

UNITED STATES ENVIRONMENTAL PROTECTION



WATER QUALITY ASSESSMENT

SOUTHERN OREGON LAKES BASIN

SURVEILLANCE AND ANALYSIS DIVISION

REGION X · PACIFIC NORTHWEST & AL  
1200 SIXTH AVENUE, SEATTLE, WASHINGTON

WATER QUALITY ASSESSMENT

SOUTHERN OREGON LAKES BASIN

SURVEILLANCE AND ANALYSIS DIVISION

# SOUTHERN OREGON LAKES BASIN

**FEBRUARY 1977**

**Surveillance & Analysis Div. Water Surv. & Invest. Section**  
**Environmental Protection Agency**  
**1200 6th Avenue Seattle, Washington 98101**



SCALE IN MILES

## REGION 10 WATER QUALITY ASSESSMENT

A logical step-by-step approach is needed to identify and abate nonpoint sources of pollution within Region 10. The first step must be to assess the magnitude and extent of the nonpoint source problem.

Region 10 has developed a water quality assessment approach which will assist EPA planners, land agencies, and state and local agencies in identifying probable nonpoint sources and determining their effects upon the "fishable-swimmable" aspect of Regional streams.

Generally the approach is to determine the biological, recreational, and water quality status of Regional streams and to display each status on color coded STORET basin maps. This information is to be related to land use and land ownership (also on basin maps) as well as other factors such as hydro-modifications, river flows, mining activities, and point source discharges. All this information is then systematically organized on a summary table which can be easily used.

This package contains information for one river basin within Region 10. The package consists of the following:

1. Five slides of the maps used in the evaluation of the basin.
2. A flow chart showing the phased assessment procedure.
3. A summary table for the basin and a detailed description of information on the table.
4. A basin point source discharge listing by segment number.
5. Specific information for biological and recreational status.

The STORET basin map is used as the base map for all status evaluations. Each map is overlaid by a transparency that contains segment basin boundaries representing drainage areas associated with segments defined by each state within the Region. These segment boundaries are used as the basis for assessing water and land information.

Biological status information is obtained from field biologists representing state and federal fish and game agencies. Their judgment is based upon a set of criteria shown on Table 1. The biological status map (slide #1) shows the results of this assessment.

Recreational status (slide #2) is obtained from field biologists, fishermen, swimmers, and recreational specialists utilizing the criteria identified in the Table Explanation.

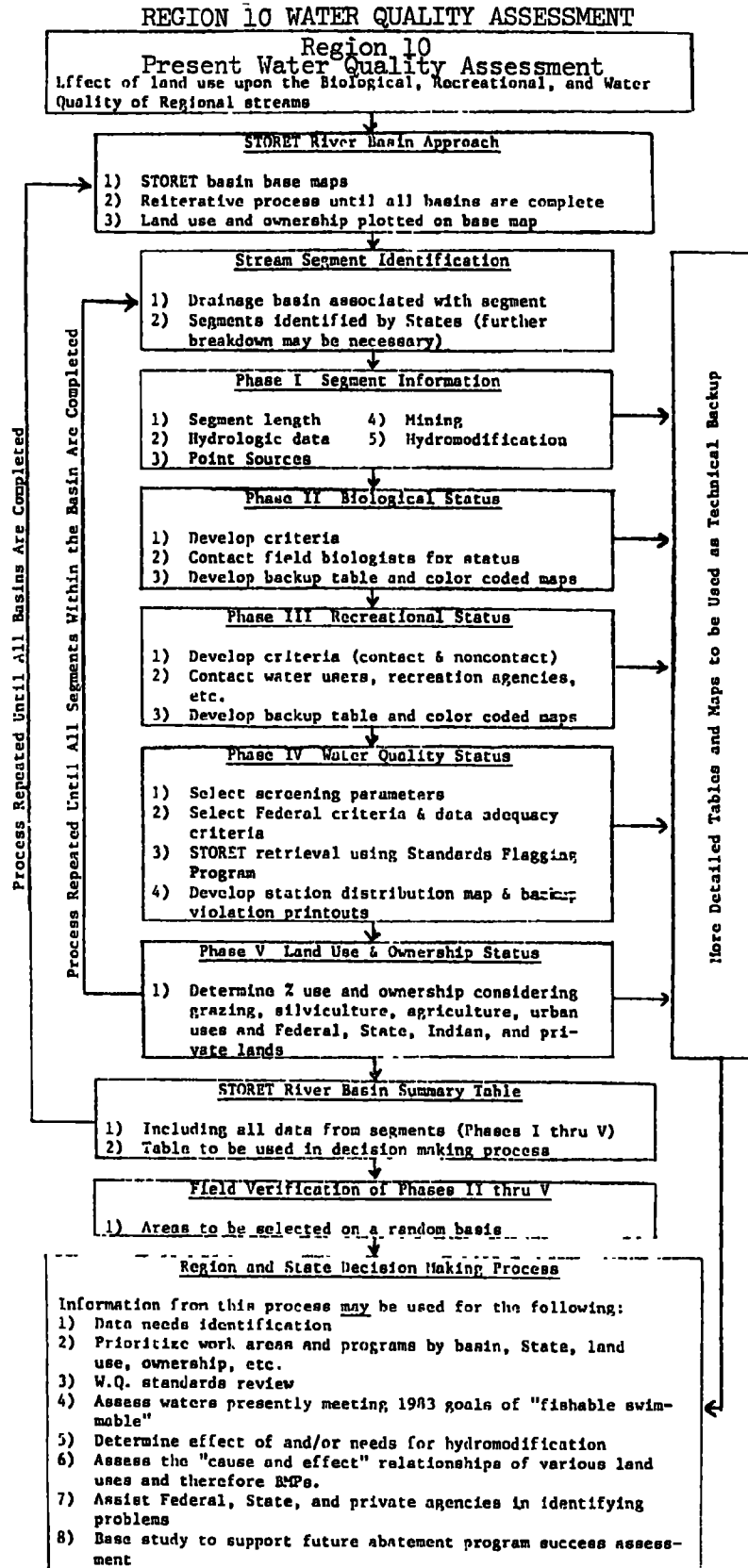
Slide #3 shows the water quality station locations in each segment. STORET was used as a basis for all water quality data since most state and federal agencies and many local agencies and universities store data in Region 10. The number associated with each point on the map references a STORET printout page number. Data was retrieved utilizing the STORET standards flagging program with EPA's Water Quality Criteria as the threshold levels. Selected water quality threshold and violation screening criteria are shown and defined in the Table Explanation.

Slides #4 and #5 show land use and land ownership throughout the STORET basin. The source of this information is from land management agencies.

All the information previously discussed and shown on maps is summarized on the River Basin tables. Information on these tables is arranged by segment in an upstream to downstream order beginning at the upper end of each STORET basin.

The information obtained and compiled using this procedure is general; however, it indicates probable cause and effect relationships related to land use and land ownership. The backup information on field tables, STORET printouts and maps allows the user to make more detailed evaluations. Specific information gathering investigations in problem areas would be necessary for an accurate "cause and effect" picture.

This evaluation process is still evolving and is continually being improved based on field verifications and comments from users. If you have specific questions on the procedures used in these evaluations, please contact Bill Schmidt, Chief, Water Surveillance and Investigation Section, Surveillance and Analysis Division, Region 10 (Telephone--FTS 399-1210).



The field biologist utilizes the following evaluation matrix in determining stream segment status classification.

# **BIOLOGICAL EVALUATION CRITERIA**

TABLE I

<div> <div>TIME &amp; SEVERITY FACTORS</div> <div>CRITERIA FOR BIOLOGICAL EVALUATION</div> </div>	Duration of Adverse Condition			Severity of Adverse Condition			Period of Biological Activity	
	NEVER-INTERMITTENT-CONTINUOUS			LOW-----HIGH			NON-CRITICAL	CRITICAL
I. Destruction of habitat for indigenous species - passage, spawning, rearing.	Blue-----		→ Red	Blue-----		→ Red	Blue/Yellow	Red
II. Interruption of total food chain	Blue-----		→ Red	Blue-----		→ Red	Yellow	Red
III. Interference with the well being of indigenous species of fish or food chain organisms.	Blue-----	→ Red	Red	Yellow-----		→ Red	Red	Red

NOTE: The color-code (blue, yellow, and red) is used on the maps (see slides).

On the summary tables, a pattern-code was used to allow for easier duplication.

Therefore:

Blue corresponds to:



Yellow corresponds to:



Red corresponds to:





## TABLE EXPLANATION

### 1. Sub-basin Information

Sub-basin:	Each "STORET" major river basin is divided into minor river basins based on major tributaries to the main stream. Each sub-basin is further subdivided into segments. In the table the segments and sub-basins appear in an upstream to downstream order.
River:	The major river or stream and its tributaries in the segment being classified are listed.
Segment Number:	The reach of the river under consideration, including the hydrologic drainage area that contributes flow to that reach, is designated by number for the purposes of identification and cross-referencing. This number will generally be the state assigned alpha-numeric code except where a finer division is necessary in giving a more accurate description of the area.
Drainage Area:	The area of the entire segment being described is given in square miles.
Flow:	Annual average, maximum, and minimum discharge (in cfs) are given for the major stream or reach in each segment where USGS flow records are available.
River Mile Range:	The upper and lower river miles of the stream or reach in each segment as well as the river mile of the confluence with the next lowest order stream is given. For instance, the Powder River (length 145 miles), which enters the Snake River at river mile 296, is described under "R.M. Range" as: <div style="text-align: center;">296/ 145-0</div>
Segment Length:	The length, in miles, of the reach of the major stream in each segment is given.

### 2. Environmental Information

Significant Discharger:	The number of significant dischargers, as determined by EPA S&A Region X, is noted under the appropriate column, being either Municipal (M) or Industrial (I).
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Hydro-modification: Agricultural (irrigation diversions or returns), reservoirs, channel realignment, or other changes in the natural flow of the stream under consideration are identified.  
 I = Agricultural Modifications  
 R = Reservoir Modification (Number of reservoirs having a total capacity of 5,000 acre-feet or more)  
 C = Channel Realignment, Revetments, etc.  
 O = Other  
 Where specific data is available, the numerical extent of the hydromodification is noted as a number after the letter abbreviation. Where numerical information is lacking, a qualitative notation of extent is used. A '+' means there is extensive modification of that type in the segment, no symbol after the letter means it is present, and no letter means its presence is at most negligible.

Mining: Present or active (A) mining operations and past or non-active (N) mining operations are identified for each segment.

Water Use: A general description of the present water uses in the segment is given. Pwr - power; Rec - recreation; Ag - agriculture; F+W - fish and wildlife; Mun - municipal; M+I - municipal and industrial; Ind - industrial; Nav - navigation.

Biological Status: This is a qualitative assessment of biological conditions in the streams of that particular segment.  
 Solid Black - (corresponds to red on map) - water environment is unsuitable for a healthy biological community.  
 Diagonal Stripes - (yellow on map) - a questionable or intermittently unhealthy environment exists.  
 Dots - (blue on map) - a good environment exists for the biota.  
 Blank Space - (green on map) - insufficient data is available for evaluation.  
 Determination of the biological status was carried out by experienced, knowledgeable biologists associated with various federal and state agencies who are familiar with the streams in the river segments. Table 1 outlines the criteria used for the biological evaluations. Evaluations are limited to major streams. In general, these include first through second or third order streams for rivers near the seacoast and first through fourth order for inland streams. A certain amount of subjective judgment has been used, however, as to whether to include

### Biological Status

(cont):

certain higher order streams. Whether a certain higher order stream falls within the just mentioned bounds is not in itself justification for inclusion. Its size and significance are also taken into account.

### Recreational Status:

This is the qualitative assessment of water related recreational use for each segment. The criteria used for evaluation of recreational status was based on typical year-round use. Two major categories were considered: (1) contact recreation (swimming), and (2) non-contact recreation (boating, fishing, and aesthetics).

Dots - (corresponds to blue on map) - popular areas, few complaints registered, wide diversity of socio-economic uses in evidence.

Diagonal Stripes - (yellow on map) - part-time use due to water management, seasonal water quality and quantity conditions, seasonal accessibility, etc.

Solid Black - (red on map) - no use in areas where that use should normally exist.

Blank Space - (green on map) - insufficient data for evaluation.

The stream order criteria for inclusion in the evaluation are the same as for biological status.

### Water Quality Status

(Parametric Coverage):

An assessment of the water quality data available in each of the segments is given. All data used in the analysis and evaluation is available in EPA's "STORET" System. A group of twelve basic parameters is used in assessing the water quality in each segment.

<u>Parameter</u>	<u>Criteria Threshold Level/Units</u>	<u>Environmental Impact and Reference</u>
Temperature (T)	20°C (68°F) MAX	To protect growth and migration routes of salmonids (Federal Water Pollution Control Administration (FWPCA), <u>Water Quality Criteria</u> , 1968).
Dissolved Oxygen (DO)	6 mg/l MIN 90% SAT MIN	For good growth and the general well-being of trout, salmon, and other species of cold water biota, DO concentrations should not be below 6 mg/l (FWPCA, <u>Water Quality Criteria</u> , 1968). In addition, state water quality standards normally require 90% saturation for dissolved oxygen (Idaho and Oregon).

<u>Parameter</u>	<u>Criteria Threshold Level/Units</u>	<u>Environmental Impact and Reference</u>
Dissolved Gas (TDG)	110% SAT MAX	To prevent fish fatalities by "gas bubble disease" in which dissolved gases in their circulatory system come out of solution to form bubbles (emboli) which block the flow of blood through the capillary vessels (Environmental Protection Agency, <u>Quality Criteria for Water</u> , 1976).
pH (pH)	6.5 MIN 8.5 MAX	The pH range which is not directly lethal to fish is 5-9. However, the toxicity of several common pollutants is markedly affected by pH changes within this range, and increasing acidity or alkalinity may make these poisons more toxic. Therefore, a pH range of 6.5 to 9.0 is desirable to protect freshwater aquatic life (EPA, <u>Quality Criteria for Water</u> , 1976). In primary contact recreation waters, the pH should be within the range of 6.5-8.3 except when due to natural causes to prevent the possibilities of eye irritations in humans (FWPCA, <u>Water Quality Criteria</u> , 1968). State pH standards range from 6.5 to 9.0 for Idaho and 6.5 to 8.5 for Oregon and Washington. In light of the above information, our criteria have been set at 6.5 to 8.5.
Turbidity (Turb)	25 JTU MAX	Most state standards have a turbidity standard of "not to exceed 5 JTU over background or natural conditions". It is, however, rather ambiguous what "background or natural conditions" are. Also, this type of standard does not relate to the fishable/swimmable concept. Excessive turbidity reduces photosynthesis by aquatic plant life and damages the spawning grounds of fish and habitat of aquatic invertebrates. It has been observed that maximum production in hatchery ponds and reservoirs occurred where the average turbidity was less than 25 JTU (Buck, D.H., 1956. Effects of turbidity on fish and fishing. <u>In</u> : 21st North Amer. Wildlife Conf. Trans.).

<u>Parameter</u>	<u>Criteria Threshold Level/Units</u>	<u>Environmental Impact and Reference</u>
Phosphorus (Phos)	Total 0.05 mg/l-P Total 0.15 mg/l-PO <sub>4</sub> Ortho 0.025 mg/l-P Ortho 0.075 mg/l-PO <sub>4</sub> Diss. Ortho 0.01 mg/l-P	Limited studies made to date indicate that different species of algae have somewhat different phosphorus requirements with the range of available phosphorus usually falling between 0.01 and 0.05 mg/l as P. At these levels, when other conditions are favorable, blooms may be expected. While there is no set relationship between total and available phosphorus (because the ratio varies with season, temperature, and plant growth), the total phosphorus is governing as it is the reservoir that supplies the available phosphorus. A desirable guideline for total phosphorus is 0.05 mg/l as P where streams enter lakes or reservoirs ( <u>FWPCA, Water Quality Criteria</u> , 1968). The other criteria levels for different units and forms of phosphorus have been determined by unit conversion and relationships found between the phosphorus forms in Region 10. The other forms of phosphorus are used as indicators only when data for total phosphorus is lacking.
Nitrate Nitrogen (N)	0.30 mg/l-N 1.33 mg/l-NO <sub>3</sub>	Mackenthun cited results indicating that inorganic nitrogen at 0.30 mg/l and inorganic phosphorus at 0.01 mg/l, at the start of an active growing season, subsequently permitted algal blooms (Mackenthun, K.M., 1965. Nitrogen and phosphorus in water. U.S. Department of Health, Education, and Welfare, Public Health Service.).
Ammonia Nitrogen (NH <sub>3</sub> )	Un-ionized 0.02 mg/l-N Total 0.20 mg/l-N Total 0.26 mg/l-NH <sub>4</sub>	The amount of un-ionized ammonia is very much dependent upon pH, temperature, and concentration of total ammonia. A maximum level of 0.02 mg/l as un-ionized ammonia is recommended to minimize toxicity to freshwater aquatic life ( <u>EPA, Quality Criteria for Water</u> , 1976). Concentrations of total ammonia above 0.20 mg/l as N are indicative of organic pollution (Klein, <u>River Pollution I., Chemical Analysis</u> , 1959).

<u>Parameter</u>	<u>Criteria Threshold Level/Units</u>	<u>Environmental Impact and Reference</u>
Bacteria (Bact)	Total Coliform 1000/100 ml Fecal Coliform 240/100 ml	Total and fecal coliform are microbiological indicators used to determine or indicate the safety of water for drinking, swimming, and shellfish harvesting. A fecal coliform log mean of 200 per 100 ml for bathing waters and 14 per 100 ml for shellfish harvesting waters is recommended by <u>Quality Criteria for Water</u> , EPA, 1976. State standards range from 240 total/50 fecal per 100 ml for primary contact recreation in Idaho, 1000 total per 100 ml in Oregon for general beneficial use, and 1000 total per 100 ml in Washington for Class B general recreation. From the above discussion, the suggested criteria level based on general recreation is 1000 per 100 ml for total coliform and 240 per 100 ml for fecal coliform.
Dissolved Solids Conductivity (Cond)	TDS 500 mg/l Cond. 750 umho/cm	High levels of dissolved solids are a hazard for irrigation water. A maximum level of 500 mg/l is indicated for water from which no detrimental effects will usually be noticed. For domestic water supply, the maximum level is 250 mg/l (EPA, <u>Quality Criteria for Water</u> , 1976). A relationship exists between dissolved solids and conductivity where total dissolved solids = .6 to .8 times the conductivity.
Pesticide Toxicity (OTOX)		The following criteria levels are recommended to protect the freshwater aquatic life (EPA, <u>Quality Criteria for Water</u> , 1976).
Aldrin	.003 ug/l	
Dieldrin	.003 ug/l	
Chlordane	.010 ug/l	
DDT	.001 ug/l	
Endrin	.004 ug/l	
Heptachlor	.001 ug/l	
Lindane	.010 ug/l	
Malathion	.100 ug/l	
Parathion	.040 ug/l	

## Heavy Metals (Met)

<u>Metal</u>	<u>Criteria Threshold Level</u>	<u>Environmental Impact</u>	<u>Reference</u>
Boron	750 ug/l	For long term irrigation, a maximum level of 750 ug/l is recommended for sensitive crops	2
Cadmium	3 ug/l	Harmful to eggs and larvae of salmon in hard water	1
Chromium	50 ug/l	Mixed aquatic populations protected	1
Copper	20 ug/l	96 hour TL <sub>50</sub> to Chinook salmon in soft water was 31 ug/l at hatch and 18 ug/l at 1 month old	2
Lead	30 ug/l	Aquatic life protected	1
Mercury	0.2 ug/l	Selected species of fish and predatory aquatic organisms protected	1
Zinc	80 ug/l	Algacidal concentration for Selenastrum Capricornutum	3

## References:

1. EPA R3.73.033, Ecological Research Series, Water Quality Criteria 1972, U.S. Government Printing Office, 1973.
2. EPA, Quality Criteria for Water, 1976.
3. Green, et. al., Report to Region X on the Results of the Spokane River Algal Assays, 1973.

The environmental status per each parameter per segment is found by determining the percentage of samples that are in violation of the particular threshold level. This percentage is then weighted according to the annual sample size for each segment as follows:

<u>Status Code</u>	<u>Class</u>	<u>Percent Violations</u>		
		Number of Samples/Year/Segment/Parameter <u>More than 20</u>	<u>11 to 20</u>	<u>4 to 10</u>
Solid Black	Not Acceptable	51-100% Viol.	61-100% Viol.	71-100% Viol.
Diagonal Stripes	Objectionable	11-50%	21-60%	31-70%
Dots	Acceptable	0-10%	0-20%	0-30%

No code at all (blank space) indicates insufficient data for evaluation.

The data used for this evaluation is for the period beginning January 1, 1970 until the date of the report. For each station, parameters with less than 4 samples per year are not used.

#### Water Quality Status (Station/Data Statistics)

Number of Stations - Actual number of stations within each segment that had at least one parameter with 4 or more samples per year.

Number of Samples/Parameter - Number of samples per year for each parameter averaged for all parameters sampled.

Data Adequacy - This determination was made by evaluating the distribution of stations, amount of data, and in some cases adequacy of parametric coverage versus known environmental quality problems.

+ denotes adequate data

- denotes indadequate data

### 3. % Land Ownership

The figure in each column represents the percentage of total area within each segment under the jurisdiction of the noted groups.

### 4. % Land Use

The figure in each column represents the percentage of total area within each segment that is used for the various purposes listed.



**NOTE:**

Data for the parameter portion of the water quality evaluation was retrieved from the STORFT system in August 1976 rather than February 1977 (the date the table was completed).

Sub-basin Information							Environmental Information										% Land Ownership					% Land Use															
Sub-basin	River	Seg #	Drain Area mi <sup>2</sup>	Cfs Flow x10 <sup>3</sup>	R M Range	Seg Length	Sig Dist mi	Hydro-mod	Mining	Water Use	WATER QUALITY										# Sta	# Smp/yr	Data Adequacy	USFS	BLM	Indian	State	Private	Urban	Agric	Range	Forest	Water	Wetland	Barren	Tundra	Snow & Ice
											Bio Sta	Rec Sta	parameters						acceptable	objectionable																	
	SILVER CR. AND HARNEY LAKE	40-01-01	2210	.065 .774 .001	62-0	62		I		Ag F+W Rec		T	DO	NH3				0		-	12	71		4	9		2	82	8	2	3	3					
	LOWER CENTRAL LAKES	40-02-01	2960					I		F+W Rec		TDG	Bact					0		-	4--Fish&Wild.						3	83	7	3		4					
												pH	Met								12--Fish&Wild.																
												Turb	Cond																								
												Phos	OTox																								
	SOUTH-EASTERN LAKES	40-03-01	1980					I	N	F+W Rec		T	DO	NH3				0		-		81		8	11		2	86	1	1	1	9					
												TDG	Bact																								
												pH	Met																								
												Turb	Cond																								
												Phos	OTox																								
												T	DO	NH3																							
												TDG	Bact																								
												pH	Met																								
												Turb	Cond																								
												Phos	OTox																								
	SILVIES src. to Malheur Lake	41-01-01	1970	.344 2.11 .006	85-0	85		I+		Ag F+W Rec		T	DO	NH3				2	5	-	33	15		2	50	1	21	44	29	1	3	1					
												TDG	Bact																								
												pH	Met																								
												Turb	Cond																								
												Phos	OTox																								
	DONNER UND BLITZEN R. & MALHEUR LAKE	41-02-01	2030	.065 .45 .011	54-0	54		I		Ag F+W Rec		T	DO	NH3				9	20	-		80		1	11		6	77	8	2	4	3					
												TDG	Bact																								
												pH	Met																								
												Turb	Cond																								
												Phos	OTox																								
												T	DO	NH3																							
												TDG	Bact																								
												pH	Met																								
												Turb	Cond																								
												Phos	OTox																								
	CHEWAUCAN R. & SUMMER LAKE	42-01-01	1710	.265 1.48 .030	52-0	52		1R I		Ag F+W Rec		T	DO	NH3				1	12	-	47	29		24		6	40	45	5	2	2						
												TDG	Bact																								
												pH	Met																								
												Turb	Cond																								
												Phos	OTox																								

[illegible]

# BIOLOGICAL STATUS

river basin name Southern Oregon Lakes

recorder Loiselle/FPA date 2/P/77

Contact:

Bill Hosford, Oregon Dept.  
of Fish and Wildlife

STREAM NAME	STREAM REACH	SEG. NO.	BIOLOGICAL CRITERIA							BIOLOGICAL PROBLEM	BIOLOGICAL EFFECT	STATUS
			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
SILVER CR. source to Nicoll Cr.	62-44	40-01-01	I	M	Yes	I	M	I	M	Road construction, log- ging, siltation, and thermal problems. Low summer flows.	Smothering of spawning grounds, high temp., rough fish competition.	Obj
SAWMILL CR. source to mouth	11.5-0	40-01-01	I	M	Yes	I	M	I	M	Same as above.	Smothering of spawning grounds, high temp., rough fish species in lower reaches. Lack of good cover.	Obj
CLAW CR. source to mouth	5-0	40-01-01	I	M	Yes	I	M	I	M	Same as above.	Same as above. Lower reach	Obj NA
ROUGH CR. source to mouth	9-0	40-01-01	I	M	Yes	I	M	I	M	Same as above plus streambed sinking in some areas.	Same as above.	Obj
NICOLL CR. source to mouth	12-0	40-01-01	I	M	Yes	I	M	I	M	Same as above.	Same as above.	Obj
SILVER CR. Nicoll Cr. to mouth	44-0	40-01-01	C	H	Yes	C	H	C	H	Channelized for irriga- tion, overgrazing, sil- tation, lack of riparian zone, low summer flow.	Lack of game fish habi- tat, siltation of spawn- ing grounds, rough fish species. Reservoir	NA Obj

S seldom

I intermittent

C continuous

L low

M medium

H high

ACC acceptable

OBJ objectionable

NA not acceptable

# BIOLOGICAL STATUS

river basin name Southern Oregon Lakes

recorder Loiselle/EPA date 2/8/77

## Contacts:

Bill Fosford & Wendell Stout  
Oregon Dept. of Fish & Wildlife

STREAM NAME	STREAM REACH	SEG. NO.	BIOLOGICAL CRITERIA							BIOLOGICAL PROBLEM	BIOLOGICAL EFFECT	STATUS
			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
HARNEY LAKE		40-01-01	C	H	Yes	C	H	C	H	Naturally occurring shallow alkaline lake which is often dry.	No fish in lake. Used by waterfowl when water is present.	NA
ROCK CR. source to mouth	42-0	40-02-01								Insufficient data.	Insufficient data.	
GUANO SLOUGH source to mouth	35-0	40-02-01								Insufficient data.	Insufficient data.	
GUANO LAKE & GUANO CR. source to mouth	26-0	40-02-01	S	L	No	S	L	S	L	Insufficient data for Guano Lk. and lower reach of Guano Cr.	Upper reach	Acc
HONEY CR. source to mouth	22-0	40-02-01	S	L	No	S	L	S	L			Acc
SNYDER CR. source to mouth	6.5-0	40-02-01	S	L	No	S	L	S	L			Acc
TWELVMILE CR. source to mouth	11.5-0	40-02-01	S	L	No	S	L	S	L			Acc

S seldom

I intermittent

C continuous

L low

M medium

H high

ACC acceptable

OBJ objectionable

NA not acceptable

# BIOLOGICAL STATUS

river basin name Southern Oregon Lakes  
 recorder Loiselle/EPA date 2/8/77

Contacts:  
 Wendell Stout & Bill Hosford  
 Oregon Dept. of Fish & Wildlife

STREAM NAME	STREAM REACH	SEG. NO.	BIOLOGICAL CRITERIA							BIOLOGICAL PROBLEM	BIOLOGICAL EFFECT	STATUS
			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
HART & CRUMP LAKES		40-02-01	S	L	No	S	L	S	L			Acc
PELICAN LK.		40-02-01								Insufficient data.	Insufficient data.	
DEEP CR., CAMAS CR., TWENTYMILE CR., & COLEMAN LAKE	31-0 16-0 22-0	40-02-01								Insufficient data.	Insufficient data.	
TROUT CR. source to RM 17	45-17	40-03-01	I	M	Yes	I	M	I	M	Overgrazing, irrigation, siltation, loss of cover due to beavers.	Siltation of spawning gravel, high temp., lack of escape cover.	Obj
TROUT CR. RM 17 to mouth	17-0	40-03-01	C	H	Yes	C	H	C	H	Alkaline ditch when dry. Low summer flows.	High temp., lack of fish habitat.	NA
ALVORD LAKE		40-03-01	C	H	Yes	C	H	C	H	Naturally occurring alkaline lake that occasionally dries up.	Little value to fish and wildlife.	NA
VAN HORN CR. source to mouth	9-0	40-03-01	I	L	Yes	I	L	I	L	Some overgrazing, steep banks, low summer flows.	Siltation, high temp.	Obj

**S** seldom      **L** low      **ACC** acceptable  
**I** intermittent      **M** medium      **OBJ** objectionable  
**C** continuous      **H** high      **NA** not acceptable

# BIOLOGICAL STATUS

river basin name Southern Oregon Lakes

recorder Loiselle/EPA date 2/8/77

Contact:

Bill Hosford, Oregon Dept.  
of Fish & Wildlife

STREAM NAME	STREAM REACH	SEG. NO.	BIOLOGICAL CRITERIA							BIOLOGICAL PROBLEM	BIOLOGICAL EFFECT	STATUS
			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
WILDHORSE CR. source to Alvord L.	17-0	40-03-01	I	M	Yes	I	M	I	M	Overgrazing on upper reach, channelization & irrigation on lower reach. Siltation & lack of escape cover.	Siltation of spawning grounds, lack of habitat, high temp. Upper reach Middle reach Lower reach	Acc Obj NA
COTTONWOOD CR. source to mouth	17-0	40-03-01	L	M	Yes	L	M	I	M	Overgrazing, rearranged bedload, siltation, no riparian habitat. Low summer flow.	Siltation of spawning beds, loss of habitat, high temp. Middle reach	NA Obj
WILLOW CR., SKULL CR., sources to mouth	8-0 18.5-0	40-03-01	C	H	Yes	C	H	C	H	Overgrazing, low summer flow.	Lack of habitat and escape cover.	NA
SILVIES R. & EAST AND WEST FORKS source to mouth	85-0	41-01-01	I	M	Yes	I	M	C	M	Grazing, logging, siltation, turbidity. Lower reaches intermittent on dry years.	Siltation of spawning beds. Affects food production & enhances rough fish species. Fast & West Forks	Obj NA
SCOTTY CR. source to mouth	13-0	41-01-01	I	M	No	I	M	I	M	Logging, grazing, lack of thermal cover.	Siltation, trampling of streambank.	Obj

S seldom

I intermittent

C continuous

L low

M medium

H high

ACC acceptable

OBJ objectionable

NA not acceptable

# BIOLOGICAL STATUS

river basin name Southern Oregon Lakes

recorder Loiselle/EPA date 2/8/77

Contact:

Bill Hosford, Oregon Dept.  
of Fish & Wildlife

STREAM NAME	STREAM REACH	SEG. NO.	BIOLOGICAL CRITERIA							BIOLOGICAL PROBLEM	BIOLOGICAL EFFECT	STATUS
			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
BEAR CR. source to mouth	23-0	41-01-01	I	L	No	S	L	S	L	Lower reach is in pasture. Some overgrazing, bank breakdown, high temp.	Thermal problems and some rough fish species in the lower reach. Lower reach	Acc Obj
CAMP CR. source to mouth	13-0	41-01-01	I	L	No	S	L	S	L	Logging & road construction causing some turbidity.	Siltation of spawning gravel.	Acc
BRIDGE CR. source to mouth	8.5-0	41-01-01	I	M	Yes	I	M	C	M	Heavy grazing & siltation in sections.	Siltation of spawning beds. Thermal problems from lack of streamside vegetation.	Obj
TROUT CR. source to mouth	11-0	41-01-01	I	M	Yes	C	M	C	M	Overgrazing, trampling of streambed, erosion.	High temp., siltation of spawning beds, lack of escape cover.	Obj
MYRTLE CR. source to mouth	13-0	41-01-01	I	M	Yes	C	M	C	M	Overgrazing, logging, road construction, siltation.	High temp., siltation of spawning beds, lack of riparian growth.	Obj
EMIGRANT CR. source to mouth	27-0	41-01-01	I	L	Yes	I	L	S	L	Logging, overgrazing, road construction.	Siltation of spawning beds, high temp.	Acc

**S** seldom

**I** intermittent

**C** continuous

**L** low

**M** medium

**H** high

**ACC** acceptable

**OBJ** objectionable

**NA** not acceptable



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river basin name Southern Oregon Lakes  
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			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
SAWTOOTH CR. source to mouth	7-0	41-01-01	I	M	Yes	I	L	S	L	Overgrazing, road construction, & logging on upper reach.	Siltation, erosion, high temp., rough fish populations. Lower reach	Obj Acc
YELLOW JACKET CR. source to mouth	7.5-0	41-01-01	I	M	Yes	I	L	S	L	Overgrazing, logging, road construction, siltation.	Siltation of spawning grounds, high temp.	Obj
HAY CR. source to mouth	10-0	41-01-01	I	M	Yes	M	L	S	L	Overgrazing, logging, siltation, low summer flow.	Siltation of spawning beds, lack of riparian growth.	Obj
SAGE HEN CR. source to mouth	8.5-0	41-01-01	C	H	Yes	C	H	C	H	Stream contains no fish life and is a limited habitat for other wildlife.	Naturally occurring low summer flow.	NA
POISON CR. source to mouth	22-0	41-01-01	C	M	Yes	M	L	I	M	Lower reach heavily channelized & diverted for irrigation. Upper reach overgrazed with unstable bedload.	High temp., siltation of spawning beds. Lower reach	Obj NA
COW CR. source to mouth	27.5-0	41-01-01	C	H	Yes	C	H	C	H	Logging, overgrazing, low summer flow.	High temp., siltation, rough fish species.	NA

**S** seldom  
**I** intermittent  
**C** continuous

**L** low  
**M** medium  
**H** high

**ACC** acceptable  
**OBJ** objectionable  
**NA** not acceptable

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			destruction of habitat			interruption of food chain		interference w/ species well-being					
			duration	severity	importance of factor	duration	severity	duration	severity				
RATTLESNAKE CR. source to mouth	21.5-0	41-01-01	C	M	Yes	I	M	C	C	Road construction, grazing, erosion, low summer flow.	High temp., siltation of spawning beds, rough fish species. Lower reach	Obj NA	
DONNER UND BLITZEN R. source to Frenchglen	54-33	41-02-01	I	L	Yes	S	L	S	L	Limited problem due to overuse by livestock.	Siltation from upper reaches.	Acc	
SOUTH FORK BLITZEN R. source to Little Blitzen R.	9-0	41-02-01	C	H	Yes	C	H	C	H	Severe overgrazing, erosion, trampling of streambank, lack of thermal cover.	High temp., siltation of spawning beds, lack of food production and escape cover.	NA	
INDIAN CR. source to mouth	10-0	41-02-01	I	L	Yes	S	L	S	L	Limited overgrazing, siltation from non-point sources during thunderstorms.	Limited siltation of spawning beds, limited thermal problems.	Acc	
LITTLE BLITZEN R. source to mouth	12-0	41-02-01	I	L	Yes	S	L	S	L	Limited overgrazing, some thermal problems from lack of shade.	Siltation of spawning beds, occasional high water temp.	Acc	

**S** seldom

**I** intermittent

**C** continuous

**L** low

**M** medium

**H** high

**ACC** acceptable

**OBJ** objectionable

**NA** not acceptable

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			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
FISH CR. source to mouth	12-0	41-02-01	I	L	Yes	S	L	S	L	Limited overgrazing, some thermal problems from lack of shade.	Siltation of spawning beds, high temp.	Acc
DONNER UND BLITZEN R. Frenchglen to mouth	33-0	41-02-01	C	H	Yes	C	H	C	H	Channelization for irrigation and control for waterfowl production.	Loss of spawning habitat, rough fish, thermal pollution, lack of stream channel, siltation.  For waterfowl	Obj.  Acc
KRUMBO CR. source to mouth	13.5-0	41-02-01	C	H	Yes	C	H	C	H	Overgrazing, siltation, lack of cover, irrigation diversions, low summer flow.	Siltation of spawning beds, high temp., destruction of habitat.	Obj
McCOY CR. source to mouth	30-0	41-02-01	I	M	Yes	I	M	I	M	Overgrazing on upper reach, beaver destruction of riparian growth, erosion, irrigation diversions, low flow.	Siltation of spawning gravel, high temp., loss of cover for fish and wildlife.  Middle reach	Obj  Acc
MALHEUR LK.		41-02-01	S	L	No	S	L	S	L	Turbidity.	High scrap fish population, interruption of food chain.	Obj
CUCAMONGA CR. source to mouth	17.5-0	41-02-01	I	M	Yes	I	M	I	M	Overgrazing in some sections, low summer flow.	Siltation of spawning gravel, thermal problems on lower reach.	Obj

**S** seldom

**I** intermittent

**C** continuous

**L** low

**M** medium

**H** high

**ACC** acceptable

**OBJ** objectionable

**NA** not acceptable

# BIOLOGICAL STATUS

river basin name Southern Oregon Lakes

recorder Loiselle/EPA date 2/8/77

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Bill Hosford & Wendell Stout

Oregon Dept. of Fish & Wildlife

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			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
KIGER CR. source to mouth	26-0	41-02-01	I	M	Yes	I	M	I	M	Overgrazing, channelization, irrigation on lower reach.	Siltation, loss of fish & wildlife habitat, high temp. Upper reach	Obj Acc
DEEP CR. source to mouth	12-0	41-02-01	I	M	Yes	I	M	I	M	Overgrazing, siltation, low summer flow.	Siltation of spawning gravel, high temp., lack of escape cover.	Obj
BARTON RES. & RIDDLE CR. source to mouth	23-0	41-02-01	I	M	Yes	I	M	I	M	Overgrazing, channelization in lower portion, low summer flow.	Siltation of spawning gravel, thermal problems, lack of escape cover. Lower reach	Obj NA
HOME CR. source to mouth	13-0	41-02-01	I	M	Yes	I	M	I	M	Overgrazing, siltation, lack of riparian growth.	Siltation of spawning gravel, thermal problems, lack of escape cover.	Obj
BEN YOUNG CR., SOUTH CR., DAIRY CR., EIDER CR. sources to mouths	8-0 10-0 13-0 16-0	42-01-01	S	L	No	S	L	S	L			Acc

S seldom

L low

ACC acceptable

9/10

I intermittent

M medium

OBJ objectionable

C continuous

H high

NA not acceptable

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recorder Loiselle/EPA date 2/8/77

STREAM NAME	STREAM REACH	SEG. NO.	BIOLOGICAL CRITERIA							BIOLOGICAL PROBLEM	BIOLOGICAL EFFECT	STATUS
			destruction of habitat			interruption of food chain		interference w/ species well-being				
			duration	severity	importance of factor	duration	severity	duration	severity			
CHEWAUCAN R source to mouth	40-0	42-01-01	S	L	No	S	L	S	L	Insufficient data for lower reach.	Upper reach	Acc
LAKE ABERT		42-01-01								Naturally occurring highly alkaline lake.	Not important to fisheries resource but acceptable for waterfowl.	
SUMMER & SILVER LAKES		42-01-01								Naturally occurring alkaline lakes.	Little, if any, importance to fisheries. Used by waterfowl during good water years.	
ANA R., BENNY CR., SQUAW CR., SILVER CR., THOMPSON RES., WEST FORK CR., BRIDGE CR., BUCK CR. sources to mouths	6.5-0 11.5-0 9-0 23-0  13-0 15-0 22-0	42-01-01	S	L	No	S	L	S	L			Acc
NORTHWEST DRAINAGE AREA		42-02-01								This area has no significant bodies of water that contribute to the fisheries resource.		

S seldom

L low

ACC acceptable

10/10

I intermittent

M medium

OBJ objectionable

C continuous

H high

NA not acceptable

# RECREATIONAL STATUS

River Basin Name Southern Oregon Lakes

Recorder Loiselle/EPA Date 2/8/77

## Contacts:

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Oregon Dept. of Fish & Wildlife

Stream Name	R.M. Range	Seg. #	Recreational Criteria					Problem - Cause	Status
			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
SILVER CR. source to Nicoll Cr.	62-44	40-01-01	S	C	S	S	S		Acc
SAWMILL CR. source to mouth	11.5-0	40-01-01	S	C	S	S	S		Acc
CLAW CREEK source to mouth	5-0	40-01-01	S	C	S	S	S	Private access on lower reach.	Obj
ROUGH CR. & NICOLL CR. sources to mouths	9-0 12-0	40-01-01	S	C	S	S	S		Acc
SILVER CR. Nicoll Cr. to mouth	44-0	40-01-01	S	S	S	S	S	Private land, limited access.	Obj
HARNEY LAKE		40-01-01	S	S	S	S	S	Highly alkaline, low aesthetic appeal.	NA

S = Seldom  
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Stream Name	R.M. Range	Seg. #	Recreational Criteria					Problem - Cause	Status
			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
ROCK CR. & GUANO SLOUGH sources to mouths	42-0 35-0	40-02-01						Insufficient data.	
GUANO LAKE & GUANO CR. source to mouth	26-0	40-02-01	S	I	S	I	C	Silt, water quality, temperature. Upper reach	Obj Acc
HONEY CR. source to mouth	22-0	40-02-01	S	S	S	I	C		Acc
SNYDER CR. & TWELVEMILE CR. sources to mouths	6.5-0 11.5-0	40-02-01	S	I	S	I	C		Acc
HART & CRUMP LAKES		40-02-01	I	I	S	I	C		Acc

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Oregon Dept. of Fish & Wildlife

Stream Name	R.M. Range	Seg. #	Recreational Criteria					Problem - Cause	Status
			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
PELICAN LK., DEEP CR., CAMAS CR., TWENTYMILE CR., COLEMAN LK. sources to mouths	31-0 16-0 22-0	40-02-01						Insufficient data.	
TROUT CR. source to RM 17	45-17	40-03-01	S	C	S	I	C	Access prohibited on some private land on lower portion.	Obj
TROUT CR. RM 17 to mouth	17-0	40-03-01	S	S	S	S	S	Limited accessibility due to private ownership.	NA
ALVORD LAKE		40-03-01	S	S	S	S	S	Low aesthetic appeal.	NA
WILDHORSE CR. source to Alvord L.	17-0	40-03-01	S	C	S	C	C	Lower reach closed due to private ownership.	Acc
COTTONWOOD CR. source to mouth	17-0	40-03-01	S	S	S	S	S	Private ownership.	NA

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			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
VAN HORN CR. source to mouth	9-0	40-03-01	S	S	S	I	I		Acc
WILLOW CR. source to mouth	8-0	40-03-01	S	S	S	S	S		Acc
SKULL CR. source to mouth	18.5-0	40-03-01	S	S	S	S	S	Accessibility limited due to private ownership.	Obj
SILVIES R. & EAST AND WEST FORKS source to mouth	85-0	41-01-01	I	C	I	I	I	Low flows, inaccessible due to private ownership.	Obj
SCOTTY CR. source to mouth	13-0	41-01-01	S	C	I	I	I	Small stream, some private land restricting access on lower reach.	Acc
BEAR CR. source to mouth	23-0	41-01-01	S	C	I	I	I	Some private land on lower reach restricts access.	Acc

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			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
CAMP CR. src to mouth	13-0	41-01-01	S	C	I	I	I	Short reach on lower end is private.	Acc
BRIDGE CR. src to mouth	8.5-0	41-01-01	S	I	I	I	I	Small stream--use very limited.	Obj
TROUT CR. src to mouth	11-0	41-01-01	S	C	I	I	I	Accessibility limited due to private ownership.	Obj
MYRTLE CR. src to mouth	13-0	41-01-01	S	C	I	I	I	Low aesthetics in some areas because of livestock.	Obj
EMIGRANT CR. & YELLOW JACKET CR. src to mouth	27-0 7.5-0	41-01-01	S	C	I	I	I		Acc
SAWTOOTH CR. src to mouth	7-0	41-01-01	S	C	I	I	I	Low aesthetic appeal from excessive livestock use.	Obj
HAY CR. src to mouth	10-0	41-01-01	S	C	I	I	I	Some access limitations on lower reach (private land). Aesthetics impaired by overgrazing.	Obj
SAGE HEN CR. src to mouth	8.5-0	41-01-01	S	S	S	I	I	Low aesthetic appeal.	NA

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			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
POISON CR. src to mouth	22-0	41-01-01	S	C	I	I	I	Restricted access (private land), low aesthetics from overgrazing.	Obj
RATTLESNAKE CR. source to mouth	21.5-0	41-01-01	S	C	I	I	I	Private access on lower reach, aesthetics poor due to U.S.F.S. road construction.	Obj
COW CREEK src to mouth	27.5-0	41-01-01	S	S	S	S	S	Private access, low aesthetic appeal.	Obj
DONNER UND BLITZEN R. source to Frenchglen	54-33	41-02-01	S	C	C	C	C		Acc
SOUTH FORK BLITZEN R. source to Little Blitzen R.	9-0	41-02-01	S	C	C	C	C	Low aesthetics from extreme overgrazing, springs polluted by livestock.	NA
INDIAN CR. & LITTLE BLITZEN R. src to mouth	10-0 12-0	41-02-01	S	C	C	C	C		Acc

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			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
FISH CR. src to mouth	12-0	41-02-01	S	C	I	I	I		Acc
DONNER UND BLITZEN R. Frenchglen to mouth	33-0	41-02-01	S	S	S	C	C		Acc
KRUMBO CR. src to mouth	13.5-0	41-02-01	S	C	I	I	I	Low aesthetics from overgrazing.	Obj
McCOY CREEK src to mouth	30-0	41-02-01	S	C	I	I	I	Aesthetics limited on lower reach (private land). low aesthetic appeal from overgrazing on upper reach.	Obj
MALHEUR LAKE		41-02-01	S	S	S	C	C	Limited aesthetics--related to Biological Status.	Obj
CUCAMONGA CR src to mouth	17.5-0	41-02-01	S	C	S	C	C		Acc
KIGER CR. src to mouth	26-0	41-02-01	S	C	S	C	C	Limited accessibility on lower end.	Obj
DEEP CREEK src to mouth	12-0	41-02-01	S	C	S	C	C	Low aesthetic appeal from overgrazing.	Obj

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7/9

# RECREATIONAL STATUS

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Stream Name	R.M. Range	Seg. #	Recreational Criteria					Problem - Cause	Status
			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
BARTON RES. & RIDDLE CR. src to mouth	23-0	41-02-01	S	C	S	S	S	Limited access (private land).	Obj
HOME CREEK src to mouth	13-0	41-02-01	S	C	S	S	S	Low aesthetic appeal from overgrazing.	Obj
BEN YOUNG CR., SOUTH CR., DAIRY CR., EIDER CR., ANA R., BENNY CR., SQUAW CR., SILVER CR., BRIDGE CR., BUCK CR., WEST FORK CR. sources to mouths	8-0 10-0 13-0 16-0 6.5-0 15-0 9-0 23-0 15-0 22-0 13-0	42-01-01	S	I	S	I	C		Acc
CHEWAUCAN R. src to mouth	40-0	42-01-01	S	I	S	I	C	Insufficient data on lower reach (Paisley to mouth). Upper reach	Acc
LAKE ABERT		42-01-01	S	S	S	I	I		Acc

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			Boating	Fishing	Water-Contact Sports	Hiking	Aesthetics		
SUMMER AND SILVER LAKES		42-01-01	S	S	S	I	C		Acc
THOMPSON RES & SILVER CR N. of Res.		42-01-01	I	C	S	I	C		Acc
NORTHWEST DRAINAGE AREA		42-02-01						Low aesthetic appeal.	

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