

# **STREAM INVENTORY REPORT**

## **Standley Creek**

### **INTRODUCTION**

A stream inventory was conducted during October 9, 2007 to October 15, 2007 on Standley Creek. The survey began at the confluence with South Fork Eel River and extended upstream 3.0 miles.

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

A biological inventory of Standley Creek was last conducted in 2001 to document the presence and distribution of juvenile salmonid species. Data from that survey is included in this report.

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**

Standley Creek is a tributary to South Fork Eel River, tributary to Eel River, which drains to the Pacific Ocean, located in Mendocino County, California (Map 1). Standley Creek's legal description at the confluence with South Fork Eel River is T24N R18W S1. Its location is 39.9602 north latitude and 123.8002 west longitude, LLID number 1238003399603. Standley Creek is a first order stream and has approximately 4.7 miles of blue line stream according to the USGS Piercy 7.5 minute quadrangle. Standley Creek drains a watershed of approximately 7.3 square miles. Elevations range from about 500 feet at the mouth of the creek to 1,000 feet in the headwater areas. Second growth redwood forest dominates the watershed. The watershed is owned by the Redwood Forest Foundation, Inc. Vehicle access exists from US Highway 101 at Piercy, via Highway 271 and then by crossing the South Fork Eel River on foot to the confluence with the mouth of Standley Creek.

### **METHODS**

The habitat inventory conducted in Sample Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Conservation Corps (CCC) Technical Advisors and Watershed Stewards Project/AmeriCorps (WSP) Members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was conducted by a two-person team.

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### 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 Standley 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". Standley 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 Standley 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 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. 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 Standley 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 Standley 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 Standley 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:

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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 is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks during habitat typing in Standley Creek. Detailed biological sampling (electrofishing and/or underwater observation) was not conducted on Standley Creek during the 2007 survey. Data from a 2001 electrofishing survey is listed in the Biological Inventory Results section of this report. Electrofishing sampling techniques are 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 Game. 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 Standley 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 October 9, 2007 to October 15, 2007 was conducted by S. McSmith & I. Mikus (DFG). The total length of the stream surveyed was 16,057 feet with an additional 145 feet of side channel.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.9 cfs on October 15, 2007.

Standley Creek is a B2 channel type for 8,699 feet of the stream surveyed (Reach 1) and a B4 channel type for 7,358 feet of the stream surveyed (Reach 2). B2 channel types are moderately entrenched, moderate gradient, riffle-dominated channels with very stable plan and profile, stable banks and boulder-dominant substrates. B4 channel types are moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks, and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 48 to 50 degrees Fahrenheit. Air temperatures ranged from 50 to 58 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 41% pool units, 30% riffle units, 27% flatwater units, and 2% no survey units (Graph 1). Based on total length of Level II habitat types there were 42.5% flatwater units, 33% pool units, 23.5% riffle units and 1% no survey units.

Thirteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 26% low gradient riffle units, 25% mid-channel pool units and 15% step run units (Graph 3). Based on percent total length step run units made up 34%, low gradient riffle units 21%, and mid-channel pool units 19%.

A total of 95 pools were identified (Table 3). Main channel pools were the most frequently

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encountered, at 65% (Graph 4), and comprised 62% 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. Sixty-three of the 95 pools (66%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 95 pool tail-outs measured, 5 had a value of 1 (5.3%); 29 had a value of 2 (30.5%); 39 had a value of 3 (41.1%); 13 had a value of 4 (13.7%) and 9 had a value of 5 (9.5%) (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 unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 9, flatwater habitat types had a mean shelter rating of 6, and pool habitats had a mean shelter rating of 20 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 21 and scour pools had a mean shelter rating of 18 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Standley Creek. Graph 7 describes the pool cover in Standley Creek. Boulders are the dominant pool cover type followed by large woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was observed in 53% of pool tail-outs and small cobble was observed in 22% of pool tail-outs.

The mean percent canopy density for the surveyed length of Standley Creek was 82% (Table 7). Eighteen percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 58% and 42%, respectively (Table 7). Graph 9 describes the total mean percent canopy in Standley Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 87%. The mean percent left bank vegetated was 89% (Table 7). The dominant elements composing the structure of the stream banks consisted of 45% bedrock, 42% sand/silt/clay, 9% boulder and 4% cobble/gravel (Graph 10). Deciduous trees were the dominant vegetation type observed in 48% of the units surveyed. Additionally, 42% of the units surveyed had coniferous trees as the dominant vegetation type, 9% had brush as the dominant vegetation and 1% observed had no vegetation (Graph 11).

## **BIOLOGICAL INVENTORY RESULTS**

Standley Creek was biologically sampled on September 13, 2001, by the California Department of Fish and Game for fish presence and identification. Using a backpack electrofisher, 7 coho salmon and 53 steelhead trout were captured and identified during the survey. The biological survey began at the confluence with South Fork Eel River and ended approximately 1,045 feet upstream.

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### DISCUSSION

Standley Creek is a B2 channel type for the first 8,699 feet of stream surveyed and a B4 channel type for the remaining 7,358 feet. The suitability of B2 and B4 channel types for fish habitat improvement structures is as follows: B2 channel types are excellent for plunge weirs, single and opposing wing-deflectors, and log cover. B4 channel types are excellent for low-stage plunge weirs; boulder clusters; bank-placed boulders; single and opposing wing-deflectors; and log cover.

The water temperatures recorded on the survey days October 9, 2007 to October 15, 2007, ranged from 48 to 50 degrees Fahrenheit. Air temperatures ranged from 50 to 58 degrees Fahrenheit. 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 42% of the total length of this survey, pools 33% and riffles 23%. The pools are relatively deep, with 63 of the 95 (66%) pools having a maximum residual 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 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.

Thirty-four of the 95 pool tail-outs measured had embeddedness ratings of 1 or 2. Fifty-two of the pool tail-outs had embeddedness ratings of 3 or 4. Nine 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 Standley Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Seventy-one of the 95 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 was low with a rating of 20. The shelter rating in the flatwater habitats was lower at 6. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Standley Creek. Boulders are the dominant cover type in pools followed by large woody debris. 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 82%. Reach 1 had a canopy density of 87.4% and Reach 2 had a canopy density of 76.3%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was high at 87% and 89%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

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### RECOMMENDATIONS

- 1) Standley Creek should be managed as an anadromous, natural production stream.
- 2) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from boulders. Adding high quality complexity with woody cover in the pools is desirable.
- 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) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.
- 5) 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 3 to 5 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 took place at the confluence with the SF Eel River.
261	0004.00	Salmonid young-of-the-year (YOY) were observed.
1758	0027.00	Erosion on the left bank was contributing fine sediment to boulders. The site measured 70' high x 30' long.
2554	0034.00	Erosion on the right bank was contributing primarily fine sediment to boulders. The site measured 25' high by 26' long. Log debris accumulation (LDA) #1, 10' high x 77' wide x 26' long, was made up of 33 pieces of large woody debris. Sediment ranging from silt to cobble was being retained. The sediment measured 7' high x 36' wide x 270' long. Water was flowing through, but there were no visible gaps in the accumulation. Dry side channels were visible.
2958	0041.00	There was a boulder plunge 2.1' high at the top of the habitat unit.



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3038	0043.00	There was a boulder plunge 1.8' high at the top of the habitat unit.
3573	0051.00	There was a large dry tributary on the left bank.
3706	0053.00	Tributary #1 entered from the left bank. The tributary temperature was 50 degrees Fahrenheit as was the main stem both upstream and downstream of the confluence. It appeared as though the tributary would not be accessible to fish more than 50' upstream due to a 30% slope. Flow was estimated to be less than 0.1cfs, contributing about 2% to the main stem flow. No fish were observed for the entire 200' of visual observation.
4011	0059.00	Old growth redwood root wads were providing excellent shelter and scour. Erosion site on the left bank. It measured 90' high x 60' long. Fine to cobble sediment was being contributed to the creek as well as large conifers and hardwood.
4255	0061.00	Erosion site on the left bank. It measured 120' high x 80' long. Fine to cobble sediments were being contributed to the creek, as well as three large redwoods. The estimated slope was 120% and the bank was entirely bare of any vegetation.
4278	0062.00	Right bank slump contributing boulders and large trees to the creek.
4354	0063.00	Right bank slump continued through this habitat unit.
4471	0065.00	Old growth conifer logs were scattered through the drainage.
4695	0071.00	Erosion site on the left bank measuring 10' high x 60' long and right bank measuring 75' high x 40' long.
5719	0082.00	Dry tributary on the right bank. The mouth of the dry tributary was plugged with an old culvert, old growth logs and rootwads.
6176	0088.00	Landslide on the right bank that had contributed large cobbles to boulder; it was partially revegetated.
6640	0094.00	LDA #2, 6' high x 41' wide x 7' long, was made up of 7 pieces of large woody debris. There was no sediment being retained. Evidence suggested that in higher flows there is an active side channel around the accumulation. Water was able to flow through the visible gaps in the accumulation with only a minor strainer at the top of the habitat unit made up of small woody debris. Salmonid YOY were observed upstream of the accumulation.
6777	0098.00	Erosion on the right bank that measured 75' high x 120' long contributing fine sediments and gravel.
6918	0099.00	Remnants of an old debris accumulation were recorded.

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YOY salmonids were observed throughout the day of survey.

7409	0106.00	The large woody debris recorded in this habitat unit was entirely made up of old growth redwood root wads.
8047	0119.00	A bedrock chute measuring 3.5' wide x 4' deep could pose a velocity barrier at higher flows. Though there were still YOY salmonids observed upstream of the bedrock chute.
8075	0120.00	The dominant substrate was bedrock, nearly forming bedrock sheets.
8579	0129.00	The remnants of an old large debris accumulation on the left bank have caused the creek to cut right.
8610	0130.00	LDA #3, 13' high x 67' wide x 37' long, was made up of 27 pieces of large woody debris. Sediment measuring 6' high x 55' wide x 100' long, was being retained upstream of the accumulation. There was fish passage through visible gaps. YOY were observed upstream of the accumulation.
9228	0140.00	Dry right bank tributary. A bedrock chute, as well as large woody debris was piled at the mouth of the dry tributary.
9276	0141.00	The large woody debris encountered in this habitat unit was all old growth.
9356	0143.00	The large woody debris encountered in this habitat unit was all old growth redwood. Tributary #2 entered from the right bank. The lower 10' of the tributary was flowing subsurface. The temperature of the tributary was 49 degrees Fahrenheit. The main stem upstream of the confluence was also 49 degrees Fahrenheit, while downstream of the confluence was 51 degrees Fahrenheit. For the 250' observed, no fish were seen even though it appeared to be accessible to fish; it could have been due to the 10% slope.
9446	0144.00	All of the large woody debris in this habitat unit was old growth redwood. This was the site of a past large debris accumulation, sediment retained from the accumulation was still working its way downstream.
9572	0146.00	All of the large woody debris in this habitat unit was old growth redwood.
10586	0158.00	Canopy was significantly improved since some old growth redwoods still remained this far up in the watershed.
10700	0160.00	Tributary #3 entered on the left bank. It was flowing and appeared to be accessible to fish for the first 100' surveyed, with a 5% slope; although no fish were observed. The temperature of the tributary was 49 degrees

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Fahrenheit. On the main stem upstream of the confluence, the temperature was also 49 degrees Fahrenheit, while downstream it was 51 degrees Fahrenheit. The estimated contribution to the flow of Standley Creek was 5%.

10868	0164.00	There was a lot of large woody debris present in this habitat unit. It appeared to be the result of a very large landslide from upstream.
10941	0166.00	There was a massive slide on the left bank measuring 300' high x 150' long. It was contributing fine sediment and gravel, as well as large woody debris. The slope was bare with no revegetation.
11429	0171.00	There was old growth conifer large woody debris present.
12496	0186.00	Tributary #4 entered on the left bank. The temperature of the tributary was 50 degrees Fahrenheit, while the main stem was 52 degrees Fahrenheit upstream and 50 degrees Fahrenheit downstream. There were YOY salmonids observed only for the first 50' of the 200' explored in the tributary. The estimated flow was less than 0.1cfs, contributing 10% flow to the main stem. The slope measured 4%.
12637	0187.00	From Habitat Units #137-187, YOY were observed in most runs and pools.
12748	0189.00	Right bank flowing drainage. After heavy rains occurred, many flowing tributaries were observed which had previously been dry.
13452	0197.00	Tributary #5 entered from the right bank. While the tributary did appear accessible to fish, there were no fish observed for the 300' explored; visibility was greatly reduced due to heavy downpour. The temperature of the tributary was 50 degrees Fahrenheit, the main stem both up and downstream was 48 degrees Fahrenheit. The estimated flow was less than 0.5cfs, contributing roughly 10% to the main stem. The slope measured 6%. One hundred feet upstream of the confluence, a tributary entered the tributary.
14209	0204.00	LDA #4, 9' high x 42' wide x 35' long, was made of 19 pieces of large woody debris. The retained sediment ranged from fines to cobbles that measured 3' high x 34' wide x 100' long. Visible gaps could be seen where water flowed through. YOY salmonids were observed upstream.
14419	0206.00	LDA #5, 11' high x 34' wide x 29' long, was made up of 22 pieces of large woody debris. There were visible gaps where the water could flow through and fish could pass. There were YOY observed upstream.
14481	0208.00	Erosion site on the right bank measuring 100' high x 120' long that contributed fine sediment and boulders. It appeared to have entirely crossed the channel within the past couple of years.

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15246	0216.00	There was a 1' log plunge at the top of the habitat unit.
15498	0220.00	Flowing tributary on the left bank contributing heavy loads of sediment. The mouth had an alluvial fan consisting of fine sediment to gravel. Upstream to downstream, it measured 3' deep x 7' long. LDA #6, 8' high x 37' wide x 12' long, consisted of 16 pieces of large woody debris. Sediment ranged from fines to cobbles and measured 3' high x 32' wide x 150' long. There were no visible gaps in the accumulation. YOY salmonids were observed upstream of the accumulation.
15972	0227.00	End of survey due to access time. The creek was still providing good fish habitat.

## 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

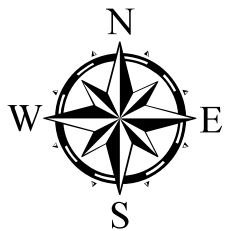
Dry	(DRY)	[7.0]	
Culvert	(CUL)	[8.0]	
Not Surveyed	(NS)	[9.0]	
Not Surveyed due to a marsh	(MAR)	[9.1]	

**Map 1**  
**Standley Creek 2007**  
**South Fork Eel Watershed**  
**Piercy Quad, Mendocino County**

Start of Survey

End of Survey

STATE WAYSIDE CAMPGROUND



**Legend**

- Reach 1, B2 Channel Type
- Reach 2, B4 Channel Type

0 950 1,900 3,800 Feet



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

Stream Name: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

Longitude: 123:48:01.0

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
62	9	FLATWATER	27.0	111	6880	42.5	15.9	0.6	1.2	887	55007	492	30531		6
5	0	NOSURVEY	2.2	24	119	0.7									
95	95	POOL	41.3	57	5401	33.3	15.9	1.0	2.5	873	82959	1278	121363	928	20
68	6	RIFFLE	29.6	56	3802	23.5	15.0	0.4	0.9	233	15829	102	6915		9
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
230	110				16202					153795			158810		

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

Stream Name: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

Longitude: 123:48:01.0W

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 (%)
59	3	LGR	25.7	56	3326	20.5	10	0.4	0.9	223	13179	86	5088		0	73
9	3	HGR	3.9	53	476	2.9	20	0.5	1.2	242	2180	117	1054		18	90
2	1	GLD	0.9	90	181	1.1	17	0.6	1.2	2465	4930	1479	2958		0	97
25	4	RUN	10.9	49	1223	7.5	13	0.6	1.6	429	10730	275	6877		6	73
35	4	SRN	15.2	156	5476	33.8	18	0.5	1.6	951	33277	463	16211		8	91
57	57	MCP	24.8	55	3126	19.3	16	1.0	7	870	49585	1311	74749	954	20	83
5	5	STP	2.2	48	241	1.5	17	1.0	3.1	643	3213	845	4227	622	28	86
9	9	CRP	3.9	72	646	4.0	16	1.2	4.5	1125	10121	1872	16845	1454	27	73
1	1	LSL	0.4	61	61	0.4	16	0.8	2.4	976	976	1074	1074	781	20	86
17	17	LSBk	7.4	68	1149	7.1	14	0.8	3.6	958	16288	1166	19821	788	6	82
1	1	LSBo	0.4	23	23	0.1	11	0.6	2.3	253	253	228	228	152	60	98
5	5	PLP	2.2	31	155	1.0	16	1.2	3.6	505	2523	884	4420	651	34	87
5	0	NS	2.2	24	119	0.7										

Total Units  
230

Total Units Fully Measured  
110

Total Length (ft.)  
16202

Total Area (sq.ft.)  
147255

Total Volume (cu.ft.)  
153551



Table 3 - Summary of Pool Types

Stream Name: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

Longitude: 123:48:01.0W

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
62	62	MAIN	65	54	3367	62	16.4	1.0	852	52798	927	57488	21
33	33	SCOUR	35	62	2034	38	15.0	0.9	914	30161	929	30664	18
Total Units	Total Units Fully Measured			Total Length (ft.)					Total Area (sq.ft.)		Total Volume (cu.ft.)		
95	95			5401					82959		88152		

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

Stream Name: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

Longitude: 123:48:01.0W

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
57	MCP	60	1	2	22	39	16	28	12	21	6	11
5	STP	5	0	0	1	20	3	60	1	20	0	0
9	CRP	9	0	0	2	22	4	44	1	11	2	22
1	LSL	1	0	0	0	0	1	100	0	0	0	0
17	LSBk	18	0	0	4	24	10	59	3	18	0	0
1	LSBo	1	0	0	0	0	1	100	0	0	0	0
5	PLP	5	0	0	2	40	1	20	2	40	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
95			1	1	31	33	36	38	19	20	8	8

Mean Maximum Residual Pool Depth (ft.): 2.5

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

Stream Name: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Dry Units: 0

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

Longitude: 123:48:01.0W

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
59	3	LGR	0	0	0	0	0	0	0	0	0
9	3	HGR	0	0	0	0	0	0	15	85	0
68	6	TOTAL RIFFLE	0	0	0	0	0	0	15	85	0
2	1	GLD	0	0	0	0	0	0	0	0	0
25	4	RUN	5	13	20	3	0	0	0	58	0
35	4	SRN	0	0	0	0	0	0	0	100	0
62	9	TOTAL FLAT	3	8	12	2	0	0	0	75	0
57	57	MCP	3	6	17	13	1	0	1	50	9
5	5	STP	0	9	16	0	0	0	0	70	5
9	9	CRP	4	14	21	11	9	0	1	27	12
1	1	LSL	0	30	70	0	0	0	0	0	0
17	17	LSBk	24	7	8	24	5	3	0	8	22
1	1	LSBo	70	0	0	30	0	0	0	0	0
5	5	PLP	20	4	19	13	0	0	4	41	0
95	95	TOTAL POOL	7	7	17	14	3	0	1	42	10
5	0	NS									
230	110	TOTAL	5	5	12	9	2	0	1	34	7

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

Stream Name: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Dry Units: 0

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

Longitude: 123:48:01.0W

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
59	3	LGR	0	0	0	67	33	0	0
9	3	HGR	0	0	0	0	0	67	33
2	1	GLD	0	0	100	0	0	0	0
25	4	RUN	0	0	100	0	0	0	0
35	4	SRN	0	0	50	0	0	50	0
57	57	MCP	2	7	60	0	4	23	5
5	5	STP	0	0	60	20	0	0	20
9	9	CRP	0	0	100	0	0	0	0
1	1	LSL	0	0	100	0	0	0	0
17	17	LSBk	0	12	71	6	6	0	6
1	1	LSBo	0	0	100	0	0	0	0
5	5	PLP	0	0	40	0	20	40	0

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

Stream Name: Standley Creek LLID: 1238003399603 Drainage: Eel River - South Fork  
Survey Dates: 10/9/2007 to 10/15/2007  
Confluence Location: Quad: PIERCY Legal Description: T24NR18WS01 Latitude: 39:57:37.0N Longitude: 123:48:01.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
82	42	58	0	87	89

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: Standley Creek		LLID: 1238003399603		Drainage: Eel River - South Fork	
Survey Dates: 10/9/2007 to 10/15/2007		Survey Length (ft.): 16202	Main Channel (ft.): 16057	Side Channel (ft.): 145	
Confluence Location: Quad: PIERCY		Legal Description: T24NR18WS01	Latitude: 39:57:37.0N	Longitude: 123:48:01.0W	

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B2

Reach Length (ft.): 8699

Riffle/Flatwater Mean Width (ft.): 18.8

BFW:

Range (ft.): 26 to 51

Mean (ft.): 37

Std. Dev.: 8

Base Flow (cfs.): 0.9

Water (F): 50 - 50

Air (F): 51 - 58

Dry Channel (ft): 0

Canopy Density (%): 87.4

Coniferous Component (%): 35.5

Hardwood Component (%): 64.5

Dominant Bank Vegetation: Hardwood Trees

Vegetative Cover (%): 87.1

Dominant Shelter: Boulders

Dominant Bank Substrate Type: Sand/Silt/Clay

Occurrence of LWD (%): 9

LWD per 100 ft.:

Riffles: 3

Pools: 6

Flat: 3

Pools by Stream Length (%): 29.3

Pool Frequency (%): 39.1

Residual Pool Depth (%):

< 2 Feet Deep: 44

2 to 2.9 Feet Deep: 38

3 to 3.9 Feet Deep: 15

>= 4 Feet Deep: 2

Mean Max Residual Pool Depth (ft.): 2.1

Mean Pool Shelter Rating: 21

Pool Tail Substrate (%): Silt/Clay: 0

Sand: 0

Gravel: 52

Sm Cobble: 8

Lg Cobble: 17

Boulder: 21

Bedrock: 2

Embeddedness Values (%): 1. 5.8

2. 26.9

3. 42.3

4. 9.6

5. 15.4

STREAM REACH: 2

Channel Type: B4

Reach Length (ft.): 7358

Riffle/Flatwater Mean Width (ft.): 11.9

BFW:

Range (ft.): 24 to 48

Mean (ft.): 33

Std. Dev.: 6

Base Flow (cfs.): 0.9

Water (F): 48 - 50

Air (F): 50 - 56

Dry Channel (ft): 0

Canopy Density (%): 76.3

Coniferous Component (%): 48.7

Hardwood Component (%): 51.3

Dominant Bank Vegetation: Coniferous Trees

Vegetative Cover (%): 88.6

Dominant Shelter: Boulders

Dominant Bank Substrate Type: Bedrock

Occurrence of LWD (%): 17

LWD per 100 ft.:

Riffles: 1

Pools: 4

Flat: 3

Pools by Stream Length (%): 38.1

Pool Frequency (%): 44.3

Residual Pool Depth (%):

< 2 Feet Deep: 21

2 to 2.9 Feet Deep: 37

3 to 3.9 Feet Deep: 26

>= 4 Feet Deep: 16

Mean Max Residual Pool Depth (ft.): 2.9

Mean Pool Shelter Rating: 19

Pool Tail Substrate (%): Silt/Clay: 0

Sand: 0

Gravel: 53

Sm Cobble: 40

Lg Cobble: 0

Boulder: 5

Bedrock: 2

Embeddedness Values (%): 1. 4.7

2. 34.9

3. 39.5

4. 18.6

5. 2.3

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

Stream Name: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

Longitude: 123:48:01.0W

**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	47	53	45.5
Boulder	11	8	8.6
Cobble / Gravel	4	4	3.6
Sand / Silt / Clay	48	45	42.3

**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	1	1	0.9
Brush	10	9	8.6
Hardwood Trees	48	57	47.7
Coniferous Trees	50	42	41.8
No Vegetation	1	1	0.9

**Total Stream Cobble Embeddedness Values:** 3

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

StreamName: Standley Creek

LLID: 1238003399603

Drainage: Eel River - South Fork

Survey Dates: 10/9/2007 to 10/15/2007

Confluence Location: Quad: PIERCY

Legal Description: T24NR18WS01

Latitude: 39:57:37.0N

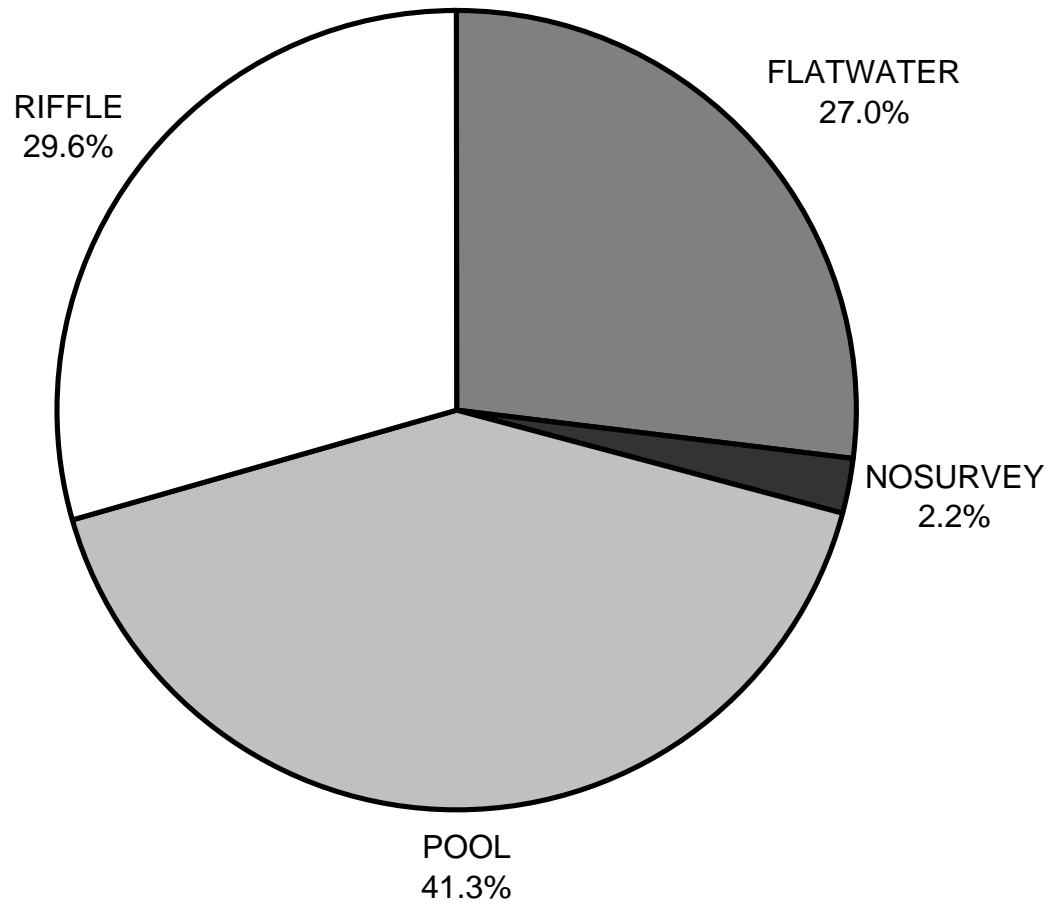
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	Riffles	Flatwater	Pools
<hr/>			
UNDERCUT BANKS (%)	0	3	7
SMALL WOODY DEBRIS (%)	0	8	7
LARGE WOODY DEBRIS (%)	0	12	17
ROOT MASS (%)	0	2	14
TERRESTRIAL VEGETATION (%)	0	0	3
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	15	0	1
BOULDERS (%)	85	75	42
BEDROCK LEDGES (%)	0	0	10

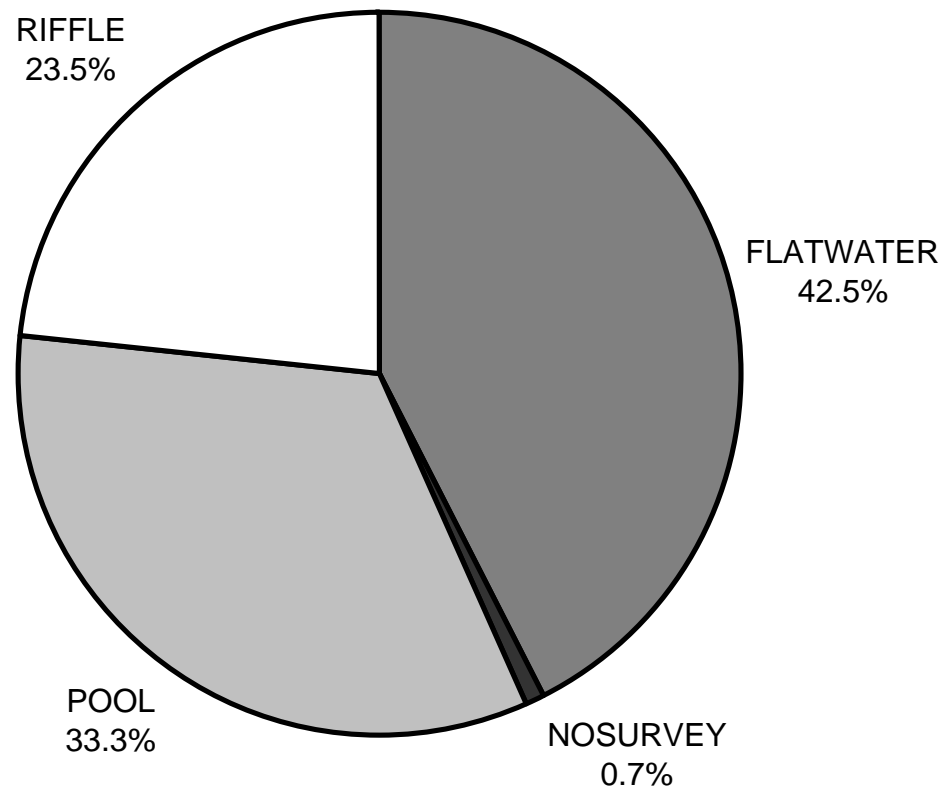


**STANDLEY CREEK 2007**  
**HABITAT TYPES BY PERCENT OCCURRENCE**



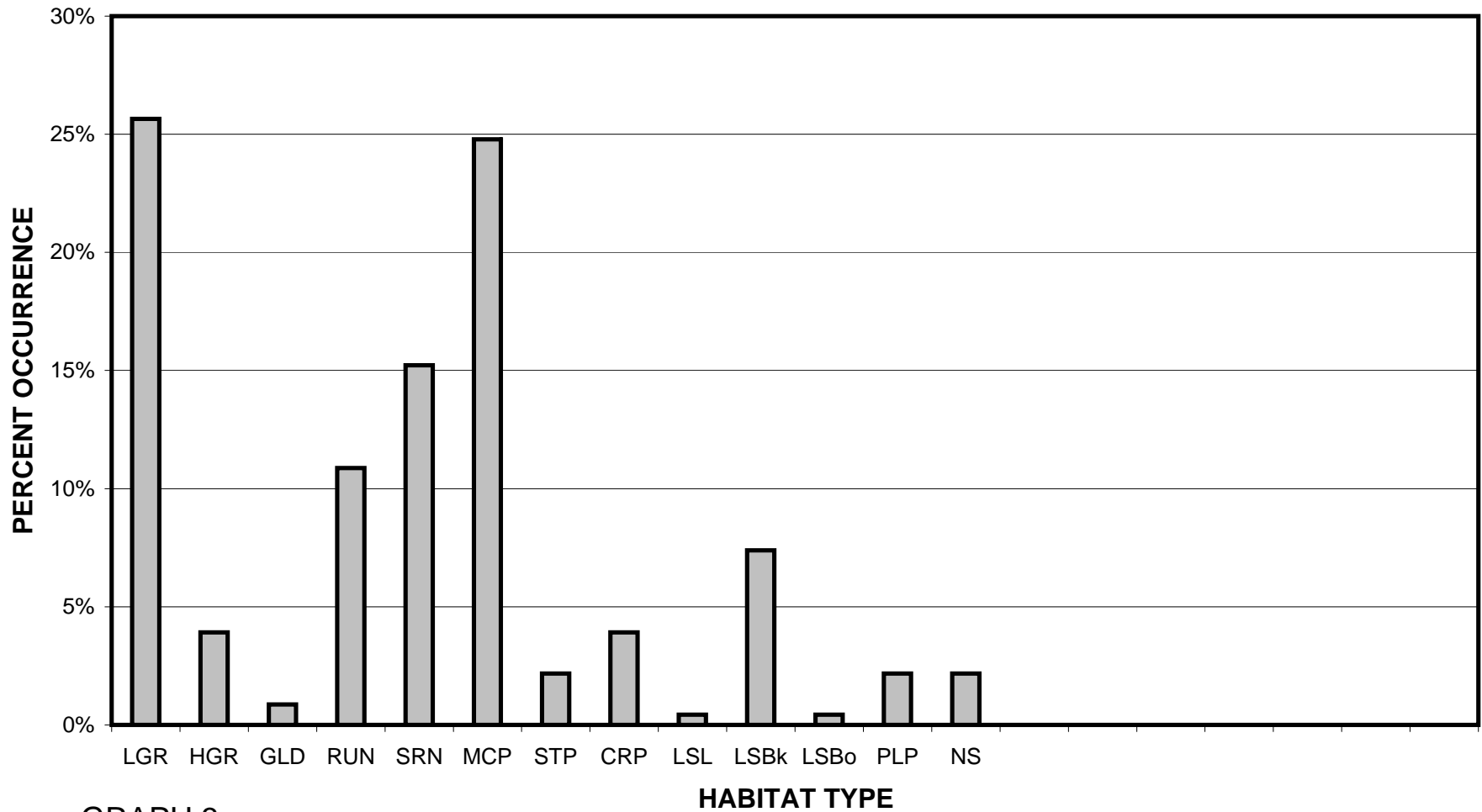
GRAPH 1

**STANDLEY CREEK 2007**  
**HABITAT TYPES BY PERCENT TOTAL LENGTH**

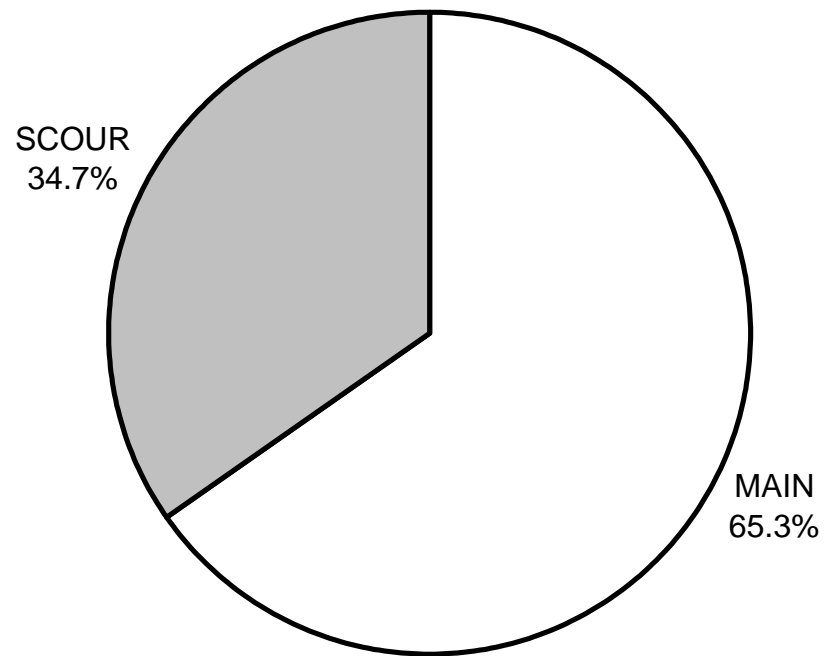


GRAPH 2

## STANDLEY CREEK 2007 HABITAT TYPES BY PERCENT OCCURRENCE

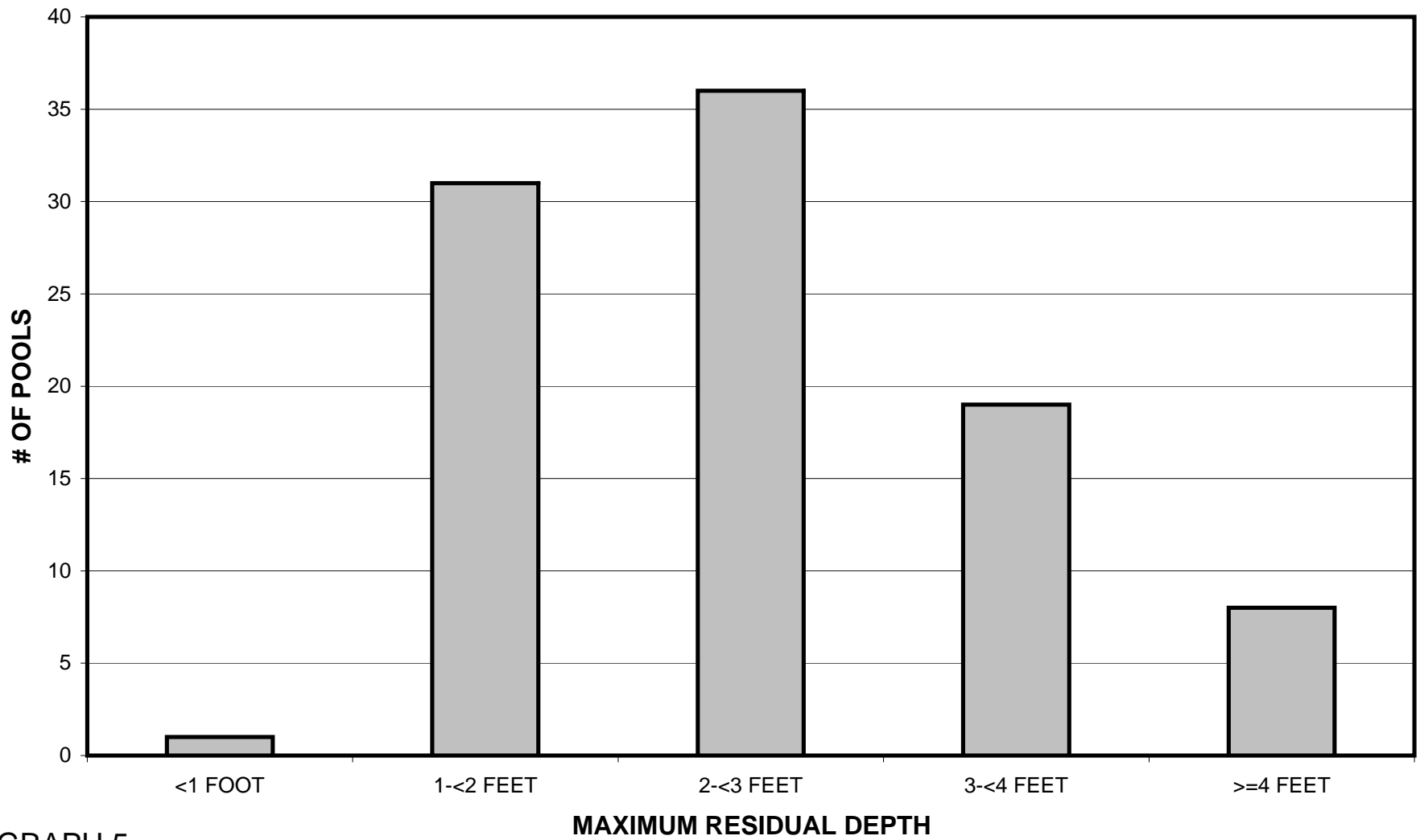


**STANDLEY CREEK 2007  
POOL TYPES BY PERCENT OCCURRENCE**



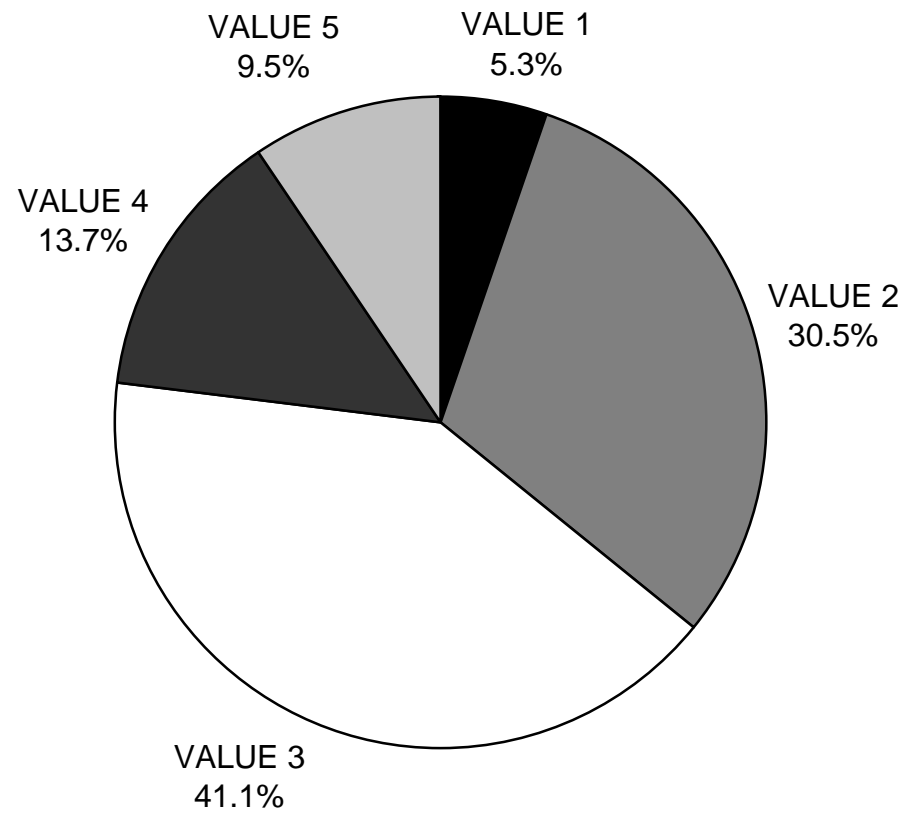
GRAPH 4

# STANDLEY CREEK 2007 MAXIMUM DEPTH IN POOLS



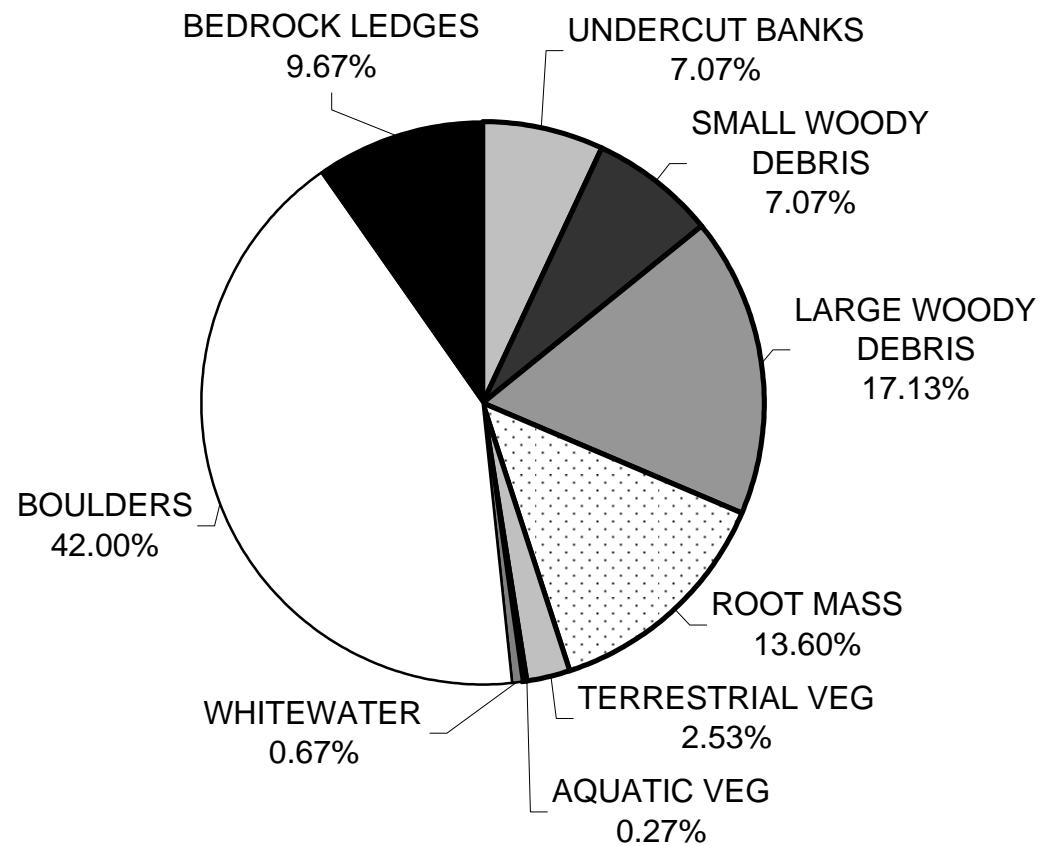
GRAPH 5

# STANDLEY CREEK 2007 PERCENT EMBEDDEDNESS



GRAPH 6

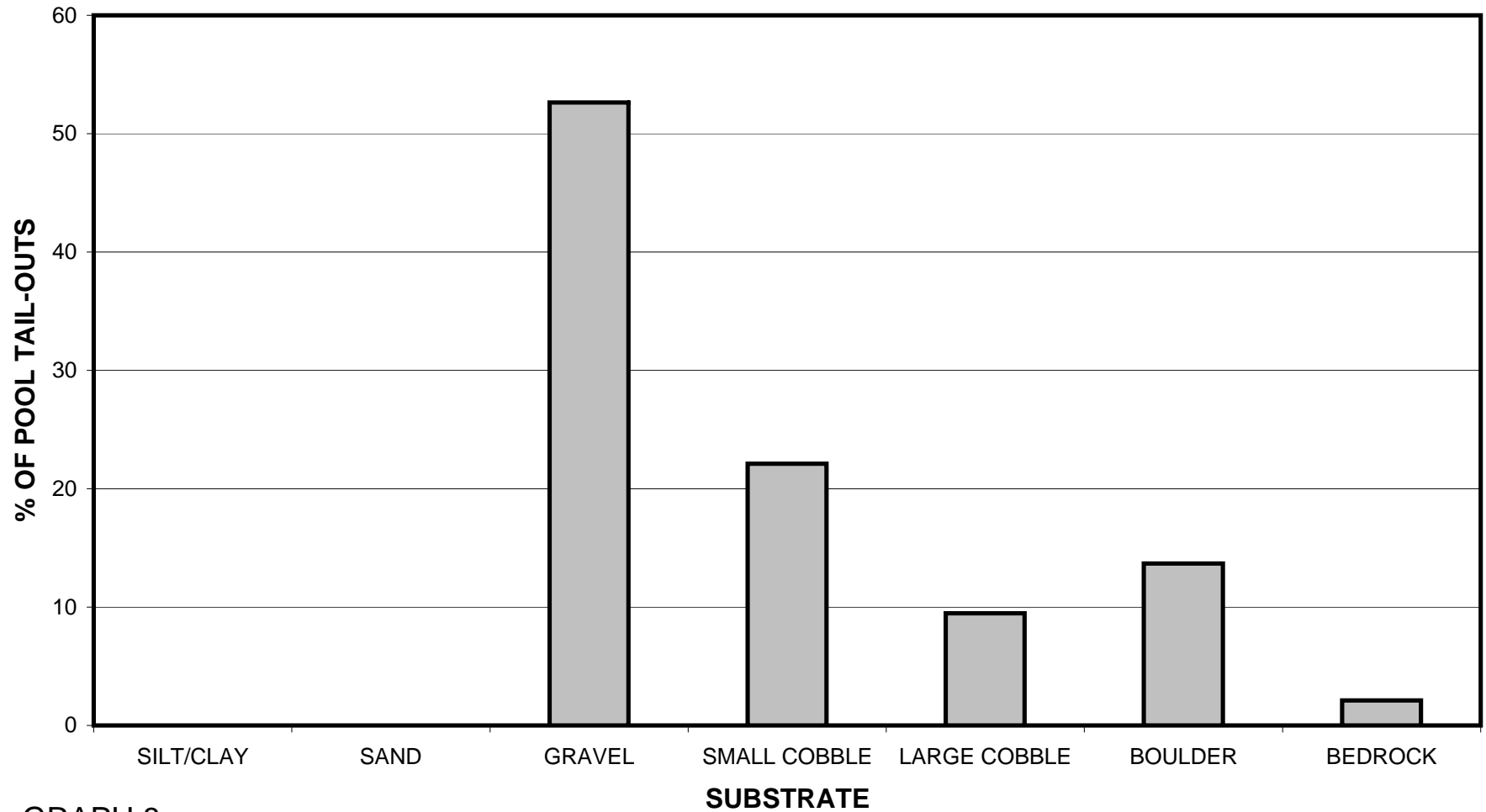
# STANDLEY CREEK 2007 MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

# STANDLEY CREEK 2007

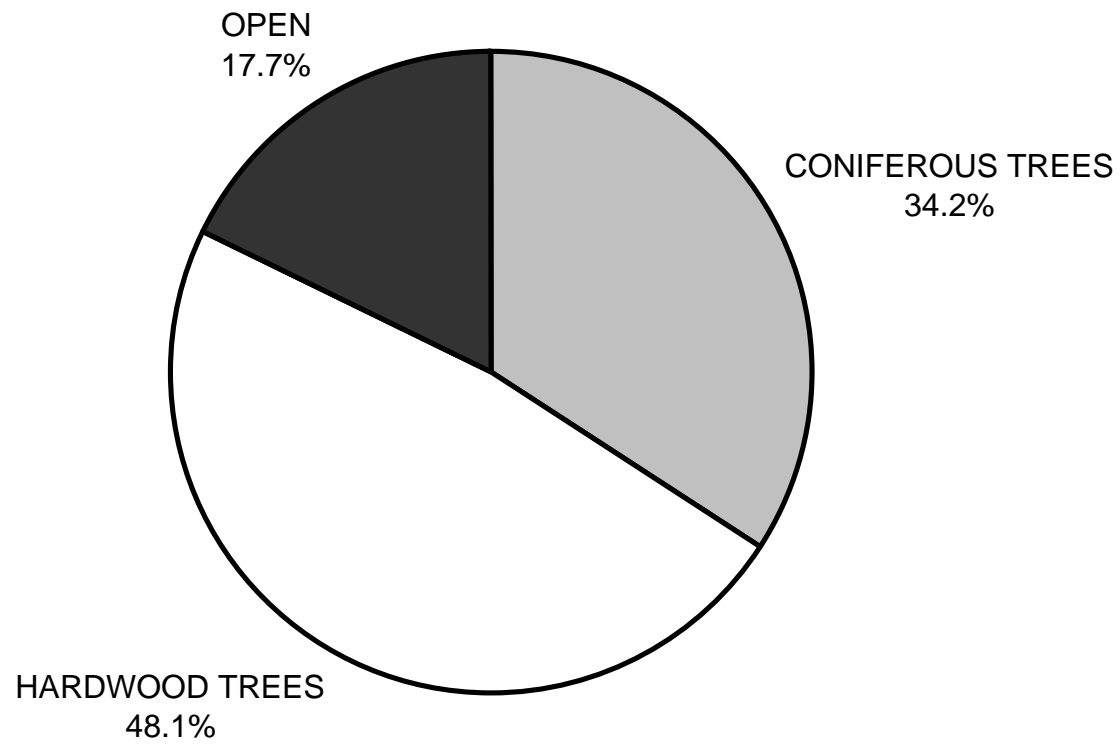
## SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



GRAPH 8

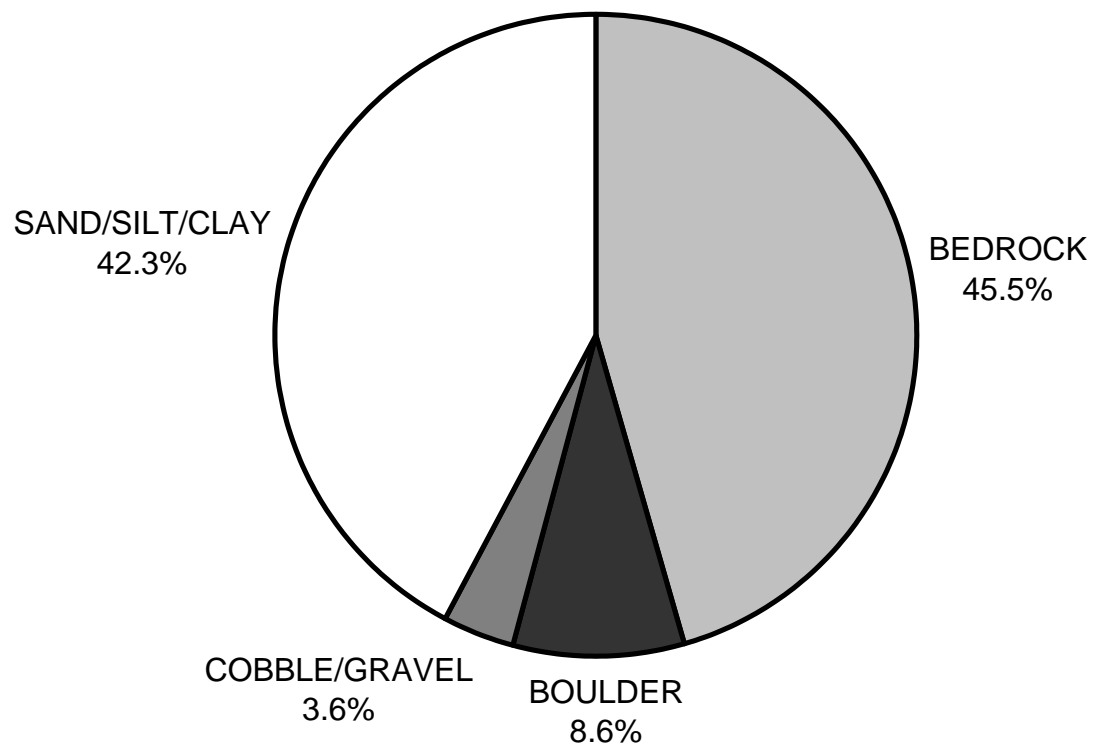


# STANDLEY CREEK 2007 MEAN PERCENT CANOPY



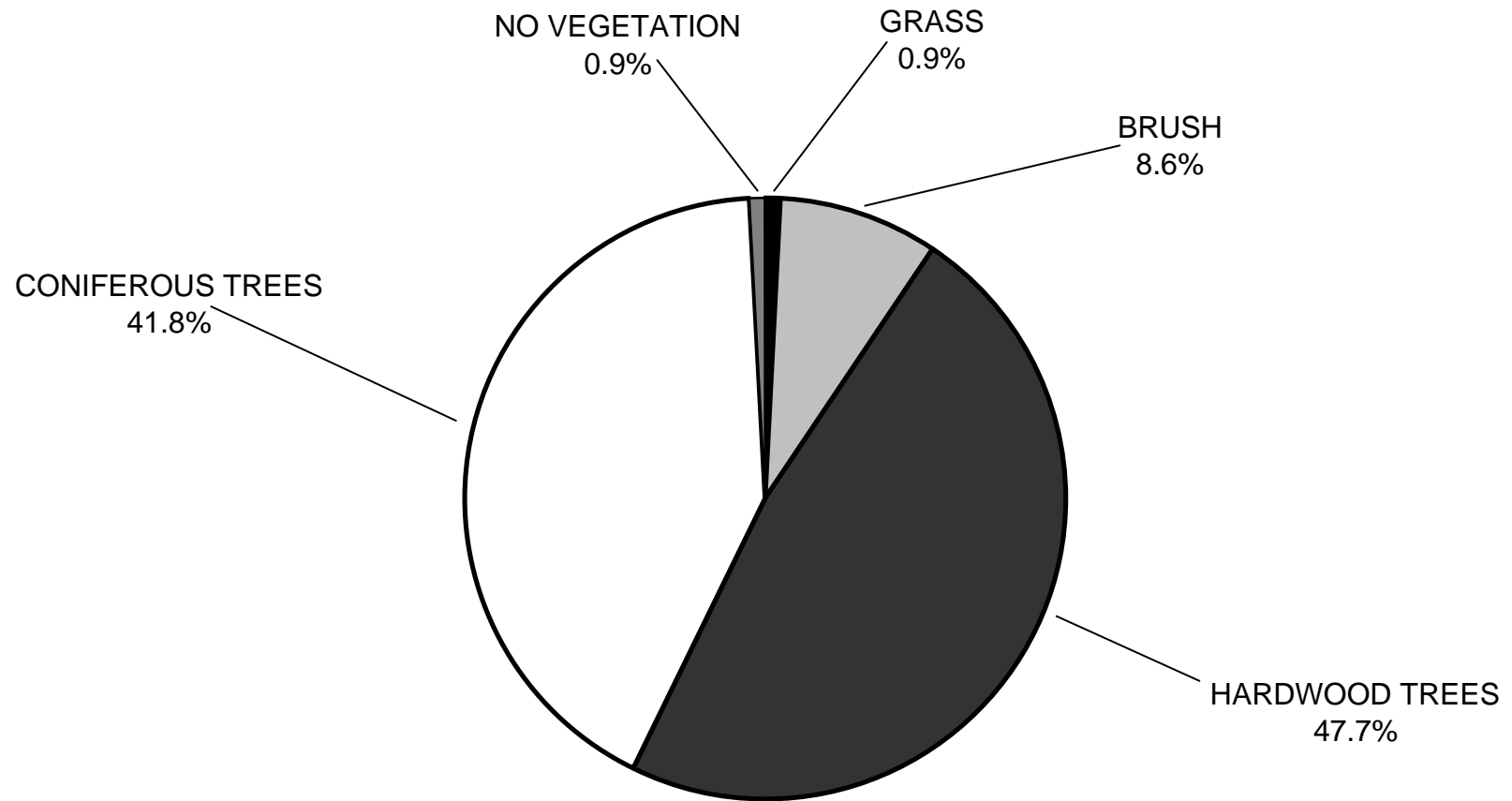
GRAPH 9

**STANDLEY CREEK 2007**  
**DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

**STANDLEY CREEK 2007**  
**DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11