



CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

STREAM INVENTORY REPORT

Mettick Creek

INTRODUCTION

A stream inventory was conducted from June 2 to June 3, 2015 on Mettick Creek. The survey began at the confluence with South Fork Big River and extended upstream 1.4 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 Chinook salmon, 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 South Fork Big River, tributary to Big River, which drains to the Pacific Ocean. It is 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 39.2580 degrees north latitude and 123.5070 degrees west longitude, LLID number 1235058392581. Mettick Creek is a second order stream and has approximately 2.2 miles of blue line stream according to the USGS Comptche 7.5 minute quadrangle. Mettick Creek drains a watershed of approximately 1.6 square miles. Elevations range from about 335 feet at the mouth of the creek to 1,200 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 Comptche-Ukiah Road, southeast of Fort Bragg.

METHODS

The habitat inventory conducted in Mettick Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Department of Fish and Wildlife (CDFW) personnel that conducted the inventory were trained in standardized habitat inventory methods by the CDFW. The 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

California Department of Fish and Wildlife

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 eleven components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) near 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 (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 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 (1990). 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 unsuitable for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

California Department of Fish and Wildlife

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide juvenile 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 for prey. 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. The shelter rating is then calculated by multiplying the qualitative shelter value by the percent of the unit covered. 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 densimeters 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 hardwood 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.

10. Large Woody Debris Count:

Large woody debris (LWD) is an important component of fish habitat and an element in channel forming processes. In each habitat unit all pieces of LWD partially or entirely below the elevation of bankfull discharge are counted and recorded. The minimum size to be considered is twelve inches in diameter and six feet in length. The LWD count is presented by reach and is expressed as an average per 100 feet.

11. Average Bankfull Width:

Bankfull width can vary greatly in the course of a channel type stream reach. This is especially true in very long reaches. Bankfull width can be a factor in habitat components like canopy density, water temperature, and pool depths. Frequent measurements taken at riffle crests

California Department of Fish and Wildlife

(velocity crossovers) are needed to accurately describe reach widths. At the first appropriate velocity crossover that occurs after the beginning of a new stream survey page (ten habitat units), bankfull width is measured and recorded in the appropriate header block of the page. These widths are presented as an average for the channel type reach.

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. In addition, underwater observations were made at 10 sites using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.18, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Wildlife. This program processes and summarizes the data, and produces the following ten tables:

- Riffle, Flatwater, and Pool Habitat Types
- Habitat Types and Measured Parameters
- Pool Types
- Maximum Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)
- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

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

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness
- Mean Percent Cover Types in Pools
- Substrate Composition in Pool Tail-outs
- Mean Percent Canopy
- Dominant Bank Composition by Composition Type
- Dominant Bank Vegetation by Vegetation Type

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HABITAT INVENTORY RESULTS

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

The habitat inventory of June 2 to June 3, 2015 was conducted by M. Groff and I. Mikus (CDFW). The total length of the stream surveyed was 7,363 feet. The survey included a 1,440 foot long unsurveyed section starting 5,765 feet upstream from the confluence with South Fork Big River and ending 7,205 upstream from the confluence with South Fork Big River. The data included in this report reflect only the length of stream actually surveyed; the unsurveyed section was not included.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.2 cfs on June 4, 2015.

Mettick Creek is a G4 channel type for all 7,363 feet of the stream surveyed. G4 channels are entrenched “gully” step-pool channels on moderate gradients with low width /depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 52 to 55 degrees Fahrenheit. Air temperatures ranged from 57 to 63 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 39% riffle units, 36% flatwater units, 25% pool units, and 1% dry units (Graph 1). Based on total length of Level II habitat types there were 56% flatwater units, 24% riffle units, and 20% pool units (Graph 2).

Fourteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were high gradient riffle units, 19%; step run units, 18%; run units, 17%; and low gradient riffle units, 17% (Graph 3). Based on percent total length, step run units made up 43%, run units 13%, and mid-channel pool units 13%.

A total of 50 pools were identified (Table 3). Main channel pools were the most frequently encountered at 60% (Graph 4), and comprised 63% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Fifteen of the 50 pools (30%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 50 pool tail-outs measured, 26 had a value of 1 (52%); 15 had a value of 2 (30%); three had a value of 3 (6%); one had a value of 4 (2%); five had a value of 5 (10%) (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 unsuitable 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. Riffle habitat types had a mean shelter

California Department of Fish and Wildlife

rating of 3, flatwater habitat types had a mean shelter rating of 2, and pool habitats had a mean shelter rating of 11 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 14. Main channel pools had a mean shelter rating of 10 (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. Small woody debris is the dominant pool cover type followed by undercut banks.

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 78% of the pool tail-outs. Bedrock was the next most frequently observed dominant substrate type and occurred in 12% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Mettick Creek was 97%. Three percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 33% and 67%, respectively. Graph 9 describes the mean percent canopy in Mettick Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 100%. The mean percent left bank vegetated was 98%. The dominant elements composing the structure of the stream banks consisted of 52% sand/silt/clay, 33% bedrock, 12% cobble/gravel, and 3% boulders (Graph 10). Coniferous trees were the dominant vegetation type observed in 42% of the units surveyed. Additionally, 35% of the units surveyed had brush as the dominant vegetation type, and 23% had hardwood trees as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at 10 sites for species composition and distribution in Mettick Creek on June 3 and June 4, 2015 (Table A). The sites were sampled by I. Mikus and M. Groff (CDFW).

The reach sites yielded 21 young-of-the-year (YOY) steelhead (SH), one age 1+ SH, 25 YOY coho salmon, three sculpin, and one signal crayfish.

During the survey, the upstream-most observation of juvenile coho salmon occurred at 39.2582 degrees north latitude, 123.5146 degrees west longitude, approximately 2,426 feet upstream from the confluence with South Fork Big River.

Table A. Summary of results for a fish composition and distribution survey within Mettick Creek, 2015.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	Steelhead			Coho Salmon		Additional Aquatic Species Observed
					YOY	1+	2+	YOY	1+	
Reach 1: G4 Channel Type										
06/03/15	1	003	Pool	73	1	1	0	4	0	CF

California Department of Fish and Wildlife

	2	012	Pool	230	2	0	0	11	0	0
	3	088	Pool	2,232	2	0	0	1	0	0
	4	093	Pool	2,426	1	0	0	9	0	0
	5	101	Pool	2,617	3	0	0	0	0	0
	6	120	Pool	3,284	1	0	0	0	0	0
	7	126	Pool	3,418	2	0	0	0	0	SCP
	8	128	Pool	3,463	1	0	0	0	0	0
	9	136	Pool	3,618	5	0	0	0	0	SCP
	10	141	Pool	3,830	3	0	0	0	0	SCP

Species Abbreviations: CF=signal crayfish. SCP=unidentified sculpin

DISCUSSION

Mettick Creek is a G4 channel type for the entire length of the survey. The suitability of G4 channel types for fish habitat improvement structures is as follows: good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days June 2 to June 3, 2015 ranged from 52 to 55 degrees Fahrenheit. Air temperatures ranged from 57 to 63 degrees Fahrenheit. This is a suitable water temperature range for salmonids. To make any further conclusions, temperatures need to be monitored throughout the warm summer months, and more extensive biological sampling needs to be conducted.

Flatwater habitat types comprised 56% of the total length of this survey, riffles 24%, and pools 20%. Fifteen of the 50 (30%) pools had a maximum residual depth greater than two 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 residual 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.

Forty-one of the 50 pool tail-outs measured had embeddedness ratings of 1 or 2. Four of the pool tail-outs had embeddedness ratings of 3 or 4. Five 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.

Forty of the 50 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools is 11. The shelter rating in the flatwater habitats is 2. 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 Mettick Creek. Small woody debris is the dominant cover type in pools followed by undercut banks. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log

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cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

The mean percent canopy density for the stream was 97%. The percentage of right and left bank covered with vegetation was 100% and 98%, respectively.

RECOMMENDATIONS

Mettick Creek should be managed as an anadromous, natural production stream.

Recommendations for potential habitat improvement activities are based on target habitat values suitable for salmonids in California's north coast streams. Considering the results from this stream habitat inventory, factors that affect salmonid productivity and CDFW's professional judgment, the following list prioritizes habitat improvement activities in Mettick Creek. Keep in mind, watershed and stream ecosystem processes, land use alterations, changes in land ownership, and other factors could potentially change the order of these recommendations or create the need to remove/add recommendations in the future.

- 1) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from small woody debris. Adding high quality complexity with woody cover in the pools is desirable.
- 2) 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.
- 3) 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.
- 4) The limited water temperature data available suggest 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 three to five years.

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):	Habitat unit #:	Comments:
0	0001.00	Start of survey at the confluence with South Fork Big River. The channel is a G4 for the entire length of the survey.
102	0006.00	There is a 1.6' high plunge over bedrock at the bottom of a bedrock sheet.

California Department of Fish and Wildlife

276	0016.00	There is a 1.3' high plunge over bedrock.
991	0047.00	There is a 2' high plunge over small woody debris accumulation and sediment.
1068	0050.00	There is a 2.1' high plunge over woody debris.
2038	0080.00	Log debris accumulation (LDA) #01 contains seven pieces of large woody debris (LWD) and measures 4' high x 19' wide x 20' long. Water does not flow through the LDA; flow is subsurface through it. There are visible gaps in the LDA. Retained sediment ranges from silt to gravel and measures 10' wide x 20' long x 1.5' deep. There is a 1.5' high plunge over a notched log at the upstream end of the LDA. Fish were observed above the LDA.
2205	0088.00	Old cabled LWD structure on the left bank.
2515	0097.00	A logging road crosses the channel. The crossing is a 15' wide x 53' long x 9.6' high railcar bridge with log abutments. Both banks are bare sediment below the bridge.
2932	0111.00	Tributary #01 enters on the right bank. It contributes approximately 1% to Mettick Creek's flow. The water temperature of the tributary was 53 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 55 degrees Fahrenheit. The slope of the tributary is approximately 80%.
3154	0116.00	Dry left bank tributary.
3448	0128.00	There is a 3.5' high plunge over bedrock.
3463	0129.00	There is a 1.5' high plunge over bedrock.
3500	0131.00	Approximately 5' elevation change over 18' long bedrock sheet.
3603	0136.00	LDA #02 contains four pieces of LWD and measures 4' high x 20' wide x 8' long. Water does not flow through the LDA; the channel is dry above it. There are no visible gaps in the LDA. Retained sediment ranges from silt to sand and measures 8' wide x 20' long x 2' deep. There is a 2' high plunge over the LDA. Fish were observed above the LDA. Trees upstream of the LDA are embedded in the sediment in the active channel width.
3798	0141.00	Stacked and rebarred logs on the left bank at the toe of a landslide measuring approximately 60' long x 30' high. There are two rows of logs, one at the toe of the landslide and one streamside.

California Department of Fish and Wildlife

3852	0144.00	Woody debris accumulating on live willows in the channel and retaining some sediment.
4036	0149.00	LDA #03 contains 12 pieces of LWD and measures 5' high x 16' wide x 12' long. Water flows through the LDA; most of the flow is going through a small woody debris plug. There are visible gaps in the LDA. Retained sediment ranges from silt to gravel and measures 10' wide x 40' long x 2' deep. There are signs that the LDA was retaining significantly more sediment in the past, which has blown. Fish were/ not observed above the LDA.
5582	0193.00	A landslide on the left bank measures approximately 30' long x 60' high and is contributing fine sediment to the channel.
5765	0199.00	Start of 1,440 foot long unsurveyed section.
7205	0200.00	End of 1,440 long unsurveyed section.
7356	0204.00	<p>Poverty Gulch (Tributary #02) enters on the left bank. It contributes approximately 95% to Mettick Creek's flow. The water temperature of the tributary was 53 degrees Fahrenheit, the water temperature downstream of the confluence was 53 degrees Fahrenheit. The slope of the tributary is approximately 8%. There is a 30' high waterfall approximately 300 feet upstream from the confluence. Poverty Gulch is accessible to salmonids below the waterfall, but no fish were observed.</p> <p>End of survey; Mettick Creek goes dry above the confluence with Poverty Gulch. Visual observation for over 1,500 feet above the confluence found only three wet units; a high gradient riffle and two runs, totaling 32 feet long. The crew may have observed a fish trapped in the first run, which was located approximately 100 feet upstream from the confluence with Poverty Gulch. Above the confluence the channel gradient increases to 6-10% and there are numerous LDAs, root masses accumulating sediment, and boulder plunges forcing the flow subsurface. The channel continued to be dry indefinitely above the 1,500 visual observation point. MRC class I/II break at 39.26254, -123.53146.</p>

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.

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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 }

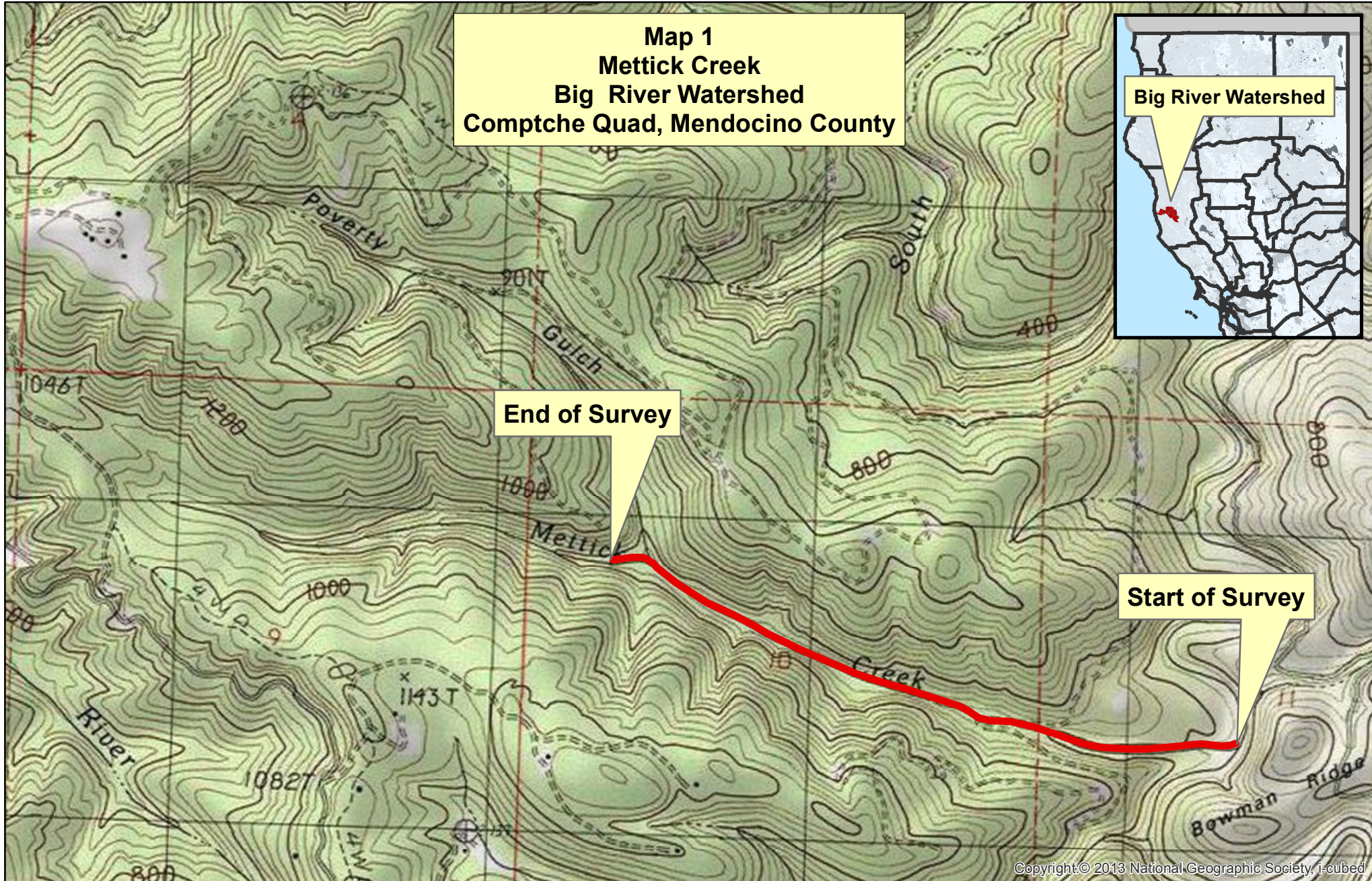
BACKWATER POOLS

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]	

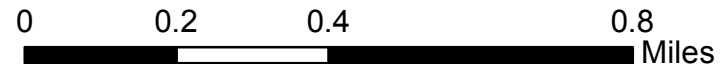
**Map 1
Mettick Creek
Big River Watershed
Comptche Quad, Mendocino County**



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G4 Channel Type



Stream Name: Mettick Creek	LLID: 1235058392581	Drainage: Big River
Survey Dates: 6/2/2015 to 6/3/2015		
Confluence Location: Quad: COMPTCHE	Legal Description: T16NR15WS11	Latitude: 39:15:29.0N Longitude: 123:30:21.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max 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
2	0	DRY	1.0	5	10	0.2									
72	13	FLATWATER	35.5	46	3314	56.0	5.3	0.3	0.7	217	15623	69	4994		2
1	0	NOSURVEY		1440	1440										
50	50	POOL	24.6	24	1194	20.2	7.5	0.8	1.7	166	8286	151	7556	132	11
79	15	RIFFLE	38.9	18	1405	23.7	4.5	0.1	0.4	64	5028	8	619		3
Total Units	Total Units Fully Measured				Total Length (ft.)						Total Area (sq.ft.)		Total Volume (cu.ft.)		
204	78				7363						28936		13169		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Mettick Creek

LLID: 1235058392581

Drainage: Big River

Survey Dates: 6/2/2015 to 6/3/2015

Confluence Location: Quad: COMPTCHE

Legal Description: T16NR15WS11

Latitude: 39:15:29.0N

Longitude: 123:30:21.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Max 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	Mean Canopy (%)
35	6	LGR	17.2	21	719	12.1	6	0.1	0.4	94	3303	9	330		0	98
39	7	HGR	19.2	17	644	10.9	4	0.1	0.6	47	1832	6	246		3	96
5	2	BRS	2.5	8	42	0.7	2	0.2	1.5	30	149	8	42		10	99
35	7	RUN	17.2	21	745	12.6	5	0.3	1.2	113	3950	41	1418		3	98
37	6	SRN	18.2	69	2569	43.4	5	0.3	1.2	338	12524	103	3812		2	97
29	29	MCP	14.3	26	742	12.5	7	0.8	2.5	176	5094	159	4624	139	10	97
1	1	CCP	0.5	7	7	0.1	7	0.6	1.1	49	49	34	34	29	0	99
1	1	CRP	0.5	17	17	0.3	8	0.8	1.3	136	136	122	122	109	20	100
2	2	LSL	1.0	28	57	1.0	8	0.5	1.5	224	447	148	296	114	25	97
2	2	LSR	1.0	19	38	0.6	5	0.6	1.2	99	197	63	126	53	28	99
6	6	LSBk	3.0	22	132	2.2	8	0.6	2.8	135	809	89	534	70	4	98
2	2	LSBo	1.0	28	55	0.9	6	0.6	1.6	172	345	114	229	97	5	96
7	7	PLP	3.4	21	146	2.5	9	1.2	3.6	173	1208	227	1590	210	16	97
2	0	DRY	1.0	5	10	0.2										
1	0	NS		1440	1440											

Total Units
204

Total Units Fully Measured
78

Total Length (ft.)
7363

Total Area (sq.ft.)
30042

Total Volume (cu.ft.)
13404

Stream Name: Mettick Creek	LLID: 1235058392581	Drainage: Big River
Survey Dates: 6/2/2015 to 6/3/2015		
Confluence Location: Quad: COMPTCHE	Legal Description: T16NR15WS11	Latitude: 39:15:29.0N Longitude: 123:30:21.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid.Vol. (cu.ft.)	Mean Shelter Rating
30	30	MAIN	60	25	749	63	7.2	0.8	171	5143	135	4063	10
20	20	SCOUR	40	22	445	37	7.8	0.8	157	3143	126	2527	14
<hr/>													
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)		Total Volume (cu.ft.)	
50	50				1194					8286		6591	

Table 4 - Summary of Maximum Residual Pool Depths By Pool Habitat Types

Stream Name: Mettick Creek

LLID: 1235058392581

Drainage: Big River

Survey Dates: 6/2/2015 to 6/3/2015

Confluence Location: Quad: COMPTCHE

Legal Description: T16NR15WS11

Latitude: 39:15:29.0N

Longitude: 123:30:21.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
29	MCP	58	0	0	19	66	10	34	0	0	0	0
1	CCP	2	0	0	1	100	0	0	0	0	0	0
1	CRP	2	0	0	1	100	0	0	0	0	0	0
2	LSL	4	0	0	2	100	0	0	0	0	0	0
2	LSR	4	0	0	2	100	0	0	0	0	0	0
6	LSBk	12	0	0	5	83	1	17	0	0	0	0
2	LSBo	4	0	0	2	100	0	0	0	0	0	0
7	PLP	14	0	0	3	43	3	43	1	14	0	0

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1< 2 Foot Max Resid. Depth	Total 1< 2 Foot % Occurrence	Total 2< 3 Foot Max Resid. Depth	Total 2< 3 Foot % Occurrence	Total 3< 4 Foot Max Resid. Depth	Total 3< 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
50	0	0	35	70	14	28	1	2	0	0

Mean Maximum Residual Pool Depth (ft.): 1.7

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Mettick Creek

LLID: 1235058392581

Drainage: Big River

Survey Dates: 6/2/2015 to 6/3/2015

Dry Units: 2

Confluence Location: Quad: COMPTCHE

Legal Description: T16NR15WS11

Latitude: 39:15:29.0N

Longitude: 123:30:21.0W

Habitat Units	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
35	6	LGR	0	0	0	0	0	0	0	0	0
39	7	HGR	0	100	0	0	0	0	0	0	0
5	2	BRS	0	0	0	0	0	0	100	0	0
79	15	TOTAL RIFFLE	0	50	0	0	0	0	50	0	0
35	7	RUN	13	20	0	33	0	0	0	33	0
37	6	SRN	0	20	15	50	0	0	0	15	0
72	13	TOTAL FLAT	8	20	6	40	0	0	0	26	0
29	29	MCP	15	27	15	4	0	7	2	12	19
1	1	CCP	0	0	0	0	0	0	0	0	0
1	1	CRP	80	10	10	0	0	0	0	0	0
2	2	LSL	0	55	45	0	0	0	0	0	0
2	2	LSR	58	3	30	10	0	0	0	0	0
6	6	LSBk	38	0	10	2	0	0	0	12	38
2	2	LSBo	0	60	0	0	0	0	20	20	0
7	7	PLP	8	18	18	23	0	3	16	0	13
50	50	TOTAL POOL	19	23	17	7	0	4	4	9	17
1	0	NS									
204	78	TOTAL	17	24	15	10	0	4	6	10	14

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Mettick Creek

LLID: 1235058392581

Drainage: Big River

Survey Dates: 6/2/2015 to 6/3/2015

Dry Units: 2

Confluence Location: Quad: COMPTCHE

Legal Description: T16NR15WS11

Latitude: 39:15:29.0N

Longitude: 123:30:21.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
35	6	LGR	0	0	100	0	0	0	0
39	7	HGR	0	0	14	29	29	0	29
5	2	BRS	0	0	0	0	0	0	100
35	7	RUN	0	0	71	14	0	14	0
37	6	SRN	0	0	100	0	0	0	0
29	29	MCP	0	3	83	3	0	3	7
1	1	CCP	0	0	100	0	0	0	0
1	1	CRP	0	0	100	0	0	0	0
2	2	LSL	0	0	100	0	0	0	0
2	2	LSR	0	0	100	0	0	0	0
6	6	LSBk	0	0	100	0	0	0	0
2	2	LSBo	0	0	100	0	0	0	0
7	7	PLP	0	0	71	0	0	0	29

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Mettick Creek

LLID: 1235058392581

Drainage: Big River

Survey Dates: 6/2/2015 to 6/3/2015

Confluence Location: Quad: COMPTCHE

Legal Description: T16NR15WS11

Latitude: 39:15:29.0N

Longitude: 123:30:21.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
97	67	33	0	100	98

Note: Mean percent conifer and hardwood 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.

Stream Name: Mettick Creek	LLID: 1235058392581	Drainage: Big River
Survey Dates: 6/2/2015 to 6/3/2015	Survey Length (ft.): 7363	Main Channel (ft.): 7363
		Side Channel (ft.): 0
Confluence Location: Quad: COMPTCHE	Legal Description: T16NR15WS11	Latitude: 39:15:29.0N
		Longitude: 123:30:21.0W

STREAM REACH: 1									
Channel Type: G4			Canopy Density (%): 97.3				Pools by Stream Length (%): 16.2		
Reach Length (ft.): 7363			Coniferous Component (%): 67.3				Pool Frequency (%): 24.5		
Riffle/Flatwater Mean Width (ft.): 4.9			Hardwood Component (%): 32.7				Residual Pool Depth (%):		
BFW:			Dominant Bank Vegetation: Coniferous Trees				< 2 Feet Deep: 70		
Range (ft.): 10 to 21			Vegetative Cover (%): 98.7				2 to 2.9 Feet Deep: 28		
Mean (ft.): 14			Dominant Shelter: Small Woody Debris				3 to 3.9 Feet Deep: 2		
Std. Dev.: 3			Dominant Bank Substrate Type: Sand/Silt/Clay				>= 4 Feet Deep: 0		
Base Flow (cfs.): 0.2			Occurrence of LWD (%): 9				Mean Max Residual Pool Depth (ft.): 1.7		
Water (F): 52 - 55			Air (F): 57 - 63				Mean Pool Shelter Rating: 11		
Dry Channel (ft): 10			LWD per 100 ft.:						
			Riffles: 2						
			Pools: 4						
			Flat: 2						
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 78 Sm Cobble: 2 Lg Cobble: 6 Boulder: 2 Bedrock: 12									
Embeddedness Values (%): 1. 52.0 2. 30.0 3. 6.0 4. 2.0 5. 10.0									

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Mettick Creek

LLID: 1235058392581

Drainage: Big River

Survey Dates: 6/2/2015 to 6/3/2015

Confluence Location: Quad: COMPTCHE

Legal Description: T16NR15WS11

Latitude: 39:15:29.0N

Longitude: 123:30:21.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	23	29	33.3
Boulder	3	1	2.6
Cobble / Gravel	8	11	12.2
Sand / Silt / Clay	44	37	51.9

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	0	0	0.0
Brush	28	26	34.6
Hardwood Trees	14	22	23.1
Coniferous Trees	36	29	41.7
No Vegetation	0	1	0.6

Total Stream Cobble Embeddedness Values: 2

Table 10 - Mean Percent of Shelter Cover Types For Entire Stream

StreamName: Mettick Creek

LLID: 1235058392581

Drainage: Big River

Survey Dates: 6/2/2015 to 6/3/2015

Confluence Location: Quad: COMPTCHE

Legal Description: T16NR15WS11

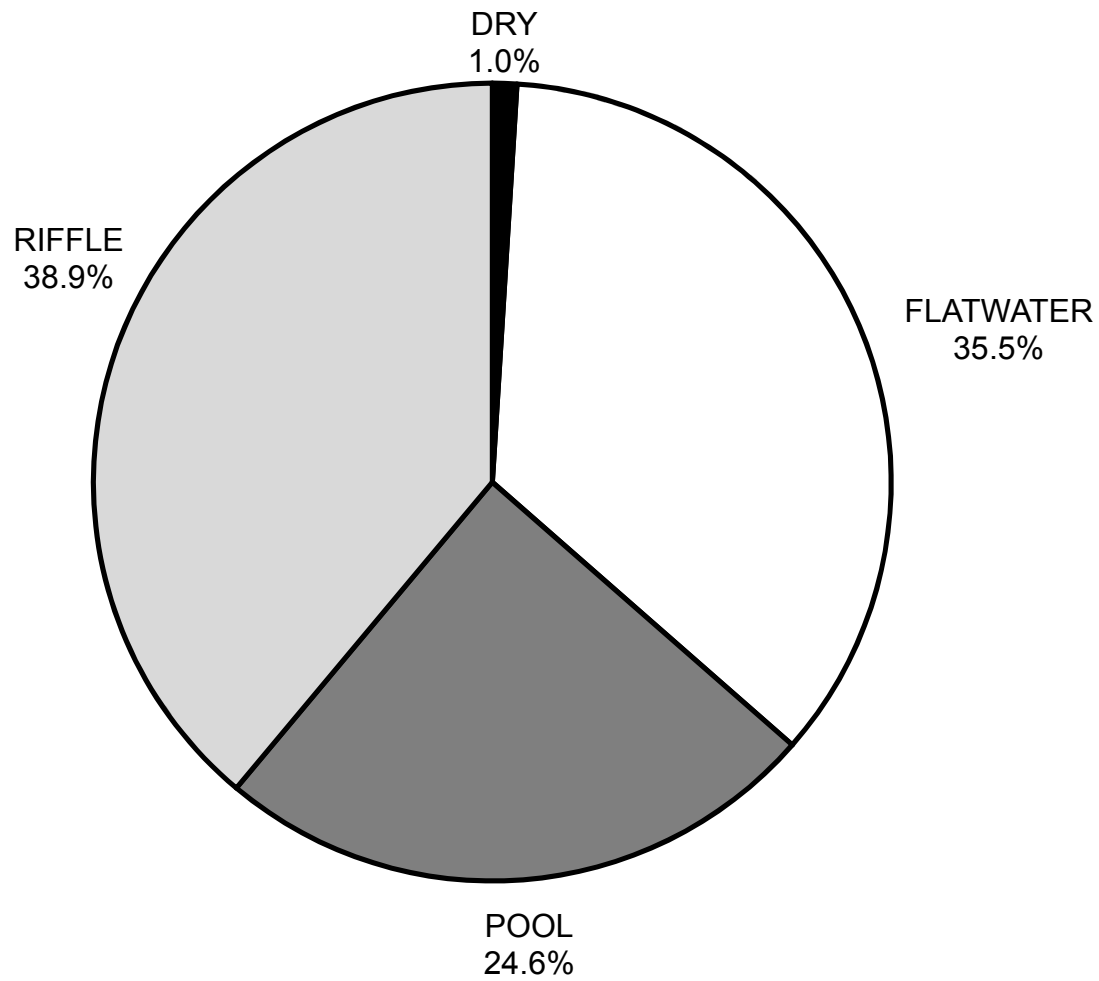
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Longitude: 123:30:21.0W

	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	8	19
SMALL WOODY DEBRIS (%)	50	20	23
LARGE WOODY DEBRIS (%)	0	6	17
ROOT MASS (%)	0	40	7
TERRESTRIAL VEGETATION (%)	0	0	0
AQUATIC VEGETATION (%)	0	0	4
WHITEWATER (%)	50	0	4
BOULDERS (%)	0	26	9
BEDROCK LEDGES (%)	0	0	17

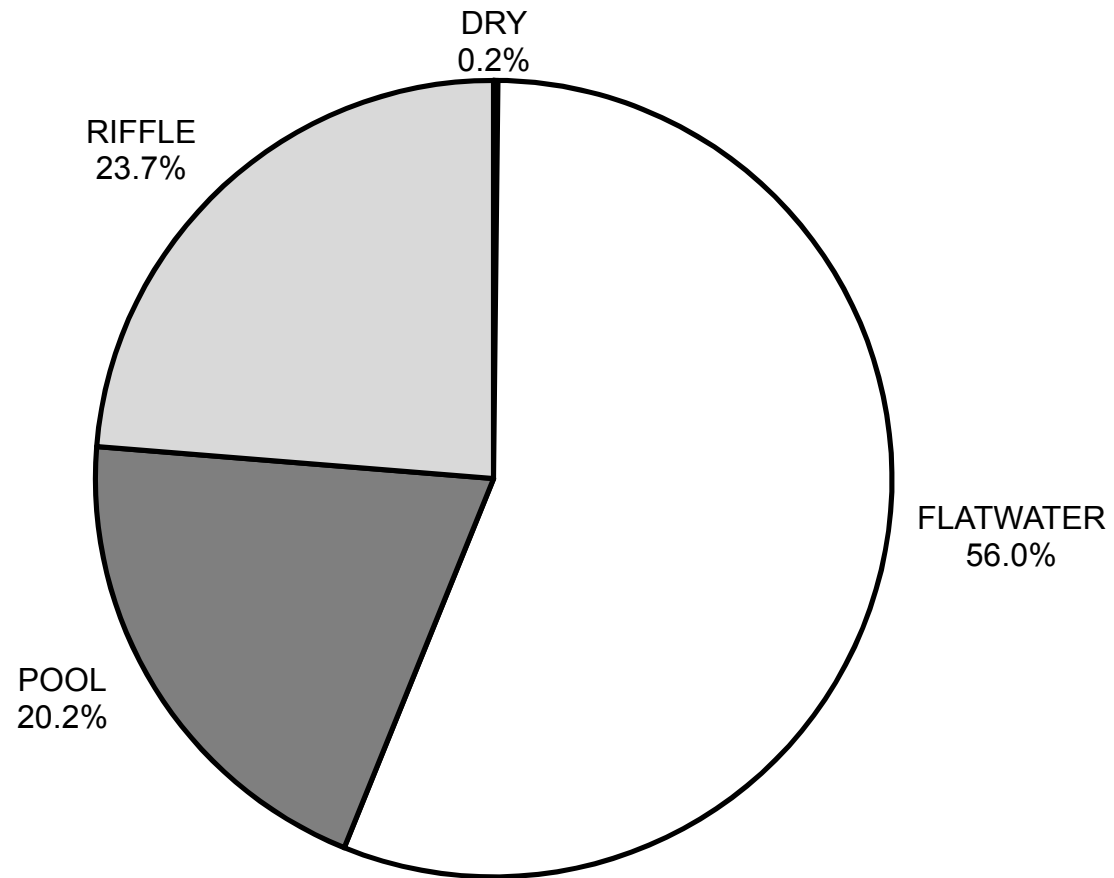
METTICK CREEK 2015

HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

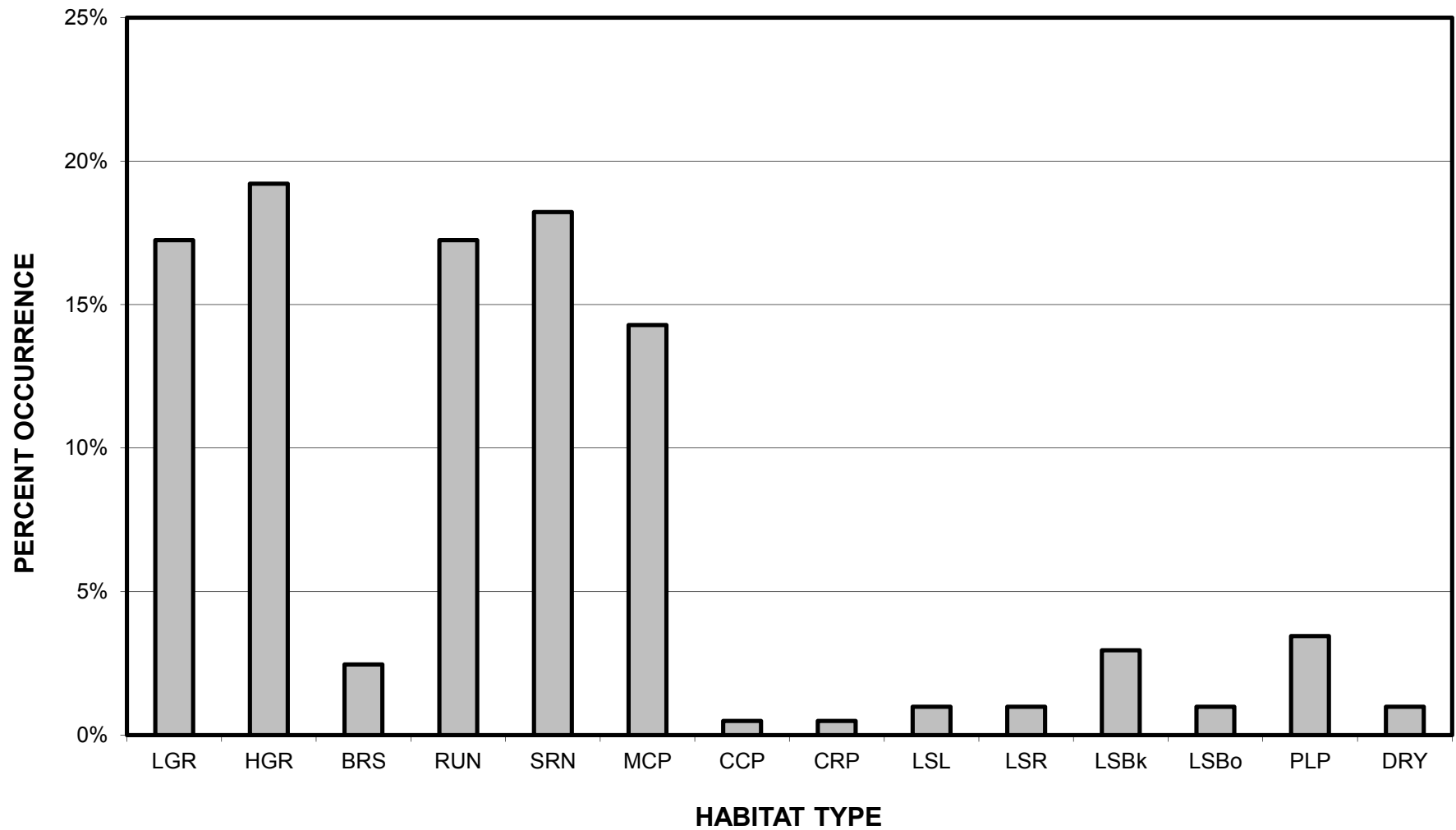
METTICK CREEK 2015
HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

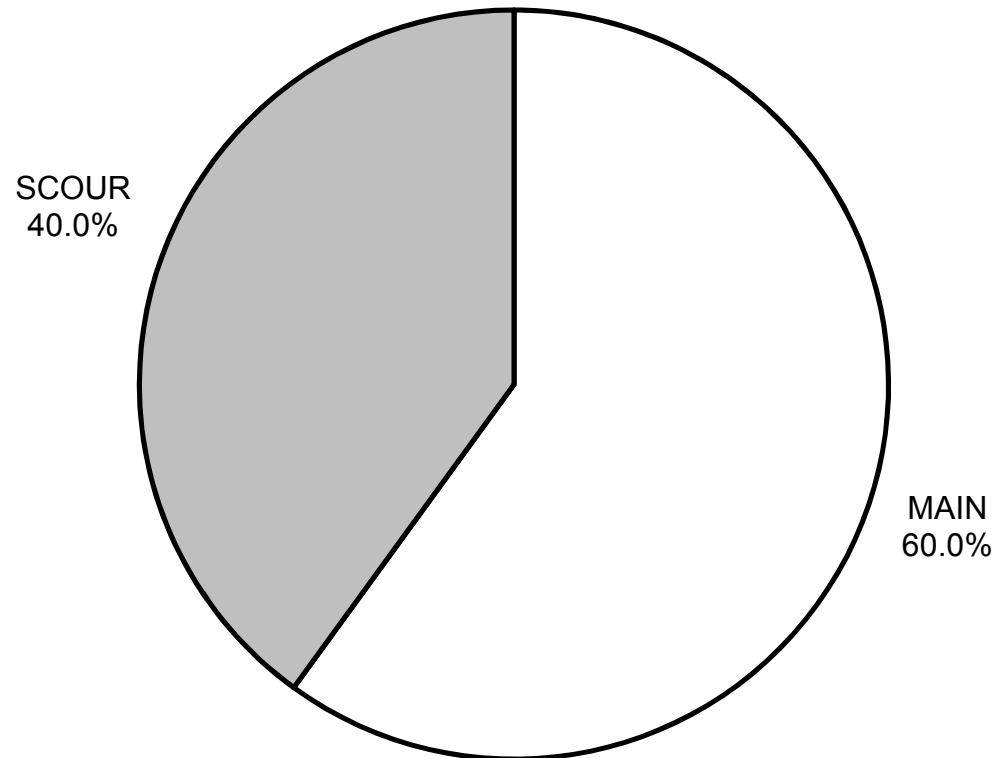
METTICK CREEK 2015

HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 3

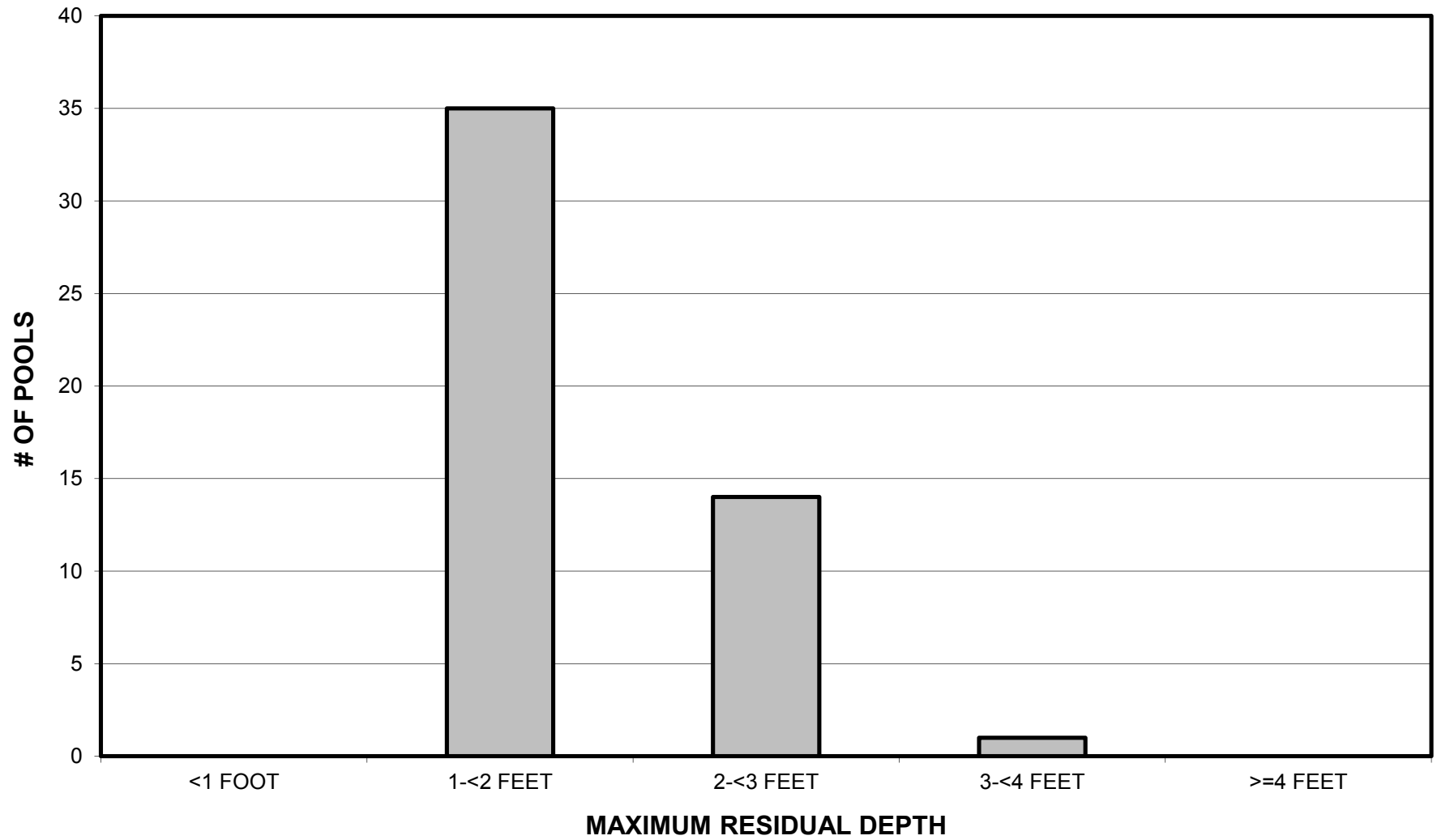
METTICK CREEK 2015
POOL TYPES BY PERCENT OCCURRENCE



GRAPH 4

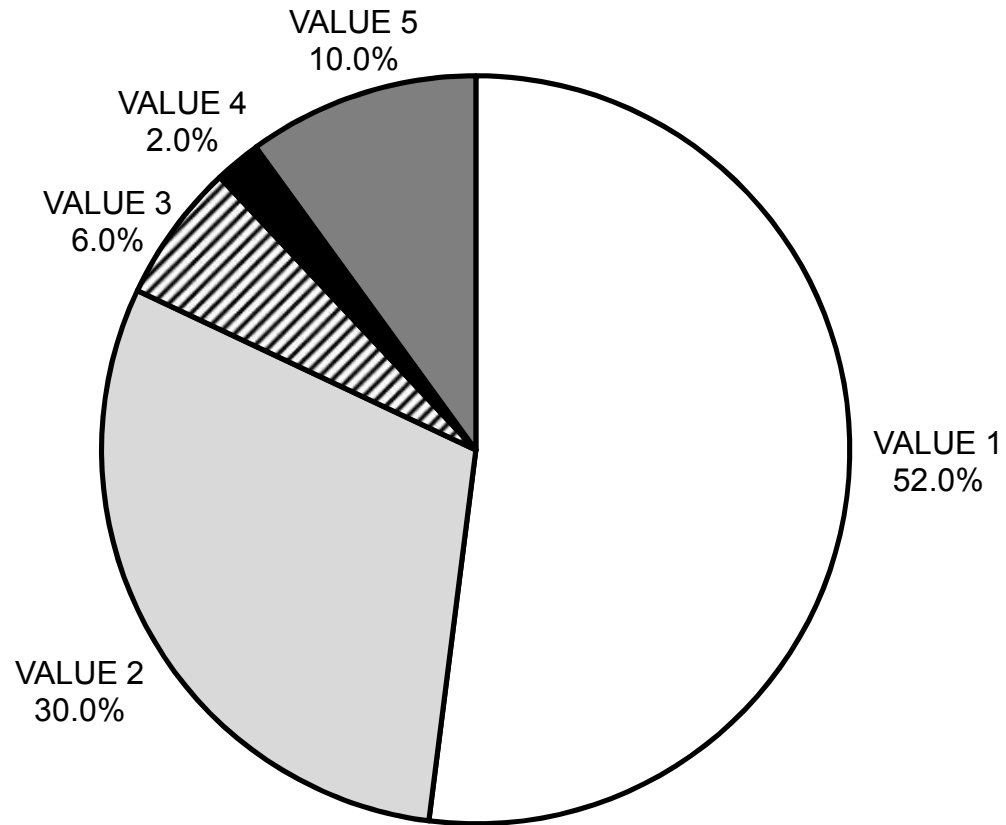
METTICK CREEK 2015

MAXIMUM DEPTH IN POOLS



GRAPH 5

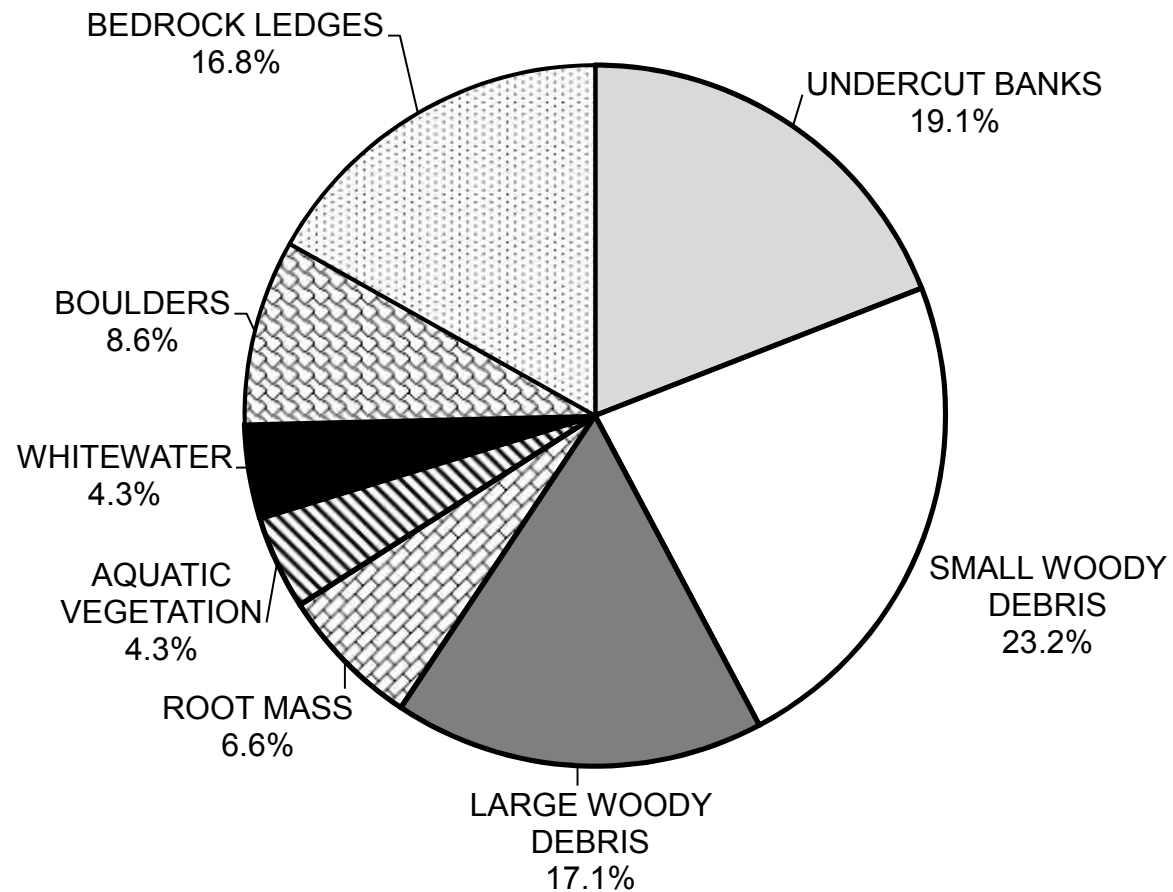
METTICK CREEK 2015 PERCENT EMBEDDEDNESS



GRAPH 6

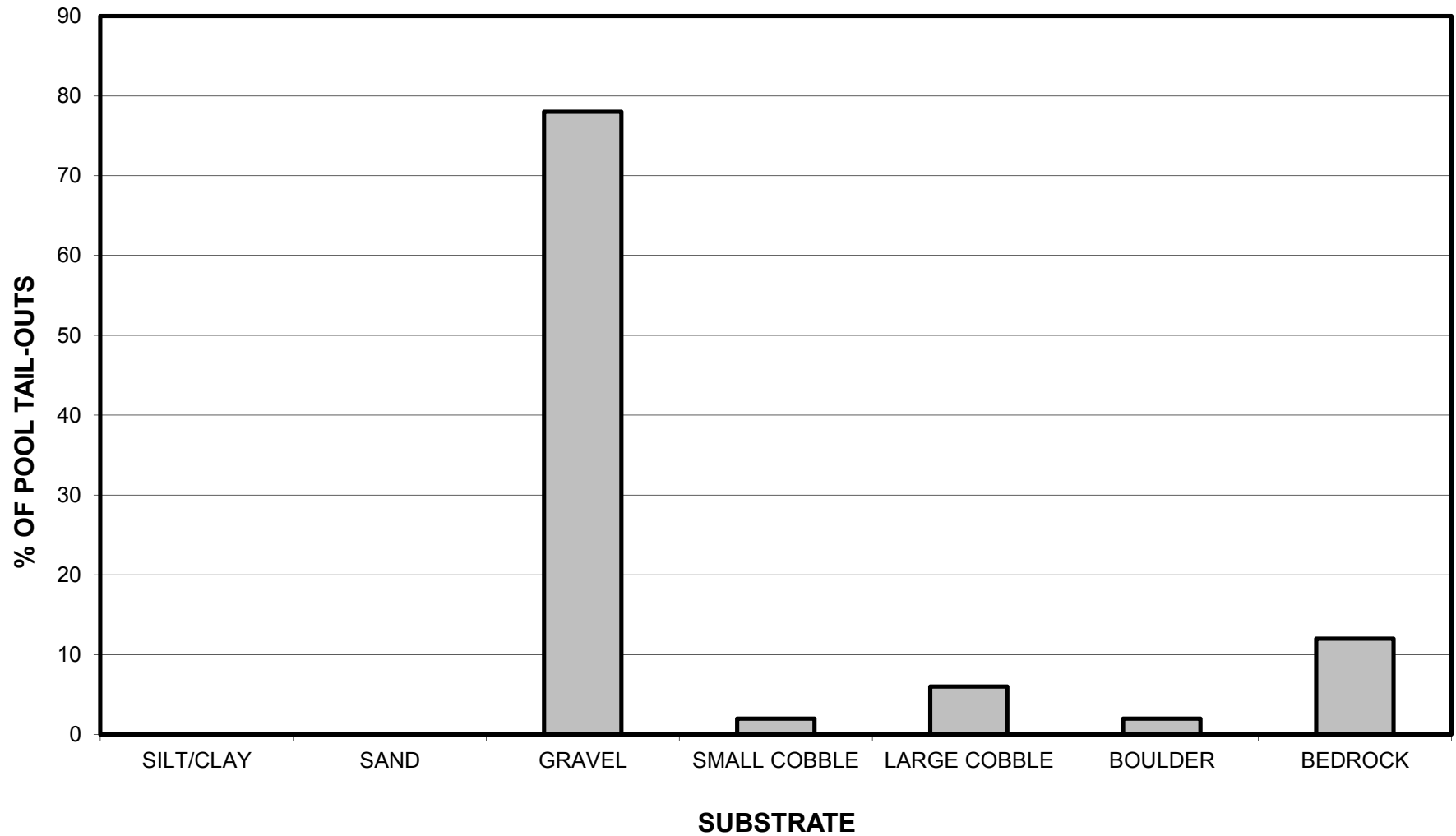
METTICK CREEK 2015

MEAN PERCENT COVER TYPES IN POOLS



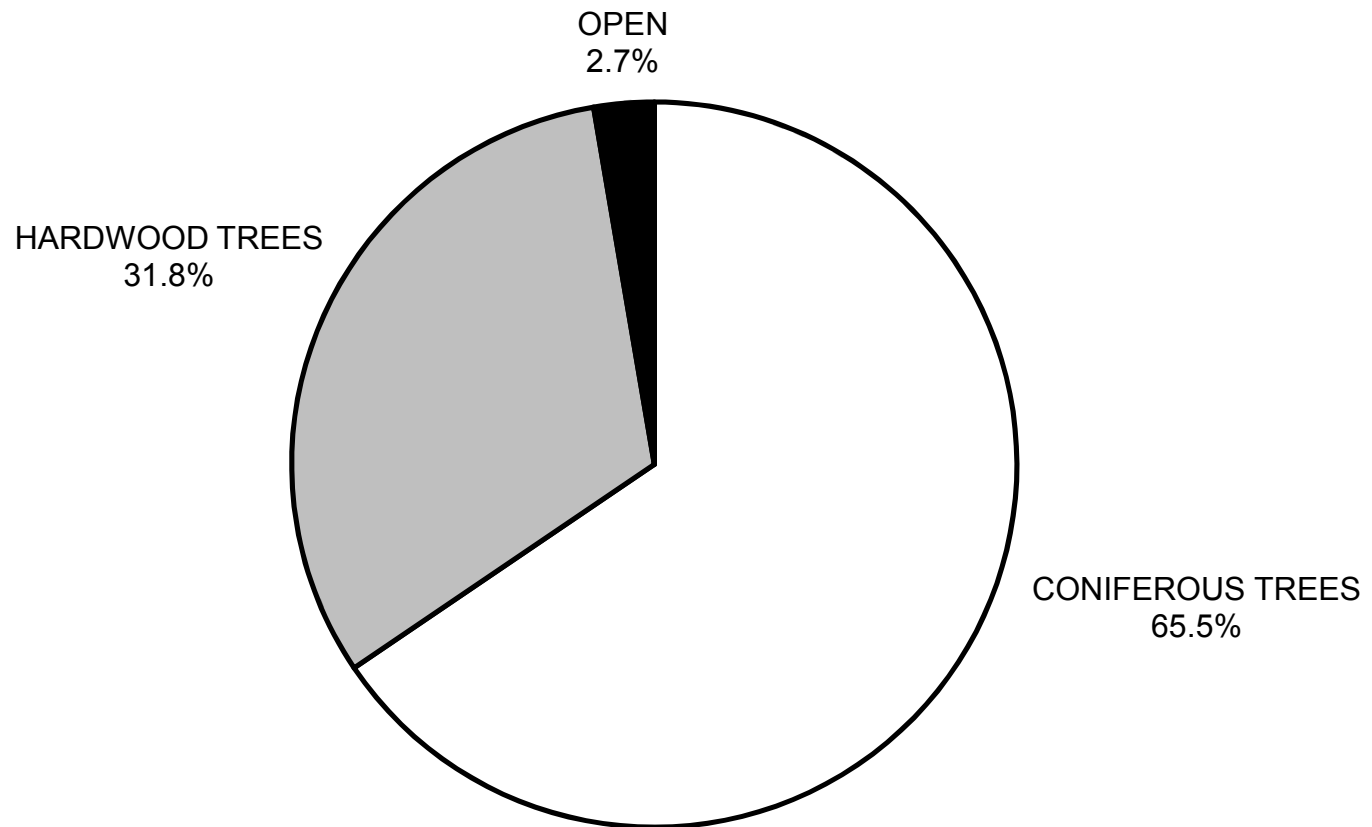
GRAPH 7

METTICK CREEK 2015
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



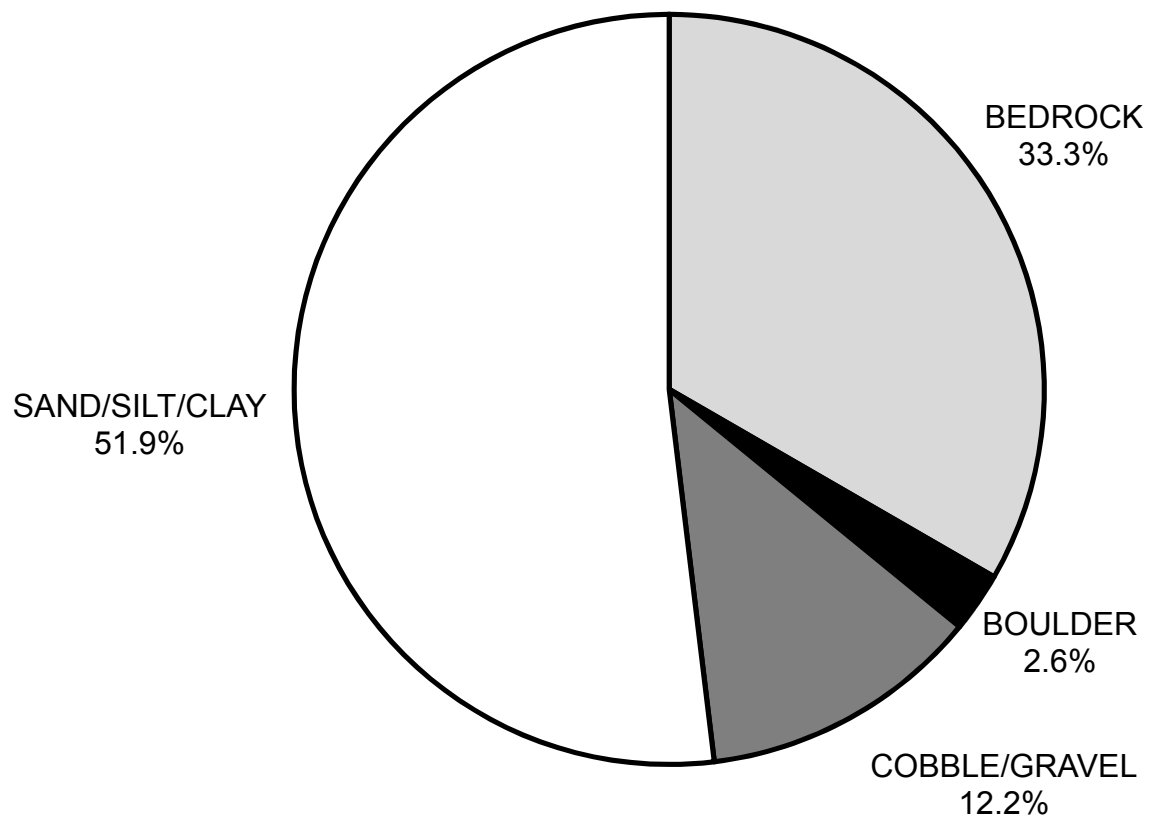
GRAPH 8

METTICK CREEK 2015
MEAN PERCENT CANOPY



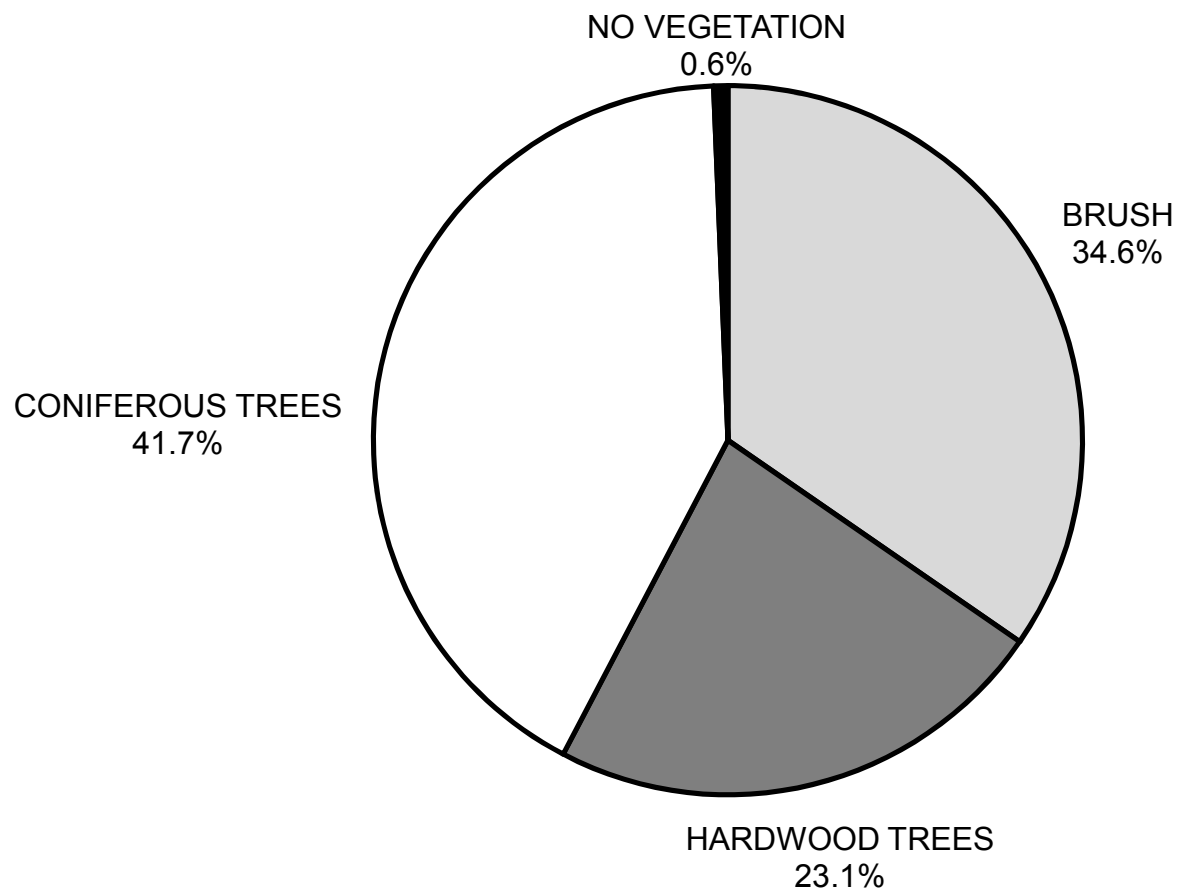
GRAPH 9

METTICK CREEK 2015
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

METTICK CREEK 2015
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11