CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

STREAM INVENTORY REPORT

"Pleasant Valley"

INTRODUCTION

A stream inventory was conducted on July 29, 2015 on an unnamed tributary to Railroad Gulch locally known as, and herein after referred to as, Pleasant Valley. The survey began at the confluence with Railroad Gulch and extended upstream 0.7 miles.

The Pleasant Valley 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 Pleasant Valley. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

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

WATERSHED OVERVIEW

Pleasant Valley is a tributary to Railroad Gulch, tributary to the Albion River, which drains to the Pacific Ocean. It is located in Mendocino County, California (Map 1). Pleasant Valley's legal description at the confluence with Railroad Gulch is T16N R17W S23. Its location is 39.2404 degrees north latitude and 123.7191 degrees west longitude, LLID number 1237179392404. Pleasant Valley is a first order stream and has approximately 1.4 miles of blue line stream according to the USGS Elk 7.5 minute quadrangle. Pleasant Valley drains a watershed of approximately 1.2 square miles. Elevations range from about 15 feet at the mouth of the creek to 400 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production and rural development. Vehicle access exists via a private logging road off of Airport Road, south of Fort Bragg, CA.

METHODS

The habitat inventory conducted in Pleasant Valley follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project (WSP) members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Wildlife (CDFW). The inventory was conducted by a two-person team.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are measured for all the

parameters and characteristics on the field form. Additionally, from the ten habitat units on each 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 Pleasant Valley to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) near the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1994). This methodology is described in the *California Salmonid Stream Habitat Restoration Manual*. Channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity. Channel characteristics are measured using a hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees Fahrenheit at the middle of the habitat unit and within one foot of the water surface.

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1990). Habitat units are numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "dry". Pleasant Valley 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 Pleasant Valley, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuitable for spawning due to inappropriate substrate like bedrock, log sills, boulders or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide juvenile salmonids protection from predation, reduce water velocities so fish can rest and conserve energy, and allow separation of territorial units to reduce density related competition for prey. Using an overhead view, a quantitative estimate of the percentage of the habitat unit covered is made. All cover is then classified according to a list of nine cover types. In Pleasant Valley, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. The shelter rating is then calculated by multiplying the qualitative shelter value by the percent of the unit covered. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. In all fully-described habitat units, dominant and sub-dominant substrate elements were ocularly estimated using a list of seven size classes and recorded as a one and two, respectively. In addition, the dominant substrate composing the pool tail-outs is recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Pleasant Valley, 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 Pleasant Valley, 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

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(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 Pleasant Valley. In addition, underwater observations were made at nine 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 Pleasant Valley include:

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

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<u>HABITAT INVENTORY RESULTS</u>

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

The habitat inventory of July 29, 2015 was conducted by T. Brown and J. Murphrey (WSP). The total length of the stream surveyed was 3,801 feet.

Stream flow was not measured on Pleasant Valley.

Pleasant Valley is a C5 channel type for all 3,801 feet of the stream surveyed. C5 channels are meandering point-bar, riffle/pool, alluvial channels with broad well defined floodplain on low gradients and sand-dominant substrates.

Water temperatures taken during the survey period ranged from 59 to 60 degrees Fahrenheit. Air temperatures ranged from 62 to 76 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 36% flatwater units, 28% pool units, 28% riffle units, 7% dry units, and 1% unsurveyed marsh units (Graph 1). Based on total length of Level II habitat types there were 41% flatwater units, 20% unsurveyed marsh units, 16% riffle units, 14% pool units, and 8% dry units (Graph 2).

Six Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pool units, 28%; low gradient riffle units, 27%; and run units, 25% (Graph 3). Based on percent total length, run units made up 24%, unsurveyed marsh units 20%, and step run units 18%.

A total of 28 pools were identified (Table 3). All of the pools encountered were main channel pools.

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. One of the 28 pools (4%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 28 pool tail-outs measured, six had a value of 2 (21.4%); 16 had a value of 3 (57.1%); four had a value of 4 (14.3%); two had a value of 5 (7.1%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate. Additionally, a value of 5 was assigned to tail-outs deemed unsuitable for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 0, flatwater habitat types had a mean shelter rating of 19, and pool habitats had a mean shelter rating of 33 (Table 1).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Pleasant Valley. Graph 7 describes the pool cover in Pleasant Valley. Large

woody debris is the dominant pool cover type followed by terrestrial vegetation.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 89% of the pool tail-outs. Sand was the next most frequently observed dominant substrate type and occurred in 7% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Pleasant Valley was 94%. Six percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 21% and 79%, respectively. Graph 9 describes the mean percent canopy in Pleasant Valley.

For the stream reach surveyed, the mean percent right bank vegetated was 99%. The mean percent left bank vegetated was 98%. The dominant elements composing the structure of the stream banks consisted of 88% sand/silt/clay and 12% cobble/gravel (Graph 10). Brush was the dominant vegetation type observed in 37% of the units surveyed. Additionally, 24% of the units surveyed had coniferous trees as the dominant vegetation type, and 22% had hardwood trees as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

A survey team conducted a snorkel survey at nine sites for species composition and distribution in Pleasant Valley on August 25, 2015 (Table A). The sites were sampled by I. Mikus (CDFW) and K. Bocast (California Conservation Corps).

The reach sites yielded one young-of-the-year (YOY) steelhead trout (SH), three age 1+ SH, and 10 sculpin.

No juvenile coho salmon were observed during this survey. Coho salmon have been observed in Pleasant Valley in previous surveys.

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

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	Steelhead Trout			Coho Salmon		Additional Aquatic Species Observed
					YOY	1+	2+	YOY	1+	
Reach 1: C5 Channel Type										
08/25/15	1	005	Pool	1,222	0	0	0	0	0	
08/25/15	2	009	Pool	1,369	1	1	0	0	0	SCP
08/25/15	3	010	Pool	1,385	0	0	0	0	0	SCP
08/25/15	4	012	Pool	1,432	0	0	0	0	0	
08/25/15	5	014	Pool	1,477	0	0	0	0	0	SCP
08/25/15	6	017	Pool	1,521	0	1	0	0	0	SCP

08/25/15	7	019	Pool	1,545	0	0	0	0	0	
08/25/15	8	020	Pool	1,565	0	0	0	0	0	
08/25/15	9	022	Pool	1,589	0	1	0	0	0	

Species Abbreviations: SCP=Sculpin (Unidentified Species)

DISCUSSION

Pleasant Valley is a C5 channel type for the entire length of the survey, 3,801 feet. The suitability of C5 channel types for fish habitat improvement structures is as follows: C5 channels are good for bank-placed boulders and fair for plunge weirs and log cover.

The water temperatures recorded on the survey day, July 29, 2015 ranged from 59 to 60 degrees Fahrenheit. Air temperatures ranged from 62 to 76 degrees Fahrenheit. This is a suitable water temperature range for salmonids. To make any further conclusions, temperatures need to be monitored throughout the warm summer months, and more extensive biological sampling needs to be conducted.

Flatwater habitat types comprised 41% of the total length of this survey, riffles 16%, and pools 14%. One of the 28 (4%) 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.

Six of the 28 pool tail-outs measured had embeddedness ratings of 1 or 2. Twenty of the pool tail-outs had embeddedness ratings of 3 or 4. Two 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 Pleasant Valley should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Twenty-six of the 28 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 33. The shelter rating in the flatwater habitats is 19. 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 Pleasant Valley. Large woody debris is the dominant cover type in pools followed by terrestrial vegetation. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

The mean percent canopy density for the stream was 94%. The percentage of right and left bank covered with vegetation was 99% and 98%, respectively.

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RECOMMENDATIONS

Pleasant Valley 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 Pleasant Valley. Keep in mind, watershed and stream ecosystem processes, land use alterations, changes in land ownership, and other factors could potentially change the order of these recommendations or create the need to remove/add recommendations in the future.

1) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from large woody debris. Adding high quality complexity with woody cover in the pools is desirable.

2) Inventory and map sources of stream bank erosion and prioritize them according to present and potential sediment yield. Identified sites should then be treated to reduce the amount of fine sediments entering the stream.

3) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

4) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for three to five years.

COMMENTS AND LANDMARKS

The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey reach.

Position (ft):	Habitat unit #:	Comments:
0	0001.00	Start of survey at the confluence with Railroad Gulch. The channel is a C5 for the entire length of the survey.
155	0002.00	This unit is a 760 long unsurveyed marsh.
1369	0010.00	Log debris accumulation (LDA) #01 contains four pieces of large woody debris (LWD) and measures approximately 6' high x 17' wide x 4' long. Water does not flow through the LDA and there are no visible gaps in it. Retained sediment ranges from silt to gravel and measures approximately 12' wide x 75' long x 3' deep. There is a 3' high plunge over the LDA. Fish were observed above the LDA.

3784 0100.00 End of survey.

REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE
Low Gradient Riffle	(LGR)	[1.1]	{ 1}
High Gradient Riffle	(HGR)	[1.2]	{ 2}

CASCADE
Cascade	(CAS)	[2.1]	{ 3}
Bedrock Sheet	(BRS)	[2.2]	{24}

FLATWATER
Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}

MAIN CHANNEL POOLS
Trench Pool	(TRP)	[4.1]	{ 8 }
Mid-Channel Pool	(MCP)	[4.2]	{17}
Channel Confluence Pool	(CCP)	[4.3]	{19}
Step Pool	(STP)	[4.4]	{23}

SCOUR POOLS
Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }

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

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

Map 1
Pleasant Valley
Albion River Watershed
Elk Quad, Mendocino County

Albion River Watershed

End of Survey

Start of Survey

N
W — E
S

C5 Channel Type

0   0.15   0.3   0.6
Miles

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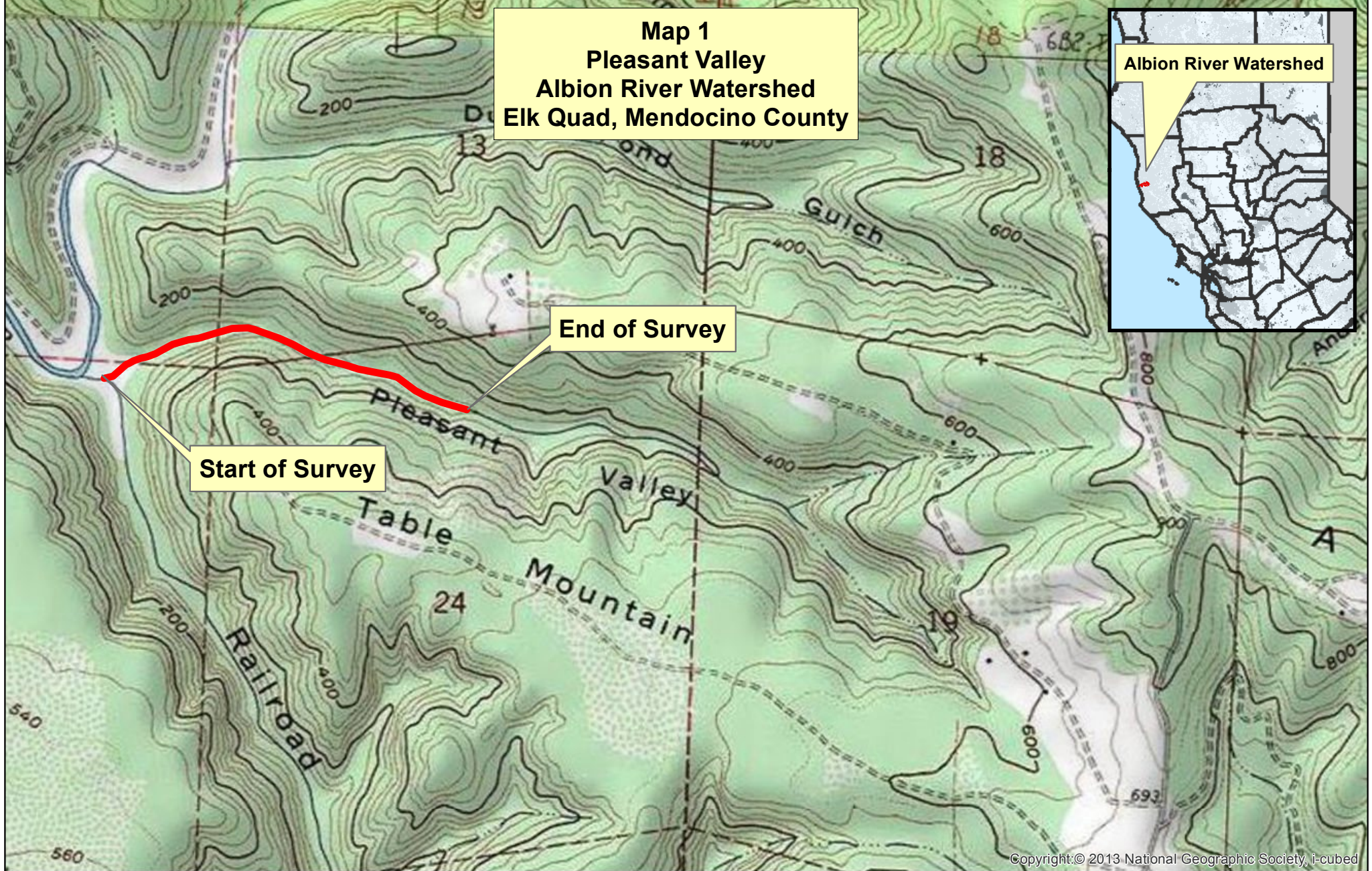
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Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0

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
7	0	DRY	7.0	44	305	8.0									
36	6	FLATWATER	36.0	44	1574	41.4	4.5	0.4	0.9	213	7650	73	2635		19
1	0	MARSH	1.0	760	760	20.0									
28	28	POOL	28.0	19	544	14.3	7.5	0.6	1.3	140	3913	99	2780	84	33
28	4	RIFFLE	28.0	22	618	16.3	2.8	0.1	0.2	36	1012	5	135		0

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
100	38	3801	12575	5550

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W

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 (%)
27	3	LGR	27.0	22	601	15.8	2	0.1	0.2	32	873	3	87		0	92
1	1	HGR	1.0	17	17	0.4	4	0.2	0.3	48	48	10	10		0	100
25	4	RUN	25.0	36	902	23.7	4	0.4	1.2	168	4188	73	1836		26	95
11	2	SRN	11.0	61	672	17.7	4	0.3	1	303	3328	73	800		5	95
28	28	MCP	28.0	19	544	14.3	7	0.6	2	140	3913	99	2780	84	33	95
7	0	DRY	7.0	44	305	8.0										
1	0	MAR	1.0	760	760	20.0										

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
100	38	3801	12348	5513

Table 3 - Summary of Pool Types

Stream Name: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W

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
28	28	MAIN	100	19	544	100	7.5	0.6	140	3913	84	2348	33

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
28	28	544	3912	2348

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

Stream Name: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W

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
28	MCP	100	3	11	24	86	1	4	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
28			3	11	24	86	1	4	0	0	0	0

Mean Maximum Residual Pool Depth (ft.): 1.3

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Pleasant Valley LLID: 1237179392404 Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015 Dry Units: 7

Confluence Location: Quad: ELK Legal Description: T16NR17WS23 Latitude: 39:14:25.0N Longitude: 123:43:04.0W

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
27	3	LGR	0	0	0	0	0	0	0	0	0
1	1	HGR	0	0	0	0	0	0	0	0	0
28	4	TOTAL RIFFLE	0	0	0	0	0	0	0	0	0
25	4	RUN	0	10	10	0	80	0	0	0	0
11	2	SRN	0	30	30	0	40	0	0	0	0
36	6	TOTAL FLAT	0	17	17	0	67	0	0	0	0
28	28	MCP	3	16	50	0	27	0	3	0	0
28	28	TOTAL POOL	3	16	50	0	27	0	3	0	0
1	0	MAR									
100	38	TOTAL	3	17	46	0	31	0	3	0	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Pleasant Valley
LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015   Dry Units: 7

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W

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
27	3	LGR	0	67	33	0	0	0	0
1	1	HGR	0	0	0	0	0	100	0
25	4	RUN	50	50	0	0	0	0	0
11	2	SRN	0	50	50	0	0	0	0
28	28	MCP	29	64	7	0	0	0	0

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
94	79	21	0	99	98

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 8 - Fish Habitat Inventory Data Summary

Stream Name: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015   Survey Length (ft.): 3801   Main Channel (ft.): 3801   Side Channel (ft.): 0

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: C5	Canopy Density (%): 94.5	Pools by Stream Length (%): 14.3
Reach Length (ft.): 3801	Coniferous Component (%): 79.2	Pool Frequency (%): 28.0
Riffle/Flatwater Mean Width (ft.): 3.8	Hardwood Component (%): 20.8	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Brush	< 2 Feet Deep: 96
Range (ft.): 7 to 19	Vegetative Cover (%): 98.7	2 to 2.9 Feet Deep: 4
Mean (ft.): 13	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.): 0.0	Occurrence of LWD (%): 37	Mean Max Residual Pool Depth (ft.): 1.3
Water (F): 59 - 60 Air (F): 62 - 76	LWD per 100 ft.:	Mean Pool Shelter Rating: 33
Dry Channel (ft.): 305	Riffles: 4	
	Pools: 10	
	Flat: 3	

Pool Tail Substrate (%):   Silt/Clay: 0   Sand: 7   Gravel: 89   Sm Cobble: 4   Lg Cobble: 0   Boulder: 0   Bedrock: 0

Embeddedness Values (%):   1. 0.0   2. 21.4   3. 57.1   4. 14.3   5. 7.1

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W
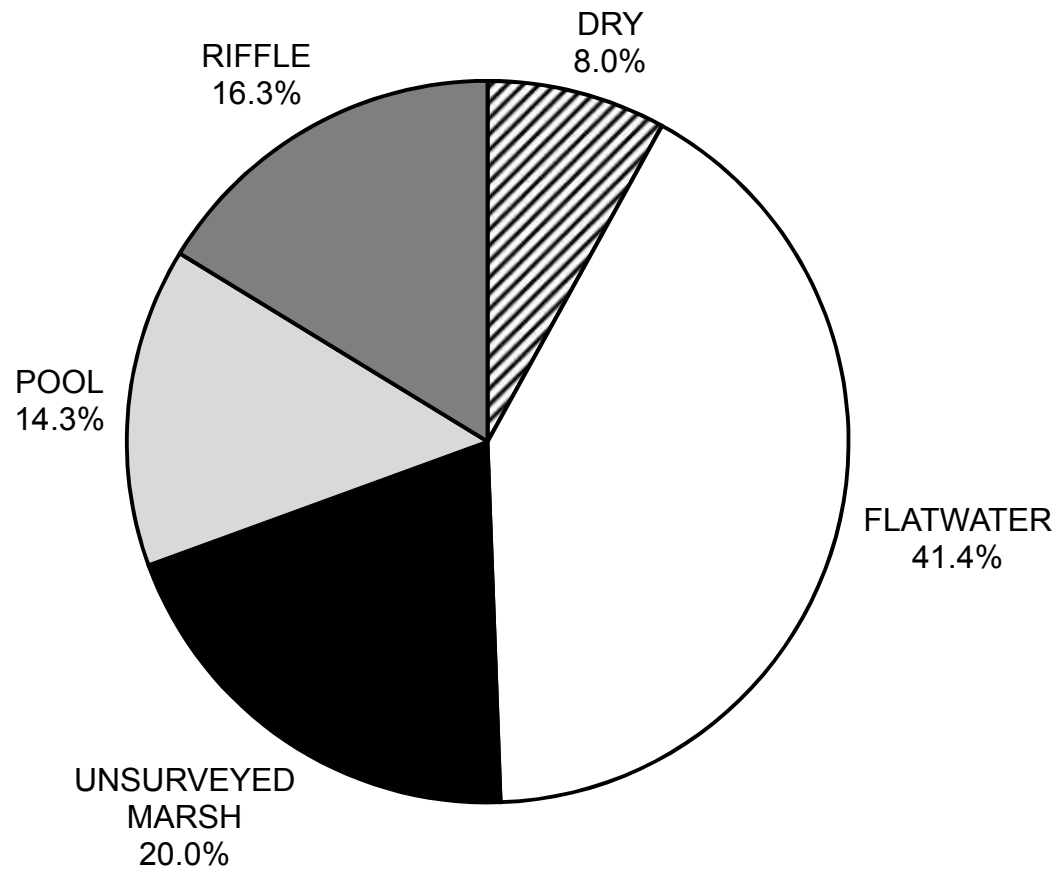
Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	0	0	0.0
Boulder	0	0	0.0
Cobble / Gravel	3	6	11.8
Sand / Silt / Clay	35	32	88.2

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	10	3	17.1
Brush	12	16	36.8
Hardwood Trees	9	8	22.4
Coniferous Trees	7	11	23.7
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values: 3

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

StreamName: Pleasant Valley   LLID: 1237179392404   Drainage: Albion River

Survey Dates: 7/29/2015 to 7/29/2015

Confluence Location: Quad: ELK   Legal Description: T16NR17WS23   Latitude: 39:14:25.0N   Longitude: 123:43:04.0W

	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	0	0	3
SMALL WOODY DEBRIS (%)	0	17	16
LARGE WOODY DEBRIS (%)	0	17	50
ROOT MASS (%)	0	0	0
TERRESTRIAL VEGETATION (%)	0	67	27
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	3
BOULDERS (%)	0	0	0
BEDROCK LEDGES (%)	0	0	0

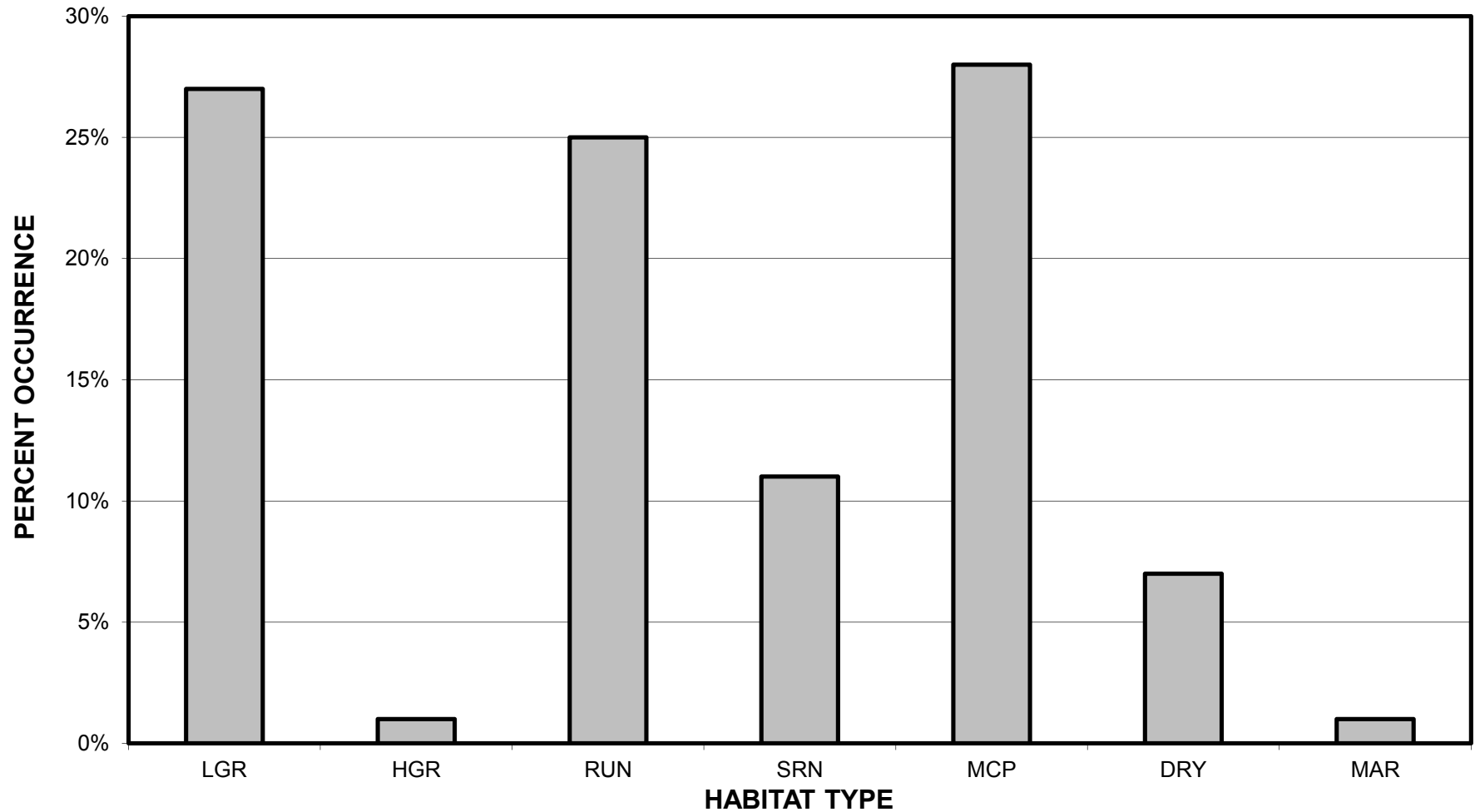# PLEASANT VALLEY 2015
HABITAT TYPES BY PERCENT OCCURRENCE

DRY
7.0%

RIFFLE
28.0%

FLATWATER
36.0%

POOL
28.0%

UNSURVEYED
MARSH
1.0%
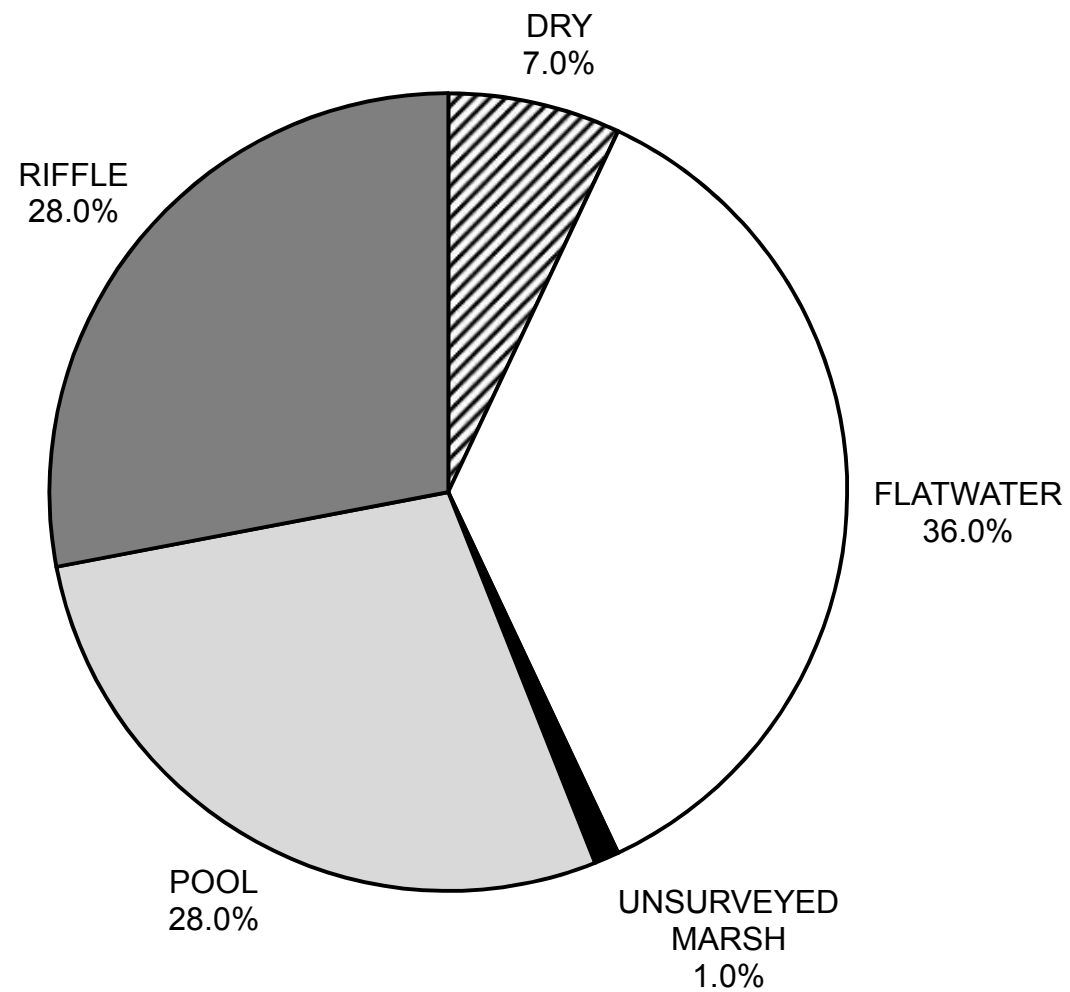
GRAPH 1

PLEASANT VALLEY 2015
HABITAT TYPES BY PERCENT TOTAL LENGTH

DRY
8.0%
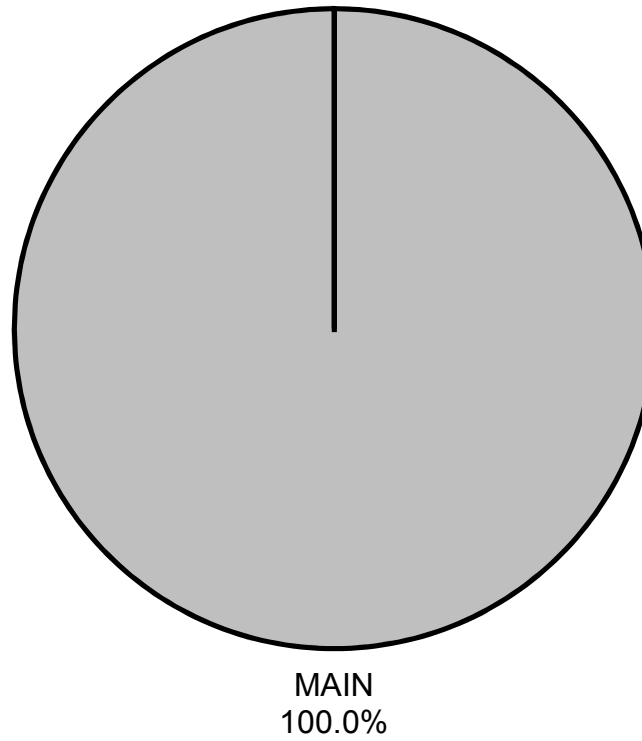
RIFFLE
16.3%

POOL
14.3%

FLATWATER
41.4%

UNSURVEYED
MARSH
20.0%

GRAPH 2

PLEASANT VALLEY 2015
HABITAT TYPES BY PERCENT OCCURRENCE

GRAPH 3
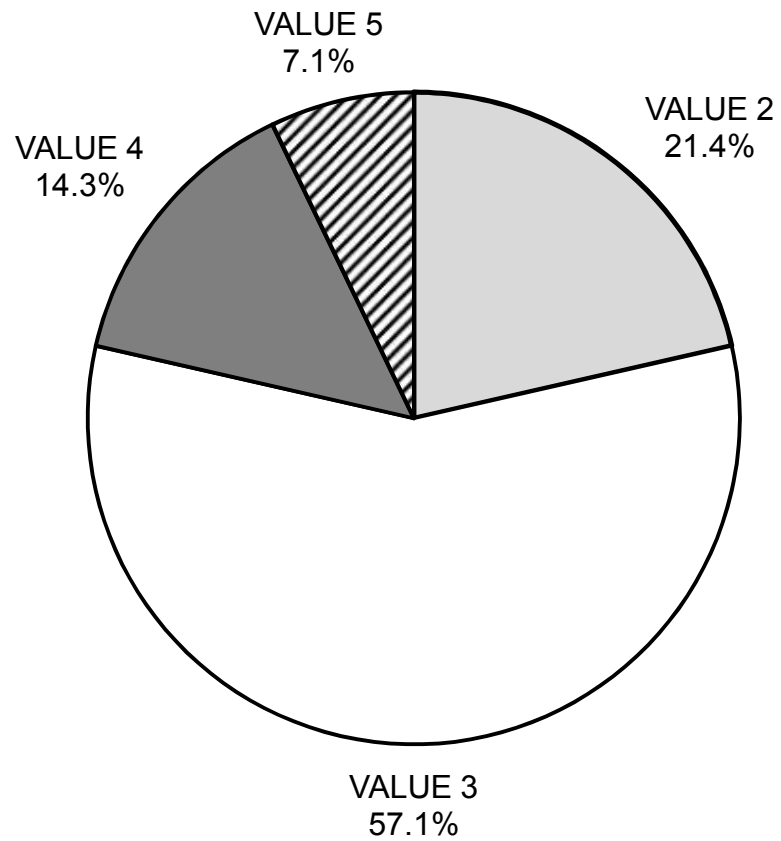
PLEASANT VALLEY 2015
POOL TYPES BY PERCENT OCCURRENCE

MAIN
100.0%

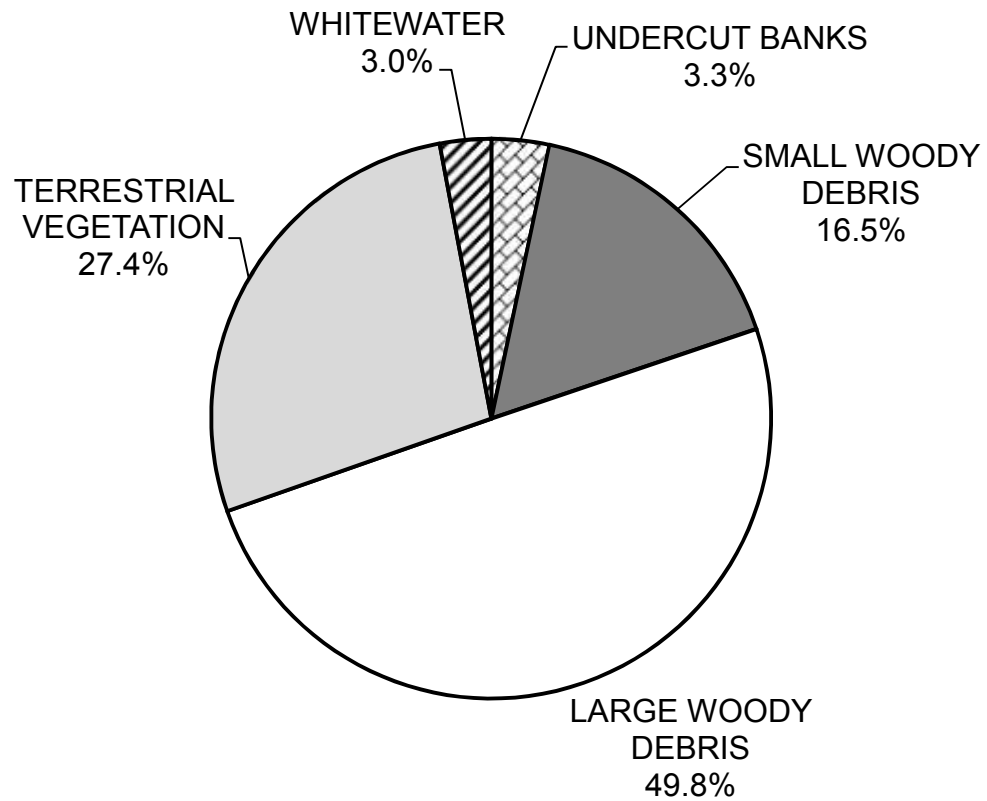GRAPH 4

PLEASANT VALLEY 2015
MAXIMUM DEPTH IN POOLS
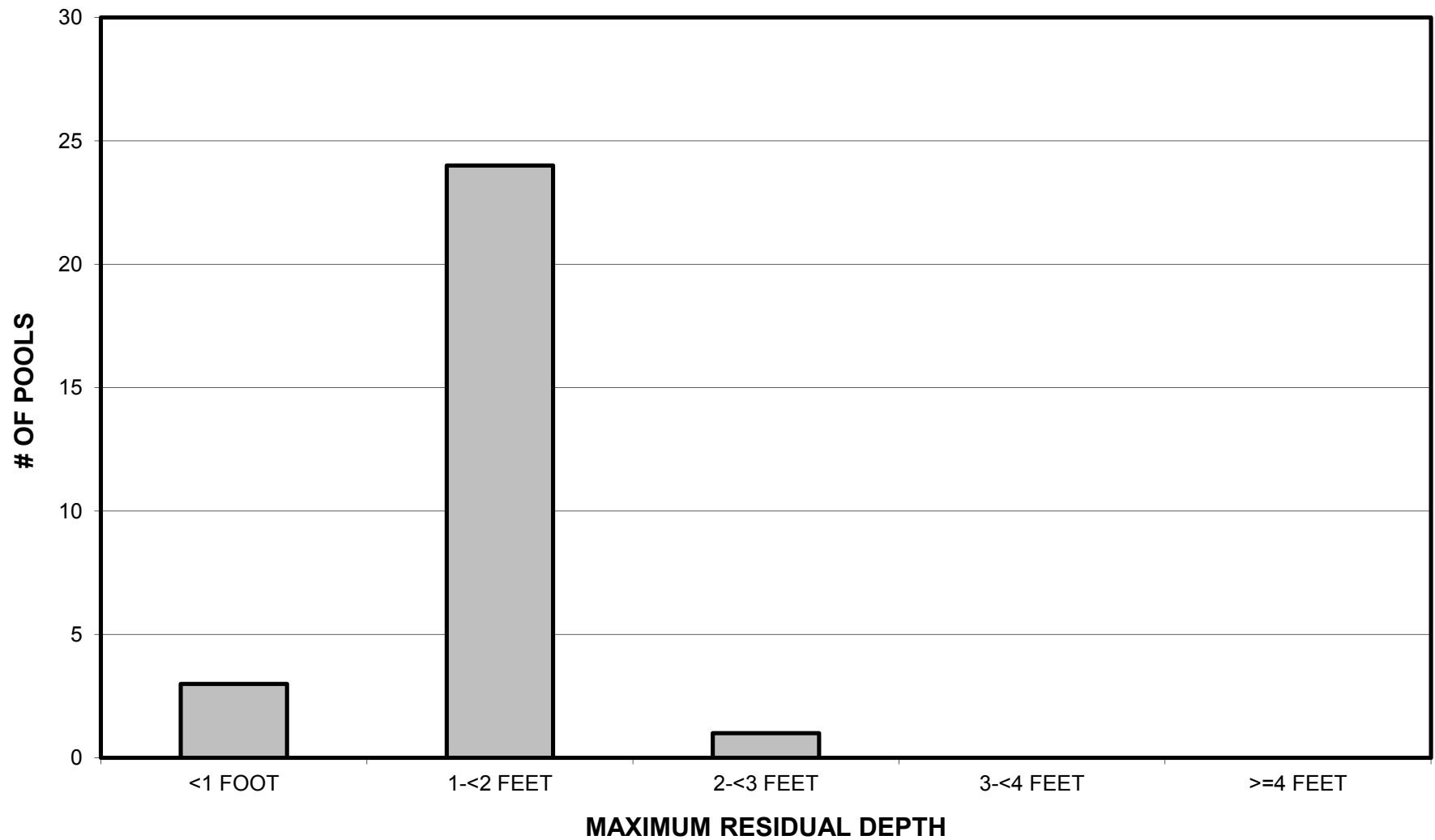
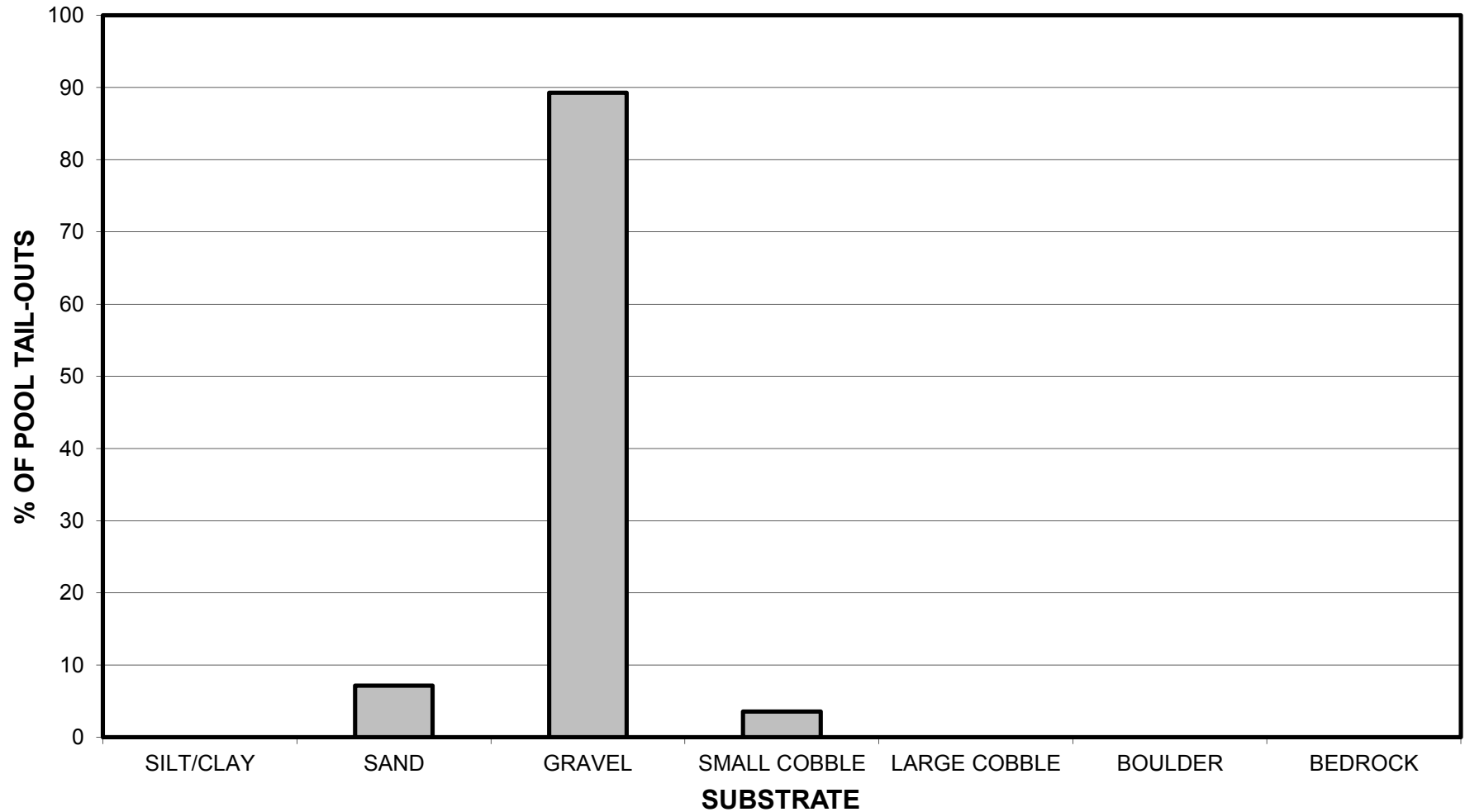GRAPH 5

PLEASANT VALLEY 2015
PERCENT EMBEDDEDNESS

VALUE 5
7.1%

VALUE 2
21.4%

VALUE 4
14.3%

VALUE 3
57.1%

GRAPH 6

PLEASANT VALLEY 2015
MEAN PERCENT COVER TYPES IN POOLS

WHITEWATER
3.0%

UNDERCUT BANKS
3.3%

SMALL WOODY
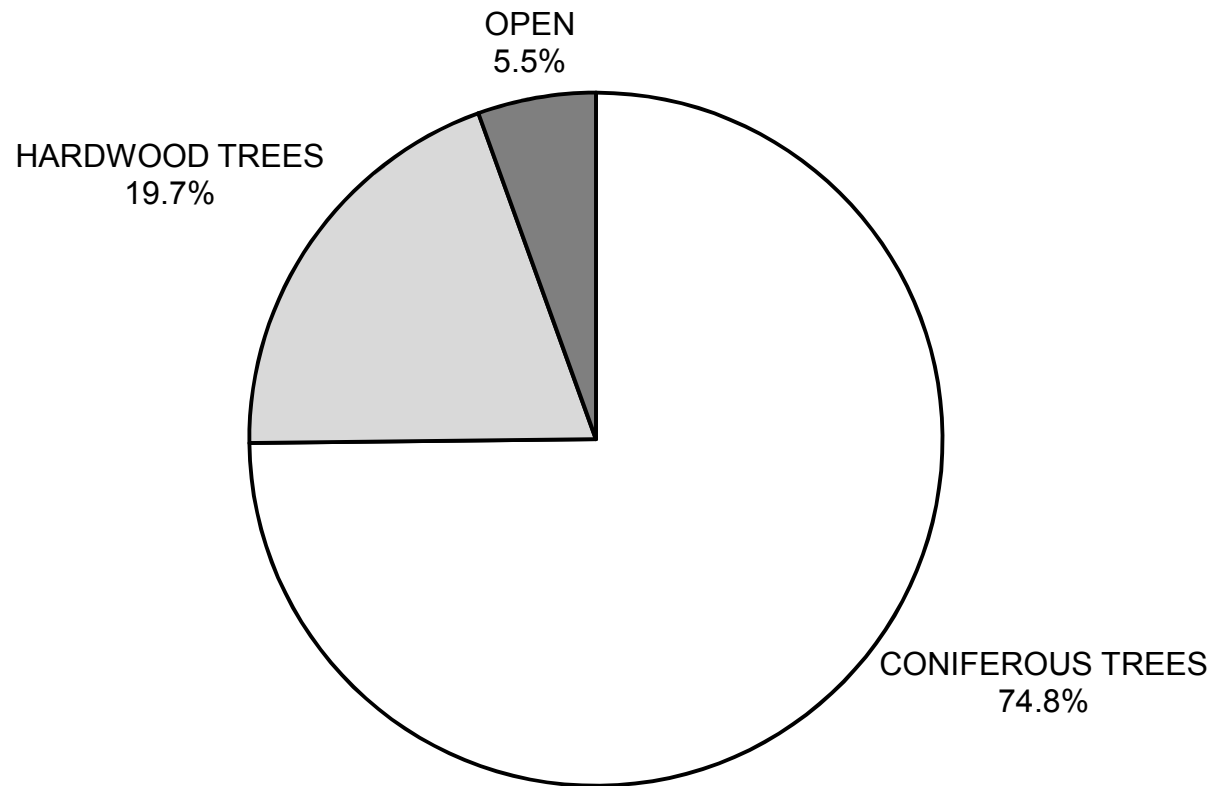DEBRIS
16.5%

TERRESTRIAL
VEGETATION
27.4%

LARGE WOODY
DEBRIS
49.8%

GRAPH 7

PLEASANT VALLEY 2015
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS

GRAPH 8

PLEASANT VALLEY 2015
MEAN PERCENT CANOPY

OPEN
5.5%

HARDWOOD TREES
19.7%

CONIFEROUS TREES
74.8%

GRAPH 9

PLEASANT VALLEY 2015
DOMINANT BANK COMPOSITION IN SURVEY REACH

COBBLE/GRAVEL
11.8%

SAND/SILT/CLAY
88.2%
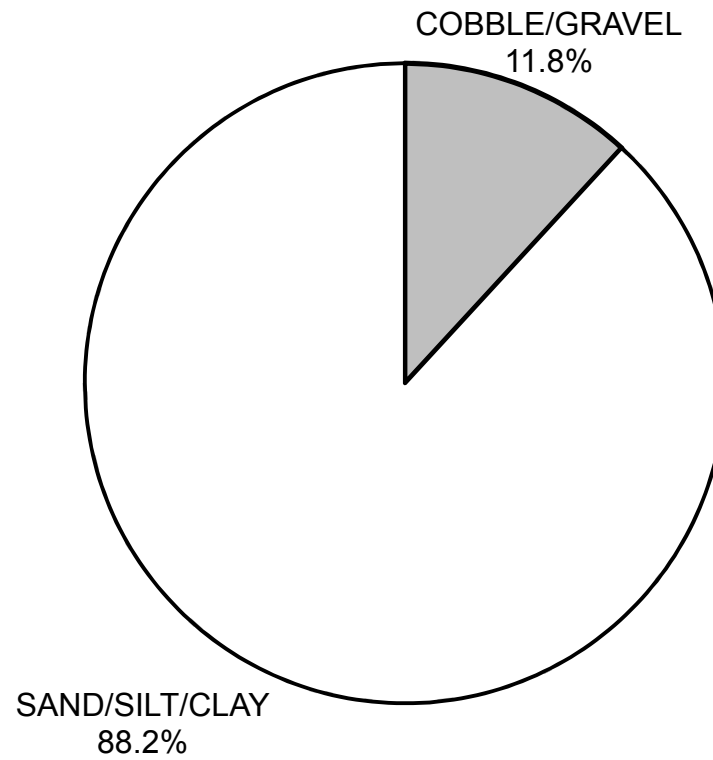
GRAPH 10

PLEASANT VALLEY 2015
DOMINANT BANK VEGETATION IN SURVEY REACH

CONIFEROUS TREES
23.7%

GRASS
17.1%

BRUSH
36.8%

HARDWOOD TREES
22.4%

GRAPH 11