STREAM INVENTORY REPORT

Anderson Gulch

INTRODUCTION

A stream inventory was conducted on August 20, 2002 on Anderson Gulch. The survey began at the confluence with South Fork Big River and extended upstream 2,521 feet.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Anderson 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

Anderson Gulch is a tributary to South Fork Big River, tributary to Big River, tributary to the Pacific Ocean located in Mendocino County, California (Map 1). Anderson Gulch's legal description at the confluence with South Fork Big River is T16N R15W S11. Its location is 39°15′19″ north latitude and 123°30′32″ west longitude. Anderson Gulch is a first order stream and has approximately 8,205 feet of solid blue line stream and 1,044 feet of dashed blue line stream according to the USGS Comptche 7.5 minute quadrangle. Anderson Gulch drains a watershed of approximately 0.93 square miles. Elevations range from about 360 feet at the mouth of the creek to 1,325 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, east of Chamberlain Creek Bridge. Mendocino Redwood Company (MRC) logging roads are used to access the area from this point. Foot access is available from MRC logging roads, approximately 12 miles south of Highway 20, by crossing the South Fork Big River to the mouth of Anderson Gulch.

A reconnaissance survey was conducted on Anderson Gulch by CDFG in 1961 (California Department of Fish and Game 1961). No salmonids were seen in the 1961 survey.

METHODS

The habitat inventory conducted in Anderson Gulch follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al., 1998). The California Department of Fish and Game (DFG) field crew that conducted the inventory were trained in standardized habitat inventory methods by 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 Anderson 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". Anderson 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 Anderson 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 Anderson 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 Anderson 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 evergreen or deciduous trees.

9. Bank Composition and Vegetation:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In Anderson 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.

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:

- 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 Anderson Gulch 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 August 20, 2002, was conducted by S. Monday and K. Knechtle (DFG). The total length of the stream surveyed was 2,521 feet.

Stream flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.017 cfs on September 25, 2002.

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Anderson Gulch is an F3 channel type for the entire 2,521 feet of the stream surveyed. F3 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and cobble-dominant substrates.

Water temperatures taken during the survey period ranged from 55 to 56 degrees Fahrenheit. Air temperatures ranged from 57 to 77 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 36% pool units, 32% flatwater units, 25% riffle units, and 8% was dry (Graph 1). Based on total length of Level II habitat types there were 67% flatwater units, 19% riffle units, 11% pool units, and 4% was dry (Graph 2).

Eleven Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were step runs, 30%; mid-channel pools, 25%; low gradient riffles, 8%; high gradient riffles, 8%; and dry, 8% (Graph 3). Based on percent total length, step runs made up 66%, high gradient riffles 11%, and mid-channel pools 6%.

A total of 19 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 79%, and comprised 82% 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. Nine of the 19 pools (47%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 19 pool tail-outs measured, 0 had a value of 1 (0%); 3 had a value of 2 (16%); had a value of 3 (37%); 0 had a value of 4 (0%); and 9 had a value of 5 (47%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate and a value of 4 the worst. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

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 21, flatwater habitat types had a mean shelter rating of 12, and riffle habitat types had a mean shelter rating of 9 (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 28. Main channel pools had a mean shelter rating of 19 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Bedrock ledges are the dominant cover types in Anderson Gulch. Graph 7 describes the pool cover in Anderson Gulch. Bedrock ledges are 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. Small cobble was the dominant substrate observed in 32% of the pool tail-outs. Bedrock was the next most frequently observed dominant substrate type and occurred in 26% of the pool tail-outs.

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The mean percent canopy density for the surveyed length of Anderson Gulch was 90%. In the closed canopy, the mean percentages of deciduous and coniferous trees were 20% and 80%, respectively. Graph 9 describes the mean percent canopy in Anderson Gulch.

For the stream reach surveyed, the mean percent right bank vegetated was 29%. The mean percent left bank vegetated was 26%. The dominant elements composing the structure of the stream banks consisted of 50% bedrock and 50% sand/silt/clay (Graph 10). Coniferous trees were the dominant vegetation type observed in 93% of the units surveyed. Additionally, 7% of the units surveyed had deciduous trees as the dominant vegetation type (Graph 11).

DISCUSSION

Anderson Gulch is an F3 channel type for the entire 2,521 feet of stream surveyed. The suitability of F3 channel types for fish habitat improvement structures is as follows: 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.

The water temperatures recorded on August 20, 2002 ranged from 55 to 56 degrees Fahrenheit. Air temperatures ranged from 57 to 77 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 67% of the total length of this survey, riffles 19%, and pools 11%. The pools are relatively shallow, with only 9 of the 19 (47%) 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.

Three of the 19 pool tail-outs measured had embeddedness ratings of 1 or 2. Seven 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 Anderson Gulch should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Ten of the 19 pool tail-outs measured had large cobble, boulders, or bedrock as the dominant substrate. This is generally considered unsuitable for spawning salmonids.

The mean shelter rating for pools was 21. The shelter rating in the flatwater habitats was 12. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by bedrock ledges in all habitat types. Additionally, boulders

contribute a small amount. Log and root wad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structure provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

The mean percent canopy density for the stream was 90%.

The percentage of right and left bank covered with vegetation was low at 29% 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) Anderson 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) Where feasible, design and engineer pool enhancement structures to increase the number of pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

4) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from bedrock ledges. Adding high quality complexity with woody cover in the pools is desirable.

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) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

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

8) Due to the high gradient of the stream, access for migrating salmonids is an ongoing potential problem. Good water temperature and flow regimes exist in the stream and it offers good conditions for rearing fish. Fish passage should be monitored and improved where possible.

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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.

Position (ft):	Comment:
0'	Begin survey 30 feet up from the confluence with South Fork Big River. Channel type is an F3. No fish noted in the first unit.
178'	Silt covering substrate in the bottom of the pool.
196'	There is a 6’ jump to the top of the bedrock sheet.
257'	There is one newt and one frog.
314'	There is a 4’ gradient change to the top of the riffle.
535'	There is a left bank tributary at the top of the unit.
1088'	Timber harvest flagging at 80 feet into unit. There is a dry left bank tributary at 80 feet into the unit.
1364'	The channel type was taken in this unit.
1616'	There is a dry right bank tributary at 15 feet into unit.
1641'	The slope is approximately 30% taken with a clinometer.
1660'	Salamander observed in unit.
1686'	There is a wood bridge structure covering the pool.
1696'	Collapsed bridge is 54’ long x 15’ wide. It is collapsed within the stream channel. Some of the bridge logs are submerged.
1775'	There is a log debris accumulation (LDA) which is 15’ wide x 15’ long x 4’ high. It is retaining sediment.
2014'	There is a spring on the left bank at 49’ into the unit.
2088'	Large wood and hand cut wood through this unit.
2160'	There is a dry left bank tributary at 43’ into unit.

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2506' End of survey due to a cascading waterfall at the top of this unit. It is 13' high with no jump pool below or above the cascade. This is a possible fish barrier. No salmonids were noted during this survey.

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.

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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

ANDERSON GULCH — Drainage: SF BIG RIVER

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 8/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'54" LONGITUDE:123°50'9"

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
13	5	RIFFLE	25	36	472	19	3.6	0.2	42	545	9	113	0	9
17	3	FLATWATER	32	99	1681	67	4.2	0.4	71	1211	30	509	0	12
19	19	POOL	36	14	270	11	5.9	1.0	89	1695	110	2095	84	21
4	0	DRY	8	25	98	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.)
53	27	2521	3451	2718

ANDERSON GULCH — Drainage: SF BIG RIVER

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 8/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'54" LONGITUDE:123°50'9"

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 %
4	1	LGR	8	33	133	5	4	0.2	0.3	46	182	9	36	0	10	88
4	1	HGR	8	67	269	11	8	0.2	0.6	80	320	16	64	0	30	92
2	1	CAS	4	18	35	1	3	0.2	1.3	43	86	9	17	0	0	100
3	2	BRS	6	12	35	1	2	0.2	0.6	21	62	5	15	0	3	93
1	1	RUN	2	15	15	1	6	0.5	1.1	86	86	43	43	0	10	90
16	2	SRN	30	104	1666	66	3	0.4	0.7	64	1026	24	377	0	13	90
13	13	MCP	25	12	159	6	6	1.0	3.4	86	1119	111	1447	86	17	89
2	2	STP	4	32	63	2	6	1.1	2.3	164	329	178	356	139	30	90
2	2	LSR	4	11	21	1	6	0.9	2.0	61	121	52	103	31	25	100
2	2	LSBk	4	14	27	1	5	1.5	2.6	63	126	95	189	74	30	90
4	0	DRY	8	25	98	4	0	0.0	0.0	0	0	0	0	0	0	85

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
53	27	2521	3456	2647

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Table 3 - SUMMARY OF POOL TYPES — Survey Dates: 8/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'54" LONGITUDE:123°50'9"

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	79	15	222	82	6.1	1.0	97	1448	120	1803	93	19
4	4	SCOUR	21	12	48	18	5.3	1.2	62	247	73	292	52	28

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
19	19	270	1695	2095

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Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 8/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'54" LONGITUDE:123°50'9"

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
13	MCP	68	0	0	10	77	2	15	1	8	0	0
2	STP	11	0	0	0	0	2	100	0	0	0	0
2	LSR	11	0	0	0	0	2	100	0	0	0	0
2	LSBk	11	0	0	0	0	2	100	0	0	0	0

TOTAL UNITS
19

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Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE — Survey Dates: 8/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'54" LONGITUDE:123°50'9"

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
4	1	LGR	0	0	0	0	90	0	0	10	0
4	1	HGR	5	0	90	0	0	0	0	5	0
2	0	CAS	0	0	0	0	0	0	0	0	0
3	1	BRS	0	0	0	0	0	0	0	0	100
1	1	RUN	10	0	0	0	0	0	0	0	90
16	2	SRN	0	5	0	0	0	0	0	90	5
13	12	MCP	5	8	9	0	0	0	1	15	62
2	2	STP	5	8	0	0	0	0	0	5	83
2	2	LSR	25	10	5	60	0	0	0	0	0
2	2	LSBk	35	3	0	0	0	0	0	8	55
4	0	DRY	0	0	0	0	0	0	0	0	0

ANDERSON GULCH — Drainage: SF BIG RIVER

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE — Survey Dates: 8/20/02

Confluence Location: QUAD: COMPTCHE LEGAL DESCRIPTION: T16NR15WS11 LATITUDE:39°25'54" LONGITUDE:123°50'9"

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
4	1	LGR	0	0	0	0	100	0	0
4	2	HGR	0	0	0	0	100	0	0
2	1	CAS	0	0	0	0	0	0	100
3	2	BRS	0	0	0	0	0	0	100
1	1	RUN	0	0	0	0	0	0	100
16	2	SRN	0	0	0	0	50	50	0
13	3	MCP	0	0	33	0	0	0	67
2	1	STP	0	0	0	0	0	0	100
2	1	LSR	0	0	0	100	0	0	0
2	1	LSBk	0	0	0	100	0	0	0
4	0	DRY	0	0	0	0	0	0	0

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: ANDERSON GULCH
SAMPLE DATES:
STREAM LENGTH: 2521 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: COMPTCHE — Latitude: 39°25'54"
Legal Description: T16NR15WS11 — Longitude: 123°50'9"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

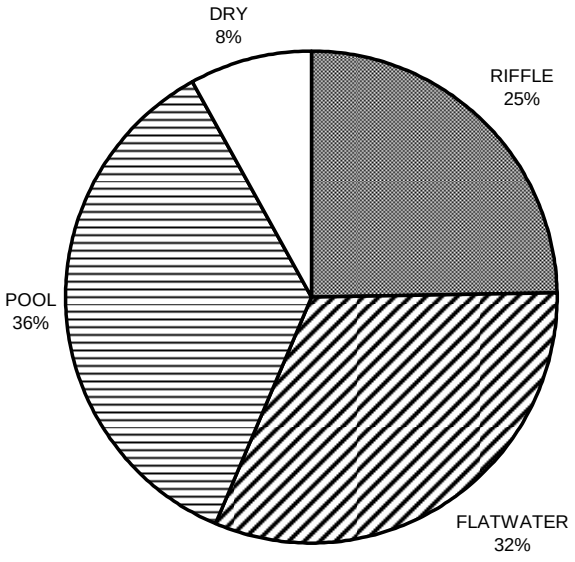
STREAM REACH 01

Channel Type: F3	Canopy Density: 90%
Channel Length: 2521 ft.	Coniferous Component: 80%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 20%
Total Pool Mean Depth: 1.0 ft.	Pools by Stream Length: 11%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 5%
Water: 055- 056°F Air: 057-077°F	Mean Pool Shelter Rtn: 21
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Bedrock Ledges
Vegetative Cover: 26%	Occurrence of LOD: 9%
Dom. Bank Substrate: Bedrock	Dry Channel: 98 ft.

Embeddness Value: 1. 0% 2.16% 3. 37% 4. 0% 5. 47%

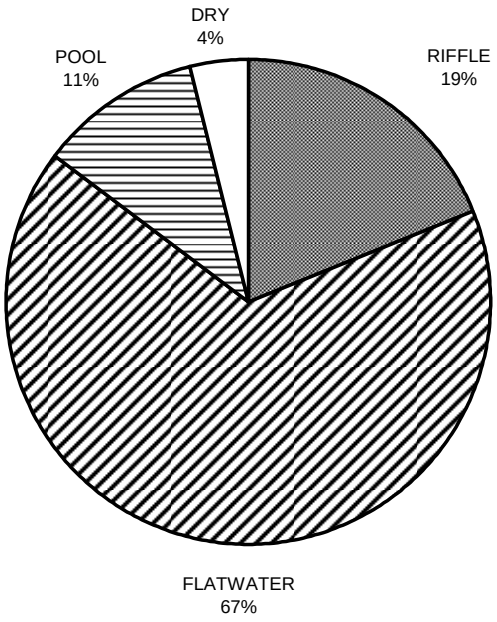
ANDERSON GULCH

HABITAT TYPES BY PERCENT OCCURRENCE



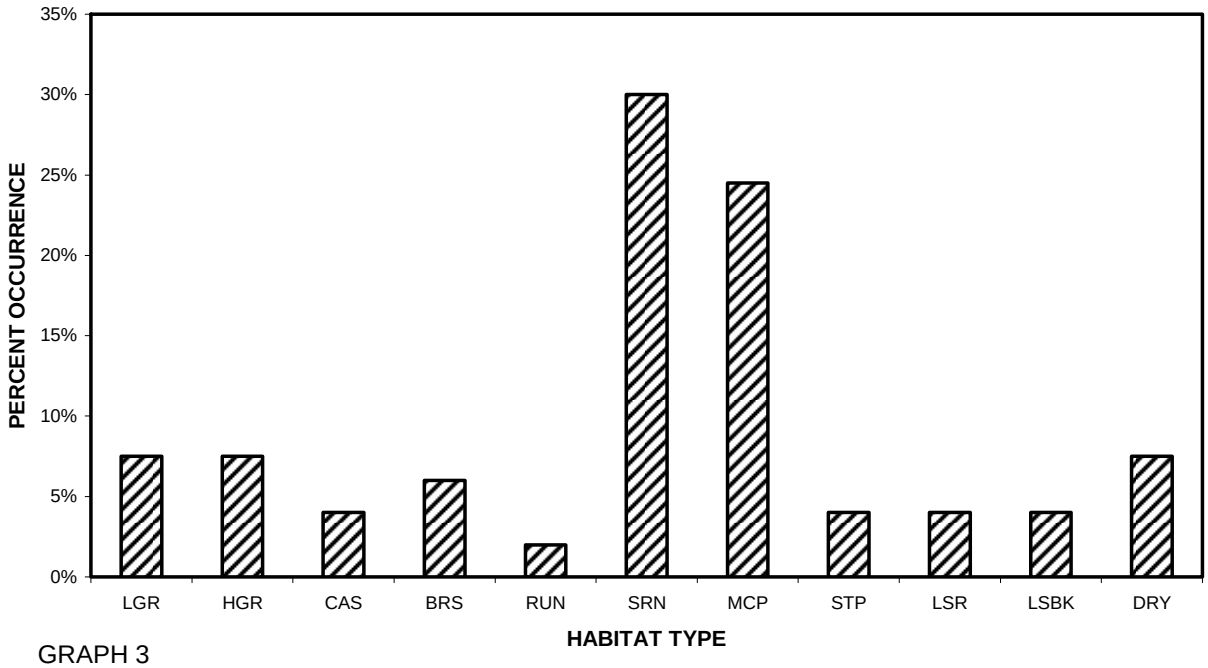
GRAPH 1

ANDERSON GULCH
HABITAT TYPES BY PERCENT TOTAL LENGTH



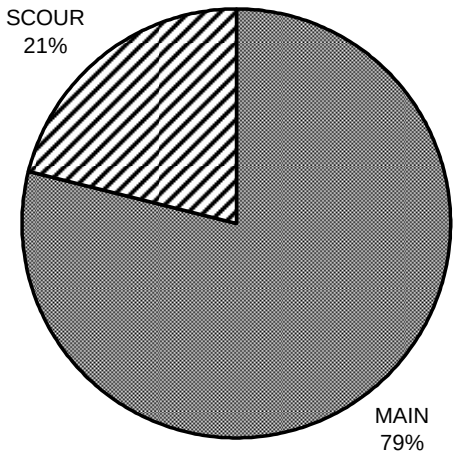
GRAPH 2

ANDERSON GULCH
HABITAT UNIT TYPES BY PERCENT OCCURRENCE



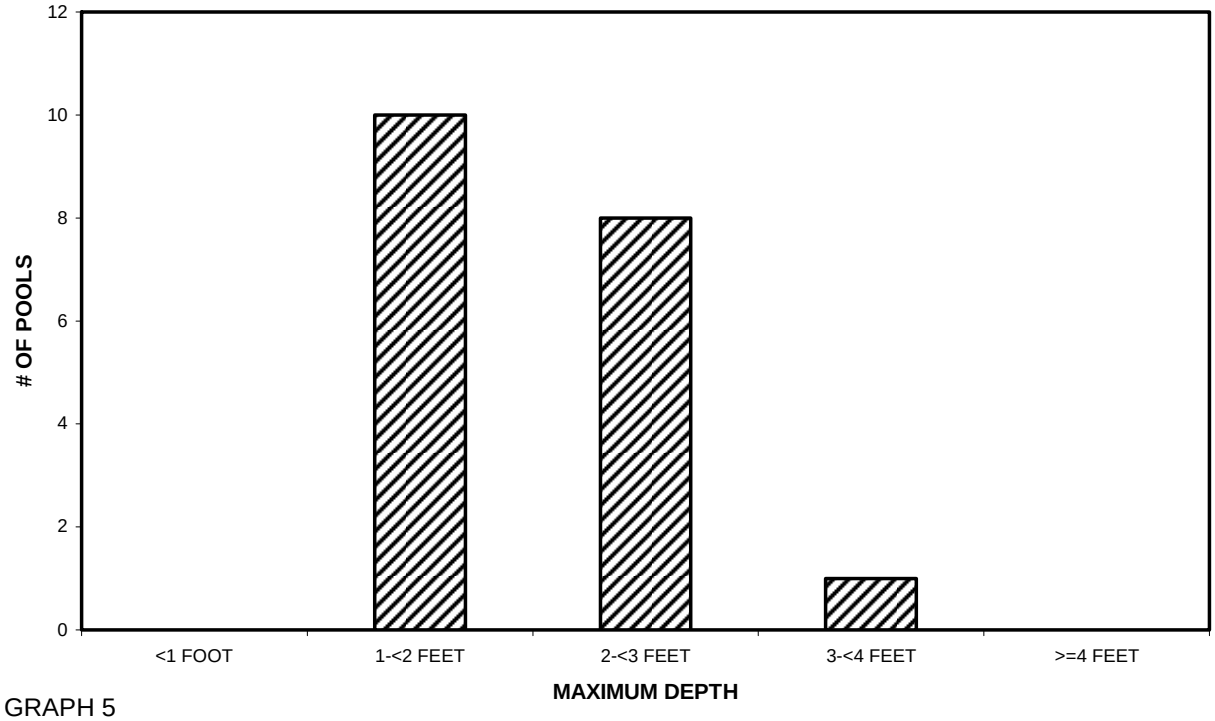
GRAPH 3

ANDERSON GULCH
POOL HABITAT TYPES BY PERCENT OCCURRENCE



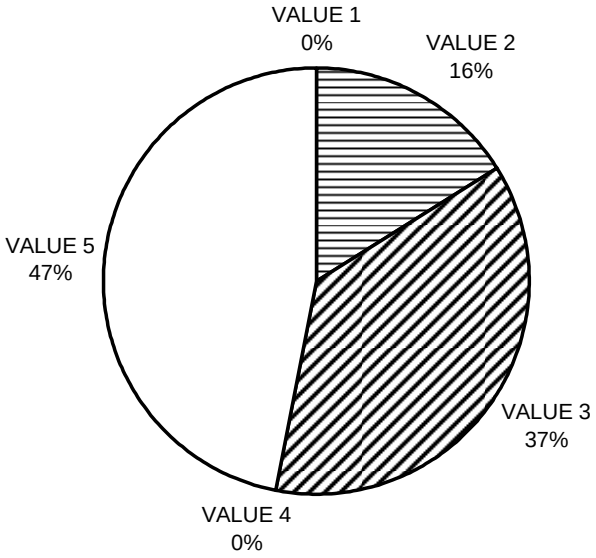
GRAPH 4

ANDERSON GULCH
MAXIMUM DEPTH IN POOLS



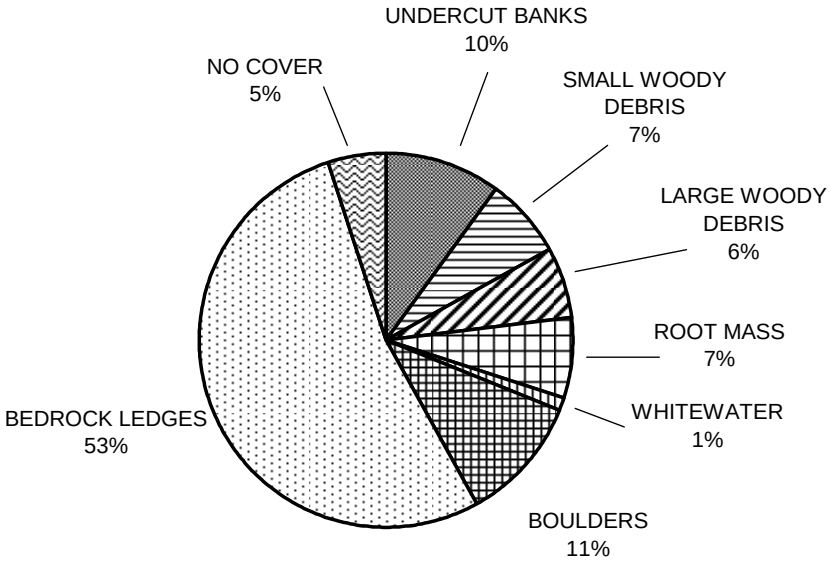
GRAPH 5

ANDERSON GULCH
PERCENT EMBEDDEDNESS



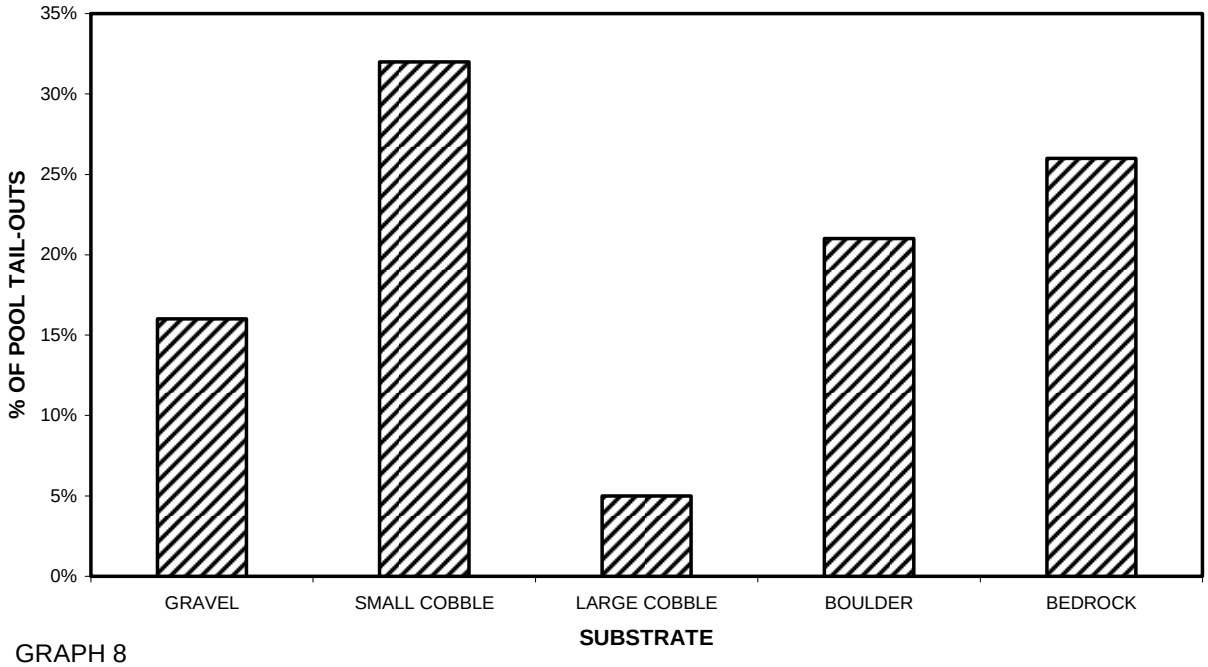
GRAPH 6

ANDERSON GULCH
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

ANDERSON GULCH
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS

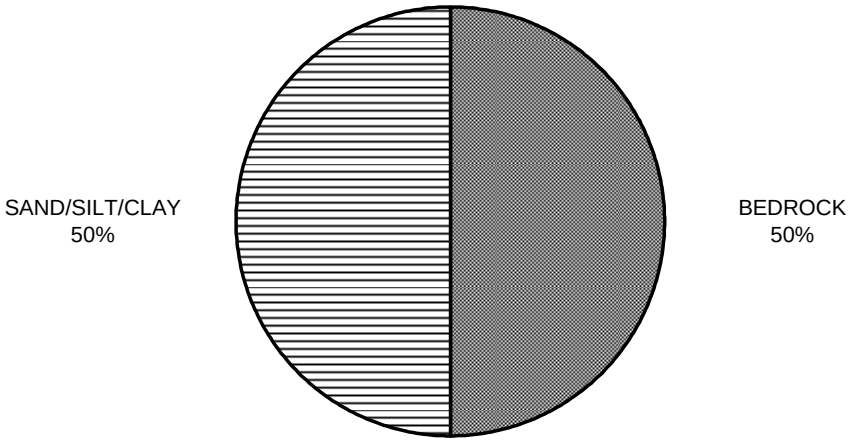


GRAPH 8

ANDERSON GULCH
MEAN PERCENT CANOPY

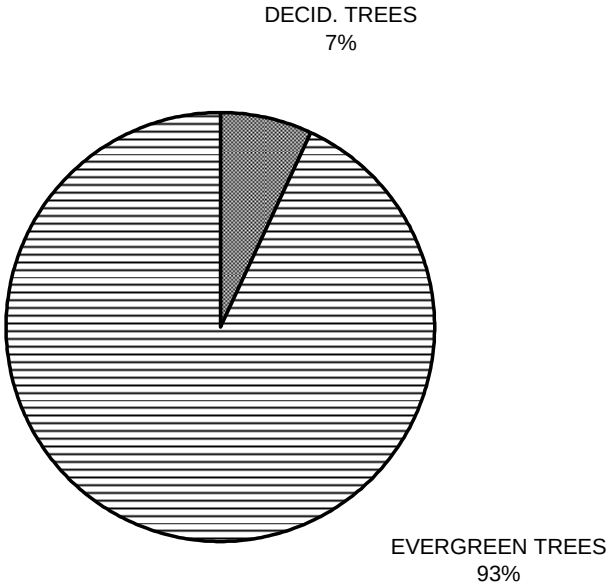
GRAPH 9

ANDERSON GULCH
DOMINANT BANK COMPOSITION IN SURVEY REACH

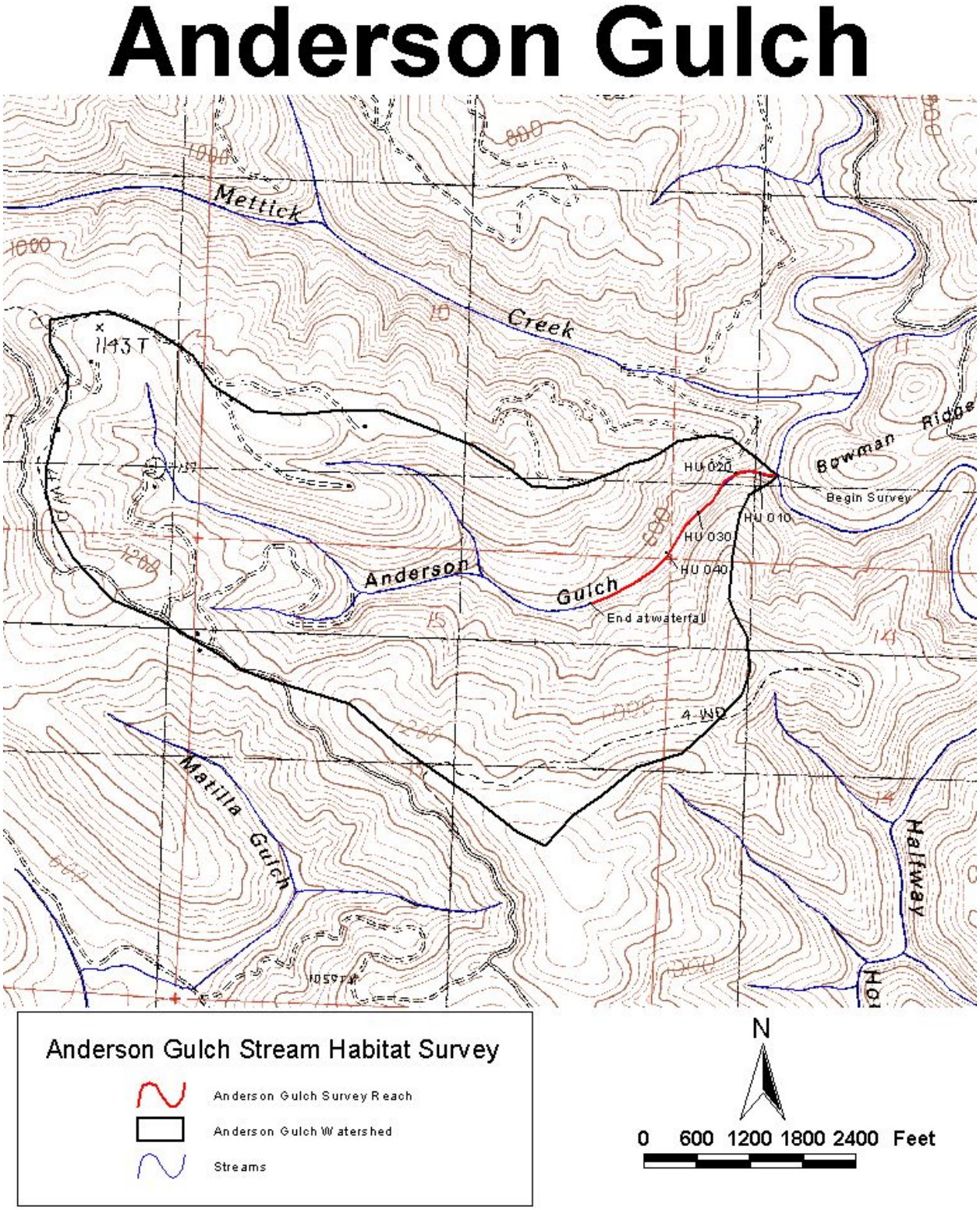


GRAPH 10

ANDERSON GULCH
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11



Map 1. Map of Anderson Gulch stream survey reach and watershed.