

APPENDIX B: RECOMMENDED DELISTINGS FOR 2012 ASSESSMENT CYCLE

Waters are grouped by watershed (Hydrologic Unit or HU).

Waterbody or Segment	Pollutant	Comment	Additional Information
East Walker Tributaries HU			
Clearwater Creek	sedimentation/ siltation	Applicable water quality objective is attained and original basis for listing was incorrect.	Staff recommendations for Clearwater Creek; Bioassessment Study (Herbst 1995); Clearwater Creek Surveys (Tetra Tech 2003); refer to fact sheet for Clearwater Creek in Appendix I
Amargosa River HU			
Amargosa River (Willow Creek confluence to Badwater)	Arsenic	Original listing was flawed and based on insufficient information. No state or federal aquatic life criteria to assess whether aquatic saline habitat within this segment of the Amargosa River is being supported or impaired by arsenic. Data were not temporally representative. Arsenic is naturally high in this waterbody.	Refer to fact sheet for Amargosa River (Willow Creek confluence to Badwater) in Appendix I

STAFF RECOMMENDATIONS FOR CLEARWATER CREEK DE-LIST

Region: Lahontan
Water Body Segment: Clearwater Creek
Pollutant: Sedimentation/Siltation

Line of Evidence

Fraction: Not Applicable

Matrix: Not Applicable

Beneficial Uses: HU 630.30 COLD (Cold Fresh Water Habitat)

WQO/Criteria: Applicable standards from the Basin Plan region wide water quality objectives for the sediment/siltation listings are:

- 1) Sediment- The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect the water for beneficial uses.
- 2) Settleable Materials- Water shall not contain substances in concentrations that result in deposition of material that causes nuisance or that adversely affects the water for beneficial uses.

Evaluation: Stream surveys, watershed assessment, and bioassessment surveys

Data Used: Listing was based on limited and out-of-date information from 1988 and 1993 BLM riparian and stream surveys. Conditions in 1988 were summarized as “good” to “moderate”, with bank conditions degrading to poor in 1993 due to trampled stream banks. No numeric data to indicate water quality standards exceedences were submitted.

In a bioassessment study performed in 1995, Clearwater Creek was one of three creeks evaluated. Two sites on Clearwater Creek were selected as “reference” sites for this study, and indicated good biologic health at those sites (Herbst, 1995). Bioassessment integrates the ecological integrity of the waterbody, representing physical, chemical, and biologic health.

Tetra Tech, under contract with the USEPA, visited two sites on Clearwater Creek in 2003 as part of a watershed assessment. They performed geomorphic (Rosgen level II) characterizations on two sites on Clearwater Creek, only one of which duplicated BLM original survey locations. Tetra Tech surveys do not provide evidence indicating

STAFF RECOMMENDATIONS FOR CLEARWATER CREEK DE-LIST

	beneficial use impairments or water quality standard exceedances in Clearwater Creek.
Spatial Representation:	Two sites for bioassessments and two sites for watershed assessment
Temporal Representation:	Initial listing was based on qualitative data produced by BLM survey conducted in 1988 and 1993. Herbst's bioassessment study was conducted in 1995. Tetra Tech performed Rosgen characterization in 2003.
Water Body Specific Issue:	Listing basis was derived from data collected over 20 years ago from two points on Clearwater Creek. More recent information developed by Herbst's bioassessment study and Tetra Tech Rosgen characterization does not indicate impairment.
Data Quality Assessment:	Good
QAPP Information:	Bioassessment impairment evaluation used US EPA-RBP III protocol 1989

Bioassessment Report - October 26, 1995

Location: Bodie Hills, Mono County [Clearwater Creek, Bodie Creek, Aurora Creeek]

Project: Demonstration project for continuing education workshop (UC cooperative extension) to establish biomonitoring comparisons and baseline among streams under varied grazing exposure and exclosure

Summary: Prior to sampling, BLM management personnel were consulted on the condition of streams in the Bodie Hills in order to select area-specific reference (or control) streams for comparison to streams exposed to livestock grazing. In many situations reference streams will not represent the ideal or pristine condition but only the least impacted with respect to the source problem under study (in this case cattle grazing). Based on minimum grazing criteria, two sites on Clearwater Creek were selected to establish the reference comparison because they were ungrazed, though they were exposed to some trampling from sheep trailing in the area. Of the sites on Bodie Creek, BC21 was within an exclosure (3 years), and BC31 was grazed. Both sites on Aurora Creek (AC51 & AC21) were also within cattle grazing areas. BLM site function ratings (based on soil, vegetative bank cover and water status) and grazing impact categories are given below for each of the six study sites:

<u>Stream Study Site Code</u>	<u>Overall Site Function Rating</u>	<u>Grazing Impact</u>
CW11	2.45	ungrazed but trampled
CW12	2.32	ungrazed but trampled
BC21 (exclosure)	3.03	high
BC31	2.63	extreme
AC51	2.85	extreme
AC21	2.23	extreme

Biological Condition Score and Impairment Assessment (see EPA rapid bioassessment handout)

The biological condition score is a "multi-metric" index, a score that integrates several metrics or measures of biological health based on aquatic invertebrate indicators. Combining measures produces an index that looks at the community as a composite and is less likely to be biased by reliance on a single measure of health. Six metrics are combined here: the **HBI** or biotic index which indicates composite pollution tolerance (unhealthy communities have more pollution tolerant species though fewer species overall); **S** or species richness, the total number of taxa declining under pollution impact; **EPT** index is the number of sensitive mayfly, stonefly and caddisfly taxa that also decline under pollution stress; **Dom** or dominance which increases under polluted conditions as one tolerant group comes to dominate the community; **%C** the percent of tolerant chironomidae midges, and **% Sim.** the percent of tolerant simuliidae blackflies, both of which increase under polluted conditions; **EPT/C** is the ratio of the most common sensitive taxa to the most common tolerant taxa (decreases as stream health deteriorates); and **CLI** the community loss index which indicates the number of species lost at subject sites relative to the reference community. These measures thus combine community structure and tolerance in evaluating pollution impacts which here are derived from non-point sources, especially sedimentation. Scores at the study sites are based on comparison to the combined reference on Clearwater Creek (32 points possible).

Percent of reference and (score) - see EPA rating sheet on following page

Site Code	S	HBI	EPT	Dom.	EPT/C	CLI	(%) and Sum Score	Level of Impairment
BC21 exclosure	98% (6)	92% (6)	>100% (6)	38% (2)	19% (0)	0.55 (4)	75% 24	slight
BC31 grazed	66% (4)	89% (6)	36% (0)	41% (0)	11% (0)	1.06 (4)	44% 14	moderate
AC51 grazed	60% (4)	>100% (6)	36% (0)	55% (0)	>100% (6)	1.19 (4)	63% 20	slight
AC21 grazed	>100% (6)	>100% (6)	>100% (6)	50% (0)	>100% (6)	0.59 (4)	88% 28	unimpaired

Interpretation: This assessment indicates that the grazed site on Bodie Creek is the most impaired of the sites (moderate), while the site under exclosure on Bodie Creek is only slightly impaired, indicating signs of recovery (significant increases in species richness and the number of EPT taxa relative to the grazed Bodie Creek location). While this is consistent with the BLM site function ratings for Bodie Creek (higher on the exclosed area), the bioassessment ratings do not agree on either Aurora Creek or Clearwater Creek. While one grazed site on Aurora Creek was rated as slightly impaired, the other site (AC21) is unimpaired and for 4 of the metrics is in fact superior to the reference condition though it has the lowest site function rating. This suggests that in-stream aquatic community health may be poorly indicated by stream bank and vegetation features and that both should be evaluated to obtain a complete picture of stream and riparian health. What favors the healthy community at AC21? Site AC21 was the only site with canopy cover (32%), and also had a relatively steep gradient (5%) and rocky substrates, favoring good flows, water oxygenation, and an armored channel. Canopy contributes shading and input of vegetation litter food sources (CPOM), and along with the rocky substrate may protect the channel from grazing impacts. Clearwater Creek also had lower site function ratings though was generally superior to the other study sites when all bioassessment metrics are considered. As indicated in the monitoring study plan, prior impacts to the reference sites were anticipated to be a possible source of bias in evaluating impairment on the grazed sites. Because the Clearwater Creeks may themselves be in the process of recovery, it would be useful to identify other reference sites and continue monitoring over time at all sites to follow the progress of recovery.

Biological Condition Scoring Criteria for Metrics:
(selected examples based on Plafkin et al. 1989, EPA-RBP level III)

Metric	Biological Condition Scores			
	6	4	2	0
Richness	>80%	60-80%	40-60%	<40%
Biotic Index	>85%	70-85%	50-70%	<50%
EPT Index	>90%	80-90%	70-80%	<70%
Dominance	<20%	20-30%	30-40%	>40%
Community Loss	<0.5	0.5-1.5	1.5-4.0	>4.0

BIOASSESSMENT IMPAIRMENT EVALUATION
(US EPA-RBP III protocol 1989)

Condition Score Sum as Percent of Reference (range)	Biological Condition Category	Attributes
> 83 % [or quartile > 75%?]	Nonimpaired	Comparable to the best situation to be expected in ecoregion. Balanced trophic and community structure for stream habitat type.
54 - 79 % [or quartile 50-75%?]	Slightly Impaired	Community structure less than expected. Reduced total and sensitive species. More tolerant taxa in community.
21 - 50 % [or quartile 25-50%?]	Moderately Impaired	Fewer species and loss of most sensitive (e.g. EPT) forms. Biotic index higher, domination by few taxa, functional group imbalance.
< 17 % [or quartile <25%?]	Severely Impaired	Few species present, dominated by 1 or 2 taxa, with pollution tolerant species sometimes abundant. High biotic index.

Bodie Hills Stream Bioassessment:

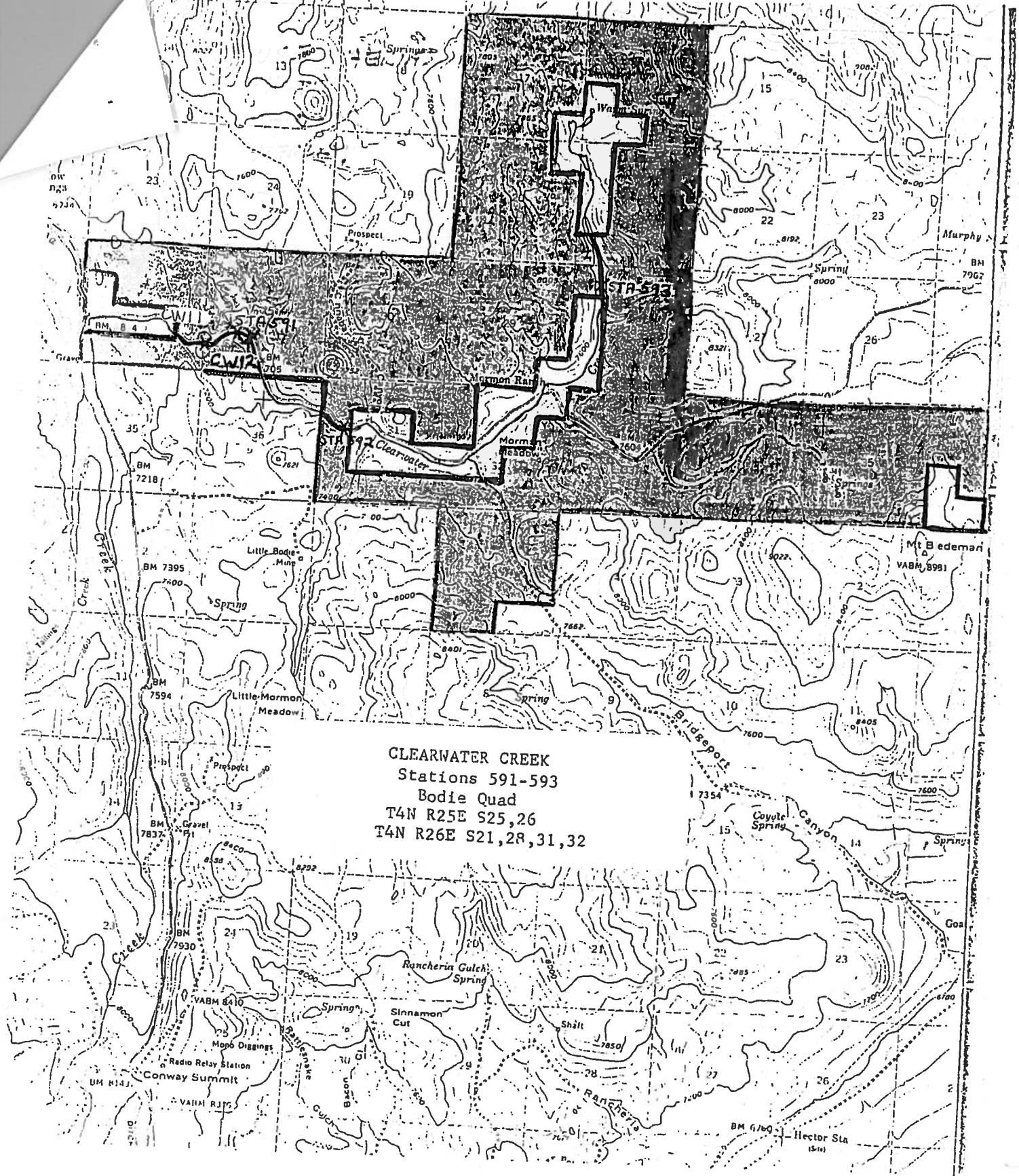
Metric Summary for Calculation of Integrated Biological Condition Scores and Assessment of Impairment

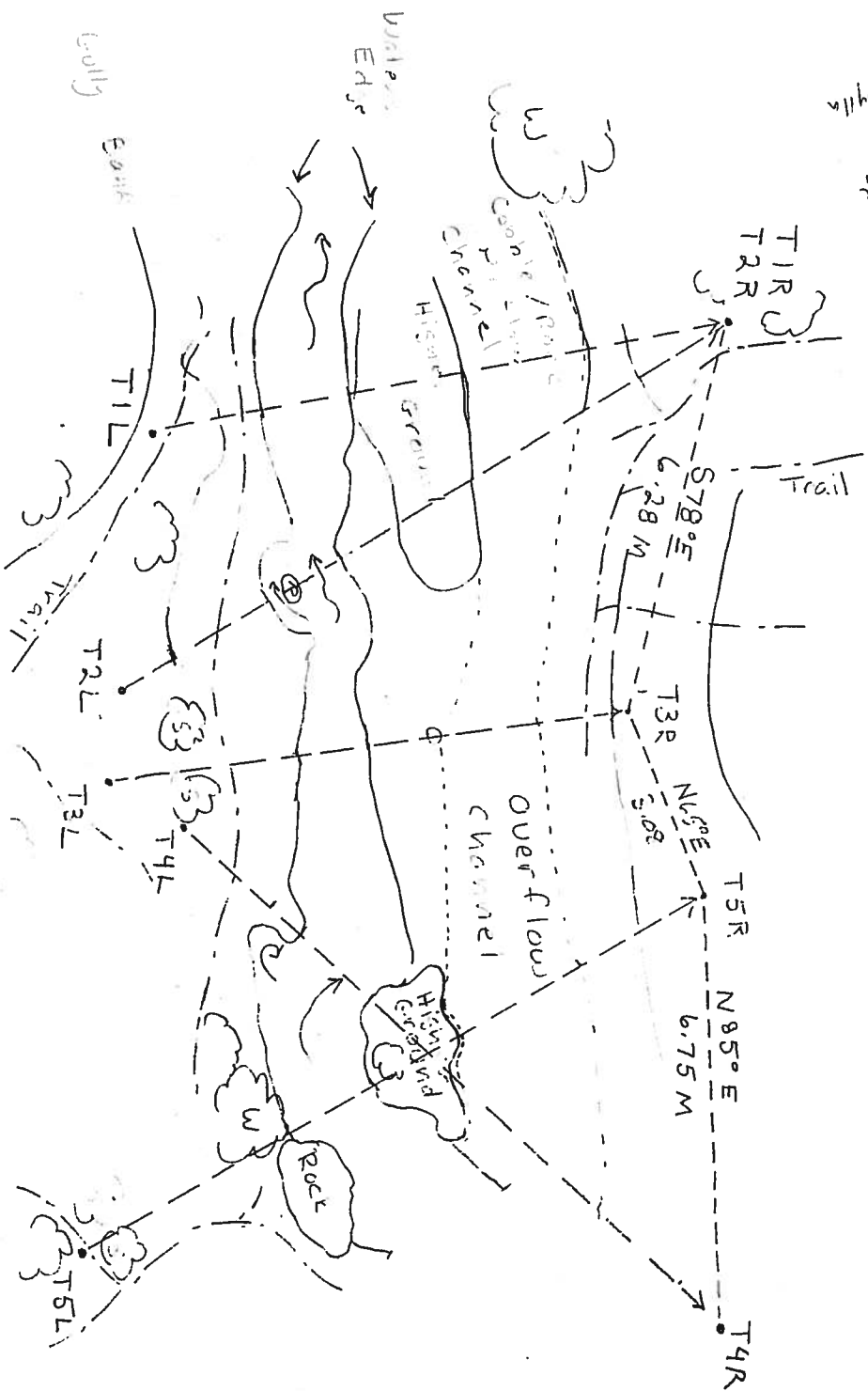
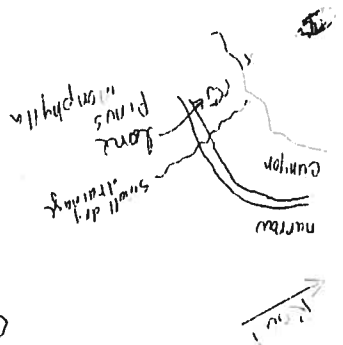
<u>Summary Means for bioassessment metrics (standard deviation values below)</u>										
<u>Sample Sites:</u>	<u>Codes:</u>	<u>HBI</u>	<u>S</u>	<u>EPT</u>	<u>Dom</u>	<u>% C</u>	<u>% Sim</u>	<u>EPT/C</u>	<u>%C+Sim</u>	
Cleawater Creek (sheep grazing)	CW11	4.94	18.3	3.0	0.455	0.198	0.279	2.218	0.477	
		0.43	1.5	0.0	0.075	0.056	0.180	1.411	0.219	
Cleawater Creek (sheep grazing)	CW12	5.36	17.0	2.7	0.293	0.500	0.181	0.407	0.681	
		0.09	0.0	0.6	0.051	0.122	0.091	0.160	0.035	
Bodie Creek (exclosure)	BC21	5.60	17.3	3.0	0.375	0.570	0.214	0.252	0.784	
		0.23	1.5	2.0	0.042	0.137	0.115	0.214	0.086	
Bodie Creek (grazed)	BC31	5.81	11.7	1.0	0.414	0.600	0.282	0.139	0.882	
		0.07	0.6	0.0	0.153	0.256	0.244	0.074	0.038	
Aurora Creek (grazed)	AC51	4.83	10.7	1.0	0.553	0.135	0.254	4.286	0.390	
		0.23	1.2	0.0	0.099	0.027	0.103	1.445	0.122	
Aurora Creek (grazed)	AC21	4.32	20.0	7.0	0.500	0.156	0.045	3.990	0.201	
		0.03	1.0	1.0	0.052	0.021	0.036	0.683	0.017	
<u>All sites on Bodie and Aurora Creeks compared to combined samples from Cleawater Creek (used as reference area)</u>										
		<u>CW11+CW12 as pooled reference:</u>								
		<u>HBI</u>	<u>S</u>	<u>EPT</u>	<u>Dom</u>	<u>% C</u>	<u>% Sim</u>	<u>EPT/C</u>	<u>%C+Sim</u>	
		5.15	17.7	2.8	0.374	0.349	0.230	1.31	0.579	
		0.36	1.2	0.4	0.106	0.186	0.138	1.34	0.179	
<p>HBI = Hilsenhoff Biotic Index. This is a biological index of pollution, calculated as the summed product of abundance and tolerance values for the community. The higher the value, the more the community is dominated by pollution-tolerant species.</p> <p>S = The total number of species or taxa in the sample (richness). More species are generally found in clean water environments.</p> <p>EPT = The number of taxa belonging to the sensitive mayfly, stonefly and caddisfly groups. Indicators of good water quality.</p> <p>Dom = Dominance, the proportion of individuals in a sample belonging to one species or taxon (indicates an imbalance).</p> <p>%C = percent chironomidae, the midges, generally indicators of polluted waters (sediment fouling, algal growth, low oxygen...).</p> <p>%Sim = percent simuliidae, the blackflies, also pollution-tolerant and feed on suspended sediments (erosion/organic particles).</p> <p>%C+Sim = combines the numbers in these two pollution-tolerant groups of flies (dipterans)</p>										

Bodie Hills Stream Bioassessment Species List

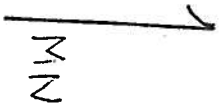
Species Composition Summaries:			Collection Locations:							
Order	Family	Genus - species	Tolerance Values	Clearwater Reference (n = 6)	Bodie BC21 (n = 3)	Bodie BC31 (n = 3)	Aurora AC61 (n = 3)	Aurora AC21 (n = 3)		
Ephemeroptera (mayflies)	Baetidae	<i>Baetis sp.</i>	4	443	210		44	267	434	
	Leptophlebiidae	<i>Paraleptophlebia sp.</i>	1	30		2			1	
	Heptageniidae	<i>Epeorus sp.</i>	0			2				
Odonata (dragon-/damselflies)	Coenagrionidae	<i>undetermined (sm. specimen)</i>	9						1	
Plecoptera (stoneflies)	Perlodidae	<i>Isoperla (patricia)</i>	2			2			19	
	Nemouridae	<i>Malenka sp.</i>	2		1				12	
	Pteronarcyidae	<i>Pteronarcella (regularis)</i>	0		1				2	
Coleoptera (beetles)	Elmidae	<i>Optioservus quadrimaculatus</i>	4	69	67				116	
		<i>Optioservus divergens</i>	4						20	
	Dryopidae	<i>Postelichus immsi</i>	4		1					
	Dytiscidae	<i>Agabus sp.</i>	5		18		2	7	4	
Megaloptera (alderflies)	Hydrophilidae	<i>Tropisternus sp.</i>	5			1				
	Sialidae	<i>Sialis sp.</i>	4			1				
Trichoptera (caddisflies)	Glossosomatidae	<i>Agapetus sp.</i>	0						2	
	Hydroptilidae	<i>Ochrotrichia sp.</i>	4		4				11	
		<i>Hydroptila sp.</i>	6		1					
	Rhyacophilidae	<i>Rhyacophila sp.</i>	0			3				
	Hydropsychidae	<i>Hydropsyche sp.</i>	4		1				39	
Limnephilidae	<i>Dicosmoecus sp.</i>	2						2		
Diptera (true flies)	Muscidae	<i>Limnophora sp.</i>	1			1				
		<i>Tabanus sp.</i>	6	16	7	11	9			
	Tabanidae	<i>Chrysops sp.</i>	8						2	
		<i>Tipulidae</i>	6			1				
		<i>Antocha sp.</i>	3						6	
	Simuliidae	<i>Dicranota sp.</i>	3		2	1			1	
		<i>Erioptera sp.</i>	6			1				
		<i>nr. Ormosia sp.</i>	6			1				
		<i>Simulium sp.</i>	6	381	274	179	131	44		
		Ceratopogonidae	<i>Bezzia/Palpomyia sp.</i>	6	5		1	1	5	
		Scathophagidae	<i>undetermined</i>	6	1					
		Chironomidae	Orthocladinae	<i>Cricotopus sp.</i>	6	161	530	171	33	
				<i>Cricotopus (nr. tremulus)</i>	6	5				36
			<i>Cricotopus (nr. bicinctus)</i>	6				4		
			<i>Cricotopus (nr. elegans)</i>	6					8	
			<i>Tvetenia sp.</i>	6	105	62	26	1		
			<i>Eukiefferiella sp.</i>	6	48	64		2	35	
<i>Eukiefferiella (claripennis)</i>			6					20		
<i>Cardiocladius sp.</i>			6	25	38	6				
<i>Psectrocladius (sordidellus)</i>			6		2		2			
<i>Psectrocladius (semicirculatus)</i>	6					8				
<i>Corynoneura (scutellata)</i>	6					1				
<i>undetermined</i>	6		1		12					
Tanypodinae	<i>Thienemannimyia sp.</i>		6	20		7				
<i>Larsia sp.</i>	6		19		5		3			
<i>Alotanypus sp.</i>	6				6					
Chironominae	<i>Paracladopelma sp.</i>		6	21	6		3			
	<i>Chironomus sp.</i>		6			6				
	<i>Micropsectra sp.</i>	6	28	25	31	11	20			
	<i>Microtendipes sp.</i>	6	13	5	102					
	<i>Phaenopsectra sp.</i>	6	74	34		1				
	<i>Paratanytarsus sp.</i>	6	1							
	<i>Pagastia sp.</i>	6	5			2	7			
Diamesinae	<i>Diamesa sp.</i>	6		1			1			
Non-insects:										
Oligochaeta	undetermined	<i>undetermined</i>	4	88	20	9	12	14		
Amphipoda	Talitridae	<i>Hyaloleia azteca</i>	8	1						
Gastropoda	Lymnaeidae	<i>undetermined (sm. specimen)</i>	6	2						
	Planorbidae	<i>nr. Gyraulus sp.</i>	8		5					
Bivalvia	Sphaeriidae	<i>Pisidium sp.</i>	8		1					
Nematomorpha	undetermined	<i>undetermined</i>	4					1		
TOTAL TAXA COLLECTED:			59	32	29	17	16	27		

CLEARWATER CREEK
Stations 591-593
Bodie Quad
T4N R25E S25,26
T4N R26E S21,28,31,32





CLEARWATER CREEK
R-1, S-2
9 Aug. 1988
1 CM = 1 M



S = Sagebrush
R = Rock
--- = Willow
- - - = Trail

43. General Remarks and
44. Narrative Report-Watershed Condition

Clearwater Creek is a small stream in fair condition, flowing over interspersed public, state, and private lands. The stream originates from a warm springs on private land and flows through four miles of meadowland before descending through a canyon to join Virginia Creek.

Construction and recent paving of the Bodie road have resulted in adverse impacts in the stream in sections 25, 26 and 36 (T4N R25E) and section 31 (T4N R26E), including channelization of the stream and removal of riparian vegetation at some points and addition of sediment and pollutants.

The lower BLM areas (S25 & 26 R25E and S31 R26E) lie on the boundary of two sheep allotments. At the survey date the only sign of use was a stream crossing at station 591. Sheep were trailed through the canyon in July, but most stayed on the road with little or no use of the stream. The warm springs (private land) was heavily used by sheep in July with severe denuding. In September sheep were grazed in Mormon Meadow resulting in considerable turbidity in the creek.

The upper BLM area (S21, 28 R26E) is in the Potato Peak allotment and is used by both sheep and cattle. Use here is moderate and some stream-bank damage is occurring.

Active erosion on the stream is almost entirely on private and state lands. Gullying is active in S36 (R25E) below the beaver dams, probably aggravated by removal of those dams, in S26 (R25E) and in S21 (R26E). Older, mostly stabilized gullying is present on almost all BLM areas.

There are a series of diversions and ditches on the private land in Mormon Meadow which enable the owner to spread the water throughout the meadow. The stream here is in good condition with well vegetated stream-banks and is at the surface.

The aquatic habitat in the stream is fair, except in the localized areas where it has been impacted by road construction, at the destroyed beaver ponds and in some areas on private and state lands where erosion is bad. The stream has a fairly large amount of sediment which is probably due to the disturbances of the road, grazing and other uses.

Recreational use of the stream is light. Some signs of camping and picnicking use were noted. Hunters undoubtedly use the area, but there is probably very little fishing use on the stream. The stream supports a fairly large resident population of brown trout above station 593 and a small population throughout the stream. The lower stream receives rainbow trout from Virginia Creek, but flow becomes very low in the summer. Clearwater Creek does support a good population of the endemic sucker species Catostomus taahoensis, throughout the entire stream length.

Comparison of 1954 and 1977 aerial photos shows little change in the stream or surrounding area.

The unnamed drainage which flows into Clearwater Creek in the NE $\frac{1}{4}$ S32 originates in a spring-seep area lying alongside the Bodie Road in S32. Above that, on BLM land, the stream was dry and only flows during runoff or storms.

The stream entering Clearwater in the SW $\frac{1}{4}$ S32 originates in Mormon Meadow around the corrals on private land. Above that on BLM land the channel is only wetted in runoff and storms. Seeps in the meadows at the SE $\frac{1}{4}$ S5 (T3N R26E) are on private land and the water from those barely reaches BLM land.

Cinnibar Canyon has a wet meadow about 0.2 miles up from Clearwater Creek. Water does not flow to Clearwater and at the survey date consisted of only a few stagnant pools.

No significant problems were noted on any of the above.

45. Management Recommendations

1. Work with state and private land owners to formulate a watershed rehabilitation plan for the stream to include: control of active erosion, and monitoring stabilizing gully areas to insure continued stabilization. Gully control structures are not recommended for BLM lands on this stream because the gully bottom is very well stabilized and the stream is progressing from fair to good condition in many places. Addition of structures would disrupt the current stream channel.
2. Encourage Cal-Trans to repair and stabilize the bulldozed trail to the stream in NW $\frac{1}{4}$ S36.
3. Allow beaver to recolonize the lower stream to provide erosion control and trap sediments. The lack of suitable habitat will act as a control against further spreading.

SUPPLEMENTAL CHECKLIST

STATE California COUNTY Mono DISTRICT Dakersfield DRAINAGE Virginia Creek
 RESOURCE AREA-P.U. Bishop-Podie LOCATION T4N R26E S21,28,31
T4N R25E S25,26
 STREAM Clearwater Creek DATE 5-31-79 INVESTIGATORS Steffen and Tool

1. Channel Alterations (Bridges, Culverts, Road Crossings, Diversions, Containment, Channelization), Man-made Features, and Human Activities On Or Near the Stream, with What Impact.

- The stream in sections 25,26,36(R25E) has been impacted in areas by the construction of the road. Most of the riparian is intact but has been denuded at narrow spots in the canyon to make space for the road.
- The stream has a system of ditches to spread water throughout the private land in Mormon Meadow.
- A culvert crossing exists in the NE1/4 S32 (R26E).
- Three ford crossings in S21,28, (R26E). (see back)

2. Bank Soil Description

- Bank soils in the depositional meadow areas are a large percentage of fine materials (a silty clay loam) and are very susceptible to erosion.
- Where the creek flows through narrow canyon areas, the bank are largely rock.

3. Pollution Information (Grazing, Mining, Recreational Use, Etc.)

- 593-appears to be moderate cattle grazing.
- 592-591 - some sediments and oils enter the stream because of the proximity of the road to the stream bank in the canyons.
- An off-road vehicle area is developing about 1/2 mile up Sinnerbar Canyon.

4. Debris

- 591-little, minor amounts from downed riparian
- 592-some downed riparian
- 593-none

5. Sediment Sources and Areas of Erosion

- Gullying has occurred along most of the stream, although some is quite old. At 591 gullying is about 5 feet deep, but seems to be mostly inactive, and the bottom is flat, from 10-20 feet wide and has a very good grass cover with some brush. There is some bad active gullying on the state land in S36 (R25E) around the beaver dams, and this has been aggravated by the building on the highway and the removal of the beaver dams. At 593 the stream lies in an old shallow gully which has sloping mostly well grassed banks. The bottom is 10-15 feet wide and has excellent soil.
- The private land around the warm springs has been heavily used by sheep and undoubtedly contributes sediment from sheet erosion.

6. Springs and Seeps

- 593-a small spring enters spring at station, several other small springs come into the stream from the west side of the meadow.

. Streamflow Loss

This stream maintains a flow throughout the entire year, although the flow may be small in some stretches.

8. Riparian Vegetation

- 591 - grass, willow, annuals, sage
- 592 - willows, rose, grass, golden currant
- 593 - grass-

9. Aquatic Vegetation

Algae, grasses

10. Fish

-Fish head of unknown species (too decayed) was found beside stream at 593-3. Large numbers of trout, probably browns, were seen above 593.

-The stream was planted in 1949 only, with eastern brook.

-DFG surveys have found rainbow and brown trout and a very good population of the endemic sucker Catostomus tahoensis, throughout the stream. The trout probably moved (see back)

11. Fish and Aquatic Habitat (Quality, Quantity, and Boundaries of)

The entire stream supports fish, although in the lower reaches flow becomes quite low in summer.

12. Spawning Habitat Quality and Boundaries

-Spawning habitat for trout is fair throughout the stream, but sediment on the gravel probably keeps spawning success down.

-Sucker spawning habitat is good throughout the stream.

13. Upstream Migration Obstructions

The beaver dams in S36 (R25E) and S31 (R26E) are upstream migration barriers.

14. Boundaries of Fishery Significance

This stream has little significance as a fishery. The populations are too small and the proximity of Virginia Creek and other stocked fishing streams makes it little used. The fish head at 593 could possibly have been left by an angler.

15. Beaver Activity

One beaver pond at SW $\frac{1}{4}$ of NW $\frac{1}{4}$ S31. Several beaver ponds below that have been cut out, probably in fall of 1978, and have not been repaired. No recent beaver activity was seen on May 31st, but one tree had been downed on June 1st. It is not known who trapped out the beaver and destroyed the dams. CDFG and Cal-Trans were not aware of the removal.

16. Access

A paved two-lane road runs along approximately 4 miles of the stream. The remainder of the stream is accessible by a high clearance unimproved dirt road, probably requiring 4-wheel drive in the upper end.

17. Improvement or Alteration Suggestions

1. Monitor erosion, especially below station 592, considering possibly control measures if erosion increases.
2. Encourage Cal-Trans to repair and stabilize the bulldozed trail to the stream in NW $\frac{1}{4}$ S36.
3. Allow beaver to recolonize the stream to provide erosion control and sediment trapping.