STREAM INVENTORY REPORT

Noyo River

INTRODUCTION

A stream inventory was conducted beginning June 1, 2004 and ending June 21, 2004 on Noyo River. The survey began at Gulch 31 approximately 20.3 miles from the confluence with the Pacific Ocean and extended upstream 13.5 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in Noyo River.

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

Noyo River is a tributary to the Pacific Ocean, located in Mendocino County, California (Map 1). Noyo River's legal description at the confluence with the Pacific Ocean is T18N R18W S13. Its location is 39°25'40" north latitude and 123°48'32" west longitude, LLID number 1238090394278. Noyo River is a fourth order stream and has approximately 34.17 miles of blue line stream according to the USGS Fort Bragg, Noyo Hill, Northspur, and Burbeck 7.5 minute quadrangles. Noyo River drains a watershed of approximately 113 square miles. Elevations range from about 0 feet at the mouth of the river to 3,173 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is primarily privately owned with portion owned by Jackson Demonstration State forest Jackson State by state park and is managed for timber production/rangeland/recreation. Vehicle access exists via Highway 20 to Road 200, approximately 18 miles west of the town of Willits. Road 200 is not marked but can be found just to the east of a bridge over Chamberlain Creek. Follow Road 200 north approximately 5 miles to a junction of 4 roads at Three Chop Ridge. Continue north on Road 1060 and down into the Noyo River watershed for 2.5 miles until reaching Camp Mendocino and the Noyo River. The survey began 1.3 miles downstream at the confluence with Gulch Thirtyone.

METHODS

The habitat inventory conducted in Noyo River follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Conservation Corps (CCC) members that conducted the inventory were trained in standardized habitat inventory methods by the California Department of Fish and Game (DFG). This inventory was conducted by a two-person team.

SAMPLING STRATEGY

The inventory uses a method that samples approximately 10% of the habitat units within the survey reach. All habitat units included in the survey are classified according to habitat type and their lengths are measured. All pool units are measured for maximum depth, depth of pool tail crest (measured in the thalweg), dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are measured for all the parameters and characteristics on the field form. Additionally, from the ten habitat units on each field form page, one is randomly selected for complete measurement. All 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 Noyo River 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". Noyo River habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted

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

5. Embeddedness:

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

7. Substrate Composition:

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

8. Canopy:

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

the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

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.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.3, 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)
- 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 Noyo River include:

- Riffle, Flatwater, Pool Habitat Types by Percent Occurrence
- Riffle, Flatwater, Pool Habitat Types by Total Length
- Total Habitat Types by Percent Occurrence

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- 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 June 1 to June 21, 2004 was conducted by S. Thompson and A. Salyer (CCC). The total length of the stream surveyed was 71,488 feet with an additional 471 feet of side channel.

Stream flow was measured 500 feet from the confluence with North Fork Noyo River with a Marsh-McBirney Model 2000 flowmeter at 13.3 cfs on May 27, 2004.

Noyo River is an F4 channel type for 17,304 feet of the stream surveyed (Reach 1) and an F3 channel for 54,184 feet of the stream surveyed (Reach 2). F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. F3 channels are entrenched meandering riffle/pool channels on low gradients with high width/depth ratio and cobble dominant substrates.

Water temperatures taken during the survey period ranged from 54 to 62 degrees Fahrenheit. Air temperatures ranged from 55 to 87 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 37% pool units, 33% flatwater units, and 30% riffle units (Graph 1). Based on total length of Level II habitat types there were 48% flatwater units, 37% pool units, and 15% riffle units (Graph 2).

Sixteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were low-gradient riffles, 28%; mid-channel pools, 22%; and step runs, 17% (Graph 3). Based on percent total length, step runs made up 28%, mid-channel pools 28%, and runs 19%.

A total of 193 pools were identified (Table 3). Main-channel pools were the most frequently encountered, at 64%, and comprised 77% 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. One hundred forty-three of the 193 pools (74%) had a residual depth of three feet or greater (Graph 5).

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The depth of cobble embeddedness was estimated at pool tail-outs. Of the 194 pool tail-outs measured, 124 had a value of 1 (63.9%); 45 had a value of 2 (23.2%); 7 had a value of 3 (3.6%); 18 had a value of 5 (9.3%) (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 like bedrock, log sills, and boulders.

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 10, flatwater habitat types had a mean shelter rating of 6, and pool habitats had a mean shelter rating of 32 (Table 1). Of the pool types, the main channel pools had a mean shelter rating of 28, scour pools had a mean shelter rating of 40, backwater pools had a mean shelter rating of 20 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris is the dominant cover type in Noyo River. Graph 7 describes the pool cover in Noyo River. Large woody debris is the dominant pool cover type followed by bedrock ledges.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 59% of pool tail-outs while small cobble was the next most frequently observed substrate type, at 26%.

The mean percent canopy density for the surveyed length of Noyo River was 94%. The mean percentages of hardwood and coniferous trees were 69% and 25%, respectively, with 6% of the canopy open. Graph 9 describes the mean percent canopy in Noyo River.

For the stream reach surveyed, the mean percent right bank vegetated was 86%. The mean percent left bank vegetated was 88%. The dominant elements composing the structure of the stream banks consisted of 20% bedrock, 1% boulder, 6% cobble/gravel, and 73% sand/silt/clay, (Graph 10). Coniferous trees were the dominant vegetation type observed in 51% of the units surveyed. Additionally, 43% of the units surveyed had hardwood trees as the dominant vegetation type (Graph 11).

DISCUSSION

Noyo River is an F4 channel type for the first 17,304 feet of the stream surveyed (Reach 1) and an F3 channel type for the remaining 54,184 feet of the stream surveyed (Reach 2). The suitability of F4 and F3 channel types for fish habitat improvement structures are as follows: F4 channel types are good for bank-placed boulders, fair for plunge weirs, single and opposing wing deflectors, channel constrictors, and log cover. F3 channel types are good for bank-placed boulders, single and opposing wing deflectors, fair for plunge weirs, boulder clusters, channel constrictors, and log cover.

The water temperatures recorded on the survey days were suitable 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.

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Flatwater habitat types comprised 48% of the total length of this survey, riffles 15%, and pools 37%. The pools are relatively deep, with 143 of the 193 (74%) pools having a maximum residual depth greater than 3 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In third order streams, a primary pool is defined to have a maximum residual depth of at least three feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width.

One hundred sixty-nine of the 194 pool tail-outs measured had embeddedness ratings of 1 or 2. Seven 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.

One hundred fifty-nine of the 188 pool tail-outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean shelter rating for pools was 32. The shelter rating in the flatwater habitats was 6. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by large woody debris in Noyo River. Large woody debris is the dominant cover type in pools followed by bedrock ledges.

The mean percent canopy density for the stream was 94%. Reach 1 had a canopy density of 91% and Reach 2 had a canopy density of 95%.

The percentage of right and left bank covered with vegetation was high at 86% and 88%, respectively.

RECOMMENDATIONS

1) Noyo River 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) 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.

5) There are several log debris accumulations present on Noyo River that are retaining large quantities of fine sediment. The modification of these debris accumulations is desirable,

but must be done carefully, over time, to avoid excessive sediment loading in downstream reaches.

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:
00001	0001	Start of survey at Gulch Thirty-one.
00334	0004	Lamprey redd. Salmonids present.
00685	0006	Lamprey redd.
00685	0006	Channel type taken.
00982	0008	Lamprey redd, 1 foot diameter.
01482	0013	Lamprey redd.
01656	0016	Train tracks visible from stream.
01656	0016	LDA 200 feet into unit.
01656	0016	Multiple lamprey redds.
02512	0018	Train tracks leaving right bank.
02640	0019	House on right bank.
02711	0020	Left ban k tributary, cascading and non fish bearing.
04159	0031	Left bank tributary 20 feet into unit.
06596	0043	Walking bridge at the end of unit.
07602	0048	Steal bridge 40 feet into unit, salmonids present.
07602	0048	Salmonids present.
09613	0057	Log bridge 75 feet into unit, road on left bank.
10414	0061	Left bank tributary 90 feet into unit.

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12156	0071	Left ban k tributary at beginning of unit.
13557	0078	Left bank tributary 40 feet into unit.
13792	0079	Train tracks visible on right bank.
17304	0101	Channel type #2; F3 channel.
17421	0102	Left bank tributary (North Fork Noyo River).
18369	0112	Rail road bridge at end of unit.
22610	0141	Bridge on right bank at end of unit.
24317	0154	Left bank tributary 100 feet into unit, non fish bearing.
24317	0154	Bridge on right bank at 100 feet into unit.
27142	0178	Rail road bridge 60 feet into unit.
27944	0186	Salmonids present.
29828	0198	Steal bridge at beginning of unit.
30473	0205	Bridge 75 feet into unit.
30621	0206	House on right bank 180 feet into unit.
31557	0211	Left bank tributary 600 feet into unit, salmonids present.
35710	0228	Rail road bridge at beginning of unit.
36640	0234	Left bank tributary 160 feet into unit.
37185	0237	Placed dam structure at end of unit.
39465	0258	Lamprey observed.
43481	0298	Right bank tributary 17 feet into unit.
43516	0299	Bridge 42 feet into unit.
44511	0305	Left bank tributary at beginning of unit.
49728	0341	Bridge 260 feet into unit.
51789	0358	LDA 100 feet into unit.

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57106	0399	Right bank tributary at end of unit.
57621	0403	Bridge 145 feet into unit.
59098	0410	Bridge 300 feet into unit.
63117	0438	Bridge 311 feet into unit.
65415	0463	Rail Road crosses river 115 feet into unit.
67238	0476	LDA 90 feet into unit.
69295	0493	Left bank tributary at 125 feet into unit.
69501	0494	Salmonids present.
70076	0504	Salmonids present.
70076	0504	LDA.
70311	0505	Salmonids present.
71159	0512	Steal culvert 150 feet into unit.
71501	0515	End of survey at vertical waterfall, approximately 20 feet high and impassable to survey team.

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

Stream Name: Noyo River Drainage: Noyo River

Survey Dates: 6/1/2004 to 6/21/2004

Confluence Location: Quad: FORT BRAGG Legal Description: T18NR18WS13 Latitude: 39:25:40.0N Longitude: 123:48:32.0

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Percent 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
172	21	FLATWATER	33.0	200	34421	47.8	15.0	0.9	2.1	2705	465212	2539	436674		6
193	193	POOL	37.0	139	26913	37.4	22.3	1.5	4.4	3518	678933	7448	1437435	5238	32
156	12	RIFFLE	29.9	68	10625	14.8	17.2	0.7	1.4	878	137014	705	109968		10

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
521	226	71959	1281158	1984076

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Noyo River Drainage: Noyo River

Survey Dates: 6/1/2004 to 6/21/2004

Confluence Location: Quad: FORT BRAGG Legal Description: T18NR18WS13 Latitude: 39:25:40.0N Longitude: 123:48:32.0W

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 (%)
147	10	LGR	28.2	68	10025	13.9	18	0.7	2.8	913	134193	693	101903		7	93
9	2	HGR	1.7	67	600	0.8	13	1.1	2.3	705	6348	763	6871		25	97
1	0	GLD	0.2	126	126	0.2										
84	10	RUN	16.1	164	13815	19.2	19	1.0	3	3405	286052	3233	271606		6	94
87	11	SRN	16.7	235	20480	28.5	11	0.7	2.7	2068	179895	1907	165939		6	96
116	116	MCP	22.3	171	19874	27.6	24	1.4	34	4572	530355	9594	1112925	6526	28	93
2	2	CCP	0.4	74	148	0.2	23	1.4	3.1	1780	3560	3038	6075	1552	3	96
5	5	STP	1.0	119	596	0.8	18	1.3	4.9	2026	10129	3840	19202	3133	30	94
22	22	CRP	4.2	97	2131	3.0	22	2.2	14	2333	51332	6490	142771	5407	22	95
16	16	LSL	3.1	74	1180	1.6	18	1.5	7.1	1285	20557	2316	37061	1833	54	94
16	16	LSR	3.1	81	1302	1.8	18	1.6	7.5	1493	23880	3151	50412	2569	51	95
4	4	LSBk	0.8	126	506	0.7	23	2.2	9.7	2723	10892	6895	27578	5273	20	98
3	3	LSBo	0.6	134	403	0.6	23	0.4	3.4	3287	9860	3931	11794	1157	47	90
7	7	PLP	1.3	79	551	0.8	19	1.5	7.6	1688	11819	3105	21736	2515	48	97
1	1	BPR	0.2	74	74	0.1	30	0.6	2.1	2109	2109	2109	2109	1265	20	92
1	1	BPL	0.2	148	148	0.2	30	1.1	3.2	4440	4440	5772	5772	4884	20	100

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
521	226	71959	1285420	1983754

Table 3 - Summary of Pool Types

Stream Name: Noyo River Drainage: Noyo River
Survey Dates: 6/1/2004 to 6/21/2004
Confluence Location: Quad: FORT BRAGG Legal Description: T18NR18WS13 Latitude: 39:25:40.0N Longitude: 123:48:32.0W

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
123	123	MAIN	64	168	20618	77	23.7	1.4	4423	544044	6303	762700	28
68	68	SCOUR	35	89	6073	23	19.7	1.7	1887	128340	3405	231562	40
2	2	BACKWATER	1	111	222	1	30.0	0.9	3275	6549	3075	6149	20

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
193	193	26913	678932.5	1000411

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

Stream Name: Noyo River Drainage: Noyo River
Survey Dates: 6/1/2004 to 6/21/2004
Confluence Location: Quad: FORT BRAGG Legal Description: T18NR18WS13 Latitude: 39:25:40.0N Longitude: 123:48:32.0W

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
116	MCP	60	0	0	5	4	27	23	28	24	56	48
2	CCP	1	0	0	0	0	1	50	1	50	0	0
5	STP	3	0	0	0	0	0	0	2	40	3	60
22	CRP	11	0	0	0	0	4	18	7	32	11	50
16	LSL	8	0	0	1	6	2	13	8	50	5	31
16	LSR	8	0	0	0	0	3	19	6	38	7	44
4	LSBk	2	0	0	0	0	0	0	1	25	3	75
3	LSBo	2	0	0	0	0	2	67	1	33	0	0
7	PLP	4	0	0	0	0	4	57	1	14	2	29
1	BPR	1	0	0	0	0	1	100	0	0	0	0
1	BPL	1	0	0	0	0	0	0	1	100	0	0

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
193	0	0	6	3	44	23	56	29	87	45

Mean Maximum Residual Pool Depth (ft.): 4.4

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Noyo River | Drainage: Noyo River
Survey Dates: 6/1/2004 to 6/21/2004 | Dry Units: 0
Confluence Location: Quad: FORT BRAGG | Legal Description: T18NR18WS13 Latitude: 39:25:40.0N Longitude: 123:48:32.0W

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
147	10	LGR	5	0	5	0	0	3	5	8	15
9	2	HGR	0	0	0	0	0	20	3	63	15
156	12	TOTAL RIFFLE	4	0	4	0	0	5	5	17	15
1	0	GLD									
84	11	RUN	26	1	2	1	0	0	0	7	26
87	11	SRN	14	5	22	0	0	0	0	23	10
172	22	TOTAL FLAT	20	3	12	0	0	0	0	15	18
116	116	MCP	14	9	18	6	4	1	1	11	27
2	2	CCP	0	0	0	0	30	0	0	20	0
5	5	STP	8	22	40	10	8	0	0	0	12
22	22	CRP	10	8	26	4	2	0	0	7	25
16	16	LSL	7	17	55	5	2	2	0	10	3
16	16	LSR	15	12	28	42	1	1	0	1	1
4	4	LSBk	3	8	13	3	0	0	0	4	71
3	3	LSBo	5	2	0	0	13	0	0	68	12
7	7	PLP	11	14	57	2	0	0	4	11	0
1	1	BPR	0	0	0	100	0	0	0	0	0
1	1	BPL	0	10	30	5	0	0	0	0	55
193	193	TOTAL POOL	12	10	24	9	3	1	1	10	22
521	227	TOTAL	12	9	22	8	3	1	1	11	21

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Noyo River | Drainage: Noyo River
Survey Dates: 6/1/2004 to 6/21/2004 | Dry Units: 0
Confluence Location: Quad: FORT BRAGG | Legal Description: T18NR18WS13 Latitude: 39:25:40.0N Longitude: 123:48:32.0W

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
147	10	LGR	0	0	30	50	10	0	10
9	2	HGR	0	0	0	0	50	0	50
1	0	GLD	0	0	0	0	0	0	0
84	9	RUN	0	0	33	56	0	0	11
87	14	SRN	0	7	43	29	14	0	7
116	115	MCP	0	20	44	25	3	1	7
2	2	CCP	0	0	100	0	0	0	0
5	5	STP	0	40	20	40	0	0	0
22	22	CRP	0	68	23	5	5	0	0
16	16	LSL	0	31	31	31	0	6	0
16	16	LSR	0	31	38	25	6	0	0
4	4	LSBk	0	0	100	0	0	0	0
3	3	LSBo	0	0	33	67	0	0	0
7	7	PLP	0	43	29	14	0	0	14
1	1	BPR	0	0	100	0	0	0	0
1	1	BPL	0	0	100	0	0	0	0

Noyo River

Table 8 - Fish Habitat Inventory Data Summary

Stream Name: Noyo River | LLID: 1238090394278 | Drainage: Noyo River

Survey Dates: 6/1/2004 to 6/21/2004 | Survey Length (ft.): 71959 | Main Channel (ft.): 71488 | Side Channel (ft.): 471

Confluence Location: Quad: FORT BRAGG | Legal Description: T18NR18WS13 | Latitude: 39:25:40.0N | Longitude: 123:48:32.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: F4	Canopy Density (%): 91	Pools by Stream Length (%): 65
Reach Length (ft.): 17304	Coniferous Component (%): 34	Pool Frequency (%): 44
Riffle/Flatwater Mean Width (ft.): 25.8	Deciduous Component (%): 66	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Deciduous Trees	< 2 Feet Deep: 4
Range (ft.): 30 to 66	Vegetative Cover (%): 86	2 to 2.9 Feet Deep: 24
Mean (ft.): 49	Dominant Shelter: Boulders	3 to 3.9 Feet Deep: 11
Std. Dev.: 9	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 60
Base Flow (cfs.): 3.3	Occurrence of LWD (%): 13	Mean Max Residual Pool Depth (ft.): 5.9
Water (F): 55 - 60 Air (F): 55 - 75	LWD per 100 ft.:	Mean Pool Shelter Rating: 36
Dry Channel (ft): 0	Riffles: 0	
	Pools: 1	
	Flat: 0	

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 2 Gravel: 67 Sm Cobble: 22 Lg Cobble: 2 Boulder: 0 Bedrock: 7

Embeddedness Values (%): 1. 78 2. 13 3. 2 4. 0 5. 7

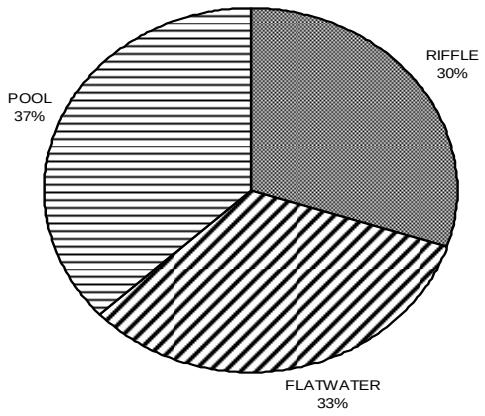
STREAM REACH: 2

Channel Type: F3	Canopy Density (%): 95	Pools by Stream Length (%): 29
Reach Length (ft.): 54184	Coniferous Component (%): 25	Pool Frequency (%): 35
Riffle/Flatwater Mean Width (ft.): 14.1	Deciduous Component (%): 75	Residual Pool Depth (%):
BFW:	Dominant Bank Vegetation: Evergreen Trees	< 2 Feet Deep: 3
Range (ft.): 14 to 62	Vegetative Cover (%): 87	2 to 2.9 Feet Deep: 22
Mean (ft.): 35	Dominant Shelter: Large Woody Debris	3 to 3.9 Feet Deep: 34
Std. Dev.: 11	Dominant Bank Substrate Type: Sand/Silt/Clay	>= 4 Feet Deep: 41
Base Flow (cfs.): 3.3	Occurrence of LWD (%): 24	Mean Max Residual Pool Depth (ft.): 4.0
Water (F): 54 - 62 Air (F): 59 - 87	LWD per 100 ft.:	Mean Pool Shelter Rating: 31
Dry Channel (ft): 0	Riffles: 0	
	Pools: 1	
	Flat: 0	

Pool Tail Substrate (%): Silt/Clay: 1 Sand: 1 Gravel: 56 Sm Cobble: 27 Lg Cobble: 7 Boulder: 0 Bedrock: 8

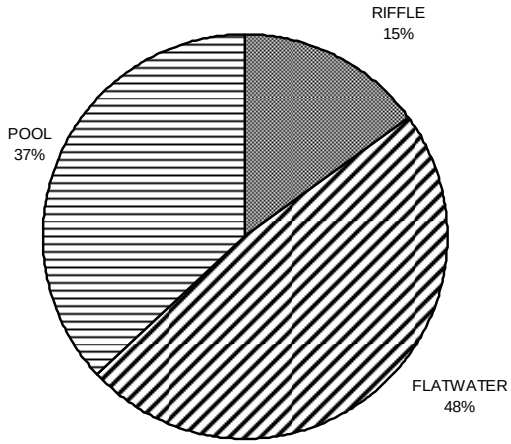
Embeddedness Values (%): 1. 59 2. 26 3. 4 4. 0 5. 10

NOYO RIVER
HABITAT TYPES BY PERCENT OCCURRENCE



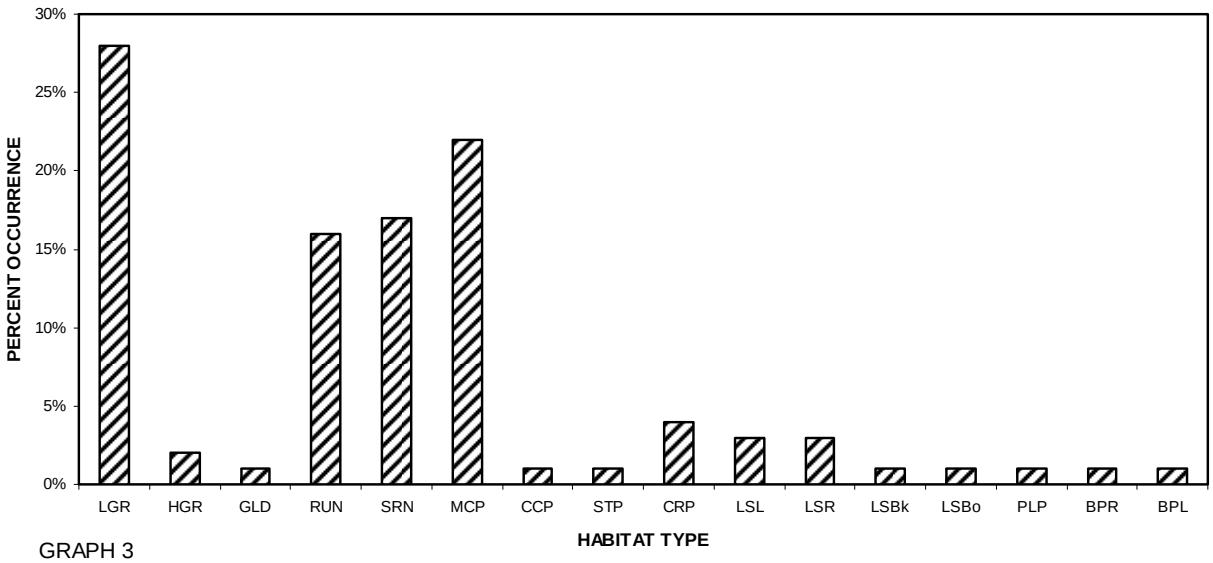
GRAPH 1

NOYO RIVER
HABITAT TYPES BY PERCENT TOTAL LENGTH



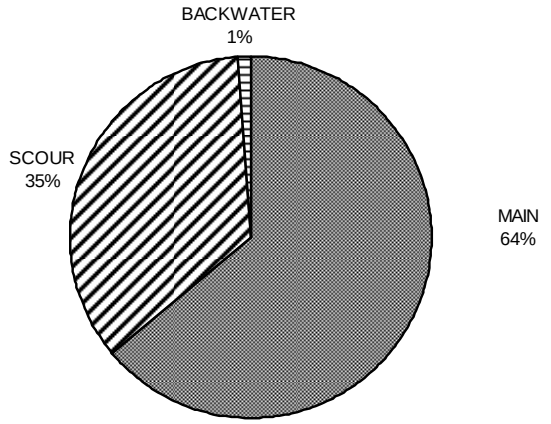
GRAPH 2

NOYO RIVER
HABITAT UNIT TYPES BY PERCENT OCCURRENCE



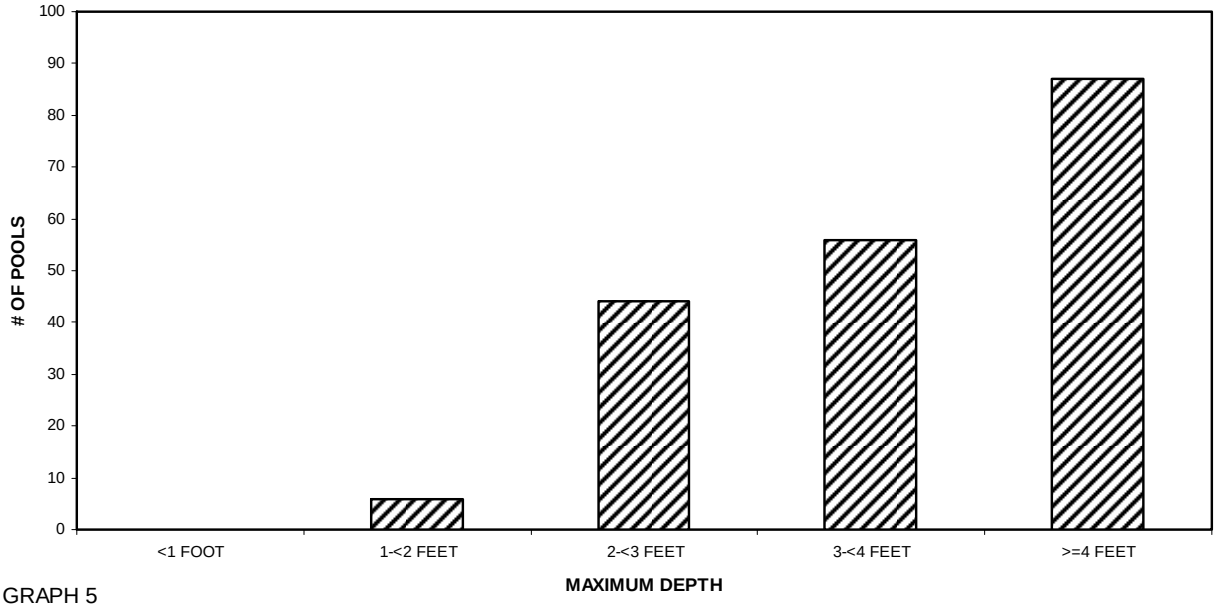
GRAPH 3

NOYO RIVER
POOL HABITAT TYPES BY PERCENT OCCURRENCE



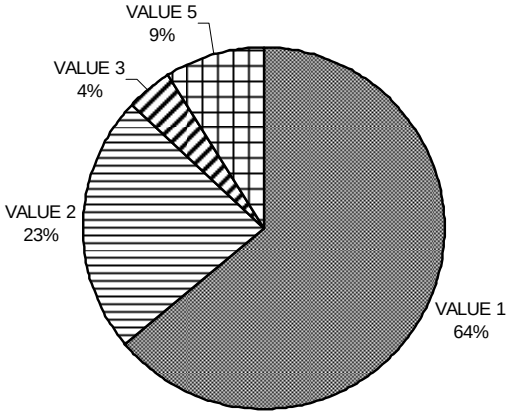
GRAPH 4

NOYO RIVER
MAXIMUM DEPTH IN POOLS



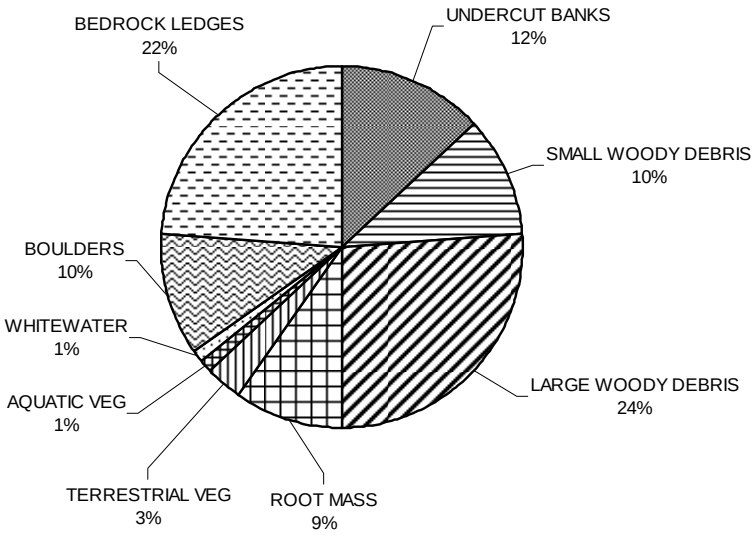
GRAPH 5

NOYO RIVER
PERCENT EMBEDDEDNESS



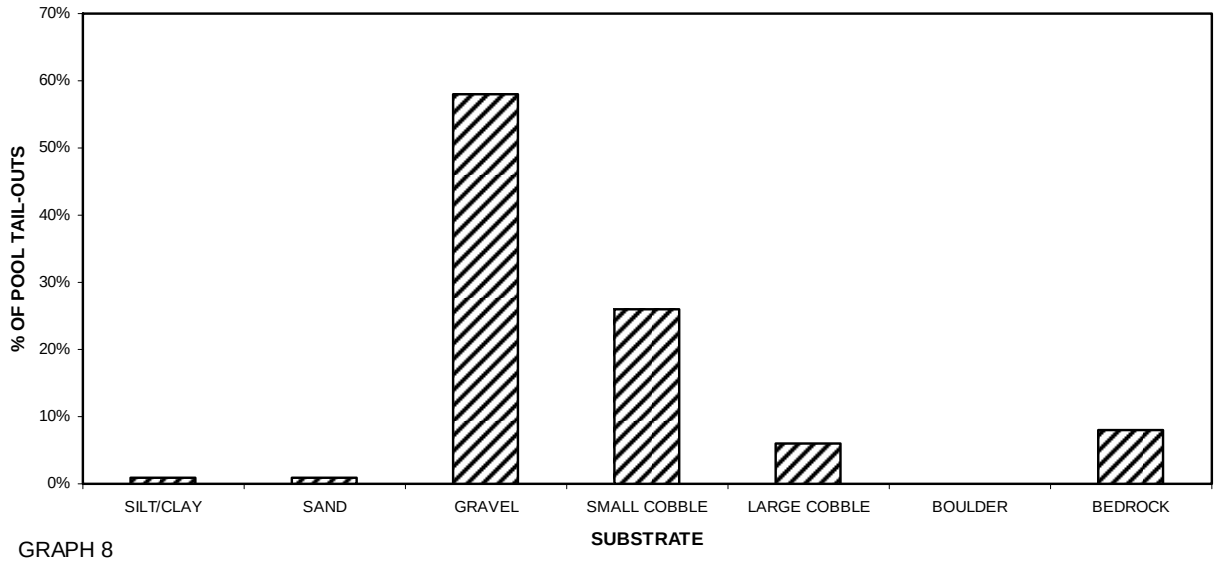
GRAPH 6

NOYO RIVER
MEAN PERCENT COVER TYPES IN POOLS



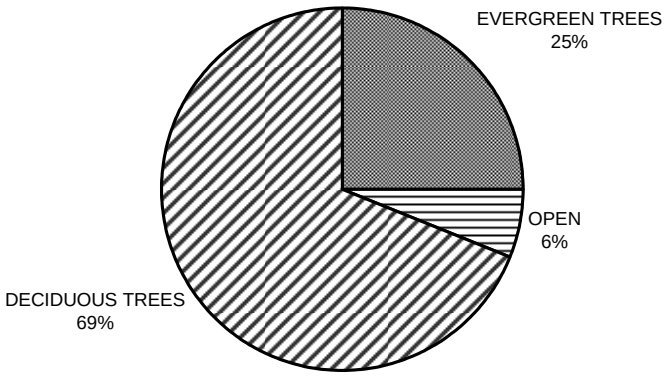
GRAPH 7

NOYO RIVER
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



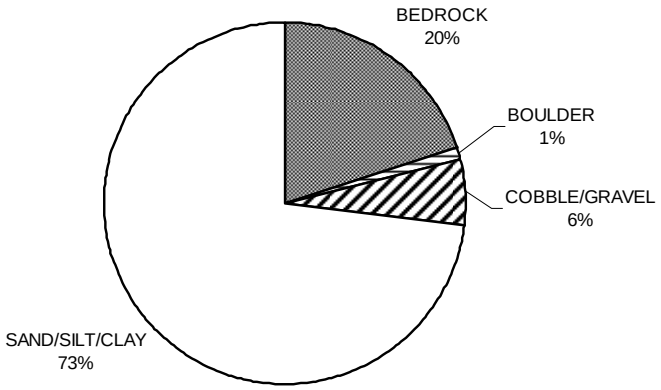
GRAPH 8

NOYO RIVER
MEAN PERCENT CANOPY



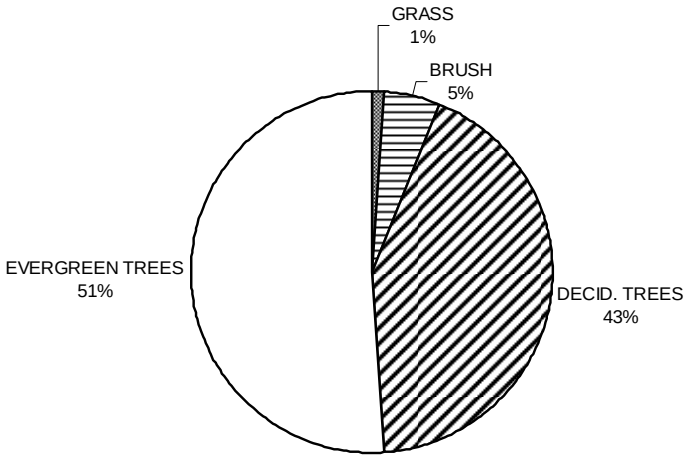
GRAPH 9

NOYO RIVER
DOMINANT BANK COMPOSITION IN SURVEY REACH



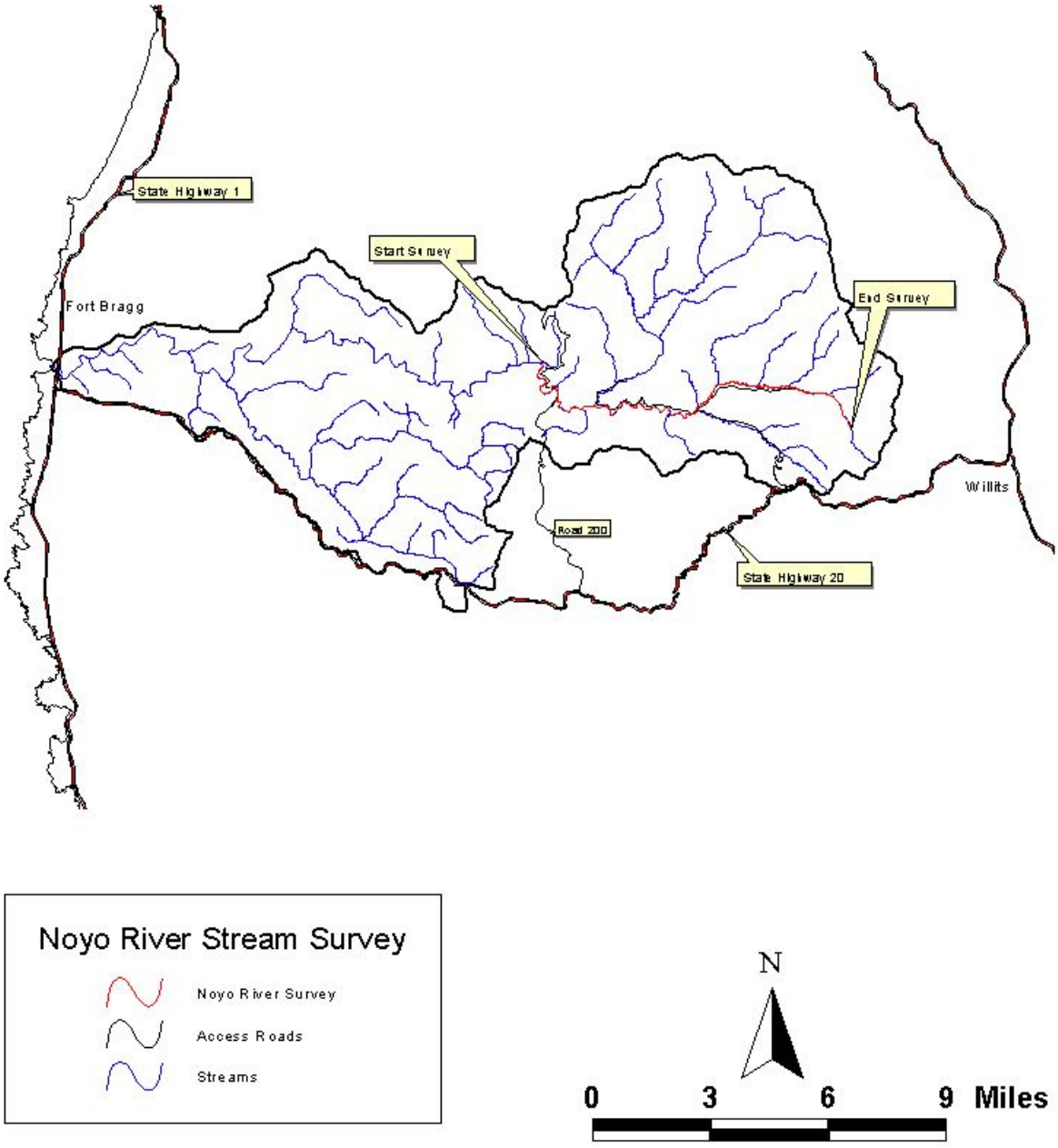
GRAPH 10

NOYO RIVER
DOMINANT BANK VEGETATION IN SURVEY REACH



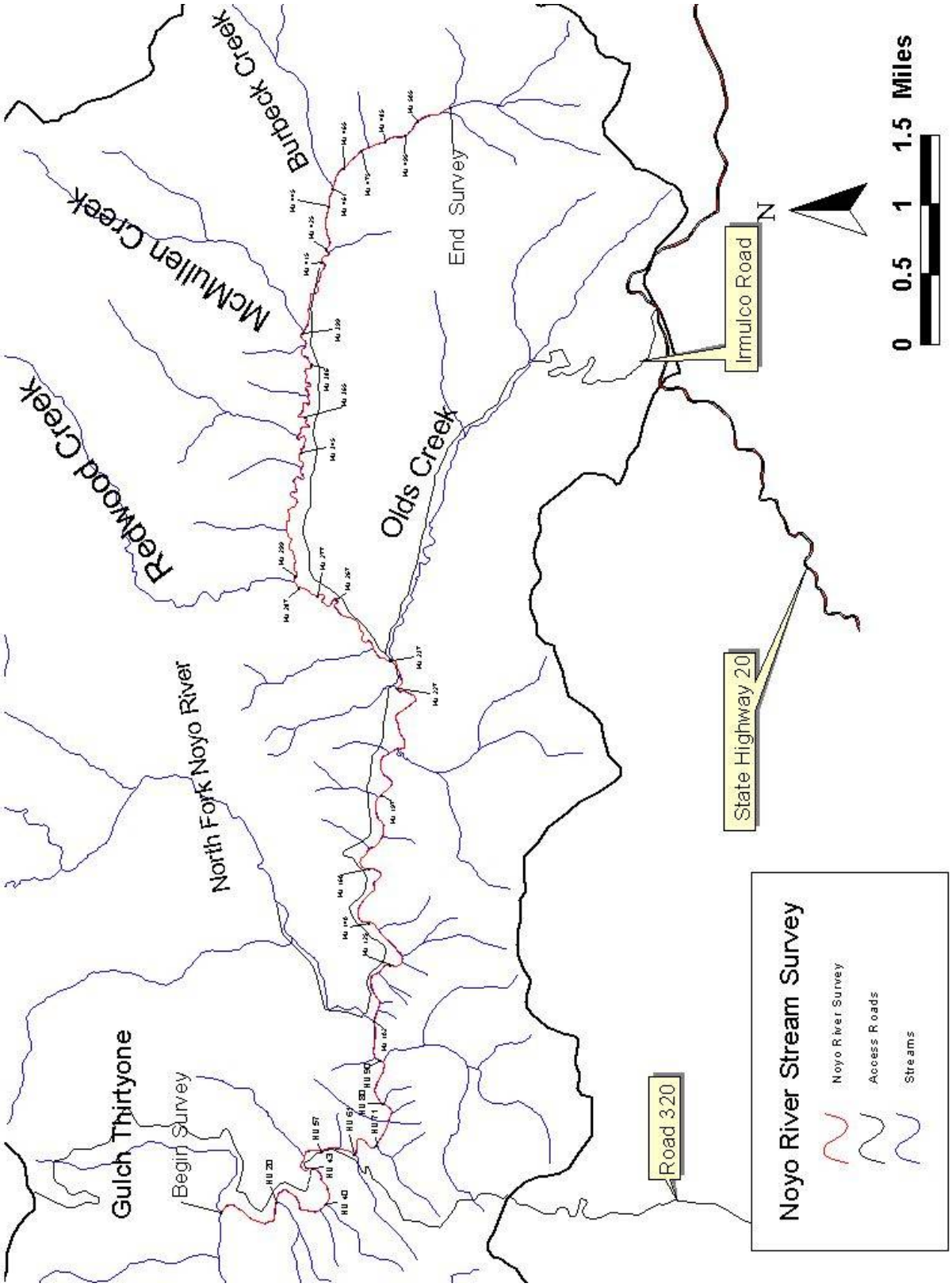
GRAPH 11

Noyo River



Map 1. Map of Noyo River showing the stream habitat inventory reach and watershed boundary.

Noyo River



Map 2. Map of Noyo River showing the stream habitat inventory reach.