STREAM INVENTORY REPORT

Marsh Creek

INTRODUCTION

A stream inventory was conducted September 18, 2001 on Marsh Creek. The survey began at the confluence with Albion River and extended upstream 0.48 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Marsh Creek.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for coho salmon, and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

Marsh Creek is a tributary to the Albion River, tributary to the Pacific Ocean, located in Mendocino County, California (Map 1). Marsh Creek's legal description at the confluence with Albion River is T16N R16W S12. Its location is 39°15′18″ north latitude and 123°35′26″ west longitude. Marsh Creek is a second order stream for 2.9 miles of solid blue line stream according to the USGS Comptche 7.5 minute quadrangle. Marsh Creek drains a watershed of approximately 2.1 square miles. Elevations range from about 200 feet at the mouth of the creek to 1000 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is privately owned for residential and cattle grazing. Vehicle access exists via Highway 1 to Comptche Ukiah Road to Flynn Creek Road. From the town of Comptche, turn south on Flynn Creek Road drive to the confluence of Albion River and Marsh Creek.

METHODS

The habitat inventory conducted in Marsh Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Department of Fish and Game Scientific Aids and Pacific States Marine Fisheries members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was conducted by a two-person team.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and

embeddedness. Habitat unit types encountered for the first time are measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement.

HABITAT INVENTORY COMPONENTS

A standardized habitat inventory form has been developed for use in California stream surveys and can be found in the *California Salmonid Stream Habitat Restoration Manual*. This form was used in Marsh Creek to record measurements and observations. There are nine components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1985 rev. 1994). This methodology is 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. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees Fahrenheit at the middle of the habitat unit and within one foot of the water surface.

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1988). Habitat units are numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "dry". Marsh Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Marsh Creek, embeddedness was ocularly estimated. The values were 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 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, bedrock, or other considerations.

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 for each fully-described habitat unit 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. In Marsh Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully-described habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes and recorded as a one and two, respectively. In addition, the dominant substrate composing the pool tail-outs is recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Marsh Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% subsample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or deciduous trees.

9. Bank Composition and Vegetation:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In Marsh Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat 8.4, a dBASE 4.2 data entry program developed by Tim Curtis, Inland Fisheries Division, California Department of Fish and Game. This program processes and summarizes the data, and produces the following six tables:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Dominant substrates by habitat types
- Mean percent shelter by habitat types

Graphics are produced from the tables using Excel. Graphics developed for Marsh Creek include:

- Riffle, flatwater, pool habitats by percent occurrence
- Riffle, flatwater, pool habitats by total length
- Total habitat types by percent occurrence
- Pool types by percent occurrence
- Total pools by maximum depths
- Embeddedness
- Pool cover by cover type
- Dominant substrate in low gradient riffles
- Mean percent canopy
- Bank composition by composition type
- Bank vegetation by vegetation type

HABITAT INVENTORY RESULTS

* ALL TABLES AND GRAPHS ARE LOCATED AT THE END OF THE REPORT *

The habitat inventory of September 18, 2001, was conducted by Kristi Knechtle (DFG) and Josh Carron (WSP). The total length of the stream surveyed was 2,510 feet.

Stream flow was not measured on Marsh Creek.

Marsh Creek is a B4 channel type for 2,510 feet of the stream surveyed. B4 channels are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools; very stable plan and profile, stable banks and gravel-dominated substrate.

Water temperature taken during the survey period was 56 degrees Fahrenheit. Air temperature was 65 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 47% pool units, 45% flatwater units, and 8% riffle units (Graph 1). Based on total **length** of Level II habitat types there were 63% flatwater units, 34% pool units, and 3% riffle units (Graph 2).

Ten Level IV habitat types were identified (Table 2). The most frequent habitat types by percent **occurrence** were step run units, 23%; mid channel pool units, 18%; and run units, 13% (Graph 3). Based on percent total **length**, step run units made up 43%, run units 14%, and mid-channel pool units made up 11%.

A total of 28 pools were identified (Table 3). Scour pools were the most frequently encountered, at 57%, and comprised 62% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Twelve of the 28 pools (43%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 28 pool tail-outs measured, 0 had a value of 1 (0%); 0 had a value of 2 (0%); 0 had a value of 3 (0%); 7 had a value of 4 (25%); and 21 had a value of 5 (75%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Pool habitats had a mean shelter rating of 18, flatwater habitat types had a mean shelter rating of 8, and riffle habitat types had a mean shelter rating of 5 (Table 1). Of the pool types, the backwater pools had the highest mean shelter rating at 20. Scour pools had a mean shelter rating of 19 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Undercut Banks are the dominant cover type in Marsh Creek. Graph 7 describes the pool cover in Marsh Creek. Undercut banks are the dominant pool cover type followed by large woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 86% of the pool tail-outs. Sand and silt/clay were the next most frequently observed dominant substrate types each occurring in 7% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Marsh Creek was 90%. Of the canopy present, the mean percentages of deciduous and coniferous trees were 60% and 40%, respectively. Graph 9 describes the mean percent canopy in Marsh Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 82%. The mean percent left bank vegetated was 81%. The dominant elements composing the structure of the stream banks consisted of 100% sand/silt/clay (Graph 10). Coniferous trees were the dominant

vegetation type observed in 56% of the units surveyed. Additionally, 44% of the units surveyed had deciduous trees as the dominant vegetation type (Graph 11).

DISCUSSION

Marsh Creek is a B4 channel type for the entire 2,510 feet of stream surveyed. The suitability of B4 channel types for fish habitat improvement structures is as follows: B4 channels are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors, and log cover.

The water temperature recorded on the survey day, September 18, 2001, was 56 degrees Fahrenheit. Air temperature was 65 degrees Fahrenheit. This is a good water temperature range for salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 63% of the total length of this survey, pools 34%, and riffles 3%. The pools are relatively shallow, with 12 of the 61 (43%) pools having a maximum depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width.

None of the 28 pool tail-outs measured had embeddedness ratings of 1 or 2. Seven of the pool tail-outs had embeddedness ratings of 3 or 4. Twenty-one of the pool tail-outs had a rating of 5, which is considered unsuitable for spawning. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead. Sediment sources in Marsh Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Twenty-four of the 28 pool tail-outs had gravel or small cobble as the dominant substrate. This is generally considered suitable for spawning salmonids.

The mean shelter rating for pools was 18. The shelter rating in the flatwater habitats was 8. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by undercut banks in all habitat types. Additionally, roots contribute a small amount. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 90%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was high at 82% and 81%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

- 1) Marsh Creek should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggests that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.
- 3) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from undercut banks. Adding high quality complexity with log and root mass cover is desirable.
- 4) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.
- 5) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.
- 6) Suitable size spawning substrate on Marsh Creek is limited to relatively few reaches. Projects should be designed at suitable sites to trap and sort spawning gravel.
- 7) There are several log debris accumulations present on Marsh Creek that are retaining large quantities of fine sediment. The modification of these debris accumulations is desirable, but must be done carefully, over time, to avoid excessive sediment loading in downstream reaches.
- 8) There are sections where the stream is being impacted from cattle trampling the riparian zone. Alternatives should be explored with the grazier and developed if possible.
- 9) Good water temperature and flow regimes exist in the stream and it offers good conditions for rearing fish.

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:
0'	Begin survey at the confluence with Albion River.
139'	Erosion on right bank is contributing sediment to the channel.
227'	Log weir across channel retaining sediment.
467'	Concrete dam with rip-rap on right bank 3' high x 10' wide.
1035'	Culvert from Flynn Creek road measures 8' in diameter x 80' long with concrete bottom.
1153'	A tributary enters on the left bank and was dry at the time of survey.
1383'	A tributary enters on the left bank and was dry at the time of survey.
2047'	Erosion on the left bank is approximately 15' high x 35' long and is contributing sediment to channel.
2443'	End of survey. Erosion on the left bank is approximately 35' high x 25' long and is contributing sediment and debris to channel.

REFERENCES

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

LEVEL III and LEVEL IV HABITAT TYPES

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

TABLES AND GRAPHS

MARSH CREEK	38.K			!			Drain	lage: ALI	Drainage: ALBION RIVBR					:
Table 1 .	SUMMARY	Table 1 - SUMMARY OF RIFFLE,	FLATWATER, AND POOL HABITAT TYPES	ND POOL H	ABITAT TY	PBS	Surve	y Dates	Survey Dates: SEPTEMBER 18, 2001	R 18, 2001				
Confluenc	re Locacio	Onfluence Locacion: QUAD: COM	PTHCB	AL DESCRI	PTION: TI	GNR16HS1.	2 LATES	TUDE: 39°1	15'18" LONG	LEGAL DESCRIPTION: TIGNRIGHS12 LATTIUDE:39°15'18" LONGITUDE:123°35'26"	'35'26"			
HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LSKGTH (ft.)	TOTAL PERCENT LSKGTH TOTAL (fc.) LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MBAN B ARBA (sq.ft.)	ESTIMATED MEAN ESTIMATED TOTAL VOLUME FOTAL AREA (cu.ft.) VOLUME (sq.ft.) (cu.ft.)	MEAN VOLUME (cu.ft.)	ESTINATED TOTAL YOLUME {cu.ft.}	NEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
5 27 28	11 5 11	RIFFLE FLATWATER POCL		14 59 31	71 1585 854	3 63 34	3.0 5.2 10.3	0.1 0.5 1.5	42 311 358	210 8397 10011	211 679	21 5696 19022	0 0 0 0	പ്രകയ
TOTAL UNITS 60	TOTAL UNITS 17			TOTAI	TOTAL LENGTH (ft.) 2510					TOTAL ARBA (sq. ft.)	E-I	TOTAL VOL. (cu. ft.) 24739		

MARSH CREEK	 bed			:				Draina	ge: ALB1	Drainage: ALBION RIVER	~					
Table 2	SUMMARY	OF HABIT	. SUMMARY OF HABITAT TYPES AND		MRASURED PARAMETERS	3T3RS		Survey	. Dates:	Survey Dates: SRPTEMBER 18, 2001	SR 18	2001				
Confluence Location: QUAD: COMPTHCE	Locatio	าก: กูบผิบ:	COMPTHUE	LEGAL DI	SCRIPTI	EGAL DESCRIPTION: T16NR16WS12	R16WS12		DE:39015	LATITUDE:39°15'18" LONGITUDE:123°35'26"	NGITUDE	:123°35	, 5¢ "			
HABITAT UNITS	UNITS FULLY MBASURBD	HABITAT TYPB	HABITAT OCCURRENCE	NEAN LENGTH	TOTAL	TOTAL	MEAN	MSAN M DEPTH	MEAN MAXINUM EPTH DEPTH	MBAN ARBA	TOTAL AREA EST.	MBAN VOLUME	TOTAL VOLUMB BST.	MEAN RESIDUAL POOL VOL	MEAN SHELTER RATING	MBAN CANOPY
-11.			0/m	다.	ft.	o/es	ţŗ.	ft.	ft.	sq.ft.	sq.ft.	cu.ft.	cu.ft.	cu.ft.		o)a
5		LGR		14	71	m	~	0.1	0.1	42	210	-, ;•	21	0	5	98
ഹ	Н	0.10	∞	32	158	9	ις	9.7	0.9	120	600	₹ 8	420	0	г	98
æ	7	RUN	13	ची' ची'	352	1.4	ι.	0.5	1,1	253	2024	138	1105	0	13	88
7	2	SRK	23	7.7	1075	43	9	0.5	1,3	465	6503	3.4± 	4862	0	'n	91
描	7	MCP	18	26	288	11	15	2,2	00 च्या	565	6215	1672	18387	1602	13	90
9	,	CRP	10	34	204	00	18	1.8	2.4	900	5400	1620	9720	1530	96	91
2	7	181	ťΩ	20	39	2	00	1.0	1.8	147	293	145	290	116	13	₽
4	₹ J*	LSR	12	36	250	10	σ,	1.5	2.4	265	1852	405	2835	337	φv	36
-	→	LSBk	2	35	35	-	Q	0.9	1.7	210	210	189	189	105	ம	5 5 5
		DPL	2	38	38	2	10	1,2	1.8	342	342	410	410	274	20	65
TOTAL UNITS 60	TOTAL UNITS 17				LENGTH (ft.) 2510						AREA (sq.ft) 23649	TOT	TOTAL VOL. (cu.ft) 38240			

MARSH CREEK	RK						Drain	lage: ALI	Drainage: ALBION RIVER					
Table 3 -	Table 3 - SUMMARY OF PCOL TYPES	F PCOL TA	(PES				Surve	y Dates:	Survey Dates: SEPTEMBER 18, 2001	R 18, 2001				
Confluence	Confluence Location: QUAD: COMPTHCE	: QUAD: (RGAL DESCR	LEGAL DESCRIPTION: TIGNRIGHS12 LATITUDE:39°15'18" LONGITUDE:123°35'26"	6NR16WS1	2 LATIT	CUDE: 39°.	15'18" LON	GITUDB:123	1035:26"			
HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MBAN LENGTH (ft.)	TOTAL LENGTH {ft.}	TOTAL PERCENT RNGTH TOTAL LENGTH (ft.)	MBAN WIDTH (ft.)	MEAN MEAN NIDTH DEPTH (ft.) (ft.)	MEAN TOTAL MEAN TOTAL HEAN AREA AREA VOLUME VOLUME RESIDUAL EST. SST. POOL VOI (sq.ft.) (cu.ft.) (cu.ft.)	TOTAL ARBA BST. {sq.ft.}	MBAN VOLUME {cu.ft.}	TOTAL VOLUMB RST. (cu.ft.)	MEAN MEAN RESIDUAL SHELTER POOL VOL. RATING (cu.ft.)	MEAN SHELTER RATING
11 16	ପଇକ	MAIN SCOUR BACKWAISR	39 57 57	26 33 38	28 22 38 38	3.4 62 4	15,0 9,1 10,0	2.2 1.4 1.2	565 308 342	6215 4922 342	1672 465 410	18387 7439 410	1602 402 274	13 19 20
TOTAL UNITS 28	TOTAL UNITS 11			101	TOTAL LENGTH (ft.) 854				E+	TOTAL AREA (sq.ft.) 11479		TOTAL VOL. (cu.ft.) 26236		

MARSH CREEK	33					Dr	ainage: AL	Drainage: ALBION RIVER				
Table 4 -	SUMMARY OF	Table 4 - SUKMARY OP MAXIMUM POOL		DEPTHS BY POOL HABITAT TYPES	BITAT TYPE		rvey Dates	Survey Dates: SEPTEMBER 18, 2001	3 18, 2001			
Confluence	Location	Confluence Location: QUAD: COMPTHCE		AL DESCRIP	TION: TIGN	LEGAL DESCRIPTION: TAGNRIGNS12 LATITUDE:39°15'18" LONGITUDE:123°35'26"	TITUDE:39°	15'18" LON(SITUDE:123	035.26"		
UNITS	HABITAT TYPE 0	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DRPTH O	FOOT <1 FOOT XINUM PERCENT DEPTH OCCURRENCE	1-<2 PT. MAXINUM DEPTH (1-<2 PT. 1-<2 POOT 2-<3 FT, MAXIMUM PERCENT MAXIMUM DEPTH OCCURRENCE DEPTH	2-<3 FT, MAXIMUM DEPTH 0	3 FT, 2-<3 FOOT XIMUM PERCENT DEPTH OCCURRENCE	3-<4 PT. MAXIMUM DRPTH	3-<4 PT. 3-<4 FOOT MAXIMUM PERCENT DEPTH OCCURRENCE	>=4 PBBT MAXIMUM DBPTH O	FEST >=4 FEST XIMUM PERCENT DEPTH OCCURRENCE
11 6 2 2 7 7 7 1 1 1 1 TOTAL UNITS	MCP CRP LSL LSR LSR DPL	23.0	00000	00000		64 33 100 100 100	E E D 4 0 0	57 20 0	01000	0 0 0	H 0 0 0 0 0	m 0 0 0 0

MARSH CREEK	NES						Drain	Drainage: ALBION RIVER	IVBR		
Table 5 - SUMMARY		P MBAN P3F	OP MEAN PERCENT COVER BY HABITAT TYPE	R BY HABIT	TAT TYPE		Surve	Survey Dates: SEPTEMBER 18, 2001	RMBBR 18, 2	1001	
Confluenc	Confluence Location: QUAD: COMPTHCE	:: QUAD: CC		LEGAL DES(CRIPTION:	T16NR16	4S12 LATIT	LEGAL DESCRIPTION: T16NR16WS12 LATITUDE:39°15'18" LONGITUDE:123°35'26"	LONGITUDE	:123°35'26"	
UNITS	UNITS FULLY MBASURED	HABITAT TYPE	MEAN & UNDERCUT BANKS	MEAN & SWD	MEAN & LWD	MEAN & ROOT MASS 1	MBAN \$ TBRR.	MBAN \$ AQUATIC VEGBTATION	MBAN % WHITE WATER	MEAN \$ BOULDERS	MEAN \$ BEDROCK LEDGES
5		LGR	0	G	0	0	100	0	0	0	0
ı,	-	GTĐ	75	O	0	0	25	0	0	0	0
00	7	RUN	25	45	0	10	20	0	0	0	0
₽. -	7	SRN	63	0	0	13	25	0	0	0	0
11	7	MCP	53	2	ιΩ	20	ĸ	0	0	13	0
G	-	CRP	20	20	23	20	2.0	0	9	0	0
2	2	TST	38	0	25	25	13	0	0	0	0
~	₹i'	LSR	63	-1 '	0	30	≖ा	0	0	0	0
-	-	LSBk	0	0	0	Ç	10	c	c	0	90
1	-	140	25	10	0	25	10	0	C	30	0

MARSH CREEK	SX) O	rainage:	Drainage: ALBION RIVER			
Table 6 -	Table 6 - SUMMARY OF DOMINANT SUBSTRATES	DOMINANT	SUBSTRATE	BY	HABITAT TYPE		urvey Da	Survey Dates: SRPTZMB3R 18, 2001	18, 2001		
Confluenc	Confluence Location: QUAD: COMPTHUE	QUAD: COMI		LEGAL DE	SSCRIPTION:	GAL DESCRIPTION: T16NR16NS12 LATITUDE:39°15'18" LONGITUDE:123°35'26"	ATITUDE:	39°15'18" LONGI	TUDE:123°35'26"		
TOTAL	UNITS	HABITAT	HABITAT & TOTAL	12	\$ TOTAL	\$ TOTAL	AL	\$ TOTAL	\$ TOTAL	\$ TOTAL	\$ TOTAL
HABITAT UNITS	FULLY MBASURBD	Яд X.I.	SILT/CLAY DOMINANT	N.	SAND	GRAVEL DOMINANT	BL NT	SM COBBLE DOMINANT	LG COBBLE DOMINANT	BOULDER	BEDROCK
5		LGR)[100	0		0	0	0	0	0
S	-	GTD		Ç	Ð		100	0	0	0	0
œ	3	RUN		0	٥	1	100	0	0	0	ර
77	7	SRN		-	0	1	00	0	0	•	<u> </u>
=======================================	2	MCP		0	100		0	Đ	0	0	0
9		CRP		0	0	1	100	0	0	0	0
2	7	181	-,	50	0		50	භ	0	0	0
r ~~	~J*	LSR		0	25		75	¢	0	0	0
-		LSBk		0	100		0	0	&	೦	0
		DPL		0	100		0	0	c.	0	0

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: MARSH CREEK

SAMPLE DATES:

STREAM LENGTH: 2510 ft. LOCATION OF STREAM MOUTH:

USGS Quad Map: COMPTHCE Latitude: 39°15'18"
Legal Description: T16NR16WS12 Longitude: 123°35'26"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1

Channel Type: B4

Channel Length: 2510 ft.

Riffle/flatwater Mean Width: 5 ft. Total Pool Mean Depth: 1.5 ft.

Base Flow: 0.0 cfs

Water: 56F- 56F°F Air: 65F-65F°F Dom. Bank Veg.: Coniferous Trees

Vegetative Cover: 81%

Embeddness Value: 1. 0%

Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 0 ft.

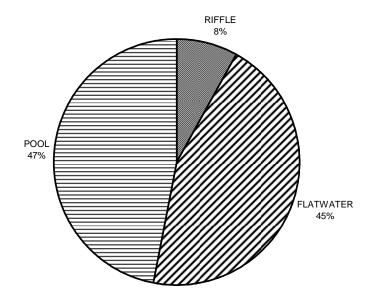
Canopy Density: 90% Coniferous Component: 40% Deciduous Component: 60% Pools by Stream Length: 34% Pools >=3 ft.deep: 7%

Mean Pool Shelter Rtn: 18 Dom. Shelter: Undercut Banks

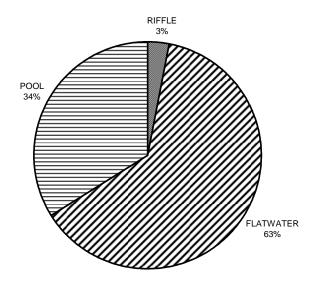
Occurrence of LOD: 5%

2.0% 3.0% 4.25% 5.75%

MARSH CREEK HABITAT TYPES BY PERCENT OCCURENCE

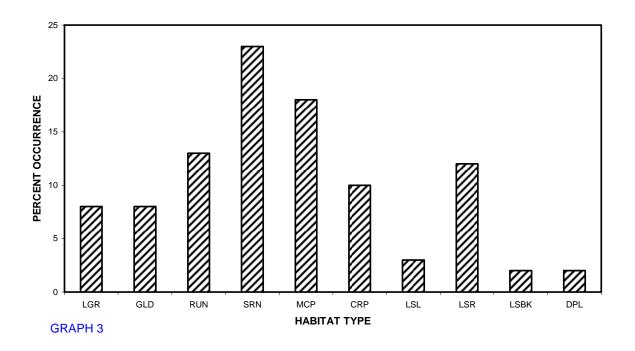


MARSH CREEK HABITAT TYPES BY PERCENT TOTAL LENGTH

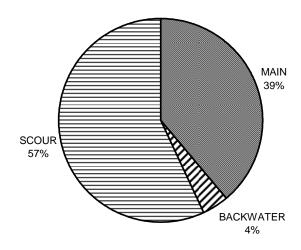


GRAPH 2

MARSH CREEK HABITAT TYPES BY PERCENT OCCURRENCE

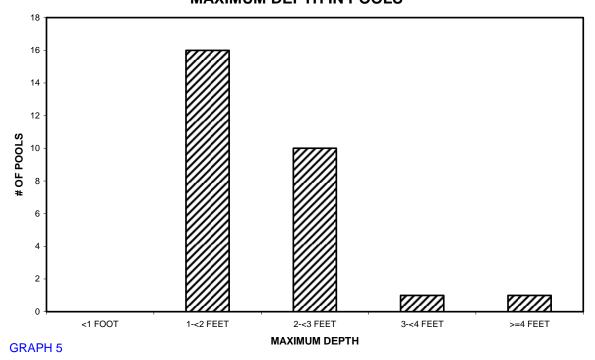


MARSH CREEK POOL HABITAT TYPES BY PERCENT OCCURRENCE

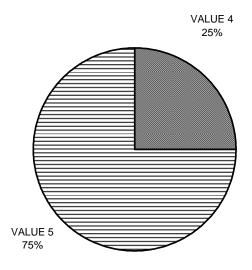


GRAPH 4

MARSH CREEK MAXIMUM DEPTH IN POOLS

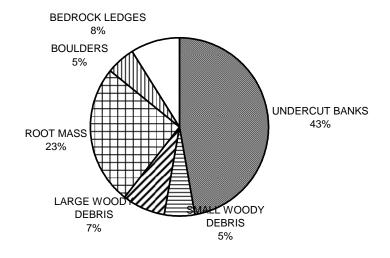


MARSH CREEK PERCENT EMBEDDEDNESS

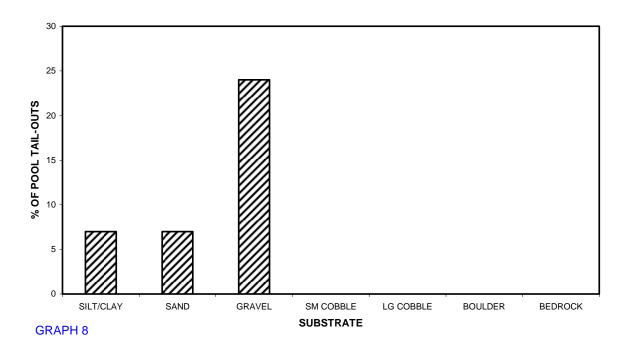


GRAPH 6

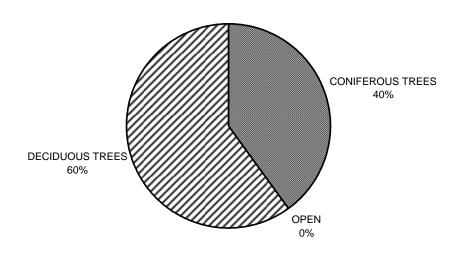
MARSH CREEK MEAN PERCENT COVER TYPES IN POOLS



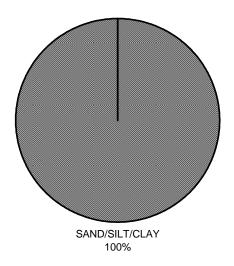
MARSH CREEK SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



MARSH CREEK MEAN PERCENT CANOPY



MARSH CREEK DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

MARSH CREEK DOMINANT BANK VEGETATION IN SURVEY REACH

