NORTH COAST WATERSHED AND FISHERY IMPROVEMENT PROGRAM

STREAM INVENTORY REPORT

Mettick Creek, South Fork Big River, 2002

CALIFORNIA DEPARTMENT OF FISH AND GAME

2003

Northern California-North Coast Region

STREAM INVENTORY REPORT

Mettick Creek

INTRODUCTION

A stream inventory was conducted beginning June 26 and ending July 2, 2002 on Mettick Creek. The survey began at the confluence with South Fork Big River and extended upstream 1.01 miles.

The Mettick Creek inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Mettick Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

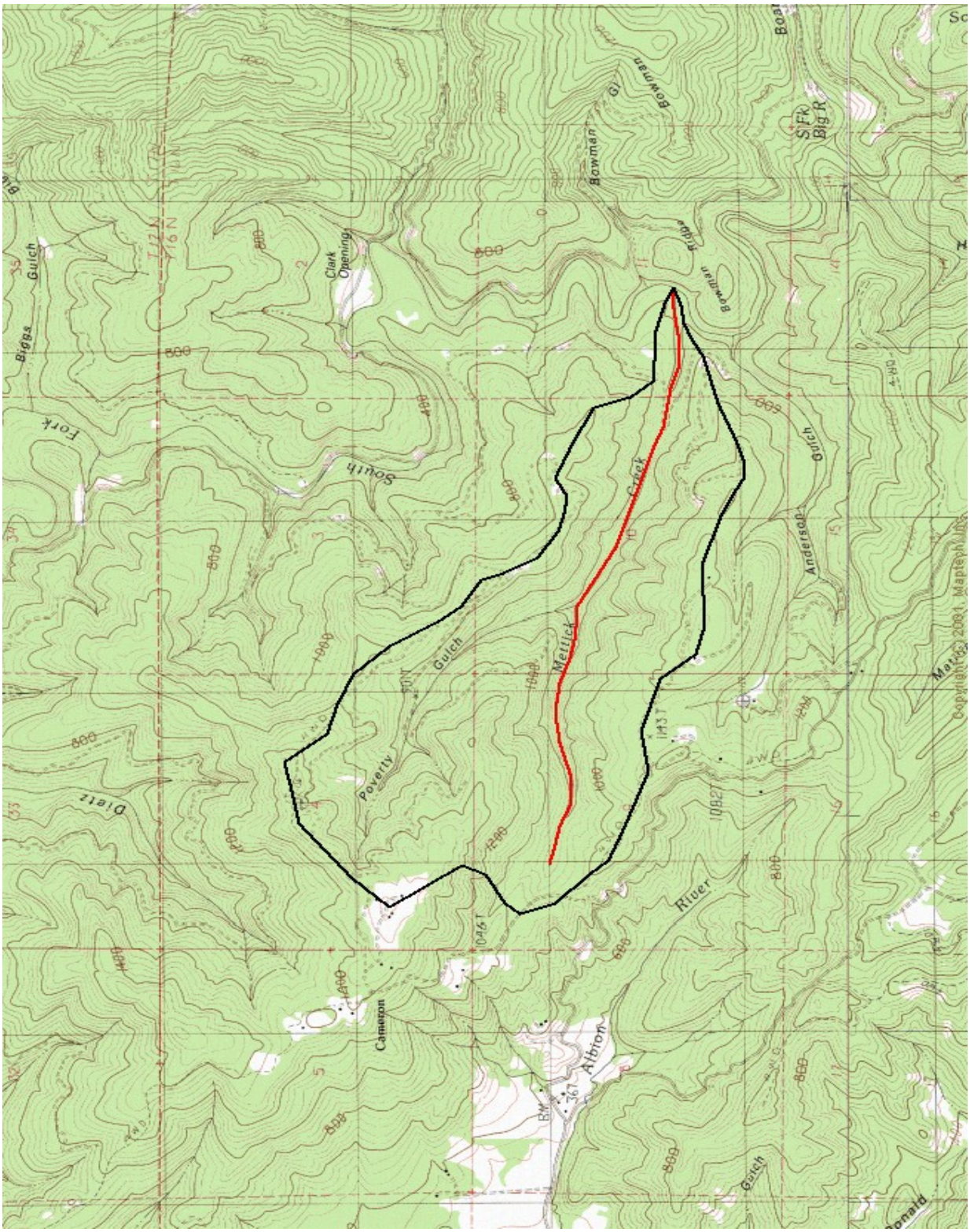
The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for coho salmon, and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's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

WATERSHED OVERVIEW

Mettick Creek is a tributary to the South Fork Big River, a tributary to the Big River, located in Mendocino County, California (Map 1). Mettick Creek's legal description at the confluence with South Fork Big River is T16N R15W S11. Its location is 39°25′8″ North latitude and 123°50′58 ″ West longitude. Mettick Creek is a first order stream and has approximately 2.2 miles of solid blue line stream according to the USGS Comptche 7.5 minute quadrangle. Mettick Creek drains a watershed of approximately 1.5 square miles. Elevations range from about 350 feet at the mouth of the creek to 850 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists via Highway 20 at mile marker 17. Foot access is available from Mendocino Redwood Company roads, approximately 12 miles south from Highway 20, by crossing the South Fork Big River to the mouth of Mettick Creek.

METHODS

The habitat inventory conducted in Boardman Gulch 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 Watershed Stewards Project/AmeriCorps (WSP/AmeriCorps) Members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was



Map 1. Mettick Creek

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 Mettick 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". Mettick 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 Mettick 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 Mettick 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 Mettick 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% sub-sample. 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 Mettick 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.

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Mettick Creek. This sampling technique is discussed in the *California Salmonid Stream Habitat Restoration Manual*.

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 Mettick 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 June 26, through July 2, 2002, was conducted by Kate Grossman and Beth Wood (WSP). The total length of the stream surveyed was 5,328 feet.

Stream flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.049 cfs on September 25, 2002.

Mettick Creek is a B4 channel type for the entire 5,328 feet of the stream surveyed. B4 channels are moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools; very stable plan and profile with stable banks and gravel-dominated substrate.

Water temperatures taken during the survey period ranged from 56 to 59 degrees Fahrenheit. Air temperatures ranged from 59 to 71 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 48% pool units, 42% flatwater units, 8% riffle units, and 3% dry units Graph 1). Based on total length of Level II habitat types there were 69% flatwater units, 19% pool units, 9% dry units, and 4% riffle units (Graph 2).

Nine Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were step runs, 42%; mid-channel pools, 29%; low gradient riffles, 8%; step pools, 8%; and lateral scour bedrock pools, 8% (Graph 3). Based on percent total length, step runs 69%, dry 9%, and mid-channel pools 8%.

A total of 37 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 76%, and comprised 82% 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. Ten of the 37 pools (27%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 37 pool tail-outs measured, 16 had a value of 1 (43%); 7 had a value of 2 (30%); 8 had a value of 3 (11%); 0 had

a value of 4 (0%); and 6 had a value of 5 (16%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate.

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. Riffle habitat types had a mean shelter rating of 3, flatwater habitat types had a mean shelter rating of 5, and pool habitats had a mean shelter rating of 26 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 30. Scour pools had a mean shelter rating of 12 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Small woody debris is the dominant cover type in Mettick Creek. Graph 7 describes the pool cover in Mettick Creek. Large woody debris is the dominant pool cover type followed by boulders.

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 46% of pool tail-outs while small cobble was the next most frequently observed substrate type, at 30%.

The mean percent canopy density for the surveyed length of Mettick Creek was 74%. The mean percentages of deciduous and coniferous trees were 18% and 82%, respectively. Graph 9 describes the mean percent canopy in Mettick Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 35%. The mean percent left bank vegetated was 36%. The dominant elements composing the structure of the stream banks consisted of 47% bedrock, 41% cobble/gravel, 6% boulder, and 6% sand/silt/clay (Graph 10). Coniferous trees were the dominant vegetation type observed in 69% of the units surveyed. Additionally, 19% of the units surveyed had deciduous trees as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Salmonids wee not detected using streambank observation techniques during the Mettick Creek stream survey.

DISCUSSION

Mettick Creek is a B4 channel type for the entire 5,328 feet of the stream surveyed. The suitability of B4 channel types for fish habitat improvement structures is as follows: B4 channels are excellent for low-stage weirs, single and opposing wing-deflectors, channel constrictors, and log cover.

The water temperatures recorded on the survey days June 26 through July 2, 2002 ranged from 56 to 59 degrees Fahrenheit. Air temperatures ranged from 59 to 71 degrees Fahrenheit. This is

a suitable water temperature range for salmonids. However, 60° F, if sustained, is near the threshold stress level 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 69% of the total length of this survey, pools 19%, riffles 8%, and dry channels 3%. The pools are relatively shallow, with only 10 of the 37 (27%) 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Twenty-three of the 37 pool tail-outs measured had embeddedness ratings of 1 or 2. Eight of the pool tail-outs had embeddedness ratings of 3 or 4. Six 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 Mettick Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Eight of the 37 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered unsuitable for spawning salmonids.

The mean shelter rating for pools was 26. The shelter rating in the flatwater habitats was 5. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by small woody debris in all habitat types. Additionally, bedrock ledges contribute a small amount. More 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 74%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 35% and 36%, 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) Mettick Creek should be managed as an anadromous, natural production stream.

2) The limited water temperature data available suggest that maximum temperatures are above the suitable 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) Where feasible, design and engineer pool enhancement structures to increase the number of pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

4) Increase woody cover in the pools and flatwater habitat units. Much of the existing cover is from small woody debris. Adding more high quality complexity with log and root wad cover is desirable.

5) 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.

6) Increase the canopy on Mettick Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is affected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

7) Suitable size spawning substrate on Mettick Creek is limited to relatively few reaches. Projects should be designed at suitable sites to trap and sort spawning gravel.

9) There are several log debris accumulations present on Mettick 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.

10) Due to the high gradient of the stream, access for migrating salmonids is an ongoing potential problem. Good water temperature and flow regimes exist in the stream and it offers good conditions for rearing fish. Fish passage should be monitored and improved where possible.

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.

0'	BEGIN SURVEY 40 FEET FROM CONFLUENCE WITH SF BIG RIVER. CHANNEL TYPE IS A B4. 3 SEPERATE POOLS SEPERATED BY SHORT RUN OR SHORT BEDROCK SHEET.
171'	3 DEEP POOLS SEPERATED BY 3-4 CASCADES OR SHORT RUN.
256'	15 FEET UNDERCUT LEFT BANK.
484'	NICE UNDERCUT BANK BUT NO SALMONIDS.
691'	3 SMALL NARROW HIGHLY ENTRENCHED BEDROCK POOLS FILLED IN WITH GRAVEL, ALL AT 45 DEGREE ANGLE TO CHANNEL AND WATER FLOW.
902'	2 POOLS, FIRST IS SMALL NARROW DEEP BEDROCK TRENCH, SECOND IS WIDER AND SHALLOWER AND LONGER.
1179'	LEFT BANK EROSION EXPOSED ROOT MASS 1 FOOT UNDERCUT BANK.
1206'	LEFT BANK BEDROCK CAUSING SOME SLIGHT SCOURING.
1264'	1 FOOT UNDERCUT BANK (40 FEET).
1459'	SALAMANDER PRESENT. LEFT BANK TRIBUTARY, DRY >5% GRADIENT.
1745'	TEN FEET UNDERCUT BANK, NO SALMONIDS OBSERVED ON ENTIRE REACH.
1812'	2 PIECES OF LWD ACROSS CHANNEL, NO SCOUR OR BLOCKAGE.
1944'	RIGHT BANK SLOPE FAILURE, 2 LARGE DOUGLAS FIRS DOWN ACROSS CHANNEL, ASSOCIATED WITH MANY SMALL PIECES OF SMALL WOODY DEBRIS (SWD) (SMALL TREES). RETAINING SOME SEDIMENT AT TOP, BUT IS DROP OF LESS THAN 1 FOOT. NOTCHED WEIR AT TOP OF UNIT, ALONG WITH 2 OTHER PIECES OF LWD.
1985'	POOL TAIL CREST IS CAUSED BY A PIECE OF SMALL WOOD ACROSS CHANNEL BUT THERE IS GRAVEL UNDERNEATH 3 PIECES OF LWD CAUSING SCOUR, ASSOCIATED WITH A LOT OF SMALL WOOD.
2260'	20 FEET OF UNDERCUT BANK AND UNDER LWD ACROSS CHANNEL.
2290'	ROAD CROSSING
2385'	ALMOST COMPLETELY UNDER BRIDGE, EROSION ON LEFT BANK DUE TO BRIDGE.
2563'	RIGHT BANK TRIBUTARY FLOWING BUT IS NOT FISH BEARING, GRADIENT GREATER THAN 10%. LEFT BANK TRIBUTARY, DRY, NON-ANADRAMOUS.

3053'	2 PIECES OF LWD WITH LOTS OF SWD, FORMING PLUNGE OF 3 FEET, RETAINING GRAVEL.
3068'	1 DOUGLAS FIR ACROSS CHANNEL.
3128'	RIGHT BANK SLOPE FAILURE REDWOOD FAMILY TREE CIRCLE (4 TREES AND 1 STUMP) ON BANK CAUSING SCOUR. ENTIRE RIGHT BANK HAS FALLEN FOR ABOUT 50 FEET UP BANK AND 50 FEET UPSTREAM. 2 DOUGLAS FIRS HAVE FALLEN ACROSS CHANNEL AFTER AND BEFORE POOL
3161'	1 DOUGLAS FIR ACROSS CHANNEL.
3238'	10 POOLS, ALL BEDROCK. DEEPEST IN MID-UNIT. GRADIENT AT 5% BUT NOT OVER DISTANCE AND DUE TO POOL DEPTH, COULD BE ACCESSIBLE TO SH.
3426'	7 PIECES OF LWD REBARED TOGETHER. RESTORATION PROJECT A-SHAPED PROVIDING GOOD SHELTER BUT LITTLE SCOUR.
3537'	FROG AND SALAMANDERS PRESENT.
3604'	2 POOLS SEPERATED BY 10 FOOT BEDROCK SHEET. LEFT BANK LANDSLIDE APPEARS AS THOUGH RESTORATION BANK STABILIZATION HAS TAKEN PLACE.
3667'	LANDSLIDE CONTINUES.
3755'	LEFT BANK SLOPE FAILURE, ONE TAN OAK IN STREAM AND 1 ROOT WAD OF STUMP. LEFT BANK DRY TRIBUTARY
3858'	6 PIECES OF LWD AND ROOT WAD FROM DOWNED TREE ON RIGHT BANK.
4282'	SEVERAL LOGS ACROSS CHANNEL.
4665'	SCULPIN PRESENT.
4678'	BEGIN AT PROPERTY BOUNDARY.
4750'	CONFLUENCE WITH POVERTY GULCH. ABOVE THIS METTICK CREEK IS DRY. ALL FLOW IS COMING FROM POVERTY.
4913'	END OF SURVEY, DIMINISHED HAHBITAT. CHANNEL IS DRY EXCEPT FOR PERIODIC POOLS OR STEP RUNS EVERY 500 FEET OF MORE. NO SALMONIDS IN STREAM.

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	(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]	

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: METTICK CREEK
SAMPLE DATES: 06/26/02 to 07/02/02
STREAM LENGTH: 5328 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: COMPTCHE — Latitude: 39°25'8"
Legal Description: T16NR15WS11 — Longitude: 123°50'58"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1

Channel Type: B4	Canopy Density: 74%
Channel Length: 5328 ft.	Coniferous Component: 82%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 18%
Total Pool Mean Depth: 0.7 ft.	Pools by Stream Length: 19%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 8%
Water: 056- 059°F Air: 059-071°F	Mean Pool Shelter Rtn: 26
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Small Woody Debris
Vegetative Cover: 36%	Occurrence of LOD: 9%
Dom. Bank Substrate: Bedrock	Dry Channel: 482 ft.

Embeddness Value: 1. 43% 2.19% 3. 22% 4. 0% 5. 16%

METTICK CREEK — Drainage: SF BIG RIVER

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 06/26/02 to 07/02/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'8" LONGITUDE:123°50'58"

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
6	2	RIFFLE	8	32	193	4	4.5	0.3	99	596	28	167	0	3
32	4	FLATWATER	42	114	3651	69	4.3	0.3	335	10713	91	2918	0	5
37	37	POOL	48	27	1002	19	7.1	0.7	187	6915	136	5024	102	26
2	0	DRY	3	241	482	9	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
77	43	5328	18224	8110

METTICK CREEK — Drainage: SF BIG RIVER

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 06/26/02 to 07/02/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'8" LONGITUDE:123°50'58"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM 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	MEAN CANOPY %
6	2	LGR	8	32	193	4	5	0.3	0.8	99	596	28	167	0	3	67
32	4	SRN	42	114	3651	69	4	0.3	0.9	335	10713	91	2918	0	5	79
22	22	MCP	29	20	435	8	8	0.7	2.3	153	3372	103	2266	75	35	76
6	6	STP	8	65	389	7	6	0.9	3.0	414	2487	345	2068	271	10	81
1	1	LSL	1	16	16	0	6	0.4	1.4	88	88	35	35	9	40	61
6	6	LSBk	8	21	126	2	6	0.6	2.3	126	756	84	506	64	4	60
1	1	LSBo	1	21	21	0	6	0.7	1.4	116	116	81	81	58	1	33
1	1	PLP	1	15	15	0	7	0.7	1.3	98	98	68	68	49	40	48
2	0	DRY	3	241	482	9	0	0.0	0.0	0	0	0	0	0	0	84

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
77	43	5328	18224	8110

METTICK CREEK — Drainage: SF BIG RIVER

Table 3 - SUMMARY OF POOL TYPES — Survey Dates: 06/26/02 to 07/02/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'8" LONGITUDE:123°50'58"

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
28	28	MAIN	76	29	824	82	7.5	0.7	209	5858	155	4334	117	30
9	9	SCOUR	24	20	178	18	5.8	0.6	117	1057	77	690	55	12

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
37	37	1002	6915	5024

METTICK CREEK — Drainage: SF BIG RIVER

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 06/26/02 to 07/02/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'8" LONGITUDE:123°50'58"

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
22	MCP	59	3	14	16	73	3	14	0	0	0	0
6	STP	16	0	0	1	17	2	33	3	50	0	0
1	LSL	3	0	0	1	100	0	0	0	0	0	0
6	LSBk	16	0	0	4	67	2	33	0	0	0	0
1	LSBo	3	0	0	1	100	0	0	0	0	0	0
1	PLP	3	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
37

METTICK CREEK — Drainage: SF BIG RIVER

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE — Survey Dates: 06/26/02 to 07/02/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'8" LONGITUDE:123°50'58"

UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN % UNDERCUT BANKS	MEAN % SWD	MEAN % LWD	MEAN % ROOT MASS	MEAN % TERR. VEGETATION	MEAN % AQUATIC VEGETATION	MEAN % WHITE WATER	MEAN % BOULDERS	MEAN % BEDROCK LEDGES
6	1	LGR	0	15	0	0	10	15	10	50	0
32	3	SRN	13	25	17	10	2	0	13	20	0
22	21	MCP	20	23	10	15	7	0	2	12	9
6	5	STP	0	18	2	4	1	22	33	5	15
1	1	LSL	40	10	50	0	0	0	0	0	0
6	5	LSBk	6	24	0	0	0	2	0	0	68
1	1	LSBo	0	0	0	0	0	30	0	0	70
1	1	PLP	0	40	30	0	0	0	15	5	10
2	0	DRY	0	0	0	0	0	0	0	0	0

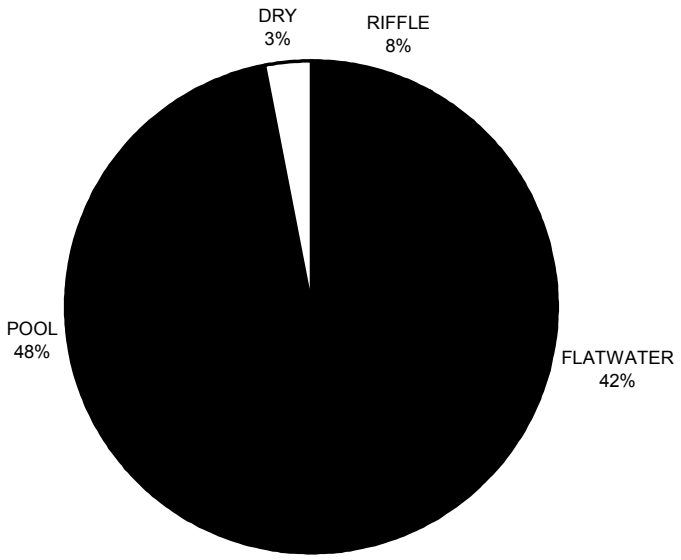
METTICK CREEK — Drainage: SF BIG RIVER

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE — Survey Dates: 06/26/02 to 07/02/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'8" LONGITUDE:123°50'58"

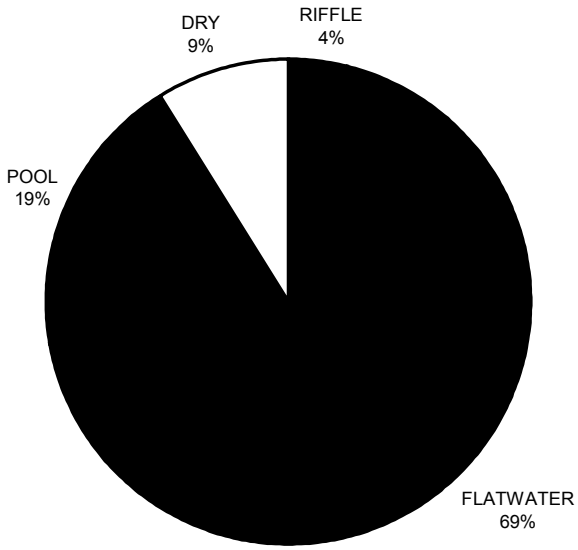
TOTAL HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
6	2	LGR	0	0	50	50	0	0	0
32	4	SRN	0	0	100	0	0	0	0
22	4	MCP	0	0	50	25	0	0	25
6	3	STP	0	0	33	0	0	0	67
1	1	LSL	0	0	100	0	0	0	0
6	1	LSBk	0	0	0	0	0	0	100
1	1	LSBo	0	0	100	0	0	0	0
1	1	PLP	0	0	100	0	0	0	0
2	0	DRY	0	0	0	0	0	0	0

METTICK CREEK
HABITAT TYPES BY PERCENT OCCURENCE



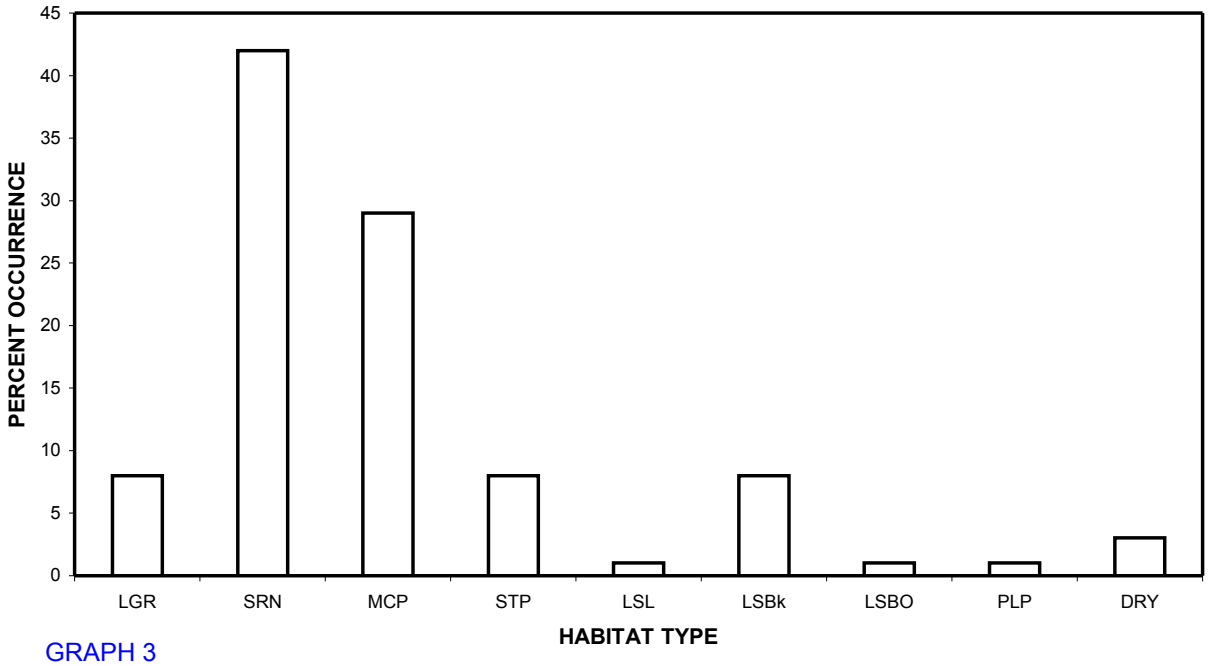
GRAPH 1

METTICK CREEK
HABITAT TYPES BY PERCENT TOTAL LENGTH



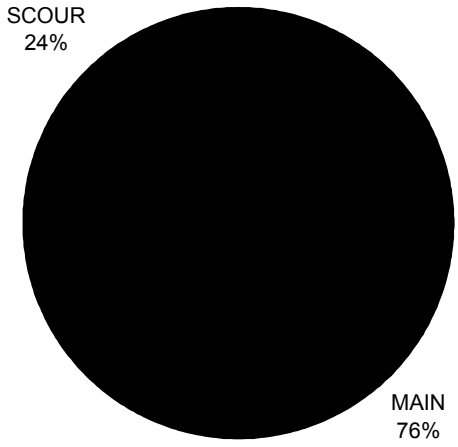
GRAPH 2

METTICK CREEK
HABITAT TYPES BY PERCENT OCCURRENCE



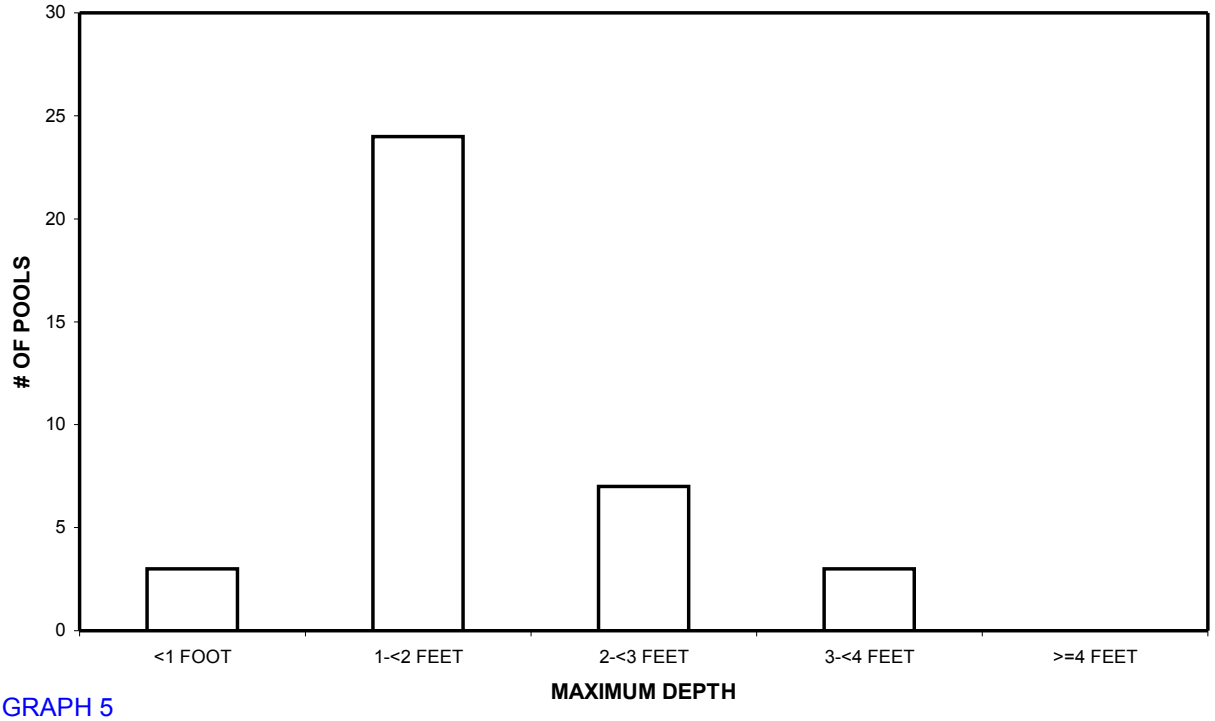
GRAPH 3

METTICK CREEK
POOL HABITAT TYPES BY PERCENT OCCURRENCE



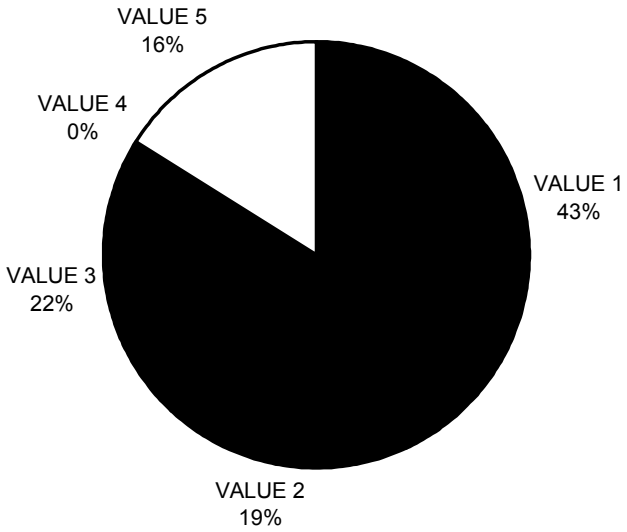
GRAPH 4

METTICK CREEK
MAXIMUM DEPTH IN POOLS



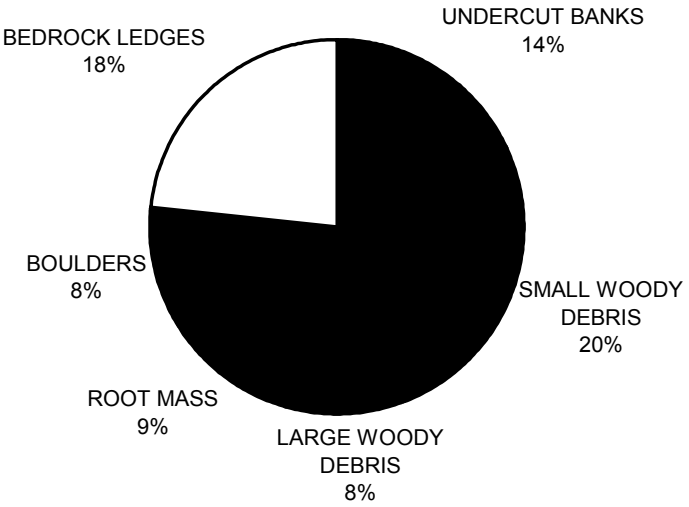
GRAPH 5

METTICK CREEK
PERCENT EMBEDDEDNESS



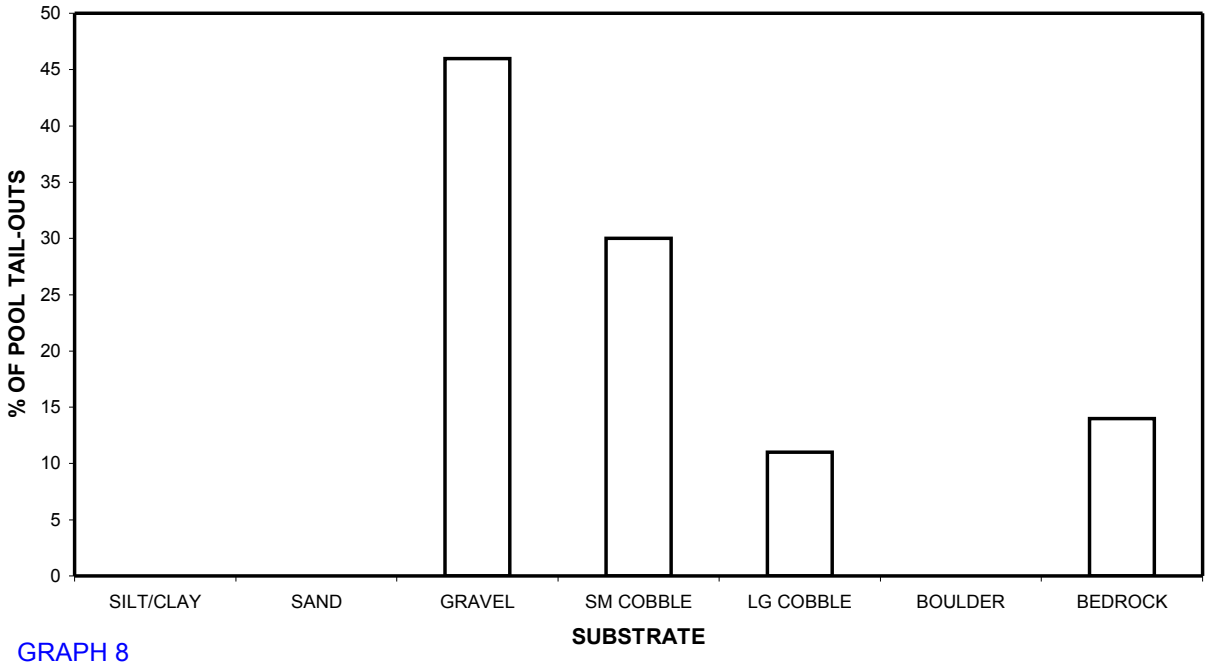
GRAPH 6

METTICK CREEK
MEAN PERCENT COVER TYPES IN POOLS



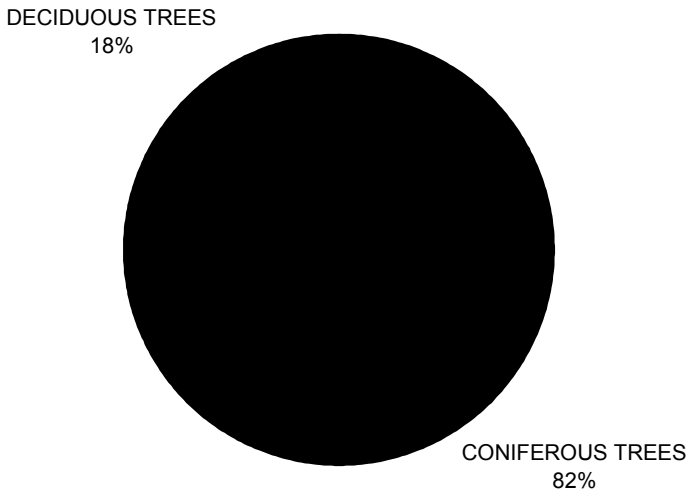
GRAPH 7

METTICK CREEK
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



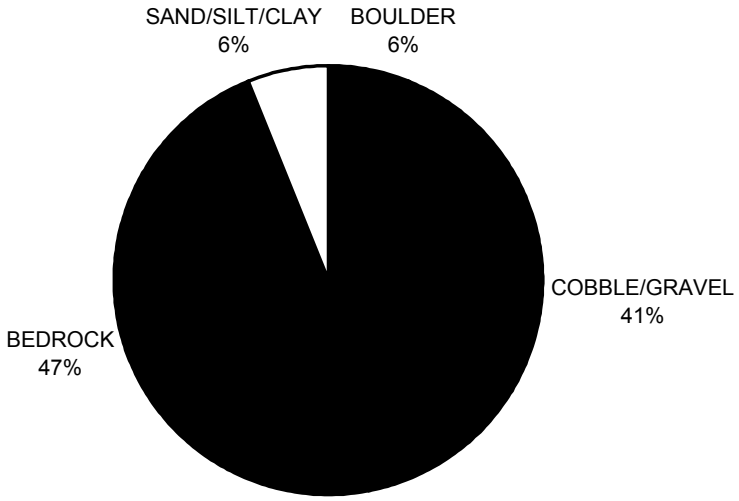
GRAPH 8

METTICK CREEK
MEAN PERCENT CANOPY



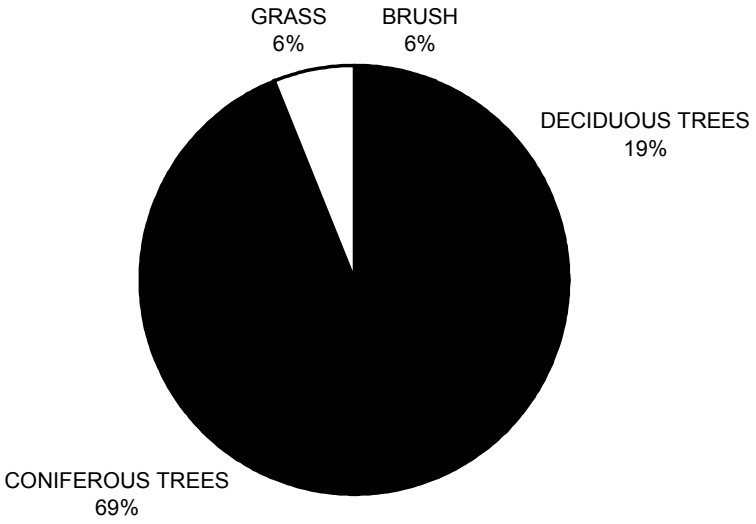
GRAPH 9

METTICK CREEK
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

METTICK CREEK
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11