STREAM INVENTORY REPORT

Schooner Gulch

INTRODUCTION

A California Department of Fish and Game (CDFG) stream fisheries inventory was conducted in summer 2001 on Schooner Gulch. The stream inventory consists of a habitat inventory and biological inventory. The objective of the habitat inventory is to assess the amount and quality of habitat available to anadromous salmonids; the objective of the biological inventory is to document the presence and distribution of juvenile salmonid species. This report presents the inventory results and recommends options for potential habitat improvements for coho salmon and steelhead trout. The recommendations are based on target habitat values suitable for salmonids in California's north coast streams.

The main stem of Schooner Gulch was surveyed by CDFG in 1966 (California Department of Fish and Game 1966) and again in 1969 (California Department of Fish and Game 1969a). The North Fork was also surveyed by CDFG in 1969 (California Department of Fish and Game 1969b). The no fish were seen in the 1966 survey (conducted in early April), but reference was made to observations of steelhead trout and coho salmon by local wardens. During the 1969 surveys no coho salmon were observed but the steelhead trout were present as well as threespine stickleback.

Electrofishing sampling was conducted on Schooner Gulch by CDFG on September 25, 1986. Steelhead were found, but no coho (CDFG file data). Electrofishing sampling was again conducted on Schooner Gulch by CDFG in 1989; again, steelhead were found, but coho were not (CDFG file memo).

WATERSHED OVERVIEW

Schooner Gulch, located in Mendocino County, California, is tributary to the Pacific Ocean. Schooner Gulch's legal description at the confluence with the Pacific Ocean is T12N R16W S32. Its mouth is located at 38E52N0O north latitude and 123E39N16O west longitude. Schooner Gulch is a second order stream and has approximately 2.5 miles of blue line stream according to the USGS Saunders Reef 7.5 minute quadrangle map. Schooner Gulch**,** excluding the North Fork, drains a watershed of approximately 2.75 square miles. Elevations range from about 0 feet at the mouth to 1000 feet in the headwater areas. Mixed coniferous forest dominates the watershed. The lower parts of both the mainstem and north fork of Schooner Gulch are within California State Parks. Private landowners own the upper reaches, where land use is mainly timber production.

METHODS

The habitat inventory conducted in Schooner Gulch followed the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi *et al.*, 1998). A two-person team

of AmeriCorps Watershed Stewards Project (WSP) members or CDFG personnel, trained in standardized habitat inventory methods by CDFG, conducted the field inventory.

HABITAT INVENTORY

The standardized habitat inventory protocol has nine components:

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using standard flow measuring equipment, if available. In some cases flows are estimated.

2. Channel Type:

As described in the *California Salmonid Stream Habitat Restoration Manual*, channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity.

3. Temperatures:

Water and air temperatures are taken in degrees Fahrenheit at the middle of the habitat unit, within one foot of the water surface.

4. Habitat Unit Type and Dimensions:

Habitat units are numbered sequentially and assigned a habitat type selected from a standard list of 24 habitat types (Appendix 1). Dewatered units are labeled "dry". The length of a described habitat unit must be equal to or greater than the streams mean wetted width. Habitat unit dimensions of mean length, mean width, mean depth, and maximum depth are measured. In pool units, maximum depth at the pool tail crest is also measured. Measurements are taken to the nearest 1/10 foot using hip chains, measuring tapes, or stadia rods.

5. Embeddedness:

Embeddedness is defined as the percent of a cobble that is surrounded or buried by fine sediment. The values are recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 is assigned to substrates deemed not suitable for spawning due to inappropriate substrate particle size (e.g. bedrock) or other considerations. On this scale, a value of 1 indicates the highest quality of spawning substrate and a value of 5 indicates the tail crest is not suitable for spawning. Embeddedness, estimated by eye, is taken in pool habitat units at the pool tail crest.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density-related competition. The shelter rating is calculated by multiplying shelter value and percent cover. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is then classified according to a list of nine cover types. A standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) is assigned according to the complexity of the cover. Thus shelter rating can range from 0-300.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. Dominant and sub-dominant substrate elements in the habitat unit are estimated by eye using a list of seven size classes. In addition, the dominant substrate composing the pool tail outs is recorded in pool habitat units.

8. Canopy:

Canopy density relates to the amount of stream shaded from the sun. Stream canopy density in the habitat unit is estimated using a handheld spherical densiometer. In addition, the area of canopy is estimated by eye into percentages of coniferous and deciduous trees.

9. Streambank Substrate and Vegetation:

Streambank substrate ranges from bedrock to silt/clay/sand, and may be covered with vegetation that enhances streambank stability. The dominant substrate type and the dominant vegetation type of both the right and left banks of the habitat unit are estimated by eye and recorded. Additionally, the percent of each bank covered by vegetation is estimated by eye and recorded.

SAMPLING STRATEGY

The sampling protocol calls for partial sampling of all habitat units within the survey reach and full sampling in approximately 10% of the habitat units. All habitat units are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest, dominant substrate composing the pool tail crest, and embeddedness. Habitat types encountered for the first time are fully sampled for all parameters on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for full sampling. Canopy density is recorded for every third unit, in addition to every fully described unit, giving an approximate 30% sub-sample. Air temperature, water temperature, and time of day are recorded at every tenth habitat unit (once per field form page).

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence is observed from the stream banks during the habitat inventory survey. Additionally, selected sites are sampled using a Smith-Root Model 12-B electrofisher. The sampling techniques are described in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into *Habitat*, a dBASE 4.2 data entry program developed by Tim Curtis, Inland Fisheries Division, CDFG. This program processes and summarizes the data, and produces the following standard tables:

- Table 1. Summary of riffle, flatwater, and pool habitat types
- Table 2. Summary of habitat types and measured parameters
- Table 3. Summary of pool types
- Table 4. Summary of maximum pool depths by pool habitat types
- Table 5. Summary of mean percent cover by habitat type
- Table 6. Summary of dominant substrates by habitat type
- Table 7. Summary of mean percent vegetative cover for entire stream
- Table 8. Fish habitat inventory data summary
- Table 9. Streambank substrate and vegetation, and pool tail crest cobble embeddedness
- Table 10. Mean percent of shelter cover types for entire stream

Graphics are produced from the tables using a spreadsheet program. Standard graphics are:

- Graph 1. Riffle, flatwater, pool habitats by percent occurrence
- Graph 2. Riffle, flatwater, pool habitats by total length
- Graph 3. Total habitat types by percent occurrence
- Graph 4. Pool types by percent occurrence
- Graph 5. Total pools by maximum depths
- Graph 6. Embeddedness
- Graph 7. Pool cover by cover type
- Graph 8. Dominant substrate in pool tail crests
- Graph 9. Percent canopy
- Graph 10. Bank composition by composition type
- Graph 11. Bank vegetation by vegetation type

Standard tables and graphics are selected for inclusion in the stream inventory report based on their importance to the particular stream.

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HABITAT INVENTORY RESULTS

Flow near the mouth of Schooner Gulch on July 10, 2001 was measured at 0.868 cfs.

Bethany Lourie and Josh Carron (WSP/AmeriCorps) conducted the habitat inventory field survey from June 8 to July 5, 2001. The total length of stream surveyed was 12,129 feet.

Schooner Gulch was classified as channel types F4 (Reach 1) and F3 (Reach 2). F4 channel types are entrenched meandering riffle/pool channel on low gradients with high width/depth ratio; gravel channel. F3 channel types are entrenched meandering riffle/pool channel on low gradients with high width/depth ratio; cobble channel.

Water temperatures taken during the survey period ranged from 54 to 57 degrees Fahrenheit. Air temperatures ranged from 60 to 74 degrees Fahrenheit.

Based on frequency of occurrence of Level II habitat types there were 25% riffle units, 32% flatwater units, and 43% pool units (Table 1). Based on total length of Level II habitat types there were 21% riffle units, 45% flatwater units, and 34% pool units (Table 1).

Fifteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pools, 23%; low gradient riffles, 24%; runs, 17%; and step runs, 8%. Based on percent total length, runs comprised 21%, low gradient riffles 20%, mid-channel pools 19%, and step runs 16%.

A total of 123 pools were identified (Table 3). Main channel pools were most frequently encountered at 54% and comprised 61% of the total length of all pools.

A primary pool is defined as a pool with a maximum depth of at least two feet, occupies at least half the width of the low flow channel, and is as long as the low flow channel width. Of the 123 pools, 67 (45%) had a depth of two feet or greater (Table 4). Primary pools totaled 2,361 feet, or 19% of the total stream surveyed.

Pool tail crest embeddedness estimates were most frequently a value of 1 in Reach 1, and a value of 2 in Reach 2 (Table 8). The pool tail crests with an embeddedness value of 5 were rated not suitable for spawning due to sediment/silt accumulations or substrate composed of wood or boulder.

Riffle habitat types had a mean shelter rating of 7, flatwater habitat types had a mean shelter rating of 19, and pool habitats had a mean shelter rating of 4 (Table 1). Mid-channel pools, the dominant pool type, had a mean shelter rating of 4 (Table 2).

Cover in Schooner Gulch was provided mainly by undercut banks, small and large woody debris, terrestrial vegetation, bubble curtains, boulders, and root mass (Table 5). Boulders, large woody debris, undercut banks, and small woody debris provided the main cover in pools (Table 10).

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The streambed substrate in low gradient riffles and in runs was dominated by gravel, while mid channel pools were dominated by sand (Table 6). Gravel was the dominant pool tail crest substrate in 66 of the 126 pool units (52%), followed by small cobble (20%); (Graph 8).

The dominant streambank substrate was silt/clay followed by cobble/gravel (Table 9). The right bank had a mean vegetative cover of 88%. The left bank had a mean vegetative cover of 86% (Table 7). Streambank vegetation was mainly composed of coniferous trees (40%), followed by deciduous trees (27%) and brush (24%); (Table 9).

The mean percent canopy density for the stream reach surveyed was 87%, with deciduous and coniferous trees comprising 59% and 41%, respectively (Table 7).

BIOLOGICAL INVENTORY RESULTS

Doug Albin, Kristi Knechtle, Kate Grossman, and Beth Wood conducted the electrofishing survey on October 23, 2001. Four pool units were sampled, totaling 174 feet of stream. The sites yielded two steelhead young-of-the-year, 12 age 1+ steelhead, five sculpin, and one stickleback. No coho were captured.

DISCUSSION

Schooner Gulch is an F3 channel type for part of the survey. The suitability of F3 channel types for fish habitat improvement structures is: good for bank-placed boulders; single and opposing wing deflectors. Fair for plunge weirs; boulder clusters; channel constrictors; and log cover.

Water temperatures for Schooner Gulch, recorded on the survey days, were within the suitable ranges for rearing of coho salmon and steelhead. Continuous monitoring of temperature throughout the warm season would be needed to verify temperature suitability. Given Schooner Gulch's location in the coastal fog belt and the high canopy density found, stream temperatures are likely suitable for coho or steelhead.

The percentages of stream length in primary pools were below those characteristic of good coho salmon habitat. CDFG data indicate that the better coastal coho streams have as much as 40% of their total habitat length in primary pools. Pool enhancement should be considered when primary pools comprise less than that percentage, which is the case for both the main stem and north fork of Schooner Gulch.

The mean shelter ratings for flatwater, riffle, and especially pool habitats in Schooner Gulch are all much below the desirable rating of 100.

The prevalence of gravel in the main stem as the dominant pool tail crest substrate is generally considered suitable for spawning salmonids. However, frequencies of embeddedness ratings of 3, 4, or 5 in Schooner Gulch indicate lower spawning substrate quality due to the presence of fine sediments.

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RECOMMENDATIONS

1) Schooner Gulch should be managed as an anadromous, natural production stream. If habitat conditions sufficiently recover, consideration should be given to introduction of a compatible strain of coho salmon.

2) Active and potential sediment delivery from roads and other sources in the watershed should be identified, mapped, and quantified. Sources should be treated according to their potential for sediment yield to the stream and its tributaries. This kind of source control will hasten stream recovery from excess sedimentation.

3) Instream wood should be increased to improve shelter rating, help sort sediments, and increase the depths of existing pools.

COMMENTS AND LANDMARKS

The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey reach.

Position (ft):	Comments:
775	Highway 1 bridge.
1786	North Fork of Schooner enters on the right bank.
1966	Large woody debris (LWD) accumulation measures 25’ wide x 7’ high x 5’ long. A 3-foot waterfall was also noted.
2940	Log bridge.
3917	LWD accumulation measures 4’ high x 20’ wide x 12’ long.
4103	LWD and boulder accumulation measures 22’ wide x 10’ high x 18’ feet long.
5463	LWD accumulation retaining fine sediment.
6105	3’ high waterfall.
6985	LWD accumulation measures 15’ long x 8’ wide x 6’ high.
7412	Tributary enters on left bank.

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8372	LWD accumulation measures 20’ long x 18’ wide x 9’ high. One or more salmonids observed.
8772	Six-inch trout observed.
9010	Tributary enters on the right bank.
9881	Spring enters the creek on the right bank.
9910	LWD accumulation measures 18’ long x 5’ high x 22’ wide.
10626	LWD accumulation measures 30’ wide x 10’ high x 15’ long.
10945	LWD accumulation measures 25’ wide x 6’ high x 20’ long.
11259	LWD accumulation measures 4’ high x 12’ wide x 14’ long.
11381	LWD accumulation measures 10’ high x 20’ wide 14’ long.
11569	LWD accumulation measures 12’ high x 30’ wide x 30’ long.
11833	LWD accumulation measures 7’ high x 30’ wide x 15’ long.

REFERENCES

California Department of Fish and Game. 1966. Stream Survey, Schooner Gulch Creek. CDFG Form FG712 survey.

California Department of Fish and Game. 1969a. Stream Survey, Schooner Gulch Creek. CDFG Form FG712 survey.

California Department of Fish and Game. 1969b. Stream Survey, North Fork Schooner Gulch Creek. CDFG Form FG712 survey.

Flosi, Gary, S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

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LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE			
Low Gradient Riffle	(LGR)	[1.1]	{ 1}
High Gradient Riffle	(HGR)	[1.2]	{ 2}
CASCADE			
Cascade	(CAS)	[2.1]	{ 3}
Bedrock Sheet	(BRS)	[2.2]	{24}
FLATWATER			
Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}
MAIN CHANNEL POOLS			
Trench Pool	(TRP)	[4.1]	{ 8 }
Mid-Channel Pool	(MCP)	[4.2]	{17}
Channel Confluence Pool	(CCP)	[4.3]	{19}
Step Pool	(STP)	[4.4]	{23}
SCOUR POOLS			
Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }
BACKWATER POOLS			
Secondary Channel Pool	(SCP)	[6.1]	{ 4 }
Backwater Pool - Boulder Formed	(BPB)	[6.2]	{ 5 }
Backwater Pool - Root Wad Formed	(BPR)	[6.3]	{ 6 }
Backwater Pool - Log Formed	(BPL)	[6.4]	{ 7 }
Dammed Pool	(DPL)	[6.5]	{13}
ADDITIONAL UNIT DESIGNATIONS			
Dry	(DRY)	[7.0]	
Culvert	(CUL)	[8.0]	
Not Surveyed	(NS)	[9.0]	
Not Surveyed due to a marsh	(MAR)	[9.1]	

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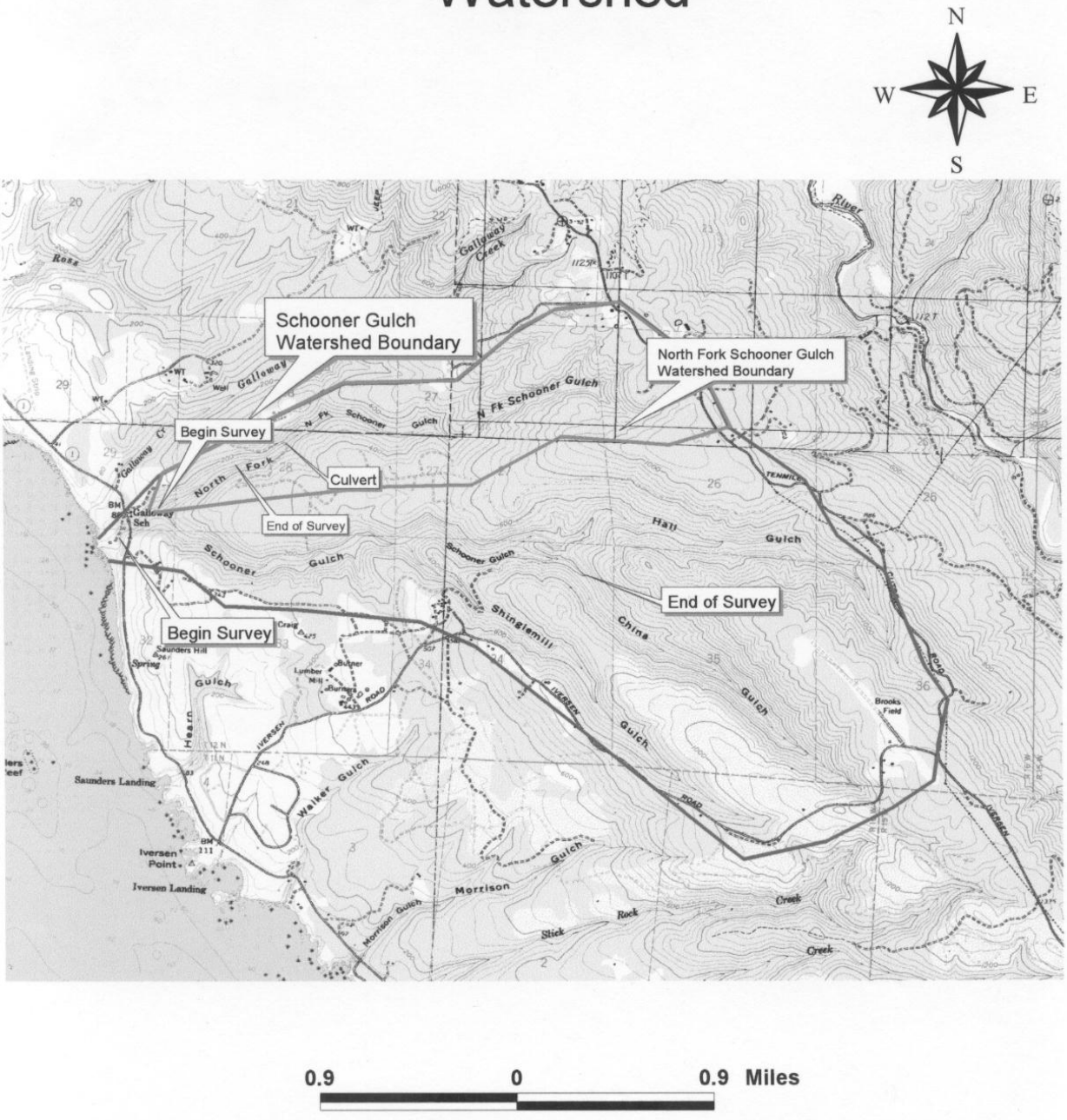
Schooner Gulch Watershed



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SCHOONER GULCH — Drainage: PACIFIC OCEAN

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 06/08/01 to 07/05/01

Confluence Location: QUAD: SAUNDER_RF LEGAL DESCRIPTION: T12NR16W832 LATITUDE:38°52'0" LONGITUDE:123°39'16"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	ESTIMATED TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	ESTIMATED TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
70	10	RIFFLE	25	37	2590	21	9.6	0.4	228	15975	99	6945	0	7
90	9	FLATWATER	32	61	5478	45	9.1	0.6	696	62636	451	40579	0	19
123	121	POOL	43	33	4097	34	13.4	1.4	461	56731	668	82134	536	4

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
283	140	12165	135341	129657

SCHOONER GULCH — Drainage: PACIFIC OCEAN

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 06/08/01 to 07/05/01

Confluence Location: QUAD: SAUNDER_RF LEGAL DESCRIPTION: T12NR16W832 LATITUDE:38°52'0" LONGITUDE:123°39'16"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE	MEAN LENGTH	TOTAL LENGTH	TOTAL LENGTH	MEAN WIDTH	MEAN DEPTH	MAXIMUM DEPTH	MEAN AREA	TOTAL AREA EST.	MEAN VOLUME	TOTAL VOLUME EST.	MEAN RESIDUAL POOL VOL	MEAN SHELTER RATING	MEAN CANOPY
#			%	ft.	ft.	%	ft.	ft.	ft.	sq.ft.	sq.ft.	cu.ft.	cu.ft.	cu.ft.		%
67	9	LGR	24	37	2467	20	10	0.4	1.3	221	14800	91	6072	0	5	84
3	1	HGR	1	41	123	1	6	0.6	1.0	294	882	176	529	0	20	86
18	1	POW	6	48	864	7	13	0.8	1.4	2480	44647	1984	35717	0	20	80
1	1	GLD	0	152	152	1	6	0.6	1.3	866	866	520	520	0	5	81
49	4	RUN	17	52	2554	21	10	0.6	1.0	337	16520	189	9271	0	33	87
22	3	SRN	8	87	1908	16	8	0.5	1.1	523	11500	266	5845	0	5	76
65	65	MCP	23	35	2280	19	14	1.3	4.3	504	32784	735	47751	589	4	85
2	2	CCP	1	108	215	2	13	1.2	2.3	1217	2434	1084	2169	683	8	90
6	6	CRP	2	37	223	2	13	1.5	3.4	487	2925	704	4223	596	5	87
12	12	LSL	4	19	233	2	14	1.2	2.7	284	3413	388	4655	303	5	87
2	2	LSR	1	30	60	0	15	1.6	3.9	465	930	779	1557	656	10	93
7	6	LSBk	2	40	277	2	12	1.8	4.2	411	2876	821	5749	692	3	93
17	17	LSBo	6	29	501	4	14	1.3	3.8	417	7083	546	9283	424	0	89
11	10	PLP	4	24	263	2	11	1.6	3.4	335	3683	572	6293	485	11	88
1	1	DPL	0	45	45	0	10	1.2	1.9	428	428	513	513	428	5	79

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
283	140	12165	145770	140146

SCHOONER GULCH — Drainage: PACIFIC OCEAN

Table 3 - SUMMARY OF POOL TYPES — Survey Dates: 06/08/01 to 07/05/01

Confluence Location: QUAD: SAUNDER_RF LEGAL DESCRIPTION: T12NR16W832 LATITUDE:38°52'0" LONGITUDE:123°39'16"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
67	67	MAIN	54	37	2495	61	13.6	1.3	526	35217	745	49919	592	4
55	53	SCOUR	45	28	1557	38	13.2	1.4	380	20924	573	31512	467	5
1	1	BACKWATER	1	45	45	1	10.0	1.2	428	428	513	513	428	5

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
123	121	4097	56869	81944

SCHOONER GULCH — Drainage: PACIFIC OCEAN

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 06/08/01 to 07/05/01

Confluence Location: QUAD: SAUNDER_RF LEGAL DESCRIPTION: T12NR16W832 LATITUDE:38°52'0" LONGITUDE:123°39'16"

UNITS MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
65	MCP	53	0	0	34	52	26	40	4	6	1	2
2	CCP	2	0	0	1	50	1	50	0	0	0	0
6	CRP	5	0	0	3	50	1	17	2	33	0	0
12	LSL	10	0	0	6	50	6	50	0	0	0	0
2	LSR	2	0	0	0	0	0	0	2	100	0	0
7	LSBk	6	1	14	2	29	2	29	1	14	1	14
17	LSBo	14	0	0	7	41	9	53	1	6	0	0
11	PLP	9	0	0	1	9	9	82	1	9	0	0
1	DPL	1	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
123

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SCHOONER GULCH — Drainage: PACIFIC OCEAN

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE — Survey Dates: 06/08/01 to 07/05/01

Confluence Location: QUAD: SAUNDER_RF LEGAL DESCRIPTION: T12NR16W832 LATITUDE:38°52'0" LONGITUDE:123°39'16"

UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN % UNDERCUT BANKS	MEAN % SND	MEAN % LWD	MEAN % ROOT MASS	MEAN % TERR. VEGETATION	MEAN % AQUATIC VEGETATION	MEAN % WHITE WATER	MEAN % BOULDERS	MEAN % BEDROCK LEDGES
67	9	LGR	14	0	0	0	0	3	0	49	23
3	1	HGR	0	0	0	0	0	0	0	100	0
18	1	POW	0	0	0	0	0	0	0	100	0
1	1	GLD	0	0	100	0	0	0	0	0	0
49	3	RUN	0	20	47	0	0	0	0	33	0
22	3	SEN	0	38	0	0	13	0	0	48	0
65	14	MCP	14	14	33	0	8	0	2	29	0
2	2	CCP	0	0	0	0	0	0	0	90	10
6	2	CRP	88	10	0	0	3	0	0	0	0
12	2	LSL	0	15	50	35	0	0	0	0	0
2	1	LSR	0	0	0	100	0	0	0	0	0
7	2	LSBk	0	0	0	0	0	0	0	100	0
17	1	LSBo	0	0	0	0	0	0	0	100	0
11	2	PLP	0	15	65	0	0	0	0	20	0
1	1	DPL	0	0	0	0	0	0	0	100	0

SCHOONER GULCH — Drainage: PACIFIC OCEAN

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE — Survey Dates: 06/08/01 to 07/05/01

Confluence Location: QUAD: SAUNDER_RF LEGAL DESCRIPTION: T12NR16W832 LATITUDE:38°52'0" LONGITUDE:123°39'16"

TOTAL HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOT BEDRC DOMINA
67	9	LGR	0	0	44	33	11	11	
3	1	HGR	0	0	0	0	0	100	
18	1	POW	0	0	100	0	0	0	
1	1	GLD	0	100	0	0	0	0	
49	4	RUN	0	25	75	0	0	0	
22	3	SEN	0	0	67	33	0	0	
65	15	MCP	0	60	33	0	7	0	
2	2	CCP	0	0	50	50	0	0	
6	3	CRP	0	67	33	0	0	0	
12	2	LSL	0	50	50	0	0	0	
2	1	LSR	100	0	0	0	0	0	
7	2	LSBk	0	0	50	0	0	50	
17	1	LSBo	0	0	100	0	0	0	
11	2	PLP	0	0	50	0	0	50	
1	1	DPL	0	0	100	0	0	0	

TABLE 7

SCHOONER GULCH

Summary of Mean Percent Vegetative Cover for Entire Stream

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Deciduous	Mean Percent Open Units	Mean Right Bank Percent Cover	Mean Left Bank Percent Cover
87	41	59	0	88	86

Note: Mean percent conifer and deciduous for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: SCHOONER GULCH
SAMPLE DATES: 06/08/01 to 07/05/01
STREAM LENGTH: 12129 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: SAUNDER_RF — Latitude: 38°52'0"
Legal Description: T12NR16WS32 — Longitude: 123°39'16"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 01

Channel Type: F4	Canopy Density: 82%
Channel Length: 1914 ft.	Coniferous Component: 37%
Riffle/flatwater Mean Width: 11 ft.	Deciduous Component: 63%
Total Pool Mean Depth: 1.5 ft.	Pools by Stream Length: 46%
Base Flow: 0.9 cfs	Pools >=3 ft.deep: 27%
Water: 055- 057°F Air: 060-064°F	Mean Pool Shelter Rtn: 19
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Large Woody Debris
Vegetative Cover: 87%	Occurrence of LOD: 32%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 60% 2.7% 3. 0% 4. 0% 5. 33%

STREAM REACH 02

Channel Type: F3	Canopy Density: 85%
Channel Length: 10215 ft.	Coniferous Component: 42%
Riffle/flatwater Mean Width: 9 ft.	Deciduous Component: 58%
Total Pool Mean Depth: 1.3 ft.	Pools by Stream Length: 31%
Base Flow: 0.9 cfs	Pools >=3 ft.deep: 8%
Water: 054- 057°F Air: 060-074°F	Mean Pool Shelter Rtn: 15
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Boulders
Vegetative Cover: 84%	Occurrence of LOD: 16%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 18% 2.35% 3. 17% 4. 3% 5. 28%

Table 9
Schooner Gulch

Mean Percentage of Dominant Substrate

Dominant Class of Substrate	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Bedrock	3	1	4.08
Boulder	8	9	17.35
Cobble/Gravel	10	6	16.33
Silt/clay	27	32	60.20

Mean Percentage of Dominant Vegetation

Dominant Class of Vegetation	Number Units Right Bank	Number Units Left Bank	Total Mean Percent
Grass	1	3	4.08
Brush	13	11	24.49
Decid. Trees	17	10	27.55
Conif. Trees	16	24	40.82
No Vegetation	1	0	1.02

Total stream average embeddedness value for pool 2.79

TABLE 10. MEAN PERCENT OF SHELTER COVER TYPES FOR ENTIRE STREAM

Stream: SCHOONER GULCH Drainage:

Survey Date: 06/08/01 to 07/05/01

	RIFFLES	FLATWATER	POOLS
UNDERCUT BANKS	9.90	0	12.10
SMALL WOODY DEBRIS	10.31	21.88	10.65
LARGE WOODY DEBRIS	19.18	30	22.58
ROOTS	3.47	0	5.48
TERRESTRIAL VEG	3.06	5	3.55
AQUATIC VEG	0.41	0	0
WHITEWATER	0.51	0	0.81
BOULDERS	38.88	43.13	34.52
BEDROCK LEDGES	4.08	0	0.65

Schooner Gulch