STREAM INVENTORY REPORT

Montgomery Creek

INTRODUCTION

A stream inventory was conducted from July 8 to July 9, 2002 on Montgomery Creek. The survey began at the confluence with South Fork Big River and extended upstream 0.63 miles.

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

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

Montgomery Creek is a tributary to the South Fork Big River, a tributary to the Big River, located in Mendocino County, California (Map 1). Montgomery Creek's legal description at the confluence with South Fork Big River is T16N R14W S22. Its location is 39°23′49″ north latitude and 123°39′51″ west longitude. Montgomery Creek is a first order stream for 9,684 feet of solid blue line stream and 2,279 feet of dashed blue line stream according to the USGS Bailey Ridge 7.5 minute quadrangle. Montgomery Creek drains a watershed of approximately 1.64 square miles. Elevations range from about 720 feet at the mouth of the creek to 2,241 feet in the headwater areas. Mixed conifer forest dominates the watershed. The majority of the watershed is owned by the State of California, with the remaining being privately owned for residential. Vehicle access exists via Comptche Ukiah Road to the confluence of Montgomery Creek and South Fork Big River.

METHODS

The habitat inventory conducted in Montgomery Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The 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.

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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 Montgomery Creek to record measurements and observations. There are nine components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) at the bottom of the stream survey reach using a Marsh-McBirney Model 2000 flow meter.

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1985 rev. 1994). This methodology is described in the *California Salmonid Stream Habitat Restoration Manual*. Channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity. Channel characteristics are measured using a clinometer, hand level, hip chain, tape measure, and a stadia rod.

3. Temperatures:

Both water and air temperatures are measured and recorded at every tenth habitat unit. The time of the measurement is also recorded. Both temperatures are taken in degrees Fahrenheit at the middle of the habitat unit and within one foot of the water surface.

4. Habitat Type:

Habitat typing uses the 24 habitat classification types defined by McCain and others (1988). Habitat units are numbered sequentially and assigned a type identification number selected from a standard list of 24 habitat types. Dewatered units are labeled "dry". Montgomery Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean

wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Montgomery Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate particle size, bedrock, or other considerations.

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 Montgomery Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. Thus, shelter ratings can range from 0-300 and are expressed as mean values by habitat types within a stream.

7. Substrate Composition:

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

8. Canopy:

Stream canopy density was estimated using modified handheld spherical densiometers as described in the *California Salmonid Stream Habitat Restoration Manual*. Canopy density relates to the amount of stream shaded from the sun. In Montgomery Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of 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 Montgomery Creek, the dominant composition type and the dominant

vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Montgomery Creek. sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

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

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

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HABITAT INVENTORY RESULTS

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

The habitat inventory of July 8 through July 9, 2002, was conducted by B. Wood and K. Grossman (WSP/AmeriCorps). The total length of the stream surveyed was 3,304 feet.

Stream flow was not measured on Montgomery Creek.

Montgomery Creek is an F2 channel type for 951 feet, a B2 for channel type for 334 feet, and an F6 for 2,019 feet of the stream surveyed. F2 channel types are entrenched meandering riffle/pool channels on low gradients with a high width/depth ratios and boulder-dominant substrates. B2 channel types are a moderately entrenched, moderate gradient, riffle dominated channels with infrequently spaced pools; very stable plan and profile, stable banks, and boulder-dominant substrates. F6 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios, sand-dominant substrates.

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

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 40% pool units, 26% riffle units, 19% flatwater units, and 14% was dry (Graph 1). Based on total length of Level II habitat types there were 23% flatwater units, 23% pool units, 12% riffle units, and 42% was dry (Graph 2).

Eleven Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pools, 24%; step runs, 14%; and dry, 14% (Graph 3). Based on percent total length, dry channels made up 42%, step runs made up 20%, and mid-channel pools made up 15%.

A total of 17 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 94%, and comprised 98% 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. Ten of the 17 pools (59%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 17 pool tail-outs measured, 2 had a value of 1 (12%); 3 had a value of 2 (18%); 3 had a value of 3 (18%); 7 had a value of 4 (41%); and 2 had a value of 5 (12%) (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 19, flatwater habitat types had a mean shelter rating of 11, and riffle habitat types had a mean shelter rating of 6 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 20. Scour pools had a mean shelter rating of 10 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover type in Montgomery Creek. Graph 7 describes the pool cover in Montgomery Creek. Boulders are the dominant pool cover type followed by undercut banks.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel and boulders were the two most dominant substrates of pool tail-outs at 29% each.

The mean percent canopy density for the surveyed length of Montgomery Creek was 80%. In the closed canopy, the mean percentages of deciduous and coniferous trees were 10% and 90%, respectively. Graph 9 describes the mean percent canopy in Montgomery Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 18%. The mean percent left bank vegetated was 25%. The dominant elements composing the structure of the stream banks consisted of 47% boulder, 35% sand/silt/clay, 15% bedrock, and 3% cobble/gravel (Graph 10). Coniferous trees were the dominant vegetation type observed in 74% of the units surveyed. Additionally, 12% of the units surveyed had grass as the dominant vegetation type, and 6% had brush as the dominant vegetation type (Graph 11).

BIOLOGICAL INVENTORY RESULTS

No biological inventory was conducted on Montgomery Creek. No salmonid presence was observed from the stream banks in Montgomery Creek.

DISCUSSION

Montgomery Creek is an F2 channel type for 951 feet, a B2 for channel type for 334 feet, and an F6 for 2,019 feet of the stream surveyed. The suitability of F2, B2 and F6 channel types for fish habitat improvement structures are as follows: F2 channels are fair for plunge weirs, single and opposing wing-deflectors and log cover. B2 channels are excellent for plunge weirs, single and opposing wing-deflectors and log cover. F6 channels are good for bank-placed boulders and fair for plunge weirs, boulder clusters, single and opposing wing deflectors, and log cover.

The water temperatures recorded on the survey days July 8 to 9, 2002, ranged from 55 to 59 degrees Fahrenheit. Air temperatures ranged from 63 to 74 degrees Fahrenheit. This is a good 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 23% of the total length of this survey, pools 23%, and riffles 12%. The pools are relatively deep, with 10 of the 17 (59%) 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.

Five of the 17 pool tail-outs measured had embeddedness ratings of 1 or 2. Ten of the pool tail-outs had embeddedness ratings of 3 or 4. Two 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 Montgomery Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Ten of the 17 pool tail-outs had silt/caly, sand, large cobble, boulders, or bedrock as the dominant substrate. This is generally considered unsuitable for spawning salmonids.

The mean shelter rating for pools was 19. The shelter rating in the flatwater habitats was 11. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in all habitat types. Additionally, undercut banks 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 80%. Reach 1 had a canopy density of 77% while Reaches 2 and 3 had canopy densities of 83% and 85%, respectively. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was low at 18% and 25%, 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 high gradient of the stream at the confluence with South Fork Big River, access for migrating salmonids is an ongoing potential problem. Fish passage should be monitored and improved where possible.

2) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover is from boulders. Adding high quality complexity with log and root mass cover is desirable.

3) 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.

Montgomery Creek

COMMENTS AND LANDMARKS

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

Position (ft):	Comments:
0'	Begin survey 18 feet from the confluence with the South Fork of Big River. Hobo temp at the beginning of the unit. Channel type is an F2.
42'	Unit completely under a bridge.
61'	Walking trail on the right bank. Water switches back across bedrock in small channels.
115'	Frogs present. 116 feet into unit a foot bridge crosses. 285 feet into unit old footbridge crosses, no longer in use.
438'	Frogs present. State picnic area on left bank in the middle of unit.
727'	Three pools in this unit. First pool is log enhanced from LWD, second is caused by SWD, and third is caused by a log jam at the top of unit. 5.5 feet high, completely cutting off the channel. Water trickles
822'	Dry left bank tributary. Gradient is greatly increasing flow is very low, but during higher flow would be a riffle. About eight redwoods are down, some across the channel, some perched on banks; huge boulders dominate the area.
935'	Habitat is diminishing. No salmonids observed.
951'	Water flows underground.
983'	Boulder jams at top of unit with SWD - potential barrier.
1027'	Eight inch pacific giant salamader. Pool formed from very large boulders deeply embedded, bedrock walls.
1092'	Three pieces of LWD perched on banks - steep bedrock banks.
1144'	Large boulders througout channel, flow is decreasing. Mid-unit there is a log jam primarily made up of many pieces of SWD trapped behind boulders that are already constricting the channel. Four to five old logs dead and down in channel and perched.
1206'	28 feet into unit- log jam not scouring or retaining gravel. Two to three pieces of LWD with many pieces of SWD.

1285'	Beginning of old growth grove. Possible channel type change.
1315'	Log jam at the top of unit, 3 feet high, 3 feet wide with several pieces of small wood in the entrenched channel.
1333'	Five feet of dry channel at bottom of unit.
1361'	Top of unit is root mass and SWD, above the pile is dry and part of the trail for the park.
1378'	Banks flatten out and channel becomes dry.
1622'	Sediment built up in 2' pool. Water is not moving and is a clouded gray-white color. Water stops at end of unit.
1927'	Unit ends at a single piece of LWD lying across the channel. Water is not moving in pool and has sediment built up behind it.
2050'	Two pools with one LWD log jam at the end. 6 feet wide and 20 feet long.
2248'	End of survey. No salmonids were observed during the survey. Stream channel became braided and obscured. Ended survey due to lack of suitable spawning habitat, no clear channel, and water is either stagnant or not present at all.

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]	

TABLES AND GRAPHS

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: MONTGOMERY CREEK
SAMPLE DATES: 07/08/02 to 07/09/02
STREAM LENGTH: 3304 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: BAILY RIDG — Latitude: 39°23'49"
Legal Description: T16NR14WS22 — Longitude: 123°39'51"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

STREAM REACH 01

Channel Type: F2	Canopy Density: 77%
Channel Length: 951 ft.	Coniferous Component: 83%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 17%
Total Pool Mean Depth: 0.8 ft.	Pools by Stream Length: 17%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 0%
Water: 056- 057°F Air: 063-069°F	Mean Pool Shelter Rtn: 24
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Boulders
Vegetative Cover: 15%	Occurrence of LOD: 10%
Dom. Bank Substrate: Boulder	Dry Channel: 60 ft.

Embeddness Value: 1. 25% 2.0% 3. 13% 4. 38% 5. 25%

STREAM REACH 02

Channel Type: B2	Canopy Density: 83%
Channel Length: 334 ft.	Coniferous Component: 96%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 4%
Total Pool Mean Depth: 0.9 ft.	Pools by Stream Length: 20%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 25%
Water: 059- 059°F Air: 069-069°F	Mean Pool Shelter Rtn: 13
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Boulders
Vegetative Cover: 60%	Occurrence of LOD: 5%
Dom. Bank Substrate: Boulder	Dry Channel: 32 ft.

Embeddness Value: 1. 0% 2.25% 3. 25% 4. 50% 5. 0%

STREAM REACH 03

Channel Type: F6	Canopy Density: 85%
Channel Length: 2019 ft.	Coniferous Component: 100%
Riffle/flatwater Mean Width: 3 ft.	Deciduous Component: 0%
Total Pool Mean Depth: 1.5 ft.	Pools by Stream Length: 26%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 40%
Water: 055- 055°F Air: 055-074°F	Mean Pool Shelter Rtn: 21
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Undercut Banks
Vegetative Cover: 27%	Occurrence of LOD: 21%
Dom. Bank Substrate: Boulder	Dry Channel: 1302 ft.

Embeddness Value: 1. 0% 2.40% 3. 20% 4. 40% 5. 0%

MONTGOMERY CREEK — Drainage: SF BIG RIVER

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 07/08/02 to 07/09/02

Confluence Location: QUAD: BAILY RIDG LEGAL DESCRIPTION: T16NR14WS22 LATITUDE:39°23'49" LONGITUDE:123°39'51"

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
11	5	RIFFLE	26	35	390	12	4.3	0.3	105	1153	40	444	0	6
8	4	FLATWATER	19	96	771	23	3.3	0.3	123	983	49	389	0	11
17	17	POOL	40	44	749	23	7.6	1.0	250	4255	299	5088	274	19
6	0	DRY	14	232	1394	42	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.)
42	26	3304	6391	5921

MONTGOMERY CREEK — Drainage: SF BIG RIVER

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 07/08/02 to 07/09/02

Confluence Location: QUAD: BAILY RIDG LEGAL DESCRIPTION: T16NR14WS22 LATITUDE:39°23'49" LONGITUDE:123°39'51"

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	7	53	158	5	6	0.4	0.9	237	710	95	284	0	13	84
4	1	MGR	10	28	113	3	4	0.2	1.3	8	32	2	6	0	5	65
3	1	CAS	7	35	105	3	4	0.2	0.3	22	66	4	13	0	0	80
1	1	BRS	2	14	14	0	3	0.3	0.7	21	21	6	6	0	0	85
2	2	RUN	5	57	113	3	3	0.4	1.5	146	292	72	144	0	15	76
6	2	SRN	14	110	658	20	4	0.3	0.5	100	597	26	154	0	8	76
2	2	TRP	5	17	34	1	5	1.7	2.4	76	152	134	267	121	25	79
10	10	MCP	24	50	502	15	9	1.0	3.9	252	2524	301	3010	281	12	83
4	4	STP	10	50	201	6	8	0.9	2.4	386	1543	446	1782	395	38	79
1	1	LSBo	2	12	12	0	3	0.8	1.9	36	36	29	29	22	10	83
6	0	DRY	14	232	1394	42	0	0.0	0.0	0	0	0	0	0	0	86

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
42	26	3304	5974	5695

MONTGOMERY CREEK — Drainage: SF BIG RIVER

Table 3 - SUMMARY OF POOL TYPES — Survey Dates: 07/08/02 to 07/09/02

Confluence Location: QUAD: BAILY RIDG LEGAL DESCRIPTION: T16NR14WS22 LATITUDE:39°23'49" LONGITUDE:123°39'51"

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
16	16	MAIN	94	46	737	98	7.9	1.1	264	4219	316	5059	289	20
1	1	SCOUR	6	12	12	2	3.0	0.8	36	36	29	29	22	10

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
17	17	749	4255	5088

Montgomery Creek

MONTGOMERY CREEK Drainage: SF BIG RIVER

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES Survey Dates: 07/08/02 to 07/09/02

Confluence Location: QUAD: BAILY RIDG LEGAL DESCRIPTION: T16NR14WS22 LATITUDE:39°23'49" LONGITUDE:123°39'51"

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
2	TRP	12	0	0	1	50	1	50	0	0	0	0
10	MCP	59	0	0	3	30	4	40	3	30	0	0
4	STP	24	0	0	2	50	2	50	0	0	0	0
1	LSBo	6	0	0	1	100	0	0	0	0	0	0

TOTAL UNITS
17

MONTGOMERY CREEK — Drainage: SF BIG RIVER

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE — Survey Dates: 07/08/02 to 07/09/02

Confluence Location: QUAD: BAILY RIDG LEGAL DESCRIPTION: T16NR14WS22 LATITUDE:39°23'49" LONGITUDE:123°39'51"

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	5	20	10	0	0	0	10	50	5
4	1	HGR	0	20	40	15	0	0	0	25	0
3	0	CAS	0	0	0	0	0	0	0	0	0
1	0	BRS	0	0	0	0	0	0	0	0	0
2	1	RUN	20	15	35	20	10	0	0	0	0
6	2	SRN	3	35	10	0	3	0	0	45	5
2	1	TRP	85	15	0	0	0	0	0	0	0
10	10	MCP	19	14	10	11	0	0	2	39	6
4	4	STP	20	21	5	0	0	10	3	39	3
1	1	LSBo	0	20	40	15	0	0	0	25	0
6	0	DRY	0	0	0	0	0	0	0	0	0

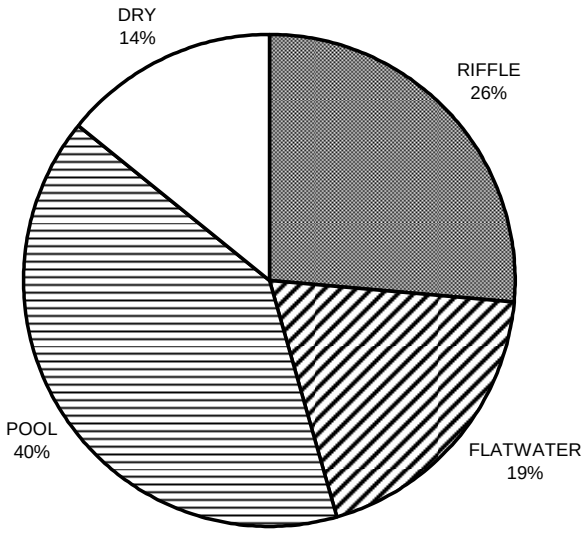
MONTGOMERY CREEK — Drainage: SF BIG RIVER

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE — Survey Dates: 07/08/02 to 07/09/02

Confluence Location: QUAD: BAILY RIDG LEGAL DESCRIPTION: T16NR14WS22 LATITUDE:39°23'49" LONGITUDE:123°39'51"

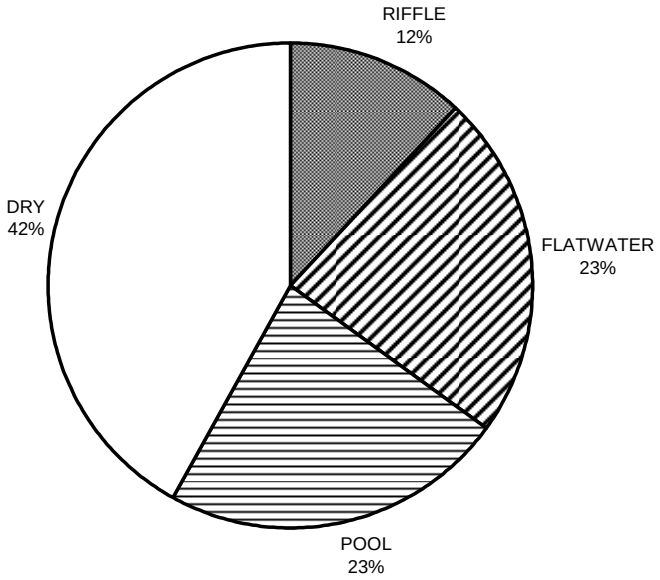
TOTAL HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
3	2	LGR	0	0	0	0	50	50	0
4	1	HGR	0	0	0	0	0	100	0
3	1	CAS	0	0	0	0	0	0	100
1	1	BRS	0	0	0	0	0	0	100
2	2	RUN	50	0	50	0	0	0	0
6	2	SRN	0	0	50	0	0	50	0
2	2	TRP	0	0	50	0	0	0	50
10	4	MCP	25	0	50	0	0	25	0
4	1	STP	0	0	0	0	0	100	0
1	1	LSBo	0	0	0	0	0	100	0
6	1	DRY	0	0	0	0	0	100	0

MONTGOMERY CREEK
HABITAT TYPES BY PERCENT OCCURRENCE



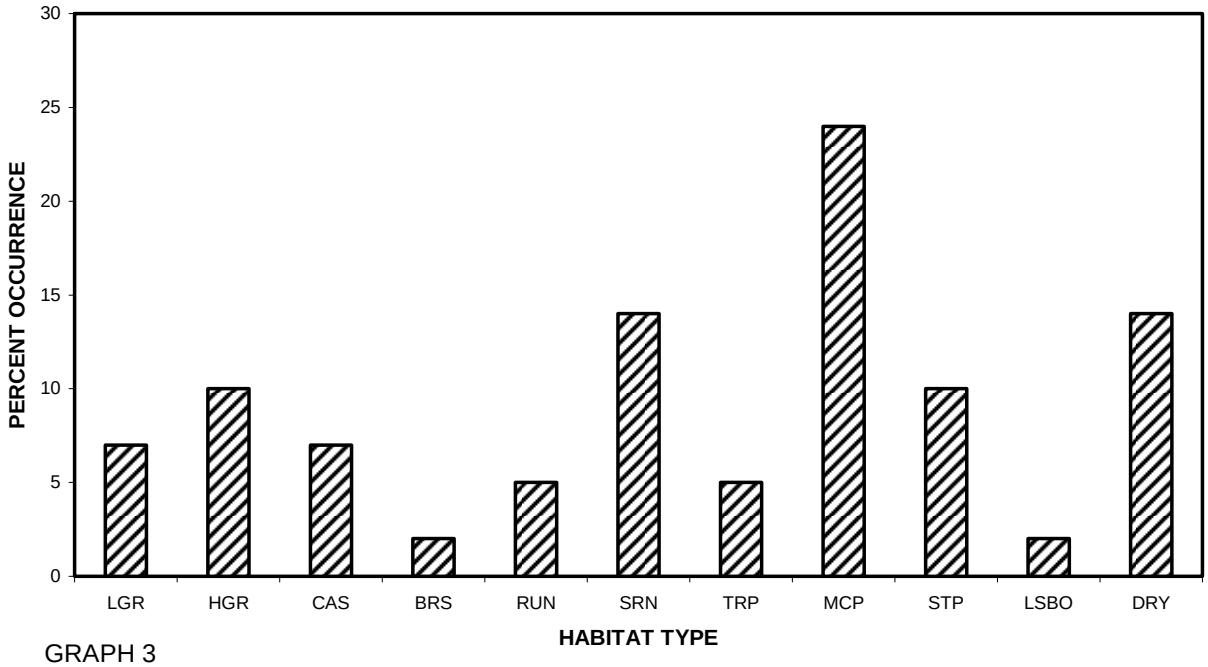
GRAPH 1

MONTGOMERY CREEK
HABITAT TYPES BY PERCENT TOTAL LENGTH



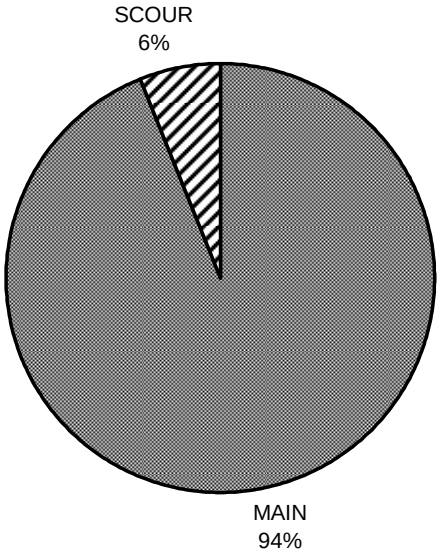
GRAPH 2

MONTGOMERY CREEK
HABITAT TYPES BY PERCENT OCCURRENCE

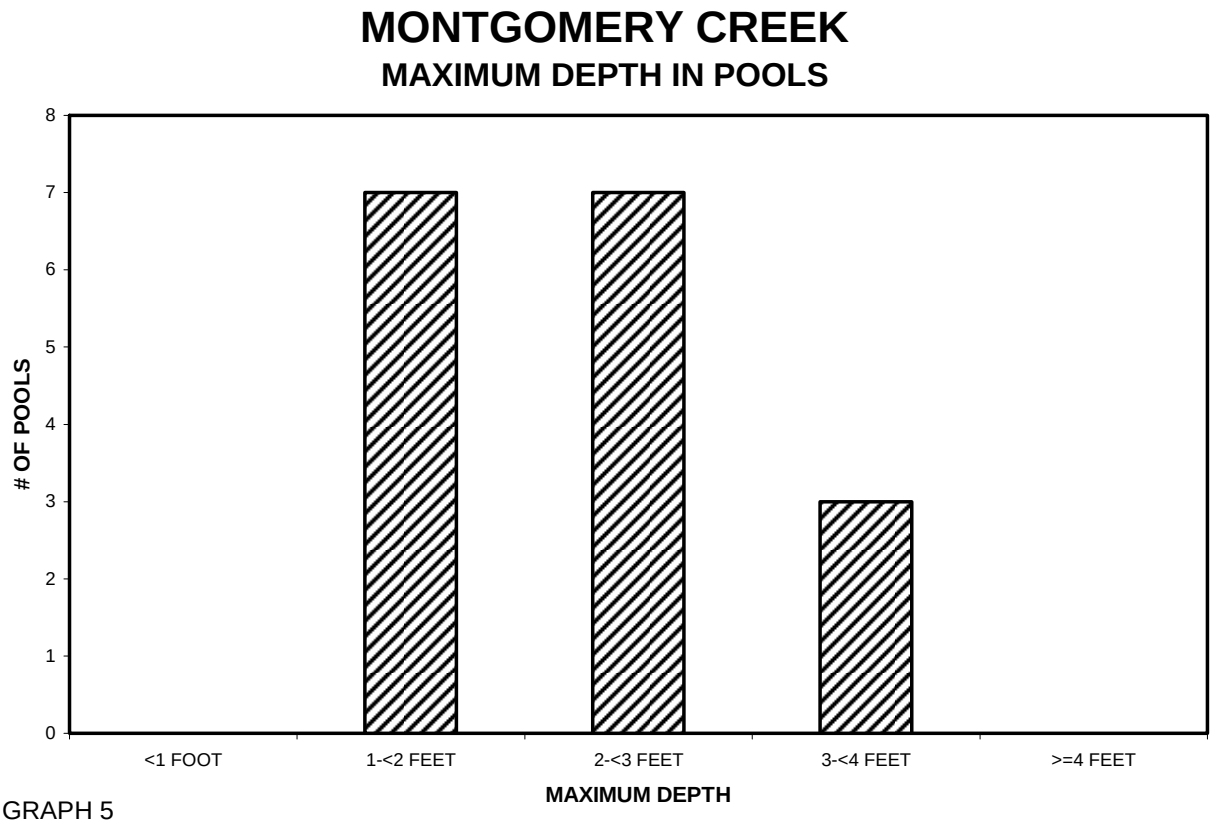


GRAPH 3

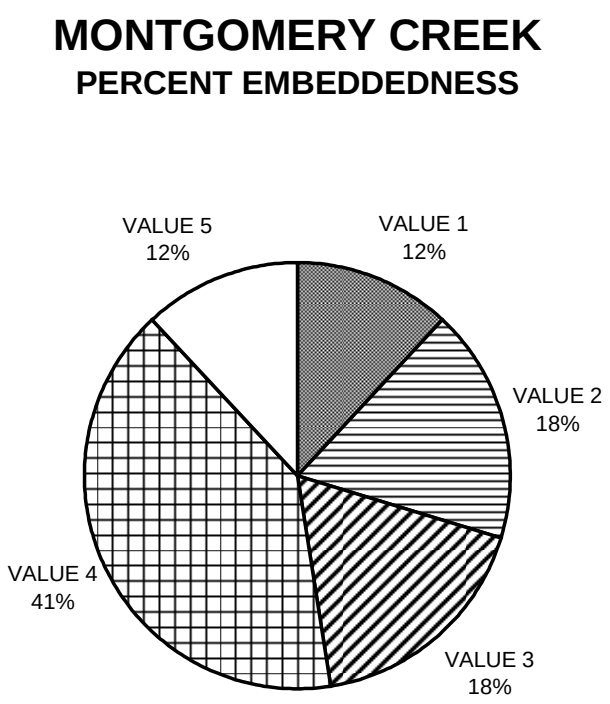
MONTGOMERY CREEK
POOL HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 4

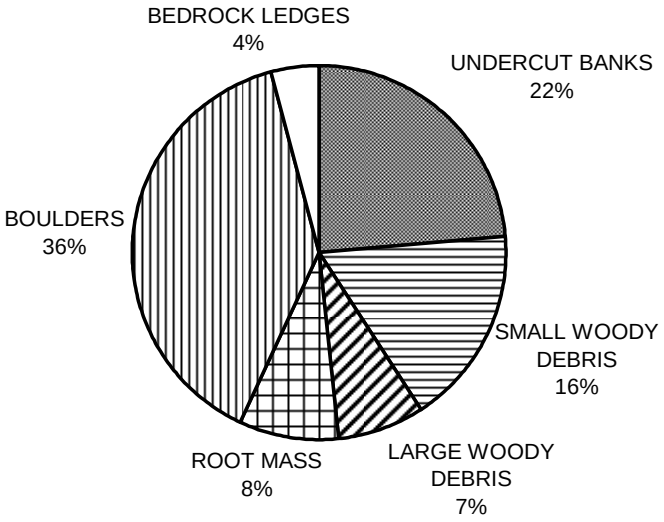


GRAPH 5



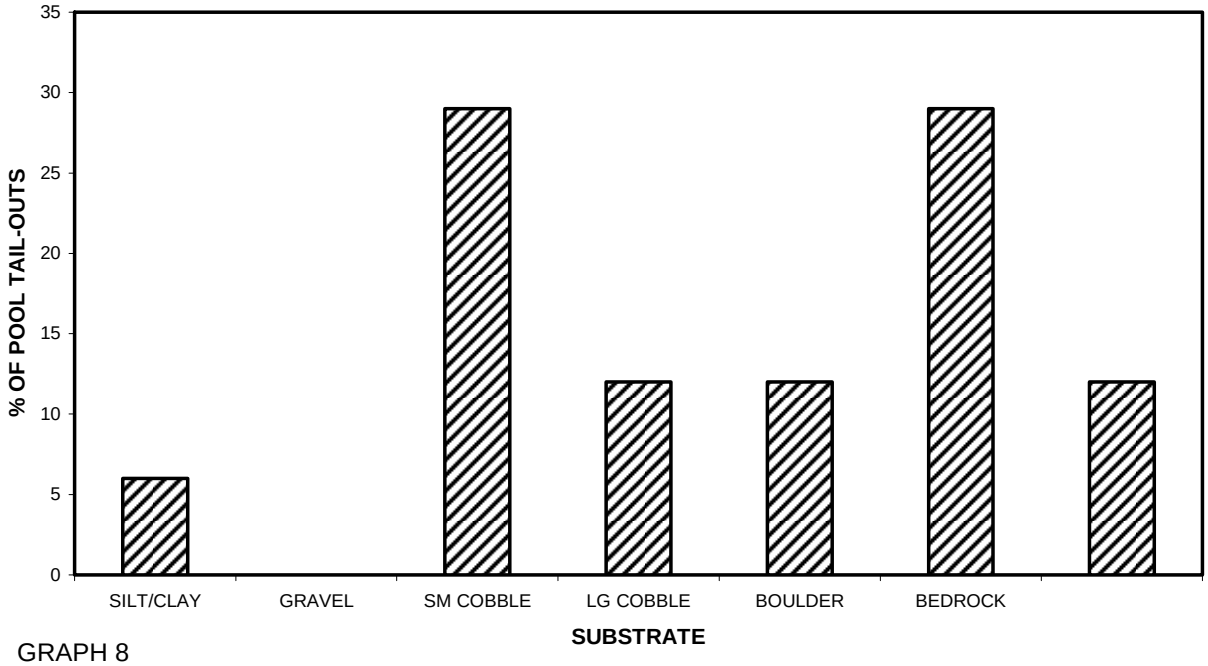
GRAPH 6

MONTGOMERY CREEK
MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

MONTGOMERY CREEK
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS

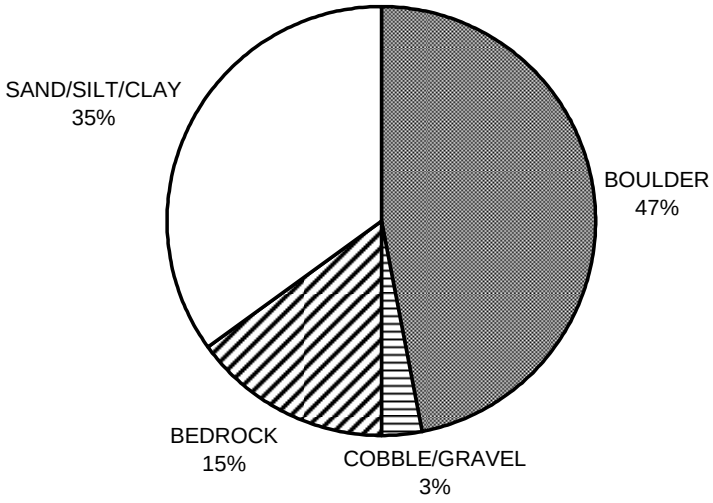


GRAPH 8

MONTGOMERY CREEK
MEAN PERCENT CANOPY

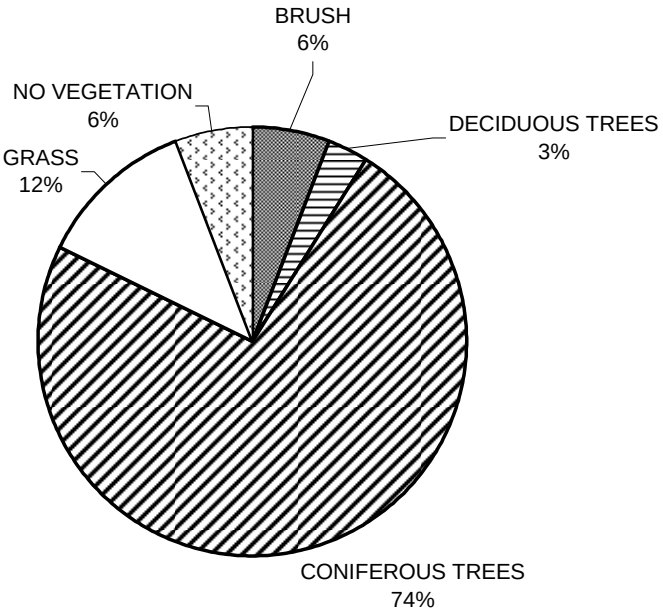
GRAPH 9

MONTGOMERY CREEK
DOMINANT BANK COMPOSITION IN SURVEY REACH



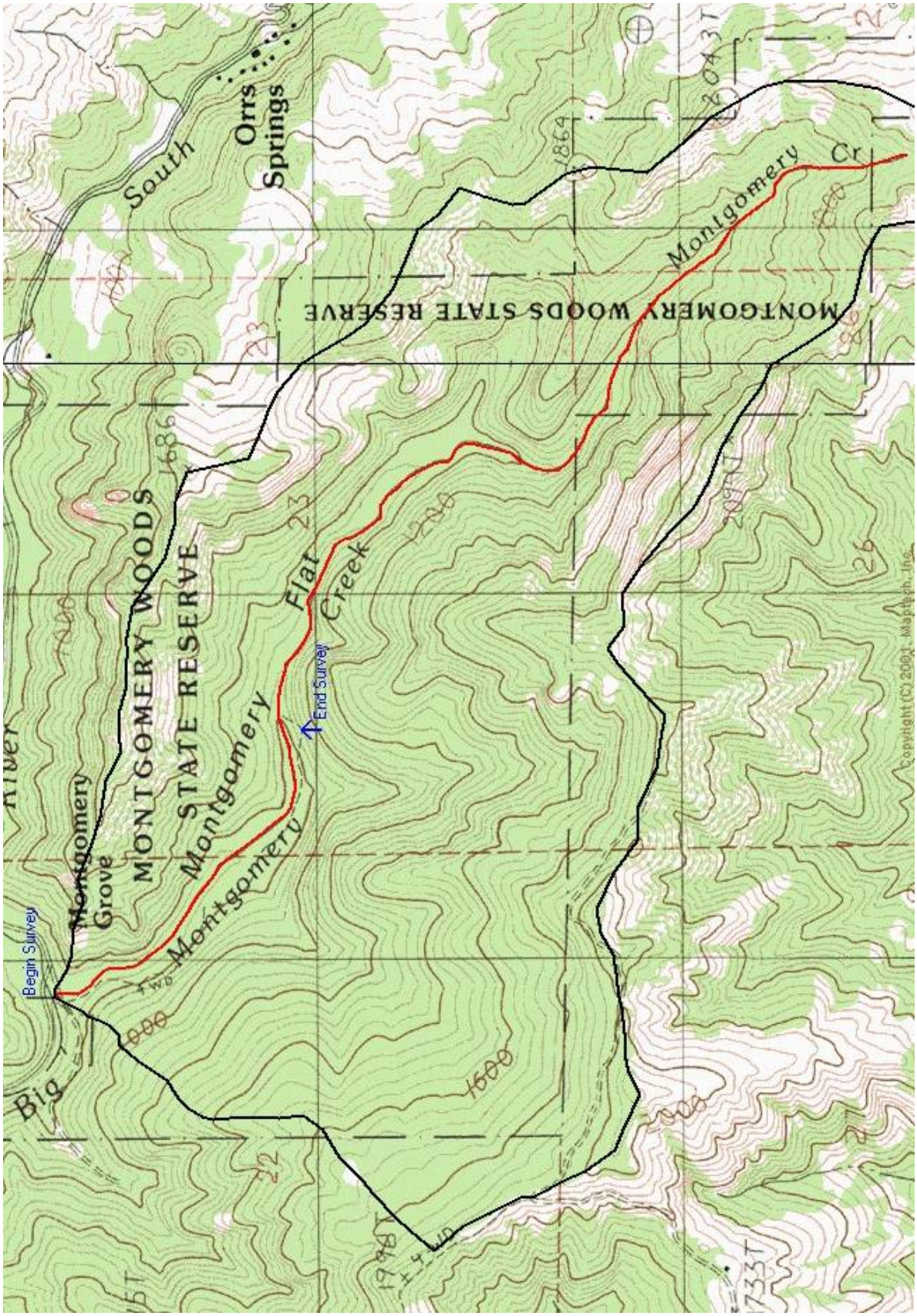
GRAPH 10

MONTGOMERY CREEK
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Montgomery Creek



MAP 1. MONTGOMERY CREEK.