

# STREAM INVENTORY REPORT

## Olds Creek

### INTRODUCTION

A stream inventory was conducted from July 22 to July 29, 2013 on Olds Creek. The survey began at the confluence with the Noyo River and extended upstream 3.5 miles. A stream inventory and report was also completed for one tributary to Olds Creek.

The Olds 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 Olds 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

Olds Creek is a tributary to the Noyo River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). Olds Creek's legal description at the confluence with the Noyo River is T18N R15W S14. Its location is 39.4203 degrees north latitude and 123.5037 degrees west longitude, LLID number 1235025394204. Olds Creek is a first order stream and has approximately 2.7 miles of blue line stream according to the USGS Northspur 7.5 minute quadrangle. Olds Creek drains a watershed of approximately 5.6 square miles. Elevations range from about 390 feet at the mouth of the creek to 2,050 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production and rural development. Vehicle access exists via Irmulco Road, seven miles west of Willits, CA.

### METHODS

The habitat inventory conducted in Olds Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project/AmeriCorps (WSP) members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Wildlife (CDFW). 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

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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 Olds 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 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 (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". Olds 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.

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### 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 Olds 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 not suitable for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

### 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 classified according to a list of nine cover types. In Olds 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 for each fully-described habitat unit by multiplying shelter value and percent 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 densimeters as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Olds 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 Olds 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.

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### 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 (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 Olds Creek. In addition, underwater observations were made at two 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 2.0.19, 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

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Graphics are produced from the tables using Microsoft Excel. Graphics developed for Olds 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

### HABITAT INVENTORY RESULTS

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

The habitat inventory of July 22 to July 29, 2013 was conducted by N. Massa and E. Augustyn (WSP). The total length of the stream surveyed was 18,290 feet.

Stream flow was not measured on Olds Creek.

Olds Creek is an F4 channel type for the entire length of the survey, 18,290 feet. F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 59 to 63 degrees Fahrenheit. Air temperatures ranged from 63 to 83 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 41% pool units, 34% riffle units, 25% flatwater units, and 1% dry units (Graph 1). Based on total length of Level II habitat types there were 59% pool units, 23% flatwater units, and 18% riffle units (Graph 2).

Eight Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 38%; low gradient riffle units, 34%; and run units, 22% (Graph 3). Based on percent total length, mid-channel pool units made up 53%, run units 19%, and low gradient riffle units 18%.

A total of 178 pools were identified (Table 3). Main channel pools were the most frequently encountered at 99% (Graph 4), and comprised 100% of the total length of all pools (Table 3).

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Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Sixty-eight of the 178 pools (38%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 178 pool tail-outs measured, 27 had a value of 1 (15%); 61 had a value of 2 (34%); 45 had a value of 3 (25%); 23 had a value of 4 (13%); 22 had a value of 5 (12%) (Graph 6). On this scale, a value of 1 indicates the best spawning conditions and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed not suitable 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 rating of 4, flatwater habitat types had a mean shelter rating of 3, and pool habitats had a mean shelter rating of 18 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 30. Main channel pools had a mean shelter rating of 18 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Small woody debris is the dominant cover type in Olds Creek. Graph 7 describes the pool cover in Olds 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 63% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 24% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Olds Creek was 95%. Five percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 61% and 39%, respectively. Graph 9 describes the mean percent canopy in Olds Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 96%. The mean percent left bank vegetated was 95%. The dominant elements composing the structure of the stream banks consisted of 47% sand/silt/clay, 39% cobble/gravel, 12% bedrock, and 2% boulders (Graph 10). Deciduous trees were the dominant vegetation type observed in 55% of the units surveyed. Additionally, 41% of the units surveyed had coniferous trees as the dominant vegetation type, and 3% had grass as the dominant vegetation type (Graph 11).

## BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a snorkel survey at two sites for species composition and distribution in Olds Creek on July 30, 2013. The sites were sampled by S. Monday (CDFW).

Two sites were sampled. The reach sites yielded one age 1+ steelhead/rainbow trout (SH/RT), one age 2+ SH/RT, and 15 young-of-the-year (YOY) coho salmon.

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The following chart displays the information yielded from these sites:

2013 Olds Creek underwater observations.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	SH/RT			Coho	
					YOY	1+	2+	YOY	1+
F4 Channel Type									
07/30/13	1	420	Pool	17,895	0	1	0	10	0
	2	433	Pool	18,290	0	0	1	5	0

## DISCUSSION

Olds Creek is an F4 channel type. The suitability of F4 channel types for fish habitat improvement structures is as follows: F4 channel types are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover.

The water temperatures recorded on the survey days July 22 to July 29, 2013 ranged from 59 to 63 degrees Fahrenheit. Air temperatures ranged from 63 to 83 degrees Fahrenheit. This is a suitable water temperature range for salmonids. However, 63 degrees Fahrenheit, if sustained, is near the threshold stress level 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 23% of the total length of this survey, riffles 18%, and pools 59%. Sixty-eight of the 178 (38%) 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.

Eighty-eight of the 178 pool tail-outs measured had embeddedness ratings of 1 or 2. Sixty-eight of the pool tail-outs had embeddedness ratings of 3 or 4. Twenty-two of the pool tail-outs had a rating of 5, which is considered not suitable 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 Olds Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

One hundred fifty-four of the 178 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 18. The shelter rating in the flatwater habitats is 3. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being

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provided primarily by small woody debris in Olds 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 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 95%. The percentage of right and left bank covered with vegetation was 96% and 95%, respectively.

### RECOMMENDATIONS

- 1) Olds Creek should be managed as an anadromous, natural production stream.
- 2) Due to the dam located at 591 feet, 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. The dam should be modified or removed to allow unimpeded fish passage for all life stages of salmonids.
- 3) 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.
- 4) The limited water temperature data available suggest that maximum temperatures are within temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.
- 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) 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.

### 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 the Noyo River. The channel is an F4 for the entire survey.



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591	0014.00	There is a concrete dam at the top of this unit. The dimensions of the dam are approximately 53' wide x 16' high x 3' thick at the top. The middle section of the dam has been modified and lowered to create a 4.5' high jump.
2806	0065.00	Three Chop Road crosses the channel. The crossing is a 13' wide x 48' long x 16' high wood and metal bridge.
3558	0083.00	Tributary #01 enters on the right bank. The tributary consists of isolated step pools for the first 30' and then it goes dry. The water temperature of the tributary was 58 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 59 degrees Fahrenheit. The slope of the tributary is approximately 19%.
3631	0084.00	Right bank seep.
4588	0099.00	Tributary #02 enters on the left bank. It contributes approximately 5% to Olds Creek's flow. The water temperature of the tributary was 59 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 59 degrees Fahrenheit. The slope of the tributary is approximately 8%. There is a culvert 90' upstream from the mouth with a 6' high plunge at the outlet.
5405	0110.00	Erosion site on right bank.
8133	0162.00	Erosion site on right bank measures 6' high.
8444	0171.00	Tributary #03 enters on the left bank. The first 40' of the tributary are dry and the tributary goes dry again 240' upstream from the mouth. The water temperature of the tributary was 61 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 61 degrees Fahrenheit. The slope of the tributary is approximately 5%. Young-of-the-year (YOY) coho and steelhead were observed in the tributary.
9794	0200.00	Log debris accumulation (LDA) #01 contains three pieces of large woody debris (LWD) and measures 5.5' high x 26' wide x 8' long. The flow is subsurface through the LDA and there are no visible gaps in it. Retained sediment ranges from sand to small cobble and measures 20' wide x 24' long x 2.5' deep. There is a 3' high plunge over the LDA. Fish were observed above the LDA.
11477	0243.00	LDA #02 contains five pieces of LWD and measures 4' high x 16' wide x 7' long. The flow is subsurface through the LDA and there are visible gaps in it. Retained sediment ranges from sand to gravel and measures 12' wide x 7' long x 2' deep. Fish were observed above the LDA.
14162	0310.00	Right bank seep.

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15681	0355.00	An erosion site on the left bank measures 15' high.
15901	0363.00	A private road crosses the channel. The crossing is a 9' wide x 33' long x 8' high wood and metal bridge.
16740	0383.00	Tributary #04 enters on the left bank. It contributes approximately 5% to Olds Creek's flow. The water temperature of the tributary was 59 degrees Fahrenheit; the water temperature downstream and upstream of the confluence was 60 degrees Fahrenheit. The slope of the tributary is 2-3%. Coho YOY were observed in the tributary.
17555	0413.00	Erosion site on right bank associated with Irmulco Road.
17745	0418.00	Irmulco Road crosses the channel. The crossing is a 12' wide x 39' long x 10' high metal bridge.
18266	0433.00	End of survey at left bank Tributary #05. For more information on Tributary #05 see the 2013 Unnamed Tributary to Olds Creek Stream Habitat Inventory Report.

## 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]	

**Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types**

Stream Name: Olds Creek

LLID: 1235025394204 Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Confluence Location: Quad: NORTHSPUR Legal Description: T18NR15WS14 Latitude: 39:25:13.0N Longitude: 123:30:09.0W

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	0.5	13	26	0.1									
106	17	FLATWATER	24.5	40	4196	22.9	6.1	0.3	0.6	239	25377	84	8950		3
178	178	POOL	41.1	60	10739	58.7	9.7	0.7	1.8	592	105432	618	109931	508	18
147	12	RIFFLE	33.9	23	3329	18.2	6.4	0.1	0.2	119	17492	15	2148		4
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>					<b>Total Area (sq.ft.)</b>			<b>Total Volume (cu.ft.)</b>		
433	207				18290					148301			121030		

**Table 2 - Summary of Habitat Types and Measured Parameters**

Stream Name: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

Latitude: 39:25:13.0N

Longitude: 123:30:09.0W

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 (%)
145	11	LGR	33.5	23	3296	18.0	7	0.1	0.4	124	17933	15	2134		4	94
2	1	BRS	0.5	16	33	0.2	5	0.2	0.4	68	135	14	27		10	100
93	15	RUN	21.5	37	3486	19.1	6	0.3	1.1	237	22085	82	7641		2	97
13	2	SRN	3.0	55	710	3.9	5	0.4	0.7	254	3300	102	1320		8	92
166	166	MCP	38.3	59	9747	53.3	9	0.7	5.9	563	93408	556	92222	452	18	95
11	11	STP	2.5	86	949	5.2	11	0.8	4.1	952	10476	1019	11208	845	15	98
1	1	PLP	0.2	43	43	0.2	36	3.9	6.3	1548	1548	6502	6502	6037	30	85
2	0	DRY	0.5	13	26	0.1										

Total Units  
433

Total Units Fully Measured  
207

Total Length (ft.)  
18290

Total Area (sq.ft.)  
148885

Total Volume (cu.ft.)  
121053

**Table 3 - Summary of Pool Types**

Stream Name: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

Latitude: 39:25:13.0N

Longitude: 123:30:09.0W

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
177	177	MAIN	99	60	10696	100	9.5	0.7	587	103884	476	84302	18
1	1	SCOUR	1	43	43	0	36.0	3.9	1548	1548	6037	6037	30

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
178	178	10739	105432	90339

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

Stream Name: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

Latitude: 39:25:13.0N

Longitude: 123:30:09.0W

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
166	MCP	93	15	9	90	54	49	30	10	6	2	1
11	STP	6	0	0	5	45	4	36	1	9	1	9
1	PLP	1	0	0	0	0	0	0	0	0	1	100

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
178	15	8	95	53	53	30	11	6	4	2

Mean Maximum Residual Pool Depth (ft.): 1.8

**Table 5 - Summary of Mean Percent Cover By Habitat Type**

Stream Name: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Dry Units: 2

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

Latitude: 39:25:13.0N

Longitude: 123:30:09.0W

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
145	11	LGR	0	50	1	0	0	0	0	49	0
2	1	BRS	0	15	0	0	0	0	0	85	0
147	12	TOTAL RIFFLE	0	44	1	0	0	0	0	55	0
93	15	RUN	13	46	6	0	0	0	0	35	0
13	2	SRN	35	15	0	0	0	0	0	50	0
106	17	TOTAL FLAT	19	38	4	0	0	0	0	39	0
166	166	MCP	29	31	24	1	1	0	0	12	2
11	11	STP	35	23	13	1	0	0	1	27	0
1	1	PLP	0	25	15	0	0	0	10	50	0
178	178	TOTAL POOL	29	30	24	1	1	0	0	13	2
433	207	TOTAL	28	31	22	1	1	0	0	16	2



**Table 6 - Summary of Dominant Substrates By Habitat Type**

Stream Name: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Dry Units: 2

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

Latitude: 39:25:13.0N

Longitude: 123:30:09.0W

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
145	11	LGR	0	0	91	9	0	0	0
2	1	BRS	0	0	0	0	0	0	100
93	15	RUN	0	7	80	13	0	0	0
13	2	SRN	0	0	100	0	0	0	0
166	166	MCP	0	31	63	4	1	0	2
11	11	STP	0	27	64	9	0	0	0
1	1	PLP	0	100	0	0	0	0	0

**Table 7 - Summary of Mean Percent Canopy for Entire Stream**

Stream Name: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

Latitude: 39:25:13.0N

Longitude: 123:30:09.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
95	39	61	0	96	95

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.

**Table 8 - Fish Habitat Inventory Data Summary**

Stream Name: Olds Creek LLID: 1235025394204 Drainage: Noyo River  
Survey Dates: 7/22/2013 to 7/29/2013 Survey Length (ft.): 18290 Main Channel (ft.): 18290 Side Channel (ft.): 0  
Confluence Location: Quad: NORTHSPUR Legal Description: T18NR15WS14 Latitude: 39:25:13.0N Longitude: 123:30:09.0W

**Summary of Fish Habitat Elements By Stream Reach**

**STREAM REACH: 1**

Channel Type: F4	Canopy Density (%): 95.2	Pools by Stream Length (%): 58.7
Reach Length (ft.): 18290	Coniferous Component (%): 38.7	Pool Frequency (%): 41.1
Riffle/Flatwater Mean Width (ft.): 6.2	Hardwood Component (%): 61.3	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Hardwood Trees	< 2 Feet Deep: 62
Range (ft.): 11 to 28	Vegetative Cover (%): 95.5	2 to 2.9 Feet Deep: 30
Mean (ft.): 17	Dominant Shelter: Small Woody Debris	3 to 3.9 Feet Deep: 6
Std. Dev.: 3	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 2
Base Flow (cfs.): 0.0	Occurrence of LWD (%): 18	Mean Max Residual Pool Depth (ft.): 1.8
Water (F): 59 - 63 Air (F): 63 - 83	LWD per 100 ft.:	Mean Pool Shelter Rating: 18
Dry Channel (ft): 26	Riffles: 1	
	Pools: 3	
	Flat: 1	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 6 Gravel: 63 Sm Cobble: 24 Lg Cobble: 1 Boulder: 0 Bedrock: 7		
Embeddedness Values (%): 1. 15.2 2. 34.3 3. 25.3 4. 12.9 5. 12.4		

**Table 9 - Mean Percentage of Dominant Substrate and Vegetation**

Stream Name: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

Latitude: 39:25:13.0N

Longitude: 123:30:09.0W

**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	19	30	11.8
Boulder	3	4	1.7
Cobble / Gravel	79	83	39.1
Sand / Silt / Clay	106	90	47.3

**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	9	2	2.7
Brush	5	1	1.4
Hardwood Trees	109	117	54.6
Coniferous Trees	84	87	41.3
No Vegetation	0	0	0.0

**Total Stream Cobble Embeddedness Values:** 3

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

StreamName: Olds Creek

LLID: 1235025394204

Drainage: Noyo River

Survey Dates: 7/22/2013 to 7/29/2013

Confluence Location: Quad: NORTHSPUR

Legal Description: T18NR15WS14

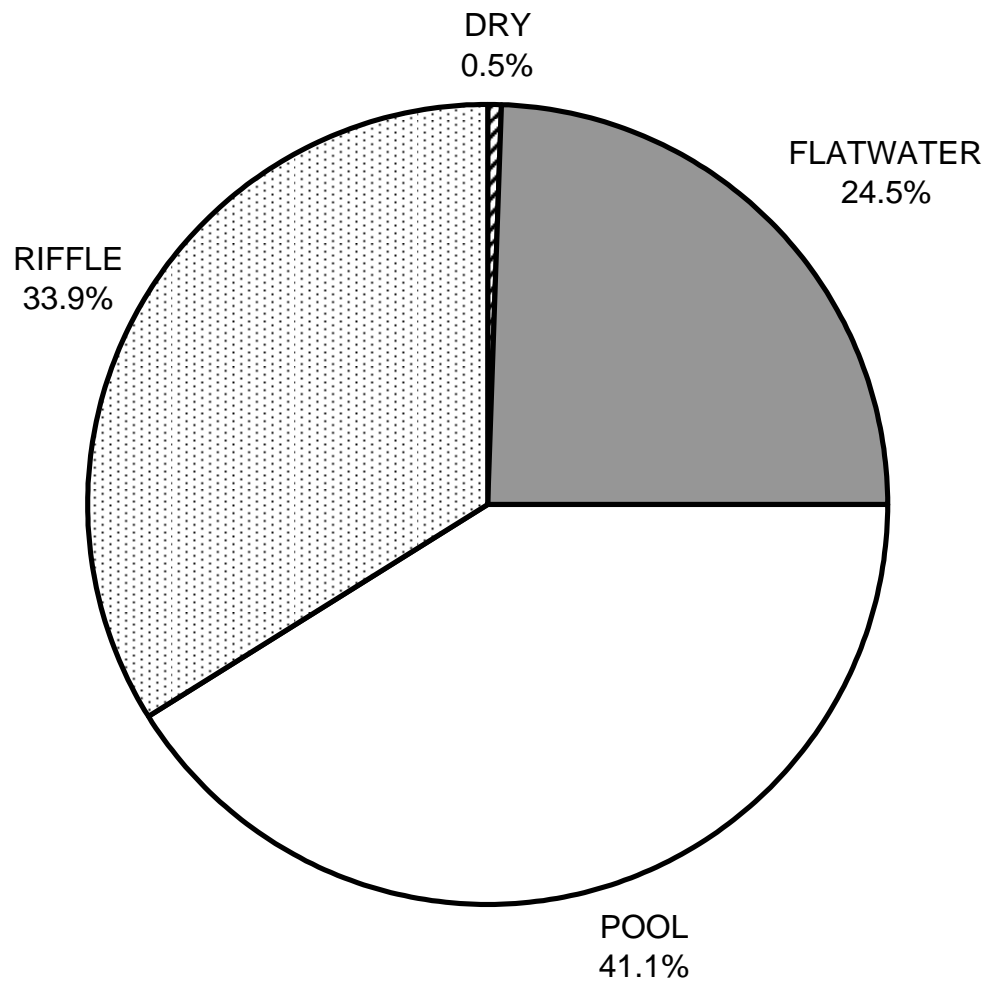
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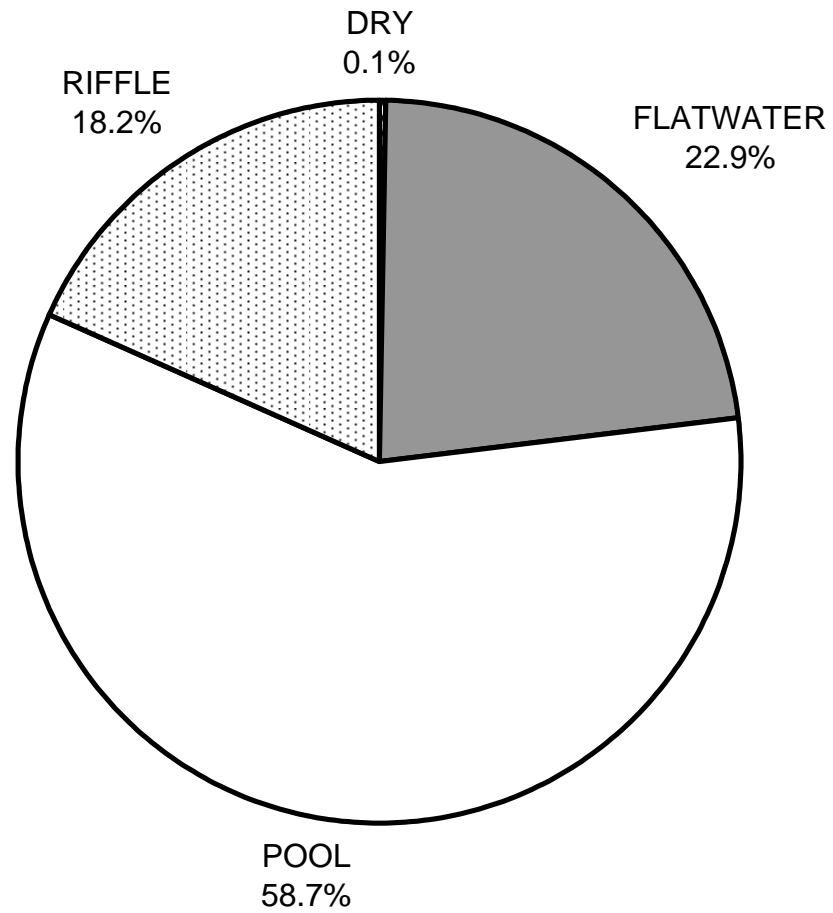
	<b>Riffles</b>	<b>Flatwater</b>	<b>Pools</b>
UNDERCUT BANKS (%)	0	19	29
SMALL WOODY DEBRIS (%)	44	38	30
LARGE WOODY DEBRIS (%)	1	4	24
ROOT MASS (%)	0	0	1
TERRESTRIAL VEGETATION (%)	0	0	1
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	55	39	13
BEDROCK LEDGES (%)	0	0	2

**OLDS CREEK 2013  
HABITAT TYPES BY PERCENT OCCURRENCE**



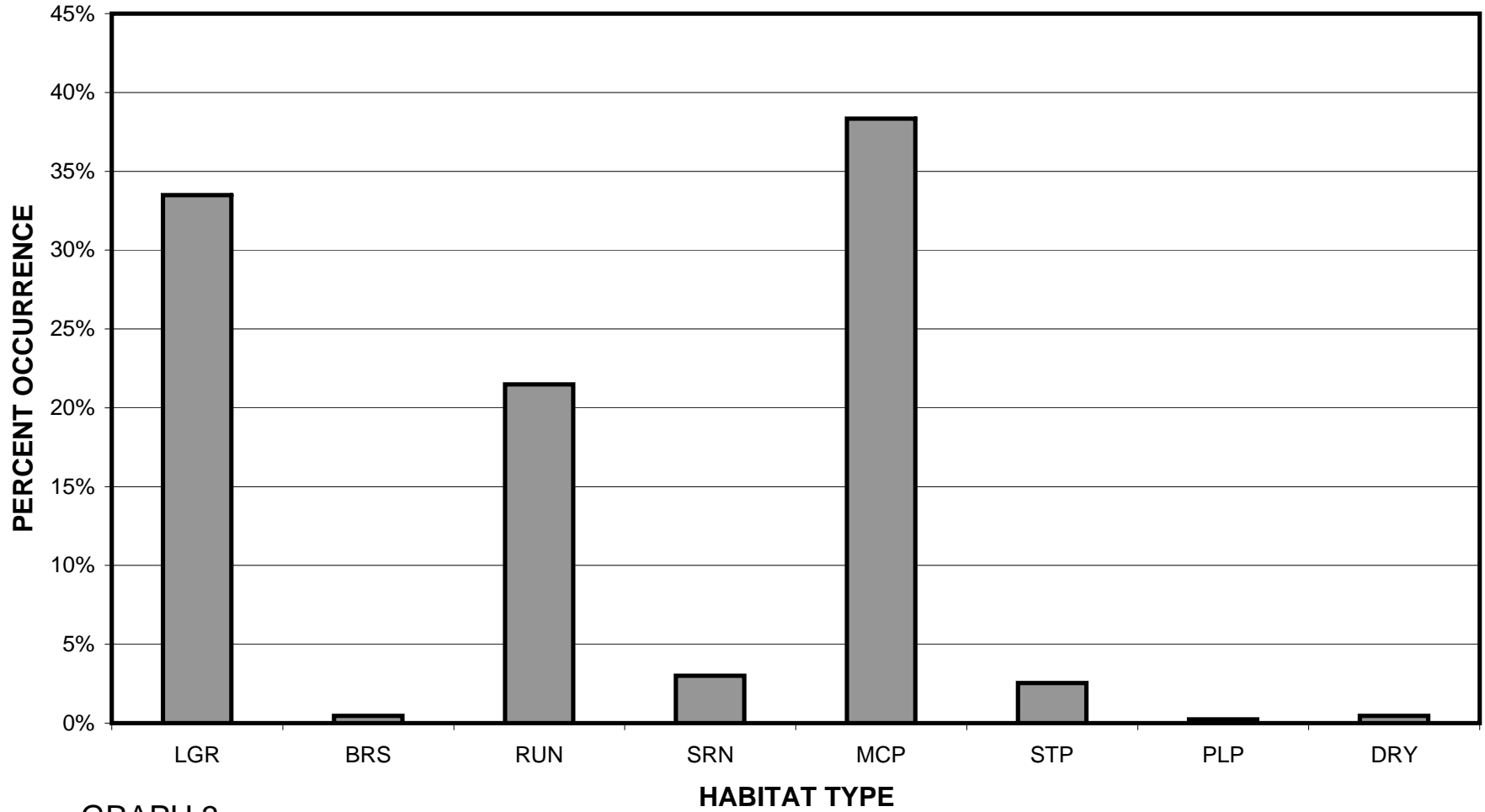
GRAPH 1

# OLDS CREEK 2013 HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

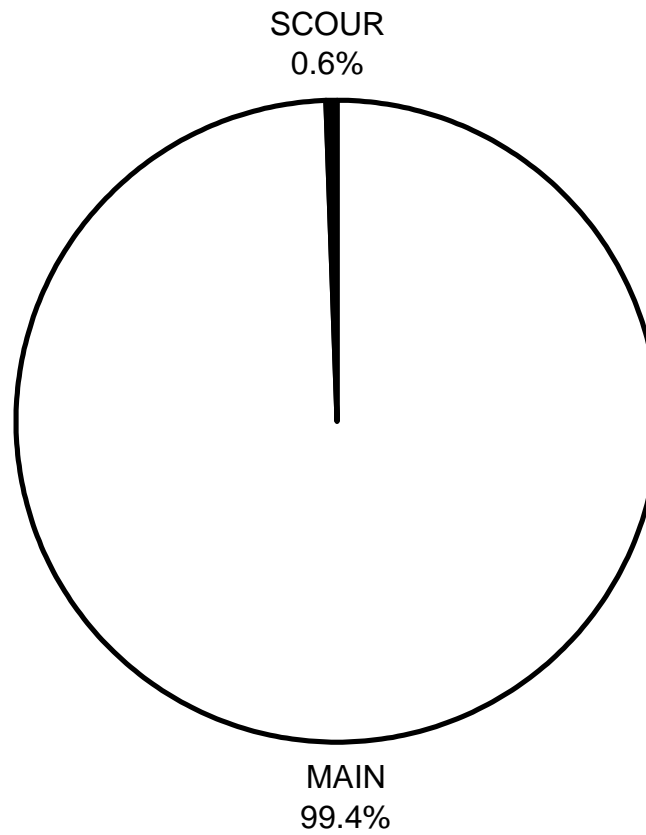
# OLDS CREEK 2013 HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 3

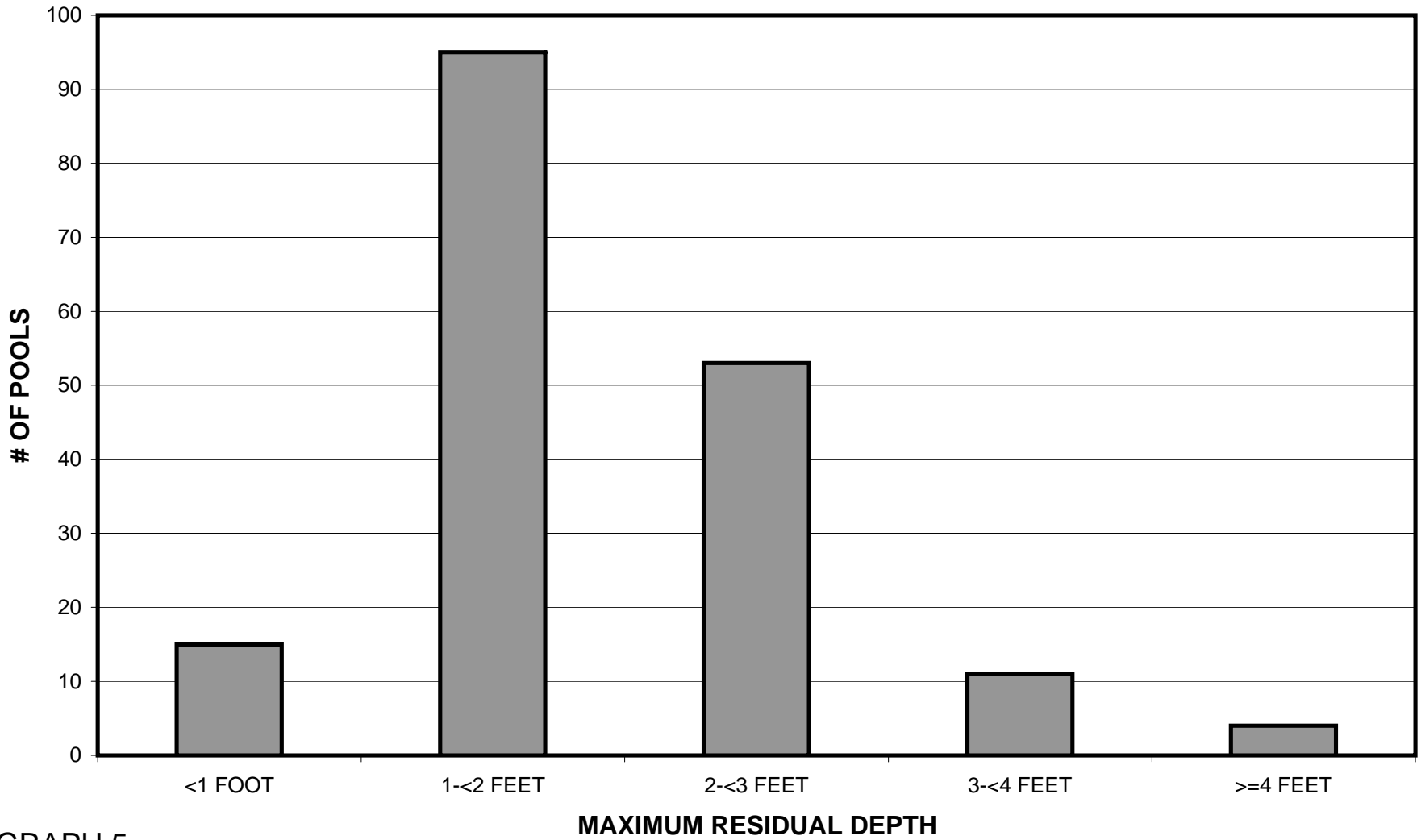


**OLDS CREEK 2013  
POOL TYPES BY PERCENT OCCURRENCE**



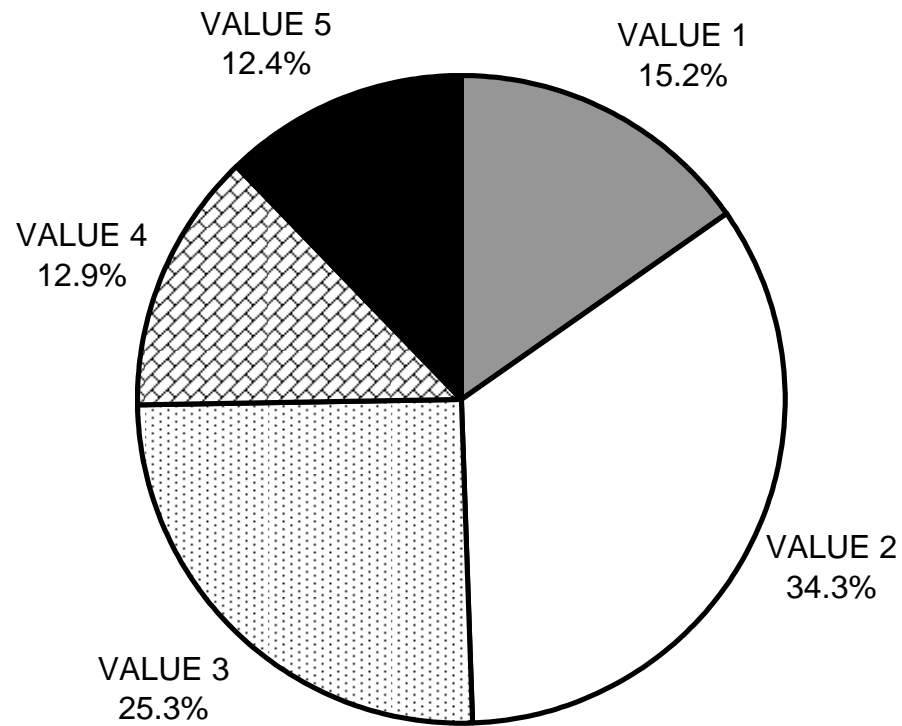
GRAPH 4

# OLDS CREEK 2013 MAXIMUM DEPTH IN POOLS



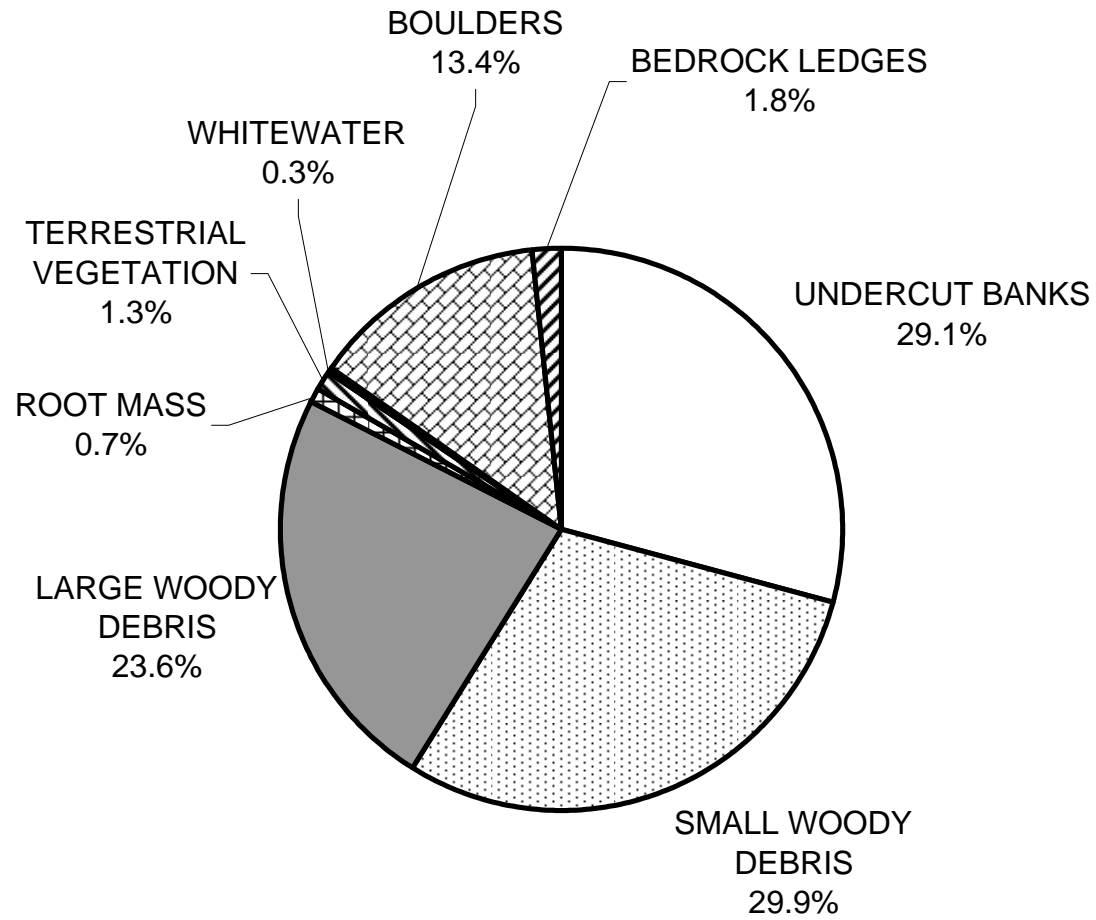
GRAPH 5

# OLDS CREEK 2013 PERCENT EMBEDDEDNESS



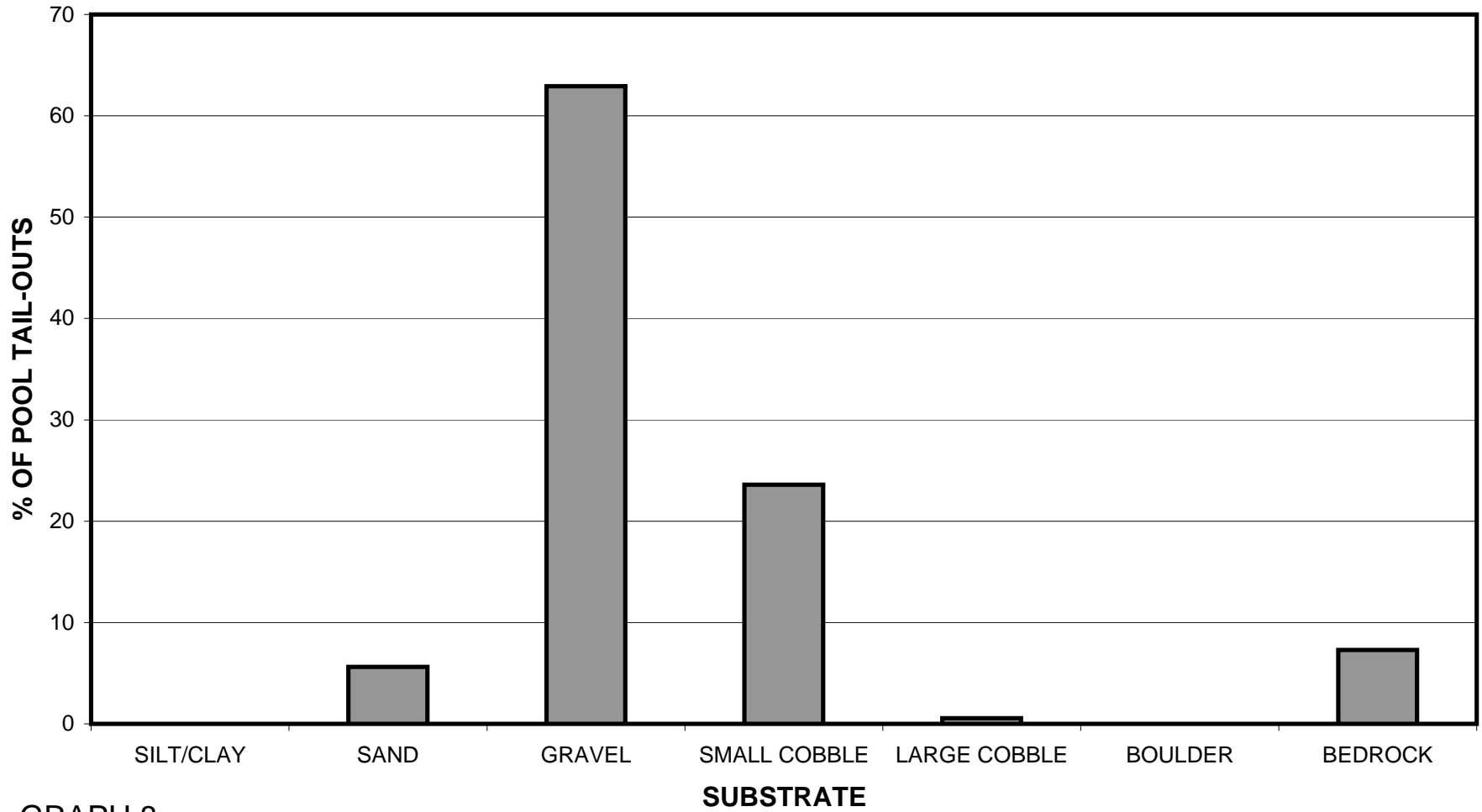
GRAPH 6

# OLDS CREEK 2013 MEAN PERCENT COVER TYPES IN POOLS



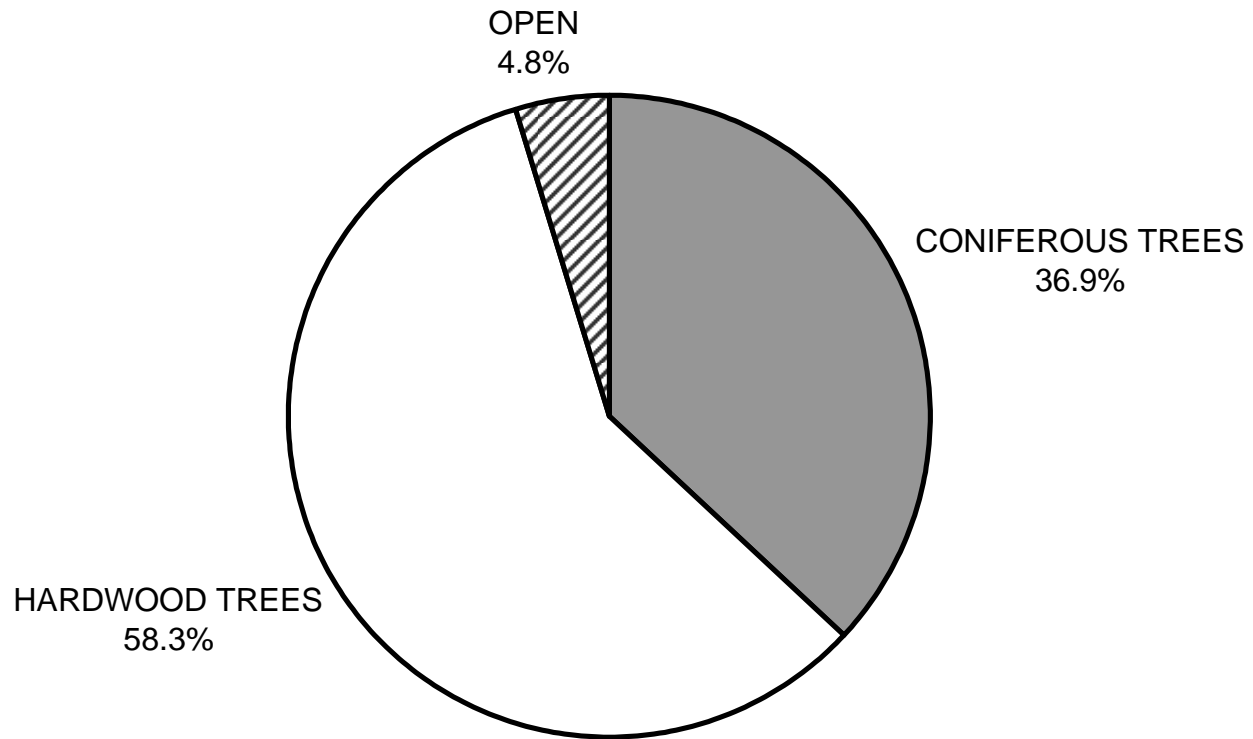
GRAPH 7

# OLDS CREEK 2013 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



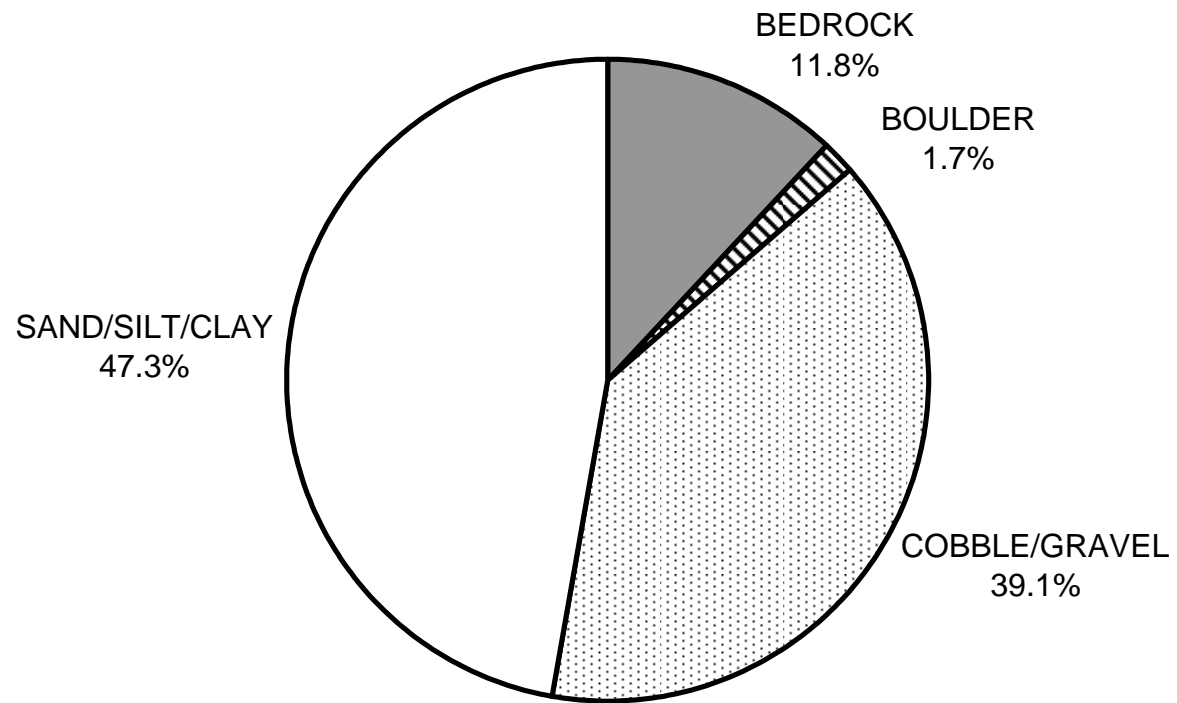
GRAPH 8

# OLDS CREEK 2013 MEAN PERCENT CANOPY



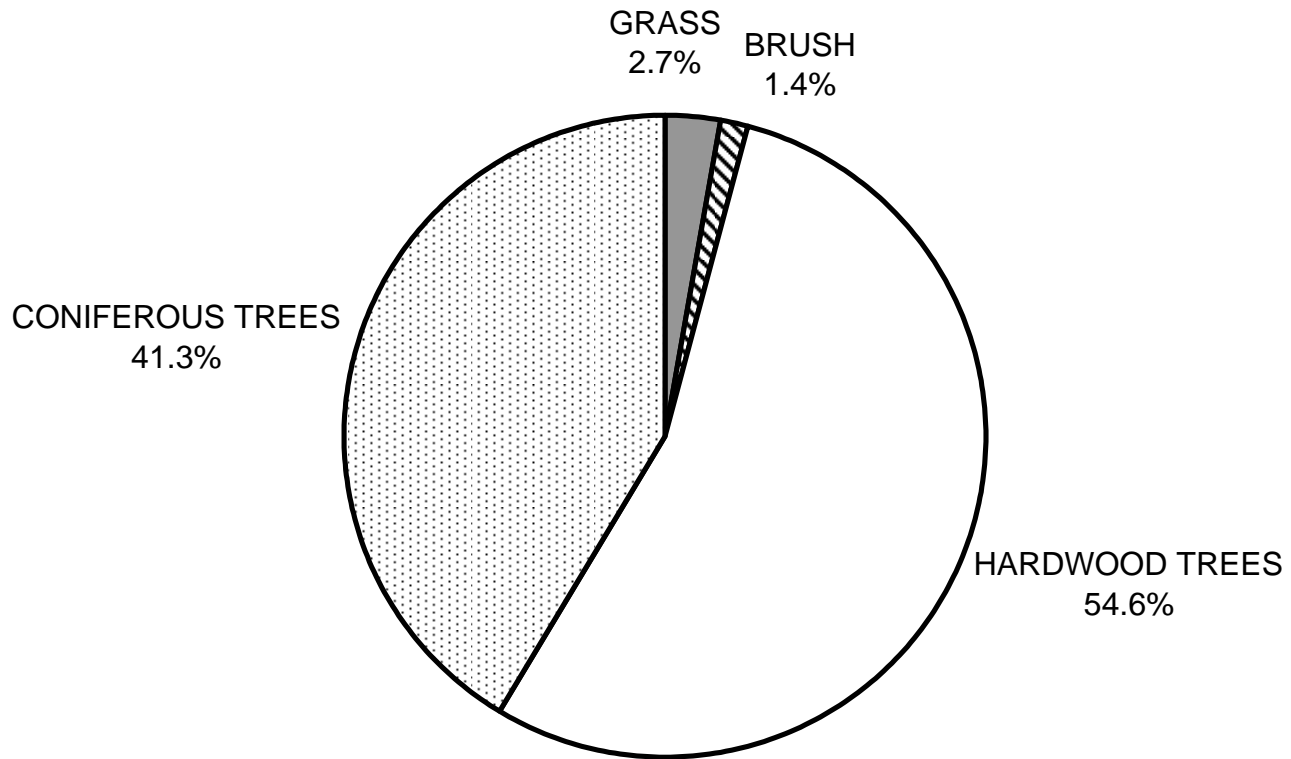
GRAPH 9

**OLDS CREEK 2013  
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

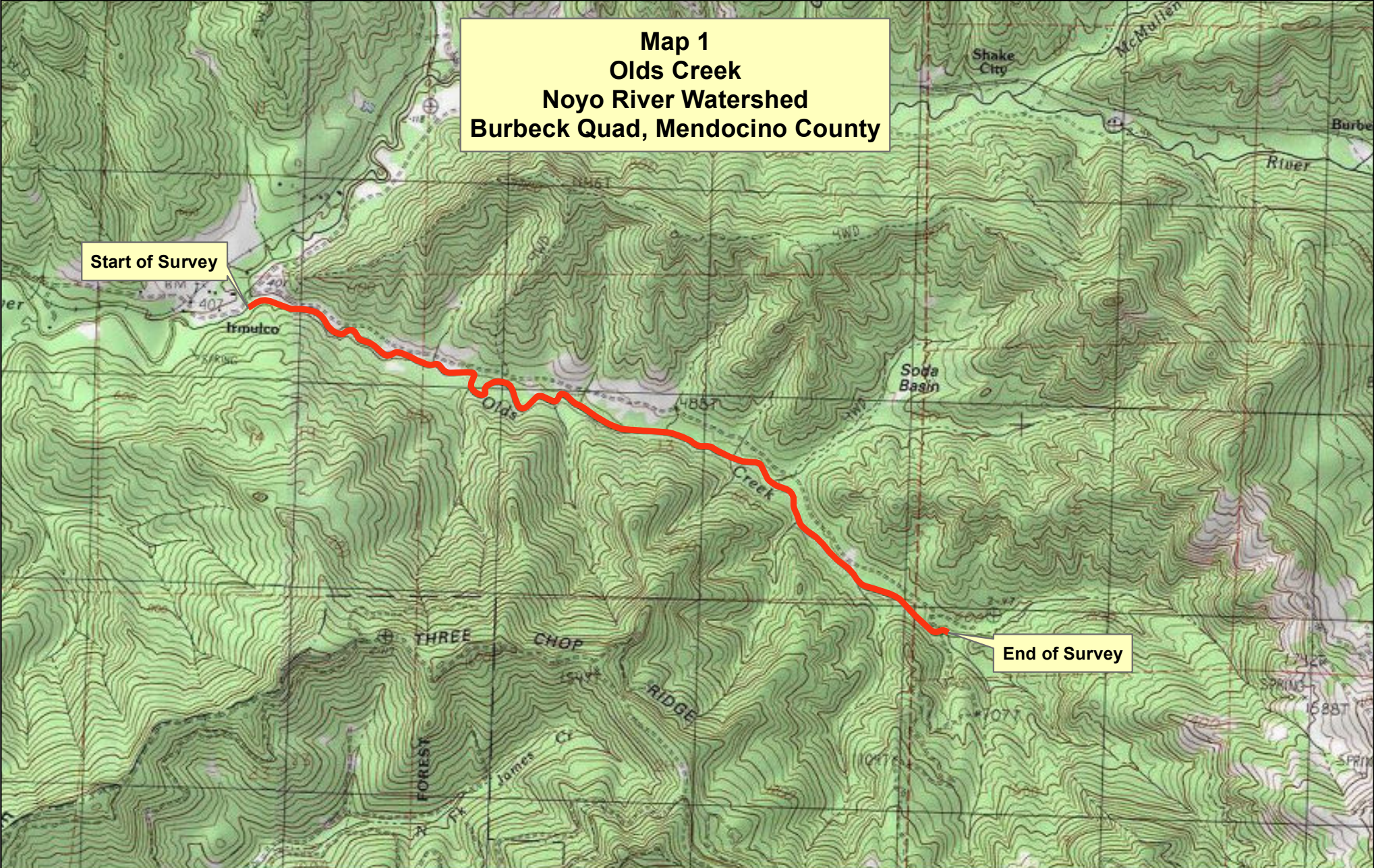
# OLDS CREEK 2013 DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11



**Map 1**  
**Olds Creek**  
**Noyo River Watershed**  
**Burbeck Quad, Mendocino County**



— Channel Type F4

