



**California Department of Fish and Game  
Walker Creek Watershed  
Stream Habitat Assessment Reports**

**Verde Canyon Creek**



## STREAM INVENTORY SUB-REPORT

### Verde Canyon

*Assessment Completed August 2008*

*Report Completed March 2009*

### WATERSHED OVERVIEW

Verde Canyon is a tributary to Walker Creek, which is a tributary to the Pacific Ocean, located in Marin County, California (Map 1). Verde Canyon's legal description at the confluence with Walker Creek is T04NR09S6. Its location is 38°09'59.0" north latitude and 122°48'40.0" west longitude, LLID number 1228112381663. Verde Canyon is an ephemeral stream according to the USGS National Hydrography Datasheet (NHD). Verde Canyon drains a watershed of approximately 3.21 square miles. Elevations range from about 187 feet at the mouth of the creek to 1033 feet in the headwater areas. Mixed hardwood forest dominates the watershed. The watershed is entirely privately owned and is considered natural. Vehicle access exists via from Marshall/Petaluma Rd.

### METHODS

The habitat inventory conducted in Chileno 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.

### 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 fully measured. 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 Chileno Creek to record measurements and observations. There are eleven components to the inventory form.

## *Verde Canyon Creek*

### 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". Chileno Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

### 5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Chileno 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:

### *Verde Canyon Creek*

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 Chileno 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 densimeters as described in the California Salmonid Stream Habitat Restoration Manual. Canopy density relates to the amount of stream shaded from the sun. In Chileno 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 Chileno Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

#### 10. Large Woody Debris Count:

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

11. Average Bankfull Width:

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

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 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

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

*Verde Canyon Creek*

- Dominant Bank Vegetation by Vegetation Type

## HABITAT INVENTORY RESULTS AND DISCUSSION

The habitat inventory of 8/27/2008 to 8/27/2008 was conducted by H. Colton, T. Pool, (WSP). The total length of the stream surveyed was 4,212 feet.

Stream flow was not measured on Verde Canyon.

Verde Canyon is a NA channel type for 1,320 feet of the stream surveyed (Reach 1) and a B4 channel type for 2,892 feet of the stream surveyed (Reach 2). The suitability of B4 channel types for fish habitat improvement structures is described in Walker Creek Stream Inventory report.

The water temperatures were not recorded on the survey days 8/27/2008 to 8/27/2008. Air temperatures ranged from 67 to 67 degrees Fahrenheit. For a more complete and accurate water temperature profile 24-hour temperatures would need to be monitored throughout the warm summer months.

Based on the total length of this survey, Level II habitat units consisted of 64% dry units, 31% nosurvey units, 2% culvert units, 2% pool units and 1% flatwater units. The pools are relatively shallow, with none of the 3 pools having a maximum residual depth greater than 2 feet.

None of the 3 pool tail-outs measured had embeddedness ratings of 1 or 2. Three of the pool tail-outs had embeddedness ratings of 3 or 4. Cobble embeddedness of 25% or less, a rating of 1, is considered best for the needs of salmon and steelhead. In Verde Canyon, sediment sources should be mapped and rated according to their potential sediment yields, and control measures should be taken.

The mean shelter rating for pools was 3. The shelter rating in the flatwater habitats was 4. A pool shelter rating of approximately 100 is desirable.

The mean percent canopy density for the stream was 62%. In general, revegetation projects are considered when canopy density is less than 80.

The percentage of right and left bank covered with vegetation was 95% and 95%, respectively. Planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended in areas of stream bank erosion or where bank vegetation is not at acceptable levels.

## GENERAL RECOMMENDATIONS

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

Winter storms often bring down large trees and other woody debris into the stream, which increases the number and quality of pools. This woody debris, if left undisturbed, will provide fish shelter and rearing habitat, and offset channel incision. Landowners should be sensitive about the natural and positive role woody debris plays in the system, and encouraged not to remove woody debris from the stream, except under extreme buildup and only under guidance by a fishery professional.

### RECOMMENDATIONS

- 1) There are sections where the stream is being impacted from cattle trampling the riparian zone. Alternatives to uncontrolled riparian grazing should be explored with the grazer and developed if possible.
- 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) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from Terrestrial Vegetation. Adding high quality complexity with woody cover is desirable and in some areas the material is at hand.
- 4) 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.
- 5) Increase the canopy on Verde Canyon by planting appropriate native vegetation like willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is affected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.
- 6) Verde Canyon Creek would benefit from utilizing bio-technical vegetative techniques for bank stabilization and to re-establish floodplain benches and a defined low flow channel. This would discourage lateral migration of the base flow channel and decrease bank erosion.
- 7) The limited water temperature data available suggest that maximum temperatures are within/above 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.

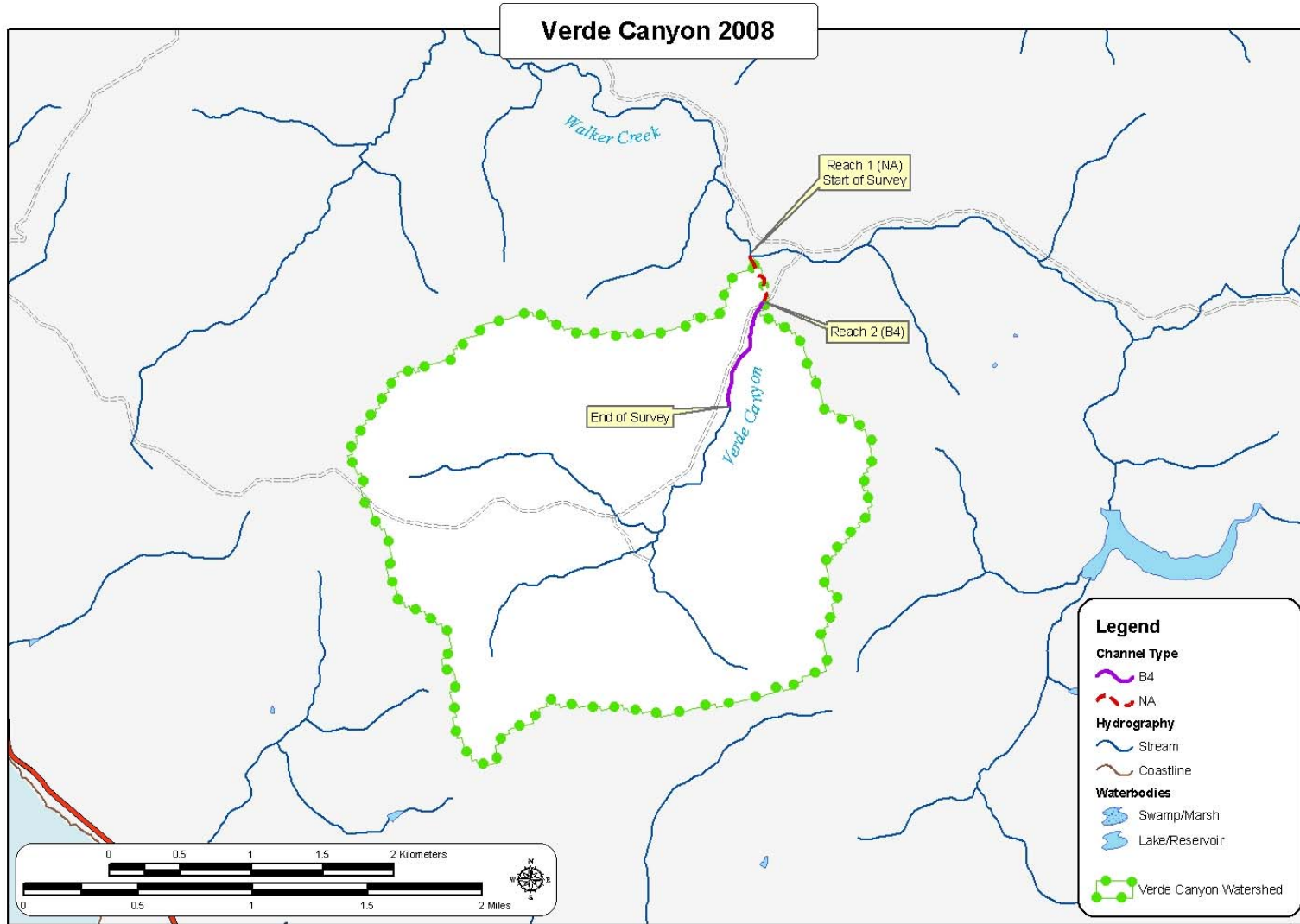
PROBLEM SITES AND LANDMARKS

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

Position	Habitat Unit#	Comment:
0	0001.00	Start of Reach 1 (NA). Reach 1 was not surveyed because there were bulls on the property that were a safety risk.
1320	0002.00	Start of Survey: Start of Survey at bridge #1. Channel Type Changes from Reach 1 (NA) to Reach 2 (B4). WP208. Access Points / Location: (Bridge) Bridge 1 is 11ft wide, 12ft tall and 91 ft long. There is about a 5 foot drop from the edge of bridge to substrate below.
2012	0011.00	Erosion Site: (Bank) 250' into unit left bank erosion and 350' into unit right bank erosion.
4212	0011.00	End of Survey: End of Survey, due to lack of access. WP210



Verde Canyon Creek



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

Stream Name:		Verde Canyon		LLID:		1228112381663		Drainage:		Tomales Bay									
Survey		8/27/2008		Confluence Location:		Quad: POINT REYES NE		Legal Description:		T04NR09S6		Latitude:		38:09:59.0N		Longitude:		122:48:40.0W	
Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating				
1	0	CULVERT	9.1	91	91	2.2													
5	0	DRY	45.5	536	2679	63.6													
1	1	FLATWATER	9.1	27	27	0.6	7.0	0.3	0.4	189	189	57	57		4				
1	0	NOSURVEY	9.1	1320	1320	31.3													
3	3	POOL	27.3	32	95	2.3	6.3	0.9	1.1	198	594	174	523	174	3				
Total Units	Total Units Fully Measured				Total Length (ft.)						Total Area (sq.ft.)		Total Volume (cu.ft.)						
11	4				4212						783		580						

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

**Stream Name:** Verde Canyon  
**Survey** 8/27/2008

**LLID:** 1228112381663 **Drainage:** Tomales Bay

**Confluence Location:** **Quad:** POINT REYES NE **Legal Description:** T04NR09S6 **Latitude:** 38:09:59.0N **Longitude:** 122:48:40.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating	Mean Canopy (%)
1	1	GLD	9.1	27	27	0.6	7.0	0.3	0.4	189	189	57	57		4	54
3	3	MCP	27.3	32	95	2.3	6.0	0.9	1.7	198	594	174	523	174	3	65
5	0	DRY	45.5	536	2679	63.6										
1	0	CUL	9.1	91	91	2.2										
1	0	NS	9.1	1320	1320	31.3										
<b>Total Units</b>	<b>Total Units Fully Measured</b>				<b>Total Length (ft.)</b>						<b>Total Area (sq.ft.)</b>		<b>Total Volume (cu.ft.)</b>			
11	4				4212						783		580			

**Table 3 - Summary of Pools Types**

**Stream Name:** Verde Canyon

**LLID:** 1228112381663

**Drainage:** Tomales Bay

**Survey** 8/27/2008

**Confluence Location: Quad:** POINT REYES NE

**Legal Description:** T04NR09S6

**Latitude:** 38:09:59.0N

**Longitude:** 122:48:40.0W

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
3	3	MAIN	100	32	95	100	6.3	0.9	198	594	174	523	3
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)		Total Volume (cu.ft.)	
3	3				95					594		523	

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

<b>Stream Name:</b> Verde Canyon			<b>LLID:</b> 1228112381663					<b>Drainage:</b> Tomales Bay					
<b>Survey</b> 8/27/2008			<b>Confluence Location: Quad:</b> POINT REYES NE					<b>Legal Description:</b> T04NR09S6		<b>Latitude:</b> 38:09:59.0N		<b>Longitude:</b> 122:48:40.0W	
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	
3	MCP	100	2	67	1	33	0	0	0	0	0	0	
Total Units			Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1 < 2 Feet Max Resid. Depth	Total 1 < 2 Feet % Occurrence	Total 2 < 3 Feet Max Resid. Depth	Total 2 < 3 Feet % Occurrence	Total 3 < 4 Feet Max Resid. Depth	Total 3 < 4 Feet % Occurrence	Total >= 4 Feet Max Resid. Depth	Total >= 4 Feet % Occurrence	
3			2	67	1	33	0	0	0	0	0	0	
Mean Maximum Residual Pool Depth (ft.):			1										

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

**Stream Name:** Verde Canyon      **Dry Units:** 5      **LLID:** 1228112381663      **Drainage:** Tomales Bay

**Survey** 8/27/2008

**Confluence Location:** Quad: POINT REYES NE      **Legal Description:** T04NR09S6      **Latitude:** 38:09:59.0N      **Longitude:** 122:48:40.0W

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
0	0	TOTAL RIFFLE									
1	1	GLD	0	0	0	0	100	0	0	0	0
1	1	TOTAL FLAT	0	0	0	0	100	0	0	0	0
3	3	MCP	3	0	0	40	23	0	0	0	0
3	3	TOTAL POOL	3	0	0	40	23	0	0	0	0
1	0	CUL									
1	0	NS									
11	4	TOTAL	3	0	0	30	43	0	0	0	0

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

**Stream Name:** Verde Canyon      **Dry Units:** 5      **LLID:** 1228112381663      **Drainage:** Tomales Bay

**Survey** 8/27/2008

**Confluence Location:** **Quad:** POINT REYES NE      **Legal Description:** T04NR09S6      **Latitude:** 38:09:59.0N      **Longitude:** 122:48:40.0W

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
1	1	GLD	0	100	0	0	0	0	0
3	3	MCP	0	100	0	0	0	0	0
1	0	CUL	0	0	0	0	0	0	0
1	0	NS	0	0	0	0	0	0	0

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

**Stream Name:** Verde Canyon

**LLID:** 1228112381663

**Drainage:** Tomales Bay

**Survey** 8/27/2008

**Confluence Location: Quad:** POINT REYES NE

**Legal Description:** T04NR09S6

**Latitude:** 38:09:59.0N

**Longitude:** 122:48:40.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
62	0	100	0	95	95

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

Open units represent habitat units with zero canopy cover.



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

Stream Verde Canyon LLID: 1228112381663 Drainage Tomales Bay  
 Survey Dates: 8/27/2008 Survey Length (ft.): 4212 Main Channel (ft.): 4212 Side Channel (ft.): 0  
 Confluence Location: Quad POINT REYES NE Legal Description: T04NR09S6 Latitude: 38:09:59.0N Longitude: 122:48:40.0W

**Summary of Fish Habitat Elements By Stream**

**STREAM REACH: 1**

Channel Type: NA	Canopy Density (%):	Pools by Stream Length
Reach Length (ft.): 1320	Coniferous Component (%):	Pool Frequency (%):
Riffle/Flatwater Mean Width (ft.):	Hardwood Component	Residual Pool Depth (%):
BFW:	Dominant Bank	< 2 Feet Deep:
Range (ft.): 15 to 15	Vegetative Cover (%):	2 to 2.9 Feet Deep:
Mean (ft.): 15	Dominant	3 to 3.9 Feet Deep:
Std. Dev.: 0	Dominant Bank Substrate	>= 4 Feet Deep:
Base Flow (cfs):	Occurrence of LWD (%):	Mean Max Residual Pool Depth
Water (F): Air (F): 67 - 67	LWD per 100 ft.:	Mean Pool Shelter
Dry Channel (ft.):	Riffles:	
	Pools:	
	Flat:	
Pool Tail Substrate (%): Silt/Clay: Sand: Gravel: Sm Cobble: Lg Cobble: Boulder Bedrock:		
Embeddedness Values (%): 1. 2. 3. 4. 5.		

**STREAM REACH: 2**

Channel Type: B4	Canopy Density (%): 62.0	Pools by Stream Length	3.3
Reach Length (ft.): 2892	Coniferous Component (%): 0.0	Pool Frequency (%):	30.0
Riffle/Flatwater Mean Width (ft.): 7.0	Hardwood Component 100.0	Residual Pool Depth (%):	
BFW:	Dominant Bank Hardwood Trees	< 2 Feet Deep:	100.0
Range (ft.): 15 to 15	Vegetative Cover (%): 95.0	2 to 2.9 Feet Deep:	0.0
Mean (ft.): 15	Dominant Terrestrial Veg.	3 to 3.9 Feet Deep:	0.0
Std. Dev.: 0	Dominant Bank Substrate Cobble/Gravel	>= 4 Feet Deep:	0.0
Base Flow (cfs):	Occurrence of LWD (%): 0.0	Mean Max Residual Pool Depth	1.1
Water (F): 0 - 0 Air (F): 67 - 67	LWD per 100 ft.:	Mean Pool Shelter	3
Dry Channel (ft.): 2679	Riffles:		
	Pools: 0		
	Flat: 0		
Pool Tail Substrate (%): Silt/Clay: 0.0 Sand: 66.7 Gravel: 33.3 Sm Cobble: 0.0 Lg Cobble: 0.0 Boulder 0.0 Bedrock: 0.0			
Embeddedness Values (%): 1. 0.0 2. 0.0 3. 66.7 4. 33.3 5. 0.0			

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

**Stream Name:** Verde Canyon **LLID:** 1228112381663 **Drainage:** Tomales Bay  
**Survey:** 8/27/2008  
**Confluence Location: Quad:** POINT REYES NE **Legal Description:** T04NR09S6 **Latitude:** 38:09:59.0N **Longitude:** 122:48:40.0W

**Mean Percentage of Dominant Stream Bank Substrate**

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage (%)
Bedrock	0	0	0.0
Boulder	0	0	0.0
Cobble/Gravel	4	4	100.0
Sand/Silt/Clay	0	0	0.0

**Mean Percentage of Dominant Stream Bank Vegetation**

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percentage
Grass	0	0	0.0
Brush	0	0	0.0
Hardwood	4	4	100.0
Coniferous	0	0	0.0
No Vegetation	0	0	0.0

**Total Stream Cobble Embeddedness Values:** 3

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

**Stream Name:** Verde Canyon

**LLID:** 1228112381663

**Drainage:** Tomales Bay

**Survey** 8/27/2008

**Confluence Location: Quad:** POINT REYES NE

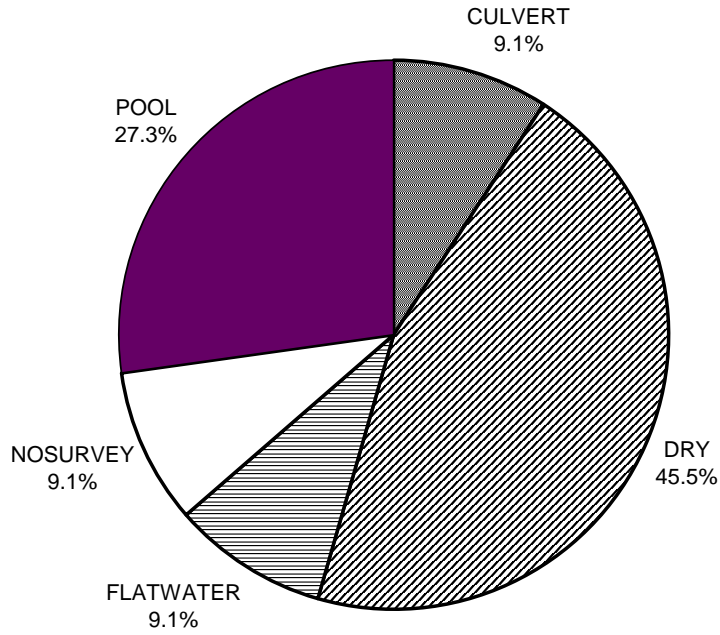
**Legal Description:** T04NR09S6

**Latitude:** 38:09:59.0N

**Longitude:** 122:48:40.0W

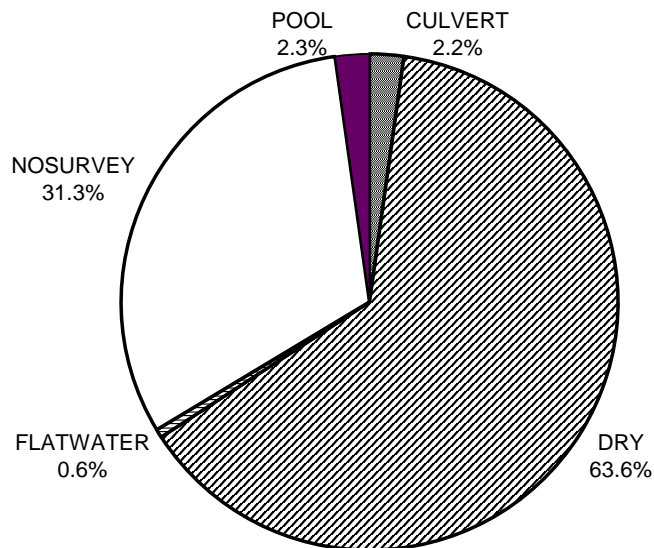
	<b>Riffles</b>	<b>Flatwater</b>	<b>Pools</b>
UNDERCUT BANKS (%)		0	3
SMALL WOODY DEBRIS (%)		0	0
LARGE WOODY DEBRIS (%)		0	0
ROOT MASS (%)		0	40
TERRESTRIAL VEGETATION		100	23
AQUATIC VEGETATION (%)		0	0
WHITEWATER (%)		0	0
BOULDERS (%)		0	0
BEDROCK LEDGES (%)		0	0

### VERDE CANYON 2008 HABITAT TYPES BY PERCENT OCCURRENCE



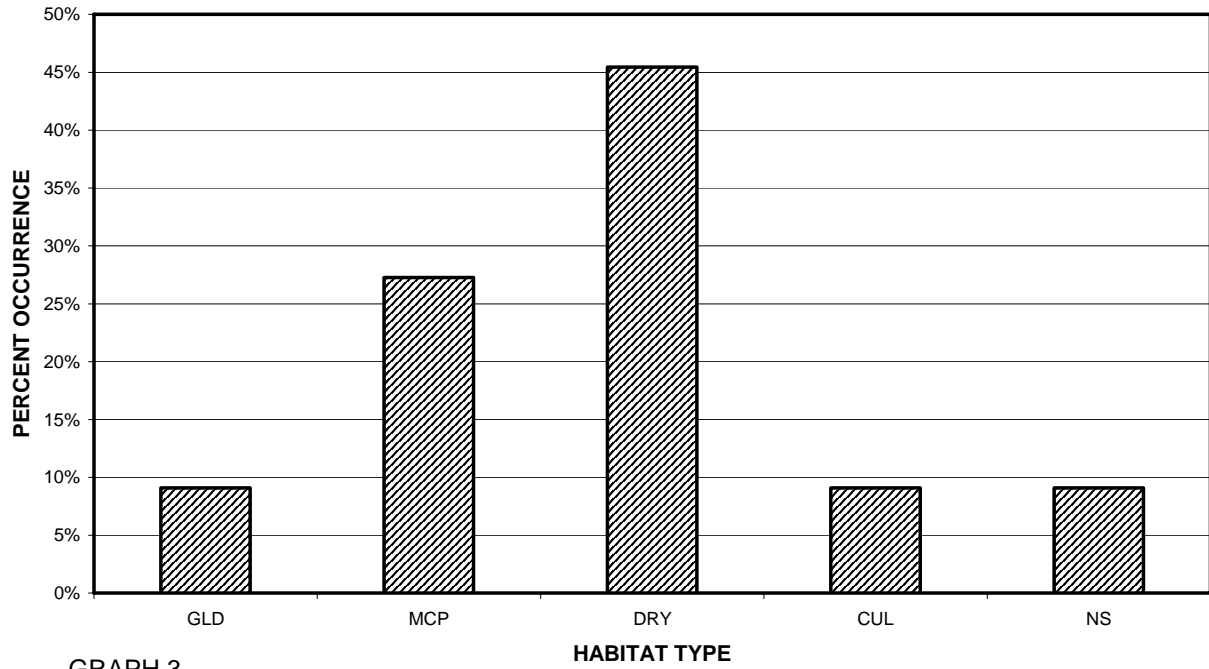
GRAPH 1

### VERDE CANYON 2008 HABITAT TYPES BY PERCENT TOTAL LENGTH



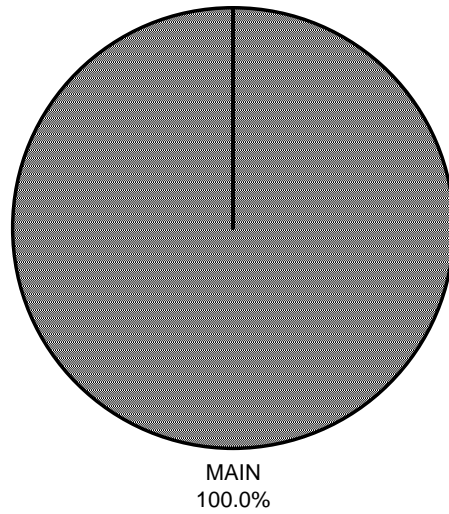
GRAPH 2

### VERDE CANYON 2008 HABITAT TYPES BY PERCENT OCCURRENCE



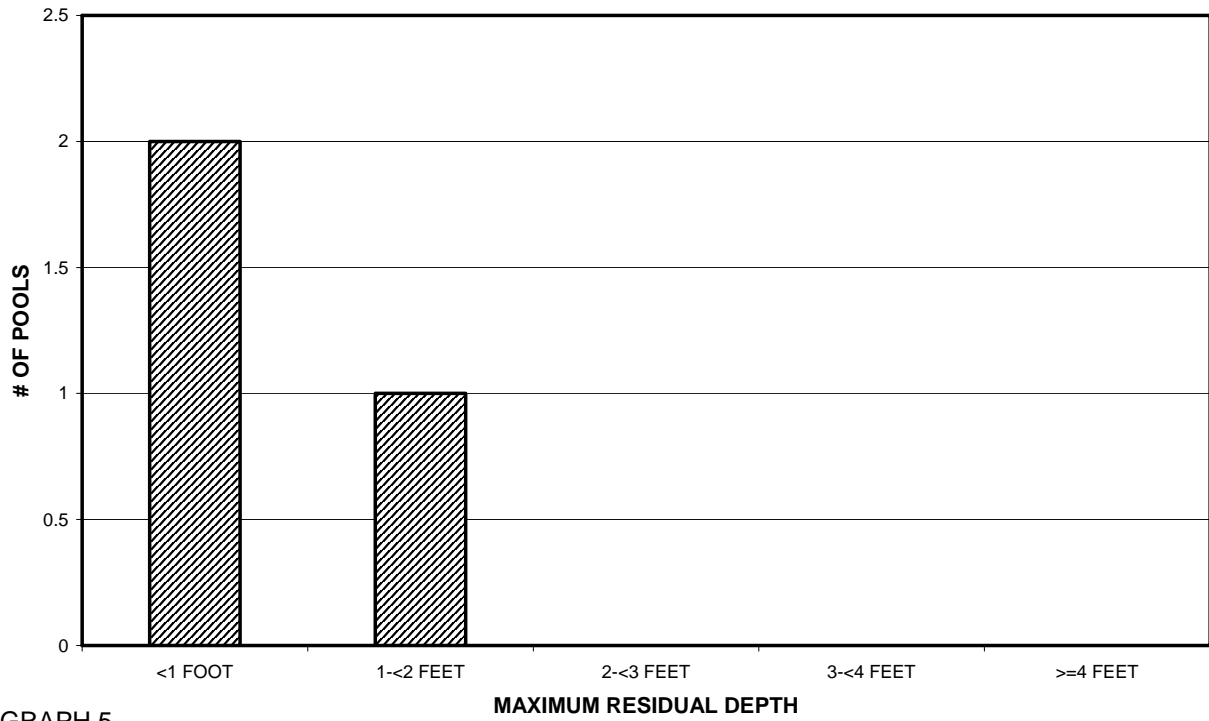
GRAPH 3

### VERDE CANYON 2008 POOL TYPES BY PERCENT OCCURRENCE



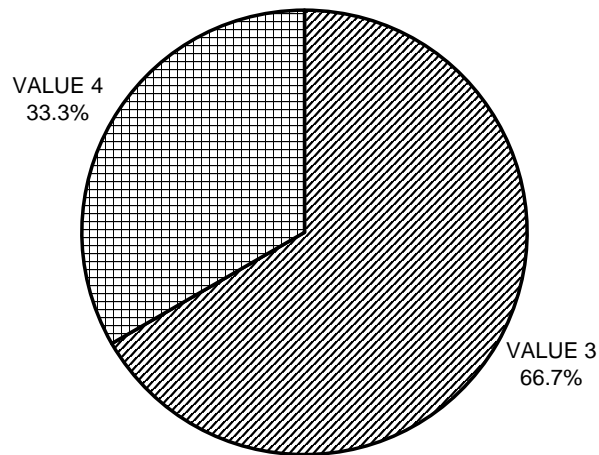
GRAPH 4

### VERDE CANYON 2008 MAXIMUM DEPTH IN POOLS



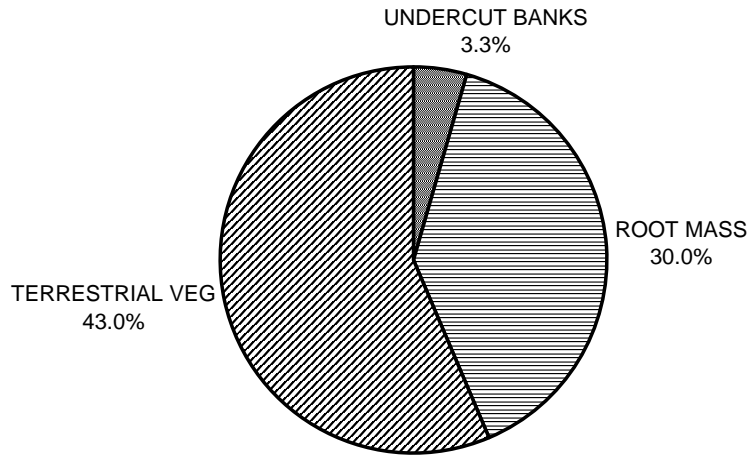
GRAPH 5

### VERDE CANYON 2008 PERCENT EMBEDDEDNESS



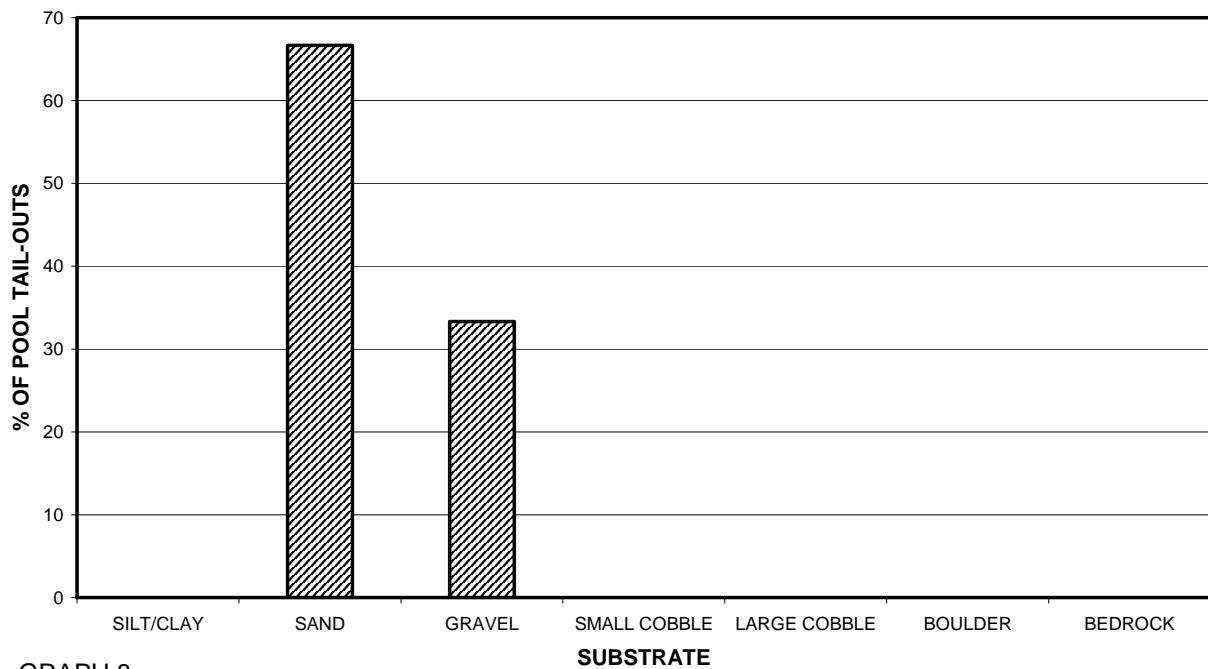
GRAPH 6

### VERDE CANYON 2008 MEAN PERCENT COVER TYPES IN POOLS



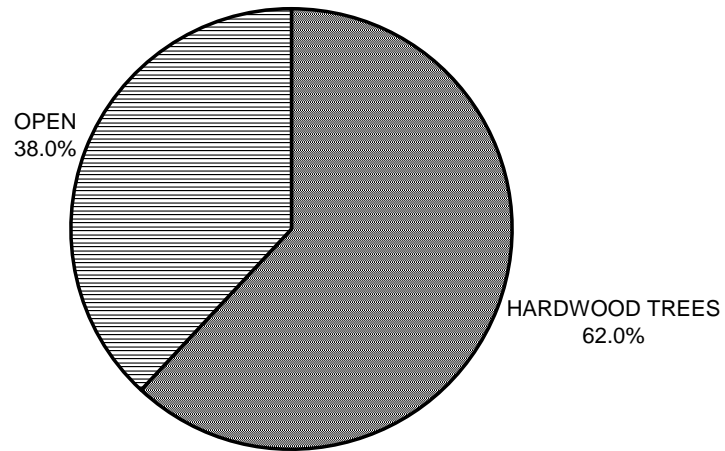
GRAPH 7

### VERDE CANYON 2008 SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



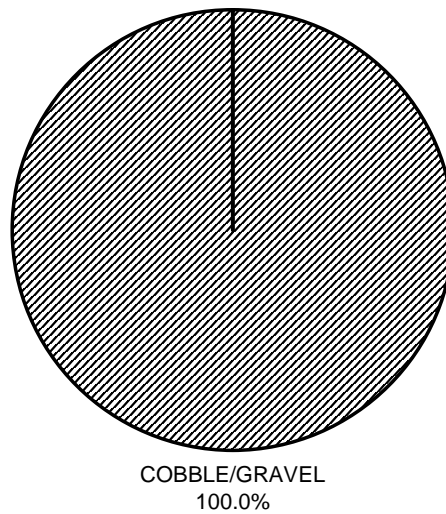
GRAPH 8

**VERDE CANYON 2008  
MEAN PERCENT CANOPY**



GRAPH 9

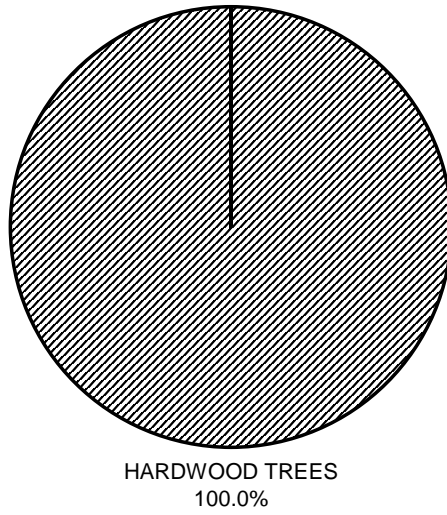
**VERDE CANYON 2008  
DOMINANT BANK COMPOSITION IN SURVEY REACH**



GRAPH 10



**VERDE CANYON 2008  
DOMINANT BANK VEGETATION IN SURVEY REACH**



GRAPH 11