	89	505	2.703	30	81.10
<i>Epeorus sp.</i>	0	4	5	9	51	1.708	21	35.86
<i>Drunella coloradensis</i>	4	4	6	14	79	1.898	18	34.16
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea cpx.</i>	1	1	3	5	28	1.447	18	26.05
<i>Glossosoma sp.</i>	0	0	1	1	6	0.778	24	18.68
<i>Anagapetus sp.</i>	1	0	0	1	6	0.778	24	18.68
Hydroptilidae	1	0	0	1	6	0.778	108	84.04
Limnephilidae	2	1	2	5	28	1.447	108	156.29
Lepidostomatidae	5	0	11	16	91	1.959	18	35.26
DIPTERA - true flies								
<i>Eukiefferiella sp.</i>	9	1	3	13	74	1.869	108	201.88
<i>Cricotopus sp.</i>	10	0	2	12	68	1.833	108	197.91
<i>Ceratopogonidae</i>	0	1	2	3	17	1.230	108	132.89
<i>Chelifera sp.</i>	0	0	2	2	11	1.041	95	98.93
<i>Oreogeton sp.</i>	0	0	3	3	17	1.230	95	116.89
COLEOPTERA - beetles								
<i>Narpus sp.</i>	2	0	3	5	28	1.447	108	156.29
<i>Heterlimnius corpulentus</i>	85	31	99	215	1219	3.086	108	333.29
MOLLUSCA - snails/clams								
<i>Sphaeriidae</i>	7	1	5	13	74	1.869	108	201.88
PLATYHELMINTHES - flatworms								
<i>Turbellaria</i>	3	0	2	5	28	1.447	108	156.29
ARTHROPODA - other arthropods								
Hydracarina A - mites	1	1	0	2	11	1.041	108	112.47
	0	1	4	5	28	1.447	0	0.00
Totals					2839	42.009	1663	2551.01
Summary Statistics								
Total Taxa	27							
CTQp	50							
CTQa	61.6							
CTQd	60.7							
BCI	82.34							
Diversity Index	3.05							
Stream gradient (% slope):						1.3 - 3.0		
Substrate (composition):						rubble (imb)		
Sulfate (mg/l SO4):						< 50		
Total Alkalinity (mg/l CaCO3):						85		

Rio de Las Vacas, above barrier, Santa Fe National Forest

Station 1

7 July 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Cultus aestivalis</i>	0	1	0	1	6	0.778	12	9.34
Chloroperlidae A	2	0	3	5	28	1.447	24	34.73
<i>Sweltsa sp.</i>	0	5	0	5	28	1.447	24	34.73
<i>Hesperoperla pacifica</i>	0	0	1	1	6	0.778	18	14.01
EPHEMEROPTERA - mayflies								
<i>Ameletus sp.</i>	2	2	7	11	62	1.792	48	86.03
<i>Baetis tricaudatus</i>	1	2	4	7	40	1.602	72	115.35
<i>Cinygmula sp.</i>	22	27	4	53	301	2.479	30	74.36
<i>Epeorus sp.</i>	0	1	0	1	6	0.778	21	16.34
TRICHOPTERA - caddisflies								
<i>Rhyacophila valuma</i>	1	0	0	1	6	0.778	18	14.01
Leptoceridae	12	14	33	59	335	2.525	54	136.35
DIPTERA - true flies								
<i>Dixa sp.</i>	0	0	1	1	6	0.778	108	84.04
Simuliidae	4	1	1	6	34	1.531	108	165.40
<i>Tvetenia sp.</i>	0	0	2	2	11	1.041	108	112.47
<i>Cricotopus sp.</i>	0	0	1	1	6	0.778	108	84.04
<i>Oreogeton sp.</i>	1	0	0	1	6	0.778	95	73.92
COLEOPTERA - beetles								
Dytiscidae	0	0	1	1	6	0.778	72	56.03
<i>Heterlimnius corpulentus</i>	12	8	1	21	119	2.076	108	224.16
PLATYHELMINTHES - flatworms								
Turbellaria	0	1	0	1	6	0.778	108	84.04
Totals					1012	22.944	1136	1419.35

Total Taxa 18
 CTQp 50
 CTQa 63.1
 CTQd 61.9
 BCI 80.83
 Diversity Index 2.76

Stream gradient (% slope): > 3.0
 Substrate (composition): boulder/rubble(imb)
 Sulfate (mg/l SO4): < 50
 Total Alkalinity (mg/l CaCO3): 23

Rio Puerco above Rio Puerco Cpgd, Santa Fe National Forest

Station 1

6 July 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	113	11	26	150	851	2.930	6	17.58
<i>Pteronarcella badia</i>	3	0	0	3	17	1.230	24	29.53
<i>Cultus aestivalis</i>	0	1	0	1	6	0.778	12	9.34
<i>Kogotus modestus</i>	0	0	3	3	17	1.230	18	22.15
<i>Suwallia</i> sp.	4	0	2	6	34	1.531	24	36.76
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	0	0	1	1	6	0.778	48	37.35
<i>Baetis tricaudatus</i>	51	28	33	112	635	2.803	72	201.80
<i>Heptagenia</i> sp.	0	3	5	8	45	1.653	54	89.27
<i>Paraleptophlebia</i> sp.	3	0	1	4	23	1.362	24	32.68
<i>Serratella tibialis</i>	3	4	7	14	79	1.898	24	45.54
<i>Ephemerella infrequens</i>	3	0	4	7	40	1.602	48	76.90
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	33	24	12	69	391	2.592	18	46.66
<i>Rhyacophila valuma</i>	1	1	0	2	11	1.041	18	18.75
<i>Agraylea</i> sp.	0	6	31	37	210	2.322	108	250.80
<i>Psychoronia</i> sp.	0	1	3	4	23	1.362	24	32.68
<i>Micrasema</i> sp.	2	1	0	3	17	1.230	24	29.53
DIPTERA - true flies								
<i>Antocha monticola</i>	0	1	1	2	11	1.041	24	24.99
<i>Dicranota</i> sp.	0	1	2	3	17	1.230	24	29.53
Simuliidae	1	0	1	2	11	1.041	108	112.47
Chironomidae A	7	4	2	13	74	1.869	108	201.88
<i>Procladius</i> sp.	23	3	8	34	193	2.286	108	246.84
Ceratopogonidae	6	0	6	12	68	1.833	108	197.91
<i>Odontomyia</i> sp.	6	0	1	7	40	1.602	108	173.02
<i>Chelifera</i> sp.	1	2	2	5	28	1.447	95	137.48
COLEOPTERA - beetles								
<i>Helichus</i> sp.	1	0	0	1	6	0.778	72	56.03
<i>Narpus</i> sp.	0	0	4	4	23	1.362	108	147.07
<i>Heterlimnius corpulentus</i>	6	4	12	22	125	2.097	108	226.47
ANNELIDA - segmented worms								
Naididae	1	0	0	1	6	0.778	108	84.04
PLATYHELMINTHES - flatworms								
Turbellaria	9	0	0	9	51	1.708	108	184.42
ARTHROPODA - other arthropods								
Hydracarina A - mites	1	0	5	6	34	1.531	108	165.40
Totals					3092	46.948	1841	2964.86
Total Taxa	30							
CTQp	50							
CTQa	61.4							
CTQd	63.2							
BCI	79.17							
Diversity Index	3.48							
					Stream gradient (% slope): 1.3 - 3.0			
					Substrate (composition): rubble/CaCO3 (imb.)			
					Sulfate (mg/l SO4): < 50			
					Total Alkalinity (mg/l CaCO3): 157			

East Fork Jemez River, near Las Conchas site, Santa Fe National Forest

Station 1

7 July 199

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	37	0	6	43	244	2.387	6	14.32
<i>Skwala parallela</i>	0	0	1	1	6	0.778	18	14.01
<i>Cultus aestivalis</i>	1	0	1	2	11	1.041	12	12.50
<i>Hesperoperla pacifica</i>	3	0	1	4	23	1.362	18	24.51
EPHEMEROPTERA - mayflies								
<i>Baetis tricaudatus</i>	6	12	11	29	164	2.215	72	159.47
<i>Cinygmula</i> sp.	75	26	25	126	714	2.854	30	85.61
<i>Paraleptophlebia</i> sp.	17	2	12	31	176	2.246	24	53.89
<i>Tricorythodes</i> sp.	1	4	0	5	28	1.447	108	156.29
<i>Ephemerella infrequens</i>	27	25	28	80	454	2.657	48	127.54
TRICHOPTERA - caddisflies								
<i>Glossosoma</i> sp.	0	1	0	1	6	0.778	24	18.68
<i>Polycentropus</i> sp.	1	1	0	2	11	1.041	108	112.47
<i>Hydropsyche venada</i>	13	6	1	20	113	2.053	108	221.73
<i>Cheumatopsyche</i> sp.	13	1	5	19	108	2.033	108	219.61
<i>Stactobiella</i> sp.	0	7	14	21	119	2.076	108	224.16
<i>Psychoronia</i> sp.	2	0	0	2	11	1.041	24	24.99
Leptoceridae	0	0	2	2	11	1.041	54	56.24
<i>Brachycentrus</i> sp.	12	1	0	13	74	1.869	24	44.86
<i>Helicopsyche borealis</i>	1	1	20	22	125	2.097	18	37.74
DIPTERA - true flies								
<i>Holorusia grandis</i>	0	3	2	5	28	1.447	72	104.20
<i>Tipula</i> sp.	1	2	4	7	40	1.602	36	57.67
Simuliidae	18	0	36	54	306	2.486	108	268.46
Chironomidae A	15	1	0	16	91	1.959	108	211.58
<i>Eukiefferiella</i> sp.	9	0	4	13	74	1.869	108	201.88
<i>Cricotopus</i> sp.	8	1	3	12	68	1.833	108	197.91
<i>Nostocladus</i> sp.	0	1	16	17	96	1.982	108	214.09
<i>Paraphaenocladus</i> sp.	8	1	17	26	147	2.167	108	234.07
Ceratopogonidae	0	0	2	2	11	1.041	108	112.47
<i>Tabanus</i> sp.	1	0	0	1	6	0.778	108	84.04
<i>Hemerodromia</i> sp.	1	0	0	1	6	0.778	95	73.92
ODONATA - damsel/dragonflies								
<i>Ophiogomphus</i> sp.	0	0	1	1	6	0.778	108	84.04
HEMIPTERA - true bugs								
<i>Ambrysus mormon</i>	17	2	17	36	204	2.310	72	166.29
COLEOPTERA - beetles								
<i>Helichus</i> sp.	1	0	0	1	6	0.778	72	56.03
<i>Heterlimnius corpulentus</i>	74	21	86	181	1026	3.011	108	325.20
MOLLUSCA - snails/clams								
Planorbidae	1	3	20	24	136	2.134	108	230.42
ANNELIDA - segmented worms								
<i>Erpobdella</i> sp.	1	1	0	2	11	1.041	108	112.47
Naididae	0	1	12	13	74	1.869	108	201.88
Lumbricidae	9	8	1	18	102	2.009	108	216.93
Totals					4836	62.890	2771	4762.17

Total Taxa 37
 CTQp 50
 CTQa 74.9
 CTQd 75.7
 BCI 66.03
 Diversity Index 4.09

Stream gradient (% slope): 1.3 - 3.0
 Substrate (composition): rubble (veg)
 Sulfate (mg/l SO₄): < 50
 Total Alkalinity (mg/l CaCO₃): 75

East Fork Jemez River, below Las Conchas site, Santa Fe National Forest
Station 2 7 July 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	30	132	36	198	1123	3.050	6	18.30
Capniidae	1	0	0	1	6	0.778	32	24.90
<i>Claassenia sabulosa</i>	0	0	1	1	6	0.778	6	4.67
<i>Hesperoperla pacifica</i>	4	16	3	23	130	2.114	18	38.05
EPHEMEROPTERA - mayflies								
<i>Baetis tricaudatus</i>	6	29	25	60	340	2.531	72	182.27
<i>Cinygmula</i> sp.	33	24	52	109	618	2.791	30	83.73
<i>Epeorus</i> sp.	3	1	1	5	28	1.447	21	30.39
<i>Paraleptophlebia</i> sp.	0	8	12	20	113	2.053	24	49.27
<i>Traverella</i> sp.	0	1	6	7	40	1.602	45	72.09
<i>Ephemerella infrequens</i>	3	22	22	47	266	2.425	48	116.39
TRICHOPTERA - caddisflies								
<i>Polycentropus</i> sp.	0	0	1	1	6	0.778	108	84.04
<i>Hydropsyche cockerelli</i>	5	3	2	10	57	1.756	108	189.63
<i>Cheumatopsyche</i> sp.	8	45	5	58	329	2.517	108	271.86
<i>Ochrotrichia</i> sp.	0	12	1	13	74	1.869	108	201.88
Limnephilidae	0	1	0	1	6	0.778	108	84.04
<i>Brachycentrus</i> sp.	3	1	0	4	23	1.362	24	32.68
<i>Micrasema</i> sp.	1	0	0	1	6	0.778	24	18.68
<i>Helicopsyche borealis</i>	1	3	0	4	23	1.362	18	24.51
DIPTERA - true flies								
<i>Antocha monticola</i>	1	3	0	4	23	1.362	24	32.68
<i>Dicranota</i> sp.	1	1	0	2	11	1.041	24	24.99
<i>Hexatoma</i> A	1	0	0	1	6	0.778	36	28.01
<i>Tipula</i> sp.	1	0	3	4	23	1.362	36	49.02
Simuliidae	15	12	6	33	187	2.272	108	245.36
Chironomidae A	0	15	2	17	96	1.982	108	214.09
<i>Eukiefferiella</i> sp.	1	5	1	7	40	1.602	108	173.02
<i>Cricotopus</i> sp.	9	21	6	36	204	2.310	108	249.44
<i>Nostocladius</i> sp.	5	39	5	49	278	2.444	108	263.96
Ceratopogonidae	0	4	0	4	23	1.362	108	147.07
<i>Tabanus</i> sp.	1	0	0	1	6	0.778	108	84.04
<i>Protandrus</i> sp.	0	19	10	29	164	2.215	95	210.41
ODONATA - damsel/dragonflies								
Gomphidae	0	1	0	1	6	0.778	108	84.04
HEMIPTERA - true bugs								
<i>Ambrysus mormon</i>	1	5	8	14	79	1.898	72	136.63
COLEOPTERA - beetles								
<i>Zaitzevia parvula</i>	6	16	15	37	210	2.322	108	250.80
<i>Narpus</i> sp.	0	3	0	3	17	1.230	108	132.89
<i>Heterlimnius corpulentus</i>	31	37	18	86	488	2.688	108	290.35
MOLLUSCA - snails/clams								
Planorbidae	0	16	11	27	153	2.185	108	235.95
<i>Physa</i> sp.	0	5	3	8	45	1.653	108	178.55
Sphaeriidae	0	0	1	1	6	0.778	108	84.04
ANNELIDA - segmented worms								
<i>Erpobdella</i> sp.	1	0	0	1	6	0.778	108	84.04
Naididae	0	9	0	9	51	1.708	108	184.42
Lumbricidae	12	1	8	21	119	2.076	108	224.16
ARTHROPODA - other arthropods								
Hydracarina A - mites	0	1	0	1	6	0.778	108	84.04
Totals					5441	69.150	3139	5219.38
Total Taxa	42							
CTQp	50							
CTQa	74.7							
CTQd	75.5							
BCI	66.24							
Diversity Index	4.19							
Stream gradient (% slope):						1.3 - 3.0		
Substrate (composition):						rubble (veg)		
Sulfate (mg/l SO4):						< 50		
Total Alkalinity (mg/l CaCO3):						75		

Santa Fe River, above reservoirs, Santa Fe National Forest

Station 1

20 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura banksii</i>	27	10	45	82	465	2.667	6	16.00
<i>Taenionema</i> sp.	3	3	3	9	51	1.708	48	81.96
Leuctridae	4	11	2	17	96	1.982	18	35.68
<i>Cultus aestivalis</i>	1	2	3	6	34	1.531	12	18.38
<i>Isoperla</i> sp.	1	0	1	2	11	1.041	48	49.99
<i>Sweltsa</i> sp.	0	1	0	1	6	0.778	24	18.68
<i>Hesperoperla pacifica</i>	0	3	4	7	40	1.602	18	28.84
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	0	2	0	2	11	1.041	48	49.99
<i>Baetis tricaudatus</i>	5	4	3	12	68	1.833	72	131.94
<i>Heptagenia</i> sp.	0	2	0	2	11	1.041	54	56.24
<i>Rhithrogena</i> sp.	2	3	2	7	40	1.602	21	33.64
<i>Drunella doddsi</i>	2	5	3	10	57	1.756	4	7.02
<i>Ephemerella infrequens</i>	4	35	10	49	278	2.444	48	117.31
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	4	2	2	8	45	1.653	18	29.76
<i>Rhyacophila hyalinata</i>	7	10	8	25	142	2.152	18	38.74
<i>Arctopsyche grandis</i>	11	9	19	39	221	2.344	18	42.20
<i>Oligophlebodes</i> sp.	0	9	0	9	51	1.708	24	40.98
<i>Lepidostoma</i> sp.	1	0	0	1	6	0.778	18	14.01
<i>Micrasema</i> sp.	0	0	1	1	6	0.778	24	18.68
DIPTERA - true flies								
<i>Antocha monticola</i>	0	1	1	2	11	1.041	24	24.99
<i>Dicranota</i> sp.	1	0	3	4	23	1.362	24	32.68
<i>Hexatoma</i> A	0	2	0	2	11	1.041	36	37.49
<i>Tipula</i> sp.	0	1	0	1	6	0.778	36	28.01
<i>Pericoma</i> sp.	0	3	0	3	17	1.230	36	44.30
<i>Eukiefferiella</i> sp.	0	1	0	1	6	0.778	108	84.04
<i>Cricotopus</i> sp.	1	7	0	8	45	1.653	108	178.55
<i>Nostocladus</i> sp.	2	9	2	13	74	1.869	108	201.88
<i>Micropsectra</i> sp.	0	7	0	7	40	1.602	108	173.02
<i>Oreogeton</i> sp.	0	1	1	2	11	1.041	95	98.93
<i>Hemerodromia</i> sp.	1	0	0	1	6	0.778	95	73.92
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	1	7	0	8	45	1.653	108	178.55
Totals					1934	45.270	1427	1986.40
Total Taxa	31							
CTQp	50							
CTQa	46							
CTQd	43.9							
BCI	113.95							
Diversity Index	3.90							
Stream gradient (% slope): 1.3 - 3.0								
Substrate (composition): rubble								
Sulfate (mg/l SO4): < 50								
Total Alkalinity (mg/l CaCO3): 51								

Rio Frijoles at Wilderness Boundary, Santa Fe National Forest
Station 1

17 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura banksii</i>	17	6	11	34	193	2.286	6	13.71
Capniidae	0	0	2	2	11	1.041	32	33.32
<i>Taenionema sp.</i>	1	0	0	1	6	0.778	48	37.35
<i>Pteronarcella badia</i>	1	4	4	9	51	1.708	24	40.98
<i>Isoperla sp.</i>	2	0	0	2	11	1.041	48	49.99
Chloroperlidae A	9	5	0	14	79	1.898	24	45.54
<i>Sweltsa sp.</i>	2	1	1	4	23	1.362	24	32.68
<i>Hesperoperla pacifica</i>	1	3	1	5	28	1.447	18	26.05
EPHEMEROPTERA - mayflies								
<i>Baetis tricaudatus</i>	3	2	2	7	40	1.602	72	115.35
<i>Rhithrogena sp.</i>	9	9	5	23	130	2.114	21	44.39
<i>Drunella grandis</i>	1	2	1	4	23	1.362	24	32.68
<i>Drunella doddsi</i>	0	1	0	1	6	0.778	4	3.11
<i>Ephemerella infrequens</i>	14	25	12	51	289	2.461	48	118.12
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea cpx.</i>	2	1	4	7	40	1.602	18	28.84
<i>Rhyacophila hyalinata</i>	1	0	0	1	6	0.778	18	14.01
<i>Hydropsyche venada</i>	0	19	20	39	221	2.344	108	253.19
<i>Arctopsyche grandis</i>	8	2	3	13	74	1.869	18	33.65
<i>Psychoronia sp.</i>	2	1	1	4	23	1.362	24	32.68
<i>Micrasema sp.</i>	1	0	0	1	6	0.778	24	18.68
DIPTERA - true flies								
<i>Antocha monticola</i>	0	0	2	2	11	1.041	24	24.99
<i>Dicranota sp.</i>	0	0	2	2	11	1.041	24	24.99
<i>Tipula sp.</i>	1	0	0	1	6	0.778	36	28.01
<i>Pericoma sp.</i>	1	0	0	1	6	0.778	36	28.01
<i>Eukiefferiella sp.</i>	0	0	1	1	6	0.778	108	84.04
<i>Nostocladus sp.</i>	2	34	0	36	204	2.310	108	249.44
<i>Oreogeton sp.</i>	0	1	0	1	6	0.778	95	73.92
Totals					1510	36.116	1034	1487.75

Total Taxa 26
CTQp 50
CTQa 39.8
CTQd 41.2
BCI 121.38
Diversity Index 3.66

Stream gradient (% slope): 1.3 - 3.0
Substrate (composition): rubble (smooth)/sand
Sulfate (mg/l SO4): < 50
Total Alkalinity (mg/l CaCO3): 51

Cow Creek, upper site, Santa Fe National Forest
13 November 1990

Station 1

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Zapada sp.</i>	1	8	3	12	68	1.833	16	29.32
<i>Megarcys signata</i>	1	3	1	5	28	1.447	24	34.73
Chloroperlidae A	0	0	6	6	34	1.531	24	36.76
<i>Sweltsa sp.</i>	3	2	1	6	34	1.531	24	36.76
Perlidae	2	5	3	10	57	1.756	24	42.14
EPHEMEROPTERA - mayflies								
<i>Ameletus sp.</i>	3	0	4	7	40	1.602	48	76.90
<i>Cinygmula sp.</i>	1	7	9	17	96	1.982	30	59.47
<i>Drunella doddsi</i>	1	0	0	1	6	0.778	4	3.11
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea cpx.</i>	2	32	0	34	193	2.286	18	41.14
<i>Rhyacophila iranda</i>	15	10	33	58	329	2.517	18	45.31
<i>Rhyacophila valuma</i>	0	11	0	11	62	1.792	18	32.26
<i>Rhyacophila hyalinata</i>	1	1	0	2	11	1.041	18	18.75
<i>Anagapetus sp.</i>	0	0	2	2	11	1.041	24	24.99
<i>Limnephilus sp.</i>	21	28	56	105	595	2.775	108	299.65
DIPTERA - true flies								
<i>Dicranota sp.</i>	0	0	1	1	6	0.778	24	18.68
<i>Limonia sp.</i>	0	1	1	2	11	1.041	36	37.49
<i>Pericoma sp.</i>	0	1	0	1	6	0.778	36	28.01
<i>Dixa sp.</i>	1	0	0	1	6	0.778	108	84.04
<i>Eukiefferiella sp.</i>	4	7	3	14	79	1.898	108	204.94
<i>Tvetenia sp.</i>	0	0	2	2	11	1.041	108	112.47
<i>Cricotopus sp.</i>	0	6	5	11	62	1.792	108	193.58
<i>Nostocladus sp.</i>	43	44	33	120	680	2.833	108	305.91
<i>Chelifera sp.</i>	0	0	1	1	6	0.778	95	73.92
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	1	2	19	22	125	2.097	108	226.47
Totals					2556	37.728	1237	2066.80
Total Taxa	24							
CTQp	50							
CTQa	51.5							
CTQd	54.8							
BCI	91.27							
Diversity Index	3.30							
Stream gradient (% slope): 1.3 - 3.0								
Substrate (composition): rubble								
Sulfate (mg/l SO4): < 50								
Total Alkalinity (mg/l CaCO3): 127								

Holy Ghost Creek, above campground, Santa Fe National Forest
Station 1

11 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura banksii</i>	7	11	6	24	136	2.134	6	12.80
<i>Taenionema</i> sp.	0	1	2	3	17	1.230	48	59.06
Leuctridae	7	3	1	11	62	1.792	18	32.26
<i>Cultus aestivalis</i>	3	1	1	5	28	1.447	12	17.37
<i>Isoperla</i> sp.	1	0	0	1	6	0.778	48	37.35
<i>Sweltsa</i> sp.	3	1	0	4	23	1.362	24	32.68
<i>Hesperoperla pacifica</i>	5	8	6	19	108	2.033	18	36.60
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	1	1	0	2	11	1.041	48	49.99
<i>Baetis tricaudatus</i>	20	18	9	47	266	2.425	72	174.59
<i>Cinygmula</i> sp.	2	3	2	7	40	1.602	30	48.06
<i>Rhithrogena</i> sp.	1	0	1	2	11	1.041	21	21.87
<i>Drunella grandis</i>	3	0	1	4	23	1.362	24	32.68
<i>Drunella doddsi</i>	0	6	6	12	68	1.833	4	7.33
<i>Ephemeraella infrequens</i>	9	6	4	19	108	2.033	48	97.60
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	0	5	5	10	57	1.756	18	31.61
<i>Rhyacophila hyalinata</i>	6	4	3	13	74	1.869	18	33.65
<i>Glossosoma</i> sp.	7	5	4	16	91	1.959	24	47.02
<i>Dolophilodes sortosa</i>	0	1	3	4	23	1.362	24	32.68
<i>Hydropsyche cockerelli</i>	0	1	0	1	6	0.778	108	84.04
<i>Arctopsyche grandis</i>	3	24	10	37	210	2.322	18	41.80
Limnephilidae	0	2	0	2	11	1.041	108	112.47
<i>Oligophlebodes</i> sp.	49	19	14	82	465	2.667	24	64.02
<i>Brachycentrus americanus</i>	4	6	0	10	57	1.756	24	42.14
<i>Micrasema</i> sp.	4	6	3	13	74	1.869	24	44.86
DIPTERA - true flies								
<i>Antocha monticola</i>	1	1	0	2	11	1.041	24	24.99
<i>Dicranota</i> sp.	1	3	0	4	23	1.362	24	32.68
<i>Pericoma</i> sp.	0	0	5	5	28	1.447	36	52.10
<i>Simulium</i> sp.	3	3	1	7	40	1.602	108	173.02
<i>Cricotopus</i> sp.	3	1	0	4	23	1.362	108	147.07
<i>Nostocladus</i> sp.	6	37	31	74	420	2.623	108	283.31
<i>Micropsectra</i> sp.	0	2	0	2	11	1.041	108	112.47
Ceratopogonidae	0	0	1	1	6	0.778	108	84.04
<i>Chelifera</i> sp.	1	0	0	1	6	0.778	95	73.92
<i>Oreogeton</i> sp.	1	0	1	2	11	1.041	95	98.93
HEMIPTERA - true bugs								
<i>Microvelia</i> sp.	0	1	0	1	6	0.778	72	56.03
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	14	33	0	47	266	2.425	108	261.89
MOLLUSCA - snails/clams								
Sphaeriidae	1	2	0	3	17	1.230	108	132.89
ANNELIDA - segmented worms								
Lumbricidae	11	11	19	41	232	2.365	108	255.47
PLATYHELMINTHES - flatworms								
Turbellaria	0	1	0	1	6	0.778	108	84.04
ARTHROPODA - other arthropods								
Hydracarina A - mites	2	0	0	2	11	1.041	108	112.47
Totals					3092	61.189	2237	3179.86
Total Taxa	40							
CTQp	50							
CTQa	55.9							
CTQd	52							
BCI	96.21							
Diversity Index	4.28							
				Stream gradient (% slope): 1.3 - 3.0				
				Substrate (composition): rubble/moss				
				Sulfate (mg/l SO4): < 50				
				Total Alkalinity (mg/l CaCO3): 53				

11 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura banksii</i>	10	4	26	40	227	2.356	6	14.14
<i>Taenionema</i> sp.	1	1	2	4	23	1.362	48	65.36
Leuctridae	0	0	1	1	6	0.778	18	14.01
<i>Pteronarcella badia</i>	0	2	0	2	11	1.041	24	24.99
<i>Isoperla</i> sp.	0	1	0	1	6	0.778	48	37.35
<i>Sweltsa</i> sp.	1	0	0	1	6	0.778	24	18.68
<i>Hesperoperla pacifica</i>	12	3	4	19	108	2.033	18	36.60
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	1	0	0	1	6	0.778	48	37.35
<i>Baetis tricaudatus</i>	19	11	18	48	272	2.435	72	175.29
<i>Cinygmula</i> sp.	2	2	0	4	23	1.362	30	40.85
<i>Rhithrogena</i> sp.	3	1	1	5	28	1.447	21	30.39
<i>Epeorus</i> sp.	0	6	1	7	40	1.602	21	33.64
<i>Paraleptophlebia</i> sp.	2	0	1	3	17	1.230	24	29.53
<i>Drunella grandis</i>	1	0	1	2	11	1.041	24	24.99
<i>Drunella doddsi</i>	0	3	2	5	28	1.447	4	5.79
<i>Ephemerella infrequens</i>	1	4	9	14	79	1.898	48	91.09
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea cpx.</i>	1	2	3	6	34	1.531	18	27.57
<i>Rhyacophila hyalinata</i>	2	1	0	3	17	1.230	18	22.15
<i>Glossosoma</i> sp.	12	6	14	32	181	2.258	24	54.18
<i>Dolophilodes sortosa</i>	7	1	4	12	68	1.833	24	43.98
<i>Hydropsyche cockerelli</i>	1	0	0	1	6	0.778	108	84.04
<i>Arctopsyche grandis</i>	15	5	5	25	142	2.152	18	38.74
<i>Oligophlebodes</i> sp.	9	27	22	58	329	2.517	24	60.41
<i>Psychoronia</i> sp.	0	1	0	1	6	0.778	24	18.68
<i>Brachycentrus</i> sp.	1	3	2	6	34	1.531	24	36.76
<i>Micrasema</i> sp.	30	18	37	85	482	2.683	24	64.39
DIPTERA - true flies								
<i>Antocha monticola</i>	8	15	4	27	153	2.185	24	52.43
<i>Dicranota</i> sp.	3	0	3	6	34	1.531	24	36.76
<i>Limonia</i> sp.	3	2	1	6	34	1.531	36	55.13
<i>Pericoma</i> sp.	16	2	1	19	108	2.033	36	73.20
<i>Simulium</i> sp.	0	5	9	14	79	1.898	108	204.94
<i>Eukiefferiella</i> sp.	0	0	1	1	6	0.778	108	84.04
<i>Tvetenia</i> sp.	0	0	2	2	11	1.041	108	112.47
<i>Cricotopus</i> sp.	4	0	2	6	34	1.531	108	165.40
<i>Nostocladia</i> sp.	13	10	52	75	425	2.628	108	283.87
<i>Micropsectra</i> sp.	2	0	2	4	23	1.362	108	147.07
<i>Chelifera</i> sp.	0	1	0	1	6	0.778	95	73.92
COLEOPTERA - beetles								
<i>Narpus</i> sp.	1	1	0	2	11	1.041	108	112.47
<i>Heterlimnius corpulentus</i>	22	11	4	37	210	2.322	108	250.80
ANNELIDA - segmented worms								
Lumbricidae	1	2	0	3	17	1.230	108	132.89
	2	1	0	3	17	1.230	0	0.00
Totals					3358	62.782	1971	2916.34
Total Taxa	41							
CTQp	50							
CTQa	48.1							
CTQd	46.5							
BCI	107.64							
Diversity Index	4.29							
				Stream gradient (% slope): 1.3 - 3.0				
				Substrate (composition): rubble (imb)				
				Sulfate (mg/l SO4): < 50				
				Total Alkalinity (mg/l CaCO3): 53				

Rio en Medio, above ski area, Santa Fe N. F.
11 November 1990

Station 1

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Zapada</i> sp.	15	23	8	46	261	2.417	16	38.67
Capniidae	1	1	2	4	23	1.362	32	43.58
<i>Megarcys signata</i>	7	3	8	18	102	2.009	24	48.21
<i>Skwala parallela</i>	6	1	2	9	51	1.708	18	30.74
<i>Cultus aestivalis</i>	20	9	8	37	210	2.322	12	27.87
<i>Kogotus modestus</i>	1	0	0	1	6	0.778	18	14.01
Chloroperlidae B	5	1	1	7	40	1.602	24	38.45
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	7	3	0	10	57	1.756	48	84.28
<i>Baetis insignificans</i>	5	2	2	9	51	1.708	72	122.95
<i>Cinygmula</i> sp.	7	9	10	26	147	2.167	30	65.02
<i>Drunella doddsi</i>	0	3	4	7	40	1.602	4	6.41
<i>Ephemerella infrequens</i>	4	3	5	12	68	1.833	48	87.96
TRICHOPTERA - caddisflies								
<i>Rhyacophila iranda</i>	56	72	53	181	1026	3.011	18	54.20
<i>Rhyacophila hyalinata</i>	4	4	0	8	45	1.653	18	29.76
Limnephilidae	0	1	0	1	6	0.778	108	84.04
<i>Limnephilus</i> sp.	20	8	9	37	210	2.322	108	250.80
<i>Oligophlebodes</i> sp.	0	0	1	1	6	0.778	24	18.68
<i>Micrasema</i> sp.	21	18	8	47	266	2.425	24	58.20
DIPTERA - true flies								
<i>Dicranota</i> sp.	3	2	2	7	40	1.602	24	38.45
<i>Tipula</i> sp.	0	0	1	1	6	0.778	36	28.01
<i>Pericoma</i> sp.	0	1	1	2	11	1.041	36	37.49
Simuliidae	2	1	0	3	17	1.230	108	132.89
<i>Cricotopus</i> sp.	2	0	2	4	23	1.362	108	147.07
<i>Nostocladus</i> sp.	16	66	16	98	556	2.745	108	296.47
<i>Micropsectra</i> sp.	0	12	27	39	221	2.344	108	253.19
<i>Paraphaenocladus</i> sp.	5	14	16	35	198	2.297	108	248.04
Ceratopogonidae	1	0	2	3	17	1.230	108	132.89
<i>Chelifera</i> sp.	2	18	8	28	159	2.201	95	209.13
<i>Oreogeton</i> sp.	0	0	1	1	6	0.778	95	73.92
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	13	28	0	41	232	2.365	108	255.47
MOLLUSCA - snails/clams								
Sphaeriidae	1	0	0	1	6	0.778	108	84.04
ANNELIDA - segmented worms								
Naididae	0	3	0	3	17	1.230	108	132.89
PLATYHELMINTHES - flatworms								
Turbellaria	0	18	25	43	244	2.387	108	257.84
Totals					4368	56.601	2012	3431.59
Total Taxa	33							
CTQp	50							
CTQa	61							
CTQd	60.6							
BCI	82.47							
Diversity Index	3.97							
Stream gradient (% slope):						3.0		
Substrate (composition):						rubble (smooth)		
Sulfate (mg/l SO4):						< 50		
Total Alkalinity (mg/l CaCO3):						13		

Rio en Medio, 200m below ski area parking lot, Santa Fe N. F.

Station 2

11 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Zapada</i> sp.	3	3	23	29	164	2.215	16	35.44
Capniidae	0	0	1	1	6	0.778	32	24.90
<i>Megarcys signata</i>	0	3	2	5	28	1.447	24	34.73
<i>Skwala parallela</i>	0	1	2	3	17	1.230	18	22.15
<i>Cultus aestivalis</i>	5	3	5	13	74	1.869	12	22.43
Chloroperlidae B	0	0	1	1	6	0.778	24	18.68
EPHEMEROPTERA - mayflies								
<i>Cinygmula</i> sp.	0	1	0	1	6	0.778	30	23.34
<i>Drunella doddsi</i>	6	4	4	14	79	1.898	4	7.59
<i>Ephemerella infrequens</i>	0	1	0	1	6	0.778	48	37.35
TRICHOPTERA - caddisflies								
<i>Rhyacophila iranda</i>	3	3	12	18	102	2.009	18	36.15
<i>Limnephilus</i> sp.	3	3	0	6	34	1.531	108	165.40
<i>Oligophlebodes</i> sp.	4	1	0	5	28	1.447	24	34.73
<i>Micrasema</i> sp.	0	1	0	1	6	0.778	24	18.68
DIPTERA - true flies								
<i>Tipula</i> sp.	0	0	2	2	11	1.041	36	37.49
<i>Pericoma</i> sp.	0	0	3	3	17	1.230	36	44.30
<i>Cricotopus</i> sp.	0	1	0	1	6	0.778	108	84.04
<i>Nostocladius</i> sp.	0	2	1	3	17	1.230	108	132.89
<i>Micropsectra</i> sp.	0	1	0	1	6	0.778	108	84.04
<i>Paraphaenocladus</i> sp.	2	2	1	5	28	1.447	108	156.29
<i>Chelifera</i> sp.	3	0	0	3	17	1.230	95	116.89
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	2	1	0	3	17	1.230	108	132.89
ANNELIDA - segmented worms								
Lumbricidae	1	1	0	2	11	1.041	108	112.47
Totals					686	27.545	1197	1382.87

Total Taxa 22
 CTQp 50
 CTQa 54.4
 CTQd 50.2
 BCI 99.59
 Diversity Index 3.66

Stream gradient (% slope): > 3.0
 Substrate (composition): rubble/sand (imb)
 Sulfate (mg/l SO4): < 50
 Total Alkalinity (mg/l CaCO3): 20

Rio en Medio, at Aspen Ranch, Santa Fe N. F.
11 November 1990

Station 3

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Zapada</i> sp.	0	1	0	1	6	0.778	16	12.45
<i>Taenionema</i> sp.	2	1	0	3	17	1.230	48	59.06
<i>Megarcys signata</i>	0	1	0	1	6	0.778	24	18.68
<i>Cultus aestivalis</i>	1	3	0	4	23	1.362	12	16.34
<i>Sweltsa</i> sp.	0	3	1	4	23	1.362	24	32.68
EPHEMEROPTERA - mayflies								
<i>Rhithrogena</i> sp.	0	9	1	10	57	1.756	21	36.87
<i>Drunella doddsi</i>	7	11	9	27	153	2.185	4	8.74
<i>Ephemerella infrequens</i>	0	1	0	1	6	0.778	48	37.35
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	4	3	2	9	51	1.708	18	30.74
<i>Glossosoma</i> sp.	0	1	2	3	17	1.230	24	29.53
<i>Arctopsyche grandis</i>	7	2	1	10	57	1.756	18	31.61
<i>Oligophlebodes</i> sp.	6	30	39	75	425	2.628	24	63.08
<i>Micrasema</i> sp.	9	10	17	36	204	2.310	24	55.43
DIPTERA - true flies								
<i>Tvetenia</i> sp.	0	1	2	3	17	1.230	108	132.89
<i>Paraphaenocladus</i> sp.	0	0	1	1	6	0.778	108	84.04
Ceratopogonidae	1	0	0	1	6	0.778	108	84.04
<i>Chelifera</i> sp.	0	1	0	1	6	0.778	95	73.92
<i>Oreogeton</i> sp.	0	1	0	1	6	0.778	95	73.92
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	2	1	0	3	17	1.230	108	132.89
MOLLUSCA - snails/clams								
Sphaeriidae	1	0	0	1	6	0.778	108	84.04
Totals					1109	26.212	1035	1098.31
Total Taxa	20							
CTQp	50							
CTQa	51.8							
CTQd	41.9							
BCI	119.33							
Diversity Index	2.95							
Stream gradient (% slope):						> 3.0		
Substrate (composition):						rubble (imb)		
Sulfate (mg/l SO4):						< 50		
Total Alkalinity (mg/l CaCO3):						19		

Rio Guaje, above reservoir, Santa Fe National Forest Station 1
1 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	0	3	3	6	34	1.531	6	9.19
<i>Pteronarcella badia</i>	2	5	6	13	74	1.869	24	44.86
<i>Cultus aestivalis</i>	1	4	0	5	28	1.447	12	17.37
<i>Suwallia</i> sp.	3	6	1	10	57	1.756	24	42.14
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	5	1	0	6	34	1.531	48	73.51
<i>Baetis tricaudatus</i>	1	2	6	9	51	1.708	72	122.95
<i>Epeorus</i> sp.	1	0	0	1	6	0.778	21	16.34
<i>Ephemerella infrequens</i>	7	38	7	52	295	2.470	48	118.55
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	0	4	2	6	34	1.531	18	27.57
<i>Rhyacophila hyalinata</i>	3	6	8	17	96	1.982	18	35.68
<i>Dolophilodes sortosa</i>	1	1	11	13	74	1.869	24	44.86
<i>Arctopsyche grandis</i>	3	2	1	6	34	1.531	18	27.57
<i>Oligophlebodes</i> sp.	65	76	25	166	941	2.974	24	71.37
<i>Psychoronia</i> sp.	0	0	3	3	17	1.230	24	29.53
Lepidostomatidae	4	1	4	9	51	1.708	18	30.74
<i>Micrasema</i> sp.	0	9	0	9	51	1.708	24	40.98
DIPTERA - true flies								
<i>Antocha monticola</i>	1	1	1	3	17	1.230	24	29.53
<i>Dicranota</i> sp.	1	0	4	5	28	1.447	24	34.73
<i>Tipula</i> sp.	0	0	1	1	6	0.778	36	28.01
<i>Pericoma</i> sp.	7	19	35	61	346	2.539	36	91.41
Simuliidae	0	0	4	4	23	1.362	108	147.07
<i>Eukiefferiella</i> sp.	1	1	0	2	11	1.041	108	112.47
<i>Cricotopus</i> sp.	0	0	1	1	6	0.778	108	84.04
<i>Nostocladus</i> sp.	1	0	0	1	6	0.778	108	84.04
<i>Stempellina</i> sp.	0	3	0	3	17	1.230	108	132.89
<i>Oreogeton</i> sp.	0	0	2	2	11	1.041	95	98.93
HEMIPTERA - true bugs								
<i>Microvelia</i> sp.	3	1	0	4	23	1.362	72	98.04
COLEOPTERA - beetles								
<i>Narpus</i> sp.	0	0	3	3	17	1.230	108	132.89
<i>Heterlimnius corpulentus</i>	72	88	49	209	1185	3.074	108	331.96
MOLLUSCA - snails/clams								
Sphaeriidae	1	0	0	1	6	0.778	108	84.04
ANNELIDA - segmented worms								
Lumbricidae	1	0	0	1	6	0.778	108	84.04
PLATYHELMINTHES - flatworms								
Turbellaria	0	1	0	1	6	0.778	108	84.04
Totals					3591	47.851	1790	2411.33
Total Taxa	32							
CTQp	50							
CTQa	55.9							
CTQd	50.4							
BCI	99.22							
Diversity Index	3.14							
Stream gradient (% slope):						1.3 - 3.0		
Substrate (composition):						rubble (imb)		
Sulfate (mg/l SO4):						< 50		
Total Alkalinity (mg/l CaCO3):						85		

Rio de Las Vacas, above barrier, Santa Fe National Forest

Station 1

15 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Cultus aestivalis</i>	2	1	4	7	40	1.602	12	19.22
Chloroperlidae A	0	0	1	1	6	0.778	24	18.68
<i>Sweltsa</i> sp.	6	6	13	25	142	2.152	24	51.65
<i>Hesperoperla pacifica</i>	5	1	0	6	34	1.531	18	27.57
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	3	4	5	12	68	1.833	48	87.96
<i>Baetis tricaudatus</i>	3	1	5	9	51	1.708	72	122.95
<i>Cinygmula</i> sp.	69	44	7	120	680	2.833	30	84.98
<i>Epeorus</i> sp.	0	0	1	1	6	0.778	21	16.34
<i>Drunella doddsi</i>	2	1	45	48	272	2.435	4	9.74
<i>Ephemerella infrequens</i>	10	15	8	33	187	2.272	48	109.05
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea</i> cpx.	1	0	2	3	17	1.230	18	22.15
<i>Rhyacophila hyalinata</i>	2	2	8	12	68	1.833	18	32.99
<i>Glossosoma</i> sp.	0	2	2	4	23	1.362	24	32.68
<i>Psychoronia</i> sp.	2	1	0	3	17	1.230	24	29.53
Leptoceridae	23	64	160	247	1400	3.146	54	169.89
DIPTERA - true flies								
<i>Dicranota</i> sp.	0	0	2	2	11	1.041	24	24.99
<i>Tipula</i> sp.	0	1	4	5	28	1.447	36	52.10
Simuliidae	6	0	0	6	34	1.531	108	165.40
<i>Cricotopus</i> sp.	0	6	0	6	34	1.531	108	165.40
<i>Procladius</i> sp.	0	0	1	1	6	0.778	108	84.04
Ceratopogonidae	1	0	0	1	6	0.778	108	84.04
<i>Chelifera</i> sp.	0	1	0	1	6	0.778	95	73.92
<i>Oreogeton</i> sp.	0	1	2	3	17	1.230	95	116.89
COLEOPTERA - beetles								
<i>Narpus</i> sp.	0	1	0	1	6	0.778	108	84.04
<i>Heterlimnius corpulentus</i>	6	6	28	40	227	2.356	108	254.45
Totals					3386	38.973	1337	1940.65
Total Taxa	25							
CTQp	50							
CTQa	53.5							
CTQd	49.8							
BCI	100.41							
Diversity Index	2.91							
Stream gradient (% slope): < 3.0								
Substrate (composition): boulder/rubble(imb)								
Sulfate (mg/l SO4): < 50								
Total Alkalinity (mg/l CaCO3): 23								

Rio Puerco above Rio Puerco Campground, Santa Fe N. F. Station 1
15 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	45	34	24	103	584	2.766	6	16.60
<i>Pteronarcella badia</i>	4	0	0	4	23	1.362	24	32.68
<i>Isoperla</i> sp.	8	8	12	28	159	2.201	48	105.67
<i>Sweltsa</i> sp.	8	40	17	65	369	2.567	24	61.61
EPHEMEROPTERA - mayflies								
<i>Ameletus</i> sp.	0	2	2	4	23	1.362	48	65.36
<i>Baetis tricaudatus</i>	11	12	8	31	176	2.246	72	161.68
<i>Heptagenia</i> sp.	1	2	0	3	17	1.230	54	66.44
<i>Rhithrogena</i> sp.	0	5	0	5	28	1.447	21	30.39
<i>Paraleptophlebia</i> sp.	32	21	5	58	329	2.517	24	60.41
<i>Drunella doddsi</i>	0	1	2	3	17	1.230	4	4.92
<i>Serratella tibialis</i>	22	14	26	62	352	2.547	24	61.12
<i>Ephemerella infrequens</i>	28	33	30	91	516	2.713	48	130.21
TRICHOPTERA - caddisflies								
<i>Rhyacophila brunea cpx.</i>	18	8	17	43	244	2.387	18	42.97
<i>Rhyacophila valuma</i>	0	13	6	19	108	2.033	18	36.60
<i>Hydropsyche oslari</i>	5	4	1	10	57	1.756	108	189.63
<i>Hydroptila</i> sp.	63	31	13	107	607	2.783	108	300.58
<i>Oligophlebodes</i> sp.	0	12	10	22	125	2.097	24	50.33
<i>Psychoronia</i> sp.	0	2	2	4	23	1.362	24	32.68
<i>Micrasema</i> sp.	115	18	12	145	822	2.915	24	69.96
DIPTERA - true flies								
<i>Antocha monticola</i>	3	9	8	20	113	2.053	24	49.27
<i>Dicranota</i> sp.	17	3	13	33	187	2.272	24	54.52
<i>Holorusia grandis</i>	1	0	0	1	6	0.778	72	56.03
<i>Pericoma</i> sp.	39	41	19	99	561	2.749	36	98.96
Simuliidae	1	0	4	5	28	1.447	108	156.29
Chironomidae A	18	2	4	24	136	2.134	108	230.42
Chironomidae B	8	0	0	8	45	1.653	108	178.55
<i>Nostocladus</i> sp.	35	18	32	85	482	2.683	108	289.77
<i>Stempellina</i> sp.	6	0	0	6	34	1.531	108	165.40
<i>Cricotopus</i> sp.	14	11	36	61	346	2.539	108	274.22
<i>Bezzia</i> sp.	12	8	12	32	181	2.258	108	243.83
<i>Odontomyia</i> sp.	3	4	2	9	51	1.708	108	184.42
COLEOPTERA - beetles								
<i>Helichus</i> sp.	2	0	0	2	11	1.041	72	74.98
<i>Narpus</i> sp.	0	0	1	1	6	0.778	108	84.04
<i>Heterlimnius corpulentus</i>	12	7	20	39	221	2.344	108	253.19
MOLLUSCA - snails/clams								
Sphaeriidae	7	0	0	7	40	1.602	108	173.02
ANNELIDA - segmented worms								
Oligochaeta	2	4	0	6	34	1.531	108	165.40
PLATYHELMINTHES - flatworms								
Turbellaria	0	1	0	1	6	0.778	108	84.04
ARTHROPODA - other arthropods								
Hydracarina A - mites	4	3	0	7	40	1.602	108	173.02
Totals					7107	73.004	2461	4509.23
Summary Statistics								
Total Taxa	38							
CTQp	50							
CTQa	64.8							
CTQd	61.8							
BCI	80.95							
Diversity Index	4.43							
		Stream gradient (% slope): 1.3 - 3.0						
		Substrate (composition): rubble/CaCO3 (imb.)						
		Sulfate (mg/l SO4): < 50						
		Total Alkalinity (mg/l CaCO3): 157						

East Fork Jemez River, near Las Conchas site, Santa Fe National Forest
Station 1

15 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura</i> sp.	25	34	10	69	391	2.592	6	15.55
<i>Cultus aestivalis</i>	4	12	12	28	159	2.201	12	26.42
<i>Isoperla</i> sp.	11	5	2	18	102	2.009	48	96.41
<i>Suwallia</i> sp.	5	0	2	7	40	1.602	24	38.45
<i>Sweltsa</i> sp.	0	0	2	2	11	1.041	24	24.99
<i>Hesperoperla pacifica</i>	0	10	0	10	57	1.756	18	31.61
EPHEMEROPTERA - mayflies								
<i>Baetis tricaudatus</i>	2	4	4	10	57	1.756	72	126.42
<i>Paraleptophlebia</i> sp.	61	28	28	117	663	2.822	24	67.72
Tricorythidae	12	0	8	20	113	2.053	108	221.73
<i>Ephemerella infrequens</i>	90	132	66	288	1633	3.213	48	154.22
TRICHOPTERA - caddisflies								
<i>Glossosoma</i> sp.	1	0	0	1	6	0.778	24	18.68
<i>Hydropsyche cockerelli</i>	132	980	317	1429	8102	3.909	108	422.13
<i>Cheumatopsyche</i> sp.	136	108	40	284	1610	3.207	108	346.34
<i>Limnephilus</i> sp.	0	2	2	4	23	1.362	108	147.07
<i>Ceraclea</i> sp.	1	0	2	3	17	1.230	54	66.44
<i>Brachycentrus</i> sp.	5	12	0	17	96	1.982	24	47.57
<i>Helicopsyche borealis</i>	8	0	0	8	45	1.653	18	29.76
DIPTERA - true flies								
<i>Antocha monticola</i>	0	8	2	10	57	1.756	24	42.14
<i>Dicranota</i> sp.	4	2	2	8	45	1.653	24	39.68
<i>Tipula</i> sp.	0	0	2	2	11	1.041	36	37.49
Chironomidae A	18	56	22	96	544	2.736	108	295.44
Chironomidae C	15	28	18	61	346	2.539	108	274.22
<i>Cricotopus</i> sp.	4	2	2	8	45	1.653	108	178.55
<i>Nostocladius</i> sp.	16	24	10	50	284	2.453	108	264.96
<i>Tabanus</i> sp.	1	0	0	1	6	0.778	108	84.04
<i>Chelifera</i> sp.	1	0	0	1	6	0.778	95	73.92
<i>Protanderus</i> sp.	2	4	0	6	34	1.531	95	145.49
HEMIPTERA - true bugs								
<i>Ambrysus mormon</i>	9	12	8	29	164	2.215	72	159.47
COLEOPTERA - beetles								
<i>Narpus</i> sp.	17	2	4	23	130	2.114	108	228.31
<i>Heterlimnius corpulentus</i>	32	30	26	88	499	2.698	108	291.39
LEPIDOPTERA - moths								
<i>Parargyractis kearfottalis</i>	0	2	0	2	11	1.041	72	74.98
MOLLUSCA - snails/clams								
<i>Physa</i> sp.	1	2	0	3	17	1.230	108	132.89
Planorbidae	7	0	7	14	79	1.898	108	204.94
ANNELIDA - segmented worms								
Naididae	12	6	0	18	102	2.009	108	216.93
Lumbricidae	0	0	12	12	68	1.833	108	197.91
AMPHIPODA - scuds								
<i>Hyalella azteca</i>	2	0	0	2	11	1.041	108	112.47
Totals					15584	68.165	2542	4936.74

Total Taxa 36
CTQp 50
CTQa 70.6
CTQd 72.4
BCI 69.04
Diversity Index 2.79

Stream gradient (% slope): 1.3 - 3.0
Substrate (composition): rubble
Sulfate (mg/l SO4): < 50
Total Alkalinity (mg/l CaCO3): 75

East Fork Jemez River, below Las Conchas site, Santa Fe National Forest
Station 2

15 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Amphinemura banksii</i>	0	2	2	4	23	1.362	6	8.17
<i>Cultus aestivalis</i>	16	2	12	30	170	2.230	12	26.77
<i>Hesperoperla pacifica</i>	0	8	2	10	57	1.756	18	31.61
EPHEMEROPTERA - mayflies								
<i>Baetis insignificans</i>	4	2	2	8	45	1.653	72	119.03
<i>Paraleptophlebia</i> sp.	24	22	34	80	454	2.657	24	63.77
Tricorythidae	26	10	14	50	284	2.453	108	264.96
<i>Ephemerella infrequens</i>	128	72	102	302	1712	3.234	48	155.21
TRICHOPTERA - caddisflies								
<i>Hydropsyche cockerelli</i>	162	58	0	220	1247	3.096	108	334.35
<i>Cheumatopsyche</i> sp.	180	74	0	254	1440	3.158	108	341.10
<i>Stactobiella</i> sp.	4	2	0	6	34	1.531	108	165.40
<i>Nectopsyche</i> sp.	2	0	0	2	11	1.041	54	56.24
<i>Ceraclea</i> sp.	14	4	0	18	102	2.009	54	108.46
<i>Helicopsyche borealis</i>	112	28	0	140	794	2.900	18	52.20
DIPTERA - true flies								
<i>Antocha monticola</i>	4	2	2	8	45	1.653	24	39.68
<i>Dicranota</i> sp.	0	4	0	4	23	1.362	24	32.68
<i>Tipula</i> sp.	2	0	2	4	23	1.362	36	49.02
Chironomidae C	2	2	2	6	34	1.531	108	165.40
<i>Eukiefferiella</i> sp.	0	6	2	8	45	1.653	108	178.55
<i>Cricotopus</i> sp.	16	4	2	22	125	2.097	108	226.47
<i>Nostocladus</i> sp.	78	50	48	176	998	2.999	108	323.91
Ceratopogonidae	6	0	0	6	34	1.531	108	165.40
HEMIPTERA - true bugs								
<i>Ambrysus mormon</i>	26	14	14	54	306	2.486	72	178.97
COLEOPTERA - beetles								
<i>Narpus</i> sp.	2	0	0	2	11	1.041	108	112.47
<i>Heterlimnius corpulentus</i>	26	14	0	40	227	2.356	108	254.45
LEPIDOPTERA - moths								
<i>Parargyractis kearfottalis</i>	4	0	0	4	23	1.362	72	98.04
MOLLUSCA - snails/clams								
<i>Physa</i> sp.	8	0	8	16	91	1.959	108	211.58
Planorbidae	12	6	4	22	125	2.097	108	226.47
ANNELIDA - segmented worms								
Naididae	8	4	6	18	102	2.009	108	216.93
Totals					8585	56.579	2046	4207.27

Total Taxa 28
CTQp 50
CTQa 73.1
CTQd 74.4
BCI 67.24
Diversity Index 3.57

Stream gradient (% slope): < 1.3
Substrate (composition): rubble/gravel
Sulfate (mg/l SO₄): < 50
Total Alkalinity (mg/l CaCO₃): 75

Rio del Oso, within exclosure, Santa Fe National Forest

Station 1

1 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Cultus aestivalis</i>	0	0	8	8	45	1.653	12	19.84
EPHEMEROPTERA - mayflies								
<i>Ameletus sp.</i>	0	1	0	1	6	0.778	48	37.35
<i>Baetis tricaudatus</i>	1	3	0	4	23	1.362	72	98.04
TRICHOPTERA - caddisflies								
<i>Hydropsyche oslari</i>	0	5	0	5	28	1.447	108	156.29
<i>Limnephilus sp.</i>	2	0	0	2	11	1.041	108	112.47
DIPTERA - true flies								
<i>Dicranota sp.</i>	0	1	0	1	6	0.778	24	18.68
<i>Limonia sp.</i>	1	1	1	3	17	1.230	36	44.30
Simuliidae	20	33	20	73	414	2.617	108	282.64
<i>Eukiefferiella sp.</i>	0	1	0	1	6	0.778	108	84.04
<i>Nostocladus sp.</i>	1	0	0	1	6	0.778	108	84.04
<i>Procladius sp.</i>	0	1	0	1	6	0.778	108	84.04
COLEOPTERA - beetles								
<i>Heterlimnius corpulentus</i>	1	3	2	6	34	1.531	108	165.40
MOLLUSCA - snails/clams								
Pelecypoda	0	1	0	1	6	0.778	108	84.04
ANNELIDA - segmented worms								
Naididae	25	0	1	26	147	2.167	108	234.07
Totals					755	17.719	1164	1505.24

Total Taxa 14
 CTQp 63
 CTQa 83.1
 CTQd 85
 BCI 74.16
 Diversity Index 2.25

Stream gradient (% slope): < 1.3
 Substrate (composition): rubble/sand
 Sulfate (mg/l SO4): 55
 Total Alkalinity (mg/l CaCO3): 170

Rio del Oso, outside exclosure (downstream), Santa Fe National Forest
Station 2

1 November 1990

	Q1	Q2	Q3	Total	#/m2	log x	TQ	log x * TQ
PLECOPTERA - stoneflies								
<i>Cultus aestivalis</i>	1	1	2	4	23	1.362	12	16.34
Chloroperlidae A	0	0	1	1	6	0.778	24	18.68
EPHEMEROPTERA - mayflies								
<i>Baetis tricaudatus</i>	1	4	8	13	74	1.869	72	134.58
<i>Ephemerella infrequens</i>	0	1	0	1	6	0.778	48	37.35
TRICHOPTERA - caddisflies								
<i>Hydropsyche oslari</i>	0	1	5	6	34	1.531	108	165.40
DIPTERA - true flies								
<i>Tipula sp.</i>	0	1	1	2	11	1.041	36	37.49
Simuliidae	15	10	17	42	238	2.377	108	256.67
Chironomidae A	0	1	0	1	6	0.778	108	84.04
Ceratopogonidae	0	0	1	1	6	0.778	108	84.04
COLEOPTERA - beetles								
<i>Helichus sp.</i>	0	0	1	1	6	0.778	72	56.03
<i>Heterlimnius corpulentus</i>	0	0	1	1	6	0.778	108	84.04
ANNELIDA - segmented worms								
Naididae	0	1	0	1	6	0.778	108	84.04
Totals					422	13.627	912	1058.70
Total Taxa	12							
CTQp	63							
CTQa	76							
CTQd	77.7							
BCI	81.09							
Diversity Index	2.18							
Stream gradient (% slope):						< 1.3		
Substrate (composition):						rubble/sand		
Sulfate (mg/l SO4):						55		
Total Alkalinity (mg/l CaCO3):						170		