NORTH COAST WATERSHED AND FISHERY IMPROVEMENT PROGRAM

STREAM INVENTORY REPORT

Biggs Gulch, South Fork Big River, 2002

CALIFORNIA DEPARTMENT OF FISH AND GAME

2003

Northern California-North Coast Region

STREAM INVENTORY REPORT

Biggs Gulch

INTRODUCTION

A stream inventory was conducted beginning June 10 and ending June 11, 2002 on Biggs Gulch. The survey began at the confluence with South Fork Big River and extended upstream 0.54 miles.

The Biggs Gulch 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 Biggs Gulch. 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.

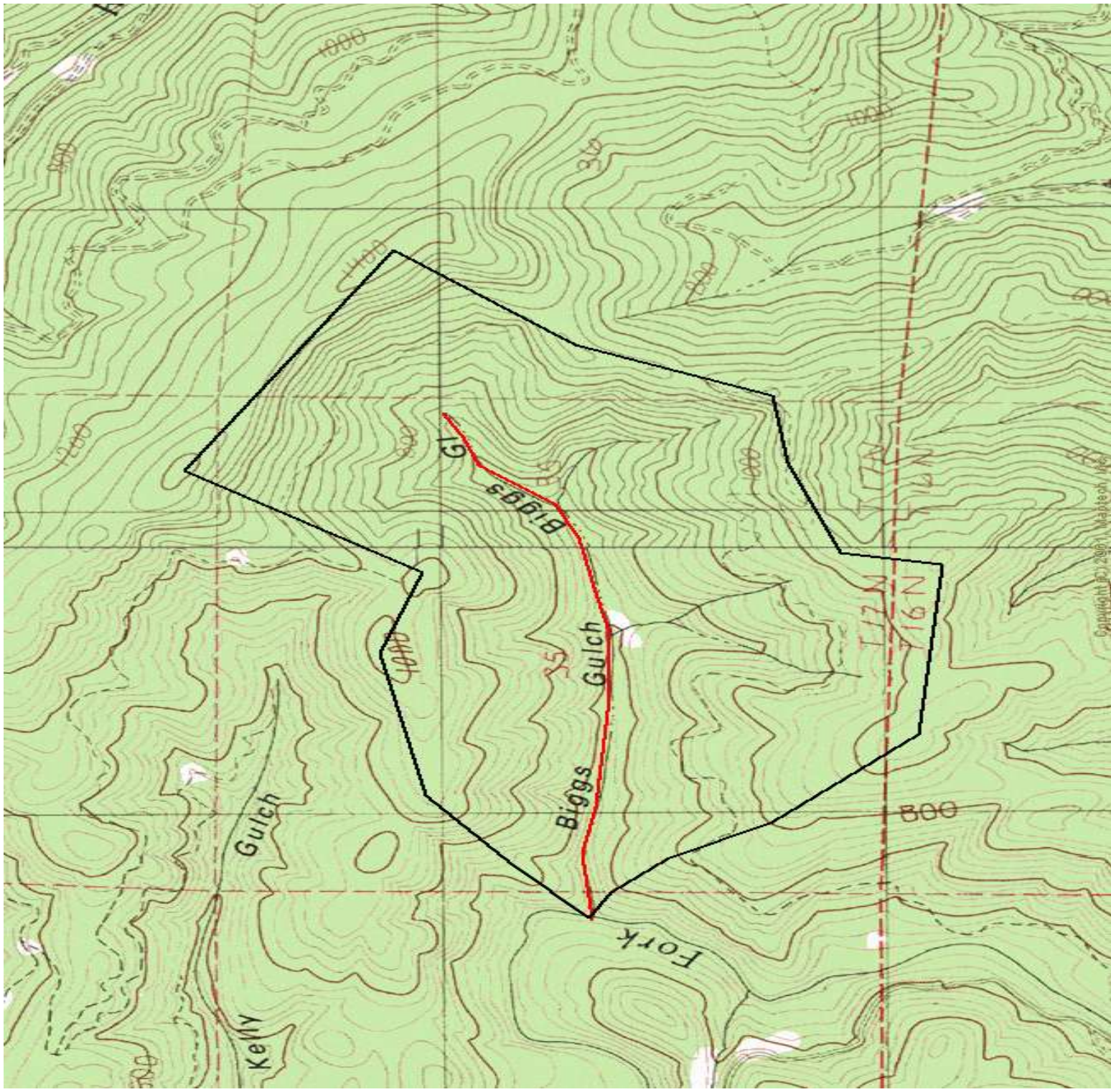
WATERSHED OVERVIEW

Biggs Gulch is a tributary to the South Fork Big River, a tributary to the Big River, located in Mendocino County, California (Map 1). Biggs Gulch's legal description at the confluence with South Fork Big River is T17N R15W S34. Its location is 39°28′8″ North latitude and 123°51′41″ West longitude. Biggs Gulch is a first order stream and has approximately 0.14 miles of solid blue line stream according to the USGS Comptche 7.5 minute quadrangle. Biggs Gulch drains a watershed of approximately 0.64 square miles. Elevations range from about 175 feet at the mouth of the creek to 850 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. Foot access is available from Mendocino Redwood Company roads, approximately 8 miles south from Highway 20, by crossing the South Fork Big River to the mouth Biggs Gulch.

A reconnaissance survey was conducted on Biggs Gulch by CDFG in 1958 (California Department of Fish and Game 1958). No salmonids were seen in the 1958 survey.

METHODS

The habitat inventory conducted in Biggs Gulch 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 and Watershed Stewards


Biggs Gulch
Biggs Gulch
Kelly Gulch
Fork
T 17 N
T 16 N
800
1000

(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 Biggs Gulch 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". Biggs Gulch 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 Biggs Gulch, 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 Biggs Gulch, 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 Biggs Gulch, 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 Biggs Gulch, 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 Biggs Gulch. 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

Graphics are produced from the tables using Excel. Graphics developed for Biggs Gulch 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 June 10 through 11, 2002, was conducted by Kate Grossman, Beth Wood (Americorp), and Kristi Knechtle (DFG). The total length of the stream surveyed was 2,855 feet.

Stream flow was not measured on Biggs Gulch.

Biggs Gulch is a F4 channel type for the entire 2,855 feet of the stream surveyed. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 54 to 57 degrees Fahrenheit. Air temperatures ranged from 67 to 78 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 45% flatwater units, 43% pool units, 8% riffle units, and 4% dry units (Graph 1). Based on total length of Level II habitat types there were 79% flatwater units, 12% pool units, 5% riffle units, and 4% dry units (Graph 2).

Eleven Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were step runs, 29%; mid-channel pools, 27%; low gradient riffles, 22%; runs, 14%; and (Graph 3). Based on percent total length, step runs 67%, runs 10%, and mid-channel pools 8%.

A total of 22 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 68%, and comprised 68% 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. Six of the 22 pools (27%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 22 pool tail-outs measured, 5 had a value of 1 (23%); 6 had a value of 2 (27%); 1 had a value of 3 (5%); 1 had a value of 4 (5%); and 9 had a value of 5 (41%) (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 28, flatwater habitat types had a mean shelter rating of 6, and riffle habitat types had a mean

shelter rating of 0 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 31. Scour pools had a mean shelter rating of 22 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Biggs Gulch. Graph 7 describes the pool cover in Biggs Gulch. Large woody debris is the dominant pool cover type followed by boulders.

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 82% of pool tail-outs while small cobble was the next most frequently observed substrate type, at 14%.

The mean percent canopy density for the surveyed length of Biggs Gulch was 85%. The mean percentages of deciduous and coniferous trees were 17% and 83%, respectively. Graph 9 describes the mean percent canopy in Biggs Gulch.

For the stream reach surveyed, the mean percent right bank vegetated was 23%. The mean percent left bank vegetated was 26%. The dominant elements composing the structure of the stream banks consisted of 67% sand/silt/clay, 22% bedrock, 8% cobble/gravel, and 3% boulder, (Graph 10). Grass was the dominant vegetation type observed in 47% of the units surveyed. Additionally, 31% of the units surveyed had coniferous trees as the dominant vegetation type, and 14% had deciduous trees as the dominant vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Salmonids were not detected using streambank observation techniques during the Biggs Gulch stream survey.

DISCUSSION

Biggs Gulch is a F4 channel type for the entire 2,855 feet of the stream surveyed. The suitability of F4 channel types for fish habitat improvement structures is as follows: F4 channels are good for bank-placed boulders, single and opposing wing-deflectors, channel constrictors and log cover.

The water temperatures recorded on the survey days August 21 through 26, 2002 ranged from 54 to 57 degrees Fahrenheit. Air temperatures ranged from 67 to 78 degrees Fahrenheit. This is a suitable water temperature range 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 79% of the total length of this survey, pools 12%, riffles 5%, and dry channels 4%. The pools are relatively shallow, with only 6 of the 22 (27%) 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.

Eleven of the 22 pool tail-outs measured had embeddedness ratings of 1 or 2. Two of the pool tail-outs had embeddedness ratings of 3 or 4. Nine 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 Biggs Gulch should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Twenty-one of the 22 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 28. The shelter rating in the flatwater habitats was 6. 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, boulders contribute a small amount. More 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 85%. 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 23% and 26%, 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) Due to the log jam barrier at the confluence of South Fork Big River, access for migrating salmonids is an ongoing potential problem. Good water temperatures exist in the stream Fish passage should be monitored and improved where possible.

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

3) Suitable size spawning substrate on Biggs Gulch is limited to relatively few reaches. Projects should be designed at suitable sites to trap and sort spawning gravel.

4) There are several log debris accumulations present on Biggs Gulch 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.

5) 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.

6) The limited water temperature data available suggest that maximum temperatures are within the suitable 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.

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 51 FEET FROM THE CONFLUENCE WITH SOUTH FORK OF BIG RIVER. THE CHANNEL IS AN F4.
51'	BEDROCK BANKS VERY STEEP. IN CHANNEL SILT DEPOSITS.
65'	UNIDENTIFIED FROG.
113'	POTENTIAL FISH BARRIER. ROOTWAD BLOCKING CHANNEL AND HOLDING BACK SUBSTRATE. 12 FOOT ELEVATION CHANGE.
127'	LARGE GRADIENT DIFFERENCE AT BOTTOM OF UNIT. WATER SUBSURFACES.
153'	SALAMANDER. SEDIMENT FROM BANKS DEPOSITED INTO STREAM.
164'	RIGHT BANK EROSION DEPOSITING SEDIMENT INTO STREAM.
340'	2 PIECES OF LARGE WOODY DEBRIS (LWD) IN UNIT, 3 FEET IN DIAMETER AND OVER 20 FEET LONG.
369'	17 FEET OF CHANNEL NOT VISABLE DUE TO LWD.
668'	CHANNEL TYPE TAKEN IN THIS UNIT.
705'	40 BY 19 FEET OF CHANNEL NOT VISABLE DUE TO LWD PILE. LWD PILE IS ASSOCIATED WITH A LOT OF SMALL WOODY DEBRIS (SWD).
762'	FINE SEDIMENT COVERING GRAVEL SUBSTRATE.
778'	OLD LOGGING TRESSLE IN STREAM CHANNEL WITH SOME LWD ASSOCIATED.

990' DRY TRIBUTARY ON RIGHT. GREATER THAN 10% GRADIENT ON THE TRIBUTARY.

1062' LARGE ROOTS CAUSING SWD TO BUILD UP AND STORE THE SEDIMENT.

1255' DRY CHANNEL DUE TO SEDIMENT DEPOSITS.

1343' SMALL SECTION OF DRY CHANNEL. SMALL DRY TRIBUTARY ON LEFT BANK. LEFT BANK EROSION 20 FEET HIGH AND 40 FEET WIDE, NO VEGETATION, CONTRIBUTING FINES TO STREAM.

1619' LWD ACROSS STREAM, 14 FEET LONG.

1663' 6 PIECES OF LWD ASSOCIATED WITH MANY PIECES OF SWD WITH SEDIMENT DEPOSITS AT THE TOP.

1674' NO VEGETATION ON RIGHT BANK. RIGHT BANK FAILURE 30 FEET HIGH BY 40 FEET LONG.

1887' MID CHANNEL POOL IS LOG ENHANCED.

1904' 37 FEET INTO UNIT THERE IS AN OLD HUMBOLDT CROSSING WHERE DIRT FROM TOP IS FALLING INTO THE STREAM. NO VEGETATION IS GROWING UNDER BRIDGE. DRY RIGHT BANK TRIBUTARY 138 FEET INTO UNIT.

2153' DRY LEFT BANK TRIBUTARY AT THE BEGINNING OF THE UNIT.

2304' LITTLE TO NO VEGETATION ON BOTH THE RIGHT AND LEFT BANKS.

2540' 2 PIECES OF LWD ABOVE THE POOL.

2836' END OF SURVEY. THE SURVEY WAS ENDED AT THE END OF HABITAT UNIT 0051. NO FISH WERE OBSERVED IN THE 2855 FEET OF STREAM THAT WAS SURVEYED. AN ADDITIONAL 500 FEET OF STREAM WAS WALKED AND THE HABITAT WAS NO LONGER SUITABLE FOR SALMONIDS.

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]	

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: BIGGS GULCH
SAMPLE DATES: 06/10/02 to 06/11/02
STREAM LENGTH: 2855 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: COMPTCHE — Latitude: 39°28'8"
Legal Description: T17NR15WS34 — Longitude: 123°51'41"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 1

Channel Type: F4	Canopy Density: 85%
Channel Length: 2855 ft.	Coniferous Component: 83%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 17%
Total Pool Mean Depth: 0.9 ft.	Pools by Stream Length: 12%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 0%
Water: 054- 057°F Air: 067-078°F	Mean Pool Shelter Rtn: 30
Dom. Bank Veg.: Grass	Dom. Shelter: Large Woody Debris
Vegetative Cover: 25%	Occurrence of LOD: 47%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 116 ft.

Embeddness Value: 1. 23% 2.27% 3. 5% 4. 5% 5. 41%

BIGGS GULCH — Drainage: SF BIG RIVER

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 06/10/02 to 06/11/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T17NR15WS34 LATITUDE:39°28'8" LONGITUDE:123°51'41"

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
4	3	RIFFLE	8	35	138	5	3.7	0.3	156	626	53	214	0	0
23	6	FLATWATER	45	98	2249	79	3.8	0.3	175	4023	65	1505	0	6
22	22	POOL	43	16	353	12	6.2	0.9	97	2139	99	2171	83	28
2	0	DRY	4	58	116	4	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.)
51	31	2855	6788	3890

BIGGS GULCH

Drainage: SF BIG RIVER

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 06/10/02 to 06/11/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T17NR15WS34 LATITUDE:39°28'8" LONGITUDE:123°51'41"

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	2	LGR	6	26	77	3	4	0.2	0.5	119	356	22	67	0	0	87
1	1	BRS	2	61	61	2	4	0.5	1.9	232	232	116	116	0	0	95
1	1	GLD	2	26	26	1	4	0.2	0.5	104	104	21	21	0	10	80
7	3	RUN	14	43	299	10	4	0.3	0.7	80	562	24	167	0	2	84
15	2	SRN	29	128	1924	67	4	0.5	1.0	352	5285	150	2252	0	10	81
14	14	MCP	27	16	220	8	6	1.0	2.9	96	1338	106	1480	92	32	85
1	1	STP	2	21	21	1	6	0.9	1.8	126	126	113	113	88	20	88
1	1	LSL	2	16	16	1	6	0.7	1.5	96	96	67	67	48	15	85
1	1	LSBo	2	22	22	1	4	0.7	1.5	88	88	62	62	18	40	88
5	5	PLP	10	15	74	3	6	0.8	2.0	98	491	90	448	76	20	83
2	0	DRY	4	58	116	4	0	0.0	0.0	0	0	0	0	0	0	90

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
51	31	2855	8678	4793

BIGGS GULCH

Drainage: SF BIG RIVER

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 06/10/02 to 06/11/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T17NR15WS34 LATITUDE:39°28'8" LONGITUDE:123°51'41"

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
15	15	MAIN	68	16	241	68	6.3	1.0	98	1464	106	1594	92	31
7	7	SCOUR	32	16	112	32	5.9	0.8	96	675	82	577	63	22

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
22	22	353	2139	2171

BIGGS GULCH Drainage: SF BIG RIVER

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 06/10/02 to 06/11/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T17NR15WS34 LATITUDE:39°28'8" LONGITUDE:123°51'41"

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
14	MCP	64	1	7	8	57	5	36	0	0	0	0
1	STP	5	0	0	1	100	0	0	0	0	0	0
1	LSL	5	0	0	1	100	0	0	0	0	0	0
1	LSBo	5	0	0	1	100	0	0	0	0	0	0
5	PLP	23	0	0	4	80	1	20	0	0	0	0

TOTAL UNITS
22

BIGGS GULCH Drainage: SF BIG RIVER

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE Survey Dates: 06/10/02 to 06/11/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T17NR15WS34 LATITUDE:39°28'8" LONGITUDE:123°51'41"

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	2	LGR	0	0	0	0	0	0	0	0	0
1	1	BRS	0	0	0	0	0	0	0	0	0
1	1	GLD	0	0	90	0	10	0	0	0	0
7	1	RUN	0	0	90	0	10	0	0	0	0
15	2	SRN	0	0	45	0	5	0	0	48	3
14	11	MCP	12	10	58	1	1	0	0	1	16
1	1	STP	30	0	5	0	0	0	10	55	0
1	1	LSL	0	10	80	0	0	0	0	0	10
1	1	LSBo	0	20	60	0	0	0	0	0	20
5	5	PLP	5	21	34	18	8	0	12	2	0
2	0	DRY	0	0	0	0	0	0	0	0	0

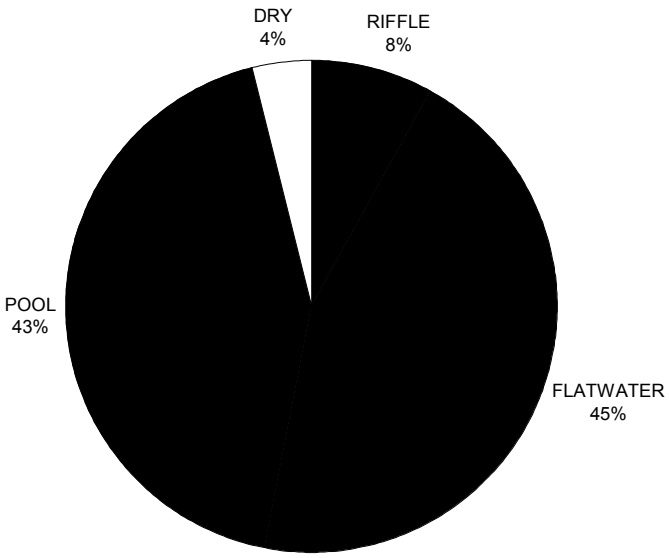
BIGGS GULCH Drainage: SF BIG RIVER

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE Survey Dates: 06/10/02 to 06/11/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T17NR15WS34 LATITUDE:39°28'8" LONGITUDE:123°51'41"

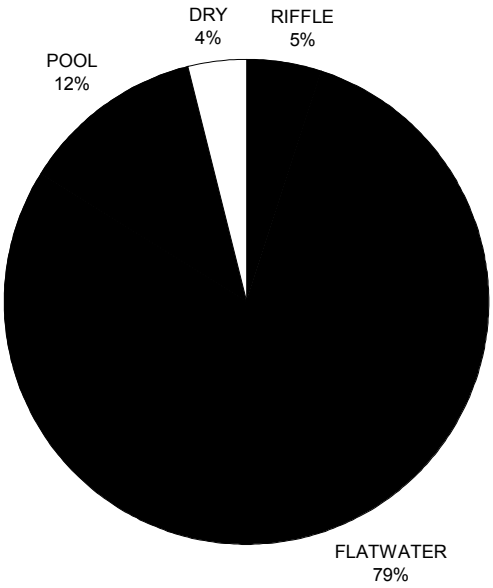
TOTAL HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
3	2	LGR	0	0	0	50	50	0	0
1	1	BRS	0	0	0	0	0	0	100
1	1	GLD	0	0	0	100	0	0	0
7	3	RUN	0	0	67	0	33	0	0
15	2	SRN	0	0	0	50	50	0	0
14	6	MCP	50	17	0	17	0	0	17
1	1	STP	0	0	0	0	0	100	0
1	1	LSL	100	0	0	0	0	0	0
1	1	LSBo	100	0	0	0	0	0	0
5	1	PLP	100	0	0	0	0	0	0
2	0	DRY	0	0	0	0	0	0	0

BIGGS GULCH
HABITAT TYPES BY PERCENT OCCURENCE



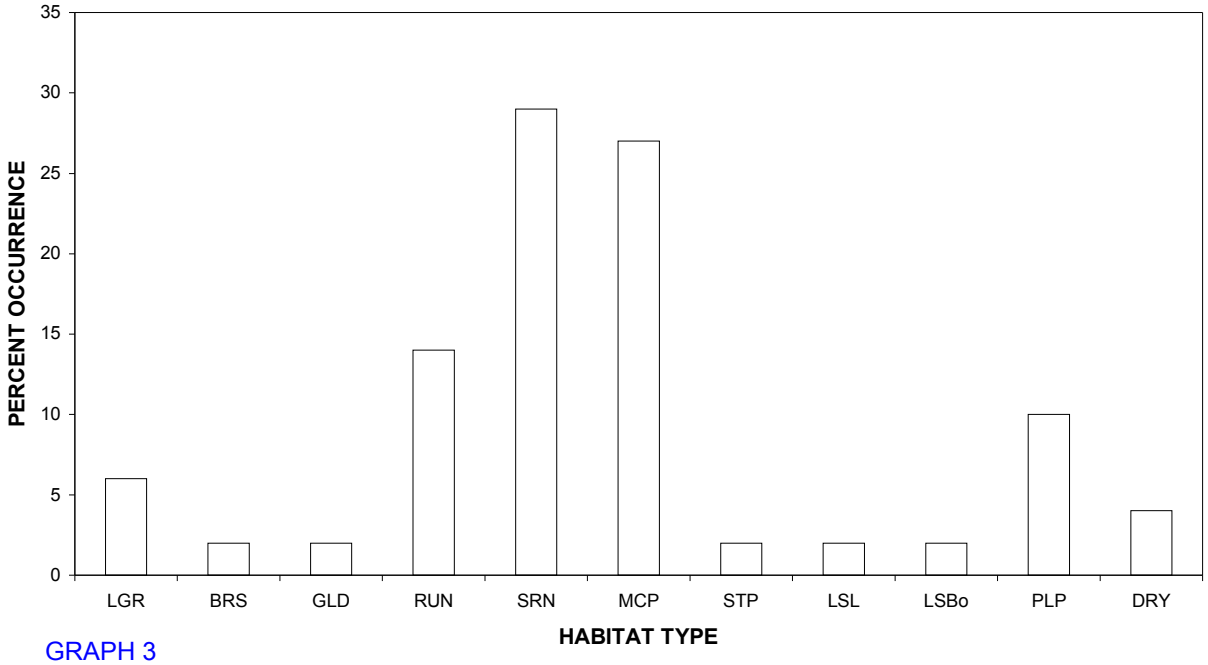
GRAPH 1

BIGGS GULCH
HABITAT TYPES BY PERCENT TOTAL LENGTH



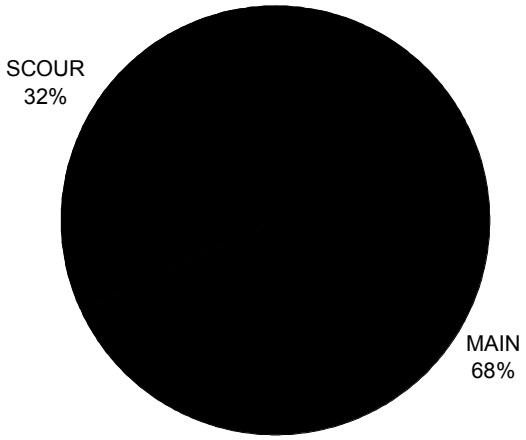
GRAPH 2

BIGGS GULCH
HABITAT TYPES BY PERCENT OCCURRENCE



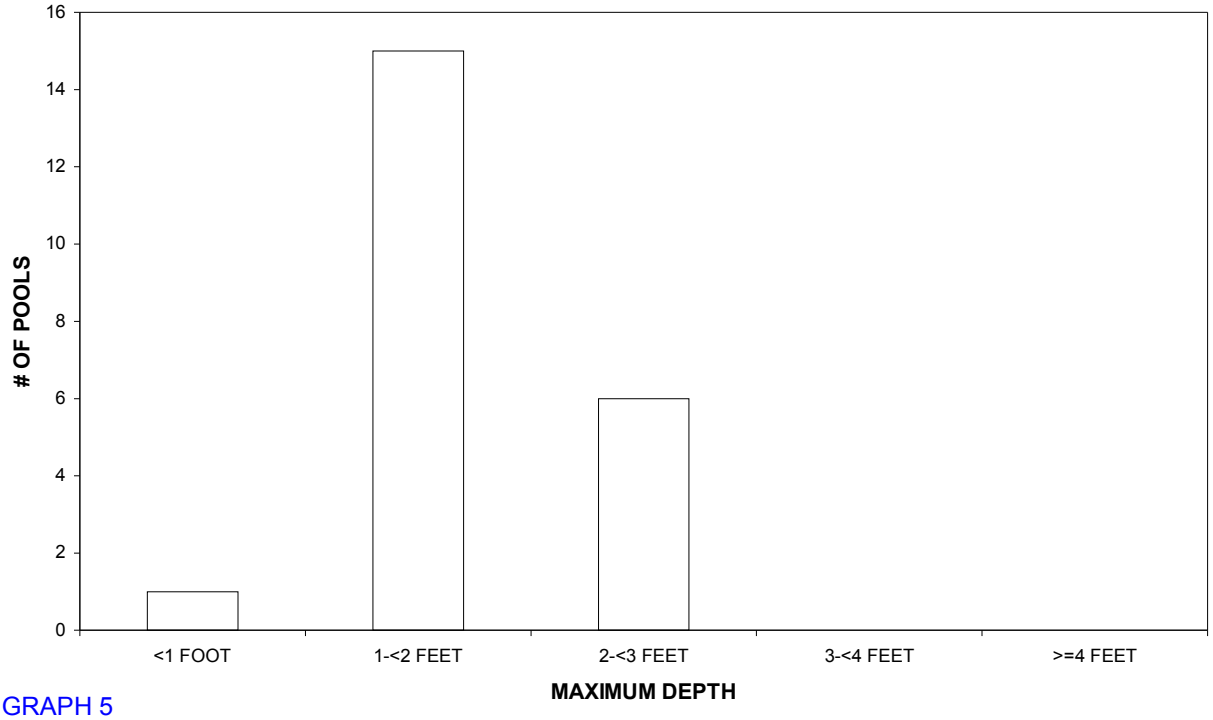
GRAPH 3

BIGGS GULCH
POOL HABITAT TYPES BY PERCENT OCCURRENCE



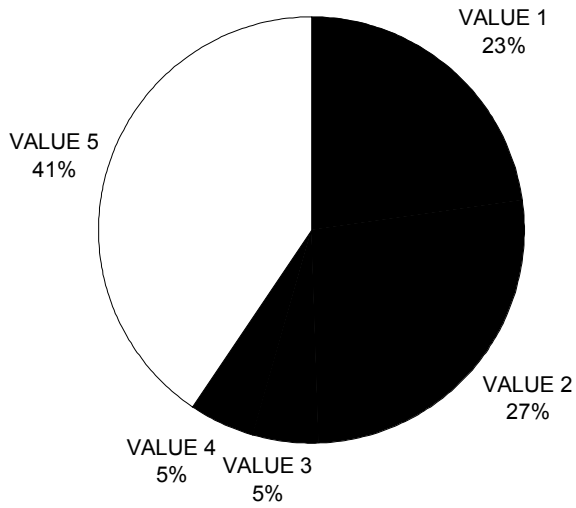
GRAPH 4

BIGGS GULCH
MAXIMUM DEPTH IN POOLS



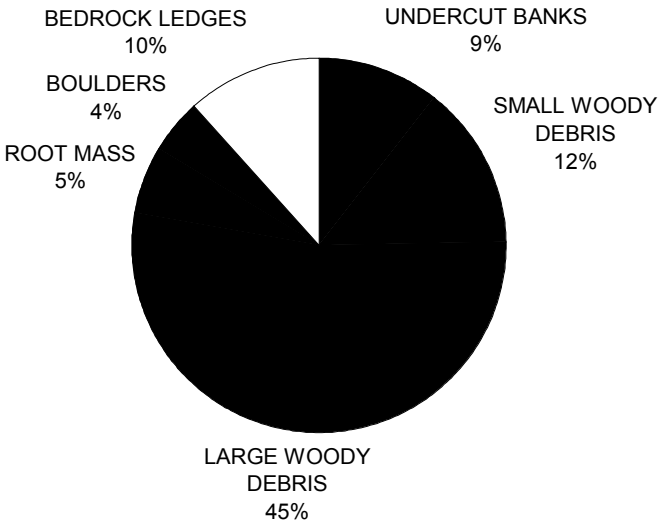
GRAPH 5

BIGGS GULCH
PERCENT EMBEDDEDNESS



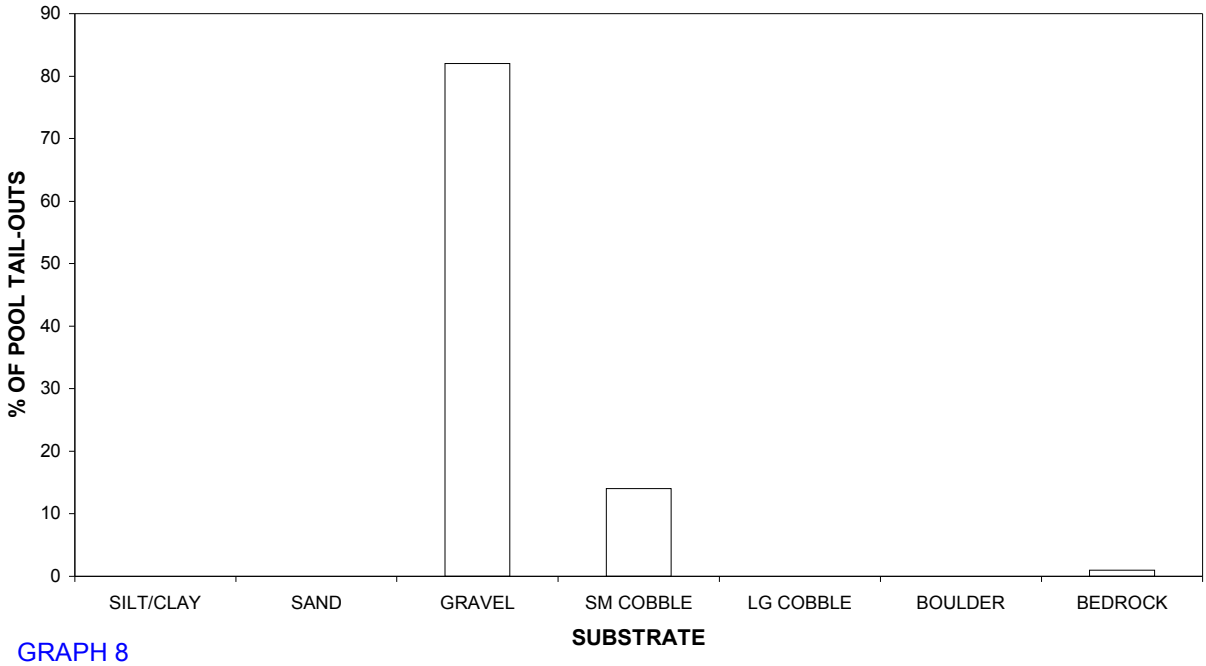
GRAPH 6

BIGGS GULCH
MEAN PERCENT COVER TYPES IN POOLS



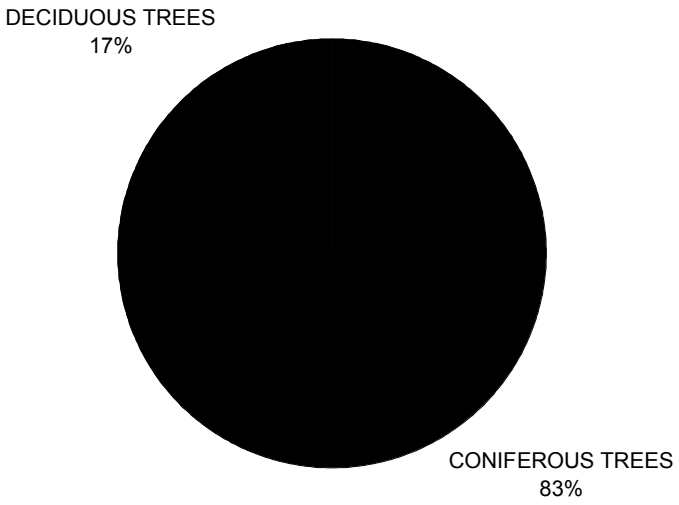
GRAPH 7

BIGGS GULCH
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



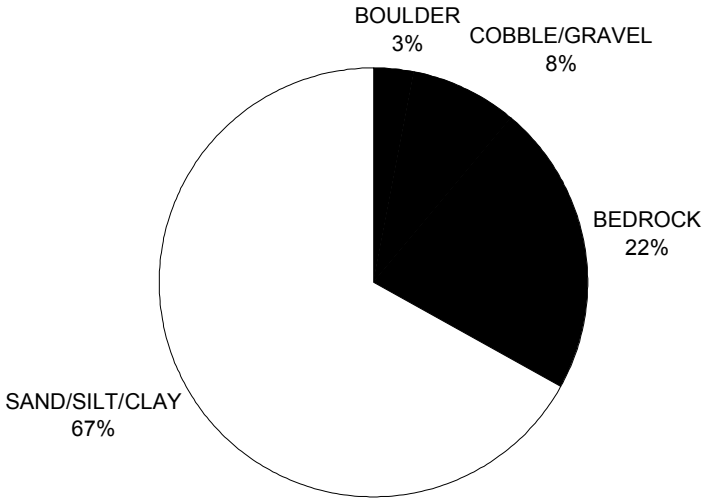
GRAPH 8

BIGGS GULCH
MEAN PERCENT CANOPY



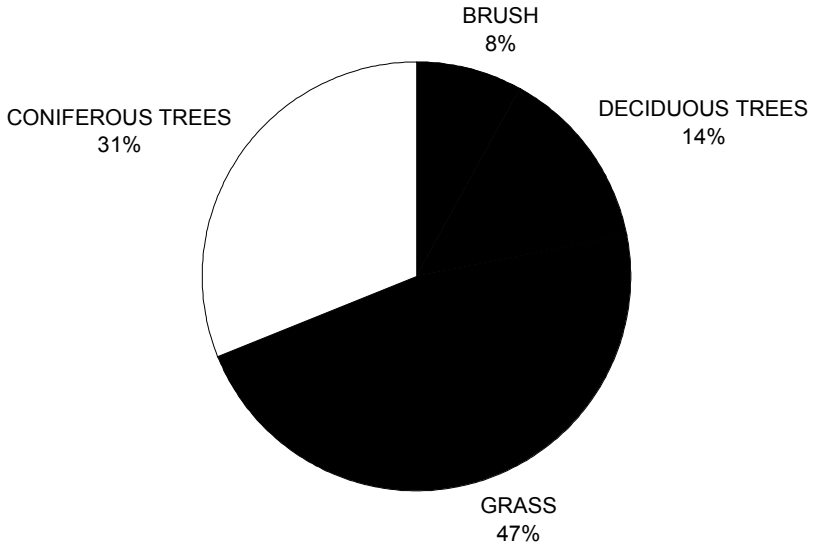
GRAPH 9

BIGGS GULCH
DOMINANT BANK COMPOSITION IN SURVEY REACH

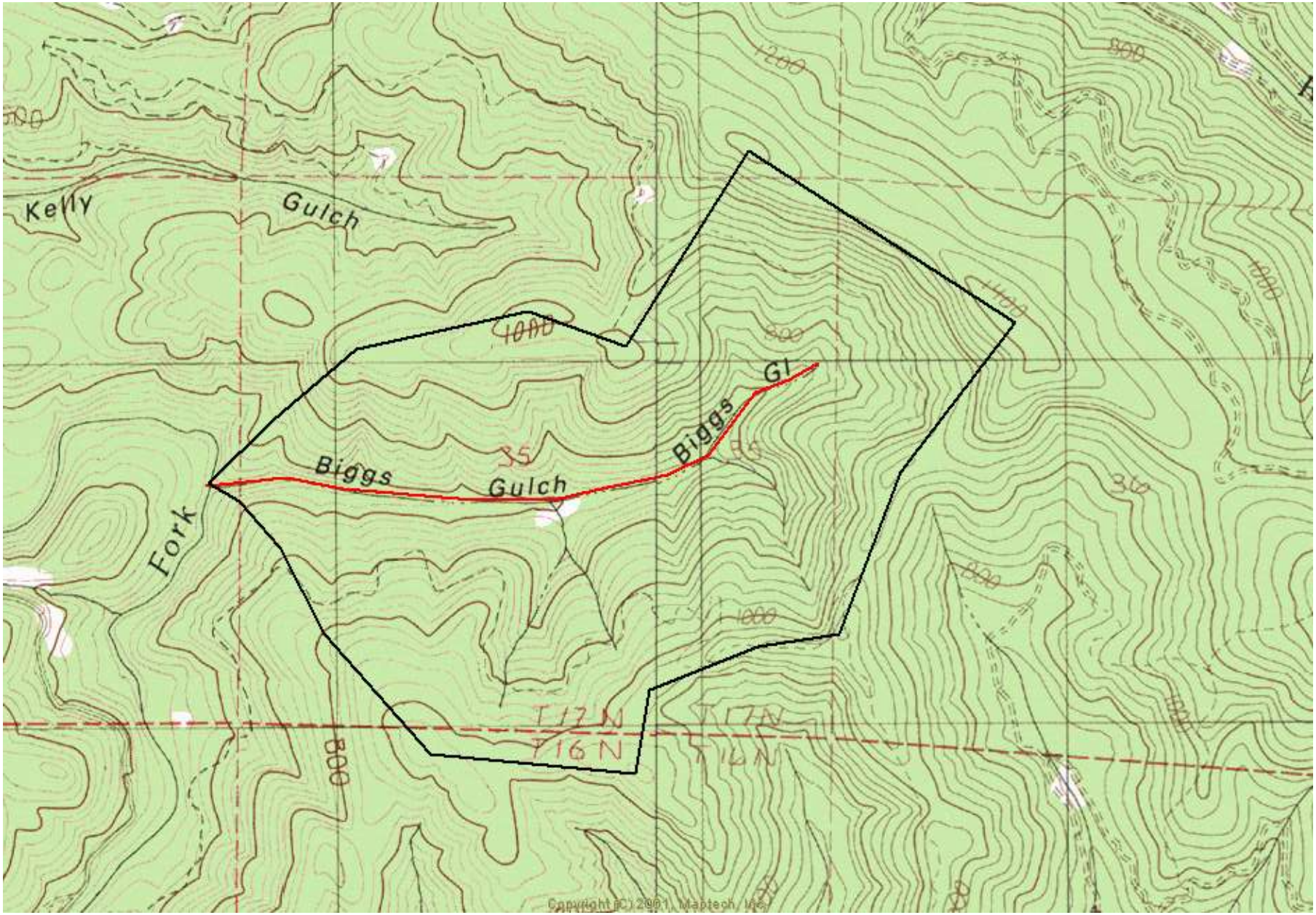


GRAPH 10

BIGGS GULCH
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11


Kelly
Gulch
Biggs
Gulch
Biggs
Gl
Fork
T17N
T16N
800
1000
1200
35
36