



CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

STREAM INVENTORY REPORT

Unnamed Tributary to the Van Duzen River

INTRODUCTION

A stream inventory was conducted May 30 to June 6, 2017 on Unnamed Tributary to the Van Duzen River. The survey began at the confluence with Van Duzen River and extended 0.7 miles upstream.

The Unnamed Tributary to Van Duzen River 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 Unnamed Tributary to Van Duzen River. 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 and 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

Unnamed Tributary to Van Duzen River flows into Van Duzen River, which drains into the Pacific Ocean, located in Humboldt County, California (Map 1). Unnamed Tributary to Van Duzen River legal description at the confluence with Van Duzen River is T02N R01E S36. Its location is 40.3030 north latitude and -124.0103 west longitude, LLID number 12401754050822017. Unnamed Tributary to Van Duzen River is a first order stream and has approximately 1 mile of blue line stream according to the USGS Hydesville 7.5 minute quadrangle. Unnamed Tributary to Van Duzen River drains a watershed of approximately 1.7 square miles. Elevations range from about 150 feet at the mouth of the creek to 650 feet in the headwaters. Redwood/Douglas fir forest dominates the watershed. The watershed is entirely privately owned by Humboldt Redwood Company and is managed for timber production. Vehicle access exists via Highway 36, approximately 8.5 miles from Highway 101.

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 Watershed Stewards Project (WSP) members and California Department of Fish and Wildlife (CDFW) personnel that conducted the inventory were trained in standardized habitat inventory methods by 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 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. Surveyors also take photos to document general habitat conditions, significant features (landslides, potential barriers, etc.), and end of survey (Appendix II).

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 The Unnamed Tributary to Van Duzen River 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:

Water and air temperatures are measured and recorded at every tenth habitat unit using a hand-held thermometer. Both temperatures are taken in degrees Fahrenheit and the time of the measurement is also recorded. Air temperatures are recorded within one foot of the water surface, while water temperatures are recorded (where possible) in flowing water within the habitat unit.

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". Unnamed Tributary to Van Duzen River 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 Unnamed Tributary to Van Duzen River, 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. 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 Unnamed Tributary to Van Duzen River, 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 Unnamed Tributary to Van Duzen River, 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 Unnamed Tributary to Van Duzen River, 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 (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 Unnamed Tributary to Van Duzen River. 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 Unnamed Tributary to Van Duzen River 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 May 30 to June 6, 2017, was conducted by Kori Roberts (CDFW), Rachel Karlov (WSP), and Ashley Woodford (WSP). The total length of the stream surveyed was 3,711 feet.

Stream flow measurement of 0.31 cfs was recorded on June 1, 2017 near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter.

Unnamed Tributary to Van Duzen River is an F4 channel type for 2,781 feet of the stream surveyed (Reach 1) and a G4 channel type for 930 feet of the stream surveyed (Reach 2). F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios, very stable with gravel-dominant substrates. G4 channels are entrenched “gully” step-pool channels on moderate gradients with low width /depth ratios, very stable with gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 52° to 54° Fahrenheit. Air temperatures ranged from 59° to 66° Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 39% flatwater units, 32% riffle units, and 29% pool units (Graph 1). Based on total length of Level II habitat types there were 51% flatwater units, 34% riffle units, and 15% pool units (Graph 2).

Seven Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were low gradient riffle units (31%), run units (27%), and mid-channel pool units, 25% (Graph 3). Based on percent total length, low gradient riffle units made up 34%, run units 29%, and step run units 22%.

A total of 37 pools were identified (Table 3). Main channel pools were the most frequently

encountered at 86% (Graph 4), and comprised 93% 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. One of the 37 pools (3%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 37 pool tail-outs measured, 8 had a value of 1 (21.6%), 29 had a value of 2 (78.4%) (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 3, flatwater habitat types had a mean shelter rating of 5, and pool habitats had a mean shelter rating of 22 (Table 1). Of the pool types, the scour pools had a mean shelter rating of 34. Main channel pools had a mean shelter rating of 21 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Unnamed Tributary to Van Duzen River. Graph 7 describes the pool cover in the unnamed tributary. Large woody debris is the dominant pool cover type followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominate substrate, observed in 97% of pool tail-outs. Sand was the next most frequently substrate and was observed in 2% of the pool tail-outs.

The mean percent canopy density for the surveyed length of the unnamed tributary was 95%. Five percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 47% and 53%, respectively. Graph 9 describes the mean percent canopy in Unnamed Tributary to Van Duzen River.

For the stream reach surveyed, the mean percent right bank vegetated was 96%. The mean percent left bank vegetated was 99%. The dominant elements composing the structure of the stream banks consisted of 57% sand/silt/clay, 27% cobble/gravel 15% bedrock, and 1% boulder, (Graph 10). Brush was the dominant vegetation type observed in 46.8% of the units surveyed. Additionally, 27.7% of the units surveyed had coniferous trees as the dominant vegetation type, and 24.5% had hardwood as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a mask and snorkel survey at 10 sites for species composition and distribution in Unnamed Tributary to Van Duzen River on September 7, 2017 (Table A). The sites were sampled by Kori Roberts (CDFW) and Chris Tevini (CCC).

In reach 1, which comprised the first 2,781 feet of stream, 10 sites were sampled. The reach sites yielded zero fish species.

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Table A. Summary of results for fish composition and distribution survey within Unnamed Tributary to Van Duzen River, 2017.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. dist. from mouth (ft.)	SH/RT			Coho		Additional Aquatic Species Observed
					YOY	1+	2+	YOY	1+	
Reach 1: F4 Channel Type										
09/07/17	1	010	Pool	341	0	0	0	0	0	
	2	014	Pool	495	0	0	0	0	0	
	3	018	Pool	629	0	0	0	0	0	
	4	020	Pool	724	0	0	0	0	0	
	5	024	Pool	861	0	0	0	0	0	
	6	026	Pool	898	0	0	0	0	0	
	7	029	Pool	1,039	0	0	0	0	0	
	8	034	Pool	1,135	0	0	0	0	0	
	9	038	Pool	1,218	0	0	0	0	0	
	10	042	Pool	1,378	0	0	0	0	0	

DISCUSSION

Unnamed Tributary to Van Duzen River is a F4 channel type for the first 2,781 feet of stream surveyed and a G4 channel type for the next 930 feet. The suitability of F4 and G4 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. G4 channel types are good for bank-placed boulders and fair for plunge weirs, opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days May 30 to June 6, 2017 ranged from 52° to 54° Fahrenheit. Air temperatures ranged from 59° to 66° 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 51% of the total length of this survey, riffles 34%, and pools 15%. One of the 37 (3%) 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 for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Thirty-seven of the 37 pool tail-outs measured had embeddedness ratings of 1 or 2. None of the pool tail-outs had embeddedness ratings of 3 or 4. None 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.

Thirty-five of the 36 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 22. The shelter rating in the flatwater habitats is 5. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by large woody debris in Unnamed Tributary to Van Duzen River. Large woody debris is the dominant cover type in pools followed by small woody debris. Log and rootwad 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%. Reach 1 had a canopy density of 95.7%, and reach 2 had a canopy density of 93.3%. The percentage of right and left bank covered with vegetation was 96% and 99%, respectively.

RECOMMENDATIONS

Unnamed Tributary to the Van Duzen River 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 the Unnamed Tributary to the Van Duzen River. 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) 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.
- 2) Where feasible, design and engineer pool enhancement structures to increase the number of pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.
- 3) There are numerous log debris accumulations present on the Unnamed Tributary to the Van Duzen River, some of which are retaining large quantities of fine sediment and large woody debris. The modification of these debris accumulations could be examined to help distribute large wood debris for cover in other portions of the stream. Any modification must be done carefully, over time, to avoid excessive sediment loading in downstream reaches.

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 Van Duzen River.
69	0004.00	Rip Rap on right bank and ATV trail on left bank.
403	0012.00	Tributary # 1 enters on the right bank. The water temperature of the tributary was 53° Fahrenheit, the water temperature downstream and upstream of the confluence was 53° Fahrenheit. The slope of the tributary is 5-7%. The tributary is not accessible to salmonids due to the high gradient slope. Fish were not observed in the tributary.
522	0015.00	The creek is out of the influence of the confluence with Van Duzen River. Channel type is a F4. Channel type cross-section location is at Habitat Unit (HU) #15.
562	0016.00	Pacific Giant Salamander observed.
821	0023.00	There is a landslide on the left bank, it measures 60' long x 40' high.
861	0024.00	Left bank landslide continues.
893	0026.00	Tributary #2 enters on the right bank. It contributes to approximately 50% of Unnamed Trib to Van Duzen's flow. The water temperature of the tributary was 53° Fahrenheit, the water downstream and upstream of the confluence was 53° Fahrenheit. The slope of the tributary is 2-4%. The tributary is accessible to salmonids. Fish were not observed in the tributary. The channel of the tributary narrows 100' upstream with bedrock walls. 200' upstream there is a large landslide on the left bank blocking the entire channel.
1019	0029.00	Log debris accumulation (LDA) #1 is 6' high x 17' wide x 11' long and contains 6 pieces of large woody debris (LWD). Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 50' long x 6' deep. The sediment ranges in size from sand to small cobble. The LDA is a possible barrier to juvenile. The LDA is not a barrier to adult salmonids. Fish were not observed above the LDA.
1061	0032.00	LDA #2 is 6' high x 25' wide x 85' long and contains 13 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 40' long x

		4' deep. The sediment ranges in size from sand to small cobble. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
1135	0034.00	There is a 1' plunge over a LWD into the pool.
1402	0044.00	LDA #3 is 9' high x 18' wide x 68' long and contains 35 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 50' long x 6' deep. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
1547	0050.00	LDA #4 is 3.5' high x 18' wide x 15.5' long and contains 6 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 30' long x 3.5' deep. The sediment ranges in size from silt to small cobble. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
1568	0052.00	LDA # 5 is 5.5' high x 18' wide x 16' long and contains 13 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 25' wide x 35' long x 4' deep. The sediment ranges in size from silt to small cobble. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
1580	0053.00	At the top of the run there is a plunge over wood into the run.
1646	0056.00	LDA #6 is 4' high x 25' wide x 20' long and contains 9 pieces of LWD. Water flows through the LDA and there are visible gaps in it. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
1703	0058.00	LDA #7 is 7' high x 30' wide x 39' long and contains 20 pieces of LWD. Water flows through the LDA and there are not any visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 10' long x 6' deep. The sediment ranges in size from sand to large cobble. The LDA is a possible barrier to juvenile salmonids. The LDA is not a barrier to adult salmonids. Fish were not observed above the LDA.
1808	0061.00	LDA #8 is 6' high x 20' wide x 11' long and contains 7 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 20' long x 6' deep. The sediment ranges in size from sand to cobble. The LDA is a possible barrier to juvenile salmonids. The LDA is a possible barrier to adult salmonids, but may not be in winter flows. Fish were not observed above the LDA. There is a 6' plunge over wood into the run.

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1845	0063.00	LDA #9 is 6' high x 20' wide x 11' long and contains 7 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 35' wide x 10' long x 6' deep. The sediment ranges in size from sand to cobble. The LDA is a barrier to juvenile salmonids because it consists of a series of 2' plunges. The LDA is not a barrier to adult salmonids. Fish were not observed above the LDA. The pool under the LDA end in a 4' plunge over wood.
1900	0066.00	There is an old ATV road on the left bank that possibly crosses the Creek.
1938	0068.00	There is an old ATV road on the right bank. There is a 1.5' plunge over wood into the pool.
2187	0080.00	LDA #10 is 9' high x 20' wide x 10' long and contains 9 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 8' wide x 15' long x 4' deep. The sediment ranges in size from silt to cobble. The LDA is a barrier to juvenile salmonids. The LDA is not a barrier to adult salmonids. Fish were not observed above the LDA.
2204	0081.00	Tributary #3 enters on the right bank. It contributes to approximately 30% of the Creek's flow. The slope of the tributary is 6-8%. The tributary is accessible to salmonids, but steepens, and narrows very quickly. It is also very bouldery, with LDA's and series of plunge pools. Fish were not observed in the tributary.
2538	0087.00	LDA #11 is 4' high x 28' wide x 8' long and contains 6 pieces of LWD. Water does not flow through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 16' wide x 15' long x 4' deep. The sediment ranges in size from sand to small cobble. The LDA is a barrier to juvenile salmonids because it has a 4' plunge with a 1.3' deep pool. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
2781	0095.00	Channel type changes to a G4 at end of habitat unit 95. Cross section was done at habitat unit 95.
2905	0101.00	LDA #12 is 10' high x 18' wide x 45' long and contains 5 pieces of LWD. Water flows through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 20' wide x 25' long x 95' deep. The sediment ranges in size from silt to cobble. The LDA is a barrier to juvenile salmonids because there is a 5' plunge with a 1' pool. The LDA is not a barrier to adult salmonids. Fish were not observed above the LDA.
2917	0102.00	LDA #12 continues in habitat unit 102.

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2932	0103.00	LDA #12 ends in habitat unit 103. There is a 4' plunge over wood into a 1' deep pool.
2939	0104.00	LDA #13 is 5' high x 16' wide x 20' long and contains 13 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 8' wide x 20' long x 3' deep. The sediment ranges in size from silt to gravel. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
2992	0105.00	LDA # 13 ends.
3122	0107.00	LDA #14 is 5' high x 17' wide x 18' long and contains 10 pieces of LWD. Water flows through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 12' wide x 30' long x 3' deep. The sediment ranges in size from sand to cobble. The LDA is a barrier to juvenile salmonids. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
3140	0108.00	The creek becomes very entrenched. Flow is subsurface for 20'.
3216	0109.00	LDA #15 is 15' high x 12' wide x 40' long and contains 5 pieces of LWD. Water flows through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 6' wide x 22' long x 5' deep. The sediment ranges in size from sand to cobble. The LDA is a barrier to salmonids because there is a large rootwad that blocks the entire channel and fish would not have access even in high winter flows. Flow becomes subsurface. Fish were not observed above the LDA.
3354	0112.00	LDA #16 is 3.5' high x 18' wide x 9' long and contains 5 pieces of LWD. Water flows through the LDA and there are visible gaps in it. Sediment is being retained in the approximate dimensions of 18' wide x 20' long x 3' deep. The sediment ranges in size from sand to small cobble. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
3384	0114.00	LDA #17 is 3' high x 17' wide x 8' long and contains 7 pieces of LWD. Water does not flow through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 10' wide x 30' long x 8' deep. The sediment ranges in size from silt to small cobble. The LDA is a barrier to juvenile salmonids because the water flows subsurface for 8'. The LDA is not a barrier to adult salmonids. Fish were not observed above the LDA.
3392	0115.00	LDA # 17 ends. There is a 4' plunge over wood into a 1' pool.

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- 3424 0117.00 LDA #18 is 3' high x 17' wide x 8' long and contains 4 pieces of LWD. Water flows through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 17' wide x 12' long x 3' deep. The sediment ranges in size from sand to gravel. The LDA is a barrier to salmonids.
- 3513 0121.00 LDA #19 is 5' high x 15' wide x 27' long and contains 8 pieces of LWD. Water flows through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 10' wide x 10' long x 2' deep. The sediment ranges in size from sand to small cobble. The LDA is not a barrier to salmonids. Fish were not observed above the LDA.
- 3605 0123.00 LDA #20 is 5' high x 16' wide x 14' long and contains 8 pieces of LWD. Water flows through the LDA and there are no visible gaps in it. Sediment is being retained in the approximate dimensions of 12' wide x 5' long x 2' deep. The sediment ranges in size from sand to small cobble. Fish were not observed above the LDA.
- 3644 0125.00 There is a 2' plunge over wood into the pool. There is a right bank landslide.
- 3698 0127.00 There is a 3' plunge over wood into a 1.4' deep pool. End of survey due to diminished habitat. The creek becomes more entrenched with an increasing slope. There are less pools and suitable spawning areas. There are a series of 10 LDA's in approximately 1,000', some having greater than a 4' plunge with shallow pools. Water periodical flows subsurface. LDA # 15 in habitat unit 109 is most likely a barrier to salmonids. It consists of a very large rootwad that blocks the entire channel where even in high winter flows would block access to salmonids. There were no fish observed in the entire reach. Access becomes increasingly difficult.

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.

REPORT CONTACT INFORMATION

California Department of Fish and Wildlife
Coastal Watershed Planning and Assessment Program
1487 Sandy Prairie ct., Suite A
Fortuna, CA 95540
www.coastalwatersheds.ca.gov

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 - Rootwad 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 }

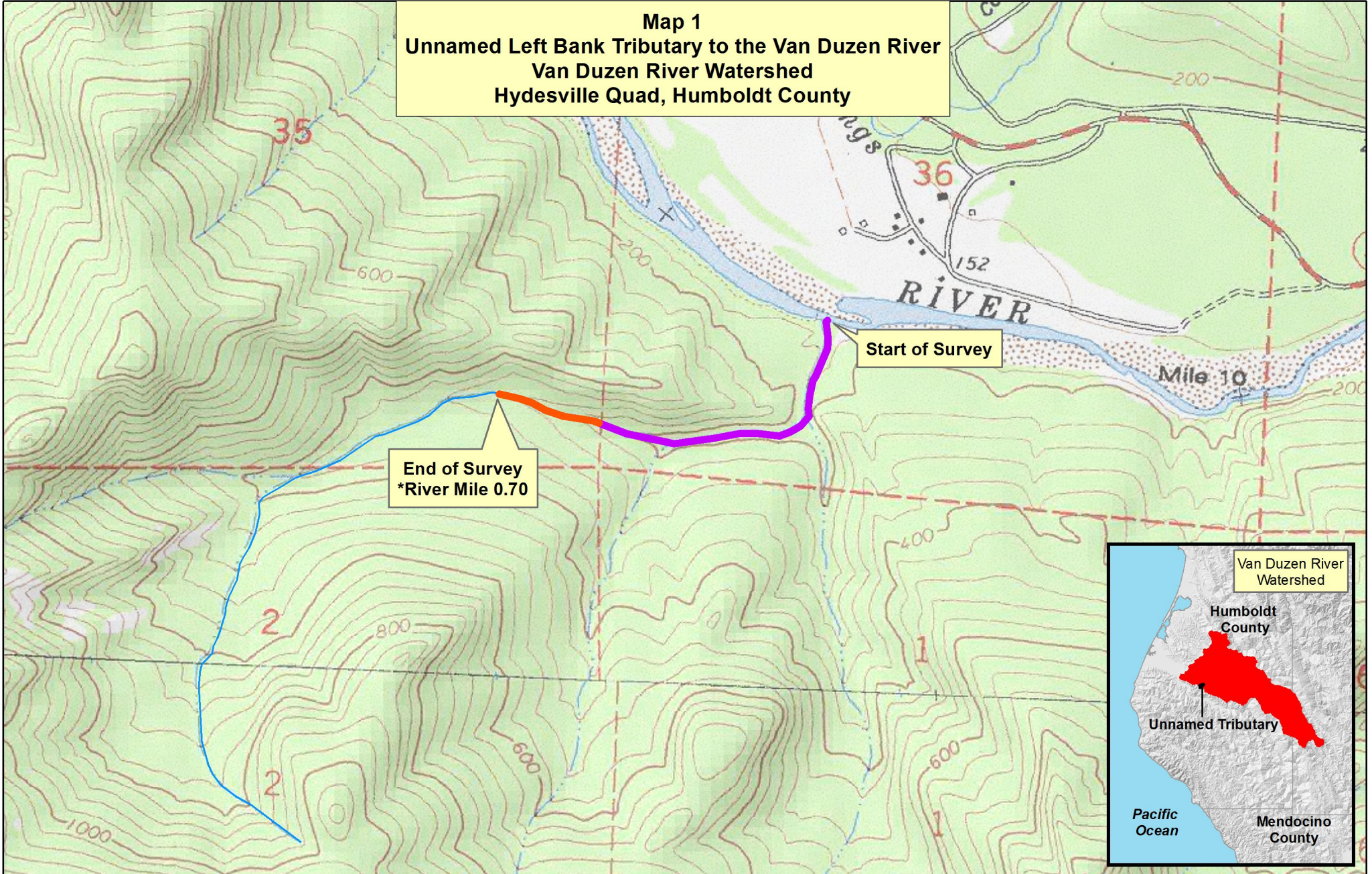
BACKWATER POOLS

Secondary Channel Pool	(SCP)	[6.1]	{ 4 }
Backwater Pool - Boulder Formed	(BPB)	[6.2]	{ 5 }
Backwater Pool - Rootwad Formed	(BPR)	[6.3]	{ 6 }
Backwater Pool - Log Formed	(BPL)	[6.4]	{ 7 }
Dammed Pool	(DPL)	[6.5]	{ 13 }

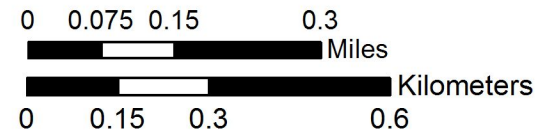
ADDITIONAL UNIT DESIGNATIONS

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

Map 1
Unnamed Left Bank Tributary to the Van Duzen River
Van Duzen River Watershed
Hydesville Quad, Humboldt County



- Reach 1: F4 Channel Type
- Reach 2: G4 Channel Type
- Unnamed Left Bank Tributary to the Van Duzen River



APPENDIX I

TABLES AND GRAPHS

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

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Confluence Location: Quad: HYDESVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0

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
49	7	FLATWATER	38.6	39	1890	50.9	4.5	0.2	0.7	252	12368	49	2409		5
37	37	POOL	29.1	15	564	15.2	6.9	0.5	1.2	105	3874	66	2442	50	22
41	4	RIFFLE	32.3	31	1257	33.9	4.6	0.2	0.4	124	5095	27	839		3
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)			Total Volume (cu.ft.)		
127	48				3711					21337			5691		

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Confluence Location: Quad: HYDESVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

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 (%)
40	4	LGR	31.5	31	1251	33.7	5	0.2	0.7	124	4971	27	819		3	95
1	0	CAS	0.8	6	6	0.2										
34	3	RUN	26.8	32	1077	29.0	5	0.2	1	232	7902	54	1838		3	98
15	4	SRN	11.8	54	813	21.9	4	0.2	0.9	267	4011	46	683		6	95
32	32	MCP	25.2	16	526	14.2	7	0.5	2.1	108	3459	70	2226	53	21	94
2	2	LSL	1.6	5	10	0.3	5	0.6	1	26	53	18	37	16	23	96
3	3	PLP	2.4	9	28	0.8	11	0.5	1.3	121	363	60	180	45	42	98

Total Units
127

Total Units Fully Measured
48

Total Length (ft.)
3711

Total Area (sq.ft.)
20758

Total Volume (cu.ft.)
5781

Table 3 - Summary of Pool Types

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Confluence Location: Quad: HYDEVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

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
32	32	MAIN	86	16	526	93	6.6	0.5	108	3459	53	1690	21
5	5	SCOUR	14	8	38	7	8.8	0.5	83	415	33	166	34
Total Units	Total Units Fully Measured			Total Length (ft.)				Total Area (sq.ft.)		Total Volume (cu.ft.)			
37	37			564				3874		1856			

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

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Confluence Location: Quad: HYDESVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

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
32	MCP	86	6	19	25	78	1	3	0	0	0	0
2	LSL	5	0	0	2	100	0	0	0	0	0	0
3	PLP	8	0	0	3	100	0	0	0	0	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
37	6	16	30	81	1	3	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 1.2

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082 Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Dry Units: 0

Confluence Location:

Quad: HYDESVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

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
40	3	LGR	0	50	50	0	0	0	0	0	0
1	0	CAS	0	0	0	0	0	0	0	0	0
41	3	TOTAL RIFFLE	0	50	50	0	0	0	0	0	0
34	2	RUN	0	0	0	100	0	0	0	0	0
15	4	SRN	0	15	45	0	15	0	0	25	0
49	6	TOTAL FLAT	0	12	36	20	12	0	0	20	0
32	32	MCP	3	12	63	11	5	0	1	4	0
2	2	LSL	5	0	67	0	5	0	23	0	0
3	3	PLP	0	17	73	0	3	0	7	0	0
37	37	TOTAL POOL	3	12	64	9	5	0	2	4	0
127	46	TOTAL	2	13	61	10	6	0	2	6	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Dry Units: 0

Confluence Location: Quad: HYDESVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

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
40	3	LGR	0	0	67	0	33	0	0
1	0	CAS	0	0	0	0	0	0	0
34	3	RUN	0	0	100	0	0	0	0
15	4	SRN	0	0	100	0	0	0	0
32	32	MCP	0	63	31	3	3	0	0
2	2	LSL	0	0	100	0	0	0	0
3	3	PLP	0	100	0	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Confluence Location: Quad: HYDESVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
95	53	47	0	96	99

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: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Survey Length (ft.): 3711

Main Channel (ft.): 3711

Side Channel (ft.): 0

Confluence Location: Quad: HYDESVILLE

Legal Description: T02NR01ES36 Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

Summary of Fish Habitat Elements By Stream Reach**STREAM REACH: 1**

Channel Type: F4	Canopy Density (%): 95.7	Pools by Stream Length (%): 17.2
Reach Length (ft.): 2781	Coniferous Component (%): 44.0	Pool Frequency (%): 28.7
Riffle/Flatwater Mean Width (ft.): 5.2	Hardwood Component (%): 56.0	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Brush	< 2 Feet Deep: 100
Range (ft.): 9 to 26	Vegetative Cover (%): 97.9	2 to 2.9 Feet Deep: 0
Mean (ft.): 16	Dominant Shelter: Large Woody Debris	3 to 3.9 Feet Deep: 0
Std. Dev.: 5	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0
Base Flow (cfs.): 0.3	Occurrence of LWD (%): 47	Mean Max Residual Pool Depth (ft.): 1.2
Water (F): 52 - 54 Air (F): 59 - 66	LWD per 100 ft.:	Mean Pool Shelter Rating: 24
Dry Channel (ft): 0	Riffles: 4	
	Pools: 18	
	Flat: 6	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 4 Gravel: 96 Sm Cobble: 0 Lg Cobble: 0 Boulder: 0 Bedrock: 0		
Embeddedness Values (%): 1. 14.8 2. 85.2 3. 0.0 4. 0.0 5. 0.0		

STREAM REACH: 2

Channel Type: G4	Canopy Density (%): 93.3	Pools by Stream Length (%): 9.4
Reach Length (ft.): 930	Coniferous Component (%): 74.3	Pool Frequency (%): 30.3
Riffle/Flatwater Mean Width (ft.): 3.5	Hardwood Component (%): 25.7	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Coniferous Trees	< 2 Feet Deep: 90
Range (ft.): 10 to 15	Vegetative Cover (%): 95.9	2 to 2.9 Feet Deep: 10
Mean (ft.): 12	Dominant Shelter: Large Woody Debris	3 to 3.9 Feet Deep: 0
Std. Dev.: 2	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 0
Base Flow (cfs.): 0.3	Occurrence of LWD (%): 70	Mean Max Residual Pool Depth (ft.): 1.2
Water (F): 52 - 54 Air (F): 59 - 65	LWD per 100 ft.:	Mean Pool Shelter Rating: 18
Dry Channel (ft): 0	Riffles: 16	
	Pools: 45	
	Flat: 12	
Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 100 Sm Cobble: 0 Lg Cobble: 0 Boulder: 0 Bedrock: 0		
Embeddedness Values (%): 1. 40.0 2. 60.0 3. 0.0 4. 0.0 5. 0.0		

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Unnamed Left Bank Tributary to Van Duzen River

LLID: 1240175405082

Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Confluence Location: Quad: HYDESVILLE

Legal Description: T02NR01ES36

Latitude: 40:30:30.0N

Longitude: 124:01:03.0W

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	8	6	14.9
Boulder	1	0	1.1
Cobble / Gravel	12	13	26.6
Sand / Silt / Clay	26	28	57.4

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	20	24	46.8
Hardwood Trees	14	9	24.5
Coniferous Trees	12	14	27.7
No Vegetation	1	0	1.1

Total Stream Cobble Embeddedness Values:

2

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

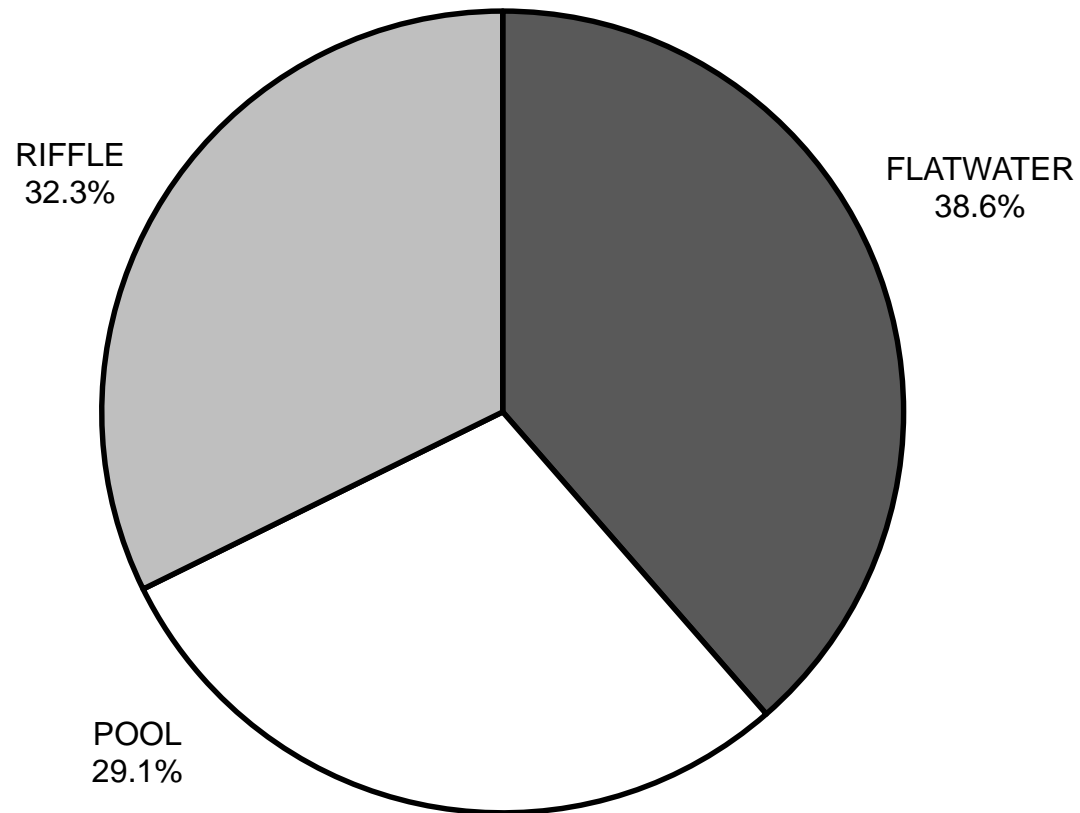
StreamName: Unnamed Left Bank Tributary to Van Duzen River LLID: 1240175405082 Drainage: Van Duzen River

Survey Dates: 5/30/2017 to 6/6/2017

Confluence Location: Quad: HYDESVILLE Legal Description: T02NR01ES36 Latitude: 40:30:30.0N Longitude: 124:01:03.0W

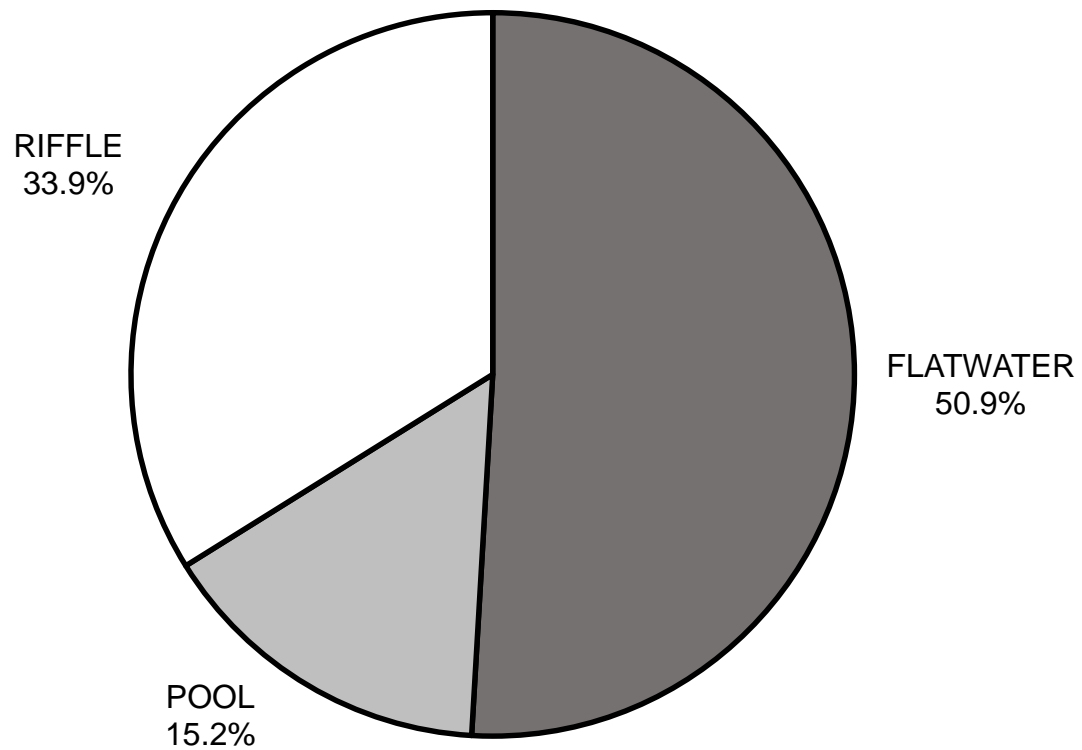
	Riffles	Flatwater	Pools
UNDERCUT BANKS(%)	0	0	3
SMALL WOODY DEBRIS (%)	50	12	12
LARGE WOODY DEBRIS (%)	50	36	64
ROOT MASS (%)	0	20	9
TERRESTRIAL VEGETATION (%)	0	12	5
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	2
BOULDERS (%)	0	20	4
BEDROCK LEDGES (%)	0	0	0

UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017 HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

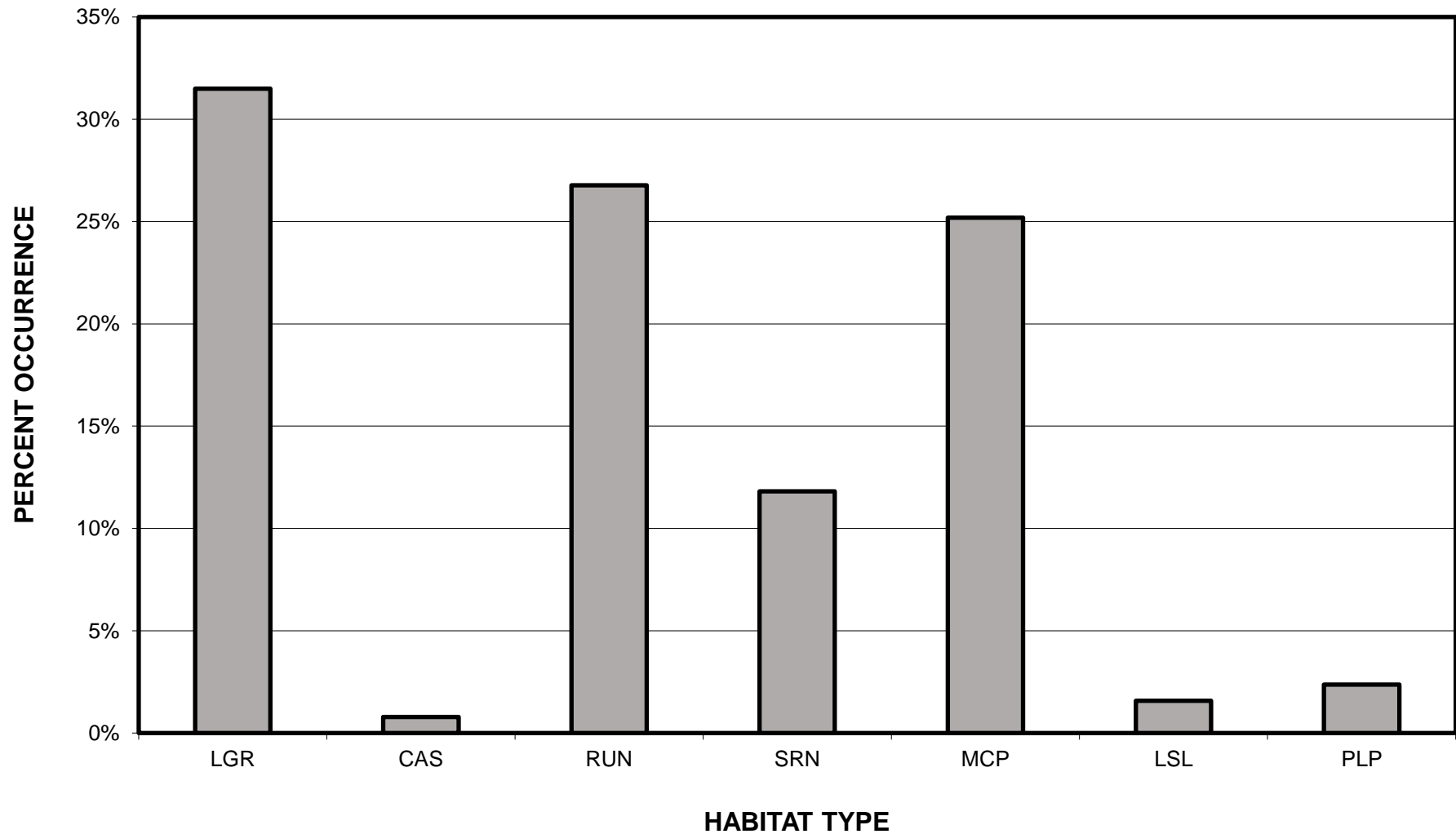
**UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017
HABITAT TYPES BY PERCENT TOTAL LENGTH**



GRAPH 2

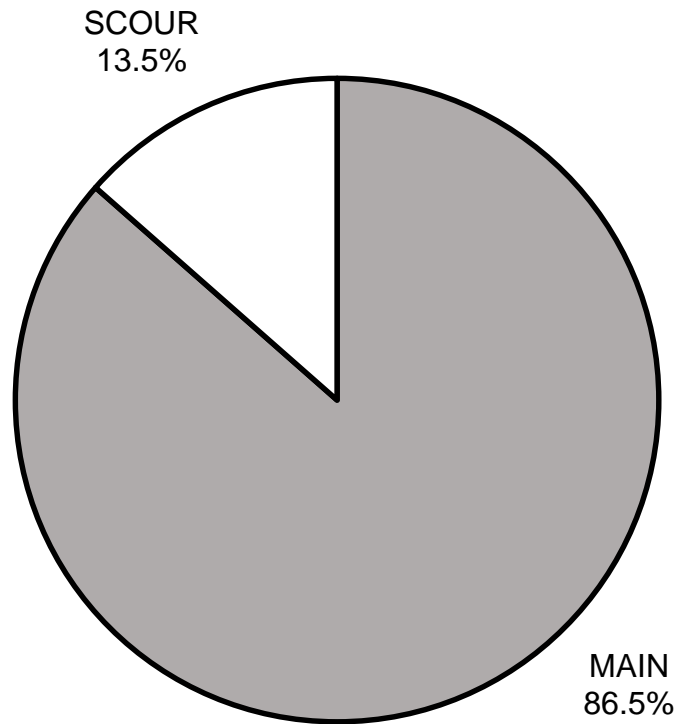
UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017

HABITAT TYPES BY PERCENT OCCURRENCE



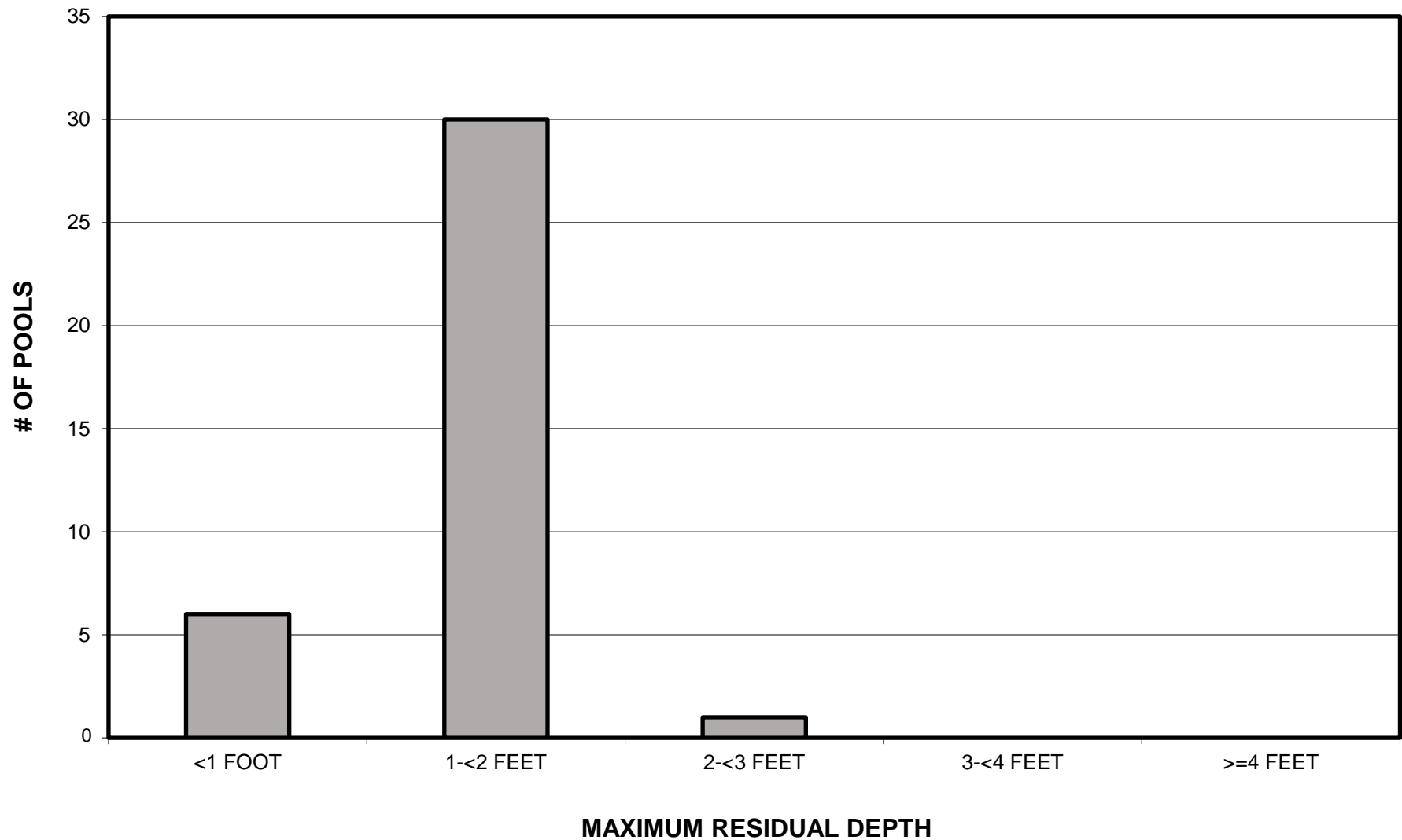
GRAPH 3

**UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017
POOL TYPES BY PERCENT OCCURRENCE**



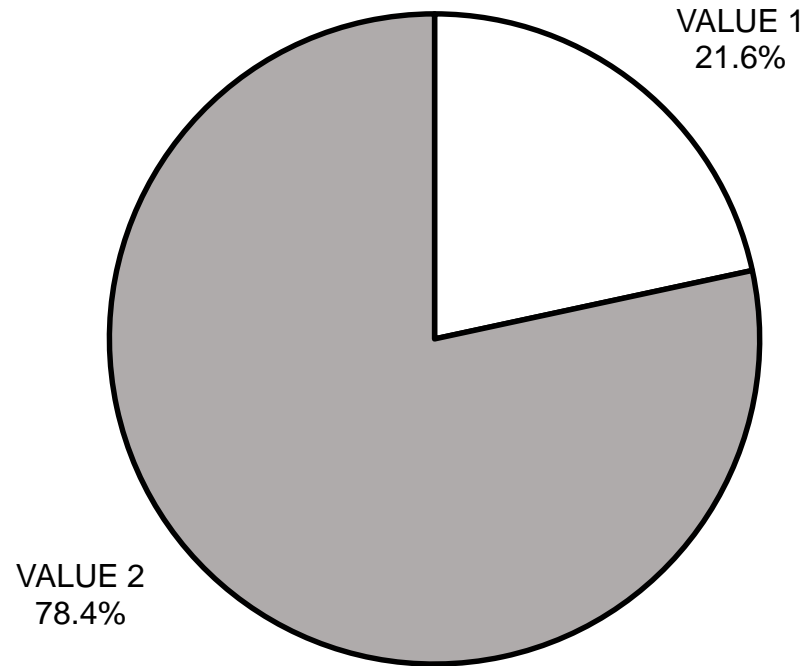
GRAPH 4

UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017 MAXIMUM DEPTH IN POOLS



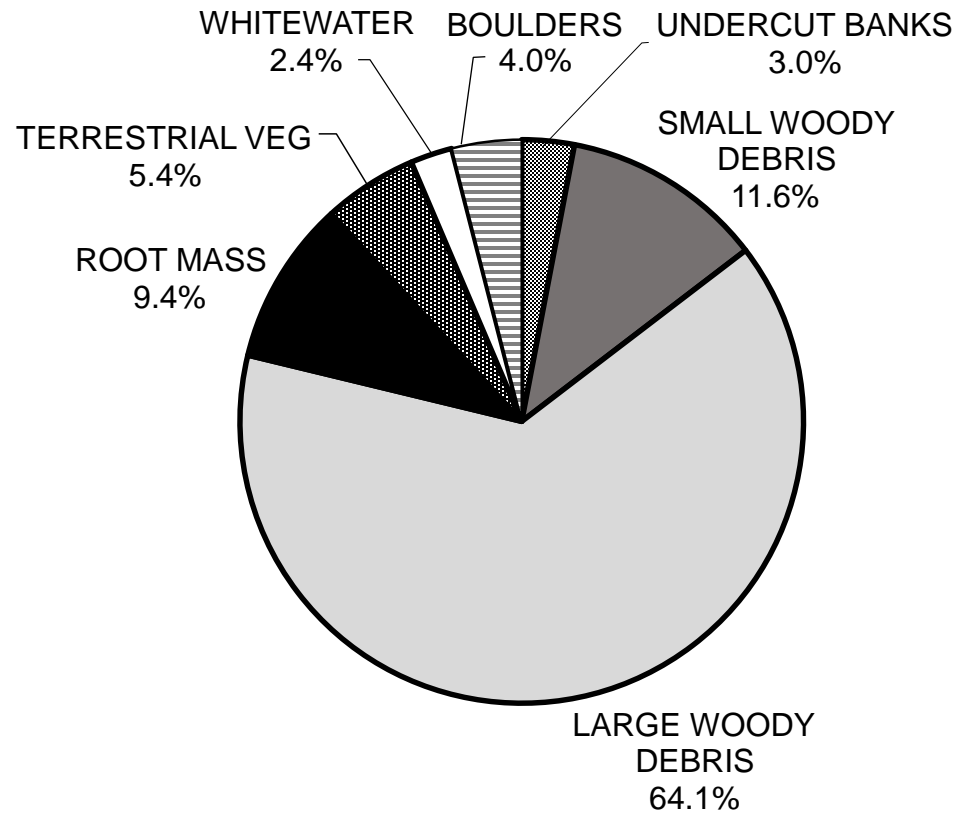
GRAPH 5

**UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017
PERCENT EMBEDDEDNESS**



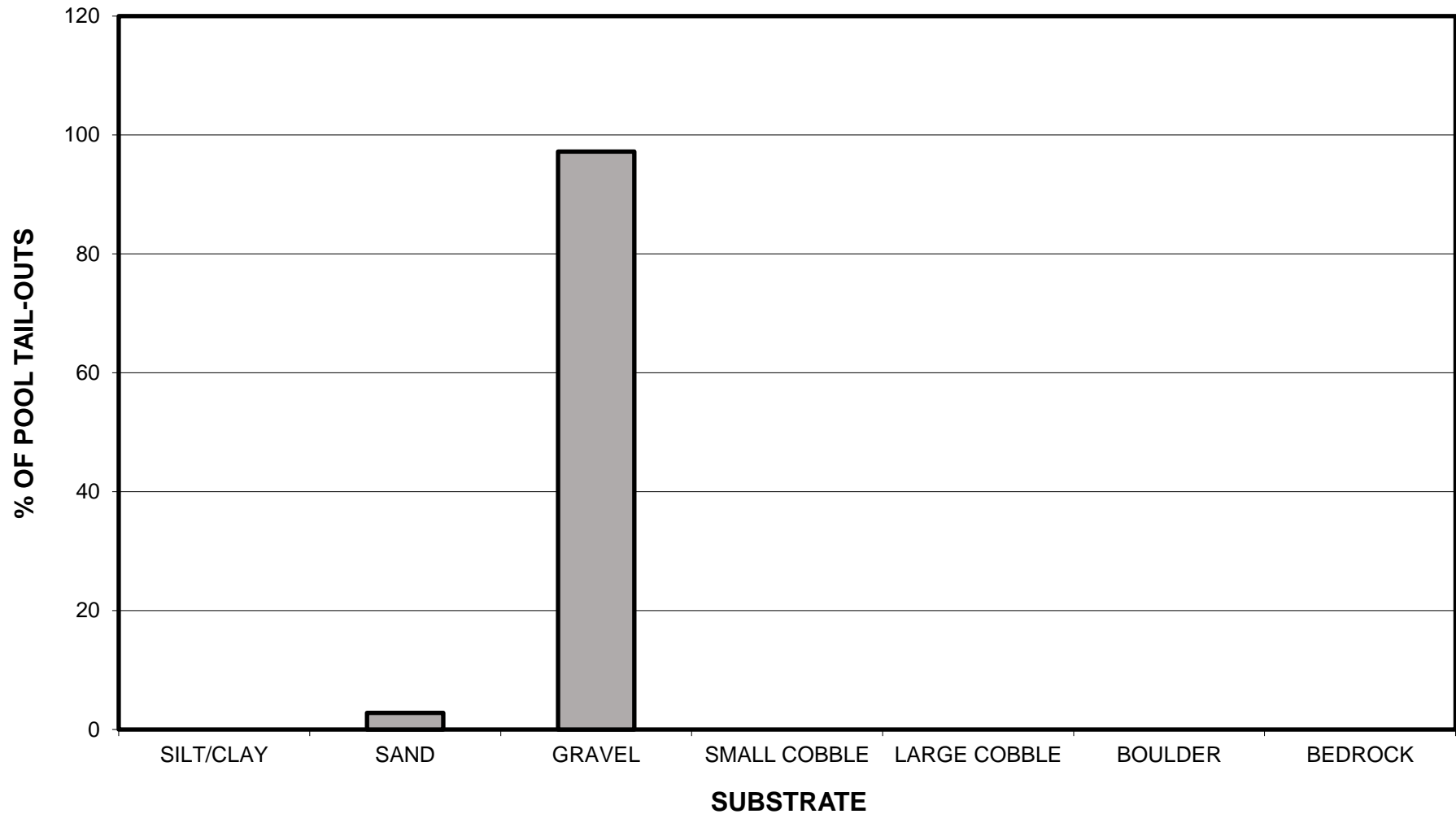
GRAPH 6

UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017 MEAN PERCENT COVER TYPES IN POOLS



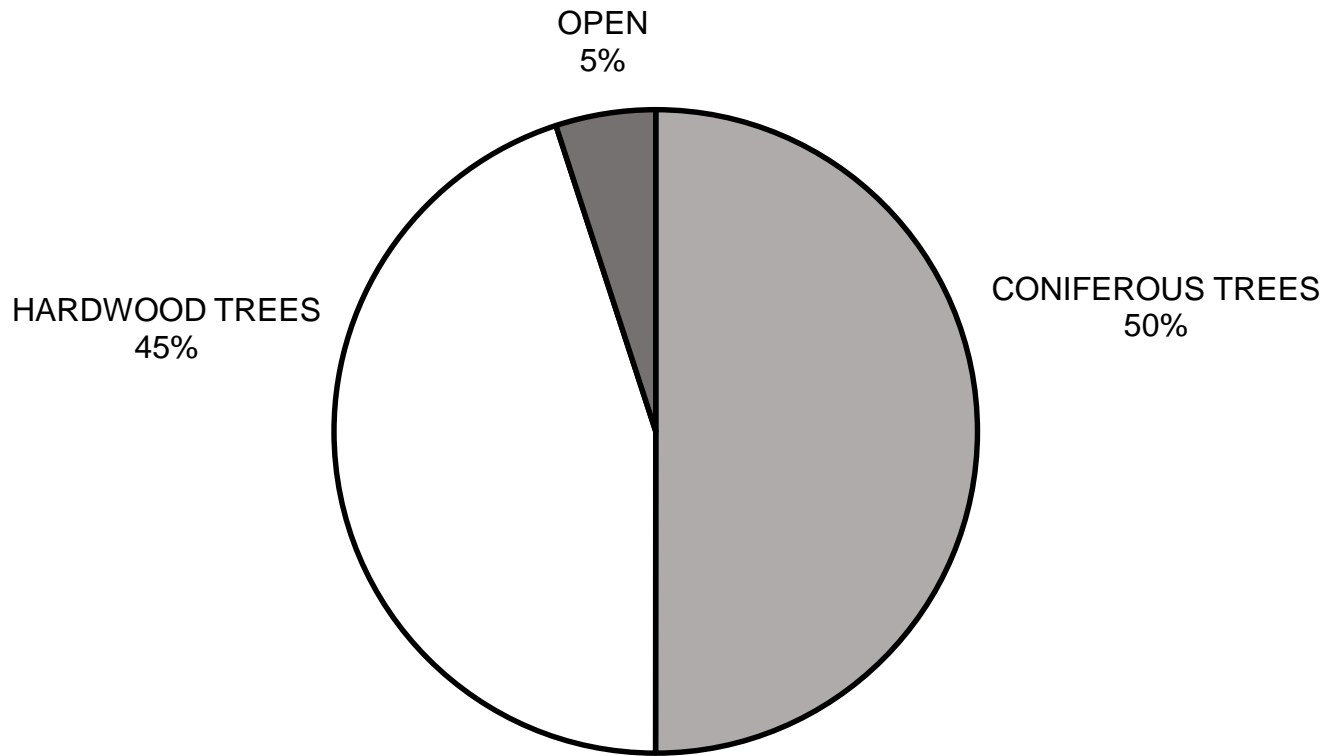
GRAPH 7

UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



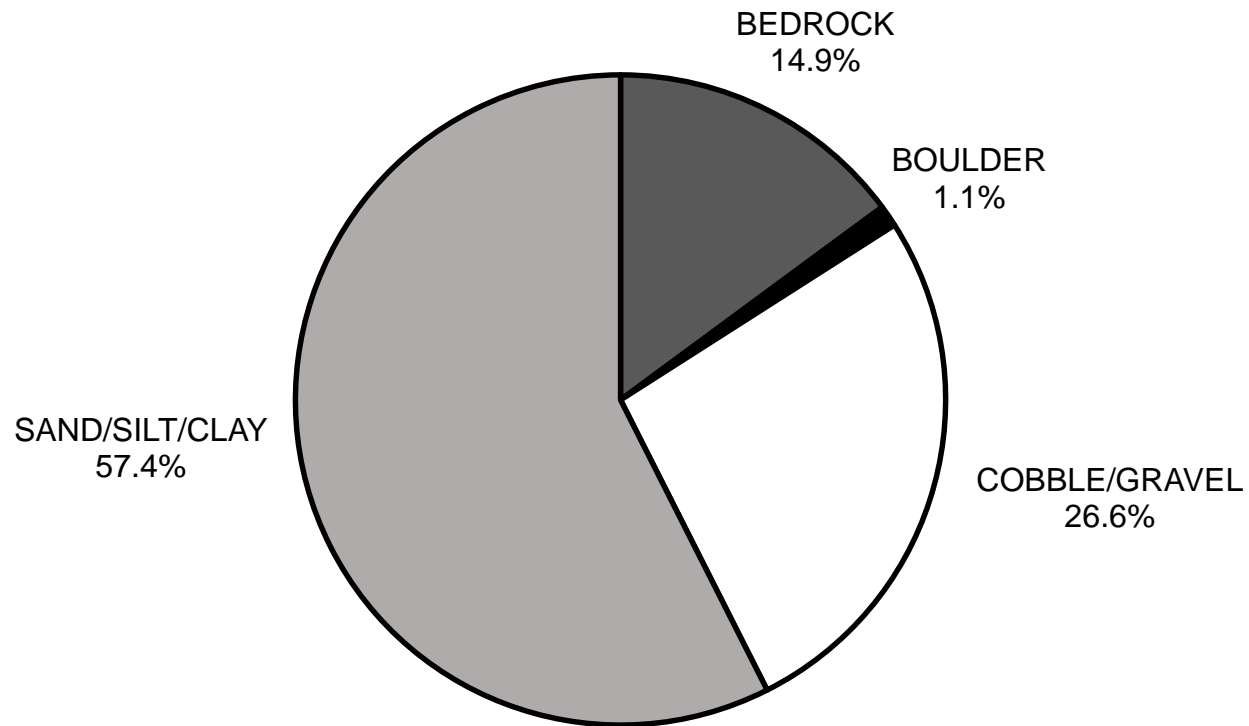
GRAPH 8

**UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017
MEAN PERCENT CANOPY**



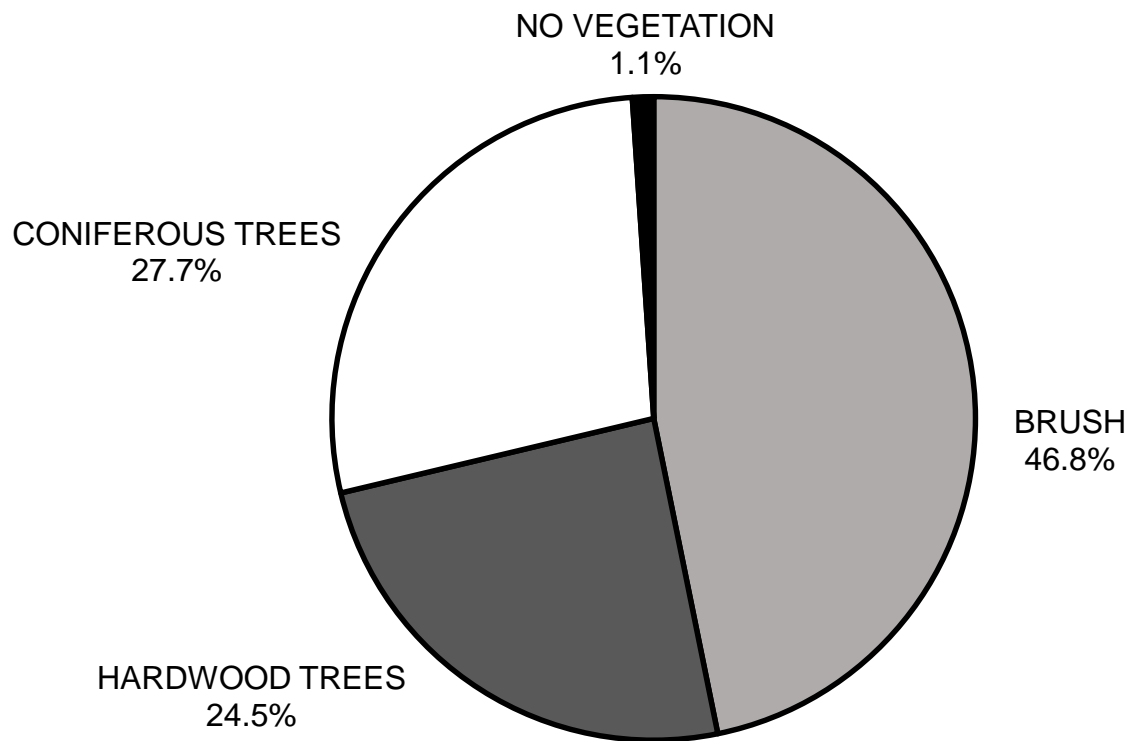
GRAPH 9

**UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10

**UNNAMED TRIBUTARY TO THE VAN DUZEN RIVER 2017
DOMINANT BANK VEGETATION IN SURVEY REACH**



APPENDIX II

STREAM INVENTORY PHOTOS



Photo 1: Start of survey at the confluence of the Van Duzen River. (Photo taken 5/30/2017)



Photo 2: Large debris accumulation #3 in habitat unit # 44, 1,402' upstream of start of survey.
(Photo taken 5/30/2017)



Photo #3: Run at unknown distance from start of survey. (Photo taken 5/31/2017)



Photo 4: End of survey at habitat unit # 127, 3,711' upstream of start of survey. (Photo taken 6/6/2017)