STREAM INVENTORY REPORT

Little South Fork Garcia River, South Fork Garcia River, 2002

CALIFORNIA DEPARTMENT OF FISH AND GAME

2003

Central Coast Region

STREAM INVENTORY REPORT

Little South Fork Garcia River

INTRODUCTION

A stream inventory was conducted August 8, 2002 on Little South Fork Garcia River. The survey began at the confluence with South Fork Garcia River and extended upstream 0.53 miles.

The Little South Fork Garcia River inventory was conducted in two parts: habitat inventory and biological inventory. The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Little South Fork Garcia River. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species.

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

Little South Fork Garcia River is a tributary to the South Fork Garcia River, tributary to the Garcia River, located in Mendocino County, California (Map 1). Little South Fork Garcia River's legal description at the confluence with South Fork Garcia River is T11N R15W S4. Its location is 38°50′19″ north latitude and 123°32′45″ west longitude. Little South Fork Garcia River is a first order stream and has approximately 1.8 miles of solid blue line stream according to the USGS Gualala 7.5 minute quadrangle. Little South Fork Garcia River drains a watershed of approximately 0.74 square miles. Elevations range from about 400 feet at the mouth of the creek to 1960 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 logging roads from Highway 1 to Iverson Road to Fish Rock Road. Fish Rock road leads to the headwaters of the South Fork Garcia River and a logging road follows the river to the confluence with Little South Fork Garcia River.

METHODS

The habitat inventory conducted in Little South Fork Garcia River follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California

Department of Fish and Game Scientific Aids (DFG) and Watershed Stewards Project/AmeriCorps (WSP/AmeriCorps) Members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was conducted by a two-person team.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are 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 Little South Fork Garcia River 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". Little South Fork Garcia River habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Little South Fork Garcia River, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed 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 Little South Fork Garcia River, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

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

substrate composing the pool tail-outs is recorded for each pool.

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Little South Fork Garcia River, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or 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 Little South Fork Garcia River, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

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 Little South Fork Garcia River. This sampling technique is 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 six tables:

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Dominant substrates by habitat types
- Mean percent shelter by habitat types

Little South Fork Garcia River

Graphics are produced from the tables using Excel. Graphics developed for Little South Fork Garcia River include:

- Riffle, flatwater, pool habitats by percent occurrence
- Riffle, flatwater, pool habitats by total length
- Total habitat types by percent occurrence
- Pool types by percent occurrence
- Total pools by maximum depths
- Embeddedness
- Pool cover by cover type
- Dominant substrate in low gradient riffles
- Mean percent canopy
- Bank composition by composition type
- Bank vegetation by vegetation type

HABITAT INVENTORY RESULTS

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

The habitat inventory of August 8, 2002, was conducted by Libby Earthman and Jen Presnell (WSP). The total length of the stream surveyed was 2,786 feet.

Stream flow was not measured on Little South Fork Garcia River.

Little South Fork Garcia River is an F4 channel type for the entire 2,786 feet of stream surveyed. F4 channel types are classified as entrenched, meandering, riffle/pool channels, on low gradients with high width/depth ratios and gravel-dominated substrates.

Water temperatures taken during the survey period ranged from 55 to 57 degrees Fahrenheit. Air temperatures ranged from 59 to 74 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 44% pool units, 37% flatwater units, 13% dry units, and 6% riffle units (Graph 1). Based on total **length** of Level II habitat types there were 51% flatwater units, 31% dry units, 16% pool units, and 2% riffle units (Graph 2).

Nine Level IV habitat types were identified (Table 2). The most frequent habitat types by percent **occurrence** were runs, 35%; mid-channel pools, 23%; and dry, 13% (Graph 3). Based on percent total **length**, runs made up, 48%, dry units, 31%, and mid-channel pools, 8%.

Little South Fork Garcia River

A total of 23 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 78%, 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. Five of the 21 pools measured (24%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 21 pool tail-outs measured, 4 had a value of 1 (19%); 7 had a value of 2 (33%); 6 had a value of 3 (29%); 0 had a value of 4 (0%); and 4 had a value of 5 (19%) (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. Riffle habitat types had a mean shelter rating of 60, pool habitats had a mean shelter rating of 53, and flatwater habitat types had a mean shelter rating of 15 (Table 1). Of the pool types, main channel pools had the highest mean shelter rating at 57. Scour pools had mean shelter rating of 36 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Little South Fork Garcia River. Graph 7 describes the pool cover in Little South Fork Garcia River. 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 90% of pool tail-outs while small cobble was the next most frequently observed substrate type, at 10%.

The mean percent canopy density for the surveyed length of Little South Fork Garcia River was 96%. The mean percentages of deciduous and coniferous trees were 29% and 71%, respectively. Graph 9 describes the mean percent canopy in Little South Fork Garcia River.

For the stream reach surveyed, the mean percent right bank vegetated was 42%. The mean percent left bank vegetated was 36%. The dominant elements composing the structure of the stream banks consisted of 64% sand/silt/clay, 21% cobble/gravel, 7% bedrock, and 7% boulder (Graph 10). Coniferous trees were the dominant vegetation type observed in 71% of the units surveyed. Additionally, 29% of the units surveyed had brush as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Young of year salmonid presence was observed from the stream banks in Little South Fork Garcia River up to 1,127 feet. Yearling salmonids were observed up to 2,050 feet.

DISCUSSION

Little South Fork Garcia River is a F4 channel type for 2,786 feet of stream surveyed. The suitability of F4 channel types for fish habitat improvement structures is as follows: F4 channel types are good for bank-placed boulders; fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover.

The water temperatures recorded on the survey day August 8, 2002 ranged from 55 to 57 degrees Fahrenheit. Air temperatures ranged from 59 to 74 degrees Fahrenheit. This is a suitable water temperature range for salmonids.

Flatwater habitat types comprised 51% of the total length of this survey, dry 31%, pools 16%, and riffles 2%. The pools are relatively shallow, with 5 of the 21 (24%) measured 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.

Ten of the 21 pool tail-outs measured had embeddedness ratings of 1 or 2. Six of the pool tail-outs had embeddedness ratings of 3 or 4. Four 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 Little South Fork Garcia River should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Twenty-one of the 21 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools was 53. The shelter rating in the flatwater habitats was 60. 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. 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 96%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 42% and 36%, 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) Little South Fork Garcia River should be managed as an anadromous, natural production stream.

2) Where feasible, design and install pool enhancement structures to increase depths of existing pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

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

4) Continue to identify and treat remaining sources of potential sediment yield.

COMMENTS AND LANDMARKS

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

0'	Begin survey at confluence with South Fork Garcia. Channel type is an F4. Bridge at 31.2 feet.
40'	Instream boulder structure creating 4.7' plunge. 10 steelhead yoy.
206'	6.2 foot plunge.
248'	Hobo temp unit; three steel head yoy.
345'	15 steelhead yoy.
416'	Took channel type in this unit. F4.
476'	Four 1+ steelhead. 4.3 foot plunge retaining sediment.
554'	Salmonid redd at 6 feet.
581'	Four LWD oak and redwood.
890'	5 pieces of LWD retaining sediment on right bank.
1008'	Right bank wall, 15 feet.
1086'	Two salamanders.
1127'	Salmonid redd at 42', one steelhead yoy.
1196'	Unknown pool tail data under the LWD jam. Potential barrier.
1255'	1 to 3 feet of dry unit included.
1275'	Good gravel/cobble substrate. No water flowing. Upstream downcutting at 300 feet.
1695'	Four salamander larva and 2 adult salamanders. Possible barrier at 175 feet 4'x25'x12'.
1870'	Throughout this reach there are large sections of log jams retaining sediment.
2050'	One 1+ steelhead.
2164'	3' plunge.
2554'	End of survey. End of anadromy. No fish seen since unit 037. Numerous log jams retaining sediment, potential barriers. Left bank tributary at 250 feet.

REFERENCES

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

LEVEL III and LEVEL IV HABITAT TYPES

RIFFLE			
Low Gradient Riffle	(LGR)	[1.1]	{ 1}
High Gradient Riffle	(HGR)	[1.2]	{ 2}
CASCADE			
Cascade	(CAS)	[2.1]	{ 3}
Bedrock Sheet	(BRS)	[2.2]	{24}
FLATWATER			
Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}

MAIN CHANNEL POOLS

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

SCOUR POOLS

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

BACKWATER POOLS

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

ADDITIONAL UNIT DESIGNATIONS

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

TABLES AND GRAPHS

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: LITTLE SOUTH FORK GARCIA
SAMPLE DATES:
STREAM LENGTH: 2786 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: GUALALA — Latitude: 38°50'19"
Legal Description: T11NR15WS04 — Longitude: 123°32'45"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1

Channel Type: F4	Canopy Density: 96%
Channel Length: 2786 ft.	Coniferous Component: 71%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 29%
Total Pool Mean Depth: 0.9 ft.	Pools by Stream Length: 15%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 0%
Water: 055- 057°F Air: 059-074°F	Mean Pool Shelter Rtn: 56
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Large Woody Debris
Vegetative Cover: 39%	Occurrence of LOD: 68%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 864 ft.

Embeddness Value: 1. 19% 2.33% 3. 29% 4. 0% 5. 19%

LITTLE SOUTH FORK GARCIA — Drainage: SF GARCIA RIVER

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 08/11/02

Confluence Location: QUAD: GUALALA LEGAL DESCRIPTION: T11NR15WS04 LATITUDE:38°50'19" LONGITUDE:123°32'45"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	ESTIMATED TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	ESTIMATED TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
3	1	RIFFLE	6	21	63	2	3.5	0.2	36	107	7	21	0	60
19	5	FLATWATER	37	75	1427	51	4.6	0.3	352	6684	115	2178	0	15
23	23	POOL	44	20	451	16	7.7	0.9	141	3245	134	3093	99	53
7	0	DRY	13	123	864	31	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
52	29	2805	10036	5292

LITTLE SOUTH FORK GARCIA — Drainage: SF GARCIA RIVER

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 08/11/02

Confluence Location: QUAD: GUALALA LEGAL DESCRIPTION: T11NR15WS04 LATITUDE:38°50'19" LONGITUDE:123°32'45"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA EST. sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME EST. cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN CANOPY %
3	1	LGR	6	21	63	2	4	0.2	0.2	36	107	7	21	0	60	91
18	4	RUN	35	75	1355	48	4	0.3	0.8	338	6084	82	1480	0	6	97
1	1	SRN	2	71	71	3	6	0.6	0.0	407	407	244	244	0	50	100
12	12	MCP	23	18	214	8	8	1.0	2.1	119	1431	112	1339	76	58	99
6	6	STP	12	27	163	6	7	0.8	2.0	182	1094	142	854	104	55	84
2	2	LSL	4	14	29	1	6	0.6	1.7	93	185	59	119	0	20	100
1	1	LSR	2	10	10	0	4	0.5	1.6	40	40	20	20	12	80	94
2	2	PLP	4	18	35	1	14	1.6	2.4	247	495	381	761	356	30	100
7	0	DRY	13	123	864	31	0	0.0	0.0	0	0	0	0	0	0	99

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
52	29	2805	9842	4838

LITTLE SOUTH FORK GARCIA — Drainage: SF GARCIA RIVER

Table 3 - SUMMARY OF POOL TYPES — Survey Dates: 08/11/02

Confluence Location: QUAD: GUALALA LEGAL DESCRIPTION: T11NR15WS04 LATITUDE:38°50'19" LONGITUDE:123°32'45"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
18	18	MAIN	78	21	377	84	7.3	0.9	140	2525	122	2193	86	57
5	5	SCOUR	22	15	74	16	8.8	0.9	144	720	180	900	145	36

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
23	- 23	451	3245	3093

LITTLE SOUTH FORK GARCIA — Drainage: SF GARCIA RIVER

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 08/11/02

Confluence Location: QUAD: GUALALA LEGAL DESCRIPTION: T11NR15WS04 LATITUDE:38°50'19" LONGITUDE:123°32'45"

UNITS MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
12	MCP	52	0	0	10	83	2	17	0	0	0	0
6	STP	26	0	0	5	83	1	17	0	0	0	0
2	LSL	9	0	0	2	100	0	0	0	0	0	0
1	LSR	4	0	0	1	100	0	0	0	0	0	0
2	PLP	9	0	0	0	0	2	100	0	0	0	0

TOTAL UNITS
23

LITTLE SOUTH FORK GARCIA — Drainage: SF GARCIA RIVER

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE — Survey Dates: 08/11/02

Confluence Location: QUAD: GUALALA LEGAL DESCRIPTION: T11NR15WS04 LATITUDE:38°50'19" LONGITUDE:123°32'45"

UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN % UNDERCUT BANKS	MEAN % SWD	MEAN % LWD	MEAN % ROOT MASS	MEAN % TERR. VEGETATION	MEAN % AQUATIC VEGETATION	MEAN % WHITE WATER	MEAN % BOULDERS	MEAN % BEDROCK LEDGES
3	1	LGR	0	50	50	0	0	0	0	0	0
18	2	RUN	0	0	20	50	0	30	0	0	0
1	1	SRN	0	0	100	0	0	0	0	0	0
12	11	MCP	0	23	72	5	0	0	0	1	0
6	6	STP	3	19	58	0	0	0	0	14	6
2	2	LSL	0	0	100	0	0	0	0	0	0
1	1	LSR	0	20	80	0	0	0	0	0	0
2	2	PLP	0	5	85	10	0	0	0	0	0
7	0	DRY	0	0	0	0	0	0	0	0	0

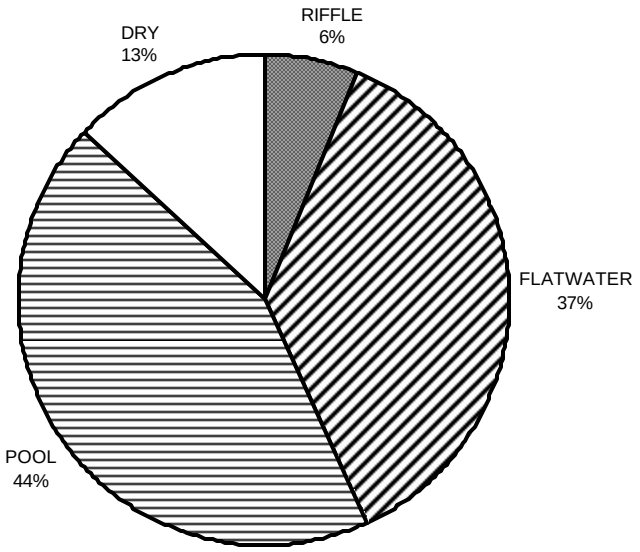
LITTLE SOUTH FORK GARCIA — Drainage: SF GARCIA RIVER

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE — Survey Dates: 08/11/02

Confluence Location: QUAD: GUALALA LEGAL DESCRIPTION: T11NR15WS04 LATITUDE:38°50'19" LONGITUDE:123°32'45"

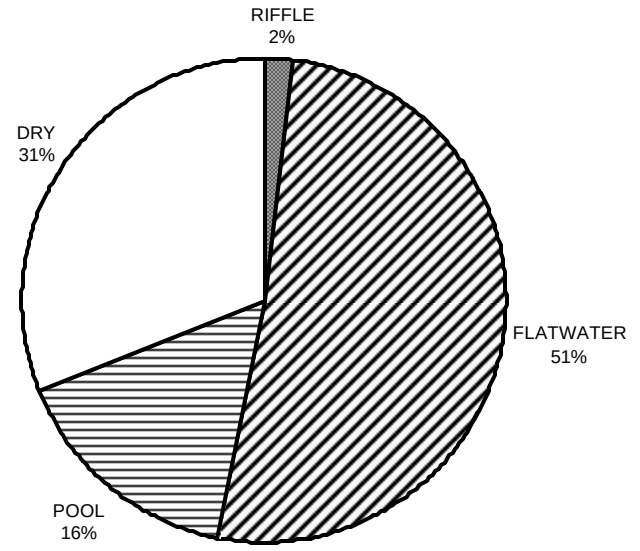
TOTAL HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
3	1	LGR	0	100	0	0	0	0	0
18	3	RUN	0	0	100	0	0	0	0
1	1	SRN	0	0	100	0	0	0	0
12	2	MCP	0	50	50	0	0	0	0
6	3	STP	0	33	67	0	0	0	0
2	1	LSL	0	0	100	0	0	0	0
1	1	LSR	0	100	0	0	0	0	0
2	1	PLP	100	0	0	0	0	0	0
7	0	DRY	0	0	0	0	0	0	0

LITTLE SOUTH FORK GARCIA RIVER
HABITAT TYPES BY PERCENT OCCURENCE



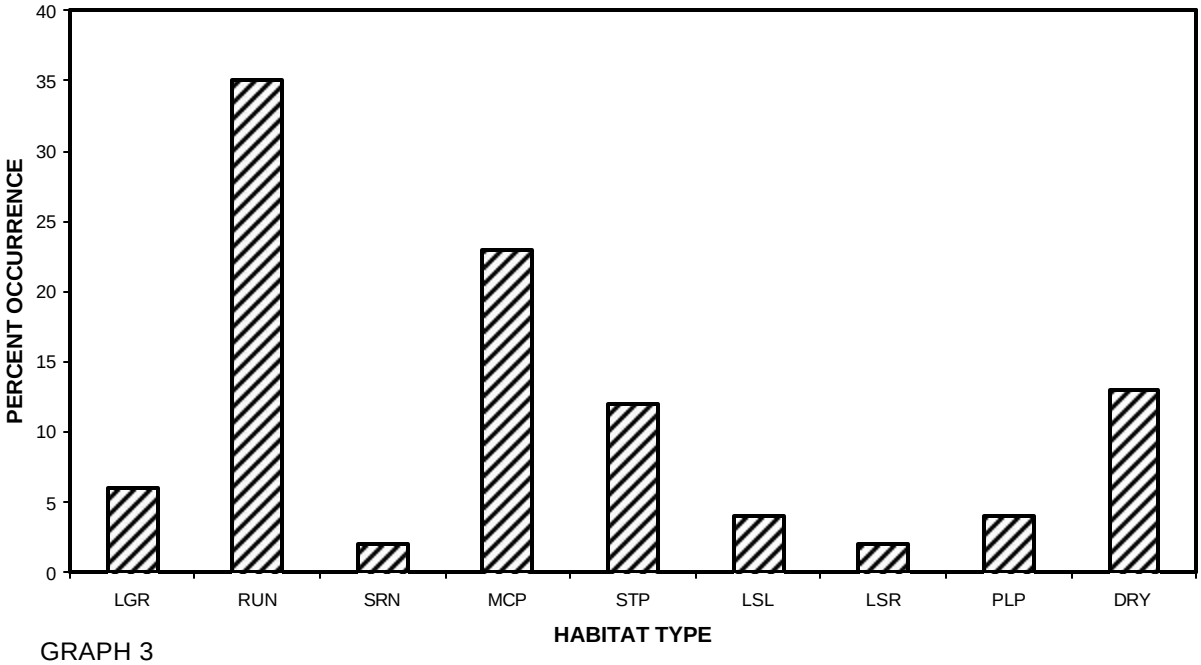
GRAPH 1

LITTLE SOUTH FORK GARCIA RIVER
HABITAT TYPES BY PERCENT TOTAL LENGTH



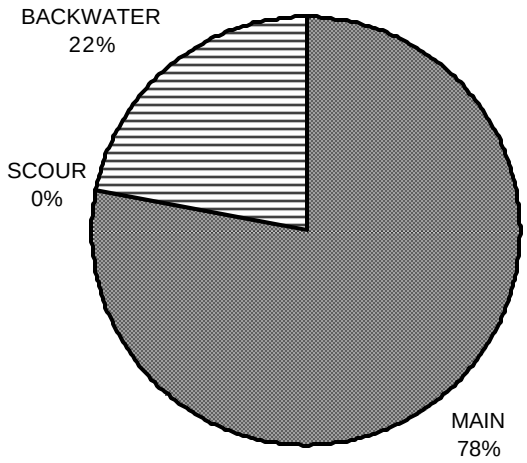
GRAPH 2

LITTLE SOUTH FORK GARCIA RIVER
HABITAT TYPES BY PERCENT OCCURRENCE



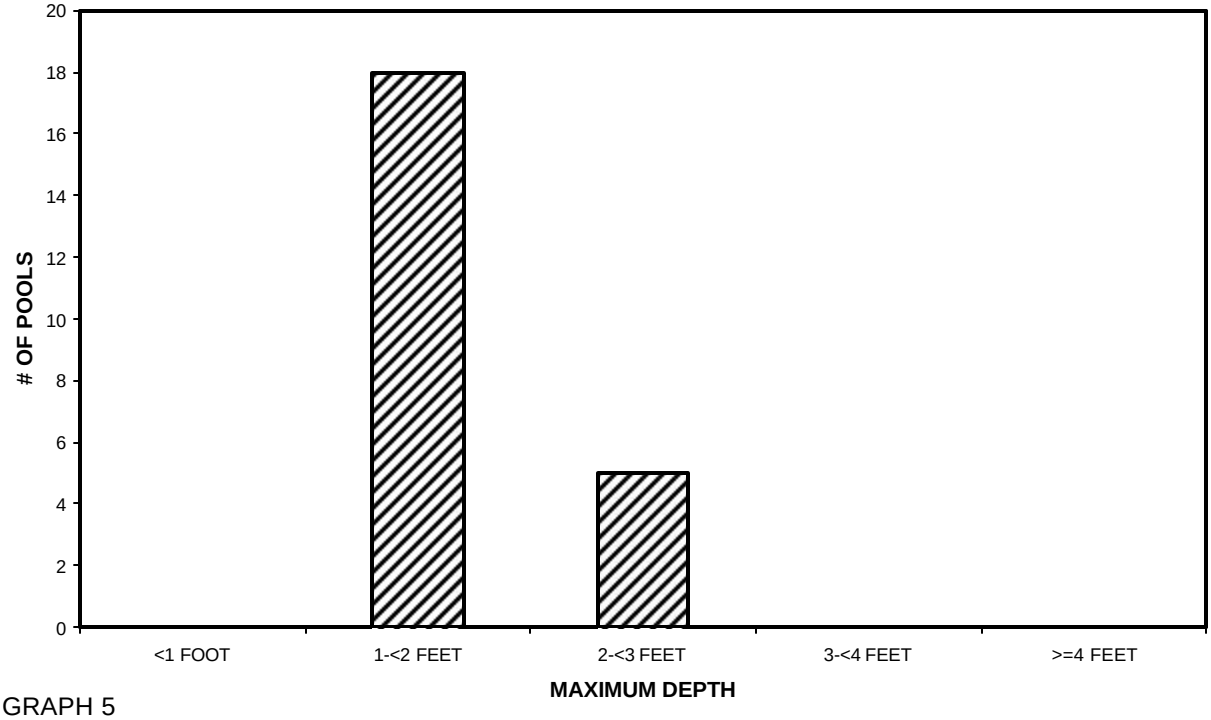
GRAPH 3

LITTLE SOUTH FORK GARCIA RIVER
POOL HABITAT TYPES BY PERCENT OCCURRENCE



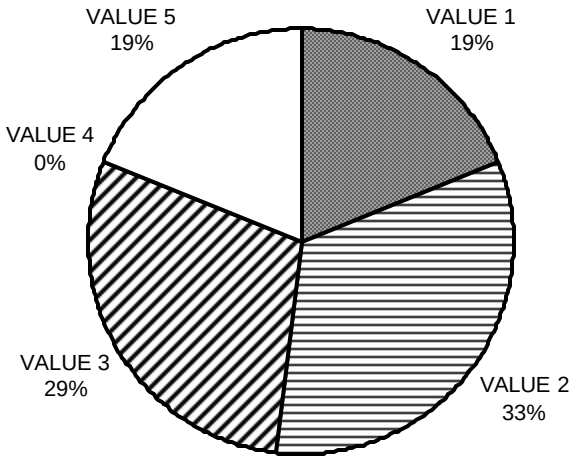
GRAPH 4

LITTLE SOUTH FORK GARCIA RIVER
MAXIMUM DEPTH IN POOLS



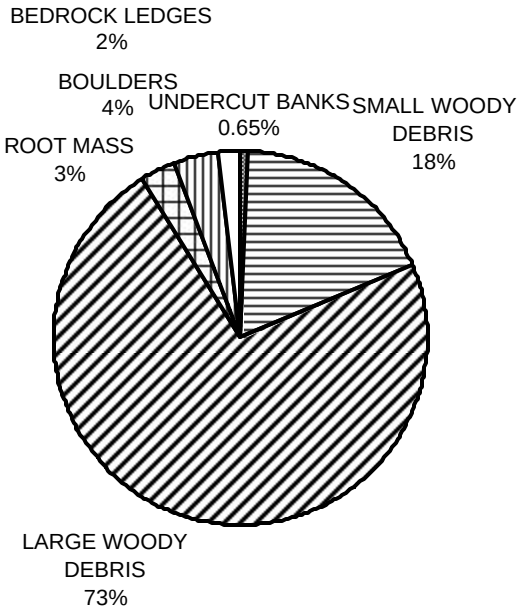
GRAPH 5

LITTLE SOUTH FORK GARCIA RIVER
PERCENT EMBEDDEDNESS



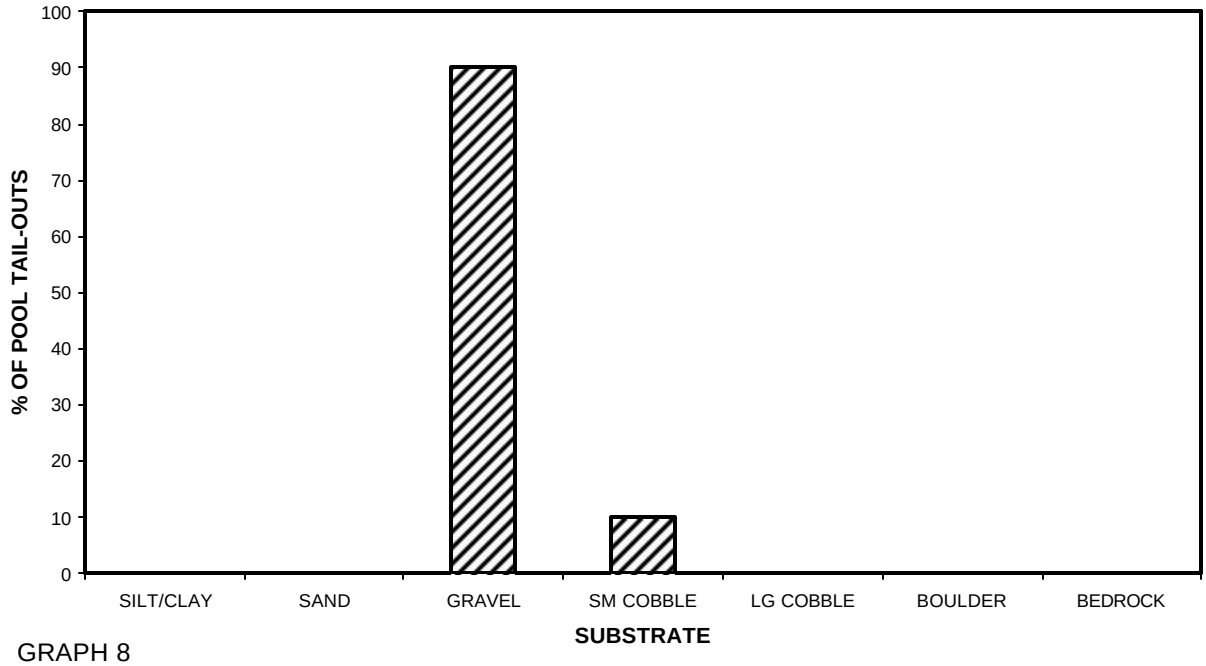
GRAPH 6

LITTLE SOUTH FORK GARCIA RIVER
MEAN PERCENT COVER TYPES IN POOLS



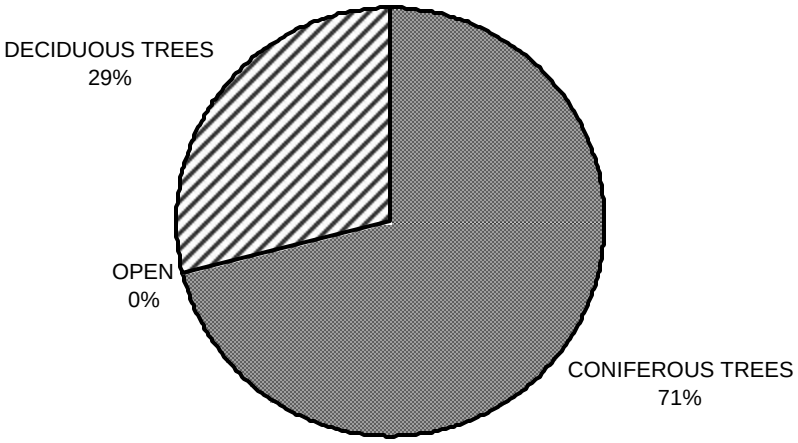
GRAPH 7

LITTLE SOUTH FORK GARCIA RIVER
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



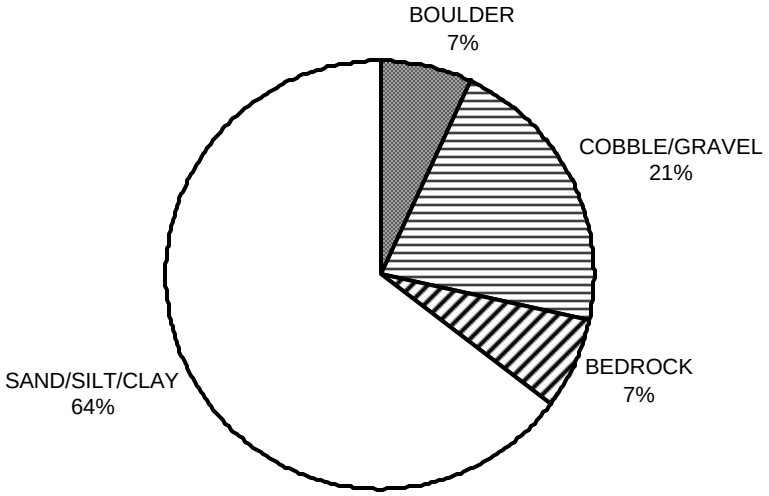
GRAPH 8

LITTLE SOUTH FORK GARCIA RIVER
MEAN PERCENT CANOPY



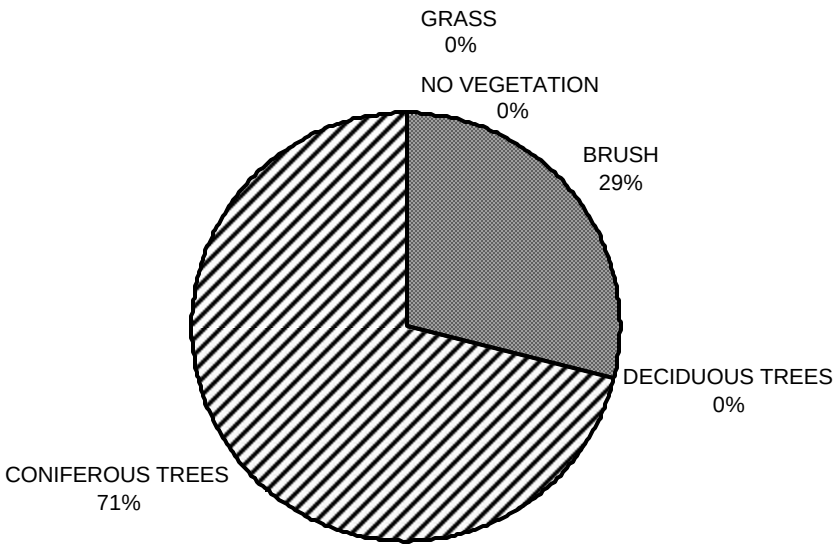
GRAPH 9

LITTLE SOUTH FORK GARCIA RIVER
DOMINANT BANK COMPOSITION IN SURVEY REACH

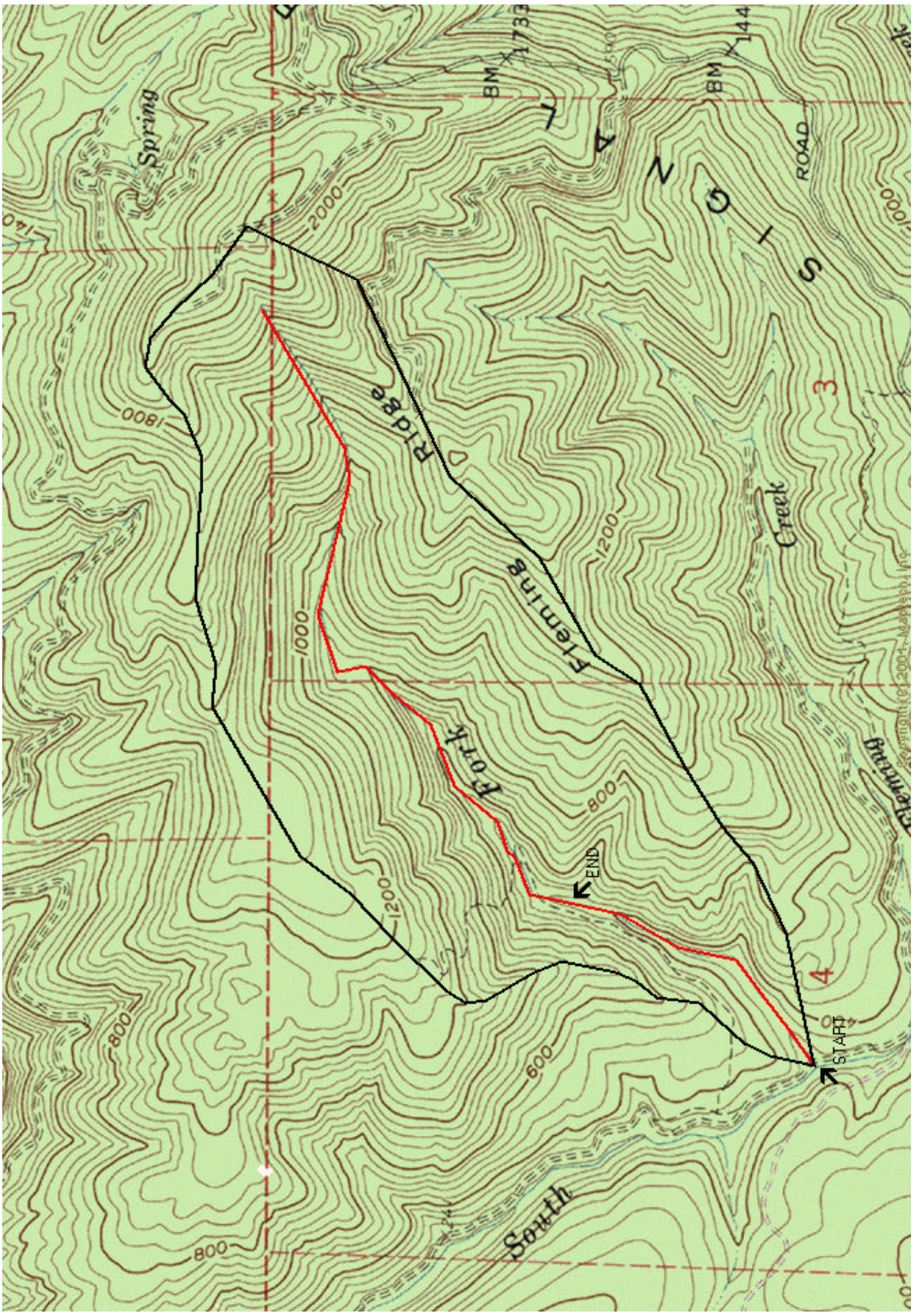


GRAPH 10

LITTLE SOUTH FORK GARCIA RIVER
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11



MAP 1. LITTLE SOUTH FORK GARCIA RIVER