Results of Macroinvertebrate Sampling on the Kings River below Pine Flat Dam

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Introduction

Benthic macroinvertebrates (BMI) are an important element of the aquatic community inhabiting the lower Kings River. Macroinvertebrates serve as prey for juvenile and adult fish, are an essential element of the food web, convert energy within an ecosystem, and serve as an indicator of habitat and environmental conditions occurring within the waterbody. In general, macroinvertebrate communities characterized by high diversity, balanced representation among taxonomic groups, relatively high abundance (density), and exhibiting a range of life history stages are general indicators of a high-quality habitat. In contrast, macroinvertebrate communities dominated by relatively few highly tolerant species having low diversity are typically viewed as indicators of a stressed aquatic habitat. Macroinvertebrates are categorized by their feeding habits. They are typically classified in a system known as functional feeding groups (Adams 2004). The major functional feeding groups are displayed in Figure 1.

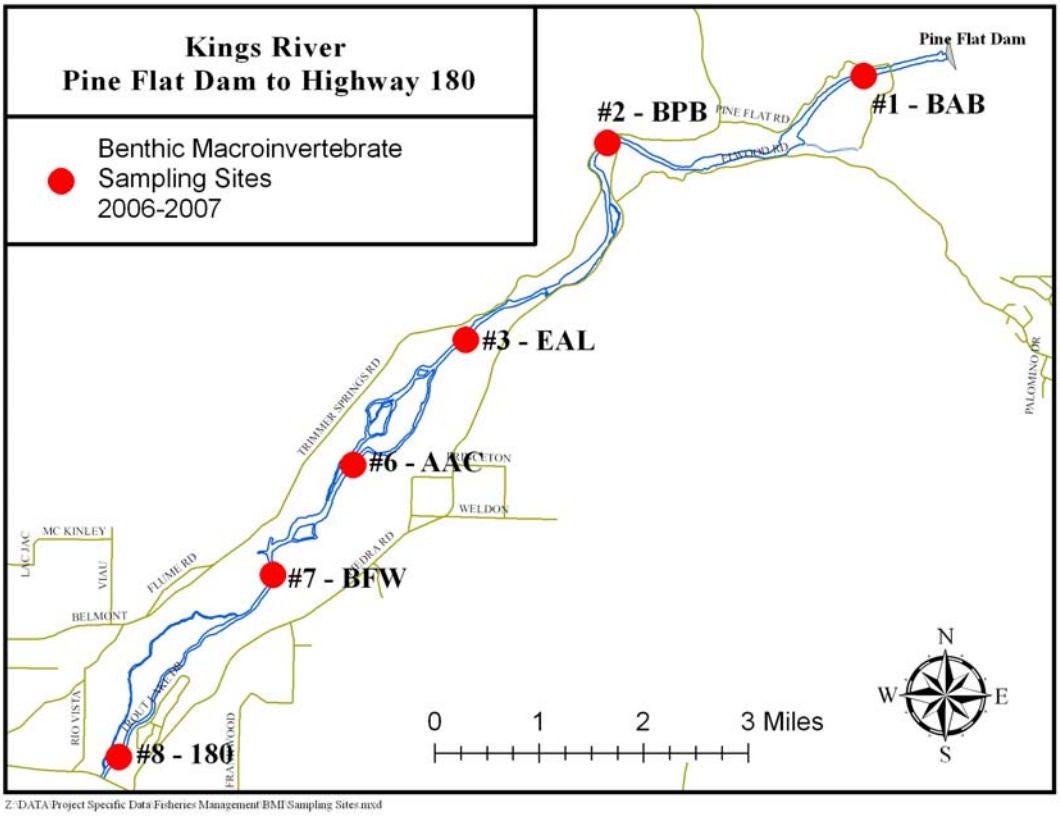
Figure 1: Functional feeding groups of macroinvertebrates

collector-filterers	feed on fine particulate organic material (FPOM) that is suspended in the water column
collector-gatherers	feed by sifting through the substrate and debris
predators	typically prey upon other, smaller macroinvertebrates
scrapers	feed by scraping or grazing diatoms from the substrate
shredders	feed by tearing apart coarse particulate organic material (CPOM) such as plant and animal

The US Environmental Protection Agency (US EPA 2002) and the California Department of Fish and Game (Harrington 1999) have developed standardized protocols for conducting macroinvertebrate surveys within a river system for use in evaluating and characterizing the habitat conditions (California Stream Bioassessment Procedure). To provide information on the macroinvertebrate community inhabiting the lower Kings River as part of the Kings River Fisheries Management Program, a series of macroinvertebrate samples were collected during 2006-2007 for use in characterizing the aquatic community inhabiting the Kings River within the reach from Pine Flat Dam downstream to Highway 180 (Figure 2). Results of the 2006-2007 surveys were also compared with results from similar surveys conducted in the lower river during 2003 and 2005 as part of the fishery program. Characteristics of the aquatic macroinvertebrate community surveyed in the lower Kings River have also been compared with macroinvertebrate survey results from other Central Valley river systems. In addition, the results of the 2006-2007 surveys were also analyzed using the Central Valley Index of Biotic Integrity (IBI). The Central Valley IBI was developed for wadable streams by the California Department of Fish and Game's Aquatic Bioassessment Laboratory through funding from the Surface Water Ambient Monitoring Program (SWAMP), a program of the State Water Resources Control Board tasked with monitoring surface water quality throughout the state of California (State of California). The Central Valley IBI is specific

to the unique qualities of western slope central valley streams (Rehn et al. 2008). The methods and results of the macroinvertebrate survey are briefly summarized below.

Figure 2. Map of Kings River from Pine Flat Dam to Highway 180



Methods

Macroinvertebrate samples were collected from the lower Kings River using the standard rapid bioassessment protocol (California Stream Bioassessment Procedure; Harrington 1999). Triplicate samples were collected at each of six sampling sites. The sampling sites surveyed as part of the 2006-2007macroinvertebrate investigation are summarized in Table 1 and shown on Figure 2.

Table 1. Summary of 2006-2007 macroinvertebrate sampling sites

Station	Site	Location	Description
BAB	1	36° 49.755 119º 22.959	Riffle below ACOE Bridge
BPB	2	36º 49.207	Riffle below Piedra Bridge

		119º 22.959	
EAL	3	36 º 47.541 119º 24.529	Riffle at East end of Avocado Lake
AAC	*6*	36 º 46.547 119 º 25.668	Near confluence with Avocado Side Channel
BFW	7	36º 45.646 119º 26.563	Riffle below Fresno Weir
180	8	36º.43.946 119º.28.255	First riffle above Highway 180

Characteristics of the sampling sites surveyed in February 2006 are summarized in Table 2. Characteristics of the sampling sites surveyed in November 2006 are summarized in Table 3. Characteristics of the sampling sites surveyed in January 2007 are summarized in Table 4. Surveys were limited to the non-irrigation season when water depths and velocities allowed safe access to riffle sampling sites.

A total of 54 macroinvertebrate samples were collected as part of this study and processed to identify and enumerate the macroinvertebrates collected. The macroinvertebrate samples were processed by the California Department of Fish and Game (CDFG) Aquatic Bioassessment Laboratory (Rancho Cordova) with taxonomic identification of organisms to the level specified by the CAMLnet Standard Taxonomic Effort (27 January 2003 revision). Sample processing was initiated by evenly distributing the entire contents of one sample into a pan marked with two-inch grids. Randomly selected grid portions (1/4, 1/2, or full grids) selected for sorting were placed in 100X15-mm Petri dishes. Samples were sorted using a dissecting microscope, and specimens were removed from the dish, identified, counted, and placed into a labeled sample vial. A minimum of 300 organisms were removed from each sample for identification. Sample processing and taxonomic identifications were in accordance with standard CDFG quality control/assurance protocols.

Results from each of the three individual samples collected at a site were used to calculate a set of standard biological metrics characterizing the macroinvertebrate community at each location during each survey. The benthic macroinvertebrate metrics calculated for each site are summarized in Table 5. The use of standardized metrics allowed statistical comparison to be made among sampling sites as well as among sampling dates for each specific location. For purposes of general comparative analyses, a subset of metrics was selected that included taxa richness, number of EPT taxa, EPT percentage index, sensitive EPT index, Shannon-Diversity index, tolerance value, percentage of intolerant taxa, and percentage of tolerant taxa.

The Central Valley IBI utilizes five of the standard biological metrics to effectively assess the health of the stream in relation to a reference site, a site that is least disturbed and most like a natural, unaltered system. The metrics chosen provided good discrimination between the reference sites and the test sites used to develop the index (Rehn et al. 2008). These metrics include collector richness, predator richness, % EPT taxa, % clinger taxa, and Shannon diversity. Each metric is given a value of 1 to 10 for a composite score of 50 (Figure 3). The IBI score was multiplied by two to standardize it to a scale of 100. The IBI rating scale is divided into five categories with Very Poor being the lowest rating and Excellent being the highest rating (Harrington, personal communication 2009). The rating scores and corresponding categories are shown in Figure 4.

Figure 3. Scoring ranges for 5 component metrics in the Central Valley IBI

Score	Collector Richness	Predator Richness	% EPT Taxa	% Clinger Taxa	Shannon Diversity
0	0-3	0-1	0	0	≤1.28
1	4	2	1-4	1-6	1.29-1.47
2	5-6	3	5-9	7-12	1.48-1.66
3	7	4-5	10-13	13-19	1.67-1.84
4	8	6	14-18	20-25	1.85-2.03
5	9-10	7	19-22	26-31	2.04-2.22
6	11	8	23-27	32-37	2.23-2.40
7	12	9-10	28-31	38-44	2.41-2.59
8	13-14	11	32-36	45-50	2.60-2.78
9	15	12	37-40	51-57	2.79-2.96
10	≥16	≥13	41-100	58-100	≥2.97

Rehn, Andrew C., J. T. May, and P. R. Ode. 2008. *An Index of Biotic Integrity (IBI) for Perennial Streams in California's Central Valley*. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Technical Report

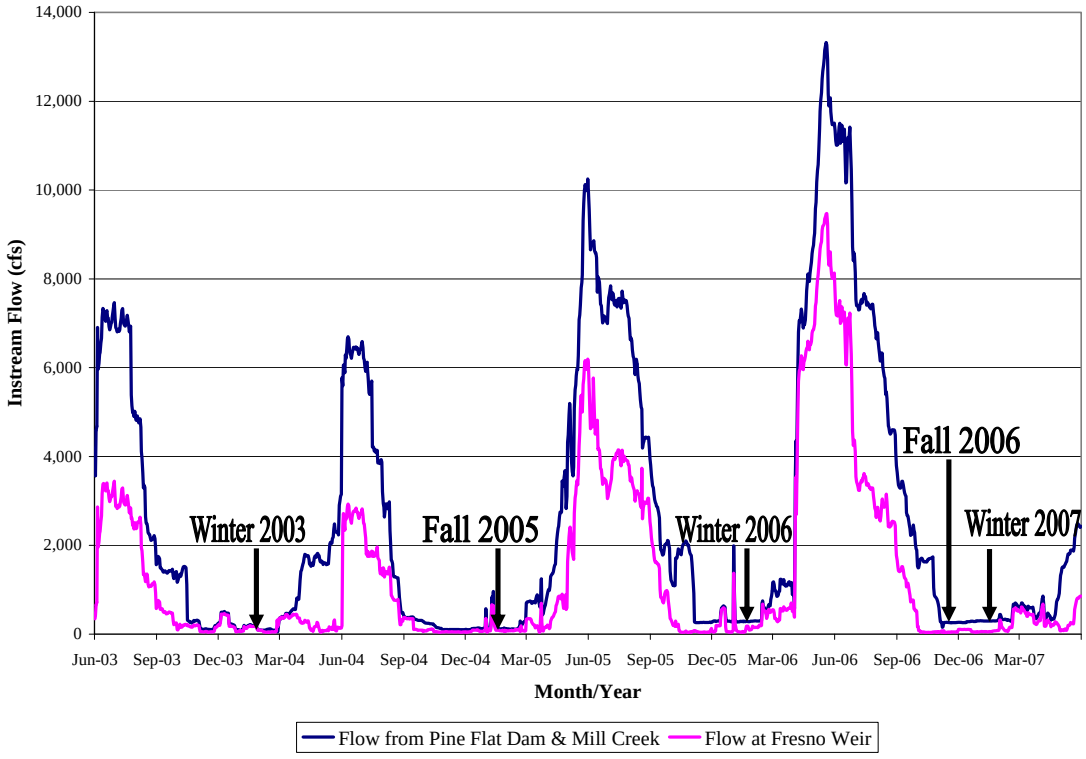
Figure 4. Central Valley Index of Biotic Integrity Rating Scale

IBI Score	Rating
0-20	**Very poor**
21-40	**Poor**
41-60	**Fair**
61-80	**Good**
81-100	**Excellent**

Results of 2006-2007 Surveys

Flows within the lower Kings River as measured at Pine Flat Dam and Fresno Weir during the survey period are shown in Figure 5. Flows showed a typical seasonal pattern of increased releases from Pine Flat Dam during the spring and summer irrigation seasons with reduced flow releases during the late summer, fall, and winter non-irrigation seasons. Macroinvertebrate collections were limited to the non-irrigation periods as a result of high water velocities and difficulty in safely sampling macroinvertebrates during periods of high flow.

Figure 5. Hydrograph of instream flows in the Kings River below Pine Flat Dam from 2003 to 2007. BMI survey dates are designated by the labels.



Results of surveys conducted in February 2006 (Table 6) showed that taxa richness of the macroinvertebrate community was similar at all locations (range 11 to 18), the numbers of EPT taxa were similar (range 4-9), the sensitive EPT indices were similar (range 1-4), tolerance values were similar (range 4.1-5.5), as were other indices of the community. Results of surveys conducted in November 2006 (Table 7) showed that taxa richness of the macroinvertebrate community was similar at all locations (range 10-15), the numbers of EPT taxa were similar (range 4-8), the sensitive EPT indices were similar (range 1-14), tolerance values were similar (range 4.3-5.2), as were other indices of the community. Results of surveys conducted in January 2007 (Table 8) showed that taxa richness of the

macroinvertebrate community was similar at all locations (range 11 to 16), the numbers of EPT taxa were similar (range 5-8), the sensitive EPT indices were similar (range 1-8), tolerance values were similar (range 4.5-4.9), as were other indices of the community. Results of sampling macroinvertebrates at various locations in the lower river between the ACOE Bridge, located immediately downstream of Pine Flat Dam, and Highway 180 (approximately 9.8 miles downstream of the dam), showed that characteristics of the macroinvertebrate community were generally similar throughout the surveyed reach during each of the three sampling periods.

Results of macroinvertebrate surveys conducted in several other Central Valley rivers and streams have shown evidence of variation among seasons and among years (de Vlaming et al. undated, Bacey and Spurlock 2007). Comparison of results for selected indices of the macroinvertebrate community sampled in this study at each of the six locations during February 2006 (winter), November 2006 (fall), and January 2007 (winter) are summarized in Table 9 through 14. Results of these comparisons showed that indices of the community did not vary substantially among the three survey dates.

The individual IBI metrics were consistent among sites for each sampling period, however some variation did occur. Collector richness scores ranged from 3 to 6, predator richness scores ranged from 1 to 8, percent EPT taxa scores ranged from 7 to 10, percent clinger taxa scores ranged from 6 to 10, and Shannon diversity scores ranged from 1 to 4. The IBI metrics values are summarized in Tables 15 and 1. Individual site scores for each sample period ranged from 52 to 68 in February 2006, 54 to 72 in November 2006, and 48 to 64 in January 2007. These results are summarized in Tables 17, 18, and 19.

Discussion

Macroinvertebrate surveys have been conducted in the lower Kings River as part of the Fisheries Management Program in 2003, 2005, 2006, and 2007. Although the specific sampling stations varied among years all surveys were conducted within the reach extending from the ACOE Bridge to Highway 180. General comparison of survey results (ranges of specific community indices) for each of the surveys is presented in Table 20. Results of this comparison show that the range of taxa richness and the number of EPT taxa were generally similar for all surveys. The index of EPT taxa (%) showed that although the maximum values were similar among surveys, the minimum percentages of EPT taxa were substantially lower during the 2003 and 2005 surveys when compared to the 2006 and 2007 survey results. The maximum value for the sensitive EPT index (23; Table 21) and percentage intolerant taxa (23; Table 21) were substantially higher in the 2005 survey when compared to results of other surveys. The maximum percentage of tolerant taxa (27; Table 21) was substantially higher in the 2003 survey when compared

to other surveys in the lower river. Although these results show variation among surveys in some of the macroinvertebrate characteristics, comparisons of the general ranges of values showed that the macroinvertebrate community inhabiting the lower Kings River has been generally similar over the period of these studies, from 2003 through 2007.

One of the objectives of the 2006-2007 surveys was to compare characteristics of the macroinvertebrate community inhabiting the lower Kings River with the macroinvertebrates inhabiting other Central Valley rivers and streams. Comparison between the lower Kings River and other rivers and streams provides a context for assessing and interpreting results of the surveys. To provide a basis for comparison, results of macroinvertebrate collections reported for other rivers and streams were compiled from a variety of technical reports. A number of macroinvertebrate surveys have been conducted within the Central Valley as a component of fishery management plans, baseline environmental surveys, water quality investigations using benthic macroinvertebrates as an integrator and indicator of local water quality and disturbance, and as part of monitoring and relicensing hydroelectric projects. Results of 69 macroinvertebrate surveys were compiled from technical reports and studies from rivers (e.g., lower Tuolumne River, Cosumnes River, south fork San Joaquin River, Merced River) as well as smaller streams and creeks (e.g., Corte Madera Creek, Big Creek, Stevenson Creek, Ely Creek, Pitman Creek). Results of the macroinvertebrate surveys conducted in these studies are summarized in Appendix A.

Data from each of the Central Valley studies (excluding all surveys on the lower Kings River) were analyzed to calculate the mean value, standard deviation, 95% confidence intervals (CI), minimum, maximum, median, 25%, and 75% for the 69 surveys included in the analyses (Table 22). From these survey results, eight metrics were selected for comparison to the 2006-2007 results from the lower Kings River: taxa richness, number of EPT taxa, EPT index (%), sensitive EPT index, Shannon diversity index, tolerance value, percentage of intolerant taxa, and percentage of tolerant taxa. Table 5 briefly describes each of the metrics used to characterize macroinvertebrate communities following the protocol outlined by CDFG (Harrington 1999). Results of the 69 macroinvertebrate surveys conducted in other watersheds were used to then calculate the 25% and 75% range for each of the selected metrics.

For each of the 2006 and 2007 macroinvertebrate surveys conducted on the lower Kings River the parameter values for each survey location (Tables 6-8) were then compared to the 25%-75% range from the background surveys. If the value for a given survey location on the lower Kings River was lower than the 25% value from the range it was designated by an “L”. If the value for a given survey location on the lower Kings River was within the range of the 25%-75% from the background surveys it was designated by

a “Y”. If the value for a given survey location on the lower Kings River was greater than the 75% value from the range it was designated by an “H”. Table 5 presents the expected direction of change in each metric in response to habitat disturbance (e.g., effects of flow, water quality, substrate, and a variety of other potential factors affecting aquatic habitat for macroinvertebrates). The comparison between the results of 2006-2007 macroinvertebrate surveys in the lower Kings River and other Central Valley locations is intended to offer a general reflection of the community and does not identify potential cause-effect relationships among factors that may influence habitat conditions within the lower Kings River when compared to other river systems.

Results of the comparison between characteristics of the lower Kings River macroinvertebrate community, by survey and location, and the 25%-75% range from other studies are summarized in Tables 23 through 27. Results of the comparison showed generally similar patterns for the February 2003 (Table 23), February 2005 (Table 24), February 2006 (Table 25), November 2006 (Table 26), and January 2007 (Table 27) surveys in that taxa richness and EPT taxa (number of taxa) in the lower Kings River were consistently lower than other rivers. Lower values for these two metrics are generally indicative of a greater level of habitat disturbance (Table 5; lower habitat suitability). EPT percentage index and Shannon diversity indices in the lower Kings River were consistently within the 25%-75% range for the 2003 and 2005 surveys and higher for the 2006-2007 surveys than other rivers. Higher values for these two metrics are indicative of a lower level of habitat disturbance (Table 5; greater habitat suitability). The metrics for sensitive EPT index, tolerance value, and percentage intolerant macroinvertebrate taxa were mixed, however, a higher proportion of the values for the lower Kings River were within the lower range (less than the 25% value) suggesting a greater level of habitat disturbance. The values for the percentage of tolerant macroinvertebrates on the lower Kings River, although variable, were generally within the 25%-75% range from other studies. Overall, results of these comparisons do not show a consistent pattern of habitat disturbance on the lower Kings River. Several of the metrics (e.g., taxa richness, number of EPT taxa) show evidence of habitat disturbance or stressors, while other indicators such as EPT percentage index, species diversity, percentage of intolerant species, and percentage of tolerant species show evidence of suitable habitat conditions for macroinvertebrates.

Central Valley Index of Biotic Integrity (IBI)

The sampling protocol known as the California Stream Bioassessment Procedure (CSBP, Harrington 1995, 1999, 2002), a point-source assessment, was employed for the duration of the Kings River BMI study. In 2007 the State Water Resource Control Board replaced the CSBP with the Targeted Riffle Composite (TRC) and Multi-Habitat (MH) procedure

known as the California Monitoring Assessment Protocol (CMAP; Ode. 2007). CMAP is based on the Environmental Monitoring & Assessment Program-West (EMAP-West, Environmental Protection Agency) model used by the Environmental Protection Agency and is increasingly being used by water quality monitoring programs throughout California (Rehn et al, 2008). Due to the use of the CSBP protocol in the 2006-2007 Kings River macroinvertebrate sampling, it was necessary for the data to be standardized using a randomized resampling technique known as the Monte Carlo procedure. The resampling of the 2006-2007 data was performed at the Aquatic Bioassessment Laboratory in Rancho Cordova, the same lab that processed the raw samples. This process enabled the use of the Central Valley Index of Biotic Integrity (IBI) for analysis of the results. The 2003 and 2005 data was processed by ECORP, a private laboratory, and was not resampled using the Monte Carlo technique and thus the data could not be analyzed using the Central Valley IBI. Resampling of the 2003 and 2005 data via the Monte Carlo technique would require additional costs and, given the similarity in results of the general analysis, these costs were not deemed necessary for evaluating results of the sampling program.

IBI scores for each of the six sample sites along the Kings River were calculated for each of the sampling periods: February 2006, November 2006, and January 2007. The individual site scores are summarized in Tables 17, 18, and 19. Though some variation is present, research has shown that these metrics do not vary significantly between spring and fall sampling events and therefore do not require seasonal adjustments in scoring (Rehn et al. 2008). The six Kings River BMI sites are rated as Fair or Good using the Central Valley Index of Biotic Integrity. As distance from Pine Flat Dam increases, the range and thus the variation in IBI score decreases. Site #1 (BAB), downstream of the Army Corps of Engineers bridge (Figure 2) shows the greatest variation with a low score of 48 in January 2007 and a high score of 72 in November 2006. In contrast, site # 3 (EAL), behind Avocado Lake, shows the least variation with a low score of 62 in both February and November 2006 and a high score of 64 in January 2007. The range increases again at site #7 (BFW), downstream of Fresno Weir, with a low score of 58 in January 2007 and a high score of 68 in February 2006. These results show a similar pattern to other studies in which IBI scores increase as a function of distance downstream of a dam. Lower IBI scores reflect a greater level of disturbance of the benthic macroinvertebrate community. A “disturbance” is defined as any derivation from conditions that would be expected in a natural system including man made structures, point-source pollutants, and invasive species. The average sampling scores for each of the three sampling events are as follows: February 2006 – 60 (Fair), November 2006 – 61 (Good), and January 2007 – 56 (Fair). The overall average IBI score for the Kings River between Pine Flat Dam and the Highway 180 bridge is 59. This ranks at the upper end of the Fair category (Table 20).

Summary

Overall, results of the 2006-2007 lower Kings River macroinvertebrate surveys show that the river supports a diverse assemblage of macroinvertebrates. Important components of the community in terms of both habitat indicators, and as a prey base for resident trout and other fish, are the Ephemeroptera (mayfly), Plecoptera (stonefly), and Trichoptera (caddisfly) insects that together comprise the EPT taxa. On the lower Kings River the percent composition of the macroinvertebrate community comprised of the EPT taxa ranged from 36% to 66% of the macroinvertebrates in the February 2006 survey (Table 6), 48% to 76% in the November 2006 survey (Table 7), and 51% to 70% in the January 2007 survey (Table 8). The values of the ETP taxa (% index) were higher in all surveys on the lower Kings River during 2006 and 2007 than 75% of the studies from other Central Valley rivers and streams (Appendix A; Tables 25-27). These results are consistent with results of the length-weight (condition factor) analysis that showed rainbow trout inhabiting the lower Kings River were in good condition. In addition, growth rates for resident rainbow trout have been found to be relatively high, which supports the finding that the macroinvertebrate community inhabiting the river is relatively diverse (the diversity index for the river was consistently higher than the majority of other Central Valley rivers and streams; Tables 25-27) and provides a prey resource for trout and other fish species. These findings are further reinforced by the Central Valley IBI analysis which rates the Kings River BMI sampling sites as Fair or Good.

Conclusion and Recommendations

Results of the Kings River BMI analysis show;

- Taxa richness and EPT index were lower in the Kings River than the majority of other Central Valley rivers,

- EPT percentage index and Shannon diversity index were higher in the Kings River than the majority of other Central Valley rivers,

- Taxa richness and EPT taxa show evidence of habitat disturbance or stressors,

- EPT percentage index, species diversity, percentage of intolerant species, and percentage of tolerant species show evidence of suitable habitat conditions for macroinvertebrates,

- Central Valley Index of Biotic Integrity (IBI) ranks the Kings River as Fair to Good,

- There were no significant differences found among sites or among survey periods,

- There is no added benefit to annual sampling.

While conditions on the Kings River have been found to be a mix of both disturbed or stressed habitat as well as suitable habitat for benthic macroinvertebrates, continued annual sampling appears to have little or no value. It is on the basis of these findings that the Technical Steering Committee recommends that the Program move away from annual BMI monitoring and towards a more episodic sampling protocol (e.g., sampling at five-year intervals or as part of a specific habitat enhancement project).

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Table 2. Characteristics of the macroinvertebrate sites surveyed in the Lower Kings River, February 2006.

	2006					
Collection Date:	**2/9**	**2/10**	**2/9**	**2/9**	**2/9**	**2/8**
Transect Number:	**1**	**2**	**3**	**6**	**7**	**8**
Site Code	BAB	BPB	EAL	AAC	BFW	180
Average Width (m)	17	14	20	59	25	20
Average Depth (cm)	65	41	61	38	39	40
Riffle Length (m)	100	50	100	100	100	100
Slope (%)	1.8	2.4	1.2	3.2	0.4	0.7
Epifaunal Substrate (0-20)	7	9	11	10	8	10
Embeddedness (0-20)	13	19	13	15	15	18
Velocity/Depth (0-20)	8	15	8	10	15	14
Sediment Deposition (0-20)	8	19	5	19	17	19
Channel Flow (0-20)	7	7	11	17	14	8
Channel Alteration (0-20)	16	14	14	19	16	18
Riffle Frequency (0-20)	4	3	1	16	16	12
Average Fines (%)	20.0	5.0	23.0	4.0	5.0	2.0
Average Gravel (%)	10.0	15.0	8.0	11.0	10.0	6.0
Average Cobble (%)	58	60	62	78	80	90
Average Boulder (%)	12.0	20.0	7.0	7.0	5.0	2.0
Average Bedrock (%)	0	0	0	0	0	0
Average Canopy Cover (%)	0	0	0	5.0	0	0.0
Average Substrate Complexity (0-20)	8	10	7	8	11	6

Habitat classifications are based on the California Department of Fish and Game
CSBP Stream Habitat Characterization Form and protocol.

Table 3. Characteristics of the macroinvertebrate sites surveyed in the Lower Kings River, November 2006.

	2006					
Collection Date:	**11/17**	**11/17**	**11/20**	**11/20**	**11/22**	**11/16**
Transect Number:	**1**	**2**	**3**	**6**	**7**	**8**
Site Code	BAB	BPB	EAL	AAC	BFW	180
Average Width (m)	17	14	18	40	15	12
Average Depth (cm)	60	73	70	35	38	33
Riffle Length (m)	45	30	70	25	30	50
Slope (%)	1.8	2.4	1.2	3.2	0.9	0.7
Epifaunal Substrate (0-20)	8	8	10	8	8	12
Embeddedness (0-20)	17	18	15	18	18	16
Velocity/Depth (0-20)	11	18	18	15	9	12
Sediment Deposition (0-20)	18	18	10	19	18	19
Channel Flow (0-20)	10	10	11	15	8	8
Channel Alteration (0-20)	16	16	18	19	15	12
Riffle Frequency (0-20)	5	6	6	10	19	11
Average Fines (%)	1.0	1.0	7.3	1.0	15.0	2.0
Average Gravel (%)	5.3	4.0	6.0	7.0	20.0	5.0
Average Cobble (%)	90	85	80	86.7	60	90
Average Boulder (%)	3.7	10.0	6.7	7.0	5.0	3.0
Average Bedrock (%)	0	0	0	0	0	0
Average Canopy Cover (%)	0	0	0	0	0.7	11.7
Average Substrate Complexity (0-20)	10	13	12	10	10	10

Habitat classifications are based on the California Department of Fish and Game CSBP Stream Habitat Characterization Form and protocol.

Table 4. Characteristics of the macroinvertebrate sites surveyed in the Lower Kings River, January 2007.

	2007					
Collection Date:	**1/29**	**1/29**	**1/29**	**1/30**	**1/30**	**1/30**
Transect Number:	**1**	**2**	**3**	**6**	**7**	**8**
Site Code	BAB	BPB	EAL	AAC	BFW	180
Average Width (m)	15	11	50	22	17	14
Average Depth (cm)	52	58	46	37	27	24
Riffle Length (m)	75	30	120	30	30	75
Slope (%)	1.8	2.4	1.2	3.2	0.4	0.7
Epifaunal Substrate (0-20)	8	8	12	10	10	16
Embeddedness (0-20)	15	17	16	16	19	18
Velocity/Depth (0-20)	18	7	19	10	10	14
Sediment Deposition (0-20)	17	19	16	17	19	19
Channel Flow (0-20)	9	9	18	15	8	8
Channel Alteration (0-20)	16	19	15	19	14	15
Riffle Frequency (0-20)	11	11	16	14	15	10
Average Fines (%)	1.0	1.0	1.0	4.0	10.0	1.0
Average Gravel (%)	5.0	3.0	5.0	42.0	30.0	4.0
Average Cobble (%)	90	90	90	49	40	90
Average Boulder (%)	4.0	6.0	4.0	5.0	20.0	5.0
Average Bedrock (%)	0	0	0	0	0	0
Average Canopy Cover (%)	0	0	0	0	0	8.0
Average Substrate Complexity (0-20)	16	14	18	16	16	16

Habitat classifications are based on the California Department of Fish and Game CSBP Stream Habitat Characterization Form and protocol.

Table 5. Biological metrics used to describe Benthic Macroinvertebrate (BMI) samples collected following the California Stream Bioassessment Procedure (CSBP) (CDFG 1999).

Biological Metrics	Description	Response to Disturbance
Richness Measures		
Taxa Richness	Total number of individual taxa	Decrease
EPT Taxa	Number of taxa in the Ephemeroptera (mayfly), Plecoptera (stonefly) and Trichoptera (caddisfly) insect orders	Decrease
Ephemeroptera Taxa	Number of mayfly taxa (genus or species)	Decrease
Plecoptera Taxa	Number of stonefly taxa (genus or species)	Decrease
Trichoptera Taxa	Number of caddisfly taxa (genus or species)	Decrease
Composition Measures		
EPT Index	Percent composition of mayfly, stonefly and caddisfly larvae	Decrease
Sensitive EPT Index	Percent composition of mayfly, stonefly and caddisfly larvae with Tolerance Values of 0 through 3	Decrease
Shannon-Diversity Index	General Measures of sample diversity that incorporates richness and evenness	Decrease
Relate Diversity (Evenness)	Measure that compares Shannon Diversity Index to its possible maximum value for the same number of taxa	Decrease
Tolerance/Intolerance Measures		
Tolerance Value	Value between 0 and 10 weighted for abundance of individuals designated as pollution tolerant (higher values) and intolerant (lower values)	Increase
Percent Intolerant Organisms	Percent of organisms in sample that are highly intolerant to impairment as indicated by a tolerance value of 0, 1 or 2	Decrease
Percent Tolerant Organisms	Percent of organisms in sample that are highly intolerant to impairment as indicated by a tolerance value of 8, 9 or 10	Increase
Percent *Hydropsychidae*	Percent of organisms in the caddisfly family *Hydropsychidae*	Increase
Percent *Baetidae*	Percent of organisms in the mayfly family *Baetidae*	Increase
Percent Dominant Taxa	Percent composition of the single most abundant Taxon	Increase

Functional Feeding Groups		
Percent Collectors	Percent of macrobenthos that collect or gather fine particulate organic matter (FPOM)	Increase
Percent Filterers	Percent of macrobenthos that filter fine particulate organic matter (FPOM)	Increase
Percent Scrapers (Grazers)	Percent of macrobenthos that graze upon periphyton	Variable
Percent Predators	Percent of macrobenthos that feed on other organisms	Variable
Percent Shredders	Percent of macrobenthos that shreds coarse particulate organic matter (CPOM)	Decrease

Table 6. Summary of benthic macroinvertebrate collections in the Lower Kings River: February 2006.

Site Code:	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River
Collection Date:	**9-Feb-06**	**10-Feb-06**	**9-Feb-06**	**9-Feb-06**	**9-Feb-06**	**8-Feb-06**
Transect Number:	**1**	**2**	**3**	**6**	**7**	**8**
Taxa Richness	11.0	13.0	14.0	16.0	18.0	12.0
Percent Dominant Taxa	47.0	36.0	53.0	40.0	49.0	28.0
EPT Taxa	4.0	7.0	7.0	7.0	9.0	6.0
EPT Index (%)	36.0	62.0	54.0	65.0	51.0	66.0
Sensitive EPT Index	1.0	2.0	4.0	1.0	3.0	1.0
Ephemeroptera Taxa	2.0	5.0	4.0	5.0	5.0	4.0
Plecoptera Taxa	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera Taxa	2.0	1.0	3.0	3.0	4.0	2.0
Dipteran Taxa	1.0	2.0	1.0	1.0	1.0	1.0
Percent Dipteran	1.0	13.0	2.0	4.0	2.0	0.0
Non-Insect Taxa	5.0	4.0	5.0	6.0	6.0	4.0
Percent Non-Insect	13.0	4.0	10.0	6.0	8.0	13.0
Percent Chironomidae	47.0	22.0	34.0	26.0	39.0	21.0
Percent Hydropsychiade	23.0	35.0	33.0	36.0	31.0	28.0
Percent Baetidae	12.0	22.0	12.0	23.0	13.0	20.0
Shannon-Weaver Diversity Index	1.5	1.6	1.6	1.6	1.6	1.8
Tolerance Value	5.5	4.8	4.8	4.8	4.9	4.1
Percent Intolerant (0-3)	1.0	2.0	4.0	1.0	2.0	1.0
Percent Tolerant (8-10)	10.0	1.0	5.0	3.0	4.0	4.0
Percent Collector-Gatherer	60.0	49.0	52.0	53.0	56.0	44.0
Percent Collector-Filterers	24.0	48.0	34.0	40.0	33.0	28.0
Percent Scrapers	3.0	1.0	5.0	3.0	5.0	20.0
Percent Predators	12.0	2.0	7.0	4.0	5.0	8.0
Percent Shredders	0.0	0.0	0.0	0.0	0.0	0.0

Table 7. Summary of benthic macroinvertebrate collections in the Lower Kings River: November 2006.

Site Code:	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River
Collection Date:	**17-Nov-06**	**17-Nov-06**	**20-Nov-06**	**20-Nov-06**	**22-Nov-06**	**16-Nov-06**
Transect Number:	**1**	**2**	**3**	**6**	**7**	**8**
Taxa Richness	15.0	10.0	14.0	14.0	16.0	14.0
Percent Dominant Taxa	40.0	36.0	40.0	34.0	37.0	38.0
EPT Taxa	6.0	4.0	6.0	7.0	8.0	7.0
EPT Index (%)	48.0	66.0	76.0	61.0	75.0	52.0
Sensitive EPT Index	1.0	9.0	14.0	7.0	9.0	1.0
Ephemeroptera Taxa	3.0	2.0	3.0	3.0	4.0	4.0
Plecoptera Taxa	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera Taxa	3.0	3.0	3.0	3.0	4.0	3.0
Dipteran Taxa	1.0	1.0	2.0	1.0	2.0	1.0
Percent Dipteran	5.0	9.0	2.0	2.0	2.0	0.0
Non-Insect Taxa	6.0	3.0	5.0	4.0	5.0	5.0
Percent Non-Insect	11.0	5.0	8.0	14.0	8.0	9.0
Percent Chironomidae	35.0	19.0	13.0	23.0	15.0	38.0
Percent Hydropsychiade	36.0	33.0	43.0	31.0	32.0	21.0
Percent Baetidae	10.0	24.0	19.0	22.0	31.0	28.0
Shannon-Weaver Diversity Index	1.7	1.7	1.8	1.8	1.8	1.6
Tolerance Value	5.0	4.7	4.3	4.7	4.6	5.2
Percent Intolerant (0-3)	1.0	9.0	14.0	7.0	9.0	1.0
Percent Tolerant (8-10)	3.0	3.0	6.0	3.0	5.0	4.0
Percent Collector-Gatherer	50.0	45.0	34.0	56.0	51.0	71.0
Percent Collector-Filterers	40.0	42.0	45.0	33.0	34.0	21.0
Percent Scrapers	2.0	9.0	14.0	7.0	9.0	2.0
Percent Predators	7.0	5.0	7.0	5.0	6.0	5.0
Percent Shredders	0.0	0.0	0.0	0.0	0.0	0.0

Table 8. Summary of benthic macroinvertebrate collections in the Lower Kings River: January 2007.

Site Code:	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River
Collection Date:	**29-Jan-07**	**29-Jan-07**	**29-Jan-07**	**29-Jan-07**	**30-Jan-07**	**30-Jan-07**
Transect Number:	**1**	**2**	**3**	**6**	**7**	**8**
Taxa Richness	11.0	11.0	15.0	14.0	16.0	15.0
Percent Dominant Taxa	42.0	51.0	37.0	42.0	42.0	42.0
EPT Taxa	6.0	5.0	7.0	8.0	7.0	7.0
EPT Index (%)	62.0	70.0	67.0	66.0	58.0	51.0
Sensitive EPT Index	1.0	1.0	8.0	3.0	4.0	1.0
Ephemeroptera Taxa	4.0	3.0	5.0	6.0	5.0	5.0
Plecoptera Taxa	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera Taxa	1.0	2.0	3.0	3.0	3.0	2.0
Dipteran Taxa	2.0	2.0	2.0	1.0	2.0	2.0
Percent Dipteran	8.0	8.0	5.0	4.0	2.0	1.0
Non-Insect Taxa	3.0	3.0	4.0	4.0	6.0	5.0
Percent Non-Insect	6.0	4.0	7.0	4.0	8.0	9.0
Percent Chironomidae	24.0	18.0	21.0	27.0	31.0	38.0
Percent Hydropsychiade	42.0	51.0	35.0	42.0	28.0	20.0
Percent Baetidae	15.0	16.0	21.0	18.0	22.0	17.0
Shannon-Weaver Diversity Index	1.6	1.4	1.8	1.6	1.7	1.8
Tolerance Value	4.8	4.6	4.5	4.7	4.9	4.6
Percent Intolerant (0-3)	1.0	1.0	8.0	3.0	4.0	1.0
Percent Tolerant (8-10)	4.0	2.0	4.0	2.0	5.0	4.0
Percent Collector-Gatherer	44.0	37.0	47.0	48.0	57.0	59.0
Percent Collector-Filterers	49.0	58.0	39.0	45.0	30.0	21.0
Percent Scrapers	0.0	1.0	8.0	4.0	6.0	13.0
Percent Predators	7.0	3.0	5.0	3.0	7.0	6.0
Percent Shredders	0.0	0.0	0.0	0.0	0.0	0.0

Table 9. Comparison of macroinvertebrate community characteristics at Site 1 among 2006-2007 surveys.

Site: 1 Riffle below ACOE Bridge				
		Survey Date		
Metric		February 2006	November 2006	January 2007
Taxa richness		11.0	15.0	11.0
EPT taxa		4.0	6.0	6.0
EPT index (%)		36.0	48.0	62.0
Sensitive EPT index		1.0	1.0	1.0
Shannon diversity index		1.5	1.7	1.6
Tolerance value		5.5	5.0	4.8
Percentage intolerant taxa		1.0	1.0	1.0
Percentage tolerant taxa		10.0	3.0	4.0

Table 10. Comparison of macroinvertebrate community characteristics at Site 2 among 2006-2007 surveys.

Site: 2 Riffle below Piedra Bridge				
		Survey Date		
Metric		February 2006	November 2006	January 2007
Taxa richness		13.0	10.0	11.0
EPT taxa		7.0	4.0	5.0
EPT index (%)		62.0	66.0	70.0
Sensitive EPT index		2.0	9.0	1.0
Shannon diversity index		1.6	1.7	1.4
Tolerance value		4.8	4.7	4.6
Percentage intolerant taxa		2.0	9.0	1.0
Percentage tolerant taxa		1.0	3.0	2.0

Table 11. Comparison of macroinvertebrate community characteristics at Site 3 among 2006-2007 surveys.

Site: 3 Riffle East end of Avocado Lake				
		Survey Date		
Metric		February 2006	November 2006	January 2007
Taxa richness		14.0	14.0	15.0
EPT taxa		7.0	6.0	7.0
EPT index (%)		54.0	76.0	67.0
Sensitive EPT index		4.0	14.0	8.0
Shannon diversity index		1.6	1.8	1.8
Tolerance value		4.8	4.3	4.5
Percentage intolerant taxa		4.0	14.0	8.0
Percentage tolerant taxa		5.0	6.0	4.0

Table 12. Comparison of macroinvertebrate community characteristics at Site 6 among 2006-2007 surveys.

Site: 6 Near confluence with Avocado Side Channel				
		Survey Date		
Metric		February 2006	November 2006	January 2007
Taxa richness		16.0	14.0	14.0
EPT taxa		7.0	7.0	8.0
EPT index (%)		65.0	61.0	66.0
Sensitive EPT index		1.0	7.0	3.0
Shannon diversity index		1.6	1.8	1.6
Tolerance value		4.8	4.7	4.7
Percentage intolerant taxa		1.0	7.0	3.0
Percentage tolerant taxa		3.0	3.0	2.0

Table 13. Comparison of macroinvertebrate community characteristics at Site 7 among 2006-2007 surveys.

Site: 7 Riffle below Fresno Weir				
		Survey Date		
Metric		February 2006	November 2006	January 2007
Taxa richness		18.0	16.0	16.0
EPT taxa		9.0	8.0	7.0
EPT index (%)		51.0	75.0	58.0
Sensitive EPT index		3.0	9.0	4.0
Shannon diversity index		1.6	1.8	1.7
Tolerance value		4.9	4.6	4.9
Percentage intolerant taxa		2.0	9.0	4.0
Percentage tolerant taxa		4.0	5.0	5.0

Table 14. Comparison of macroinvertebrate community characteristics at Site 8 among 2006-2007 surveys.

Site: 8 First riffle above Highway 180				
		Survey Date		
Metric		February 2006	November 2006	January 2007
Taxa richness		12.0	14.0	15.0
EPT taxa		6.0	7.0	7.0
EPT index (%)		66.0	52.0	51.0
Sensitive EPT index		1.0	1.0	1.0
Shannon diversity index		1.8	1.6	1.8
Tolerance value		4.1	5.2	4.6
Percentage intolerant taxa		1.0	1.0	1.0
Percentage tolerant taxa		4.0	4.0	4.0

Table 15. Biological metrics values for the 2006-2007 surveys used in the Central Valley Index of Biotic Integrity

Metric	BAB 2/9/2006	BAB 11/17/2006	BAB 1/29/2007
Collector Richness	8	10	7
Predator Richness	8	6	4
% EPT Taxa	30	42	42
% Clinger Taxa	42	64	33
Shannon Diversity	1.57	1.78	1.64

Metric	EAL 2/9/2006	EAL 11/20/2006	EAL 1/29/2007
Collector Richness	11	9	11
Predator Richness	6	5	3
% EPT Taxa	45	40	47
% Clinger Taxa	50	62	58
Shannon Diversity	1.82	1.9	1.86

Metric	BFW 2/9/2006	BFW 11/22/2006	BFW 1/30/2007
Collector Richness	11	10	8
Predator Richness	7	5	6
% EPT Taxa	54	50	41
% Clinger Taxa	59	57	45
Shannon Diversity	1.84	1.83	1.79

Table 16. Biological metrics values for the 2006-2007 surveys used in the Central Valley Index of Biotic Integrity

Metric	BPB 2/9/2006	BPB 11/17/2006	BPB 1/29/2007
Collector Richness	11	7	8
Predator Richness	3	4	3
% EPT Taxa	56	42	43
% Clinger Taxa	57	50	40
Shannon Diversity	1.75	1.72	1.47

Metric	AAC 2/9/2006	AAC 11/20/2006	AAC 1/30/2007
Collector Richness	11	10	8
Predator Richness	4	4	4
% EPT Taxa	53	47	56
% Clinger Taxa	54	60	58
Shannon Diversity	1.74	1.88	1.64

Metric	180 2/9/2006	180 11/16/2006	180 1/30/2007
Collector Richness	8	9	8
Predator Richness	2	4	4
% EPT Taxa	57	53	41
% Clinger Taxa	50	50	45
Shannon Diversity	1.92	1.64	1.94

Table 17. Central Valley IBI Scores for the Kings River BMI Sampling Sites, February 2006 Sampling Period.

	BAB 2/9/2006	BPB 2/9/2006	EAL 2/9/2006	AAC 2/9/2006	BFW 2/9/2006	180 2/9/2006
Collector Richness	4	6	6	6	6	4
Predator Richness	6	2	4	3	5	1
% EPT Taxa	7	10	10	10	10	10
% Clinger Taxa	7	9	8	9	10	8
Shannon Diversity	2	3	3	3	3	4
Total	26	30	31	31	34	27
IBI Score (Total x 2)	**52**	**60**	**62**	**62**	**68**	**54**

Table 18. Central Valley IBI Scores for the Kings River BMI Sampling Sites, November 2006 Sampling Period.

	BAB 11/17/2006	BPB 11/17/2006	EAL 11/20/2006	AAC 11/20/2006	BFW 11/22/2006	180 11/16/2006
Collector Richness	5	3	5	5	5	5
Predator Richness	8	3	3	3	3	3
% EPT Taxa	10	10	9	10	10	10
% Clinger Taxa	10	8	10	10	9	8
Shannon Diversity	3	3	4	4	3	2
Total	36	27	31	32	30	28
IBI Score (Total x 2)	**72**	**54**	**62**	**64**	**60**	**56**

Table 19. Central Valley IBI Scores for the Kings River BMI Sampling Sites, January 2007 Sampling Period.

	BAB 1/29/2007	BPB 1/29/2007	EAL 1/29/2007	AAC 1/30/2007	BFW 1/30/2007	180 1/30/2007
Collector Richness	3	4	6	4	4	4
Predator Richness	3	2	2	3	4	3
% EPT Taxa	10	10	10	10	10	10
% Clinger Taxa	6	7	10	10	8	8
Shannon Diversity	2	1	4	2	3	4
Total	24	24	32	29	29	29
IBI Score (Total x 2)	**48**	**48**	**64**	**58**	**58**	**58**

IBI Score	Rating
0-20	**Very poor**
21-40	**Poor**
41-60	**Fair**
61-80	**Good**
81-100	**Excellent**

Table 20. Average IBI score by site for the 2006-2007 survey period.

Site Average

BAB	BPB	EAL	AAC	BFW	180
57	54	63	61	62	56

Table 21. Comparison of macroinvertebrate community characteristics from the Lower Kings River in 2003, 2005, 2006 and 2007 surveys.

Site: Locations between Pine Flat Dam and Highway 180						
		Survey Date				
Metric		February 2003	February 2005	February 2006	November 2006	January 2007
Taxa richness		14-24	10-19	11-18	10-16	11-16
EPT taxa		4-9	2-6	4-9	4-8	5-8
EPT index (%)		11-52	8-62	51-66	48-78	51-70
Sensitive EPT index		0-3	0-23	1-4	1-14	1-8
Shannon diversity index		1.9-2.3	1.1-2.2	1.5-1.8	1.6-1.8	1.4-1.8
Tolerance value		5.0-6.1	4.2-5.8	4.1-5.5	4.3-5.2	4.5-4.9
Percentage intolerant taxa		0-2	0-23	1-4	1-14	1-8
Percentage tolerant taxa		5-27	5-11	3-10	3-6	2-5

Table 22. Summary of benthic macroinvertebrate metrics for Central Valley rivers and streams.

	Size	Mean	Standard Deviation	CI of Mean	Min	Max	Median	25%	75%
Taxa Richness	69	29.4	8.5	2.1	9.0	45.0	30.0	23.7	35.1
Percent Dominant Taxa	69	33.0	11.6	2.8	15.0	65.8	30.6	24.7	40.0
EPT Taxa	69	14.1	5.6	1.3	2.0	25.0	16.0	9.8	17.5
EPT Index (%):	69	36.3	16.5	4.0	7.7	74.9	34.8	23.0	47.5
Sensitive EPT Index	69	19.9	14.5	3.5	0.4	51.9	17.2	7.7	32.5
Ephemeroptera Taxa	69	4.9	2.4	0.6	0.0	10.0	5.5	3.0	6.7
Plecoptera Taxa	69	3.4	2.4	0.6	0.0	9.3	3.0	1.2	5.0
Trichoptera Taxa	69	5.8	2.0	0.5	1.0	11.3	6.0	4.3	7.0
Percent Hydropsychiade	69	2.8	3.9	0.9	0.0	17.8	1.5	0.0	3.9
Percent Baetidae	69	8.4	8.0	1.9	0.0	40.8	5.9	2.7	12.1
Shannon-Weaver Diversity Index	69	1.0	0.2	0.1	0.0	1.3	1.0	0.8	1.2
Tolerance Value	69	4.5	0.8	0.2	2.9	6.6	4.6	3.9	5.1
Percent Intolerant (0-3)	69	20.9	15.0	3.6	0.1	56.9	18.1	8.6	33.8
Percent Tolerant (8-10)	69	6.4	8.5	2.1	0.0	41.0	3.4	1.1	8.0
Percent Collector-Gatherer	69	49.2	14.0	3.4	22.1	87.0	48.7	39.8	57.2
Percent Collector-	69	18.4	19.4	4.7	0.0	69.4	9.8	1.9	33.0

Filterers									
Percent Scrapers	69	11.0	8.0	1.9	0.6	33.4	8.8	3.7	17.1
Percent Predators	69	11.0	9.2	2.2	0.7	45.0	8.0	4.6	14.1
Percent Shredders	69	10.4	9.0	2.2	0.0	41.6	9.1	3.8	15.5

Table 23. Comparison of macroinvertebrate community characteristics observed in the Lower Kings River during the February 2003 survey and other Central Valley rivers.

Survey: February 2003		Lower Kings River Survey Site						
Metric	**Central Valley Range (25%-75%)**	**KR-1**	**KR-2**	**KR-3a**	**KR-3b**	**KR-4**	**KR-5**	**KR-6**
Taxa richness	23.7 – 35.1	L	L	L	L	L	Y	L
EPT taxa	9.8 – 17.5	L	L	L	L	L	L	L
EPT index (%)	23.0 – 47.5	Y	Y	L	Y	Y	H	L
Sensitive EPT index	7.7 – 32.5	L	L	L	L	L	L	L
Shannon diversity index	0.8 – 1.2	H	H	H	H	H	H	H
Tolerance value	3.9 – 5.1	H	H	H	Y	H	H	H
Percentage intolerant taxa	8.6 – 33.8	L	L	L	L	L	L	L
Percentage tolerant taxa	1.1 – 8.0	H	H	H	Y	H	H	H

Lower than 75% of Central Valley Rivers
Between 25% and 75% of Central Valley Rivers
Higher than 75% of Central Valley Rivers

Table 24. Comparison of macroinvertebrate community characteristics observed in the Lower Kings River during the February 2005 survey and other Central Valley rivers.

Survey: February 2005		Lower Kings River Survey Site							
Metric	**Central Valley Range (25%-75%)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Taxa richness	23.7 – 35.1	L	L	L	L	L	L	L	L
EPT taxa	9.8 – 17.5	L	L	L	L	L	L	L	L
EPT index (%)	23.0 – 47.5	Y	Y	Y	L	L	Y	Y	H
Sensitive EPT index	7.7 – 32.5	L	L	L	L	L	L	L	Y
Shannon diversity index	0.8 – 1.2	Y	H	H	H	H	H	H	H
Tolerance value	3.9 – 5.1	H	H	H	H	H	H	H	Y
Percentage intolerant taxa	8.6 – 33.8	L	L	L	L	L	L	L	Y
Percentage tolerant taxa	1.1 – 8.0	Y	Y	Y	Y	H	H	Y	Y

Lower than 75% of Central Valley Rivers
Between 25% and 75% of Central Valley Rivers
Higher than 75% of Central Valley Rivers

Table 25. Comparison of macroinvertebrate community characteristics observed in the Lower Kings River during the February 2006 survey and other Central Valley rivers.

Survey: February 2006 **Lower Kings River Survey Site**

Metric	Central Valley Range (25%-75%)	1	2	3	6	7	8
Taxa richness	23.7 – 35.1	L	L	L	L	L	L
EPT taxa	9.8 – 17.5	L	L	L	L	L	L
EPT index (%)	23.0 – 47.5	Y	H	H	H	H	H
Sensitive EPT index	7.7 – 32.5	L	L	L	L	L	L
Shannon diversity index	0.8 – 1.2	H	H	H	H	H	H
Tolerance value	3.9 – 5.1	H	Y	Y	Y	Y	Y
Percentage intolerant taxa	8.6 – 33.8	L	L	L	L	L	L
Percentage tolerant taxa	1.1 – 8.0	H	L	Y	Y	Y	Y

Lower than 75% of Central Valley Rivers
Between 25% and 75% of Central Valley Rivers
Higher than 75% of Central Valley Rivers

Table 26. Comparison of macroinvertebrate community characteristics observed in the Lower Kings River during the November 2006 survey and other Central Valley rivers.

Survey: November 2006		Lower Kings River Survey Site					
Metric	**Central Valley Range (25%-75%)**	1	2	3	6	7	8
Taxa richness	23.7 – 35.1	L	L	L	L	L	L
EPT taxa	9.8 – 17.5	L	L	L	L	L	L
EPT index (%)	23.0 – 47.5	H	H	H	H	H	H
Sensitive EPT index	7.7 – 32.5	L	Y	Y	L	Y	L
Shannon diversity index	0.8 – 1.2	H	H	H	H	H	H
Tolerance value	3.9 – 5.1	Y	Y	Y	Y	Y	H
Percentage intolerant taxa	8.6 – 33.8	L	Y	Y	L	Y	L
Percentage tolerant taxa	1.1 – 8.0	Y	Y	Y	Y	Y	Y

Lower than 75% of Central Valley Rivers
Between 25% and 75% of Central Valley Rivers
Higher than 75% of Central Valley Rivers

Table 27. Comparison of macroinvertebrate community characteristics observed in the Lower Kings River during the January 2007 survey and other Central Valley rivers.

Survey: January 2007		Lower Kings River Survey Site					
Metric	**Central Valley Range (25%-75%)**	1	2	3	6	7	8
Taxa richness	23.7 – 35.1	L	L	L	L	L	L
EPT taxa	9.8 – 17.5	L	L	L	L	L	L
EPT index (%)	23.0 – 47.5	H	H	H	H	H	H
Sensitive EPT index	7.7 – 32.5	L	L	Y	L	L	L
Shannon diversity index	0.8 – 1.2	H	H	H	H	H	H
Tolerance value	3.9 – 5.1	Y	Y	Y	Y	Y	Y
Percentage intolerant taxa	8.6 – 33.8	L	L	L	L	L	L
Percentage tolerant taxa	1.1 – 8.0	Y	Y	Y	Y	Y	Y

Lower than 75% of Central Valley Rivers
Between 25% and 75% of Central Valley Rivers
Higher than 75% of Central Valley Rivers

APPENDIX A

Summary of benthic macroinvertebrate survey results for the
Lower Kings River and other Central Valley rivers

Site Code:	South Slide Creek	South Slide Creek	North Slide Creek	North Slide Creek	North Slide Creek
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	Site AD (RM 0.40)	Site BD 2 (RM 0.05)	Site AD (RM 0.35)	Site BD 2 (RM 0.25)	Site BD 1 (RM 0.05)
Taxa Richness	34.7	25.5	41.7	20.0	29.0
Percent Dominant Taxa	29.5	36.7	21.9	30.4	36.9
EPT Taxa	16.7	12.5	19.7	7.0	12.0
EPT Index (%)	37.0	34.2	35.2	8.3	19.4
Sensitive EPT Index	16.5	19.0	23.5	3.0	17.5
Ephemeroptera Taxa	5.0	5.0	6.3	3.0	4.0
Plecoptera Taxa	6.7	5.0	7.0	1.5	4.0
Trichoptera Taxa	5.0	2.5	6.3	2.5	4.0
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade	0.0	0.0	0.5	0.0	0.0
Percent Baetidae	0.1	2.7	1.4	0.2	0.3
Shannon Diversity Index	1.1	0.9	1.3	0.9	0.9
Tolerance Value	4.3	4.5	4.4	6.6	4.8
Percent Intolerant (0-3)	17.1	19.8	25.2	3.8	17.8
Percent Tolerant (8-10)	11.6	4.5	8.5	38.3	2.5
Percent Collector-Gatherer	46.9	62.1	43.1	73.5	69.8
Percent Collector-Filterers	0.4	0.0	3.2	0.2	0.3
Percent Scrapers	22.6	11.1	9.4	3.4	0.6
Percent Predators	21.7	11.9	28.3	22.9	13.8
Percent Shredders	8.4	14.8	16.1	0.0	15.4

Site Code: Collection Date: Transect Number:	Hooper Creek Fall 2002 Site AD (RM 0.70)	Hooper Creek Fall 2002 Site BD 2 (RM 0.55)	Hooper Creek Fall 2002 Site BD 1 (RM 0.05)	Crater Creek Fall 2002 Site AD (RM 3.10)	Crater Creek Fall 2002 Site BD 3 (RM 2.40)
Taxa Richness	34.0	34.3	30.3	16.0	30.3
Percent Dominant Taxa	28.5	26.4	26.1	56.6	39.1
EPT Taxa	18.0	18.3	16.0	10.0	16.5
EPT Index (%)	46.5	58.7	42.9	19.0	33.9
Sensitive EPT Index	42.7	41.7	35.7	17.2	23.9
Ephemeroptera Taxa	6.5	7.3	5.7	5.0	6.5
Plecoptera Taxa	5.5	6.7	4.3	2.0	5.8
Trichoptera Taxa	6.0	4.3	6.0	3.0	4.3
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade	0.3	0.1	0.0	0.0	0.0
Percent Baetidae	2.9	15.8	5.8	0.0	5.6
Shannon Diversity Index	1.1	1.1	1.0	0.7	1.0
Tolerance Value	3.2	3.5	3.9	4.6	4.4
Percent Intolerant (0-3)	43.5	42.5	36.1	17.2	25.1
Percent Tolerant (8-10)	0.0	2.0	1.1	0.0	3.4
Percent Collector-Gatherer	49.7	49.4	52.3	78.1	70.2
Percent Collector-Filterers	2.4	2.9	6.6	0.0	0.2
Percent Scrapers	22.5	16.3	13.1	4.4	4.7
Percent Predators	19.8	16.3	10.5	10.9	13.1
Percent Shredders	5.5	15.1	17.5	6.6	11.7

Site Code: Collection Date: Transect Number:	Bear Creek Fall 2002 Site AD (RM 1.80)	Bear Creek Fall 2002 Site BD 2 (RM 1.50)	Bear Creek Fall 2002 Site BD 1 (RM 0.05)	Chinquapin Creek Fall 2002 Site AD (RM 0.95)	Chinquapin Creek Fall 2002 Site BD 2 (RM 0.60)	Chinquapin Creek Fall 2002 Site BD 1 (RM 0.35)
Taxa Richness	40.0	29.0	27.0	38.0	40.0	30.0
Percent Dominant Taxa	15.7	37.6	24.8	27.0	29.4	42.2
EPT Taxa	24.0	16.7	13.7	23.3	23.5	14.0
EPT Index (%)	62.7	40.7	34.8	48.9	46.7	7.7
Sensitive EPT Index	33.4	17.5	6.3	39.4	37.3	5.6
Ephemeroptera Taxa	10.0	6.7	5.0	7.3	9.0	8.0
Plecoptera Taxa	7.0	2.3	2.0	9.3	8.5	3.0
Trichoptera Taxa	7.0	7.7	6.7	6.7	6.0	3.0
Dipteran Taxa						
Percent Dipteran						
Non-Insect Taxa						
Percent Non-Insect						
Percent Chironomidae						
Percent Hydropsychiade	16.8	5.5	2.0	1.9	0.3	0.0
Percent Baetidae	4.3	8.9	8.8	2.7	1.4	0.9
Shannon Diversity Index	1.3	1.0	1.1	1.2	1.1	0.7
Tolerance Value	3.4	4.6	5.6	3.6	3.6	5.1
Percent Intolerant (0-3)	33.6	18.4	8.5	41.1	41.9	8.6
Percent Tolerant (8-10)	3.7	0.4	23.1	8.0	1.4	1.5
Percent Collector-Gatherer	44.7	33.5	59.1	48.6	52.8	87.0
Percent Collector-Filterers	16.9	44.9	14.5	1.9	0.5	0.6

Percent Scrapers	15.4	7.8	19.1	18.8	13.3	2.9
Percent Predators	14.5	4.6	4.7	13.1	11.4	6.8
Percent Shredders	8.5	9.3	2.6	17.6	21.9	2.7

Site Code:	Camp 62 Creek	Camp 62 Creek	Camp 62 Creek	Bolsillo Creek	Bolsillo Creek	Bol
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002	Fall 2002	F
Transect Number:	Site AD	Site BD 2	Site BD 1	Site AD	Site BD 2	S
	(RM 1.40)	(RM 1.20)	(RM 0.05)	(RM 1.65)	(RM 1.30)	(F
Taxa Richness	35.0	35.0	40.3	29.5	35.0	
Percent Dominant Taxa	18.9	19.9	31.3	29.4	26.1	
EPT Taxa	18.3	18.0	23.3	19.0	20.5	
EPT Index (%)	61.0	56.3	43.1	62.5	47.8	
Sensitive EPT Index	47.6	49.0	37.7	51.9	34.9	
Ephemeroptera Taxa	6.7	7.0	7.7	7.5	6.5	
Plecoptera Taxa	6.7	5.0	4.3	8.0	8.0	
Trichoptera Taxa	5.0	6.0	11.3	3.5	6.0	
Dipteran Taxa						
Percent Dipteran						
Non-Insect Taxa						
Percent Non-Insect						
Percent Chironomidae						
Percent Hydropsychiade	0.0	0.3	0.4	0.0	0.0	
Percent Baetidae	2.8	4.0	2.4	2.9	4.4	
Shannon Diversity Index	1.2	1.2	1.2	1.0	1.0	
Tolerance Value	3.1	3.0	3.6	3.3	3.9	
Percent Intolerant (0-3)	50.3	56.9	38.1	52.8	36.1	
Percent Tolerant (8-10)	1.7	0.7	0.6	0.5	0.9	
Percent Collector-Gatherer	43.3	49.5	49.8	41.2	56.9	
Percent Collector-Filterers	0.9	0.7	3.9	0.2	0.6	
Percent Scrapers	17.9	15.4	18.1	10.0	8.8	
Percent Predators	15.9	15.0	11.8	7.0	7.3	
Percent Shredders	22.0	19.5	16.4	41.6	26.4	

Site Code: Collection Date: Transect Number:	Mono Creek Fall 2002 Site BD 4 (RM 5.70)	Mono Creek Fall 2002 Site BD 3 (RM 4.90)	Mono Creek Fall 2002 Site BD 2 (RM 1.30)	Mono Creek Fall 2002 Site BD 1 (RM 0.40)
Taxa Richness	28.0	27.3	29.3	31.0
Percent Dominant Taxa	29.6	40.6	52.2	42.0
EPT Taxa	11.7	15.7	17.3	17.0
EPT Index (%)	34.6	64.1	25.6	34.4
Sensitive EPT Index	18.3	13.1	10.1	9.5
Ephemeroptera Taxa	3.7	5.0	6.3	6.7
Plecoptera Taxa	4.3	4.3	3.0	3.7
Trichoptera Taxa	3.7	6.3	8.0	6.7
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	0.1	2.6	1.8	3.6
Percent Baetidae	5.9	40.8	9.4	18.0
Shannon Diversity Index	1.0	1.0	0.8	0.9
Tolerance Value	5.0	4.6	5.1	5.0
Percent Intolerant (0-3)	18.8	13.0	10.4	10.5
Percent Tolerant (8-10)	18.7	6.5	5.0	0.9
Percent Collector-Gatherer	61.5	75.7	25.2	37.0
Percent Collector-Filterers	3.4	5.2	57.9	47.4
Percent Scrapers	9.7	8.0	7.6	5.3
Percent Predators	13.1	6.5	4.4	6.3
Percent Shredders	12.4	4.6	4.9	4.0

Site Code:	Above Mammoth	Below Mammoth	Below Mammoth	Below Mammoth	Below Mammoth
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	Pool Site AM (RM 34.55)	Pool Site BM 4 (RM 26.20)	Pool Site BM 3 (RM 22.85)	Pool Site BM 2 (RM 22.10)	Pool Site BM 1 (RM 18.40)
Taxa Richness	12.3	15.0	13.3	21.0	23.0
Percent Dominant Taxa	50.2	35.4	65.8	39.8	41.3
EPT Taxa	6.3	6.0	6.0	7.3	10.0
EPT Index (%)	26.6	20.9	21.3	35.8	42.9
Sensitive EPT Index	5.0	2.0	2.1	1.3	2.5
Ephemeroptera Taxa	2.7	1.3	1.7	1.3	3.3
Plecoptera Taxa	0.7	0.0	0.0	0.3	0.9
Trichoptera Taxa	3.0	4.7	4.3	5.7	6.0
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade	1.2	0.1	2.3	6.6	17.8
Percent Baetidae	16.2	15.4	11.9	20.5	16.7
Shannon Diversity Index	0.6	0.7	0.6	0.8	0.8
Tolerance Value	5.2	5.6	5.6	5.4	5.3
Percent Intolerant (0-3)	6.2	0.9	1.0	1.2	2.5
Percent Tolerant (8-10)	0.8	3.3	1.5	3.3	5.6
Percent Collector-Gatherer	43.8	63.5	27.7	54.5	34.7
Percent Collector-Filterers	48.7	32.8	69.4	38.7	56.7
Percent Scrapers	3.4	1.9	1.9	3.5	5.9
Percent Predators	3.6	1.9	0.7	2.6	2.7
Percent Shredders	0.6	0.0	0.3	0.8	0.0

Site Code: Collection Date: Transect Number:	Rock Creek Fall 2002 Site AD (RM 0.55)	Rock Creek Fall 2002 Site BD 2 (RM 0.40)	Rock Creek Fall 2002 Site BD 1 (RM 0.05)
Taxa Richness	36.3	15.3	31.5
Percent Dominant Taxa	26.3	54.0	25.8
EPT Taxa	17.0	5.7	10.0
EPT Index (%)	47.4	15.6	22.7
Sensitive EPT Index	36.6	0.8	6.1
Ephemeroptera Taxa	5.7	2.0	4.5
Plecoptera Taxa	4.0	0.3	0.5
Trichoptera Taxa	7.3	3.3	5.0
Dipteran Taxa			
Percent Dipteran			
Non-Insect Taxa			
Percent Non-Insect			
Percent Chironomidae			
Percent Hydropsychiade	3.7	1.8	4.8
Percent Baetidae	3.0	9.2	11.0
Shannon Diversity Index	1.1	0.6	1.1
Tolerance Value	3.4	5.1	5.1
Percent Intolerant (0-3)	36.5	1.0	6.8
Percent Tolerant (8-10)	1.5	0.5	2.8
Percent Collector-Gatherer	41.7	70.9	48.7
Percent Collector-Filterers	13.6	22.8	31.3
Percent Scrapers	16.1	2.2	8.2
Percent Predators	6.8	3.7	10.8
Percent Shredders	21.9	0.4	1.0

Site Code: Collection Date: Transect Number:	Stevenson Reach Fall 2002 Site SR 4 (RM 16.09)	Stevenson Reach Fall 2002 Site SR 3 (RM 15.40)	Stevenson Reach Fall 2002 Site SR 2 (RM 13.50)	Stevenson Reach Fall 2002 Site SR 1 (RM 11.80)
Taxa Richness	23.5	23.3	17.0	19.7
Percent Dominant Taxa	33.8	52.3	60.5	53.8
EPT Taxa	7.0	6.3	6.3	8.0
EPT Index (%)	24.8	16.9	17.9	14.9
Sensitive EPT Index	2.3	1.6	0.6	0.4
Ephemeroptera Taxa	1.5	1.3	1.0	1.0
Plecoptera Taxa	0.0	0.0	0.3	0.0
Trichoptera Taxa	5.5	5.0	5.0	7.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	1.1	5.0	5.5	6.2
Percent Baetidae	9.9	5.9	8.1	5.1
Shannon Diversity Index	0.9	0.8	0.6	0.7
Tolerance Value	5.7	5.6	5.8	5.9
Percent Intolerant (0-3)	0.2	1.6	1.2	0.1
Percent Tolerant (8-10)	12.0	4.8	12.2	12.3
Percent Collector-Gatherer	51.7	42.4	36.1	33.7
Percent Collector-Filterers	36.7	50.1	60.2	61.4
Percent Scrapers	8.1	3.2	1.6	3.1
Percent Predators	3.0	3.0	1.9	1.8
Percent Shredders	0.5	0.2	0.2	0.0

Site Code: Collection Date: Transect Number:	Big Creek Fall 2002 Site 3 (RM 9.85)	Big Creek Fall 2002 Site 2 (RM 7.90)	Big Creek Fall 2002 Site 1 (RM 6.40)	Big Creek Fall 2002 Site B (RM 8.80)
Taxa Richness	23.7	35.5	35.0	31.0
Percent Dominant Taxa	38.7	24.2	30.6	23.0
EPT Taxa	10.7	19.0	16.7	16.0
EPT Index (%)	23.1	60.8	23.8	66.6
Sensitive EPT Index	14.1	28.4	16.6	47.2
Ephemeroptera Taxa	2.3	7.5	7.3	6.0
Plecoptera Taxa	4.3	3.0	4.0	3.0
Trichoptera Taxa	4.0	8.5	5.3	7.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	8.3	2.7	1.3	0.0
Percent Baetidae	0.6	24.2	3.5	12.6
Shannon Diversity Index	0.9	1.2	1.1	1.1
Tolerance Value	4.6	4.0	5.1	3.6
Percent Intolerant (0-3)	16.1	28.0	17.9	47.4
Percent Tolerant (8-10)	13.0	4.3	17.0	5.5
Percent Collector-Gatherer	22.1	44.3	52.5	38.2
Percent Collector-Filterers	25.1	21.6	23.4	9.8
Percent Scrapers	0.6	17.8	3.8	10.2
Percent Predators	41.0	7.3	10.6	7.4
Percent Shredders	11.2	9.1	9.7	34.5

Site Code:	Big Creek Dam 4 to PH 2	Big Creek Dam 4 to PH 2	Big Creek Dam 4 to PH 2	Dam 5 to PH 8	Dam 5 to PH 8
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	Site 3 (RM 6.00)	Site 2 (RM 4.95)	Site 1 (RM 2.15)	Upstream Site 2 (RM 1.55)	Downstream Site 1 (RM 0.55)
Taxa Richness	34.7	37.0	39.0	22.0	30.0
Percent Dominant Taxa	39.0	20.0	20.1	33.2	31.9
EPT Taxa	16.3	14.0	17.0	11.3	11.0
EPT Index (%)	37.7	48.7	49.6	34.8	26.5
Sensitive EPT Index	17.3	25.7	32.2	11.3	5.4
Ephemeroptera Taxa	5.7	4.0	6.0	2.7	3.7
Plecoptera Taxa	4.3	2.0	2.3	2.3	2.0
Trichoptera Taxa	6.3	8.0	8.7	6.3	5.3
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade	9.8	0.7	3.2	2.8	7.5
Percent Baetidae	7.8	20.0	11.5	10.3	12.1
Shannon-Weaver Diversity Index	1.0	1.2	1.3	0.9	1.0
Tolerance Value	4.5	3.9	3.5	5.3	5.3
Percent Intolerant (0-3)	20.2	22.1	29.8	11.2	4.3
Percent Tolerant (8-10)	2.6	5.0	3.4	9.8	7.1
Percent Collector-Gatherer	38.8	42.1	34.7	40.1	28.9
Percent Collector-Filterers	34.9	2.0	7.8	36.2	33.7
Percent Scrapers	7.1	33.4	32.4	10.6	5.2
Percent Predators	8.0	6.7	6.4	3.8	6.3
Percent Shredders	11.2	15.7	18.7	9.3	2.6

Site Code: Collection Date: Transect Number:	Pitman Creek Fall 2002 Site AD (RM 1.65)	Pitman Creek Fall 2002 Site BD 2 (RM 1.45)	Pitman Creek Fall 2002 Site BD 1 (RM 1.30)	Pitman Creek Fall 2002 Site BD 0 (RM 0.20)
Taxa Richness	39.0	14.3	18.3	26.0
Percent Dominant Taxa	32.2	47.7	37.3	42.1
EPT Taxa	25.0	7.0	9.3	11.7
EPT Index (%)	40.6	18.3	26.4	43.9
Sensitive EPT Index	16.0	0.9	7.9	7.1
Ephemeroptera Taxa	8.3	1.7	3.0	5.3
Plecoptera Taxa	5.7	0.3	1.3	1.3
Trichoptera Taxa	11.0	5.0	5.0	5.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	10.7	1.5	3.9	1.7
Percent Baetidae	3.7	13.6	12.8	30.8
Shannon Diversity Index	1.2	0.7	0.8	0.8
Tolerance Value	4.5	5.5	5.0	5.0
Percent Intolerant (0-3)	15.5	1.3	7.7	7.6
Percent Tolerant (8-10)	2.3	0.0	1.3	0.3
Percent Collector-Gatherer	57.2	48.5	60.4	57.3
Percent Collector-Filterers	13.8	47.9	30.2	28.4
Percent Scrapers	17.0	2.3	1.7	7.8
Percent Predators	6.5	1.2	1.6	2.7
Percent Shredders	5.5	0.1	4.5	3.8

Site Code: Collection Date: Transect Number:	Ely Creek Fall 2002 Site AD (RM 1.20)	Ely Creek Fall 2002 Site BD 3 (RM 0.60)	Ely Creek Fall 2002 Site BD 2 (RM 0.45)	Ely Creek Fall 2002 Site BD 1 (RM 0.20)
Taxa Richness	45.0	29.7	25.3	29.3
Percent Dominant Taxa	18.9	22.0	31.1	25.5
EPT Taxa	17.0	4.3	4.7	8.0
EPT Index (%)	31.6	9.5	8.5	24.1
Sensitive EPT Index	28.1	9.3	8.5	14.2
Ephemeroptera Taxa	6.0	0.0	0.0	3.0
Plecoptera Taxa	5.0	0.0	0.7	1.0
Trichoptera Taxa	6.0	4.3	4.0	4.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	0.0	0.0	0.0	0.0
Percent Baetidae	1.8	0.0	0.0	2.0
Shannon Diversity Index	1.3	1.2	1.0	1.1
Tolerance Value	4.4	5.1	4.6	4.8
Percent Intolerant (0-3)	30.5	9.0	9.5	17.5
Percent Tolerant (8-10)	8.4	15.7	5.2	7.6
Percent Collector-Gatherer	49.8	34.8	24.0	53.4
Percent Collector-Filterers	2.1	9.1	1.7	0.3
Percent Scrapers	6.7	17.1	21.9	12.3
Percent Predators	23.5	33.8	45.0	21.4
Percent Shredders	17.9	5.3	7.4	12.6

Site Code:	Balsam Creek	Balsam Creek	Balsam Creek	Adit 8 Creek	Adit 8 Creek
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	Site AD (RM 0.80)	Site BD 2 (RM 0.50)	Site BD 1 (RM 0.10)	Site 2 (RM 0.90)	Site 1 (RM 0.40)
Taxa Richness	35.7	35.3	31.7	14.0	31.7
Percent Dominant Taxa	20.8	30.4	18.5	39.6	26.8
EPT Taxa	19.3	17.3	17.0	7.0	16.7
EPT Index (%)	60.5	55.2	74.9	21.3	64.2
Sensitive EPT Index	31.9	23.2	44.9	18.0	30.9
Ephemeroptera Taxa	7.0	6.3	6.0	2.0	3.7
Plecoptera Taxa	4.7	3.7	3.7	3.0	5.7
Trichoptera Taxa	7.7	7.3	7.3	2.0	7.3
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade	3.7	9.1	13.9	1.5	1.8
Percent Baetidae	18.3	19.1	7.7	1.9	25.0
Shannon Diversity Index	1.2	1.1	1.2	0.8	1.2
Tolerance Value	3.7	3.9	2.9	5.4	3.8
Percent Intolerant (0-3)	34.5	26.6	44.6	18.1	30.5
Percent Tolerant (8-10)	1.5	1.6	0.3	41.0	7.6
Percent Collector-Gatherer	53.0	54.8	23.0	58.5	38.6
Percent Collector-Filterers	8.3	15.9	19.7	1.5	2.8
Percent Scrapers	17.2	8.6	25.8	1.6	19.6
Percent Predators	9.7	10.3	9.4	24.6	28.4
Percent Shredders	11.7	10.5	22.1	13.9	10.6

Site Code:	North Fork Stevenson Creek	North Fork Stevenson Creek	North Fork Stevenson Creek	North Fork Stevenson Creek
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	Site AO (RM 3.60)	Site BO 3 (RM 3.45)	Site BO 2 (RM 2.75)	Site BO 1 (RM 1.35)
Taxa Richness	41.0	25.3	42.0	34.3
Percent Dominant Taxa	21.1	40.9	15.0	19.9
EPT Taxa	22.3	13.3	22.0	16.7
EPT Index (%)	43.3	16.7	46.6	54.3
Sensitive EPT Index	35.2	11.8	27.3	35.8
Ephemeroptera Taxa	7.7	6.0	8.5	7.3
Plecoptera Taxa	6.7	2.7	5.0	3.0
Trichoptera Taxa	8.0	4.7	8.5	6.3
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	3.9	0.3	4.6	4.4
Percent Baetidae	0.8	2.5	3.7	6.3
Shannon Diversity Index	1.2	0.8	0.0	1.2
Tolerance Value	3.9	5.4	4.3	3.6
Percent Intolerant (0-3)	37.3	20.3	29.1	36.2
Percent Tolerant (8-10)	1.1	35.8	14.9	0.9
Percent Collector-Gatherer	48.7	82.0	53.8	36.6
Percent Collector-Filterers	4.0	0.8	7.1	22.3
Percent Scrapers	6.6	2.9	21.3	20.8
Percent Predators	19.3	6.1	9.5	9.1
Percent Shredders	21.4	8.2	8.3	11.2

Site Code:	Stevenson Creek	Stevenson Creek	Stevenson Creek	Stevenson Creek	Stevenson Creek
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	Site 5 (RM 3.95)	Site 4 (RM 2.60)	Site 3 (RM 2.40)	Site 2 (RM 2.10)	Site 1 (RM 0.80)
Taxa Richness	43.0	34.0	29.0	28.0	40.3
Percent Dominant Taxa	20.0	26.3	48.8	35.1	17.5
EPT Taxa	18.5	16.0	15.0	12.0	17.3
EPT Index (%)	36.9	31.3	30.1	18.1	27.4
Sensitive EPT Index	27.5	12.5	13.9	9.6	15.1
Ephemeroptera Taxa	4.5	6.0	5.5	7.0	5.3
Plecoptera Taxa	3.5	4.0	3.0	1.0	3.0
Trichoptera Taxa	10.5	6.0	6.5	4.0	9.0
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade	2.0	2.4	0.1	0.0	1.5
Percent Baetidae	4.8	11.6	12.1	5.6	8.0
Shannon Diversity Index	1.3	1.0	0.8	1.0	1.3
Tolerance Value	4.0	4.8	4.9	5.1	4.3
Percent Intolerant (0-3)	28.6	14.0	14.8	12.0	18.9
Percent Tolerant (8-10)	6.1	1.8	0.3	8.0	3.7
Percent Collector-Gatherer	61.0	49.6	43.9	45.5	47.4
Percent Collector-Filterers	7.6	29.6	35.5	35.1	11.8
Percent Scrapers	25.3	8.1	12.2	10.4	21.8
Percent Predators	13.9	6.3	4.2	5.3	14.5
Percent Shredders	12.1	7.0	4.2	3.7	4.6

Project Name: Big Creek ALP

Site Code:	Tombstone Creek	Tombstone Creek	Tombstone Creek
Collection Date:	Fall 2002	Fall 2002	Fall 2002
Transect Number:	AD	BD2	BD1
Taxa Richness	35.0	36.0	36.0
Percent Dominant Taxa	24.7	11.6	30.4
EPT Taxa	19.0	17.0	16.3
EPT Index (%)	57.5	52.4	27.2
Sensitive EPT Index	25.3	42.1	22.5
Ephemeroptera Taxa	5.0	7.0	5.3
Plecoptera Taxa	7.0	3.0	4.7
Trichoptera Taxa	7.0	7.0	6.3
Dipteran Taxa			
Percent Dipteran			
Non-Insect Taxa			
Percent Non-Insect			
Percent Chironomidae			
Percent Hydropsychiade	0.3	0.0	0.2
Percent Baetidae	3.6	4.0	0.8
Shannon Diversity Index	1.2	1.3	1.2
Tolerance Value	3.9	3.7	4.4
Percent Intolerant (0-3)	25.7	42.1	23.0
Percent Tolerant (8-10)	2.6	7.0	2.8
Percent Collector-Gatherer	28.7	42.4	56.7
Percent Collector-Filterers	10.1	4.6	4.2
Percent Scrapers	30.3	18.3	7.6
Percent Predators	20.2	26.2	24.0
Percent Shredders	10.7	8.5	7.5

Project Name:	Big Creek ALP				
Site Code:	South Fork San Joaquin	South Fork San Joaquin	South Fork San Joaquin	South Fork San Joaquin	South Fork San Joaquin
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	9	8	7	6	5
Taxa Richness	24.0	24.0	38.0	32.3	24.0
Percent Dominant Taxa	51.6	39.3	25.8	38.0	31.9
EPT Taxa	13.7	12.0	19.0	14.7	12.0
EPT Index (%)	23.5	21.7	46.3	60.0	32.5
Sensitive EPT Index	7.2	15.7	12.0	11.4	3.7
Ephemeroptera Taxa	6.7	4.0	6.0	6.3	5.3
Plecoptera Taxa	2.0	3.0	4.7	3.0	1.7
Trichoptera Taxa	5.0	5.0	8.3	5.3	5.0
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade	4.1	0.3	2.1	2.2	3.9
Percent Baetidae	5.9	0.3	2.9	5.3	5.7
Shannon Diversity Index	0.8	0.9	1.2	1.0	0.9
Tolerance Value	5.0	5.5	5.0	5.1	5.5
Percent Intolerant (0-3)	9.1	16.0	16.2	12.5	4.0
Percent Tolerant (8-10)	0.2	20.0	7.0	4.2	4.1
Percent Collector-Gatherer	42.6	23.7	38.3	26.6	36.9
Percent Collector-Filterers	43.7	47.7	6.9	15.8	36.5
Percent Scrapers	8.9	2.7	29.9	42.9	19.4

Percent Predators	3.7	11.7	17.6	9.2	5.7
Percent Shredders	1.2	14.3	7.3	5.5	1.6

Project Name:	Big Creek ALP			
Site Code:	South Fork San Joaquin	South Fork San Joaquin	South Fork San Joaquin	South Fork San Joaquin
Collection Date:	Fall 2002	Fall 2002	Fall 2002	Fall 2002
Transect Number:	4	3	2	1
Taxa Richness	30.3	24.3	22.0	31.3
Percent Dominant Taxa	45.9	59.6	74.4	34.0
EPT Taxa	16.7	10.7	9.3	16.0
EPT Index (%)	27.4	19.0	17.1	48.2
Sensitive EPT Index	10.8	3.9	3.9	10.9
Ephemeroptera Taxa	6.3	3.7	4.0	7.0
Plecoptera Taxa	4.3	2.0	1.0	3.0
Trichoptera Taxa	6.0	5.0	4.3	6.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	4.9	3.4	4.9	21.2
Percent Baetidae	6.9	10.6	7.2	9.9
Shannon Diversity Index	0.9	0.7	0.5	1.0
Tolerance Value	4.9	5.4	5.4	4.6
Percent Intolerant (0-3)	12.3	5.1	6.0	8.7
Percent Tolerant (8-10)	1.1	0.4	0.2	2.2
Percent Collector-Gatherer	29.7	28.5	12.0	55.2
Percent Collector-Filterers	51.9	64.1	80.3	26.5
Percent Scrapers	9.4	4.1	4.5	12.3
Percent Predators	6.1	2.7	2.9	5.0
Percent Shredders	2.8	0.7	0.3	1.0

Project Name:	Lower Tuolumne River			
Site Code:	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River
Collection Date:	July-1997	July-2000	July-2001	Aug-2002
Transect Number:	Riffle 4A	Riffle 4A	Riffle 4A	Riffle 4A
Taxa Richness				
Percent Dominant Taxa	62.0	33.0	32.0	40.0
EPT Taxa				
EPT Index (%)	28.0	52.0	44.0	49.0
Sensitive EPT Index				
Ephemeroptera Taxa				
Plecoptera Taxa				
Trichoptera Taxa				
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect	6.0	21.0	28.0	16.0
Percent Chironomidae	63.0	25.0	28.0	34.0
Percent Hydropsychiade				
Percent Baetidae				
Shannon Diversity Index	1.3	2.1	2.0	2.0
Tolerance Value				
Percent Intolerant (0-3)				
Percent Tolerant (8-10)				
Percent Collector-Gatherer				
Percent Collector-Filterers				
Percent Scrapers				
Percent Predators				
Percent Shredders				

Project Name:	Lower Tuolumne River			
Site Code:	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River
Collection Date:	Aug-2002	Aug-2002	Aug-2002	Aug-2002
Transect Number:	Riffle 4A	Riffle 4A	23 C	Riffle 4A
Taxa Richness	23.0	21.0	20.0	
Percent Dominant Taxa	42.0	51.0	29.0	40.0
EPT Taxa	7.0	7.0	5.0	
EPT Index (%)	65.0	59.0	24.0	49.0
Sensitive EPT Index	9.0	2.0	2.0	
Ephemeroptera Taxa	3.0	3.0	2.0	
Plecoptera Taxa	0.0	0.0	0.0	
Trichoptera Taxa	4.0	5.0	3.0	
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				16.0
Percent Chironomidae				34.0
Percent Hydropsychiade	3.0	1.0	14.0	
Percent Baetidae	7.0	0.0	6.0	
Shannon Diversity Index	2.0	1.7	2.3	2.0
Tolerance Value	4.6	4.8	5.2	
Percent Intolerant (0-3)	8.0	1.0	2.0	
Percent Tolerant (8-10)	9.0	7.0	16.0	
Percent Collector-Gatherer	76.0	83.0	34.0	
Percent Collector-Filterers	3.0	2.0	15.0	
Percent Scrapers	10.0	2.0	20.0	
Percent Predators	8.0	8.0	31.0	
Percent Shredders	0.0	0.0	0.0	

Project Name:	Lower Tuolumne River			
Site Code:	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River
Collection Date:	Sep-1988	Sep-1989	Oct-1990	Sep-1991
Transect Number:	Riffle 4A	Riffle 4A	Riffle 4A	Riffle 4A
Taxa Richness				
Percent Dominant Taxa	19.0	24.0	33.0	19.0
EPT Taxa				
EPT Index (%)	9.0	35.0	14.0	26.0
Sensitive EPT Index				
Ephemeroptera Taxa				
Plecoptera Taxa				
Trichoptera Taxa				
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa	47.0	19.0	19.0	40.0
Percent Non-Insect				
Percent Chironomidae	29.0	38.0	53.0	25.0
Percent Hydropsychiade				
Percent Baetidae				
Shannon Diversity Index	2.3	2.4	2.1	2.6
Tolerance Value				
Percent Intolerant (0-3)				
Percent Tolerant (8-10)				
Percent Collector-Gatherer				
Percent Collector-Filterers				
Percent Scrapers				
Percent Predators				
Percent Shredders				

Project Name:	Lower Tuolumne River			
Site Code:	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River
Collection Date:	Sep-1992	Oct-1993	Aug-1994	Aug-1996
Transect Number:	Riffle 4A	Riffle 4A	Riffle 4A	Riffle 4A
Taxa Richness				
Percent Dominant Taxa	38.0	41.0	22.0	47.0
EPT Taxa				
EPT Index (%)	14.0	15.0	22.0	84.0
Sensitive EPT Index				
Ephemeroptera Taxa				
Plecoptera Taxa				
Trichoptera Taxa				
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa	24.0	34.0	58.0	7.0
Percent Non-Insect				
Percent Chironomidae	60.0	44.0	17.0	8.0
Percent Hydropsychiade				
Percent Baetidae				
Shannon Diversity Index	2.1	1.8	2.6	1.6
Tolerance Value				
Percent Intolerant (0-3)				
Percent Tolerant (8-10)				
Percent Collector-Gatherer				
Percent Collector-Filterers				
Percent Scrapers				
Percent Predators				
Percent Shredders				

Project Name:	Corte Madera Creek				
Site Code:	Corte Madera Creek	Corte Madera Creek	Corte Madera Creek	Corte Madera Creek	Corte Madera Creek
Collection Date:	Spring 2005	Spring 2005	Spring 2005	Spring 2005	Spring 2005
Transect Number:	1	2	3	4	5
Taxa Richness	19.0	31.0	36.0	21.0	32.0
Percent Dominant Taxa	26.4	27.5	13.3	44.5	20.2
EPT Taxa					
EPT Index (%)					
Sensitive EPT Index	1.4	13.0	25.1	4.2	34.6
Ephemeroptera Taxa					
Plecoptera Taxa					
Trichoptera Taxa					
Dipteran Taxa					
Percent Dipteran					
Non-Insect Taxa					
Percent Non-Insect					
Percent Chironomidae					
Percent Hydropsychiade					
Percent Baetidae					
Shannon Diversity Index	1.9	2.3	2.8	1.7	2.5
Tolerance Value	5.3	4.8	4.2	4.9	3.9
Percent Intolerant (0-3)					
Percent Tolerant (8-10)					
Percent Collector-Gatherer					
Percent Collector-Filterers					
Percent Scrapers					
Percent Predators					
Percent Shredders					

Project Name:	San Joaquin River					
Site Code:	Cosumnes River	Cosumnes River	Merced River	Merced River	Merced River	
Collection Date:			Fall			
Transect Number:		3	581	580	546	
Taxa Richness	23.0					
Percent Dominant Taxa	37.0					
EPT Taxa	3.0					
EPT Index (%)	6.0	9.0	57.0	54.0	14.0	
Sensitive EPT Index	0.0					
Ephemeroptera Taxa	1.0					
Plecoptera Taxa						
Trichoptera Taxa	2.0					
Dipteran Taxa						
Percent Dipteran						
Non-Insect Taxa	18.0					
Percent Non-Insect						
Percent Chironomidae	30.0					
Percent Hydropsychiade	3.0					
Percent Baetidae	2.0					
Shannon Diversity Index	2.0					
Tolerance Value	5.0					
Percent Intolerant (0-3)	23.0					
Percent Tolerant (8-10)	7.0					
Percent Collector-Gatherer	36.0					
Percent Collector-Filterers	42.0					
Percent Scrapers	14.0					
Percent Predators	7.0					
Percent Shredders	0.0					

Project Name:	San Joaquin River			
Site Code:	Cosumnes River	Mokelumne River	Calaveras River	Merced River
Collection Date:				Jun-2001
Transect Number:	4	512	514	AG-1
Taxa Richness				16.0
Percent Dominant Taxa				2.0
EPT Taxa				
EPT Index (%)	2.0	32.0	33.0	
Sensitive EPT Index				0.0
Ephemeroptera Taxa				
Plecoptera Taxa				1.0
Trichoptera Taxa				3.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				36.0
Percent Non-Insect				
Percent Chironomidae				59.0
Percent Hydropsychiade				1.0
Percent Baetidae				1.0
Shannon Diversity Index				2.0
Tolerance Value				7.0
Percent Intolerant (0-3)				0.0
Percent Tolerant (8-10)				29.0
Percent Collector-Gatherer				60.0
Percent Collector-Filterers				32.0
Percent Scrapers				1.0
Percent Predators				7.0
Percent Shredders				0.0

Project Name:	Russian River			
Site Code:	Willow Creek	Markwest Creek	Russian River	All Others
Collection Date:				
Transect Number:				
Taxa Richness	21.0	24.0	19.0	32.0
Percent Dominant Taxa	29.0	32.0	27.0	25.0
EPT Taxa	10.0	10.0	6.0	15.0
EPT Index (%)	52.0	53.0	41.0	52.0
Sensitive EPT Index				
Ephemeroptera Taxa	4.0	4.0	3.0	6.0
Plecoptera Taxa	4.0	2.0	0.0	4.0
Trichoptera Taxa	2.0	4.0	3.0	5.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	0.0	6.0	26.0	1.0
Percent Baetidae	18.0	25.0	13.0	14.0
Shannon Diversity Index	2.3	2.1	2.2	2.6
Tolerance Value	3.8	4.4	4.6	3.7
Percent Intolerant (0-3)	30.0	6.0	0.0	31.0
Percent Tolerant (8-10)	1.0	1.0	1.0	1.0
Percent Collector-Gatherer	42.0	57.0	19.0	41.0
Percent Collector-Filterers	8.0	22.0	36.0	11.0
Percent Scrapers	3.0	12.0	31.0	16.0
Percent Predators	25.0	8.0	20.0	23.0
Percent Shredders	12.0	1.0	0.0	9.0

Project Name:	City of Sacramento			
Site Code:	Morrison	Morrison	Arcade	Arcade
Collection Date:	Apr-2007	Apr-2007	Apr-2007	Apr-2007
Transect Number:	BRD	FLR	SBC	NWA
Taxa Richness	27.0	20.0	21.0	12.0
Percent Dominant Taxa	55.9	33.2	34.2	91.2
EPT Taxa	2.0	2.0	1.0	0.0
EPT Index (%)	1.1	1.3	0.8	0.0
Sensitive EPT Index	0.0	0.0	1.8	0.0
Ephemeroptera Taxa				
Plecoptera Taxa				
Trichoptera Taxa				
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	0.0	0.0	0.0	0.0
Percent Baetidae	0.0	1.2	0.8	0.0
Shannon Diversity Index				
Tolerance Value	7.6	7.6	7.3	7.9
Percent Intolerant (0-3)	0.0	0.2	0.8	0.0
Percent Tolerant (8-10)	8.9	4.3	37.4	30.6
Percent Collector-Gatherer	85.5	88.2	51.0	96.2
Percent Collector-Filterers	4.1	0.4	2.9	1.8
Percent Scrapers	1.4	0.4	2.9	0.4
Percent Predators	2.1	4.6	1.2	1.4
Percent Shredders	1.8	6.1	38.3	0.0

Project Name:	Lower Tuolumne River			
Site Code:	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River	Lower Tuolumne River
Collection Date:	2002	2002	2002	2002
Transect Number:	RA-4	R-33	R-57	R-72
Taxa Richness	20.0	27.0	25.0	23.0
Percent Dominant Taxa	46.0	22.0	16.0	33.0
EPT Taxa	5.0	7.0	8.0	5.0
EPT Index (%)	31.0	27.0	34.0	38.0
Sensitive EPT Index	0.7	0.0	2.0	2.0
Ephemeroptera Taxa	1.0	5.0	5.0	4.0
Plecoptera Taxa	1.0	0.0	0.0	0.0
Trichoptera Taxa	3.0	2.0	3.0	1.0
Dipteran Taxa				
Percent Dipteran				
Non-Insect Taxa				
Percent Non-Insect				
Percent Chironomidae				
Percent Hydropsychiade	5.0	20.0	13.0	2.0
Percent Baetidae	25.0	4.0	13.0	1.0
Shannon Diversity Index	1.7	2.3	2.7	2.2
Tolerance Value	5.7	5.2	5.1	5.2
Percent Intolerant (0-3)	0.7	0.0	2.5	1.7
Percent Tolerant (8-10)	9.7	19.4	14.7	21.2
Percent Collector-Gatherer	41.0	29.0	46.0	63.0
Percent Collector-Filterers	51.0	22.0	13.0	2.0
Percent Scrapers	1.0	7.0	13.0	3.0
Percent Predators	6.0	42.0	26.0	32.0
Percent Shredders	0.0	0.0	0.0	0.0

Project Name: Piru Creek

Site Code:	Piru Creek	Piru Creek
Collection Date:	July-2004	July-2004
Transect Number:	Down	Up
Taxa Richness	19.7	12.7
Percent Dominant Taxa	45.3	46.6
EPT Taxa	6.0	5.0
EPT Index (%)	56.2	10.4
Sensitive EPT Index	0.0	0.0
Ephemeroptera Taxa		
Plecoptera Taxa		
Trichoptera Taxa		
Dipteran Taxa		
Percent Dipteran		
Non-Insect Taxa		
Percent Non-Insect		
Percent Chironomidae	3.1	4.0
Percent Hydropsychiade	5.4	0.0
Percent Baetidae	45.7	5.7
Shannon Diversity Index	1.9	1.5
Tolerance Value	4.4	6.6
Percent Intolerant (0-3)	6.2	0.0
Percent Tolerant (8-10)	12.4	61.8
Percent Collector-Gatherer	62.0	26.6
Percent Collector-Filterers	8.3	18.6
Percent Scrapers	14.0	46.8
Percent Predators	4.2	5.9
Percent Shredders	0.4	0.0

Site Code:	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River
Collection Date:	2003	2003	2003	2003	2003	2003	2003
Transect Number:	Reach 1	Reach 2	Reach 3	R3 - New Gravel Site	Reach 4	Reach 5	Reach 6
Taxa Richness	15.7	18.3	19.7	14.0	22.7	24.3	20.0
Percent Dominant Taxa	28.1	39.3	44.3	29.8	28.9	30.6	32.5
EPT Taxa	6.3	7.0	6.0	4.3	8.7	7.0	6.0
EPT Index (%)	37.9	28.6	10.8	28.2	34.7	51.6	12.4
Sensitive EPT Index	1.8	0.8	0.8	0.1	1.0	0.8	3.1
Ephemeroptera Taxa	4.0	4.3	4.0	4.3	4.0	5.0	3.3
Plecoptera Taxa	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera Taxa	2.3	2.7	2.0	0.0	4.7	2.0	2.7
Dipteran Taxa	3.0	4.3	2.7	3.3	4.7	6.7	4.0
Percent Dipteran	32.4	45.3	47.0	32.9	35.3	29.4	21.3
Non-Insect Taxa	5.3	6.0	10.0	6.0	8.3	9.7	9.0
Percent Non-Insect	19.9	19.2	36.0	38.8	28.1	16.9	62.6
Percent Chironomidae	31.8	43.9	46.3	32.1	32.6	20.4	18.8
Percent Hydropsychiade	17.0	14.0	0.7	0.0	14.6	11.6	1.0
Percent Baetidae	4.4	4.6	1.3	3.8	7.5	32.9	2.8
Shannon Diversity Index	2.1	2.0	2.0	1.9	2.3	2.3	2.2
Tolerance Value	5.2	5.5	6.1	5.0	5.4	5.3	5.6
Percent Intolerant (0-3)	1.7	0.3	0.5	0.1	0.1	0.5	0.0
Percent Tolerant (8-10)	8.5	9.7	27.0	4.9	11.8	9.3	13.9
Percent Collector-Gatherer	58.4	62.3	60.8	72.4	62.7	62.9	59.6
Percent Collector-Filterers	17.3	14.6	1.5	0.6	16.1	19.0	3.3
Percent Scrapers	11.9	8.2	12.3	0.5	4.2	4.4	20.8
Percent Predators	8.1	10.0	23.3	23.0	11.0	10.9	13.3
Percent Shredders	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Site Code:	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River	Kings River
Collection Date:	2005	2005	2005	2005	2005	2005	2005	2005
Transect Number:	Reach 1	Reach 2	Reach 3	Reach 4	Reach 5	Reach 6	Reach 7	Reach 8
Taxa Richness	10.0	14.7	16.0	16.0	18.7	16.7	19.3	17.3
Percent Dominant Taxa	66.2	41.6	48.0	56.2	53.0	41.6	40.5	24.2
EPT Taxa	2.0	5.0	4.3	5.0	4.3	5.3	6.3	6.3
EPT Index (%)	23.3	34.0	38.1	16.4	8.3	25.4	35.3	61.7
Sensitive EPT Index	0.3	0.8	0.3	0.5	0.1	1.3	2.8	22.5
Ephemeroptera Taxa	1.0	4.0	2.7	3.3	2.7	3.0	3.3	4.0
Plecoptera Taxa	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Trichoptera Taxa	1.0	1.0	1.7	1.7	1.7	2.3	3.0	2.3
Dipteran Taxa	2.3	4.0	3.7	3.3	3.7	3.0	4.3	4.0
Percent Dipteran	17.4	49.8	52.4	62.9	56.5	52.0	47.4	25.6
Non-Insect Taxa	4.7	5.0	6.7	6.3	9.7	7.3	7.7	6.3
Percent Non-Insect	58.2	15.0	8.6	18.5	32.4	21.6	16.7	12.2
Percent Chironomidae	16.0	31.6	44.7	60.7	55.6	44.6	44.8	23.7
Percent Hydropsychiade	8.7	10.3	14.9	4.7	1.9	2.5	8.3	6.7
Percent Baetidae	14.2	21.8	21.3	6.0	0.8	9.4	13.5	28.7
Shannon Diversity Index	1.1	1.7	1.5	1.6	1.6	1.8	2.0	2.2
Tolerance Value	5.2	5.5	5.5	5.7	5.8	5.7	5.3	4.2
Percent Intolerant (0-3)	0.3	0.8	0.3	0.5	0.1	1.3	2.8	22.5
Percent Tolerant (8-10)	5.3	7.8	6.5	6.8	8.2	10.5	7.0	6.3
Percent Collector-Gatherer	66.7	27.4	23.5	18.6	26.5	29.0	28.4	33.2
Percent Collector-Filterers	10.0	27.8	23.3	7.3	3.7	15.3	10.3	8.3
Percent Scrapers	1.2	1.8	1.9	3.1	3.8	2.7	4.7	26.3
Percent Predators	6.2	10.8	6.3	10.3	10.4	8.1	11.2	8.1
Percent Shredders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0