#### CALIFORNIA DEPARTMENT OF FISH AND GAME STREAM INVENTORY REPORT Copeland Creek Report Revised April 14, 2006 Report Completed 2005 Assessment Completed 2001

#### **INTRODUCTION**

A stream inventory was conducted beginning July 2 and ending July 18, 2001 on Copeland Creek. The survey began at the confluence with Laguna De Santa Rosa Creek and extended upstream 29,962 feet.

The Copeland Creek inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Copeland Creek. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for 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

Copeland Creek is a tributary to the Laguna De Santa Rosa, a tributary to Santa Rosa Creek, a tributary to Mark West Creek, a tributary to the Russian River, a tributary to the Pacific Ocean located in Sonoma County, California (Map 1). Copeland Creek's legal description at the confluence with Laguna De Santa Rosa Creek is T6N R8W S22. Its location is 38.3437143356184° north latitude and 122.722324538536° west longitude. Copeland Creek is a third order stream and has approximately 9.06 miles of solid blue line stream according to the USGS Cotati 7.5 minute quadrangle. Copeland Creek drains a watershed of approximately 5.56 square miles. Elevations range from about 89 feet at the mouth of the creek to 2,454 feet in the headwater areas. Herbaceous vegetation, urban area, and hardwood forest dominate the watershed. The watershed is primarily privately owned. Vehicle access exists from Old Redwood Highway (101), south of Santa Rosa, to Highway 116 west. From the junction of Highways 101 and 116, travel west on 116, 0.6 miles to a freeway exit that leads to the mouth of Copeland Creek.

#### **METHODS**

The habitat inventory conducted in Copeland Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al., 1998). The Sonoma County Water Agency field crew 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 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 Copeland Creek to record measurements and observations. There are nine components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) at 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 (1985 rev. 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 (1988). 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". Copeland 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 Copeland Creek, embeddedness was visually 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 particle size, bedrock, or other considerations.

#### 6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide 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. 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 Copeland 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 visually 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 Copeland 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% subsample. In addition, the area of canopy was estimated visually into percentages of evergreen or deciduous 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 Copeland 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.

### **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 Copeland Creek. These sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

### DATA ANALYSIS

Data from the habitat inventory form are entered into Habitat 8.4, a dBASE 4.2 data entry program developed by Tim Curtis, Inland Fisheries Division, California Department of Fish and Game. This program processes and summarizes the data, and produces the following tables:

- Summary of riffle, flatwater, and pool habitat types
- Summary of habitat types and measured parameters
- Summary of pool types
- Summary of maximum pool depths by pool habitat types
- Summary of mean percent cover by habitat type
- Summary of dominant substrates by habitat type
- Summary of fish habitat elements by stream reach

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Copeland Creek include:

- Level II habitat types by % occurrence
- Level II habitat types by % total length
- Level IV habitat types by % occurrence
- Level I pool habitat types by % occurrence
- Maximum depth in pools
- Percent embeddedness estimated in pool tail-outs
- Mean percent cover types in pools
- Substrate composition in pool tail-outs
- Mean percent canopy
- Dominant bank composition in survey reach
- Dominant bank vegetation in survey reach

### HABITAT INVENTORY RESULTS

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

The habitat inventory of July 2 to July 18, 2001, was conducted by H. Fett and H. Fantacone of the Sonoma County Water Agency. The total length of the stream surveyed was 29,962 feet with an additional 1,021 feet of side channel.

Stream flow was not measured on Copeland Creek.

Copeland Creek is a C3 channel type for 10,172 feet, a B3 for 10,411 feet, an F3 for 6,762 feet, an A2 for 2,618 feet of the stream surveyed. C3 channels are low gradient, meandering, pointbar, riffle/pool, alluvial channels with broad, well defined floodplains and cobble-dominant substrates. B3 channel types are moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools, very stable plan and profile, stable banks and cobble-dominant substrates. F3 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and cobble-dominant substrates. A2 channels are steep, narrow, cascading, step-pool streams, with high energy/debris transport associated with depositional soils and boulder-dominant substrates.

Water temperature taken during the survey period was 60 degrees Fahrenheit. Air temperature was 65 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of *occurrence* there were 26% riffle units, 32% flatwater units, 31% pool units, and 11% dry units (Graph 1). Based on total *length* of Level II habitat types there were 31% riffle units, 21% flatwater units, 7% pool units, and 41% dry units (Graph 2).

Seventeen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent *occurrence* were step runs, 20%; low-gradient riffles, 13%; and high-gradient riffles, 12% (Graph 3). Based on percent total *length*, dry made up 41%, step runs 17%, and high-gradient riffles 17%.

A total of 81 pools were identified (Table 3). Scour pools were the most frequently encountered, at 49%, and comprised 40% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Nineteen of the 81 measured pools (23%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 81 pool tail-outs measured, 64 had a value of 1 (79%); 13 had a value of 2 (16%); one had a value of 3 (1%); and three had a value of 5 (4%) (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 unsuited for spawning due to inappropriate substrate like bedrock, log sills, boulders.

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 6, flatwater habitat types had a mean shelter rating of 16, and pool habitats had a mean shelter rating of 25 (Table 1). Of the pool types, the Scour pools had the highest mean shelter rating at 30. Backwater pools and main-channel pools had mean shelter ratings of 26 an 20, respectively (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Copeland Creek. Graph 7 describes the pool cover in Copeland Creek. Boulders are the dominant pool cover type followed by roots.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Small cobble was the dominant substrate observed in 47% of pool tail-outs while large cobble was the next most frequently observed substrate type, at 32%.

The mean percent canopy density for the surveyed length of Copeland Creek was 70%. The mean percentages of evergreen and deciduous trees were 15% and 55%, respectively. Graph 9 describes the mean percent canopy in Copeland Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 71%. The mean percent left bank vegetated was 64%. The dominant elements composing the structure of the stream banks consisted of 8% bedrock, 36% boulder, 49% cobble/gravel, and 8% sand/silt/clay (Graph 10). Deciduous trees were the dominant vegetation type observed in 46% of the units surveyed. Additionally, 30% of the units surveyed had grass as the dominant vegetation type, and 16% had brush as the dominant vegetation (Graph 11).

### **BIOLOGICAL INVENTORY RESULTS**

Due to inadequate staffing levels, biological inventory surveys were not conducted in Copeland Creek in 2001.

There is no record of hatchery stocking or fish rescue/transfer operations in Copeland Creek.

#### DISCUSSION

Copeland Creek is a C3 channel type for 10,172 feet, a B3 for 10,411 feet, an F3 for 6,762 feet, and an A2 for 2,618 feet. The suitability of C3, B3, F3, and A2 channel types for fish habitat improvement structures are as follows: C3 channel types are excellent for bank-placed boulders, good for plunge weirs, boulder cluster, single and opposing wing-deflectors, and log cover. B3 channel types are excellent for plunge weirs, boulder clusters and bank placed boulder, single and opposing wing-deflectors and log cover. F3 channel types are good for bank-placed boulders, single and opposing wing-deflectors; fair for plunge weirs, boulder clusters, channel constrictors and log cover. A2 channel types are generally not suitable for fish habitat improvement structures.

Riffle habitat types comprised 31% of the total length of this survey, flatwater 21%, and pool 7%. The pools are relatively shallow, with only 19 of the 81 (23%) measured pools having a maximum 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 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.

Seventy-seven of the 81 pool tail-outs measured had embeddedness ratings of 1 or 2. One of the pool tail-outs had embeddedness ratings of 3 or 4. Three 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 Copeland Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Forty-eight of the 81 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter for flatwater was 16. The mean shelter rating for pools was 25. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in all habitat types. Additionally, roots contribute a small amount. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 70%. Reach 1 had a canopy density of 62% while Reaches 2, 3, 4, and 5 had canopy densities of 73%, 64%, 82%, and 83% respectively. In

general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was moderate at 71% and 64%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic trees species, in conjunction with bank stabilization, is recommended.

#### GENERAL RECOMMENDATIONS

Copeland 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 <u>not to remove woody debris</u> from the stream, except under extreme buildup and only under guidance by a fishery professional.

#### **RECOMMENDATIONS**

- 1. There is at least one section where the stream is being impacted from cattle trampling the riparian zone. Alternatives to limit cattle access, control erosion and increase canopy, should be explored with landowners, and developed if possible.
- 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. 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.
- 4. Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from boulders. Adding high quality complexity with log and root wad cover is desirable.
- 5. Increase the canopy on Copeland Creek by planting 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.

### COMMENTS AND LANDMARKS

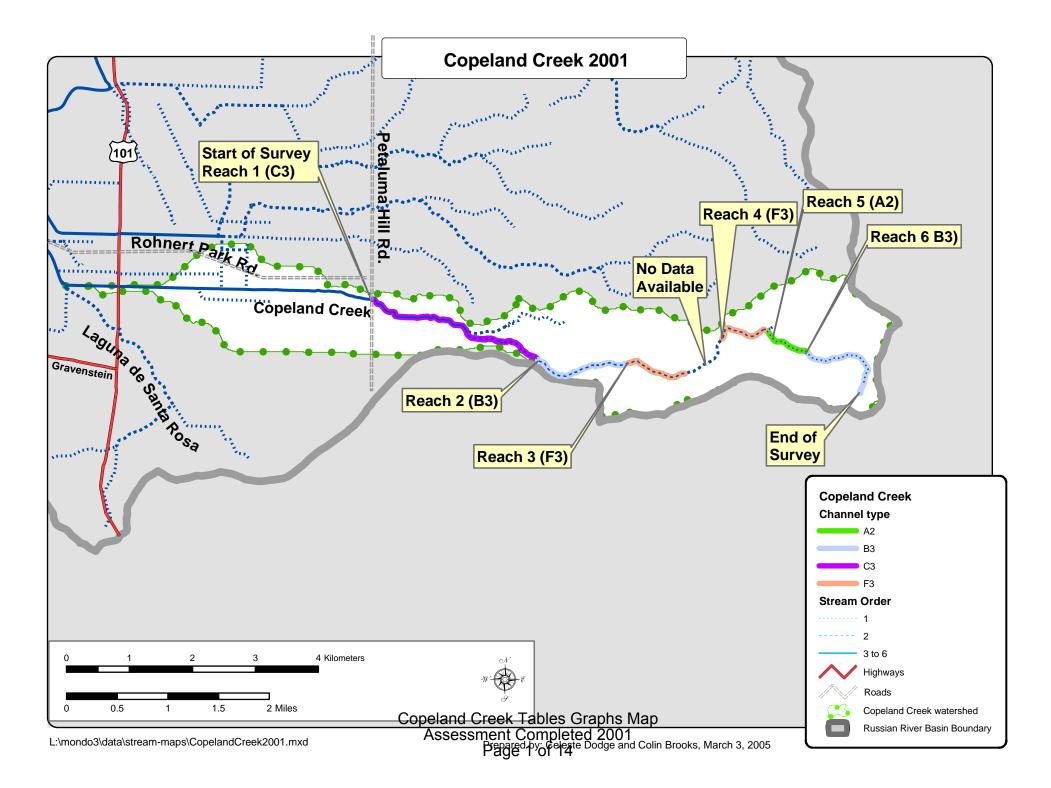
The following landmarks and possible problem sites were noted. All distances are approximate and taken from the beginning of the survey.

- 0' Petaluma Hill Bridge>>> START OF SURVEY<< (N38°20'32.3"/W122°40'0.2"); SCWA Restoration Projects.HU #1-#3 6547' +/-100 tadpoles Presley Rd. Bridge; (N38°20'14.9"/W122°38'49.3") 6662' 6812' Steelhead; Roach; +/- 40 Sculpin; Evidence of cows in creek from here thru HU #071 6948' SS, Sculpin, +/- 100 fish Big white pipe into middle of creek buried under debris extending into next HU as 6975' well--6"; evidence of cows in creek 7042' Evidence of cows in creek throughout this and next 60 HU's; Fish 7122' Three dead Steelhead 7167' +/- 30 FISH; R. Bank 11' high 7253' Steelhead, fish 7294' Flag N38°20'14.1/W122°38'42.1" 7323' Fish; Cattle access creek here 7923' (N38°20'12.3"/W122°38'35.0") 7941' 98' tractor crossing 8201' Isolated pool 8363' Frogs (Not Tree Frogs); snake (N38°20'03.7"/W122°38'11.5"); Fish; Steelhead 10106' 10172' CHANNEL TYPE CHANGE (C3---->B3); Fish; 2 Steelhead; water temp 80° 10690' N38°20'1.1"/W122°38'6.5" 10923' Fish present Side channel coming in at 31' on Right 10978' 10867' (N38°19'973"/W122°38'044") 11387' (N38°19'942"/W122°38'011") 11583' Side channel coming in at 0' on left 11651' 10' high R Bank oak tree ready to fall in 11777' **Fish Present** 11798' (N38°19'937"/W122°37'920") fish present, 10-20 11893' 11917' Right Bank +/- 20' vert 12077' Steelhead 12241' R. Bank 5' vertical 12330' (N38°19'922"/W122°37'836") 12684' on Right Tributary w/ trickle of water coming in at 3' Lichau Rd. Bridge, lots of fish-Steelhead; (N38°19'952"/W122°37'763") 12771' see erosion sheet-fence hanging 4' off bank running along road 13624' 13677' large cobble dam across creek-Temporary 13813' L. Bank 15' vertical 13895' (N38°20'019"/W122°37'601") 14207' trib on Left side 26' in water temp  $60^{\circ}$ 14776' FISH PRESENT; (N38°20'039"/W122°37'428") 16189' (N38°20'048"/W122°37'177"); CHANNEL TYPE CHANGE(B3----->F3) 16617' (N38°20'079"/W122°37'087") shelter provided by old culvert pipe - 35% 16831'
- 17189' (N38°20'022"/W122°37'022")

17325'	water intake pipe 4"
17708'	(N38°19'907"/W122°36'910")
17912'	Foothill Yellow Legged Tadpoles
18048'	Steelhead (multiple)
18072'	tadpoles
18311'	(N38°19'963"/W122°36'821")
18322'	California newt
19049'	Large debris, water underneath
19070'	(N38°19'969"/W122°36'644"); FROGS
19617'	(N38°20'284"/W122°36'187"); See Dam Sheet
19783'	About 5 - 10 Steelhead
19894'	Wood structure on cement, 7" pipe in and out
20102'	Banana Slugs
20221'	(N38°20'374"/W122°36'142")
20580'	4' waterfall
21353'	42' Trib on Right
21508'	(N38°20'303"/W122°35'909")
21817'	111' Trib Left
22129'	Side Channel on Left at 100'; Trib on R 170' (60°)
22448'	tree frogs
22543'	CA Newt
22801'	tree frogs
22951'	Steep Gradient; 10' Waterfalls; CHANNEL CHANGE (F3>A2)
24367'	Start of INCREASE IN SEDIMENT
24906'	Substrate- cement from culvert
24936'	most of unit contains the culvert
25019'	tree frogs
25569'	(N38°20'180"/W122°35'248"); CHANNEL TYPE CHANGE(A2>B3)
25807'	tadpoles, tree frogs, frogs
25842'	tadpoles
26286'	Inside culvert 130';(N38°20'127"/W122°35'121")
26401'	on left side Trib at 50'(DRY); Cattle in creek
26467'	Frog
26962'	Wet Trib on left at 53'
27241'	Dry Trib on left at 139'
28126'	R. Side Trib at 305' (DRY); Frogs, Yellow Legged
28687'	Tree Frogs
28987'	(N38°19'990"/W122°34'619"); Lots of <i>Juncus</i> sp., Dry Trib on Right at 630'
29872'	4" pipe from house into creek by culvert; culvert at 600' for driveway, 13' long caved
	in for 2' on left; Trib on left at 780' (DRY); >>>> END OF
	CREEK/SURVEY<<<<<< (N38°19'849"/W122°34'673")

## **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.



	d Creek							Drain	age: RUS	SIAN RIVI	SR					
able 1	- SUMMARY (	F RIFFLE,	FLATWATER,	AND PO	OL HABIT	AT TYP	ES	Surve	y Dates:	07/02/01	L to 07/	/18/01	L			
onfluer	nce Location	: QUAD: CO	OTATI I	BGAL DE	SCRIPTIO	N: T6N	R8W	LATIT	UDB:38°2	0'35" LON	GITUDE	:123°4	3'19"			
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35 31 3 2 29 53	5 PULLY MEASURED 5 7 1 3 3 2 2 2 2 2 9 10 8 8	TYPE ( LGR EGR CAS - GLD RUN SRN	13 12 1 1	LENGTH ft. 117 172 65 30	LENGTH ft. 4094 5341 195 60	LENGT	ft WIDT	H DEPTH	ft. 1.9 1.0 1.2 0.7 1.0 1.2	AREA sq.ft. 400 222 120 169 228 323	AREA BST. sq.ft. 13998 6876 360 338 6626	VOLUM cu.ft 18 8 8 8 5 9 9 9	HE VOLUM EST C. Cu.ft 7 655 86 265 87 26 86 11 92 266 93 493	IR RESIDUAL 2. POOL VOL 3. cu.ft. 10 0 12 0	SHELTER RATING 4 3 16 15	CANOPY 8 61 67 73 100 61 63
35 31 3 2 29	5 PULLY MEASURED 5 7 1 3 3 2 2 2 2 2 9 10 8 8 1	TYPE ( LGR BGR CAS - GLD RUN	13 12 1 1 1 1 20	LENGTH ft. 117 172 65 30 46 97	LENGTH ft. 4094 5341 195 60 1345 5139	LENGT 1 1 1	H WIDT ft 3 7 1 1 2 0 4 4 7 0	H DEPTH . ft. 7 0.4 5 0.3 5 0.6 7 0.4 5 0.3 5 0.3 5 0.3	ft. 1.9 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 1.6	ARBA sq.ft. 400 222 120 169 228 323 71	ARBA BST. sq.ft. 13998 6876 360 338 6626 17123	VOLUM cu.ft 18 8 8 8 5 9 9 9	HE VOLUN BST C. CU.ft 7 655 86 265 87 26 86 11 92 266 93 493 71 7	IR RESIDUAL 2. POOL VOL 3. cu.ft. 30 0 32 0 3 3 3 3 3 3 3 3 3 3 3 3 3	4 3 16 15 7 29	CANOPY * 61 67 73 100 61 63 90
# 35 31 3 2 29 53 1	5 PULLY MEASURED 5 7 1 3 3 2 2 2 2 2 9 10 8 8 8 1 1 3 27	TYPE ( LGR EGR CAS - GLD RUN SRN TRP	13 12 1 1 1 1 20 0	LENGTH ft. 117 172 65 30 46 97 18	LENGTH ft. 4094 5341 195 60 1345 5139 18	LENGI 1 1 1	H WIDT ft 7 ! 1 ! 4 ! 7 ! 3 !	H DEPTH . ft. 7 0.4 5 0.2 5 0.6 7 0.4 5 0.3 5 0.3 4 1.0	ft. 1.9 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 1.0 2.8	ARBA sq.ft. 400 222 120 169 228 323 71 210	ARBA BST. sq.ft. 13998 6876 360 338 6626 17123 71	VOLUM cu.ft 18 8 8 5 9 9 7	HE         VOLUM           BST            Cu.ft            87         265           86         265           87         266           93         493           91         7           52         425	E RESIDUAL 2. POOL VOL 3. cu.ft. 40 0 2 0 2 0 2 0 7 0 5 0 1 57 6 98	SHELTER RATING 4 3 16 15 7 29 2	CANOPY
# 35 31 3 2 29 53 1 28	5 FULLY MEASURED 5 7 1 3 3 2 2 2 2 2 9 10 8 8 8 1 1 3 27 9 9	TYPE ( LGR EGR CAS - GLD RUN SRN TRP MCP	13 12 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1	LENGTH ft. 117 172 65 30 46 97 18 28 44 25	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 397 25	LENGT	H WIDT ft 3 7 1 1 1 7 0 4 7 0 4 1 1 1 1 1 1 1 1 1 1 1 1 1	H DEPTE . ft. 7 0.4 5 0.2 5 0.6 7 0.4 5 0.3 5 0.3 4 1.0 8 0.1 7 0.4 5 0.5 6 0.5 6 0.5 6 0.5 6 0.5 7 0.4 6 0.5 6 0.5 6 0.5 7 0.4 6 0.5 6 0.5 6 0.5 6 0.5 7 0.4 6 0.5 6 0.5 7 0.4 6 0.5 6 0.5 6 0.5 7 0.4 6 0.5 7 0.5 6 0.5 7 0.5	t DEPTH ft. 1.9 1.0 1.2 0.7 1.0 1.2 1.0 1.2 1.0 1.2 1.6 2.8 2.7	ARBA sq.ft. 400 222 120 169 228 323 71 210 312	ARBA EST. sq.ft. 13998 6876 360 338 6626 17123 71 5886 2810 117	VOLUM cu.ft 18 8 8 5 9 9 7 15 23	HE         VOLUM           BST            Cu.ft            87         265           86         265           87         266           93         493           91         7           52         425	E RESIDUAL 2. POOL VOL 3. cu.ft. 10 0 12 0 12 0 12 0 12 0 12 0 15 0 11 57 16 98 13 149 10 23	SHELTER RATING 4 3 16 15 7 29 2 19 24 20	CANOPY * 61 67 73 100 61 63 90 76 66 65
# 35 31 3 2 29 53 1 28 9	5 PULLY MEASURED 5 7 1 3 3 2 2 2 2 2 9 10 8 8 1 1 8 27 9 9 9 1 1	TYPE ( LGR BGR CAS - GLD RUN SRN TRP MCP STP	\$ 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0	LENGTH ft. 117 172 65 30 46 97 18 28 44 25 27	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 397	LENGT	H WIDT ft 3 7 1 1 1 7 0 4 7 0 4 1 1 1 1 1 1 1 1 1 1 1 1 1	H DEPTE . ft. 7 0.4 5 0.2 5 0.6 7 0.4 5 0.3 5 0.3 4 1.6 8 0.7 7 0.8	t DEPTH ft. 1.9 1.0 1.2 0.7 1.0 1.2 1.6 2.8 2.7 1.3	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117	ARBA BST. sq.ft. 13998 6876 360 338 6626 17123 71 5886 2810 117 231	VOLUM cu.ft 18 8 8 5 9 9 7 15 23	HE VOLUM BST C. Cu.ft R7 655 R6 265 R7 26 R7 26 R7 26 R7 26 R7 26 R3 493 R1 7 F2 425 R6 212 R0 7 R1 7 R1 7 R1 7 R1 7 R1 7 R1 8 R1 8 R1 8 R1 8 R1 8 R1 8 R1 8 R1 8	IE RESIDUALE POOL VOL . cu.ft. . cu.ft.	SHELTER RATING 4 3 16 15 7 29 2 2 19 2 2 19 24 24 20 15	CANOPY * 61 67 73 100 61 63 90 76 66 65
# 35 31 3 29 53 1 28 9 1 28 9 1 1 23	5 PULLY MEASURED 5 77 4 3 3 2 2 2 2 2 9 10 8 8 8 1 1 3 27 9 9 9 1 1 1 8 27 9 2 9 2 1 1 1 2 2 23	TYPE ( LGR HGR CAS - GLD RUN SRN TRP MCP STP CRP LSL LSR	8 13 12 1 1 1 20 0 0 11 1 3 0 0 0 9 9	LENGTH ft. 117 172 65 30 46 97 18 28 44 25 27 24	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 397 25 27 544	LENGT	H WIDT ft 3 7 7 1 1 9 4 4 7 7 4 9 7 7 9 4 1 1 9 9 9 1 1 9 9 9 9 9 9 9 9 9 9 9	H DEPTE . ft. 7 0.4 5 0.2 5 0.6 7 0.4 5 0.3 5 0.3 4 1.0 8 0.7 7 0.4 5 0.2 5 0.6 6 0.5 6 0.6 6 0.6 6 0.5 7 0.4 6 0.2 7 0.4 7 0.4 6 0.2 7 0.4 7 0.4 6 0.2 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 6 0.2 7 0.4 7 0.4 6 0.2 7 0.4 6 0.2 7 0.4 6 0.2 7 0.4 6 0.2 7 0.4 6 0.2 6 0.2 7 0.4 6 0.2 6 0.2 6 0.2 7 0.4 6 0.2 6 0.2 7 0.4 6 0.4 7 0.4 6 0.4 7 0.4	t DEPTH ft. 1.9 1.0 1.2 0.7 1.0 1.2 1.6 2.8 2.8 2.7 1.3 1.2 1.2 2.7	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144	ARBA BST. sq.ft. 13998 6876 360 338 6626 17123 71 5886 2810 117 231 3321	VOLUM cu.ft 18 8 8 8 8 8 8 8 8 8 8 8 9 9 9 9 7 15 23 7 11 8	HE VOLUM BST c. cu.ft B7 655 B6 265 B7 26 B6 11 D2 266 D3 493 T1 7 E2 425 B6 212 T0 7 C6 11 B9 205	IE         RESIDUALE           2         00L           2         0           2         0           2         0           2         0           10         0           12         0           12         0           13         149           10         23           6         69           1         47	SHELTER RATING 4 3 16 15 7 29 2 2 19 24 20 15 39	CANOPY * 61 67 73 100 61 63 90 76 66 66 66 66 85 80 90 90 90 90 90 90 90 90 90 9
# 35 31 3 29 53 1 28 9 1 28 9 1 1 23 2 2	5 FULLY MEASURED 5 7 1 3 3 2 2 2 2 9 10 8 8 8 1 1 3 27 9 9 1 1 1 1 8 23 2 2 2 2 2 2 2 2 2 2 2 10 8 8 8 8 1 1 3 27 9 2 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	TYPE ( LGR HGR CAS - GLD RUN SRN TRP MCP STP CRP LSL LSR LSR LSBk	8 13 12 1 1 1 1 1 1 1 20 0 1 1 1 1 3 0 0 0 9 9 1	LENGTH ft. 117 172 65 30 46 97 18 28 44 44 25 27 24 18	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 397 25 27 544 35	LENGT	H WIDT ft 3 7 1 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 2 0 1 1 1 1 1 1 1 1 1 1 1 1 1	H DEPTE . ft. 7 0.4 5 0.3 5 0.6 7 0.4 5 0.3 5 0.6 7 0.4 1 0.5 0 0.5	t DEPTH ft. 1.9 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.0 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.0 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.0 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.0 1.2 0.7 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 185	ARBA EST. sq.ft. 13998 6876 360 338 6626 17123 71 5886 2810 117 231 3321 369	VOLUM cu.ft 188 8 8 5 9 9 7 7 15 23 7 11 8 17	E VOLUM BST cu.ft BS7 655 86 265 87 26 86 265 87 26 86 212 70 7 62 425 16 212 70 7 61 11 89 205 97 35	Image: Rest DUAL           2         0           12         0           12         0           12         0           12         0           12         0           12         0           12         0           12         0           15         0           15         0           1         57           16         98           3         149           0         23           6         69           1         4	SHELTER RATING 4 3 16 15 7 7 2 9 2 2 19 24 20 15 5 39 10	CANOPY \$ 61 67 73 100 61 63 90 76 66 85 80 90 98
# 35 31 39 29 53 11 28 99 11 23 23 2 55	5 PULLY MEASURED 5 77 L 33 3 2 2 2 2 9 10 8 8 L 1 1 3 227 9 9 1 L 1 1 8 23 2 2 2 5 5 5	TYPE ( LGR HGR CAS - GLD RUN SRN TRP MCP STP CRP LSL LSR LSBk LSBo	CCURRENCE 13 12 1 1 1 1 1 2 0 0 11 1 3 0 0 9 1 2 2 2 2 2 2 2 2 2 2 2 2 2	LENGTH ft. 117 172 65 30 46 97 18 28 44 25 27 24 24 18 14	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 397 25 27 544 35 70	LENGT	H WIDT ft 3 7 1 1 4 6 7 4 6 7 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1	H DEPTE . ft. 7 0.4 5 0.3 5 0.6 7 0.4 5 0.3 5 0.6 7 0.4 5 0.3 4 1.0 8 0.7 7 0.8 5 0.6 9 0.5 6 0.6 9 0.5 9 0.5 1 0.5	I         DEPTH           ft.         1.9           1.0         1.2           0.7         0.7           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           1.6         2.8           2.7         1.3           1.2         2.7           1.3         1.2           1.7         2.00	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 185 5116	ARBA BST. sq.ft. 13998 6876 360 338 6626 17123 71 5886 2810 2810 117 231 3321 369 582	VOLUM cu.ft 18 8 8 8 9 9 9 7 7 5 5 23 23 7 7 11 8 8 7 7 7 7 7 7 7 7	E VOLUM BST cu.ft Fr cu.ft Fr	RESIDUAL           200L         VOL           0         0           12         0           12         0           12         0           12         0           12         0           12         0           12         0           15         0           15         0           13         149           0         23           6         69           1         47           4         128           8         46	SHELTER RATING 4 3 16 15 7 29 2 19 24 20 15 39 24 20 15 39 10 17	CANOPY
# 35 31 39 29 53 11 28 99 11 23 23 2 5 8	5 FULLY MEASURED 5 7 1 3 3 2 2 2 2 2 3 10 8 8 1 1 3 27 9 9 1 1 1 1 8 23 2 2 2 2 5 5 5 8 8	TYPE ( LGR HGR CAS GLD RUN SRN TRP MCP STP CRP LSL LSR LSB LSB PLP	CCURRENCE 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1	LENGTH ft. 117 172 65 300 46 97 18 28 44 25 27 27 24 8 14 19	LENGTH ft. 4094 5341 195 60 1345 5139 188 785 397 25 27 544 345 70 148	LENGT	H WIDT the WIDT	H DEPTE . ft. 7 0.4 5 0.3 5 0.6 7 0.4 5 0.3 6 0.3 6 0.3 6 0.3 6 0.3 6 0.3 6 0.4 7 0.4 7 0.4 7 0.4 7 0.4 6 0.3 6 0.5 6 0.5 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.5 7 0.5	I         DEPTH           ft.         1.9           1.0         1.2           0.7         1.0           1.2         0.7           1.6         2.8           2.7         1.3           1.2         2.7           3.5         3.5	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 185 116 202	ARBA BST. sq.ft. 13998 6876 360 3388 6626 17123 71 5886 2810 117 231 3321 3321 369 582 1613	VOLUM cu.ft 188 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	E VOLUM BST c. cu.ft BST 655 66 2255 87 266 83 493 71 7 26 11 92 266 71 7 72 425 76 11 19 205 77 35 76 37 99 167	I RESIDUAL POOL VOL Cu.ft.	SHELTER RATING 4 3 16 15 7 29 2 19 24 20 15 39 24 20 15 39 10 17 17	CANOPY * 61 67 73 100 61 63 900 76 66 66 65 80 90 908 100 77
# 35 31 39 53 1 28 9 1 1 23 2 3 5 5 8 8 3	5 FULLY MEASURED 5 7 1 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	TYPE ( LGR HGR CAS GLD RUN SRN TRP MCP SSTP CRP LSL LSR LSBk LSBk LSBb DPL	CCURRENCE 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1	LENGTH ft. 117 172 65 30 46 97 18 28 44 25 27 24 18 14 19 18	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 27 544 35 700 148 53	LENGT 1 1 1	H WIDT the WIDT	H DEPTH . ft. . ft. . ft. . c. . ft. . c. . c.	I         DEPTH           ft.         1.9           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           1.7         1.6           2.8         2.7           1.3         1.2           2.7         1.3           1.2         2.7           2.0         1.7           3.5         2.2	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 185 116 202 159	ARBA EST. 59.ft. 13998 6876 360 338 6626 17123 71 5886 2810 117 231 3321 369 582 1613 478	VOLUM cu.ft 188 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	E VOLUM BST c. cu.ft BST 655 66 265 756 265 756 11 72 266 83 493 71 7 72 266 83 493 71 7 72 266 83 493 71 7 75 24 225 70 7 76 11 89 205 77 35 76 37 79 167 77 32	IE RESIDUALE POOL VOL Cu.ft.	SHELTER RATING 4 3 16 15 7 29 24 20 15 39 10 15 39 10 17 17 17 26	CANOPY
# 35 31 39 53 1 28 9 1 28 9 1 1 23 23 2 5 8	5 FULLY MEASURED 5 7 1 3 3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	TYPE ( LGR HGR CAS GLD RUN SRN TRP MCP STP CRP LSL LSR LSB LSB PLP	CCURRENCE 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1	LENGTH ft. 117 172 65 300 46 97 18 28 44 25 27 27 24 8 14 19	LENGTH ft. 4094 5341 195 60 1345 5139 188 785 397 25 27 544 345 70 148	LENGT 1 1 1	H WIDT the WIDT	H DEPTE . ft. 7 0.4 5 0.3 5 0.6 7 0.4 5 0.3 6 0.3 6 0.3 6 0.3 6 0.3 6 0.3 6 0.4 7 0.4 7 0.4 7 0.4 7 0.4 6 0.3 6 0.5 6 0.5 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.4 7 0.5 7 0.5	I         DEPTH           ft.         1.9           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           0.7         1.0           1.2         0.7           1.6         2.8           2.7         1.3           1.2         2.7           1.3         1.2           2.7         2.0           2.0         2.0           2.2         2.2	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 185 116 202 159	ARBA BST. sq.ft. 13998 6876 360 3388 6626 17123 71 5886 2810 117 231 3321 3321 369 582 1613	VOLUM cu.ft 188 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	E VOLUM BST c. cu.ft BST 655 66 265 756 265 756 11 72 266 83 493 71 7 72 266 83 493 71 7 72 266 83 493 71 7 75 24 225 70 7 76 11 89 205 77 35 76 37 79 167 77 32	I RESIDUAL POOL VOL Cu.ft.	SHELTER RATING 4 3 16 15 7 29 2 19 24 20 15 39 24 20 15 39 10 17 17	CANOPY * 61 67 73 100 61 63 900 76 66 66 65 80 90 908 100 77
# 35 31 39 53 1 28 9 1 1 23 2 3 5 5 8 8 3	5 PULLY MEASURED 5 7 1 3 3 2 2 2 2 9 10 8 8 8 1 1 3 227 9 9 9 1 1 1 8 23 2 2 2 3 9 10 8 8 8 1 1 3 227 9 9 9 1 1 1 1 3 223 2 2 5 5 8 8 8 3 9 0 0	TYPE ( LGR HGR CAS GLD RUN SRN TRP MCP SSTP CRP LSL LSR LSBk LSBk LSBb DPL	CCURRENCE 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1	LENGTH ft. 117 172 65 30 46 97 18 28 44 25 27 24 18 14 19 18	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 27 544 35 700 148 53	LENGT 1 1 1	H WIDT the WIDT	H DEPTH . ft. . ft. . ft. . c. . ft. . c. . c.	I         DEPTH           ft.         1.9           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           1.7         1.6           2.8         2.7           1.3         1.2           2.7         1.3           1.2         2.7           2.0         1.7           3.5         2.2	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 185 116 202 159	ARBA EST. 59.ft. 13998 6876 360 338 6626 17123 71 5886 2810 117 231 3321 369 582 1613 478	VOLUM cu.ft 18 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 7 15 23 7 7 15 23 7 7 11 8 8 7 7 20 10 10 10 10 10 10 10 10 10 10 10 10 10	E VOLUM BST c. cu.ft BST 655 66 265 756 265 756 11 72 266 83 493 71 7 72 266 83 493 71 7 72 266 83 493 71 7 75 24 225 70 7 76 11 89 205 77 35 76 37 79 167 77 32	IE         RESIDUAL           12         000           12         0           12         0           12         0           12         0           12         0           12         0           12         0           13         149           10         23           6         699           1         47           14         128           8         46           159         1           17         70           0         0	SHELTER RATING 4 3 16 15 7 29 24 20 15 39 10 15 39 10 17 17 17 26	CANOPY
# 355 311 3 2 299 53 3 1 28 9 9 1 1 23 2 2 5 5 8 8 3 29	5 PULLY MEASURED 5 7 1 3 3 2 2 2 2 3 10 8 8 1 1 3 27 9 9 1 1 1 1 8 27 9 9 9 1 1 1 1 3 2 2 2 5 5 8 8 8 3 0 0 0	TYPE ( LGR HGR CAS GLD RUN SRN TRP MCP SSTP CRP LSL LSR LSBk LSBk LSBb DPL	CCURRENCE 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1	LENGTH ft. 117 172 65 30 46 97 18 28 44 25 27 24 18 14 19 18	LENGTH ft. 4094 5341 195 60 1345 5139 18 785 397 25 27 544 35 70 148 35 70 148 53 12708	LENGT 1 1 1	H WIDT the WIDT	H DEPTH . ft. . ft. . ft. . c. . ft. . c. . c.	I         DEPTH           ft.         1.9           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           1.7         1.6           2.8         2.7           1.3         1.2           2.7         1.3           1.2         2.7           2.0         1.7           3.5         2.2	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 4185 116 202 159 0	ARBA BST. 89.ft. 13998 6876 360 338 6626 17123 71 5886 2810 117 231 3321 3321 3321 369 582 1613 478 0	VOLUM cu.ft 18 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 7 15 23 7 7 15 23 7 7 11 8 8 7 7 20 10 10 10 10 10 10 10 10 10 10 10 10 10	E VOLUM BST cu.ft BST 265 B6 265 B7 266 B7 266 B1 102 266 B3 493 B1 7 B2 266 B3 493 B1 7 B2 266 B3 493 B1 7 B1 20 B1 7 B1 6 B1 10 B1 6 B1 6 B1 10 B1 6 B1 10 B1 6 B1 10 B1 10	IE         RESIDUAL           2         0           12         0           12         0           12         0           12         0           12         0           12         0           12         0           12         0           15         0           15         0           1         57           16         98           13         149           0         23           6         69           1         44           128         46           1         157           1         70           0         0	SHELTER RATING 4 3 16 15 7 29 24 20 15 39 10 15 39 10 17 17 17 26	CANOPY
# 355 31 3 2 29 5 3 3 2 2 5 8 8 3 3 29 TOTAL	5 PULLY MEASURED 5 7 1 3 3 2 2 2 2 2 3 2 2 2 2 2 2 1 0 10 8 8 8 1 1 1 3 227 9 9 1 1 1 1 8 223 2 2 2 2 9 10 8 8 8 1 1 1 2 2 2 3 9 0 0 1 0 1 8 8 8 1 1 1 2 2 2 2 9 10 8 8 8 1 1 1 2 2 2 2 9 10 8 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	TYPE ( LGR HGR CAS GLD RUN SRN TRP MCP SSTP CRP LSL LSR LSBk LSBk LSBb DPL	CCURRENCE 13 12 1 1 1 1 1 1 1 1 1 1 1 1 1	LENGTH ft. 117 172 65 30 46 97 18 28 44 25 27 24 18 14 19 18	LENGTH ft. 4094 5341 195 60 1345 5139 785 397 25 27 544 35 70 148 35 70 148 2708 LENGTH	LENGT 1 1 1	H WIDT the WIDT	H DEPTH . ft. . ft. . ft. . c. . ft. . c. . c.	I         DEPTH           ft.         1.9           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           0.7         1.0           1.2         0.7           1.0         1.2           1.7         1.6           2.8         2.7           1.3         1.2           2.7         1.3           1.2         2.7           2.0         1.7           3.5         2.2	ARBA sq.ft. 400 222 120 169 228 323 71 210 312 117 231 144 4185 116 202 159 0	ARBA EST. 89.ft. 13998 6876 360 338 6626 1712 5886 2810 117 231 3321 369 582 1613 478 0 ARBA	VOLUM cu.ft 18 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 7 15 23 7 7 15 23 7 7 11 8 8 7 7 20 10 10 10 10 10 10 10 10 10 10 10 10 10	E VOLUM BST cu.ft Cu.ft Cu.ft Cu.ft Cu.ft Co.ft	E RESIDUAL 2. POOL VOL 2. cu.ft. 0 0 2. 0 2. 0 2. 0 1. 57 1. 57	SHELTER RATING 4 3 16 15 7 29 24 20 15 39 10 15 39 10 17 17 17 26	CANOPY

Copeland	Creek						Drain	nage: RUS	SIAN RIVE	R				
able 3 -	SUMMARY O	F POOL TYP	BS				Surve	ey Dates:	07/02/01	to 07/18,	/01			
onfluenc	e Location	: QUAD: CO	TATI LI	GAL DESCR	IPTION: T	6NR8W	LATI	CUDB:38°2	0'35' LON	GITUDE:12	3°43'19"			
IABITAT UNITS	UNITS PULLY MBASURBD	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PBRCENT TOTAL LENGTH	NBAN WIDTE (ft.)	MBAN DEPTH (ft.)	MBAN ARBA (sq.ft.)	TOTAL ARBA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	VOLUME EST.	MEAN RESIDUAL POOL VOL (cu.ft.)	
38 40 3	37 40 3	MAIN SCOUR _ BACKWATER	47 49 4	32 21 18	1200 849 53	40	7.6 7.6 9.0	0.7 0.7 0.7	231 156 159	8788 6234 478	170 116 107	6458 4641 321	109 73 70	20 30 26
TOTAL UNITS 81	TOTAL UNITS 80			TOT	AL LENGTH (ft.) 2102				Ţ	0TAL AREA (sq.ft.) 15500		TOTAL VOL. (cu.ft.) 11430		 -
opeland	Creek						I	rainage:	RUSSIAN	RIVER				
able 4 -			1 POOL DEP1 COTATI	THS BY POO LEGAL DE			S	urvey Da	tes: 07/(	RIVER 2/01 to LONGITU		3'19"		
able 4 -	- SUMMARY	n: QUAD: (	COTATI AT <1 FO( RT MAXIMI	LEGAL DE	SCRIPTION FOOT 1-<	: T6NR8W	I -<2 FOOT PERCENT	ATITUDE: 2 -<3 FT MAXIMU	tes: 07/( 38°20'35' . 2-<3 I	2/01 to LONGITU	DE:123°43	<4 FOOT PERCENT	>=4 FBBT MAXIMUM DBPTH (	PERCEN
able 4 - confluenc UNITS BASURED	- SUMMARY ce Locatio HABITAT TYPB TRP	n: QUAD: ( HABIT) PBRCEN OCCURREN(	COTATI AT <1 FO( AT MAXIMI CE DEP1 1	LEGAL DE: DT <1 1 JM PER( TH OCCURR) 0	SCRIPTION FOOT 1 CENT MA ENCE 0	: T6NR8W 2 PT, 1 XIMUM DEPTH OCU 1	I -<2 FOOT PERCENT CURRENCE 100	Curvey Da ATITUDE: 2-<3 FT MAXIMU B DEPT	tes: 07/( 38°20'35' . 2-<3 H M PBR( H OCCURR 0	2/01 to LONGITU 200T 3-< ENT MA ENCE 1	DE:123°43 4 FT. 3- XIMUM DEPTH OCC 0	<4 FOOT PERCENT CURRENCE	MAXIMUM DBPTH (	PERCEN
able 4 - onfluenc UNITS EASURED 1 28	- SUMMARY ce Locatio HABITAT TYPE TRP MCP	n: QUAD: ( HABIT) PBRCBI OCCURREN(	COTATI AT <1 FOO AT MAXIMU 28 DBP1 1 35	LEGAL DES DT <1 1 JM PERI TH OCCURRI 0 5	SCRIPTION FOOT 1 CENT MA ENCE 0 18	: T6NR8W 2 FT, 1 XIMUM DEPTH OCC 1 16	S I PERCENT CURRENCE 100 57	ATITUDE: ATITUDE: 2-<3 FT MAXIMU B DEPT	tes: 07/( 38°20'35' . 2-<3 H M PBR( H OCCURRH 0 7	2/01 to LONGITU 200T 3-< 20T MA 20CE 1 0 25	DE:123°43 4 FT. 3- XIMUM DBPTH OCC 0 0	<4 FOOT PERCENT CURRENCE 0 0	MAXIMUM DBPTH ( 0 0	PERCEN
able 4 - confluenc UNITS EASURED 1 28 9	- SUMMARY ce Locatio HABITAT TYPE TRP MCP STP	n: QUAD: ( HABIT) PBRCEN OCCURREN(	COTATI AT <1 FO( AT MAXIMU CE DEP1 1 35 11	LEGAL DES DT <1 1 JM PER TH OCCURR 0 5 1	SCRIPTION FOOT 1-< CENT MA ENCE 0 18 11	: T6NR8W 2 PT, 1 XIMUM DEPTH OCU 1 16 7	S I PERCENT CURRENCE 100 57 78	ATITUDB: 2-<3 FT MAXIMU B DBPT	tes: 07/( 38°20'35' 2-<3 H M PBR( H OCCURRH 0 7 1	2/01 to LONGITU 200T 3-< ENT MA ENCE 1 0 25 11	DB:123°43 4 FT. 3- XIMUM DBPTH OCC 0 0 0	<4 FOOT PERCENT CURRENCE 0 0 0	MAXINUM DBPTH ( 0 0 0	>=4 FBE PERCEN CCURRENC
able 4 - onfluenc UNITS EASURED 1 28 9 1	- SUMMARY ce Locatio HABITAT TYPE TRP MCP STP CRP	n: QUAD: ( HABIT) PBRCBI OCCURREN(	COTATI AT <1 FO( AT MAXIMI CE DEP1 1 35 11 1	LEGAL DES DT <1 1 JM PER TH OCCURR 0 5 1 0	SCRIPTION FOOT 1-< CENT MA ENCE 0 18 11 0	: T6NR8W 2 PT. 1 XIMUM DEPTH OCU 1 16 7 1	S I PERCENT CURRENCE 100 57 78 100	artitude: Atitude: 2-<3 FT Maximu BBPT	tes: 07/( 38*20*35' 2-<3 H M PER( H OCCURR) 0 7 1 0	2/01 to LONGITU 200T 3-< 20T MA 20T MA 25 11 0	DE:123°43 4 FT. 3- XIMUM DBPTH OCC 0 0 0 0	<4 FOOT PERCENT CURRENCE 0 0 0 0 0	MAXIMUM DBPTH ( 0 0	PERCEN
able 4 - onfluenc UNITS EASURED 1 28 9 1 1	- SUMMARY ce Locatio HABITAT TYPE TRP MCP STP CRP LSL	n: QUAD: ( HABIT) PBRCBI OCCURREN(	COTATI AT <1 FO( AT MAXIMI CE DEP1 1 35 11 1 1	LEGAL DES DT <1 1 JM PER TH OCCURR 0 5 1	SCRIPTION FOOT 1 CENT MA ENCE 0 18 11 0 0	: T6NR8W 2 FT. 1 XIMUM DEPTH OCU 1 16 7 1 1	S I PERCENT CURRENCE 100 57 78 100 100	arvey Da Atituds: 2-<3 ft Maxinu DBPT	tes: 07/( 38°20'35' . 2-<3 H M PBR( H OCCURR) 0 7 1 0 0	2/01 to LONGITU: 200T 3-<- 20NT MA: 20NT MA: 20NT MA: 20 25 11 0 0 0	DB:123°43 4 FT. 3- XIMUM DBPTH OCC 0 0 0	<4 FOOT PERCENT CURRENCE 0 0 0	MAXIMUM DBPTH ( 0 0 0 0	PERCEN
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able 4 - Confluence UNITS IBASURED 1 28 9 1 1 23	- SUMMARY ce Locatio HABITAT TYPB TRP MCP STP CRP LSL LSR	n: QUAD: ( HABIT) PBRCBI OCCURREN(	COTATI AT <1 FOO AT MAXIMI CE DEP1 1 35 11 1 1 28	LEGAL DE: DT <1 1 DM PER PH OCCURRI 0 5 5 1 0 0 0 4 0	CRIPTION FOOT 1 CRNT MA ENCE 0 18 11 0 0 17 0	: T6NR8W 2 FT. 1 XINUM DEPTH OC 1 16 7 1 16 1 16 1	5 -<2 F001 PERCENI CURRENCE 100 55 78 100 100 70 50 50 50 50 50 50 50 50 50 50 50 50 50	urvey Da ATITUDE: 2-<3 FT MAXINU BEPT	tes: 07/( 38*20*35* . 2-<3 1 M PER( H OCCURR) 0 7 1 0 0 3 1	2/01 to LONGITU COOT 3-< ENT MA ENCE 1 0 25 11 0 0 13 50	DE:123°43 4 PT. 3- XIMUM DBPTH OCC 0 0 0 0 0 0 0 0 0 0	- 4 FOOT PERCENT CURRENCE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	MAXINUM DBPTH ( 0 0 0 0 0 0 0 0 0 0 0	PERCEN
UNITS UNITS WEASURED 1 1 1 1 23 2 3 2 5	- SUMMARY ce Locatio HABITAT TYPE TRP MCP STP CRP LSL LSR LSBk LSBk LSBo	n: QUAD: ( HABIT) PBRCBI OCCURREN(	COTATI AT <1 FO( T MAXIMU CE DEP1 1 1 1 1 28 2 6	LEGAL DE: DT <1 1 DM PER: TH OCCURRI 0 5 1 0 0 4 0 0 0	CRIPTION CRNT MA ENCE 0 18 11 0 0 17 0 0 0	: T6NR8W 2 FT. 1 XIMUM DEPTH OC 1 1 16 1 1 16 1 5	5 -<2 F001 PERCENJ CURRENCE 100 57 78 100 100 70 50 100	urvey Da ATITUDE: 2-<3 FT MAXIMU DEPT	tes: 07/( 38*20*35* . 2-<3 1 M PBR( H OCCURR) 0 7 1 0 0 3 1 0 0	2/01 to LONGITU COOT 3-< ENT MA ENCE 1 0 25 11 0 0 13 50 0	DE:123°43 4 PT. 3- XIMUM DBPTH OCC 0 0 0 0 0 0 0 0 0 0 0 0	<4 FOOT PERCENT CURRENCE 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	MAXIMUM DBPTH 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	PERCEN

#### Copeland Creek

#### Drainage: RUSSIAN RIVER

onfluenc	e Location	: QUAD: C	OTATI	LEGAL DES	CRIPTION:	T6NR8W	LATIT	UDB:38°20'35"	LONGITUDE	:123°43'19"	
UNITS BASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN \$ UNDERCUT BANKS	MBAN % SWD	MBAN % LWD	MEAN & ROOT MASS	MBAN & TERR. VEGETATION	MEAN % AQUATIC VEGETATION	MBAN % WHITE WATER	MBAN % BOULDERS	MBAN BEDROC LEDGE
35	3	LGR	0	17	0	0	0	0	27	57	
31	2	HGR	0	10	0	0	3	0	. 3	85	
3	2	CAS	0	0	0	0	3	0	. 8	90	
2	2	GLD -	43	23	0	25	0	0	0	10	
29	7	RUN	4	3	0	0	1	10	2	80	
53	7	SRN	0	1	0	4	13	10	11	61	
1	1	TRP	0	0	0	0	0	0	100	0	
28	25	MCP	3	10	2	0	6	8	10	56	
9	9	STP	0	11	2	2	1	3	9	73	
1	1	CRP	0	10	0	40	10	0	0	40	
1	1	LSL	0	55	0	0	10	0	0	30	
23	22	LSR	9	6	0	49	14	2	3	18	
2	2	LSBk	0	3	0	0	0	0	3	95	
5	5	LSBO	0	4	0	2	1	2	10	81	
8	8	PLP	10	8	11	0	1	0	0	70	
3	3	DPL	0	15	0	0	0	0	23	50	
29	0	DRY	0	0	0	0	0	0	0	0	

Copeland	Creek				Drainag	e: RUSSIAN RIVER			
Table 6 -	SUMMARY OF	DOMINANT S	SUBSTRATES BY	HABITAT TYPE	Survey	Dates: 07/02/01	to 07/18/01		· · ·
Confluenc	e Location:	QUAD: COT	ATI LEGAL	DESCRIPTION: TENR	SW LATITUD	B:38°20'35" LONG	ITUDE:123°43'19"	-	
TOTAL HABITAT UNITS	UNITS FOLLY MEASURED	HABITAT Type	<pre>% TOTAL SILT/CLAY DOMINANT</pre>	<pre>% TOTAL SAND DOMINANT</pre>	<pre>% TOTAL GRAVEL DOMINANT</pre>	<pre>% TOTAL SN COBBLE DOMINANT</pre>	<pre>% TOTAL LG COBBLB DOMINANT</pre>	<pre>% TOTAL BOULDER DOMINANT</pre>	TOTAL BEDROCK DOMINANT
35	7	LGR	14	0	14	43	0	29	. 0
31	3	HGR	0	0	0	Û	33	67	0
3	2		- 0	0	0	50	0	50	Ċ
2	2	GLD	. 0	Ó	Û	50	50	0	Ċ
29	9	RUN	0	Ó	- 0	56	44	0	
53	7	SRN	Ū	. 0	0	29	71	Ō	Ċ
1	- 1	TRP	0	Ó	0	0	0	Ó	100
- 28	8	MCP	0	Ó	Ó	75	25	ů	. 0
9	3	STP	0	0	0	67	0	33	
1	. 1	CRP	0-	0	0	100	0	.0	Ó
1	1	LSL	0	0	0 -	100	0 -	. 0	0
23	9	LSR	11	Ó	Ó	33	33	22	Ō
2	1	LSBk	0	0	0	0	100	0	0
- 5	- 1	LSBO	0	0	0	100	0	0	0
8	4	PLP	0	0	50	50	0	0	0
3	1	DPL	0	0	0	100	0	0	- O
29	0	DRY	0	0	0	٥	0	0	0

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE

Survey Dates: 07/02/01 to 07/18/01

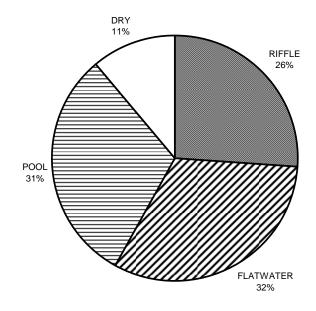
Copeland Creek Tables Graphs Map Assessment Completed 2001 Page 4 of 14

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY STREAM NAME: Copeland Creek SAMPLE DATES: 07/02/01 to 07/18/01 STREAM LENGTH: 29962 ft. LOCATION OF STREAM MOUTH: USGS Quad Map: COTATI Latitude: 38°20'35" Legal Description: T6NR8W Longitude: 123°43'19" SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH STREAM REACH 1 Channel Type: C3 Canopy Density: 62% Coniferous Component: 3% Channel Length: 10172 ft. Deciduous Component: 98% Riffle/flatwater Mean Width: 5 ft. Pools by Stream Length: 4% Total Pool Mean Depth: 0.6 ft. Pools >=3 ft.deep: 0% Base Flow: 0.0 cfs Mean Pool Shelter Rtn: 35 °F Air: 75 -75 °F Water: -Dom. Shelter: Root masses Dom. Bank Veg.: Deciduous Trees Occurrence of LOD: 0% Vegetative Cover: 71% Dry Channel: 8870 ft. Dom. Bank Substrate: Cobble/Gravel 2.0% 3.0% 4.0% 5. 0% Embeddness Value: 1. 100% STREAM REACH 2 Canopy Density: 73% Channel Type: B3 Coniferous Component: 10% Channel Length: 6018 ft. Deciduous Component: 90% Riffle/flatwater Mean Width: 6 ft. Pools by Stream Length: 12% Total Pool Mean Depth: 0.5 ft. Pools >=3 ft.deep: 0% Base Flow: 0.0 cfs Mean Pool Shelter Rtn: 31 °F Air: 65 -75 °F Water: -Dom. Bank Veg.: Deciduous Trees Dom. Shelter: Boulders Occurrence of LOD: 1% Vegetative Cover: 65% Dom. Bank Substrate: Cobble/Gravel Dry Channel: 0 ft. Embeddness Value: 1. 72% 08 2.248 3.38 4.08 5. STREAM REACH 3 Canopy Density: 64% Channel Type: F3 Coniferous Component: 24% Channel Length: 6762 ft. Riffle/flatwater Mean Width: 6 ft. Deciduous Component: 76% Pools by Stream Length: 8% Total Pool Mean Depth: 0.8 ft. Pools >=3 ft.deep: 0% Base Flow: 0.0 cfs Mean Pool Shelter Rtn: 21 - 60 °F Air: 65 -65 °F Water: Dom. Shelter: Boulders Dom. Bank Veg.: Deciduous Trees Occurrence of LOD: 2% Vegetative Cover: 60% Dom. Bank Substrate: Cobble/Gravel Dry Channel: 844 ft. 3.08 4.08 5. 0% Embeddness Value: 1. 89% 2.118 STREAM REACH 4 Canopy Density: 82% Channel Type: A2 Coniferous Component: 67% Channel Length: 2618 ft. Riffle/flatwater Mean Width: 6 ft. Deciduous Component: 33% Total Pool Mean Depth: 1.3 ft. Pools by Stream Length: 4% Pools >=3 ft.deep: 17% Base Flow: 0.0 cfs Water: 60 - 60 ° Copeland Creek 5T ables Grand Mappl Shelter Rtn: 13 Dom. Bank Veg.: DecAdsessmerresompleted 2001 Shelter: Boulders Page 5 of 14

Vegetative Cover: 85% Occurrence of LOD: 0% Dry Channel: 1280 ft. Dom. Bank Substrate: Cobble/Gravel Embeddness Value: 1. 67% 2.33% 3.08 4.08 5. 08 STREAM REACH 5 Canopy Density: 83% Channel Type: B3 Coniferous Component: 81% Channel Length: 4393 ft. Riffle/flatwater Mean Width: 7 ft. Deciduous Component: 21% Pools by Stream Length: 7% Pools >=3 ft.deep: 13% Total Pool Mean Depth: 0.9 ft. Base Flow: 0.0 cfs Water: 60 - 60 °F Air: 65 -65 °F Mean Pool Shelter Rtn: 24 Dom. Bank Veg.: Deciduous Trees Dom. Shelter: Boulders Occurrence of LOD: 3% Vegetative Cover: 86% Dry Channel: 975 ft. Dom. Bank Substrate: Cobble/Gravel Embeddness Value: 1. 38% 2.25% 3.08 4.08 5. 38%

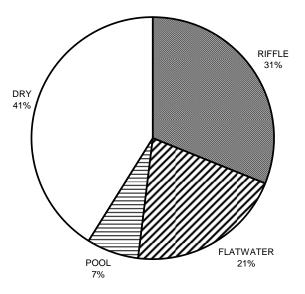
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# **COPELAND CREEK** LEVEL II HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

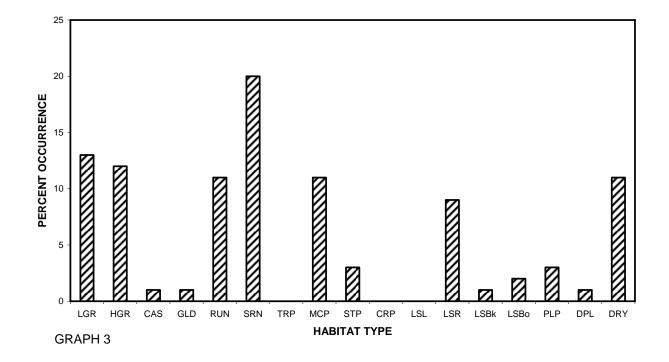
# **COPELAND CREEK** LEVEL II HABITAT TYPES BY PERCENT TOTAL LENGTH



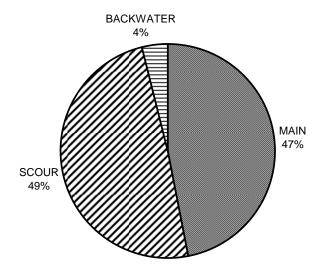
GRAPH 2

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# **COPELAND CREEK** LEVEL IV HABITAT TYPES BY PERCENT OCCURRENCE



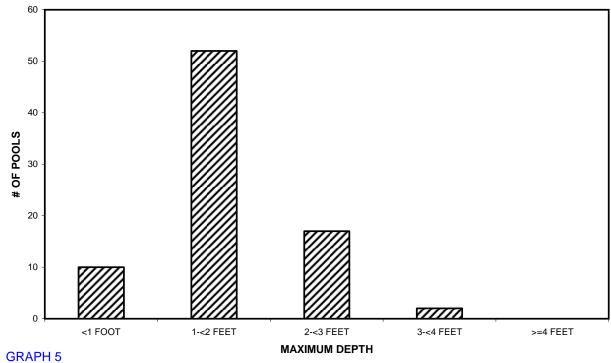
**COPELAND CREEK** LEVEL I POOL HABITAT TYPES BY PERCENT OCCURRENCE



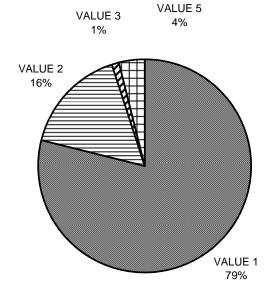
**GRAPH 4** 

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# COPELAND CREEK MAXIMUM DEPTH IN POOLS

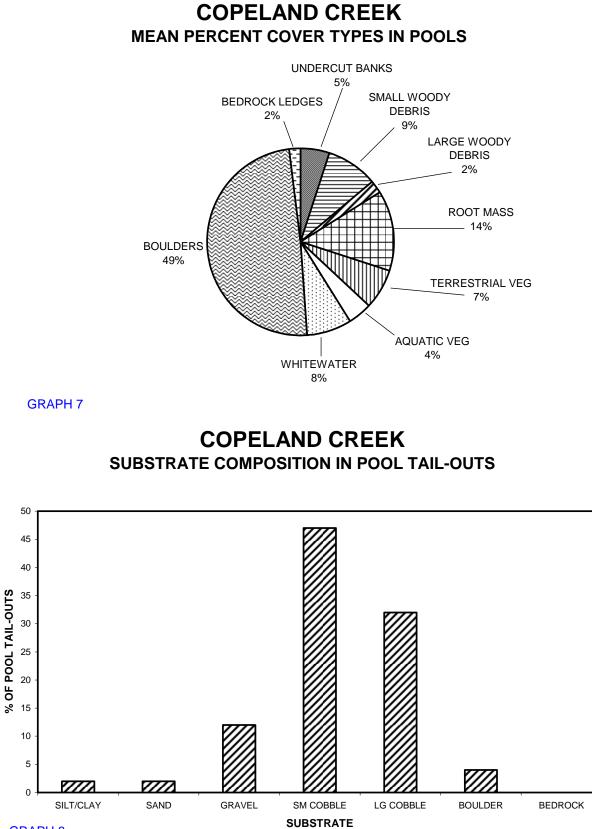


# COPELAND CREEK PERCENT EMBEDDEDNESS



**GRAPH 6** 

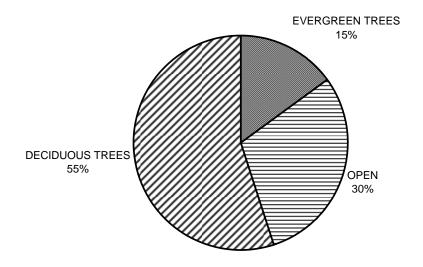
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**GRAPH 8** 

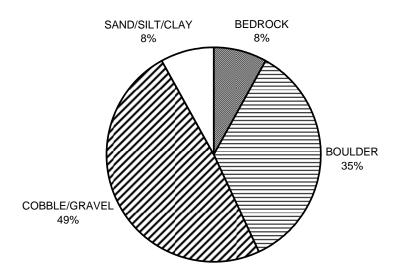
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# COPELAND CREEK MEAN PERCENT CANOPY



**GRAPH 9** 

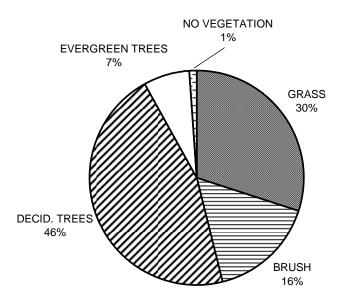
# COPELAND CREEK DOMINANT BANK COMPOSITION IN SURVEY REACH



**GRAPH 10** 

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# **COPELAND CREEK** DOMINANT BANK VEGETATION IN SURVEY REACH



**GRAPH 11** 

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yarologic	Sub-Ar	eas c	overed I	y the	watershe	d:						Tribut	tary to	Lac	guna De	Santa Rosa
lame:				LLIC	d: (1:24k)	)	Coι	nty:					tary to		rk West	
opeland (	Creek			1227	722338343	37	Son	oma					tary to			
ocation	:	Т:	06N	R:	08W	S:	22	I	Latit	ude: 38	3.343714		-			7223245385
Hydrologia	c Bounda	ary De	lineatior	Arc		ArcInfo										ning under DEM to enfo
Aerial Pho	otos (Sou	urce):		proj	Mendocin ection. Fo D83 projec	r Sonor	na Coun	y wat	tersh							rs, NAD27 ate Plane,
Stream	Order	: 3			Total	ongth		٩	0.06	Miles	Note: I	_ength is	for the			
Note: St	ream or	der is			Total L hod, recor ms layer.	-	•	14.		Km		blue-line		0		
D	o Aroa			144 <sup>.</sup>	1 Hectare	s			Ele	vations:	Mout	h:		89	feet	
Drainag	e Alea	•				•										
Drainag	e Alea			3562	2 Acres						Head	lwaters:	245	4	feet	
Drainag	e Alea	-									Note	: Headwa	aters ele	vatio	on is the	highest
Drainag			4- Nu	5.50	2 Acres 6 sq. mi.		Surface	area	· 0		Note: eleva		aters ele	vatio	on is the	highest
Lakes ii				5.56 mber:	2 Acres 6 sq. mi. 0		Surface		-		Note: eleva sq. mi.	: Headwa	aters ele	vatio	on is the	highest
				5.56 mber:	2 Acres 6 sq. mi.				-		Note: eleva sq. mi.	: Headwa	aters ele	vatio	on is the	highest
Lakes in Fish Sp	n Water ecies (;	rshee as in	No dicated	5.56 mber: te: So <b>by hi</b>	2 Acres 6 sq. mi. 0 urce for la storical	kes dat	a is the l	JSGS	-		Note: eleva sq. mi.	: Headwa	aters ele	vatio	on is the	highest
Lakes in Fish Sp	n Water ecies (;	rshee as in	No dicated	5.56 mber: te: So <b>by hi</b>	2 Acres 6 sq. mi. 0 urce for la	kes dat		JSGS	-		Note: eleva sq. mi.	: Headwa	aters ele	vatio	on is the	highest
Lakes ir Fish Sp salmon	n Water ecies ( id strea	rsheo as in ams I	No dicated ayer cr	5.50 mber: te: So <b>by hi</b> eated	2 Acres 6 sq. mi. 0 urce for la storical	kes dat Coey):	a is the U None	JSGS	S-DFC	G 1:100k la	Note: eleva sq. mi.	: Headwa	aters ele	vatio	on is the	highest
Lakes ir Fish Sp salmon	n Water ecies ( id strea hip, for	rsheo as in ams I	No dicated ayer cr waters	5.50 mber: te: So <b>by hi</b> eated	2 Acres 6 sq. mi. 0 urce for la storical by Bob (	kes dat Coey): (and %	a is the U None	JSGS	S-DFC	G 1:100k la	Note: eleva sq. mi. akes laye	: Headwa	aters ele	vatio	on is the	highest
Lakes ii Fish Sp salmon Owners	n Water ecies (i id strea hip, for	rsheo as in ams I	No dicated ayer cr waters	5.50 mber: te: So by hi eated ned, in	2 Acres 6 sq. mi. 0 urce for la storical by Bob (	kes dat Coey): (and %	None <b>of tota</b>	JSGS	S-DFC	6 1:100k la n <b>ed):</b>	Note: eleva sq. mi. akes laye	: Headwa	aters ele	vatio	on is the	highest
Lakes in Fish Sp salmon Owners Federal:	n Water ecies (i id strea hip, for	rsheo as in ams I r the	No dicated ayer cr waters Si 21	5.50 mber: te: So by hi eated ned, in ate:	2 Acres 6 sq. mi. 0 urce for la storical by Bob (	kes dat Coey): (and %	None of tota	JSGS	S-DFC	G 1:100k la ned): Private:	Note: eleva sq. mi. akes laye	: Headwa	aters ele	vatio	on is the	highest
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#### USGS 7.5' Topographic Quads completely or partially in the watershed:

Quad Name	USGS Code
GLEN ELLEN	38122C5
COTATI	38122C6

#### Endangered/Threatened/Sensitive Species: (California Natural Diversity Database, May 5, 2003 version )

Scientific Name	Common Name
Rana boylii	foothill yellow-legged frog
Rana boylii	foothill yellow-legged frog
Agelaius tricolor	tricolored blackbird
Rana boylii	foothill yellow-legged frog
Rana boylii	foothill yellow-legged frog
Caecidotea tomalensis	Tomales isopod
Caecidotea tomalensis	Tomales isopod
Northern Vernal Pool	Northern Vernal Pool
Legenere limosa	legenere
Emys (=Clemmys) marmorata marmorat	northwestern pond turtle
Hydrochara rickseckeri	Ricksecker's water scavenger beetle
Coccyzus americanus occidentalis	western yellow-billed cuckoo
Leptosiphon jepsonii	Jepson's leptosiphon

#### Hydrologic Sub-Areas covered by the watershed

Hydrologic Sub-Area Name:	ID code (RBUAS)	Hydrologic Area Name	% of watershed in this HSA
Sonoma Creek	220640	Sonoma Creek	0.01
Santa Rosa	111422	Middle Russian River	0.23
Petaluma River	220630	Petaluma River	0.01
Laguna	111421	Middle Russian River	99.75