

STREAM INVENTORY REPORT

Ramon Creek

INTRODUCTION

A stream inventory was conducted from June 13 to June 20, 2002 on Ramon Creek. The survey began at the confluence with South Fork Big River and extended upstream 3.95 miles. A stream inventory and sub-section to this report was also completed for North Fork Ramon Creek.

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

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

Ramon Creek is a tributary to South Fork Big River, tributary to Big River, tributary to the Pacific Ocean, located in Mendocino County, California (Map 1). Ramon Creek's legal description at the confluence with South Fork Big River is T16N R15W S2. Its location is 39°16'18" north latitude and 123°30'10" west longitude. Ramon Creek is a second order stream and has approximately 21,057 feet of solid blue line stream and approximately 760 feet of dashed blue stream according to the USGS Comptche 7.5 minute quadrangle. Ramon Creek drains a watershed of approximately 5.3 square miles. Elevations range from about 305 feet at the mouth of the creek to 1,923 feet in the headwater areas. Mixed conifer forest dominates the watershed.

The watershed is entirely privately owned and is managed for timber production. Vehicle access exists via Highway 20 at mile marker 17.55. Mendocino Redwood Company logging roads are used to access the stream.

METHODS

The habitat inventory conducted in Ramon Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Department of Fish and Game 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.

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

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was used in Ramon 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". Ramon 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 Ramon 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 particle size, bedrock, or other considerations.

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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 Ramon 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 Ramon 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 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 Ramon 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.

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 seven tables:

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- 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 shelter by habitat types
- Summary of dominant substrates by habitat types
- Summary of fish habitat elements by stream reach

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Ramon Creek and North Fork Ramon 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 June 13 through June 20, 2002, was conducted by S. Monday and K. Knechtle (DFG). The total length of the stream surveyed was 20,832 feet.

Stream flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.05 cfs on September 25, 2002.

Ramon Creek is a B4 channel type for 8,356 feet of stream surveyed (Reach 1), an F3 for 7,638 feet of stream surveyed (Reach 2), and a B3 for 4,838 feet of stream surveyed (Reach 3). B4 channel types are classified as moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools; very stable plan and profile, stable banks, and gravel-dominant substrates. F3 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios 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 with cobble-dominant, substrates.

Water temperatures taken during the survey period ranged from 54 to 64 degrees Fahrenheit. Air temperatures ranged from 58 to 81 degrees Fahrenheit.

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Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 52% flatwater units, 41% pool units, and 7 % riffle units (Graph 1). Based on total length of Level II habitat types there were 86% flatwater units, 12% pool units, and 2% riffle units (Graph 2).

Fifteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were step run units, 41%; mid-channel pool units, 36%; and glide units, 7% (Graph 3). Based on percent total length, step run units made up 79%, and mid-channel pool units 10%.

A total of 94 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 87%, and comprised 84% 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. Thirty-seven of the 94 pools (39%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 94 pool tail-outs measured, 15 had a value of 1 (16%); 52 had a value of 2 (55%); 24 had a value of 3 (24%); and 3 had a value of 4 (3%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate.

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. Pool habitats had a mean shelter rating of 34, flatwater habitat types had a mean shelter rating of 19, and riffle habitat types had a mean shelter rating of 13 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 35. Scour pools had a mean shelter rating at 28 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Ramon Creek. Graph 7 describes the pool cover in Ramon Creek. Large woody debris is the dominant pool cover type followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 61% of the pool tail-outs. Small cobble was the next most frequently observed dominant substrate type and occurred in 32%.

The mean percent canopy density for the surveyed length of Ramon Creek was 77%. Thirteen percent of the canopy was open. Of the canopy present, the mean percentages of deciduous and coniferous trees were 12% and 88%, respectively. Graph 9 describes the mean percent canopy in Ramon Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 69%. The mean percent left bank vegetated was 69%. The dominant elements composing the structure of the stream banks consisted of 76% sand/silt/clay, 12% cobble/gravel, 10% bedrock, and 3% boulder

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(Graph 10). Coniferous trees were the dominant vegetation type observed in 72% of the units surveyed. Additionally, 17% of the units surveyed had brush as the dominant vegetation type, and 8% had deciduous trees as the dominant vegetation (Graph 11).

DISCUSSION

Ramon Creek is a B4 channel type for the first 8,356 feet of stream surveyed, an F3 channel type for the next 7,638 feet of stream surveyed, and a B3 channel type for the remaining 4,838 feet of stream surveyed. The suitability of B4, F3, and B3 channel types for fish habitat improvement structures is as follows: B4 channel types are excellent for low-stage plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors, and log cover. F3 channel types are good for bank-placed boulders, single and opposing wing-deflectors; and fair for plunge weirs, boulder clusters, channel constrictors, and log cover. B3 channel types excellent for plunge weirs, boulder clusters, bank placed boulders, single and opposing wing-deflectors, and log cover.

The water temperatures recorded on the survey days June 13 through June 20, 2002 ranged from 54 to 64 degrees Fahrenheit. Air temperatures ranged from 58 to 81 degrees Fahrenheit. The recorded water temperatures of 60 degrees Fahrenheit and below are suitable for salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 86% of the total length of this survey, pools 12%, and riffles 2%. The pools are relatively shallow, with 37 of the 94 (39%) pools having a maximum depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum 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.

Sixty-seven of the 94 pool tail-outs measured had embeddedness ratings of 1 or 2. Twenty-seven of the pool tail-outs had embeddedness ratings of 3 or 4. Cobble embeddedness measured to be 25% or less, a rating of 1, is considered to indicate good quality spawning substrate for salmon and steelhead.

Eighty-seven of the 94 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good spawning salmonids.

The mean shelter rating for pools was 34. The shelter rating in the flatwater habitats was 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 all habitat types. Additionally, small woody debris contributes a small amount.

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The mean percent canopy density for the stream was 77%. Reach 1 had a canopy density of 68%, Reach 2 had a canopy density of 75%, and Reach 3 had a canopy density of 89%. 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 69% and 69%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting endemic species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

- 1) Ramon Creek should be managed as an anadromous, natural production stream.
- 2) The limited water temperature data available suggest that maximum temperatures are within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.
- 3) Increase the canopy Reach 1 and Reach 2 on Ramon 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.
- 4) Active and potential sediment sources need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.
- 5) 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.
- 6) There are several log debris accumulations present on Ramon Creek that are retaining large quantities of fine sediment. The modification of these debris accumulations is desirable, but must be done carefully, over time, to avoid excessive sediment loading in downstream reaches.
- 7) 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.

COMMENTS AND LANDMARKS

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

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Position (ft):	Comments:
0'	Begin survey about 30 feet from the confluence with South Fork Big River. The channel type is a B4.
47'	Pool created from boulder scour. Coho young-of-the-year (YOY) in pool.
163'	Left bank erosion is 17' long x 20' high.
241'	Root wad stump on the right bank.
517'	Rootwad and boulder creating pool.
769'	Dry right bank trib at top of pool, greater than 10% gradient.
1308'	Restoration work on left bank includes large woody debris (LWD) cabled together.
1413'	Stump/rootwad helping with the scour of this pool. Coho and steelhead yoy.
1439'	Right bank tributary at the top of unit is Donkey Gulch. There is a culvert about 100' up the bank. Tributary has a high gradient and no fish present.
1506'	Restoration work on right bank includes 2 logs cabled together.
1781'	There are 2 or 3 possible salmonid redds.
1912'	Bridge crossing 78' into unit is approximately 50' above the channel.
2314'	Resident steelhead. Restoration work on the left bank includes logs rebarred together to remediate left bank erosion.
2451'	Dry left bank tributary at the bottom of unit. High gradient. No fish observed.
2811'	Left bank erosion is 35' long x 45' high.
2837'	Spring on left bank 31' into unit.
3146'	Dry right bank tributary.
3500'	Large woody debris (LDA) associated with small woody debris.
3834'	Dry left bank tributary.
4401'	Left bank trib with water flowing. Old restoration project in this unit.
4770'	Restoration work done with LWD.

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- 5004' Culvert is 1.5' diameter in stream about 20' long.
- 5196' North Fork Ramon Creek enters on the right bank in this unit. Tributary is flowing.
- 5240' Restoration site.
- 5765' Restoration site.
- 6538' Flowing right bank tributary is "big butt creek".
- 6705' Right bank tributary with a 1' culvert.
- 7539' Flowing left bank tributary.
- 7823' Channel type changes to F3.
- 8867' Dry left bank tributary.
- 9163' Bank stabilization restoration work on right bank. LWD cabled together.
- 9658' More than 10 pieces of LWD with one log across channel with weir notched in middle. Root stumps in channel.
- 9689' Dry small left bank tributary. Landslide on the left bank is approximately 200' high x 200' wide.
- 10518' LDA with small wood.
- 10541' Dry tributary on right bank at 114' into unit.
- 10763' Dry right bank tributary at the top of pool.
- 10971' Dry left bank tributary at the top of pool.
- 11153' Bedrock on right bank and LWD on left bank. Right bank slide contributing fines.
- 11192' Sculpin noted in unit.
- 11458' Scour from rootwad and LWD.
- 11534' LDA on left bank contributing to the scour.
- 11787' Dry right bank tributary at the top of the unit. High gradient.
- 12085' LWD and bedrock forming the pool.

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- 12096' Right bank erosion is 40' high x 20' long.
- 12378' Salmonid redd at 200' into unit.
- 13152' LDA is 6' high x 30' wide x 50' long.
- 13174' Left bank tributary is 86' into unit with little flow.
- 14119' Sculpin, steelhead, and coho yoy in glide.
- 14172' Channel becoming overgrown with grass and brush.
- 14400' Right bank tributary at 50' into unit.
- 14670' LDA at top of unit is 6' high x 20' wide x 10' long, retaining sediment at the top which could be a potential barrier.
- 15218' LDA at 188' into unit.
- 15986' Channel type change to B3.
- 15994' Have not seen coho yoy since habitat unit 170. Still seeing scattered steelhead yoy.
- 16389' LDA is splitting the stream. Steelhead yoy.
- 16404' Left bank erosion contributing fines into the stream.
- 16633' Sculpin, no steelhead or coho.
- 16662' Dry right bank tributary is 251' into unit. Large wood structure is an old splash dam with many logs crossing throughout the channel. Some logs are up to 30' high and broken in half. Logs appear to have been burned.
- 17137' At 130' into unit there is a log weir restoration site.
- 17345' LDA at 75' into unit.
- 17515' Cut log lying across stream.
- 17684' LDA in stream.
- 17740' Dry left bank tributary about 50' into unit.
- 17906' Sculpin observed.

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- 17944' at 100' into unit there are large wooden structures in stream.
- 18358' Left bank tributary at the top of the unit.
- 18474' Scour created by LDA. Layer of fine sediment covering the pool bottom. Sediment retained at top of LDA.
- 18488' Some bedrock at the bottom of unit. Slide on left bank contributing fines.
- 18661' Left bank tributary.
- 18785' At 290' into unit there is a right bank tributary with little water flowing. At 320' into unit there is some restoration work on the left bank. At 350 feet there is dry left bank tributary.
- 19325' There is a 2.5 foot plunge over log weir.
- 19450' A 3' plunge retaining sediment. Potential downstream migration issue.
- 20332' Large cobble and large wood in channel. Stream is becoming entrenched.
- 20375' Potential barrier at 85' into unit. LDA retaining sediment, flow is subsurface. LDA is 10' high x 25' wide x 13' long.
- 20495' Right bank tributary at 54' into unit.
- 20672' End of survey. Possibl the end of anadromy. Coho have not been observed since habitat unit 170. Steelhead have not been observed since unit 187. Crossed multiple LDAs that may have been potential barriers. Gradient has increased.

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LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE

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

CASCADE

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

FLATWATER

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

MAIN CHANNEL POOLS

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

SCOUR POOLS

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

BACKWATER POOLS

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

ADDITIONAL UNIT DESIGNATIONS

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

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TABLES AND GRAPHS

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: RAMON CREEK
SAMPLE DATES: 06/13/02 to 06/20/02
STREAM LENGTH: 20832 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: COMPTCHE Latitude: 39°29'56"
Legal Description: T16NR15WS02 Longitude: 123°53'26"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 01

Channel Type: B4	Canopy Density: 68%
Channel Length: 8356 ft.	Coniferous Component: 88%
Riffle/flatwater Mean Width: 7 ft.	Deciduous Component: 12%
Total Pool Mean Depth: 1.0 ft.	Pools by Stream Length: 15%
Base Flow: 0.3 cfs	Pools >=3 ft.deep: 8%
Water: 056- 064°F Air: 058-076°F	Mean Pool Shelter Rtn: 26
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Large Woody Debris
Vegetative Cover: 68%	Occurrence of LOD: 25%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 22% 2.59% 3. 19% 4. 0% 5. 0%

STREAM REACH 02

Channel Type: F3	Canopy Density: 75%
Channel Length: 7638 ft.	Coniferous Component: 83%
Riffle/flatwater Mean Width: 7 ft.	Deciduous Component: 17%
Total Pool Mean Depth: 1.0 ft.	Pools by Stream Length: 10%
Base Flow: 0.3 cfs	Pools >=3 ft.deep: 6%
Water: 055- 062°F Air: 065-081°F	Mean Pool Shelter Rtn: 31
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Large Woody Debris
Vegetative Cover: 79%	Occurrence of LOD: 27%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.

Embeddness Value: 1. 14% 2.57% 3. 23% 4. 6% 5. 0%

STREAM REACH 03

Channel Type: B3	Canopy Density: 89%
Channel Length: 4838 ft.	Coniferous Component: 93%
Riffle/flatwater Mean Width: 5 ft.	Deciduous Component: 7%
Total Pool Mean Depth: 0.9 ft.	Pools by Stream Length: 8%
Base Flow: 0.3 cfs	Pools >=3 ft.deep: 0%
Water: 054- 058°F Air: 058-079°F	Mean Pool Shelter Rtn: 58
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Large Woody Debris
Vegetative Cover: 50%	Occurrence of LOD: 35%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 13 ft.

Embeddness Value: 1. 9% 2.45% 3. 41% 4. 5% 5. 0%

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Drainage: SF BIG RIVER

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES Survey Dates: 06/13/02 to 06/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15MS02 LATITUDE: 39°29'56" LONGITUDE: 123°53'26"

HABITAT UNITS MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	MEAN WIDTH (ft.)	TOTAL WIDTH (ft.)	MEAN DEPTH (ft.)	TOTAL DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA (sq.ft.)	MEAN ESTIMATED VOLUME (cu.ft.)	TOTAL ESTIMATED VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	TOTAL RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
15	7 RIFFLE	7	32	479	2	6.7	0.2	191	2863	47	704	0	13		
120	17 FLATWATER	52	149	17895	86	6.4	0.4	491	58902	210	25228	0	19		
94	94 POOL	41	26	2445	12	8.0	1.0	211	19866	219	20569	163	34		
1	0 DRY	0	13	13	0	0.0	0.0	0	0	0	0	0	0	0	
TOTAL UNITS	230			TOTAL LENGTH (ft.)	20832				TOTAL AREA (sq. ft.)	81631		TOTAL VOL. (cu. ft.)	46500		

RANCO CRBEK

Drainage: SF BIG RIVER

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 06/13/02 to 06/20/02

Confluence Location: QUAD: COMFICHE LEGAL DESCRIPTION: T16N15W502 LATITUDE:39°29'56" LONGITUDE:123°53'26"

HABITAT UNITS #	HABITAT FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE	MEAN LENGTH	MEAN LENGTH	TOTAL LENGTH	TOTAL LENGTH	MEAN WIDTH	MEAN WIDTH	TOTAL WIDTH	MEAN DEPTH	MEAN DEPTH	MAXIMUM DEPTH	MEAN AREA	TOTAL AREA	MEAN VOLUME	TOTAL VOLUME	MEAN RESIDUAL	TOTAL RESIDUAL	MEAN SHELTER	TOTAL SHELTER	MEAN CANOPY	TOTAL CANOPY						
#	%	ft.	%	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	ft.	sq.ft.	sq.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.						
14	6	31	6	436	2	7	0.2	0.9	207	2897	50	700	0	8	74	6	LGR	0	43	0	4	0.3	1.1	95	28	0	40	90	
1	0	43	0	43	0	4	0.3	1.1	95	95	28	28	0	0	0	1	HGR	0	43	0	4	0.3	1.1	95	28	0	40	90	
16	7	43	7	689	3	8	0.6	1.5	320	5124	194	3104	0	8	71	7	GLD	0	43	0	8	0.6	1.5	320	5124	194	3104	8	71
10	4	66	4	664	3	5	0.2	0.5	342	3416	92	924	0	4	61	4	RUN	0	66	0	4	0.2	0.5	342	3416	92	924	4	61
94	41	176	41	16542	79	6	0.3	1.8	789	74205	308	28924	0	42	77	6	SRN	0	176	0	42	0.3	1.8	789	74205	308	28924	42	77
82	36	25	36	2060	10	8	1.0	4.7	209	17114	215	17645	160	35	75	82	MCP	160	25	160	35	4.7	4.7	209	17114	215	17645	35	75
1	0	21	0	21	0	11	1.5	3.1	231	231	347	347	300	60	80	1	LSL	300	21	300	60	3.1	3.1	231	347	347	300	60	80
3	1	25	1	74	0	5	0.9	1.5	110	330	97	290	78	17	87	3	LSR	78	25	78	17	1.5	1.5	110	330	97	290	17	87
6	3	43	3	256	1	7	1.0	3.4	304	1825	312	1872	233	12	83	6	LSBk	233	43	233	12	3.4	3.4	304	1825	312	1872	12	83
2	1	17	1	34	0	11	1.1	2.7	183	366	207	414	153	75	90	2	PLP	153	17	153	75	2.7	2.7	183	366	207	414	75	90
1	0	13	0	13	0	0	0.0	0.0	0	0	0	0	0	0	0	1	DRY	0	13	0	0	0.0	0.0	0	0	0	0	0	95

TOTAL UNITS	230	TOTAL LENGTH (ft.)	20832	TOTAL AREA (sq.ft.)	105602	TOTAL VOLUME (cu.ft.)	54249
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Ramon Creek

RAMON CREEK

Drainage: SF BIG RIVER

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 06/13/02 to 06/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16N15W502 LATITUDE: 39°29'56" LONGITUDE: 123°53'26"

HABITAT UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL SHELFER EST. POOL VOL. RATING (cu.ft.)
82	MAIN	87	25	2060	8.1	1.0	209	17114	215	17645	160
12	SCOUR	13	32	385	7.3	1.0	229	2752	244	2923	187
TOTAL UNITS	TOTAL UNITS		TOTAL LENGTH (ft.)	TOTAL LENGTH (ft.)			TOTAL AREA (sq.ft.)	TOTAL AREA (sq.ft.)		TOTAL VOL. (cu.ft.)	TOTAL VOL. (cu.ft.)
94	94		2445	2445			19866	19866		20569	20569

RAMON CREEK Drainage: SF BIG RIVER

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 06/13/02 to 06/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS02 LATITUDE:39°29'56" LONGITUDE:123°53'26"

UNITS MEASURED	HABITAT TYPE	<1 FOOT		1-<2 FT.		2-<3 FT.		3-<4 FT.		3-<4 FOOT		>=4 FEET		>=4 FEET	
		PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH	PERCENT OCCURRENCE	MAXIMUM DEPTH
82	MCP	87	0	0	53	26	65	32	2	2	1	1	1	1	1
1	LSL	1	0	0	0	0	0	0	1	100	0	0	0	0	0
3	LSR	3	0	0	3	0	100	0	0	0	0	0	0	0	0
6	LSBK	6	0	0	0	5	0	83	1	17	0	0	0	0	0
2	PLP	2	0	0	1	1	50	50	0	0	0	0	0	0	0

TOTAL UNITS 94

Ramon Creek

RAMON CREEK

Drainage: SF BIG RIVER

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE

Survey Dates: 06/13/02 to 06/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS02 LATITUDE:39°29'56" LONGITUDE:123°53'26"

UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN % UNDERCUT BANKS	MEAN % SWD	MEAN % LWD	MEAN % ROOT MASS VEGETATION	MEAN % TERR. VEGETATION	MEAN % AQUATIC VEGETATION	MEAN % WHITE WATER	MEAN % BOULDERS	MEAN % BEDROCK LEDGES
14	5	LGR	0	18	14	0	31	0	0	37	0
1	1	HGR	0	50	50	0	0	0	0	0	0
16	7	GLD	11	1	13	0	21	0	0	21	33
10	3	RUN	0	17	17	0	23	0	0	43	0
94	6	SRK	0	10	30	5	29	0	0	23	3
82	77	MCP	10	22	32	7	5	0	0	9	15
1	1	LSL	25	25	25	0	0	0	0	25	0
3	2	LSR	75	0	0	25	0	0	0	0	0
6	6	LSBK	8	17	9	3	9	0	0	6	48
2	2	PLP	25	20	40	8	0	0	8	0	0
1	0	DRY	0	0	0	0	0	0	0	0	0

Ramon Creek

RAMON CREEK

Drainage: SF BIG RIVER

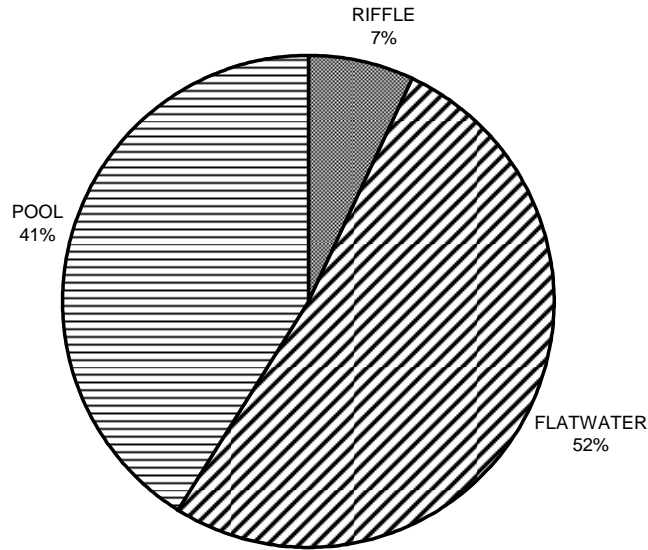
Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 06/13/02 to 06/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS02 LATITUDE:39°29'56" LONGITUDE:123°53'26"

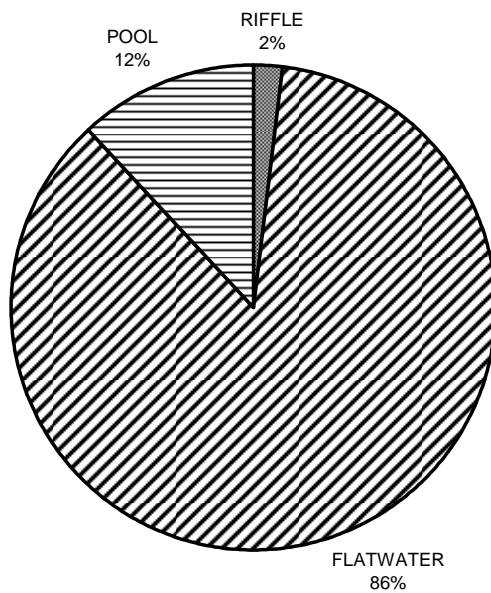
TOTAL HABITAT UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
14	6	LGR	0	0	33	67	0	0	0
1	1	HGR	0	0	0	100	0	0	0
16	7	GLD	0	0	71	29	0	0	0
10	4	RUN	0	0	75	25	0	0	0
94	6	SRN	0	0	67	17	17	0	0
82	10	MCP	0	20	60	20	0	0	0
1	1	LSL	0	100	0	0	0	0	0
3	1	LSR	0	100	0	0	0	0	0
6	2	LSBk	50	0	50	0	0	0	0
2	1	PLP	0	0	100	0	0	0	0
1	0	DRY	0	0	0	0	0	0	0

RAMON CREEK HABITAT TYPES BY PERCENT OCCURRENCE



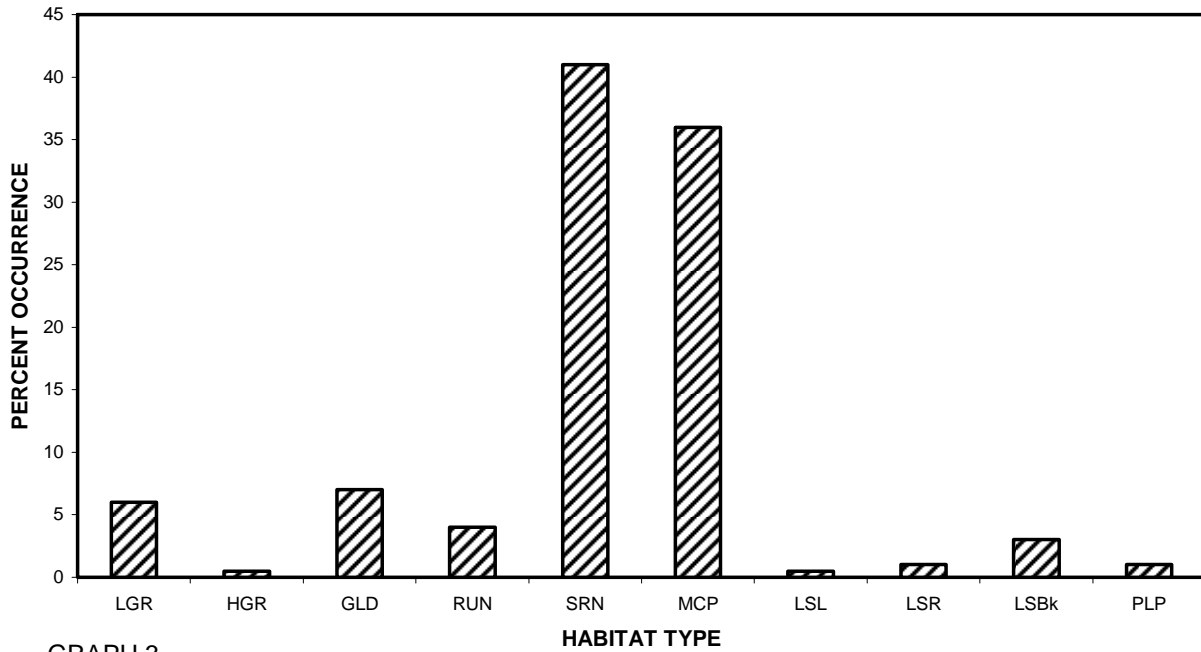
GRAPH 1

RAMON CREEK HABITAT TYPES BY PERCENT TOTAL LENGTH



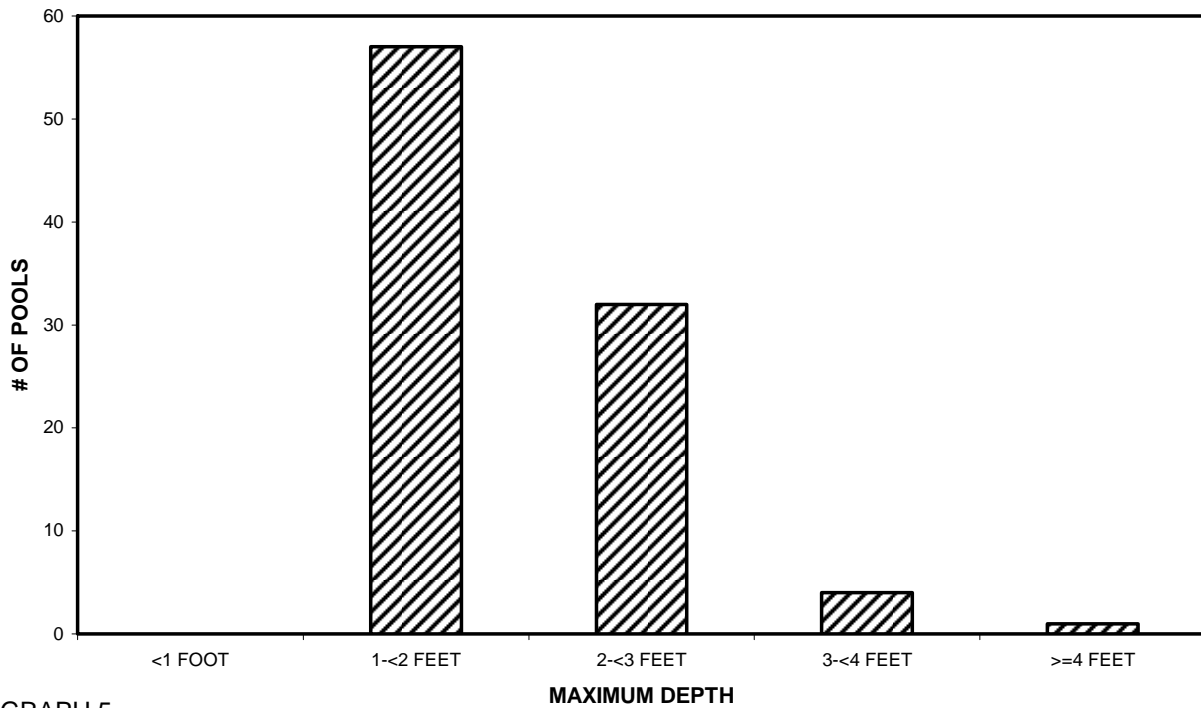
GRAPH 2

RAMON CREEK HABITAT TYPES BY PERCENT OCCURRENCE



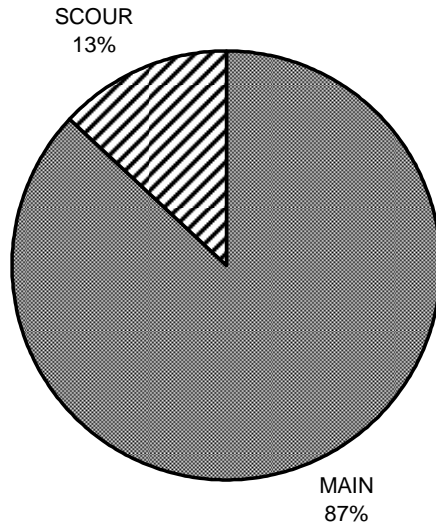
GRAPH 3

RAMON CREEK MAXIMUM DEPTH IN POOLS



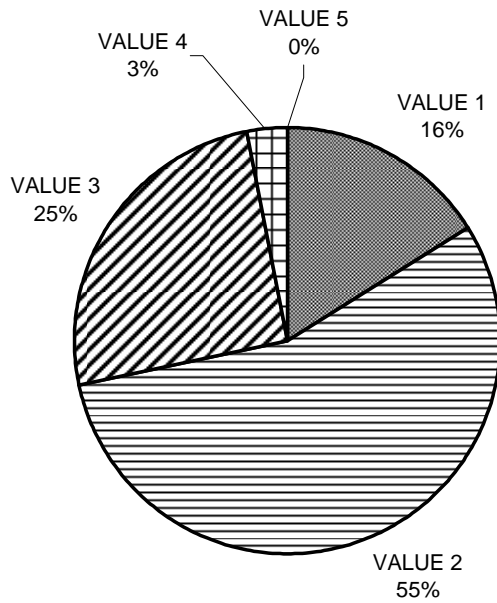
GRAPH 5

RAMON CREEK POOL HABITAT TYPES BY PERCENT OCCURRENCE



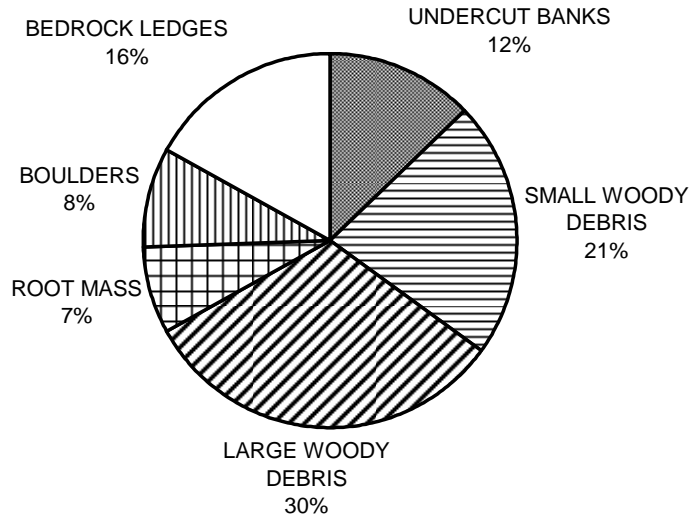
GRAPH 4

RAMON CREEK PERCENT EMBEDDEDNESS



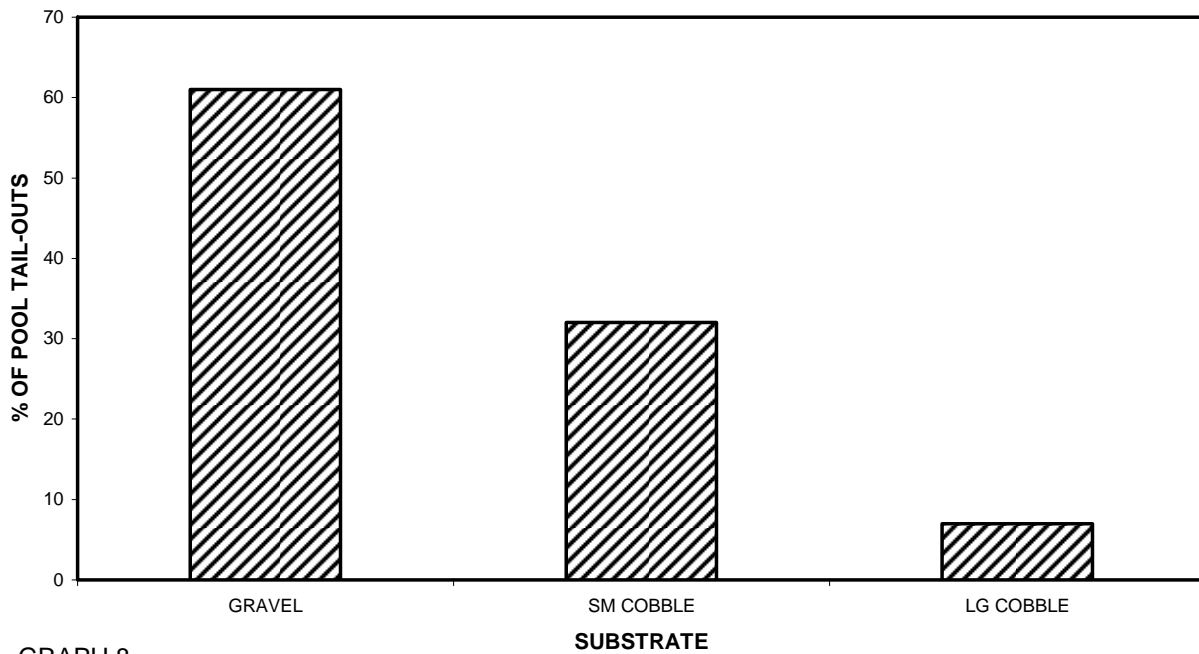
GRAPH 6

RAMON CREEK MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

RAMON CREEK SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



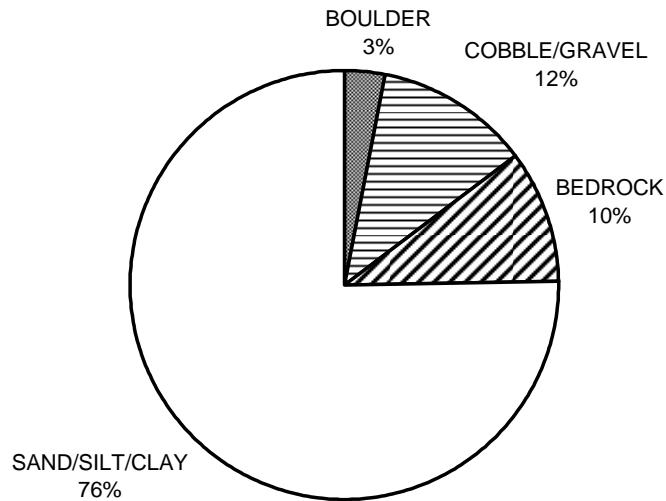
GRAPH 8

RAMON CREEK MEAN PERCENT CANOPY



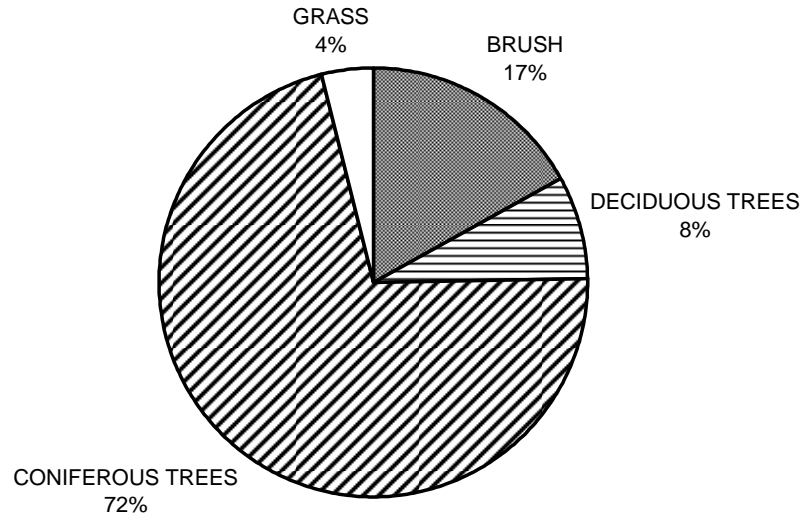
GRAPH 9

RAMON CREEK DOMINANT BANK COMPOSITION IN SURVEY REACH



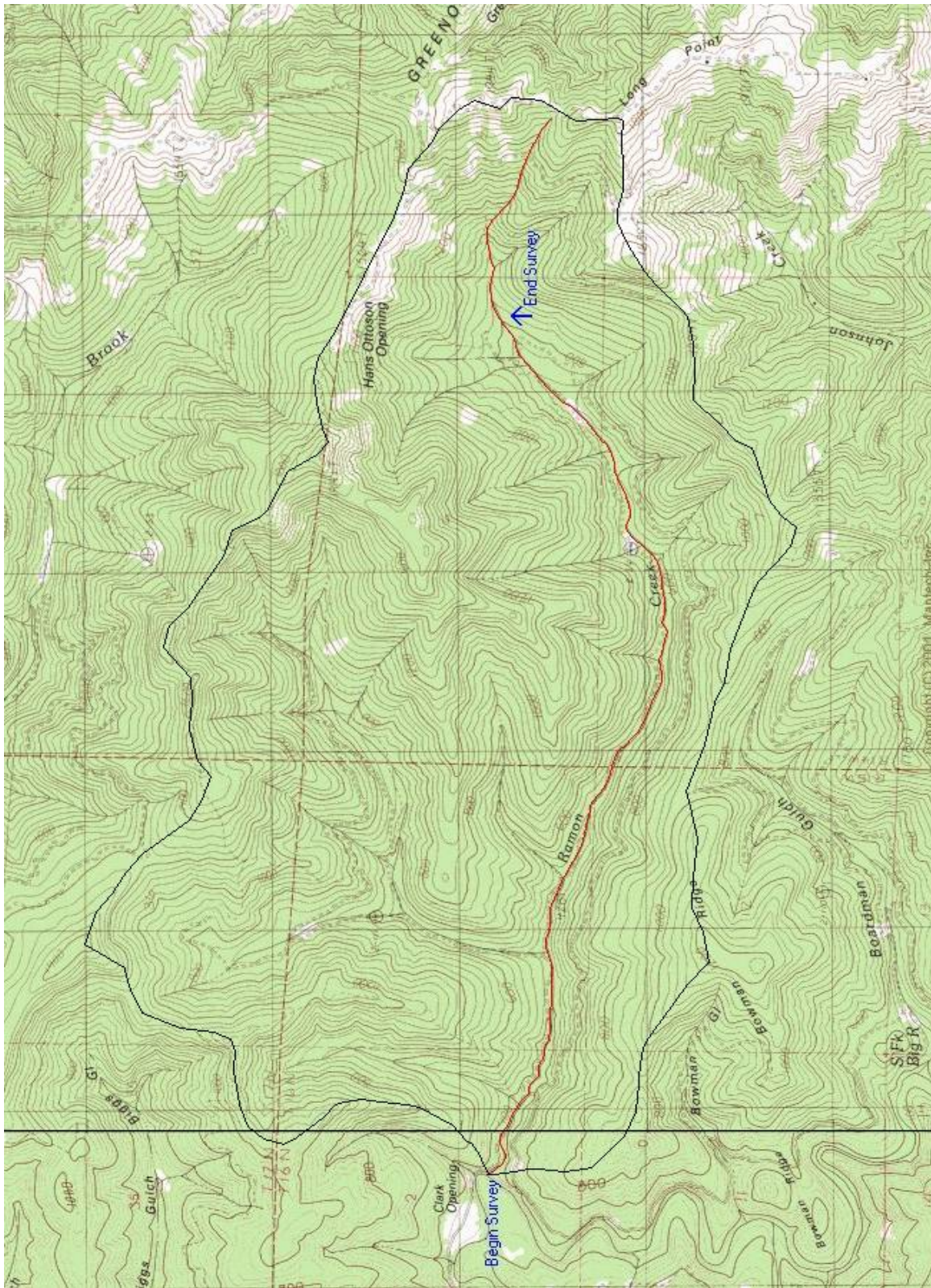
GRAPH 10

RAMON CREEK DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Ramon Creek



MAP 1. RAMON CREEK