

STREAM INVENTORY REPORT

**Kenny Creek
October 2005**

INTRODUCTION

A stream inventory was conducted on 10/24/2005 and 10/25/2005 on Kenny Creek. The survey began at the confluence with South Fork Eel River and extended upstream 2.6 miles.

The Kenny 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 Kenny 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 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

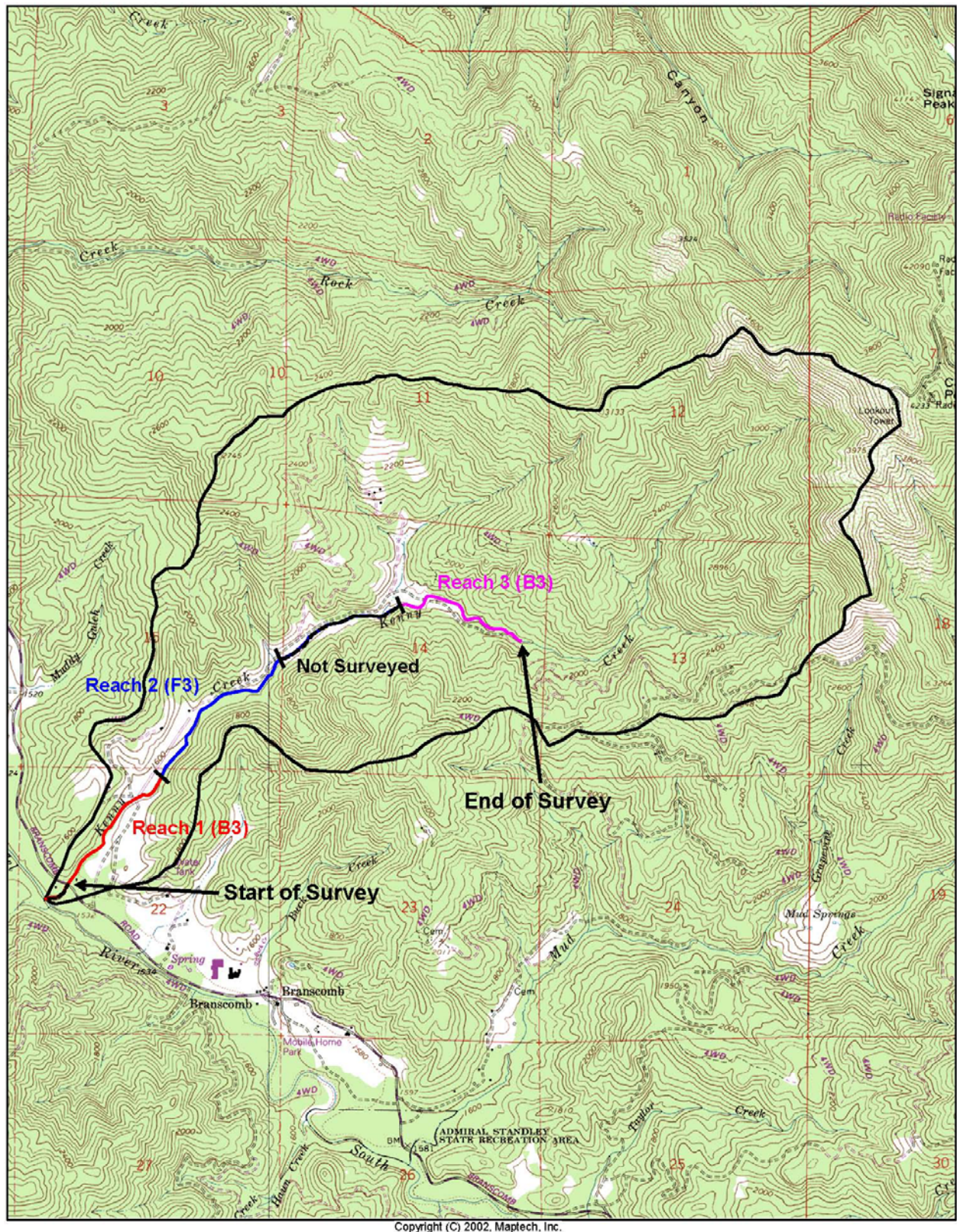
Kenny Creek is a tributary to South Fork Eel River, a tributary to the Eel River, located in Mendocino County, California (Map 1). Kenny Creek's legal description at the confluence with South Fork Eel River is T21N R16W S22. Its location is 39°39'33" north latitude and 123°38'27" west longitude, LLID number 1236407396592. Kenny Creek is a 1st order stream and has approximately 3.6 miles of blue line stream according to the USGS Lincoln Ridge 7.5 minute quadrangle. Kenny Creek drains a watershed of approximately 3.4 square miles. Elevations range from about 1,500 feet at the mouth of the creek to 3,500 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is partially managed for timber production. Vehicle access exists via exit Branscomb Road in Laytonville from Highway 101. Travel approximately 10.5 miles to Kenny Creek Road, this parallels the creek.

METHODS

The habitat inventory conducted in Kenny Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Conservation Corps (CCC) Technical Advisors and Watershed Stewards Project/AmeriCorps (WSP) 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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Map 1



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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. All pools except step-pools are fully sampled.

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 Kenny Creek to record measurements and observations. There are eleven components to the inventory form.

1. Flow:

Flow is measured in cubic feet per second (cfs) near 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 (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 (1990). 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". Kenny 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

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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 Kenny 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 like bedrock, log sills, boulders or other considerations.

6. Shelter Rating:

Instream shelter is composed of those elements within a stream channel that provide juvenile 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 for prey. 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 Kenny 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 Kenny Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or hardwood 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 Kenny Creek, the dominant composition type and the dominant

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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.

10. Large Woody Debris Count:

Large woody debris (LWD) is an important component of fish habitat and an element in channel forming processes. In each habitat unit all pieces of LWD partially or entirely below the elevation of bankfull discharge are counted and recorded. The minimum size to be considered is twelve inches in diameter and six feet in length. The LWD count is presented by reach and is expressed as an average per 100 feet.

11. Average Bankfull Width:

Bankfull width can vary greatly in the course of a channel type stream reach. This is especially true in very long reaches. Bankfull width can be a factor in habitat components like canopy density, water temperature, and pool depths. Frequent measurements taken at riffle crests (velocity crossovers) are needed to accurately describe reach widths. At the first appropriate velocity crossover that occurs after the beginning of a new stream survey page (ten habitat units), bankfull width is measured and recorded in the appropriate header block of the page. These widths are presented as an average for the channel type reach.

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 Kenny Creek. In addition, underwater observations were made at 8 sites using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.19, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Game. This program processes and summarizes the data, and produces the following ten tables:

- Riffle, Flatwater, and Pool Habitat Types
- Habitat Types and Measured Parameters
- Pool Types
- Maximum Residual Pool Depths by Habitat Types
- Mean Percent Cover by Habitat Type
- Dominant Substrates by Habitat Type
- Mean Percent Vegetative Cover for Entire Stream
- Fish Habitat Inventory Data Summary by Stream Reach (Table 8)

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- Mean Percent Dominant Substrate / Dominant Vegetation Type for Entire Stream
- Mean Percent Shelter Cover Types for Entire Stream

Graphics are produced from the tables using Microsoft Excel. Graphics developed for Kenny Creek include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence
- Pool Types by Percent Occurrence
- Maximum Residual Depth in Pools
- Percent Embeddedness
- Mean Percent Cover Types in Pools
- Substrate Composition in Pool Tail-outs
- Mean Percent Canopy
- Dominant Bank Composition by Composition Type
- Dominant Bank Vegetation by Vegetation Type

HABITAT INVENTORY RESULTS

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

The habitat inventory of 10/24/2005 and 10/25/2005 was conducted by Isaac Mikus and Sean McSmith (WSP). The total length of the stream surveyed was 13,571 feet.

Stream flow was measured near the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.3 cfs on 10/21/05.

Kenny Creek is a B3 channel type for 3,893 feet of the stream surveyed (Reach 1), a F3 channel type for 6,601 feet of the stream surveyed (Reach 2), a B3 channel type for 3,077 feet of the stream surveyed (Reach 3).

B3 channel types are moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools; very stable plan and profile; stable banks; cobble channel. F3 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratio; cobble channel.

Water temperatures taken during the survey period ranged from 48 to 51 degrees Fahrenheit. Air temperatures ranged from 41 to 61 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 38% pool units, 31% riffle units, 29% flatwater units, 1% was not surveyed, and 1% culvert units (Graph 1). Based on total length of Level II habitat types there

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were 29.1% flatwater units, 25.3% pool units, 17.4% riffle units and 0.3% culvert units (Graph 2). Due to lack of landowner access 27.8% of the total stream length was not surveyed.

Twelve Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were 34% mid-channel pool units, 23% low gradient riffle units and 18% step run units (Graph 3). Based on percent total length, 28% was not surveyed, 23% step run units and 22% mid-channel pool units.

A total of 72 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 93%, and comprised 92% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Thirty four of the 72 pools (47%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 72 pool tail-outs measured, 2 had a value of 1 (2.8%); 28 had a value of 2 (38.9%); 17 had a value of 3 (23.6%); 7 had a value of 4 (9.7%); 18 had a value of 5 (25%); (Graph 6). On this scale, a value of 1 indicates the best spawning conditions 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. Riffle habitat types had a mean shelter rating of 12, flatwater habitat types had a mean shelter rating of 9, and pool habitats had a mean shelter rating of 17 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 17, scour pools had a mean shelter rating of 12 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders the dominant cover types in Kenny Creek. Graph 7 describes the pool cover in Kenny Creek. Bedrock ledge 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. Large cobble observed in 51% of pool tail-outs and small cobble observed in 18% of pool tail-outs.

The mean percent canopy density for the surveyed length of Kenny Creek was 95%. The mean percentages of hardwood and coniferous trees were 82.5% and 13.0%, respectively and 4.5% of the canopy was open. Graph 9 describes the mean percent canopy in Kenny Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 97%. The mean percent left bank vegetated was 99%. The dominant elements composing the structure of the stream banks consisted of 53% sand/silt/clay and 38% bedrock (Graph 10). Hardwood trees were the dominant vegetation type observed in 75% of the units surveyed. Additionally, 23.9% of the units surveyed had coniferous trees as the dominant vegetation type, and 1.1% had brush as the dominant vegetation (Graph 11).

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BIOLOGICAL INVENTORY RESULTS

Eight sites were dived for species composition and distribution in Kenny Creek in November, 2005. Water temperatures taken during the sampling period 12:00 to 13:20 ranged from 46° to 48° Fahrenheit. Air temperature was 54° Fahrenheit. The sites were sampled by Trevor Toffelfson (DFG) and Isaac Mikus (WSP).

In reach 1, which comprised the first 3,893 feet of stream, 2 sites were sampled. The reach sites yielded 20 young-of-the-year steelhead/rainbow trout (SH/RT) and 43 coho.

In reach 2, four sites were sampled starting approximately 3,894 feet from the confluence with South Fork Eel River and continuing upstream 6,601 feet. The reach sites yielded 11 young-of-the-year SH/RT and 19 coho.

In reach 3, two sites were sampled starting approximately 10,495 feet from the confluence with South Fork Eel River and continuing upstream 3,077 feet. The reach sites yielded 8 young-of-the-year SH/RT, 1 age 1+ SH/RT and 27 coho.

The following chart displays the information yielded from these sites:

2005 Kenny Creek dive observations

Date	Site #	Hab. Unit #	Hab. Type	Approx. Dist. from mouth (ft.)	Coho		SH/RT		
					YOY	1+	YOY	1+	2+
Reach 1 B3 Channel Type									
11/01/05	1	002	Pool	579	24	0	9	0	0
11/01/05	2	005	Pool	799	19	0	11	0	0
Reach 2 F3 Channel Type									
11/01/05	3	050	Pool	3,301	12	0	4	0	0
11/01/05	4	058	Pool	3,813	0	0	1	0	0
11/01/05	5	061	Run	3,893	0	0	0	0	0
11/01/05	6	127	Pool	7,180	7	0	6	0	0
Reach 3 B3 Channel Type									
11/01/05	7	183	Pool	13,303	4	0	4	0	0
11/01/05	8	188	Pool	13,464	23	0	4	1	0

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DISCUSSION

Kenny Creek is a B3 channel type for 3,893 feet of the stream surveyed (Reach 1), a F3 channel type for 6,601 feet of the stream surveyed (Reach 2), a B3 channel type for 3,077 feet of the stream surveyed (Reach 3). The suitability of B3 channel types for fish habitat improvement structures is as follows: excellent for plunge weirs, boulder clusters and bank placed boulders, single and opposing wing deflectors, and log cover. The suitability F3 channel types for fish habitat improvements structures is as follows: 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 the survey days 10/24/2005 and 10/25/2005, ranged from 48 to 51 degrees Fahrenheit. Air temperatures ranged from 41 to 61 degrees Fahrenheit. To make any 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 29% of the total length of this survey, riffles 17%, and pools 25%. The pools are relatively deep, with only 34 of the 72 (47%) pools having a maximum residual 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 residual 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.

Thirty of the 72 pool tail-outs measured had embeddedness ratings of 1 or 2. Twenty four of the pool tail-outs had embeddedness ratings of 3 or 4. Eighteen 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 Kenny Creek should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Forty seven of the 72 pool tail-outs had silt, 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 17. The shelter rating in the flatwater habitats was 9. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by boulders in Kenny Creek. Bedrock ledges are the dominant cover type in pools followed by boulders. 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 95%. Reach 1 had a canopy density of 94%; reach 2 had a canopy density of 95.7%; reach 3 had a canopy density of 97%. In general, revegetation projects are considered when canopy density is less than 80%.

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The percentage of right and left bank covered with vegetation was 97% and 99%, respectively. In areas of stream bank erosion or where bank vegetation is sparse, planting endemic species of coniferous and hardwood trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

- 1) Kenny 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 Kenny Creek is limited to relatively few reaches. Projects should be designed at suitable sites to trap and sort spawning gravel.

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.)	Habitat Unit #	Comments:
0	001	Start of survey at the Branscomb Road Bridge. Landowner access permission was not granted below the bridge. The 1996 stream survey was used to get the stream length from the South Fork Eel River to the bridge. Channel type is a B3.

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Position (ft.)	Habitat Unit #	Comments:
579	002	Branscomb Road Bridge. First fish sample site.
799	005	Second fish sample site.
2,511	036	Right bank erosion, 50' long x 25' high.
2,820	041	Creek dark with tannins for the entire survey length.
2,865	042	Habitat Unit #30 1996 survey.
3,112	046	Culvert.
3,301	050	Third fish sample site.
3,813	058	Fourth fish sample site.
3,893	061	Channel type changes to a F3. Fifth fish sample site.
4,379	067	Bedrock sheet with a 3.1' plunge.
5,582	091	Access at the airstrip.
5,794	096	Bedrock sheet with a 3.8' plunge.
6,125	103	Right bank erosion from the road.
6,298	107	Plunge of 1.8'.
6,468	111	Plunge of 1.3'.
6,885	120	Plunge of 2.6'.
6,912	121	Bedrock plunge of 2.2'.
7,180	127	Sixth fish sample site.
7,216	128	Right bank tributary, accessible to fish with a slope of ~6%. No fish were observed. N39.67202 degrees, W123.62628 degrees.

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Position (ft.)	Habitat Unit #	Comments:
7,204	130	Landowner access permission not granted for this section of creek. The road length was measured with a hip chain in order to get an approximation of the stream length. In this un-surveyed portion is a right bank tributary. N39.67606, W123.61736.
10,494	131	Channel type changes to a B3.
10,944	137	Left bank erosion, 6' high x 15' long.
10,984	138	Wood vehicle bridge, 12' wide x 10' high x 40' long.
11,740	155	Slight right bank erosion.
11,957	158	All left bank trees have been cut down through HU 158 and parts of 157 and 159.
12,262	165	Right bank erosion contributing fine sediment, 15' high x 25' long.
12,475	169	Temporary bridge.
13,158	178	Left bank erosion.
13,303	183	Seventh fish sample site.
13,464	188	Eighth fish sample site.
13,571	190	End of survey due to lack of landowner access. Stream gradient increasing, with boulders more dominant.

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.

McCain, M., D. Fuller, L. Decker and K. Overton. 1990. Stream habitat classification and inventory procedures for northern California. FHC Currents. No.1. U.S. Department of Agriculture. Forest Service, Pacific Southwest Region.

Rosgen, D.L., 1994. A Classification of Natural Rivers. Catena, Vol 22: 169-199, Elsevier Science, B. V. Amsterdam.

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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 }

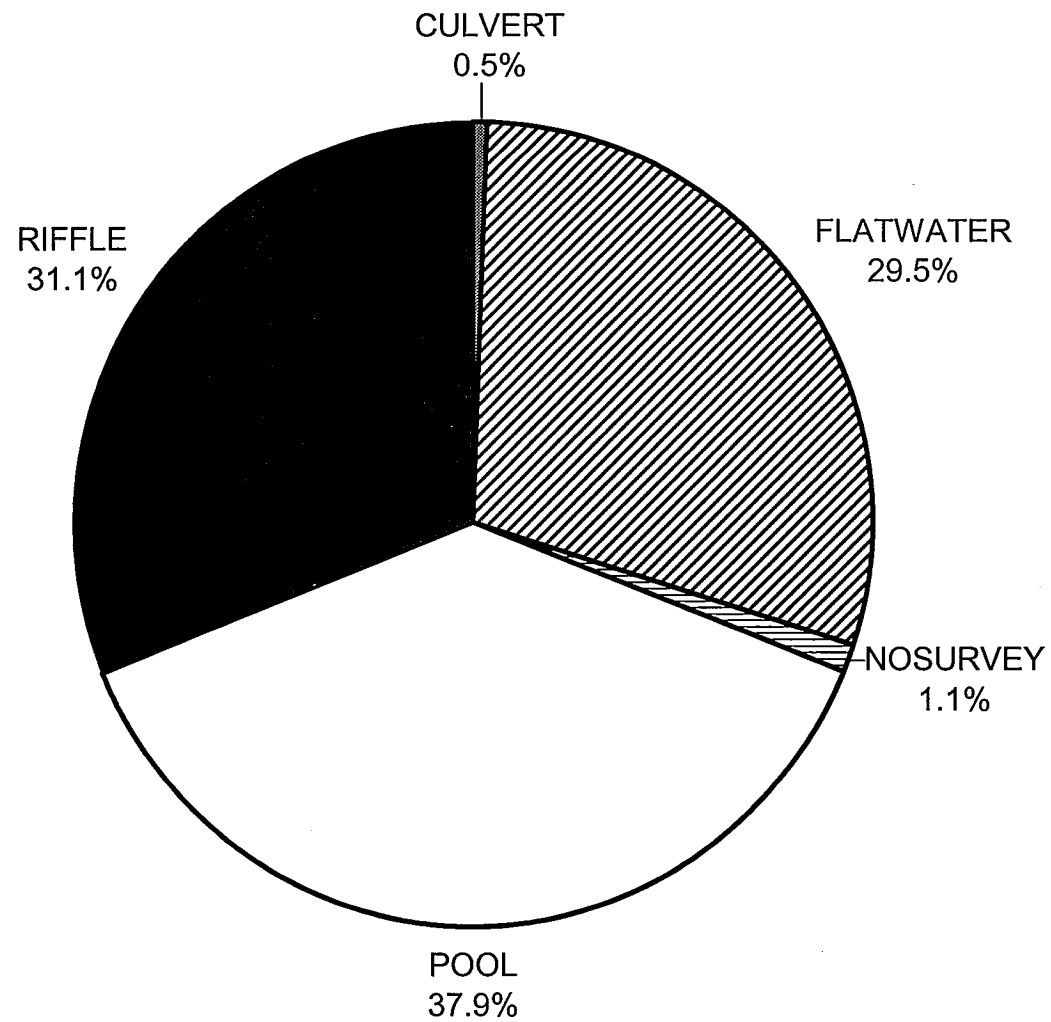
BACKWATER POOLS

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]	

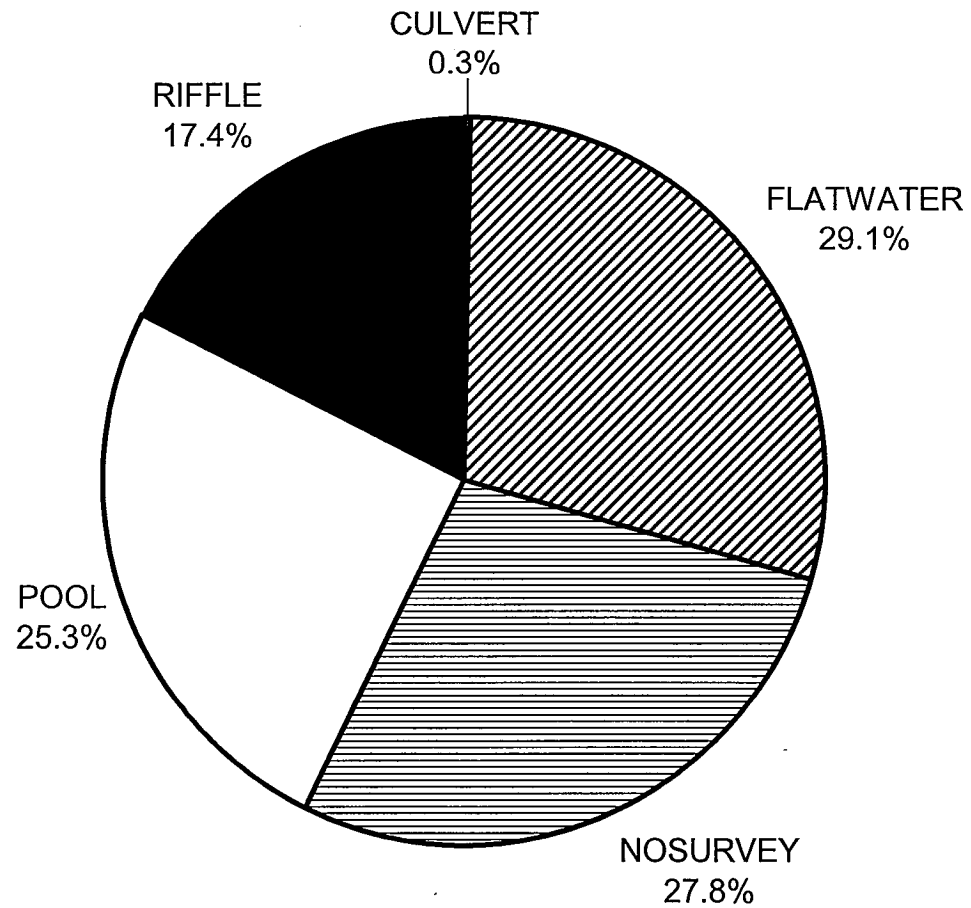
KENNY CREEK 2005
HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 1

KENNY CREEK 2005

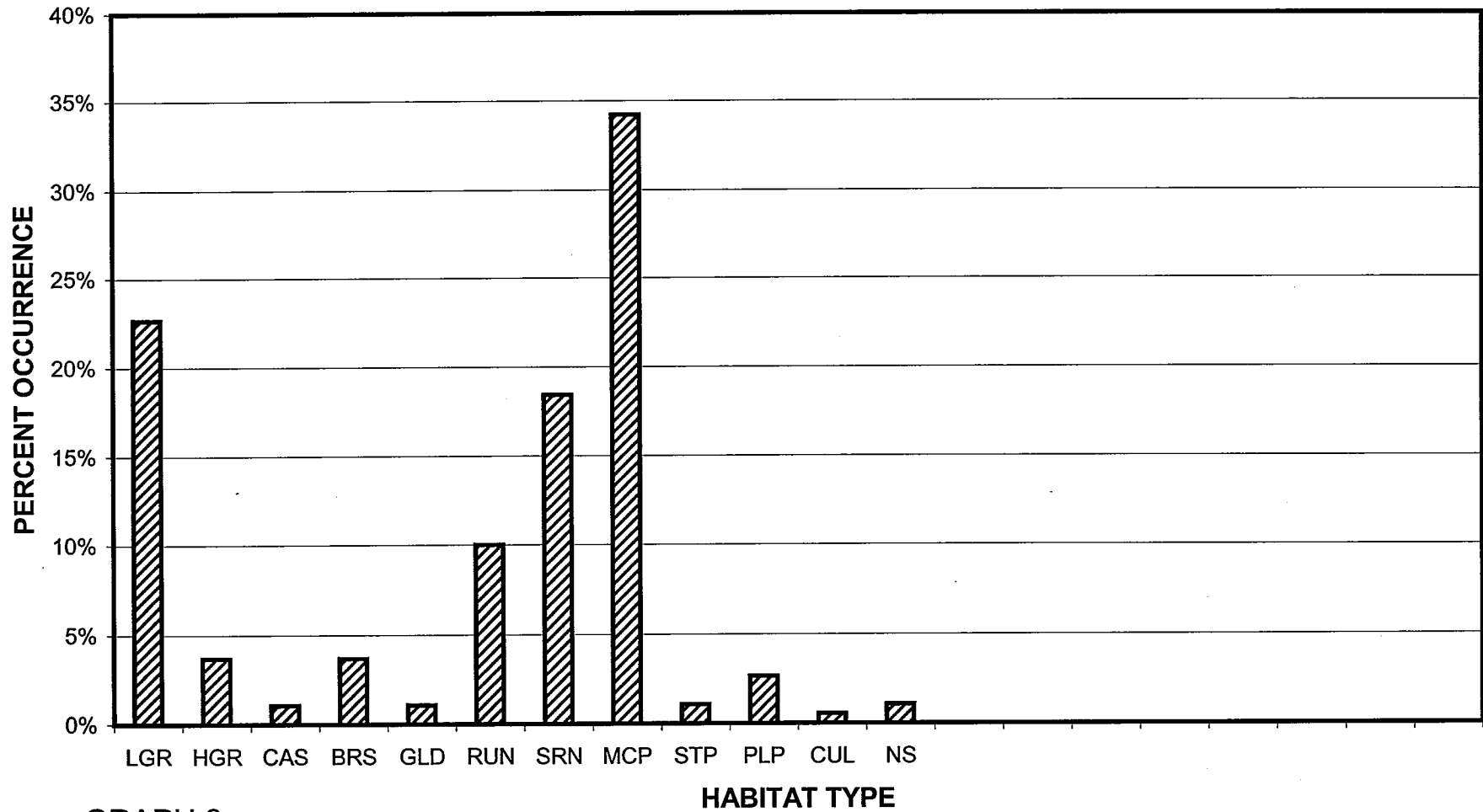
HABITAT TYPES BY PERCENT TOTAL LENGTH



GRAPH 2

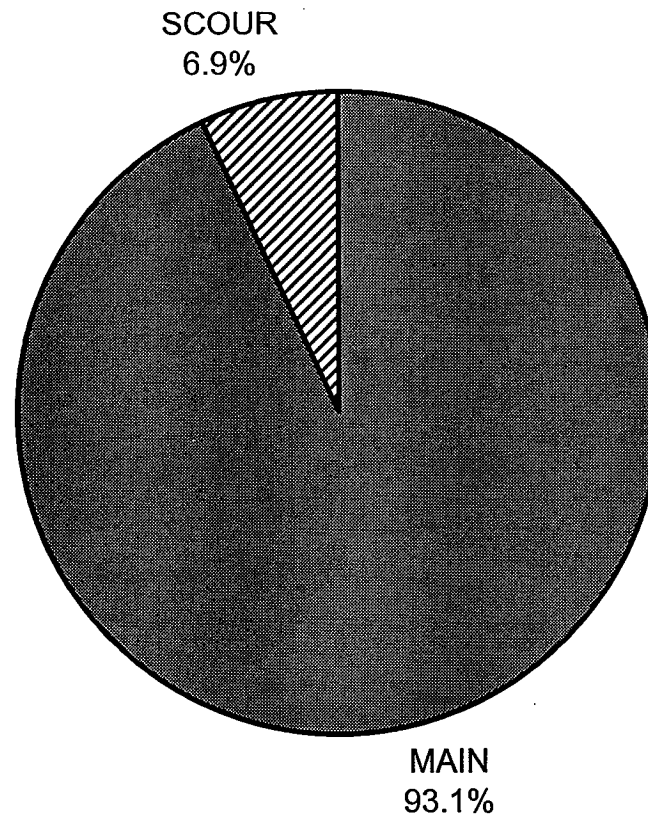
KENNY CREEK 2005

HABITAT TYPES BY PERCENT OCCURRENCE



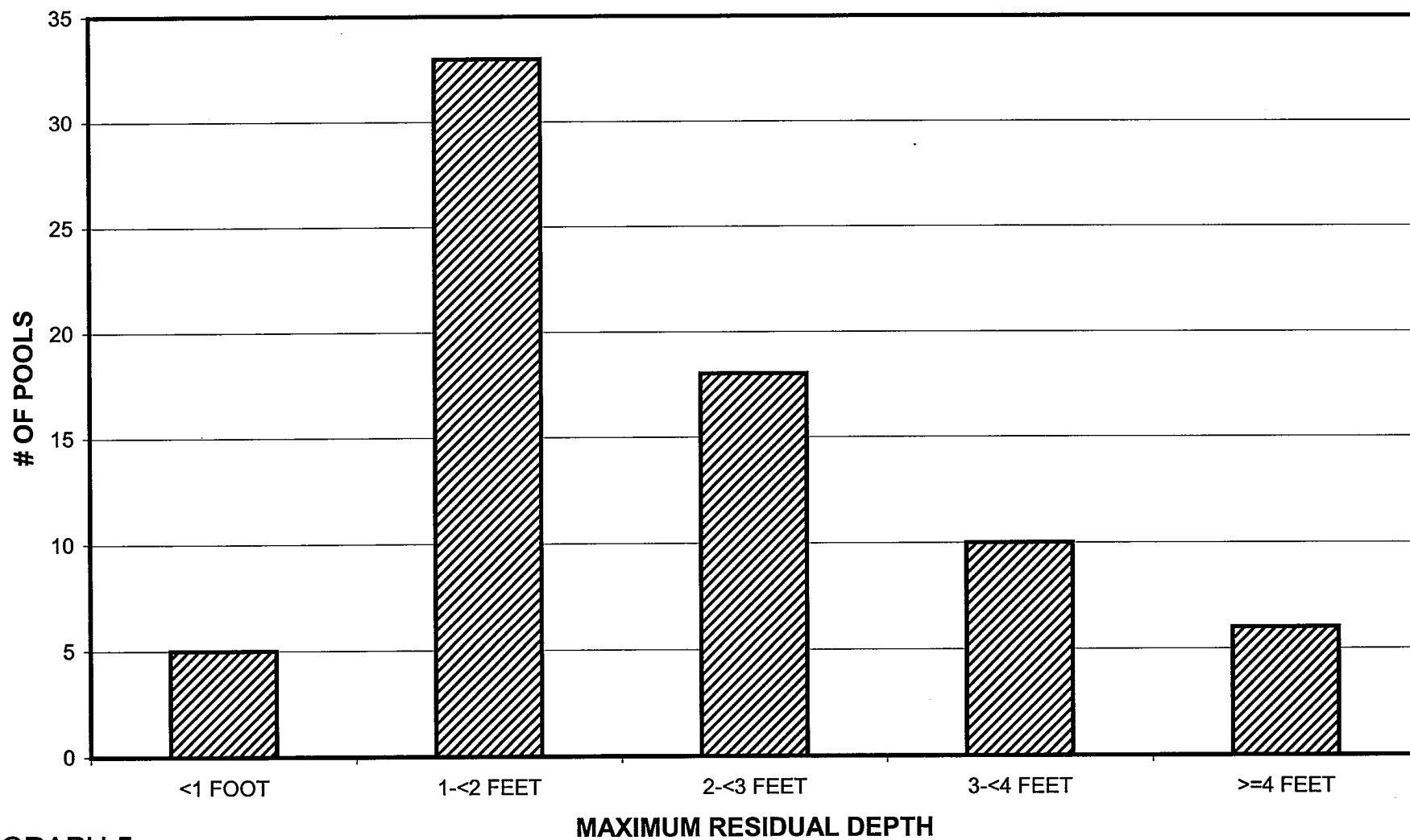
GRAPH 3

**KENNY CREEK 2005
POOL TYPES BY PERCENT OCCURRENCE**



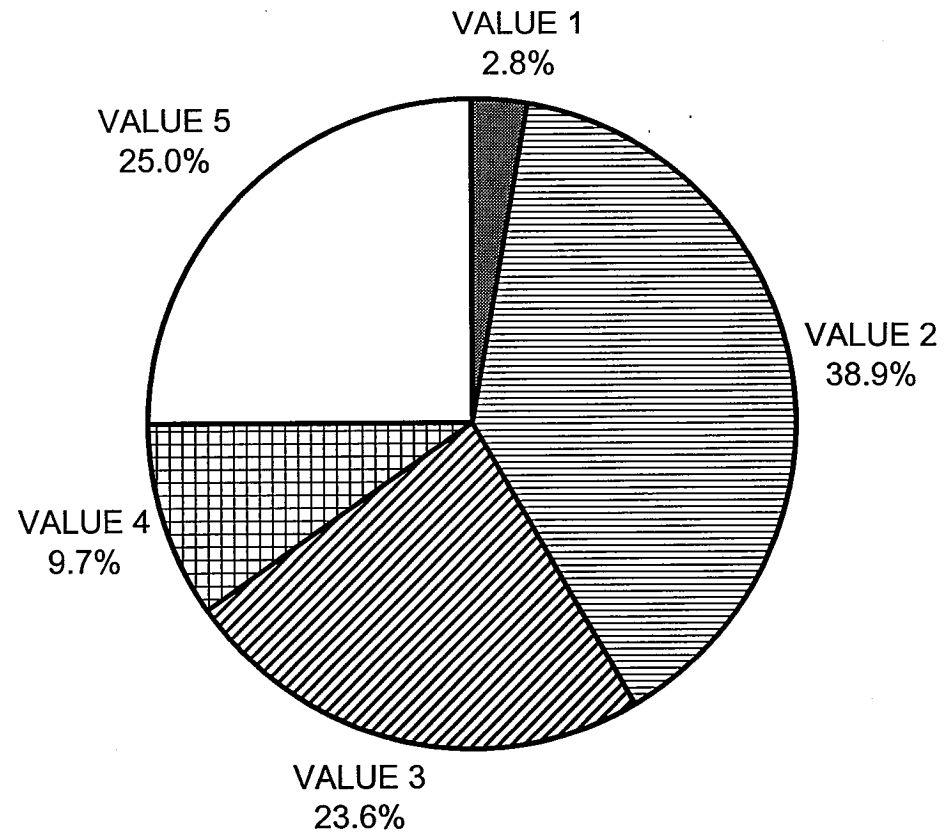
GRAPH 4

**KENNY CREEK 2005
MAXIMUM DEPTH IN POOLS**



GRAPH 5

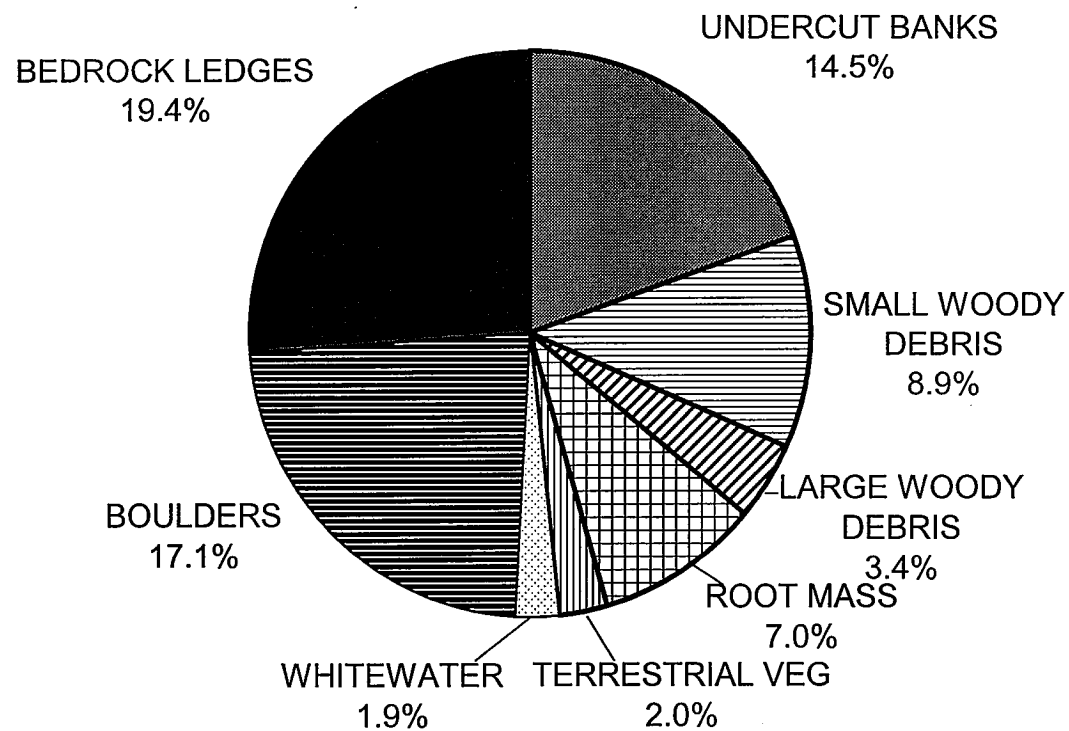
KENNY CREEK 2005 PERCENT EMBEDDEDNESS



GRAPH 6

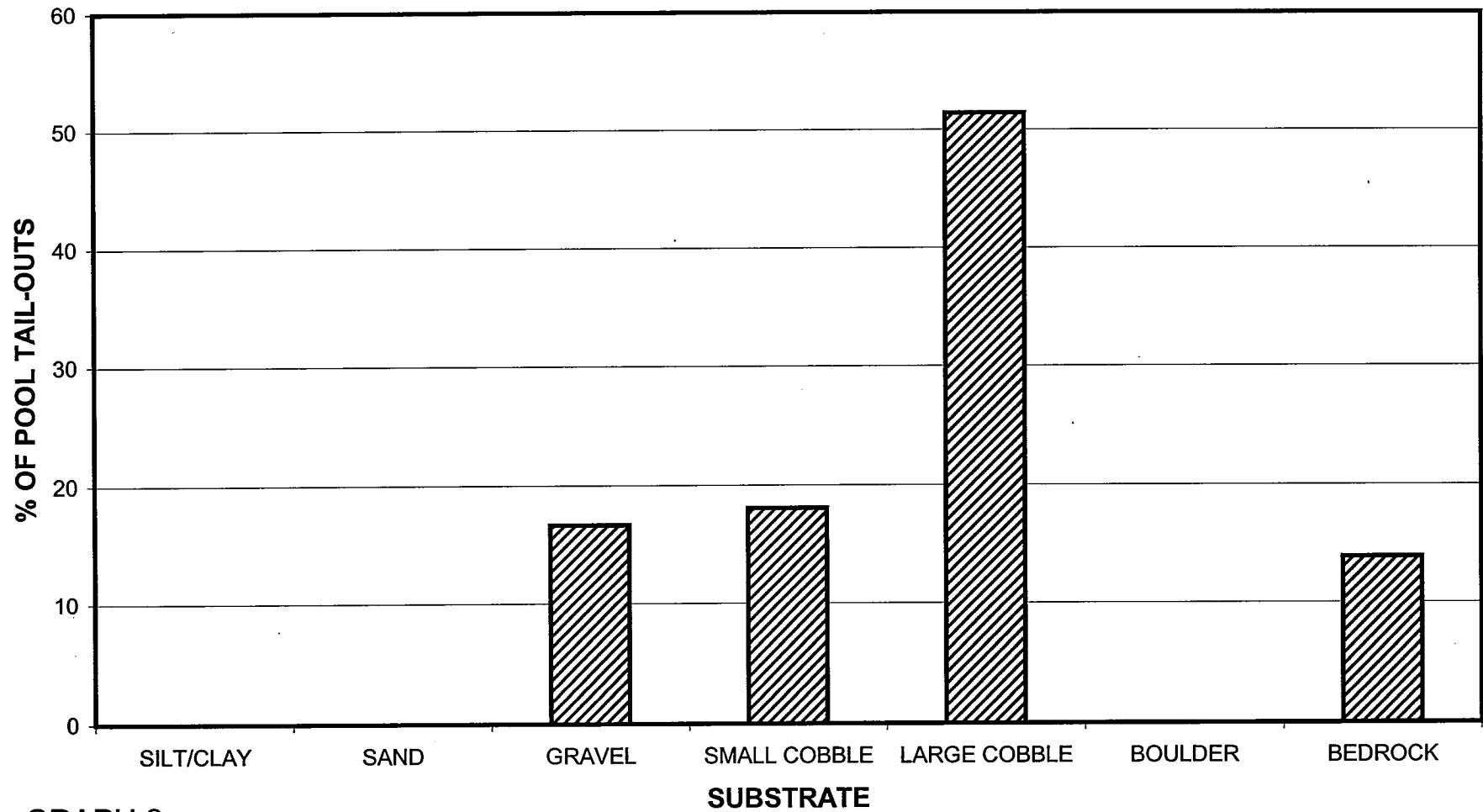
KENNY CREEK 2005

MEAN PERCENT COVER TYPES IN POOLS



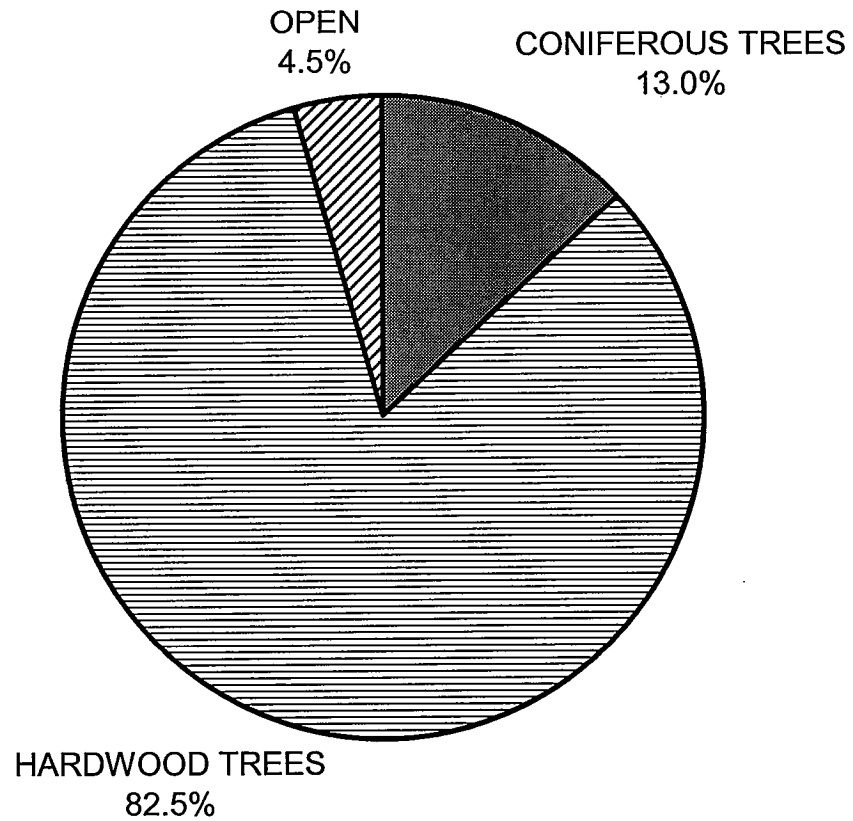
GRAPH 7

KENNY CREEK 2005
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



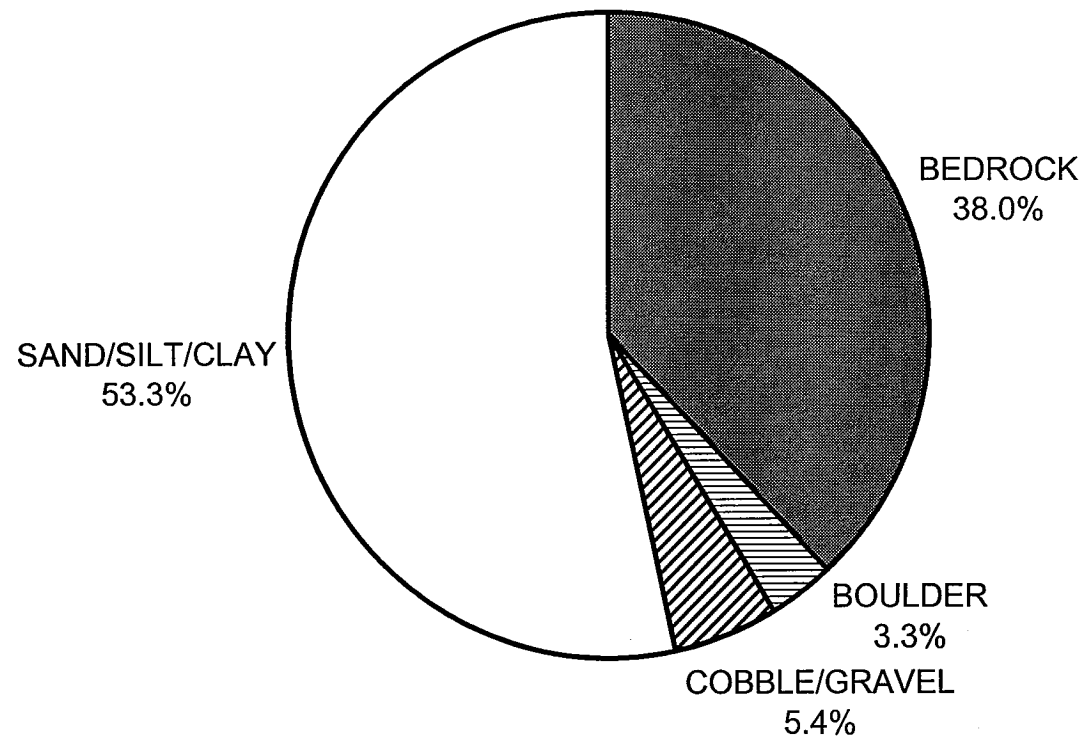
GRAPH 8

KENNY CREEK 2005 MEAN PERCENT CANOPY



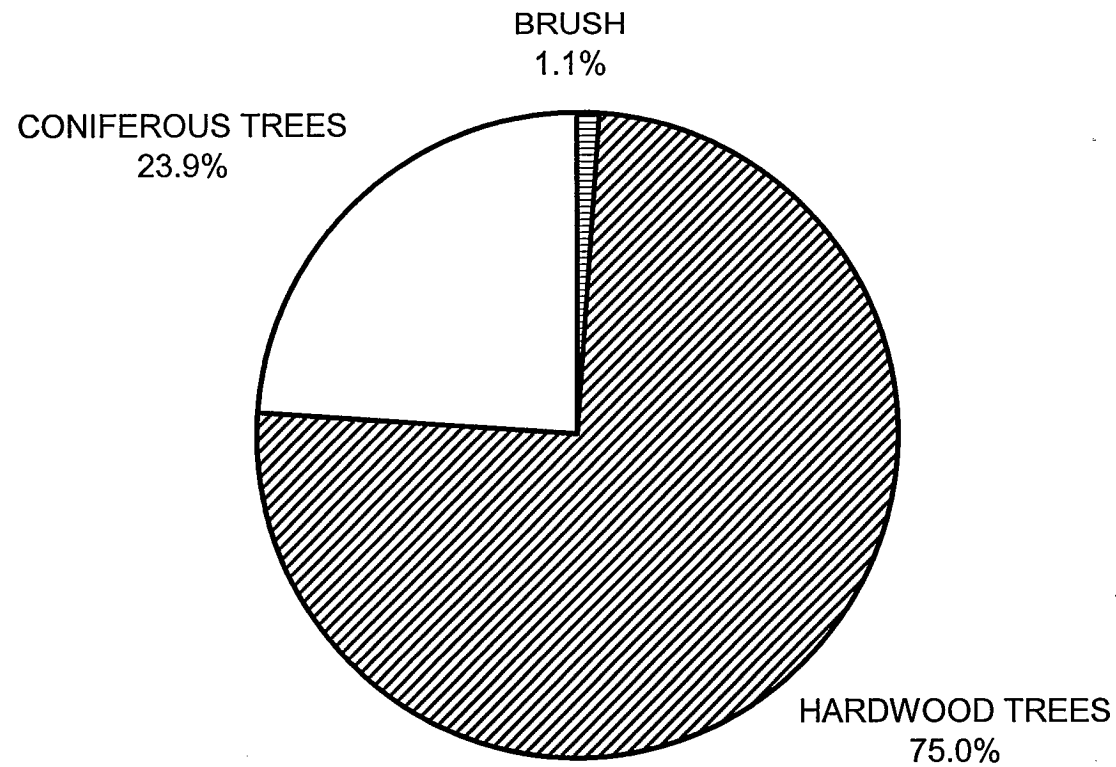
GRAPH 9

KENNY CREEK 2005
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

KENNY CREEK 2005
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Table 1 - Summary of Riffle, Flatwater, and Pool Habitat Types

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max 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
1	0	CULVERT	0.5	46	46	0.3									
56	8	FLATWATER	29.5	71	3950	29.1	11.6	0.7	1.2	493	27624	326	18263		9
2	0	NOSURVEY	1.1	1890	3779	27.8									
72	72	POOL	37.9	48	3431	25.3	13.8	1.3	2.4	687	49482	1255	90381	1028	17
59	12	RIFFLE	31.1	40	2365	17.4	11.3	0.4	0.8	236	13927	101	5930		12
<hr/>															
Total Units	Total Units Fully Measured				Total Length (ft.)					Total Area (sq.ft.)		Total Volume (cu.ft.)			
190	92				13571					91033		114574			

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Max 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	Mean Canopy (%)
43	7	LGR	22.6	44	1872	13.8	11	0.4	1	284	12223	112	4796		6	95
7	2	HGR	3.7	39	270	2.0	15	0.5	0.8	109	764	50	349		30	98
2	2	CAS	1.1	34	69	0.5	11	0.6	1.5	274	549	144	288		20	93
7	1	BRS	3.7	22	154	1.1	4	0.5	0.9	76	529	38	265		0	100
2	1	GLD	1.1	58	115	0.8	12	1.1	1.5	612	1224	673	1346		0	99
19	4	RUN	10.0	38	726	5.3	11	0.6	1.4	367	6975	199	3781		0	99
35	3	SRN	18.4	89	3109	22.9	12	0.6	1.6	622	21767	380	13297		20	95
65	65	MCP	34.2	47	3053	22.5	13	1.1	10.8	650	42250	1070	69526	863	17	96
2	2	STP	1.1	58	115	0.8	14	1.3	1.9	707	1414	1036	2071	846	10	97
5	5	PLP	2.6	53	263	1.9	22	2.7	8.5	1164	5818	3757	18784	3259	12	84
1	0	CUL	0.5	46	46	0.3										
2	0	NS	1.1	1890	3779	27.8										

Total Units
190

Total Units Fully Measured
92

Total Length (ft.)
13571

Total Area (sq.ft.)
93514

Total Volume (cu.ft.)
114503

Table 3 - Summary of Pool Types

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0W

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Residual Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Residual Pool Vol (cu.ft.)	Estimated Total Resid.Vol. (cu.ft.)	Mean Shelter Rating
67	67	MAIN	93	47	3168	92	13.2	1.1	652	43664	862	57758	17
5	5	SCOUR	7	53	263	8	22.2	2.7	1164	5818	3259	16293	12

Total Units
72

Total Units Fully Measured
72

Total Length (ft.)
3431

Total Area (sq.ft.)
49482

Total Volume (cu.ft.)
74051

Table 4 - Summary of Maximum Residual Pool Depths By Pool Habitat Types

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0W

Habitat Units	Habitat Type	Habitat Occurrence (%)	< 1 Foot Maximum Residual Depth	< 1 Foot Percent Occurrence	1 < 2 Feet Maximum Residual Depth	1 < 2 Feet Percent Occurrence	2 < 3 Feet Maximum Residual Depth	2 < 3 Feet Percent Occurrence	3 < 4 Feet Maximum Residual Depth	3 < 4 Feet Percent Occurrence	>= 4 Feet Maximum Residual Depth	>= 4 Feet Percent Occurrence
65	MCP	90	5	8	31	48	17	26	9	14	3	5
2	STP	3	0	0	2	100	0	0	0	0	0	0
5	PLP	7	0	0	0	0	1	20	1	20	3	60

Total Units	Total < 1 Foot Max Resid. Depth	Total < 1 Foot % Occurrence	Total 1 < 2 Foot Max Resid. Depth	Total 1 < 2 Foot % Occurrence	Total 2 < 3 Foot Max Resid. Depth	Total 2 < 3 Foot % Occurrence	Total 3 < 4 Foot Max Resid. Depth	Total 3 < 4 Foot % Occurrence	Total >= 4 Foot Max Resid. Depth	Total >= 4 Foot % Occurrence
72	5	7	33	46	18	25	10	14	6	8

Mean Maximum Residual Pool Depth (ft.): 2.4

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Dry Units: 0

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0W

Habitat Units	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
43	7	LGR	13	0	0	1	0	0	0	14	0
7	2	HGR	0	0	0	0	0	0	0	100	0
2	2	CAS	0	0	0	0	0	0	5	45	0
7	1	BRS	0	0	0	0	0	0	0	0	0
59	12	TOTAL RIFFLE	8	0	0	1	0	0	1	33	0
2	1	GLD	0	0	0	0	0	0	0	0	0
19	3	RUN	0	0	0	0	0	0	0	0	0
35	3	SRN	0	0	0	0	33	0	0	0	0
56	7	TOTAL FLAT	0	0	0	0	14	0	0	0	0
65	63	MCP	16	9	4	8	2	0	1	18	18
2	2	STP	5	0	0	0	0	0	3	23	20
5	5	PLP	2	16	0	2	2	0	13	4	41
72	70	TOTAL POOL	15	9	3	7	2	0	2	17	19
1	0	CUL									
2	0	NS									
190	89	TOTAL	12	7	3	6	3	0	2	18	15

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Dry Units: 0

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0W

Habitat Units	Units Fully Measured	Habitat Type	% Total Silt/Clay Dominant	% Total Sand Dominant	% Total Gravel Dominant	% Total Small Cobble Dominant	% Total Large Cobble Dominant	% Total Boulder Dominant	% Total Bedrock Dominant
43	7	LGR	0	0	0	14	86	0	0
7	2	HGR	0	0	0	0	50	50	0
2	2	CAS	0	0	0	0	50	0	50
7	1	BRS	0	0	0	0	0	0	100
2	1	GLD	0	0	0	0	100	0	0
19	4	RUN	0	0	25	0	75	0	0
35	3	SRN	0	0	0	0	100	0	0
65	65	MCP	2	0	29	11	42	2	15
2	2	STP	0	0	50	0	50	0	0
5	5	PLP	0	0	0	0	20	0	80

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
95	14	86	0	97	99

Note: Mean percent conifer and hardwood for the entire reach are means of canopy components from units with canopy values greater than zero.

Open units represent habitat units with zero canopy cover.

Table 8 - Fish Habitat Inventory Data Summary

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Survey Length (ft.): 13571

Main Channel (ft.): 13571

Side Channel (ft.): 0

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

Longitude: 123:38:27.0W

Summary of Fish Habitat Elements By Stream Reach**STREAM REACH: 1**

Channel Type: B3

Reach Length (ft.): 3893

Riffle/Flatwater Mean Width (ft.): 13.9

BFW:

Range (ft.): 23 to 29

Mean (ft.): 25

Std. Dev.: 2

Base Flow (cfs.): 0.3

Water (F): 49 - 50 Air (F): 53 - 61

Dry Channel (ft): 0

Canopy Density (%): 94.0

Coniferous Component (%): 20.3

Hardwood Component (%): 79.7

Dominant Bank Vegetation: Hardwood Trees

Vegetative Cover (%): 96.3

Dominant Shelter: Undercut Banks

Dominant Bank Substrate Type: Sand/Silt/Clay

Occurrence of LWD (%): 8

LWD per 100 ft.:

Riffles: 1

Pools: 1

Flat: 1

Pools by Stream Length (%): 34.9

Pool Frequency (%): 38.3

Residual Pool Depth (%):

< 2 Feet Deep: 35

2 to 2.9 Feet Deep: 39

3 to 3.9 Feet Deep: 17

>= 4 Feet Deep: 9

Mean Max Residual Pool Depth (ft.): 2.4

Mean Pool Shelter Rating: 32

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 4 Sm Cobble: 39 Lg Cobble: 57 Boulder: 0 Bedrock: 0

Embeddedness Values (%): 1. 8.7 2. 60.9 3. 26.1 4. 4.3 5. 0.0

STREAM REACH: 2

Channel Type: F3

Reach Length (ft.): 6601

Riffle/Flatwater Mean Width (ft.): 12.3

BFW:

Range (ft.): 18 to 31

Mean (ft.): 25

Std. Dev.: 5

Base Flow (cfs.): 0.3

Water (F): 48 - 50 Air (F): 41 - 61

Dry Channel (ft): 0

Canopy Density (%): 95.7

Coniferous Component (%): 12.5

Hardwood Component (%): 87.5

Dominant Bank Vegetation: Hardwood Trees

Vegetative Cover (%): 99.5

Dominant Shelter: Boulders

Dominant Bank Substrate Type: Bedrock

Occurrence of LWD (%): 0

LWD per 100 ft.:

Riffles: 0

Pools: 0

Flat: 0

Pools by Stream Length (%): 26.0

Pool Frequency (%): 47.1

Residual Pool Depth (%):

< 2 Feet Deep: 45

2 to 2.9 Feet Deep: 24

3 to 3.9 Feet Deep: 18

>= 4 Feet Deep: 12

Mean Max Residual Pool Depth (ft.): 2.9

Mean Pool Shelter Rating: 9

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 15 Sm Cobble: 6 Lg Cobble: 48 Boulder: 0 Bedrock: 30

Embeddedness Values (%): 1. 0.0 2. 30.3 3. 18.2 4. 6.1 5. 45.5

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 3

Channel Type: B3 Reach Length (ft.): 3077 Riffle/Flatwater Mean Width (ft.): 7.7 BFW: Range (ft.): 21 to 24 Mean (ft.): 23 Std. Dev.: 1 Base Flow (cfs.): 0.3 Water (F): 48 - 51 Air (F): 52 - 58 Dry Channel (ft): 0	Canopy Density (%): 96.9 Coniferous Component (%): 7.4 Hardwood Component (%): 92.6 Dominant Bank Vegetation: Hardwood Trees Vegetative Cover (%): 96.9 Dominant Shelter: Boulders Dominant Bank Substrate Type: Sand/Silt/Clay Occurrence of LWD (%): 0 LWD per 100 ft.: Riffles: 1 Pools: 1 Flat: 0	Pools by Stream Length (%): 11.6 Pool Frequency (%): 26.7 Residual Pool Depth (%): < 2 Feet Deep: 94 2 to 2.9 Feet Deep: 6 3 to 3.9 Feet Deep: 0 >= 4 Feet Deep: 0 Mean Max Residual Pool Depth (ft.): 1.3 Mean Pool Shelter Rating: 11
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Pool Tail Substrate (%):	Silt/Clay: 0	Sand: 0	Gravel: 38	Sm Cobble: 13	Lg Cobble: 50	Boulder: 0	Bedrock: 0
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Embeddedness Values (%):	1. 0.0	2. 25.0	3. 31.3	4. 25.0	5. 18.8
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Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

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Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	27	43	38.0
Boulder	5	1	3.3
Cobble / Gravel	4	6	5.4
Sand / Silt / Clay	56	42	53.3

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	0	0	0.0
Brush	0	2	1.1
Hardwood Trees	66	72	75.0
Coniferous Trees	26	18	23.9
No Vegetation	0	0	0.0

Total Stream Cobble Embeddedness Values:

3

Table 10 - Mean Percent of Shelter Cover Types For Entire Stream

StreamName: Kenny Creek

LLID: 1236407396592

Drainage: Eel River - South Fork

Survey Dates: 10/24/2005 to 10/25/2005

Confluence Location: Quad: LINCOLN RIDGE

Legal Description: T21NR16WS22

Latitude: 39:39:33.0N

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	Riffles	Flatwater	Pools
UNDERCUT BANKS (%)	8	0	15
SMALL WOODY DEBRIS (%)	0	0	9
LARGE WOODY DEBRIS (%)	0	0	3
ROOT MASS (%)	1	0	7
TERRESTRIAL VEGETATION (%)	0	14	2
AQUATIC VEGETATION (%)	0	0	0
WHITewater (%)	1	0	2
BOULDERS (%)	33	0	17
BEDROCK LEDGES (%)	0	0	19