

# STREAM INVENTORY REPORT

## North Fork Albion River

### INTRODUCTION

A stream inventory was conducted from July 18 to July 25, 2002 on North Fork Albion River. The survey began at the confluence with Albion River and extended upstream 2.3 miles.

The objective of the habitat inventory was to document the habitat available to anadromous salmonids in North Fork Albion River.

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

North Fork Albion River is a tributary to the Albion River, which is a tributary to the Pacific Ocean, located in Mendocino County, California (Map 1). North Fork Albion River's legal description at the confluence with Albion River is T16N R16W S2. Its location is 39°15'52" north latitude and 123°36'21" west longitude. North Fork Albion River is a first order stream and has approximately 2.5 miles of solid blue line stream according to the USGS Comptche 7.5 minute quadrangle. North Fork Albion River drains a watershed of approximately 5.2 square miles. Elevations range from about 141 feet at the mouth of the stream to 1266 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists via Comptche-Ukiah Road to the confluence with mainstem Albion River at Docker Hill Road near the town of Comptche.

A stream habitat inventory was conducted August 16-19, 1996 by Coastal Land Trust employees.

Observations of salmonids were not noted within the North Fork Albion River Habitat Inventory Report.

### METHODS

The habitat inventory conducted in North Fork Albion River follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The California Department of Fish and Game Scientific Aids and Pacific States Marine Fisheries 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 North Fork Albion River 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". North Fork Albion River

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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 North Fork Albion 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 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 North Fork Albion 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 North Fork Albion 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 deciduous trees.

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### **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 North Fork Albion 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.

### DATA ANALYSIS

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

- Riffle, flatwater, and pool habitat types
- Habitat types and measured parameters
- Pool types
- Maximum pool depths by habitat types
- Dominant substrates by habitat types
- Mean percent shelter by habitat types

Graphics are produced from the tables using Excel. Graphics developed for North Fork Albion River include:

- Riffle, flatwater, pool habitats by percent occurrence
- Riffle, flatwater, pool habitats by total length
- Total habitat types by percent occurrence
- Pool types by percent occurrence
- Total pools by maximum depths
- Embeddedness
- Pool cover by cover type
- Dominant substrate in low gradient riffles
- Mean percent canopy
- Bank composition by composition type
- Bank vegetation by vegetation type

### HABITAT INVENTORY RESULTS

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

The habitat inventory of July 18 to July 25, 2002, was conducted by Cynthia Ledoux-Bloom and Andy Pothast (DFG), and John Richardson (PSMFC). The total length of the stream surveyed was 12,351 feet.

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Stream flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 0.057 cfs on July 29, 2002.

North Fork Albion River is an F4 channel for the first 6,417 feet of the stream surveyed (Reach1), an F1 channel type ge bankfull width of 13' for the next 339 feet; an F4 channel type with an average bankfull width of 13' for 1,120 feet surveyed; an F1 channel type with an average bankfull width of 7' for 1,979 feet surveyed; and an E6 channel type with an average bankfull width of 7' for the final 1,808 feet of the stream surveyed. F4 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates. F1 channels are entrenched, meandering, riffle/pool channels on low gradients with high width/depth ratios and very stable bedrock controlled channel. E6 channels are low gradient, meandering riffle/pool channels with low width/depth ratios and little deposition, very efficient and stable, high meander width ratios and sand-dominated substrates.

Water temperatures taken during the survey period ranged from 56 to 63 degrees Fahrenheit. Air temperatures ranged from 56 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, 24% flatwater units, 21% riffle units, and 15% dry units (Graph 1). Based on total length of Level II habitat types there were 61% pool units, 20% flatwater units, 10% riffle units, and 9% dry units (Graph 2).

Nine Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid channel pools, 39%; runs, 21%; low gradient riffles, 19%; and dry 15% (Graph 3). Based on percent total length, mid channel pools made up 56%, runs made up 16%, and dry channels made up 9%.

A total of 123 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 99%, 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. Forty-three of the 122 pools (35%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 119 pool tail-outs measured, 1 had a value of 1 (0.8%); 19 had a value of 2 (16%); 13 had a value of 3 (11%); 2 had a value of 4 (2%); and 84 had a value of 5 (68%) (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 16, flatwater habitat types had a mean shelter rating of 1, and riffle habitat types had a mean shelter rating of 0 (Table 1). Of the pool types, the main channel pools had the highest mean shelter rating at 16. Scour pools had a mean shelter rating of 10 (Table 3).

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In reach one, North Fork had an average of 0.5 pieces of LWD per 100'; in reach two, 0.0 pieces of LWD per 100'; in reach three, 0.2 pieces of LWD per 100'; in reach four 0.2 pieces of LWD per 100'; and in reach five, 0.6 pieces of LWD per 100'.

Table 5 summarizes mean percent cover by habitat type. Bedrock ledges are the dominant cover types in North Fork Albion River. Graph 7 describes the pool cover in North Fork Albion River. Undercut banks are the dominant pool cover type followed by small woody debris.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Bedrock was the dominant substrate observed in 38% of pool tail-outs while gravel was the next most frequently observed substrate type, at 37%.

The mean percent canopy density for the surveyed length of North Fork Albion River was 93%. The mean percentages of deciduous and coniferous trees were 38% and 55%, respectively. Graph 9 describes the mean percent canopy in North Fork Albion River.

For the stream reach surveyed, the mean percent right bank vegetated was 48%. The mean percent left bank vegetated was 49%. The dominant elements composing the structure of the stream banks consisted of 78% sand/silt/clay, 16% bedrock, 3% cobble/gravel, and 0% boulder (Graph 10). Coniferous trees were the dominant vegetation type observed in 64% of the units surveyed. Additionally, 27% of the units surveyed had deciduous trees as the dominant vegetation type, and 5% had grass as the dominant vegetation (Graph 11).

## DISCUSSION

North Fork Albion River is an F4 channel type for 7,537 feet, an F1 channel type for 2,318 feet and an E6 channel type for the remaining 1,808 feet. The suitability of F4, F1 and E6 channel types for fish habitat improvement structures are as follows: F4 channels are good for bank-placed boulders, single and opposing wing-deflectors, channel constrictors and log cover. F1 channels are good for bank-placed boulders, fair for single wing-deflectors and log cover. E6 channels are good for bank-placed boulders and fair for opposing wing-deflectors.

The water temperatures recorded on the survey days July 18, through July 25, 2002, ranged from 56 to 63 degrees Fahrenheit. Air temperatures ranged from 56 to 74 degrees Fahrenheit. This is a good water temperature range for salmonids. However, 60° F, if sustained, is near the threshold stress level for salmonids. This does not seem to be the case here, and North Fork Albion River seems to have temperatures favorable to 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.

Pool habitat types comprised 61% of the total length of this survey, flatwater 20%, riffles 10%, and dry channel 10%. The pools are relatively shallow, with 43 of the 123 (35%) pools having a maximum depth greater than 2 feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum depth of at least two feet, occupy at

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least half the width of the low flow channel, and be as long as the low flow channel width. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the numerous log debris accumulations (LDA's) in the stream.

Twenty of the 119 pool tail-outs measured had embeddedness ratings of 1 or 2. Fifteen of the pool tail-outs had embeddedness ratings of 3 or 4. Eighty-four 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 North Fork Albion River should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Seventy-three of the 119 pool tail-outs had silt or 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 16. The shelter rating in the flatwater habitats was 1. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by undercut banks in all habitat types. Additionally, small woody debris contributes 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 93%. Reach 1 had a canopy density of 91%, Reach 2 had a canopy density of 100%, Reach 3 had canopy density of 89%, Reach 4 had a canopy density of 93%, and Reach 5 had a canopy density of 100%. 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 48% and 49%, 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) North Fork Albion 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.

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- 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 is from small woody debris. Adding high quality complexity with log and root wad cover 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 North Fork Albion River 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):        Comments:

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0'	Begin Survey at confluence with Albion River.
249'	Salmonids are present.
4255'	Right bank tributary is not accessible for fish.
4539'	Docker Hill Road on right bank approximately 20' from stream
5783'	Bridge above stream measures 12' wide and is 15' above thalweg.
6412'	Begin F1 channel type.
6730'	Begin F4 channel.
7560'	Road crossing channel.
7876'	House on right bank is approximately 15' from the stream.



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- 8047' Begin Reach 4, F1 channel type.
- 8786' Log debris accumulation (LDA) at top of unit.
- 8831' Mineral deposits forming dams.
- 8870' Confluence with Soda Springs Creek, 39°16'97.4" north, 123°36'34.2" west.
- 8918' Young-of-the-year (YOY).
- 9488' YOY present.
- 9512' YOY present.
- 9647' Salmonid yoy are in about every puddle. This unit is extremely small but there are approximately 8 yoy present. Water temp readings have been taken in standing water since the Soda Springs Gulch confluence. Some spawning gravel is present in this section.
- 9699' YOY. End of permitted access.
- 10331' Old road crossing was possibly a bridge or culvert.
- 10462' Fewer YOY present.
- 10535' Road on right bank is approximately 15' away from channel and 10' above channel.
- 10671' Road moves away from stream.
- 10726' End of access.
- 11226' Restart access at a fence.
- 11403' Many YOY. Good spawning gravel present below pool.
- 11913' There is a 4' gravel wedge.
- 12137' Road on right bank is 10' from stream.
- 12229' Road crosses channel. Steel flatcar bridge is 2.5' above the stream.
- 12299' Road is 10' from the left bank. YOY observed.
- 12327' End of survey due to end of anadromy. The channel width is less than 2' after tributary and diminishes rapidly with no pockets of water. Coordinates: 39 degrees

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17' 00.0" N, 123 degrees 35'43.8" W. Tributary entering on left bank. Tributary contains few pools but no fish were observed.

### REFERENCES

Flosi, G., Downie, S., Hopelain, J., Bird, M., Coey, R., and Collins, B. 1998. *California Salmonid Stream Habitat Restoration Manual*, 3rd edition. California Department of Fish and Game, Sacramento, California.

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### LEVEL III and LEVEL IV HABITAT TYPES

#### RIFFLE

Low Gradient Riffle	(LGR)	[1.1]	{ 1 }
High Gradient Riffle	(HGR)	[1.2]	{ 2 }

#### CASCADE

Cascade	(CAS)	[2.1]	{ 3 }
Bedrock Sheet	(BRS)	[2.2]	{24}

#### FLATWATER

Pocket Water	(POW)	[3.1]	{21}
Glide	(GLD)	[3.2]	{14}
Run	(RUN)	[3.3]	{15}
Step Run	(SRN)	[3.4]	{16}
Edgewater	(EDW)	[3.5]	{18}

#### MAIN CHANNEL POOLS

Trench Pool	(TRP)	[4.1]	{ 8 }
Mid-Channel Pool	(MCP)	[4.2]	{17}
Channel Confluence Pool	(CCP)	[4.3]	{19}
Step Pool	(STP)	[4.4]	{23}

#### SCOUR POOLS

Corner Pool	(CRP)	[5.1]	{22}
Lateral Scour Pool - Log Enhanced	(LSL)	[5.2]	{10}
Lateral Scour Pool - Root Wad Enhanced	(LSR)	[5.3]	{11}
Lateral Scour Pool - Bedrock Formed	(LSBk)	[5.4]	{12}
Lateral Scour Pool - Boulder Formed	(LSBo)	[5.5]	{20}
Plunge Pool	(PLP)	[5.6]	{ 9 }

#### BACKWATER POOLS

Secondary Channel Pool	(SCP)	[6.1]	{ 4 }
Backwater Pool - Boulder Formed	(BPB)	[6.2]	{ 5 }
Backwater Pool - Root Wad Formed	(BPR)	[6.3]	{ 6 }
Backwater Pool - Log Formed	(BPL)	[6.4]	{ 7 }
Dammed Pool	(DPL)	[6.5]	{13}

#### ADDITIONAL UNIT DESIGNATIONS

Dry	(DRY)	[7.0]	
Culvert	(CUL)	[8.0]	
Not Surveyed	(NS)	[9.0]	
Not Surveyed due to a marsh	(MAR)	[9.1]	

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TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: NF Albion River  
SAMPLE DATES: 07/18/02 to 07/25/02  
STREAM LENGTH: 12351 ft.  
LOCATION OF STREAM MOUTH:  
USGS Quad Map: Comptche Latitude: 39°15'53"  
Legal Description: T16NR16WS11 Longitude: 123°36'22"

## SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

### STREAM REACH 1

Channel Type: F4	Canopy Density: 91%
Channel Length: 6417 ft.	Coniferous Component: 68%
Riffle/flatwater Mean Width: 6 ft.	Deciduous Component: 32%
Total Pool Mean Depth: 1.2 ft.	Pools by Stream Length: 68%
Base Flow: 0.1 cfs	Pools >=3 ft.deep: 38%
Water: 056- 62 °F Air: 056-65 °F	Mean Pool Shelter Rtn: 16
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Undercut Banks
Vegetative Cover: 87%	Occurrence of LOD: 4%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.
Embeddness Value: 1. 2% 2.30% 3. 20% 4. 0% 5. 48%	

### STREAM REACH 2

Channel Type: F1	Canopy Density: 100%
Channel Length: 339 ft.	Coniferous Component: 12%
Riffle/flatwater Mean Width: 5 ft.	Deciduous Component: 88%
Total Pool Mean Depth: 0.6 ft.	Pools by Stream Length: 34%
Base Flow: 0.1 cfs	Pools >=3 ft.deep: 0%
Water: 058- 059°F Air: 063-064°F	Mean Pool Shelter Rtn: 11
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Undercut Banks
Vegetative Cover: 98%	Occurrence of LOD: 0%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.
Embeddness Value: 1. 0% 2.0% 3. 0% 4. 0% 5. 100%	

### STREAM REACH 3

Channel Type: F4	Canopy Density: 89%
Channel Length: 1120 ft.	Coniferous Component: 60%
Riffle/flatwater Mean Width: 6 ft.	Deciduous Component: 40%
Total Pool Mean Depth: 1.1 ft.	Pools by Stream Length: 56%
Base Flow: 0.1 cfs	Pools >=3 ft.deep: 22%
Water: 059- 059°F Air: 062-064°F	Mean Pool Shelter Rtn: 13
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Undercut Banks
Vegetative Cover: 88%	Occurrence of LOD: 1%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 0 ft.
Embeddness Value: 1. 0% 2.22% 3. 44% 4. 0% 5. 33%	

Length of stream section not surveyed within survey reach  
and not included in above totals or calculations: 213 ft.

### STREAM REACH 4

Channel Type: F1	Canopy Density: 93%
Channel Length: 1979 ft.	Coniferous Component: 46%
Riffle/flatwater Mean Width: 5 ft.	Deciduous Component: 54%

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Total Pool Mean Depth: 0.8 ft. Pools by Stream Length: 56%  
Base Flow: 0.1 cfs Pools >=3 ft.deep: 3%  
Water: 056- 059°F Air: 058-064°F Mean Pool Shelter Rtn: 16  
Dom. Bank Veg.: Coniferous Trees Dom. Shelter: Small Woody Debris  
Vegetative Cover: 95% Occurrence of LOD: 6%  
Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 353 ft.

Embeddness Value: 1. 0% 2.3% 3. 6% 4. 3% 5. 88%

### STREAM REACH 5

Channel Type: E6 Canopy Density: 100%  
Channel Length: 1808 ft. Coniferous Component: 66%  
Riffle/flatwater Mean Width: 3 ft. Deciduous Component: 35%  
Total Pool Mean Depth: 0.9 ft. Pools by Stream Length: 49%  
Base Flow: 0.1 cfs Pools >=3 ft.deep: 7%  
Water: 058- 062°F Air: 058-073°F Mean Pool Shelter Rtn: 18  
Dom. Bank Veg.: Coniferous Trees Dom. Shelter: Undercut Banks  
Vegetative Cover: 89% Occurrence of LOD: 11%  
Dom. Bank Substrate: Silt/Clay/Sand Dry Channel: 765 ft.

Embeddness Value: 1. 0% 2.3% 3. 0% 4. 3% 5. 93%

Length of stream section not surveyed within survey reach  
and not included in above totals or calculations: 475 ft.

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Drainage:

Table 1 - SUMMARY OF RIPPLE, FLATWATER, AND POOL HABITAT TYPES

Survey Dates: 07/18/02 to 07/25/02

Confluence Location: QUAD: Comptche LEGAL DESCRIPTION: T16NR16NS11 LATITUDE:39°15'53" LONGITUDE:123°36'22"

HABITAT UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	MEAN WIDTH (ft.)	TOTAL WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA (sq.ft.)	MEAN ESTIMATED VOLUME (cu.ft.)	TOTAL ESTIMATED VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	TOTAL RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
66	RIPPLE	21	17	1123	10	4.4	0.2	67	4391	15	997	1	997	0
73	FLATWATER	24	32	2349	20	6.7	0.4	227	16543	93	6766	0	6766	1
123	POOL	40	58	7073	61	9.6	1.0	634	77986	725	89209	580	89209	16
47	DRY	15	24	1118	10	3.0	0.3	156	7332	47	2200	0	2200	0

TOTAL UNITS 309

TOTAL LENGTH (ft.) 11663

TOTAL AREA (sq. ft.) 106251

TOTAL VOL. (cu. ft.) 99171

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NF Albion River

Drainage:

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS

Survey Dates: 07/18/02 to 07/25/02

Confluence Location: QUAD: Comptche LEGAL DESCRIPTION: T16NR16WS11 LATITUDE:39°15'53" LONGITUDE:123°36'22"

HABITAT UNITS	HABITAT TYPE	HABITAT OCCURRENCE	MEAN LENGTH	MEAN WIDTH	MEAN DEPTH	MEAN MAXIMUM DEPTH	MEAN AREA	MEAN EST. AREA	MEAN EST. VOLUME	MEAN RESIDUAL	MEAN SHUTTER	MEAN CANOPY
#		%	ft.	ft.	ft.	ft.	sq.ft.	sq.ft.	cu.ft.	cu.ft.	cu.ft.	%
58	LGR	19	16	5	0.2	5.0	71	4118	16	909	1	80
6	HGR	2	7	3	0.2	1.2	24	144	5	27	0	98
2	BRS	1	27	6	0.7	0.3	66	132	46	92	0	96
8	GLD	3	50	8	0.5	1.2	412	3295	211	1691	0	50
65	RUN	21	30	7	0.4	5.0	204	13248	78	5074	0	84
121	MCP	39	57	10	1.0	5.6	625	75673	711	85973	568	98
1	CCP	0	24	14	0.8	1.4	336	336	269	269	235	100
1	LSBK	0	164	12	1.5	2.6	1968	1968	2952	2952	2362	97
47	DRY	15	24	3	0.3	0.4	156	7332	47	2200	0	71
TOTAL UNITS			LENGTH (ft.)				AREA (sq.ft.)		TOTAL VOL. (cu.ft.)			
309			11663				106246		99187			

# North Fork Albion River

NF Albion River

Drainage:

Table 3 - SUMMARY OF POOL TYPES

Survey Dates: 07/16/02 to 07/25/02

Confluence Location: QUAD: Compeche LEGAL DESCRIPTION: T16NR16WS11 LATITUDE:39°15'53" LONGITUDE:123°36'22"

HABITAT UNITS	HABITAT FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL EST. (cu.ft.)	MEAN SHELTER RATING
122	121	MAIN	99	57	6909	9.6	1.0	623	76007	707	86238	566	16
1	1	SCOUR	1	164	164	12.0	1.5	1968	1968	2952	2952	2362	10
TOTAL UNITS	TOTAL UNITS			TOTAL LENGTH (ft.)				TOTAL AREA (sq.ft.)		TOTAL VOLUME (cu.ft.)			
123	122			7073				77975		89190			



North Fork Albion River

NF Albion River		Drainage:										
Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES		Survey Dates: 07/18/02 to 07/25/02										
Confluence Location: QUAD: Comptche		LEGAL DESCRIPTION: T16NR16WS11 LATITUDE:39°15'53" LONGITUDE:123°36'22"										
UNITS MEASURED	HABITAT TYPE	<1 FOOT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	1-<2 FOOT MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	2-<3 FOOT MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	3-<4 FOOT MAXIMUM DEPTH	>=4 FOOT PERCENT OCCURRENCE	>=4 FOOT MAXIMUM DEPTH	
121	MCP	98	15	12	64	53	19	16	14	12	9	7
1	CCP	1	0	0	1	100	0	0	0	0	0	0
1	LSBK	1	0	0	0	0	1	100	0	0	0	0
TOTAL UNITS		123										

# North Fork Albion River

NF Albion River

Drainage:

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE

Survey Dates: 07/18/02 to 07/25/02

Confluence Location: QUAD: Comptche LEGAL DESCRIPTION: T16NR16WS11 LATITUDE: 39°15'53" LONGITUDE: 123°36'22"

UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN % UNDERCUT BANKS	MEAN % SWD	MEAN % LWD	MEAN % ROOT MASS VEGETATION	MEAN % TERR. VEGETATION	MEAN % AQUATIC VEGETATION	MEAN % WHITE WATER	MEAN % BOULDERS	MEAN % BEDROCK LEASES
58	7	LGR	0	1	0	0	0	0	0	30	14
6	1	HGR	0	5	0	0	0	0	0	0	95
2	1	BRS	0	20	0	0	0	0	0	40	40
8	1	GUD	80	10	40	0	0	0	0	0	0
65	6	RUN	17	34	5	3	0	0	0	8	17
121	116	MCP	39	25	6	6	2	0	0	9	12
1	1	CCP	10	10	0	10	5	50	0	0	20
1	1	LSBK	50	30	0	10	0	0	0	5	5
47	0	DRY	0	0	0	0	0	0	0	0	0

# North Fork Albion River

NF Albion River

Drainage:

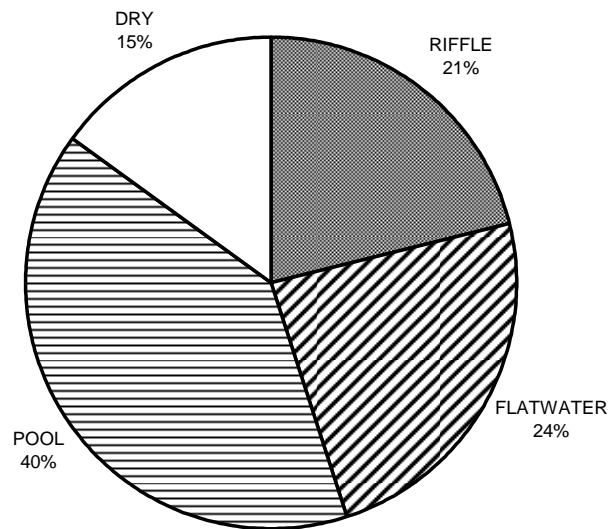
Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 07/18/02 to 07/25/02

Confluence Location: QUAD: Comptche LEGAL DESCRIPTION: T16NR16WS11 LATITUDE:39°15'53" LONGITUDE:123°36'22"

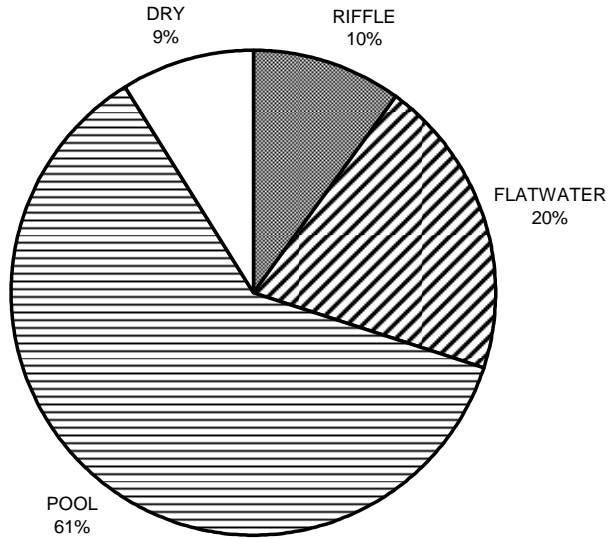
TOTAL HABITAT UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	SILT/CLAY		SAND		GRAVEL		SM COBBLE		LG COBBLE		BOULDER		BEDROCK	
			% DOMINANT	% TOTAL	% DOMINANT	% TOTAL	% DOMINANT	% TOTAL	% DOMINANT	% TOTAL	% DOMINANT	% TOTAL	% DOMINANT	% TOTAL	% DOMINANT	% TOTAL
58	6	LGR	0	0	0	0	17	17	0	0	0	0	0	0	0	67
6	2	HGR	0	0	0	0	0	0	0	0	0	0	0	0	0	100
2	1	BRS	0	0	0	0	0	0	0	0	0	0	0	0	0	100
8	1	GLD	0	0	0	0	100	100	0	0	0	0	0	0	0	0
65	7	RUN	0	0	14	29	29	29	0	0	0	0	0	0	0	57
121	119	MCP	24	11	11	29	29	5	0	0	0	0	0	0	0	31
1	1	CCP	0	0	0	100	100	0	0	0	0	0	0	0	0	0
1	1	LSBK	0	0	0	100	100	0	0	0	0	0	0	0	0	0
47	0	DRY	0	0	0	0	0	0	0	0	0	0	0	0	0	0

### NORTH FORK ALBION RIVER HABITAT TYPES BY PERCENT OCCURRENCE



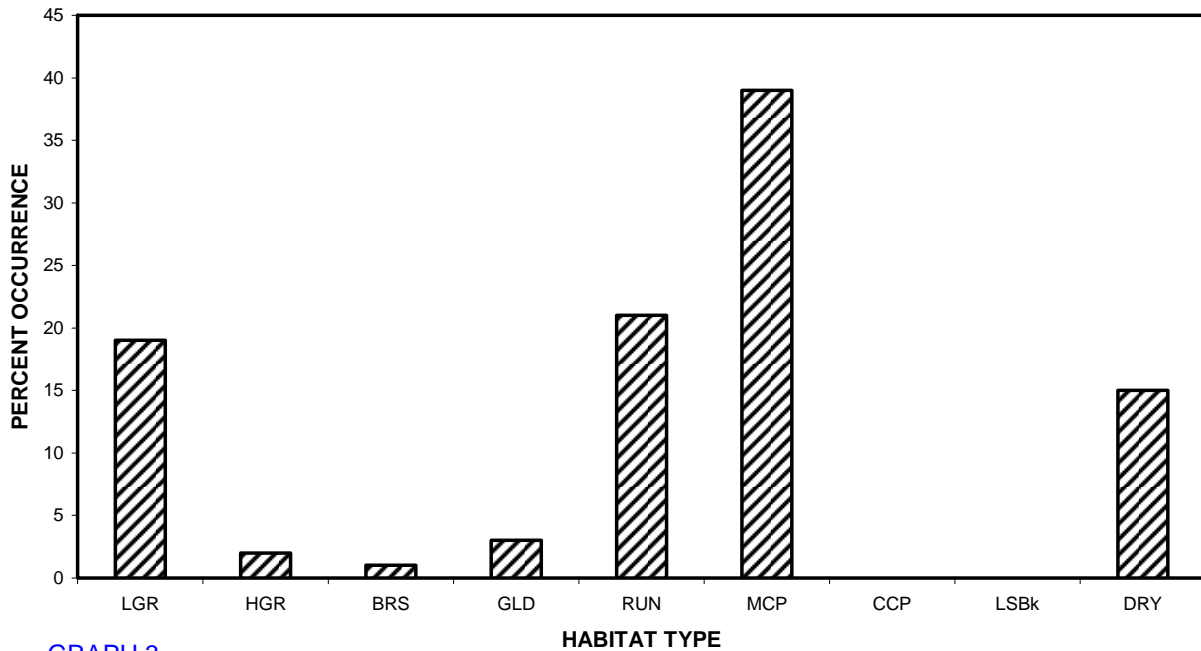
GRAPH 1

### NORTH FORK ALBION RIVER HABITAT TYPES BY PERCENT TOTAL LENGTH



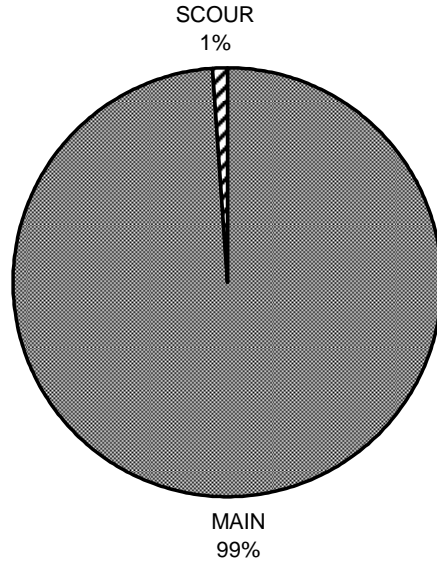
GRAPH 2

### NORTH FORK ALBION RIVER HABITAT TYPES BY PERCENT OCCURRENCE



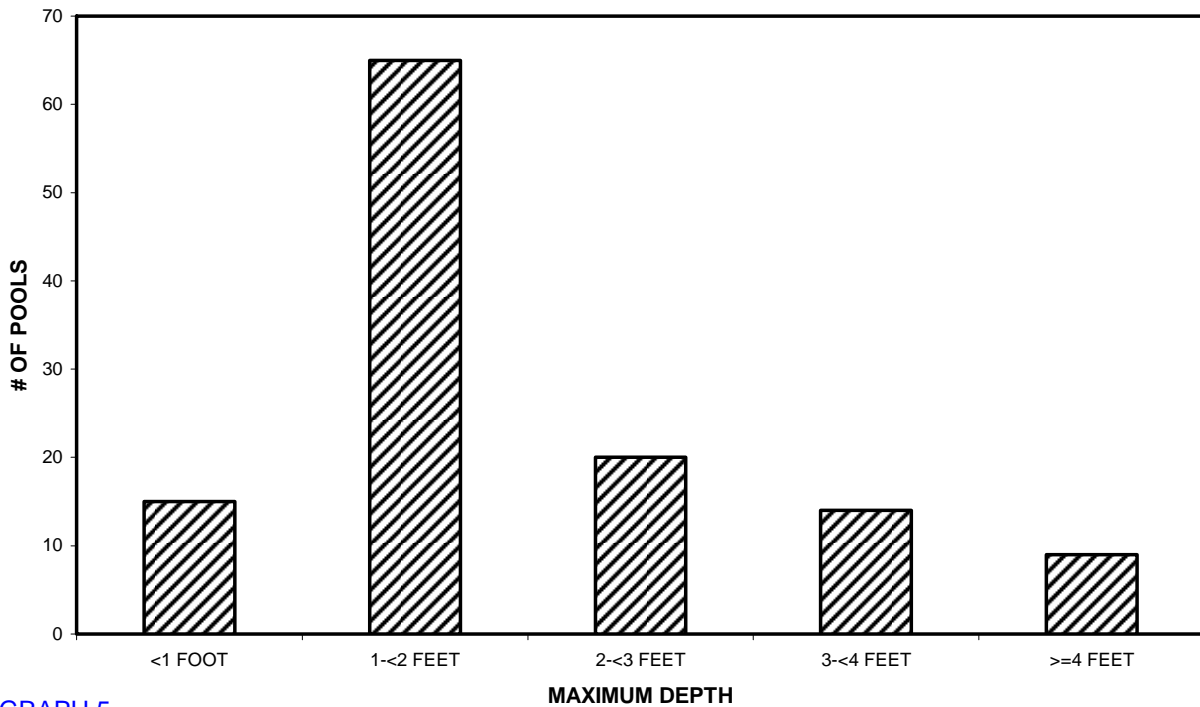
GRAPH 3

### NORTH FORK ALBION RIVER POOL HABITAT TYPES BY PERCENT OCCURRENCE



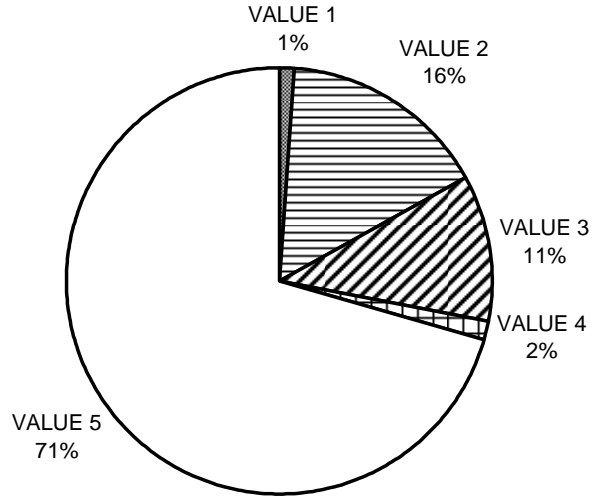
GRAPH 4

### NORTH FORK ALBION RIVER MAXIMUM DEPTH IN POOLS



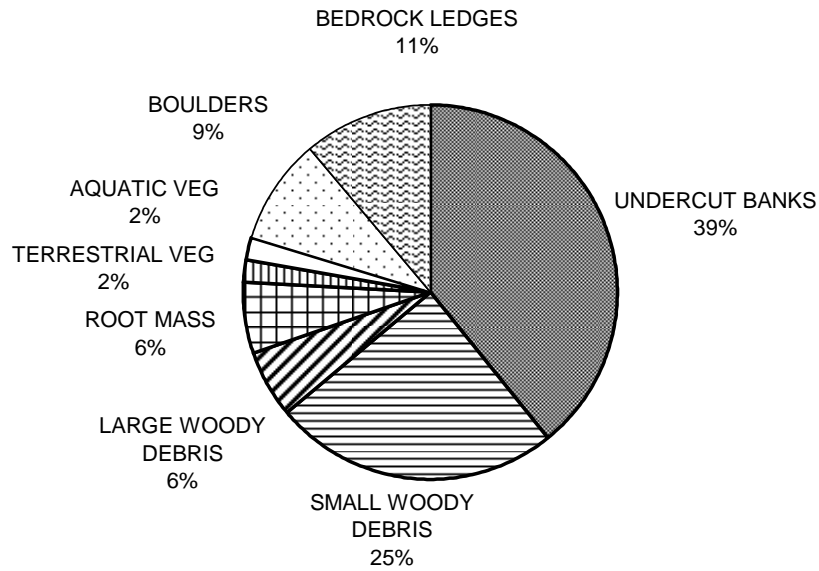
GRAPH 5

### NORTH FORK ALBION RIVER PERCENT EMBEDDEDNESS



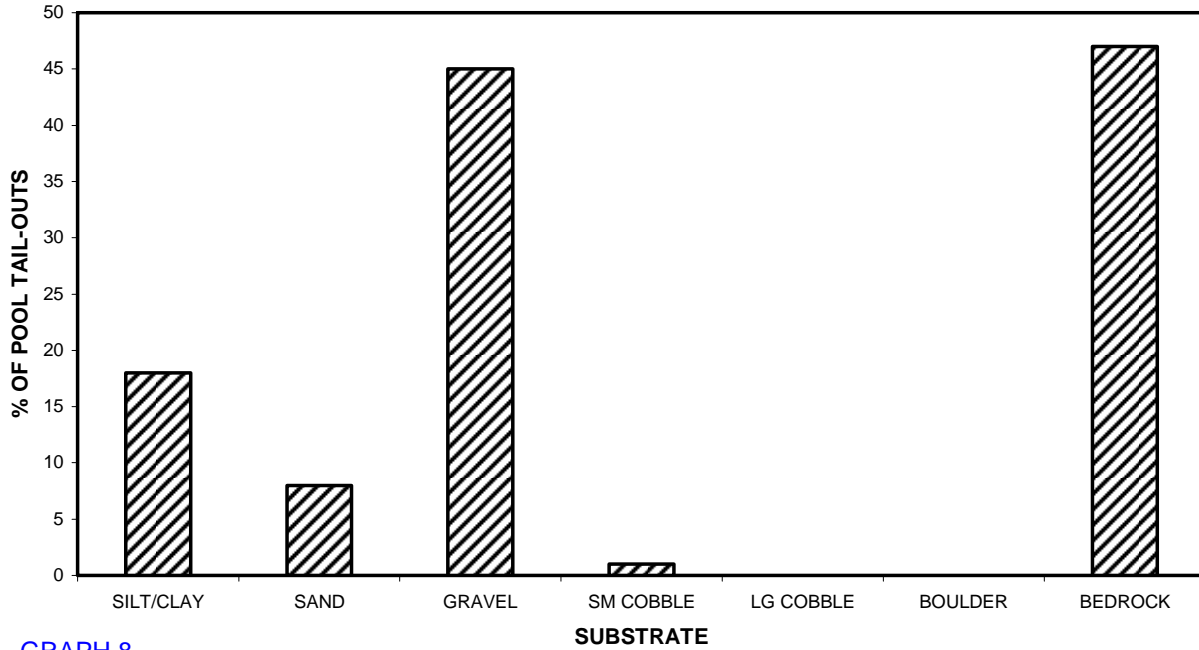
GRAPH 6

### NORTH FORK ALBION RIVER MEAN PERCENT COVER TYPES IN POOLS



GRAPH 7

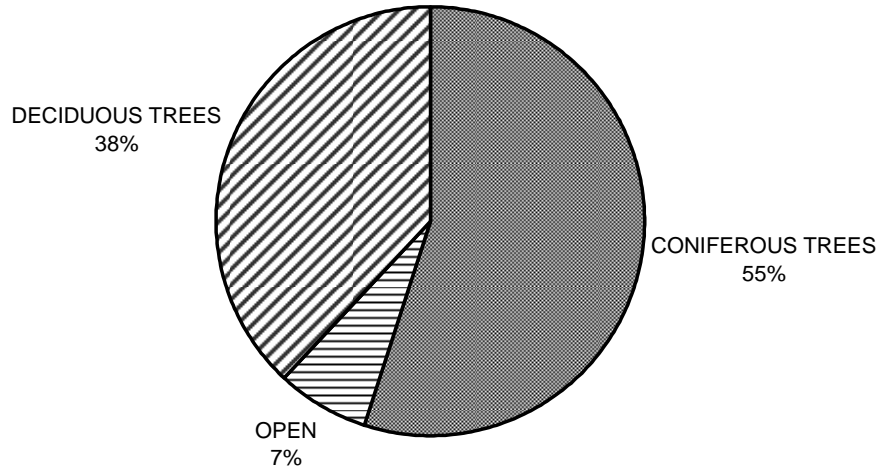
### NORTH FORK ALBION RIVER SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



GRAPH 8

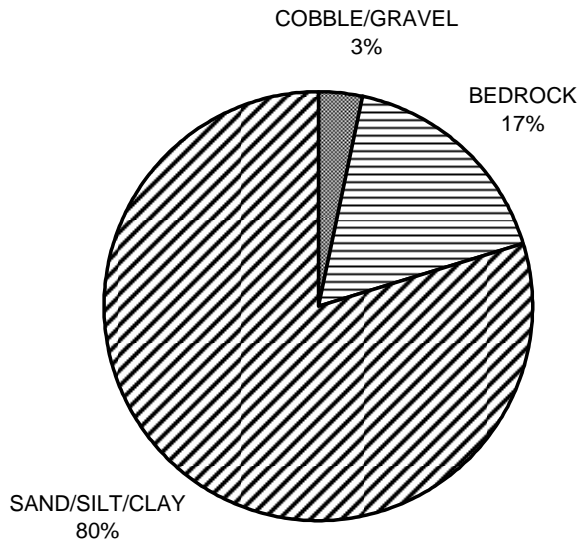


### NORTH FORK ALBION RIVER MEAN PERCENT CANOPY



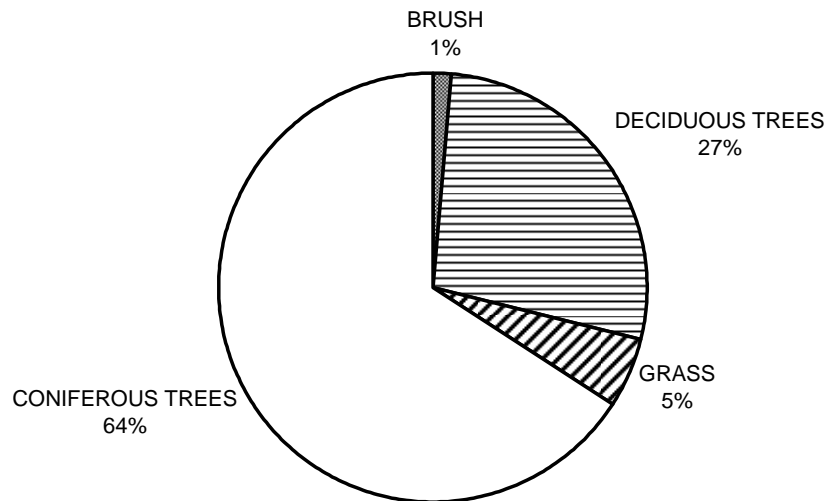
GRAPH 9

### NORTH FORK ALBION RIVER DOMINANT BANK COMPOSITION IN SURVEY REACH



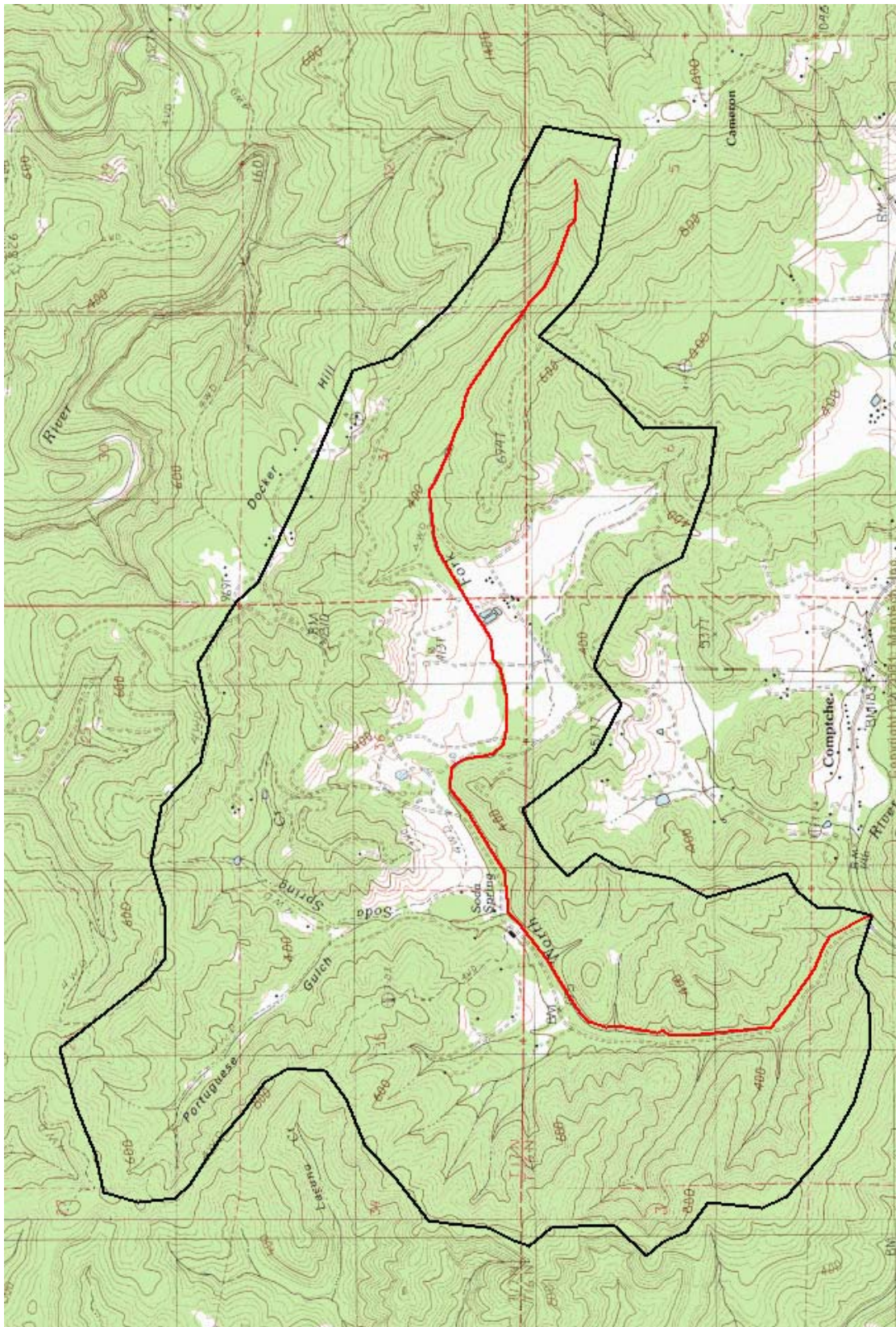
GRAPH 10

## NORTH FORK ALBION RIVER DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

# North Fork Albion River



Map 1. North Fork Albion River