STREAM INVENTORY REPORT

Upper Albion River

INTRODUCTION

A stream inventory was conducted from October 15 to October 28, 2002 on the Albion River. The survey began at the confluence with North Fork Albion River and extended upstream 2.3 miles.

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

The Albion River is a tributary to the Pacific Ocean, located in Mendocino County, California (Map 1). Albion River's legal description at the confluence with the Pacific Ocean is T16N R16W S2. Its location is 39°15′52″ north latitude and 123°36′21″ west longitude. Albion River, above the Albion River North Fork, is a third order stream and has approximately 4.6 miles of solid blue line stream according to the USGS Comptche 7.5 minute quadrangle. Albion River drains a watershed of approximately 7.9 square miles. Elevations range from about 200 feet at the mouth of the creek to 600 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is privately owned privately owned for residential and cattle grazing. Vehicle access exists via Comptche Ukiah Road near the town of Comptche.

A stream inventory report was conducted on the mainstem Albion River July 7-19, 1996 by Coastal Land Trust employees. Coho salmon and steelhead were observed from the stream banks.

An electrofishing inventory was conducted on the mainstem Albion River on September 25, 1996 by DFG. Coho salmon, steelhead, and sticklebacks were captured and measured for fork lengths. Bullfrogs were also identified.

METHODS

The habitat inventory conducted in 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.

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 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". Albion 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 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 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 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.

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 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 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 October 15 to October 28, 2002, was conducted by Andy Pothast (DFG) and John Richardson (PSMFC). The total length of the stream surveyed was 12,228 feet. Stream flow was not measured on Albion River.

Upper Albion River

Albion River is an F4 channel type for 10,359 feet of the stream surveyed. This does not include 1,869 feet of inaccessible stream, due to landowners' refusal of access. F4 channel types are entrenched meandering riffle/pool channels on low gradients with high width/depth ratios and gravel-dominant substrates.

Water temperatures taken during the survey period ranged from 44 to 57 degrees Fahrenheit. Air temperatures ranged from 47 to 65 degrees Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of **occurrence** there were 38% pool units, 35% dry units, 20% flatwater units, and 7% riffle units (Graph 1). Based on total **length** of Level II habitat types there were 43% dry units, 41% pool units, 14% flatwater units, and 2% riffle units (Graph 2).

Ten Level IV habitat types were identified (Table 2). The most frequent habitat types by percent **occurrence** were mid channel pools, 36%; dry, 35%; and runs, 19% (Graph 3). Based on percent total **length**, dry channels made up 37%, mid channel pools 33%, and runs 11%.

A total of 87 pools were identified (Table 3). Main channel pools were the most frequently encountered, at 98%, and comprised 99% 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. Twenty of the 87 pools (23%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 87 pool tail-outs measured, 11 had a value of 1 (13%); 14 had a value of 2 (16%); 29 had a value of 3 (34%); 5 had a value of 4 (6%); and 28 had a value of 5 (32%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate. Additionally, a value of 5 was assigned to tail-outs deemed unsuited for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Pool habitats had a mean shelter rating of 24, flatwater habitat types had a mean shelter rating of 6, and riffle habitat types had a mean shelter rating of 1, (Table 1). Of the pool types, the scour pools had the highest mean shelter rating at 40. Main channel pools had a mean shelter rating of 24 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Boulders are the dominant cover types in Albion River. Graph 7 describes the pool cover in Albion River. Small woody debris is the dominant pool cover type followed by undercut banks.

Table 6 summarizes the dominant substrate by habitat type. Graph 8 depicts the dominant substrate observed in pool tail-outs. Gravel was the dominant substrate observed in 78% of the pool tail-outs. Bedrock was the next most frequently observed dominant substrate type and occurred in 15% of the pool tail-outs.

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The mean percent canopy density for the surveyed length of Albion River was 97%. Of the canopy present, the mean percentages of deciduous and coniferous trees were 22% and 78%, respectively. Graph 9 describes the mean percent canopy in Albion River.

For the stream reach surveyed, the mean percent right bank vegetated was 87%. The mean percent left bank vegetated was 85%. The dominant elements composing the structure of the stream banks consisted of 81% sand/silt/clay, 12% cobble/gravel, and 7% bedrock (Graph 10). Coniferous trees were the dominant vegetation type observed in 68% of the units surveyed. Additionally, 26% of the units surveyed had deciduous trees as the dominant vegetation type, and 6% had brush as the dominant vegetation (Graph 11).

DISCUSSION

Albion River is an F4 channel type for 10,359 feet. The suitability of F4 channel types for fish habitat improvement structures are as follows: F4 channel types are good for bank-placed boulders and fair for plunge weirs, single and opposing wing-deflectors, channel constrictors, and log cover.

The water temperatures recorded on the survey days October 15 through October 28, 2002, ranged from 44 to 57 degrees Fahrenheit. Air temperatures ranged from 47 to 65 degrees Fahrenheit. This is a good water temperature range for salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Dry channel habitat types comprised 43% of the total length of this survey, pools 41%, flatwater 14%, and riffles 2%. The pools are relatively shallow, with 20 of the 87 (23%) 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 third order streams, a primary pool is defined to have a maximum 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy.

Twenty-five of the 87 pool tail-outs measured had embeddedness ratings of 1 or 2. Thirty-four of the pool tail-outs had embeddedness ratings of 3 or 4. Twenty-eight 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 Albion River should be mapped and rated according to their potential sediment yields, and control measures should be taken.

Seventy-one of the 87 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 24. The shelter rating in the flatwater habitats was 14. 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 97%. In general, revegetation projects are considered when canopy density is less than 80%.

The percentage of right and left bank covered with vegetation was moderate at 87% and 85%, 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) Albion River should be managed as an anadromous, natural production stream.

2) The limited water temperature data available suggests 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 is from small woody debris. Adding high quality complexity with log and root mass 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) Riparian vegetation should be increased on Albion River. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is affected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

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

9) There are sections where the stream is being impacted from cattle trampling the riparian zone. Alternatives should be explored with the grazier and developed if possible.

10) Good water temperatures exist in the stream and it offers good conditions for rearing fish. Fish passage should be monitored and improved where possible. Pool habitat should be increased to help rearing conditions.

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:
0'	Begin survey at the confluence of the North Fork Albion River. Channel type is an F4 for the entire survey.
338'	Large woody debris (LWD) is 4’ in diameter x 40' long.
613'	Gravel bar on right bank, possible spawning substrate. Coho young-of-the-year (YOY) observed.
852'	A 3' diameter redwood with root mass slid in from the left bank and is creating a 5' high log debris accumulation (LDA). This is not a barrier. The left bank is unstable.
1108'	A dead coho yoy in this unit.
1167'	Scour around standing stump is exposing root mass.
1435'	Comptche Ukiah road on left bank is 15' above and 35' away from stream.
2057'	Residence is 50' from stream on the left bank at the top of the unit.
2387'	The left bank is eroding due to an old well.
3672'	Well on left bank.
3982'	A dam in this unit is 3' high x 30' wide. The spillway is 3' high x 5' wide. Coordinates for the dam are N39.15.54.8 by W123.35.45.3. There are two plastic water pipes in the pool coming from the left bank.

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4126' A bridge measures 4’ long x 15’ wide and is 17' above channel. A dam at the top of the unit measures 4' high x 34' wide. The spillway opening is 4' high x 5' wide. There is a 3' plunge from the spillway. Plastic water pipes coming from the left bank. Gravel accumulation above the dam is 40’ long x 25 wide.

4167' There is a well on left bank approximately 20' from the channel.

4255' There is a road on the right bank.

4531' There is a well on the right bank approximately 15' from the channel.

4975' Unidentified salmonid yoy observed.

5011' There is a left bank tributary at 130' into unit. It is not accessible to fish.

5469' A bridge crosses this unit approximately 16' above the channel. It measures 14' wide x 50' long. There are two concrete pillars at each support. Orange flag "041 7-11-96".

5713' There is a well on the left bank approximately 15' from the stream.

5737' There is a good spawning substrate in this unit.

6209' Unidentified salmonid yoy present. There is good spawning substrate in this unit.

6277' There is a well on the left bank approximately 20' from the channel. There is a foot bridge at 60' into the unit. The bridge is made of redwood beams and a plywood surface. The bridge is 10' above the channel and measures 6' wide x 38' long.

6435' Begin no access at N39.15.43 and W123.35.34.7.

8321’ Restart survey with access.

8702' Confluence with Marsh Creek.

8914' There is a water extraction hose on the left bank.

9134' Unidentified salmonid yoy present. There is a house on the right bank approximately 100' from the stream.

9193' There is a 3’ drop from a culvert outlet to the stream bed.

9267' There is a 14' diameter culvert under Flynn Creek Road. The bottom 10% of the culvert is concrete.

9433' There are water extraction pipes in the pool. Unidentified salmonid yoy observed.

An LDA at top of the pool includes 5 pieces of LWD and measures 4' high x 25' long and is retaining 3' of sediment.

9610' There is a building approximately 70' from stream on the right bank.

9929' There are 2 water pipes in the pool.

9987' There is a right bank erosion that measures 20' high x 100' long.

10105' Unidentified salmonid yoy observed.

10263' Good spawning gravel.

10472' There is an LDA that measures 3' high x 25' long.

10836' There is some spawning substrate and approximately 20% bedrock.

11120' There is a well on the right bank approximately 25' from the channel in the flood plain.

11224' Unidentified salmonid yoy present. Dead coho yoy in algae.

11372' Concrete retaining wall on the right bank is approximately 70' from channel and measures 20' high x 60' long.

11810' Dead coho yoy. Orange flag 150 7/19/96.

12228' End of survey due to the end of access. MacDonald Gulch enters on the right bank and is not accessible for fish. Coordinates: N39.15.16.11 W123.34.52.22.

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.

Upper Albion River

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

Albion River above NFork — Drainage:

Table 1 - SUMMARY OF RIFFLE, FLATWATER, AND POOL HABITAT TYPES — Survey Dates: 10/15/02 to 10/28/02

Confluence Location: QUAD: Albion — LEGAL DESCRIPTION: T16NR17WS28 — LATITUDE:39°13'36" LONGITUDE:123°46'8"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	ESTIMATED TOTAL AREA (sq.ft.)	MEAN VOLUME (cu.ft.)	ESTIMATED TOTAL VOLUME (cu.ft.)	MEAN RESIDUAL POOL VOL (cu.ft.)	MEAN SHELTER RATING
15	15	RIFFLE	7	14	207	2	3.1	0.1	23	349	3	52	0	1
45	45	FLATWATER	20	31	1413	14	4.5	0.2	138	6217	30	1334	0	6
87	87	POOL	38	49	4224	41	9.4	0.7	511	44445	409	35567	396	24
80	0	DRY	35	56	4509	43	0.0	0.0	0	0	0	0	0	0
1	0	CULVERT	0	57	57	1	0.0	0.0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq. ft.)	TOTAL VOL. (cu. ft.)
228	147	10410	51010	36953

Albion River above NFork — Drainage:

Table 2 - SUMMARY OF HABITAT TYPES AND MEASURED PARAMETERS — Survey Dates: 10/15/02 to 10/28/02

Confluence Location: QUAD: Albion LEGAL DESCRIPTION: T16NR17WS28 LATITUDE:39°13'36" LONGITUDE:123°46'8"

HABITAT UNITS #	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT OCCURRENCE %	MEAN LENGTH ft.	TOTAL LENGTH ft.	TOTAL LENGTH %	MEAN WIDTH ft.	MEAN DEPTH ft.	MAXIMUM DEPTH ft.	MEAN AREA sq.ft.	TOTAL AREA EST. sq.ft.	MEAN VOLUME cu.ft.	TOTAL VOLUME EST. cu.ft.	MEAN RESIDUAL POOL VOL cu.ft.	MEAN SHELTER RATING	MEAN CANOPY %
15	15	LGR	7	14	207	2	3	0.1	0.4	23	349	3	52	0	1	98
1	1	GLD	0	21	21	0	6	0.2	0.4	120	120	24	24	0	10	100
44	44	RUN	19	32	1392	11	4	0.2	1.0	139	6097	30	1311	0	6	98
1	1	TRP	0	41	41	0	5	0.5	1.1	185	185	92	92	19	20	100
83	83	MCP	36	49	4096	33	10	0.7	4.2	525	43552	415	34450	403	24	96
1	1	CCP	0	65	65	1	8	1.7	2.9	520	520	884	884	832	20	55
1	1	PLP	0	12	12	0	9	1.0	2.6	108	108	108	108	108	40	100
1	1	DPL	0	10	10	0	8	0.4	0.9	80	80	32	32	0	5	99
80	0	DRY	35	56	4509	37	0	0.0	0.0	0	0	0	0	0	0	99
1	0	CUL	0	57	57	0	0	0.0	0.0	0	0	0	0	0	0	0

TOTAL UNITS	TOTAL UNITS	LENGTH (ft.)	AREA (sq.ft)	TOTAL VOL. (cu.ft)
228	147	10410	51010	36953

Albion River above NFork — Drainage:

Table 3 - SUMMARY OF POOL TYPES — Survey Dates: 10/15/02 to 10/28/02

Confluence Location: QUAD: Albion LEGAL DESCRIPTION: T16NR17WS28 LATITUDE:39°13'36" LONGITUDE:123°46'8"

HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	MEAN LENGTH (ft.)	TOTAL LENGTH (ft.)	PERCENT TOTAL LENGTH	MEAN WIDTH (ft.)	MEAN DEPTH (ft.)	MEAN AREA (sq.ft.)	TOTAL AREA EST. (sq.ft.)	MEAN VOLUME (cu.ft.)	TOTAL VOLUME EST. (cu.ft.)	MEAN RESIDUAL POOL VOL. (cu.ft.)	MEAN SHELTER RATING
85	85	MAIN	98	49	4202	99	9.5	0.7	521	44257	417	35427	404	24
1	1	SCOUR	1	12	12	0	9.0	1.0	108	108	108	108	108	40
1	1	BACKWATER	1	10	10	0	8.0	0.4	80	80	32	32	0	5

TOTAL UNITS	TOTAL UNITS	TOTAL LENGTH (ft.)	TOTAL AREA (sq.ft.)	TOTAL VOL. (cu.ft.)
87	87	4224	44445	35567

Albion River above NFork — Drainage:

Table 4 - SUMMARY OF MAXIMUM POOL DEPTHS BY POOL HABITAT TYPES — Survey Dates: 10/15/02 to 10/28/02

Confluence Location: QUAD: Albion — LEGAL DESCRIPTION: T16NR17W528 — LATITUDE:39°13'36" LONGITUDE:123°46'8"

UNITS MEASURED	HABITAT TYPE	HABITAT PERCENT OCCURRENCE	<1 FOOT MAXIMUM DEPTH	<1 FOOT PERCENT OCCURRENCE	1-<2 FT. MAXIMUM DEPTH	1-<2 FOOT PERCENT OCCURRENCE	2-<3 FT. MAXIMUM DEPTH	2-<3 FOOT PERCENT OCCURRENCE	3-<4 FT. MAXIMUM DEPTH	3-<4 FOOT PERCENT OCCURRENCE	>=4 FEET MAXIMUM DEPTH	>=4 FEET PERCENT OCCURRENCE
1	TRP	1	0	0	1	100	0	0	0	0	0	0
83	MCP	95	22	27	43	52	13	16	4	5	1	1
1	CCP	1	0	0	0	0	1	100	0	0	0	0
1	PLP	1	0	0	0	0	1	100	0	0	0	0
1	DPL	1	1	100	0	0	0	0	0	0	0	0

TOTAL UNITS
87

Albion River above NFork — Drainage:

Table 5 - SUMMARY OF MEAN PERCENT COVER BY HABITAT TYPE — Survey Dates: 10/15/02 to 10/28/02

Confluence Location: QUAD: Albion — LEGAL DESCRIPTION: T16NR17WS28 — LATITUDE:39°13'36" LONGITUDE:123°46'8"

UNITS MEASURED	UNITS FULLY MEASURED	HABITAT TYPE	MEAN % UNDERCUT BANKS	MEAN % SWD	MEAN % LWD	MEAN % ROOT MASS	MEAN % TERR. VEGETATION	MEAN % AQUATIC VEGETATION	MEAN % WHITE WATER	MEAN % BOULDERS	MEAN % BEDROCK LEDGES
15	3	LGR	13	2	0	0	0	0	0	85	0
1	1	GLD	0	20	20	0	0	0	0	60	0
44	17	RUN	4	23	0	0	9	0	0	54	4
1	1	TRP	0	10	0	0	0	0	0	50	40
83	82	MCP	28	32	10	5	4	0	0	13	8
1	1	CCP	50	10	0	30	5	0	0	5	0
1	1	PLP	0	10	0	0	0	0	0	50	40
1	1	DPL	0	100	0	0	0	0	0	0	0
80	0	DRY	0	0	0	0	0	0	0	0	0
1	0	CUL	0	0	0	0	0	0	0	0	0

Albion River above NFork

Drainage:

Table 6 - SUMMARY OF DOMINANT SUBSTRATES BY HABITAT TYPE

Survey Dates: 10/15/02 to 10/28/02

Confluence Location: QUAD: Albion LEGAL DESCRIPTION: T16NR17WS28 LATITUDE:39°13'36" LONGITUDE:123°46'8"

TOTAL HABITAT UNITS	UNITS FULLY MEASURED	HABITAT TYPE	% TOTAL SILT/CLAY DOMINANT	% TOTAL SAND DOMINANT	% TOTAL GRAVEL DOMINANT	% TOTAL SM COBBLE DOMINANT	% TOTAL LG COBBLE DOMINANT	% TOTAL BOULDER DOMINANT	% TOTAL BEDROCK DOMINANT
15	8	LGR	0	0	63	25	0	0	13
1	1	GLD	0	0	0	0	0	0	100
44	18	RUN	0	11	50	6	0	0	33
1	1	TRP	0	0	0	0	0	0	100
83	83	MCP	2	27	48	0	0	0	23
1	1	CCP	0	100	0	0	0	0	0
1	1	PLP	0	0	0	0	0	0	100
1	1	DPL	0	100	0	0	0	0	0
80	0	DRY	0	0	0	0	0	0	0
1	0	CUL	0	0	0	0	0	0	0

TABLE 8. FISH HABITAT INVENTORY DATA SUMMARY

STREAM NAME: Albion River above NFork
SAMPLE DATES: 10/15/02 to 10/28/02
STREAM LENGTH: 12228 ft.
LOCATION OF STREAM MOUTH:
USGS Quad Map: Albion — Latitude: 39°13'36"
Legal Description: T16NR17WS28 — Longitude: 123°46'8"

SUMMARY OF FISH HABITAT ELEMENTS BY STREAM REACH

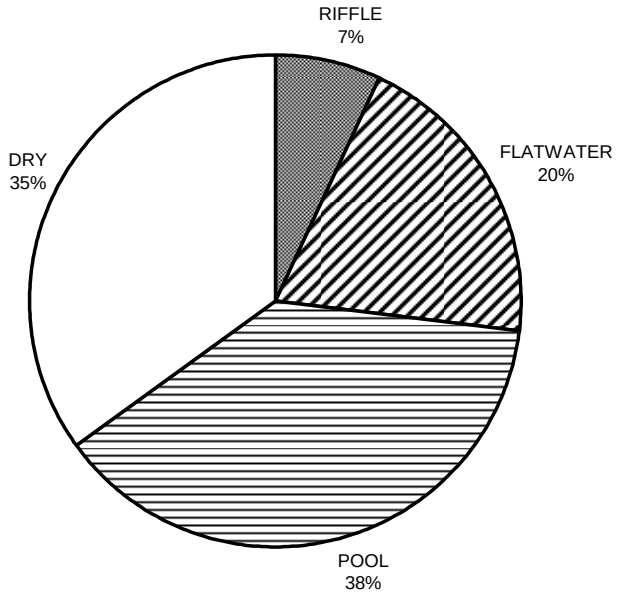
STREAM REACH 1

Channel Type: F4	Canopy Density: 97%
Channel Length: 10359 ft.	Coniferous Component: 78%
Riffle/flatwater Mean Width: 4 ft.	Deciduous Component: 22%
Total Pool Mean Depth: 0.7 ft.	Pools by Stream Length: 41%
Base Flow: 0.0 cfs	Pools >=3 ft.deep: 6%
Water: 044- 057°F Air: 047-065°F	Mean Pool Shelter Rtn: 24
Dom. Bank Veg.: Coniferous Trees	Dom. Shelter: Small Woody Debris
Vegetative Cover: 86%	Occurrence of LOD: 8%
Dom. Bank Substrate: Silt/Clay/Sand	Dry Channel: 4509 ft.

Embeddness Value: 1. 13% 2.16% 3. 33% 4. 6% 5. 32%

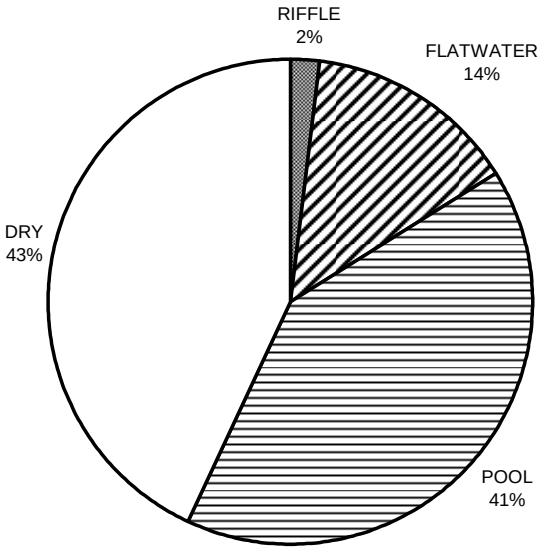
Length of stream section not surveyed within survey reach and not included in above totals or calculations: 1869 ft.

Upper Albion River
HABITAT TYPES BY PERCENT OCCURRENCE



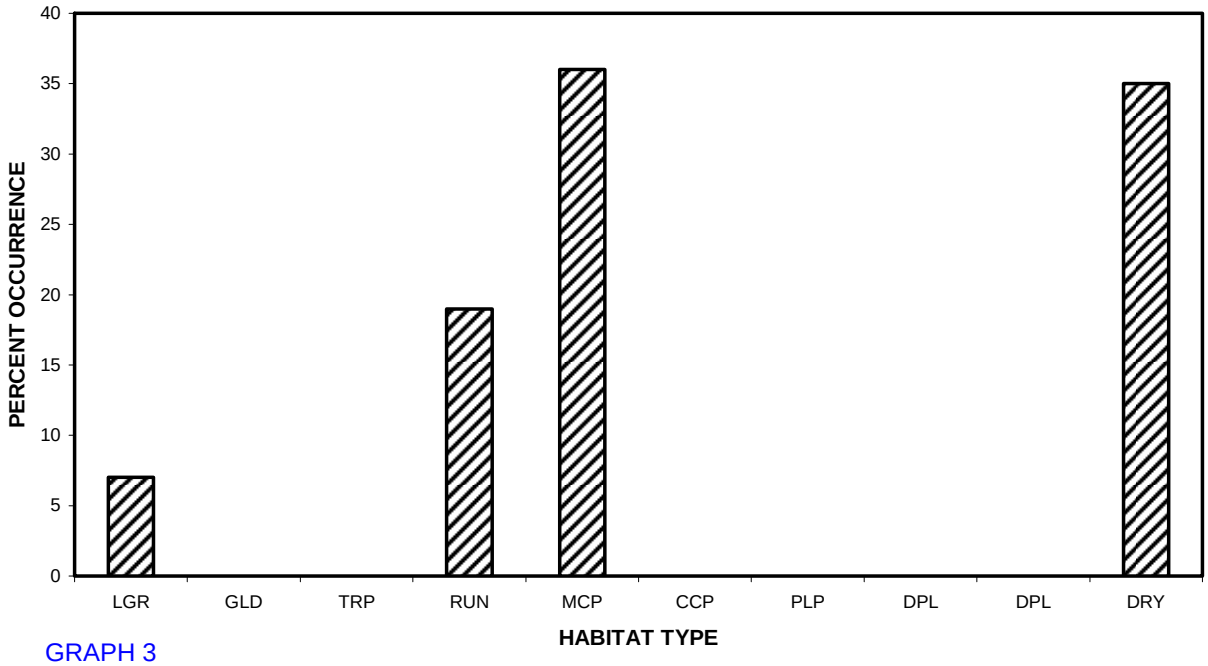
GRAPH 1

UPPER ALBION RIVER
HABITAT TYPES BY PERCENT TOTAL LENGTH



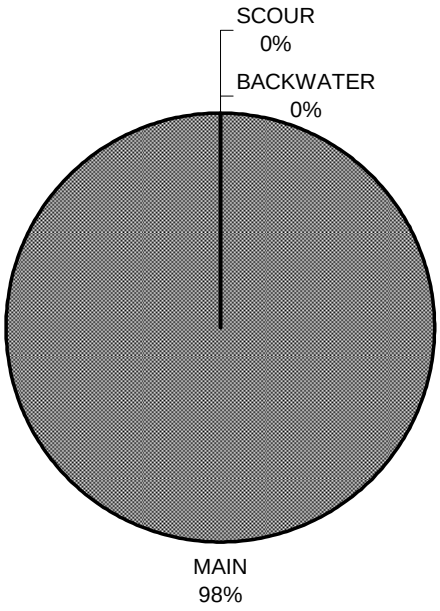
GRAPH 2

UPPER ALBION RIVER
HABITAT TYPES BY PERCENT OCCURRENCE

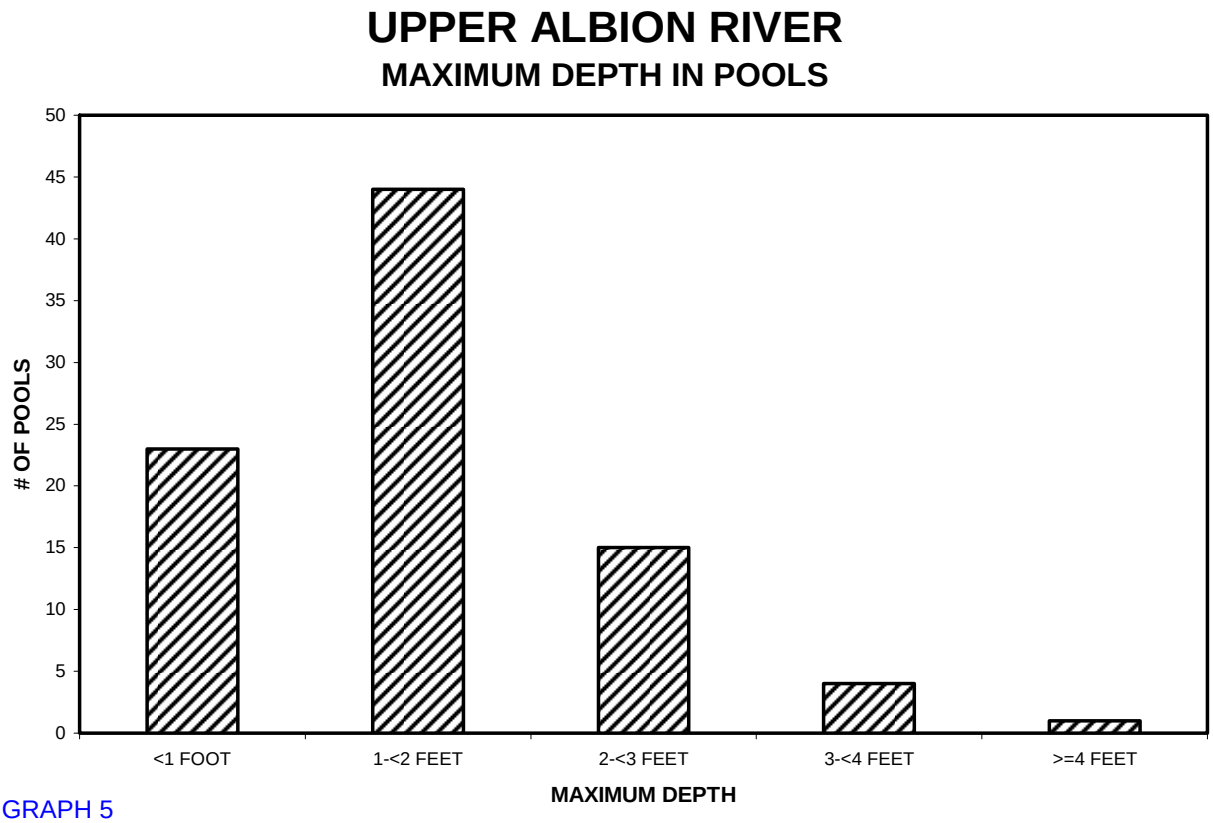


GRAPH 3

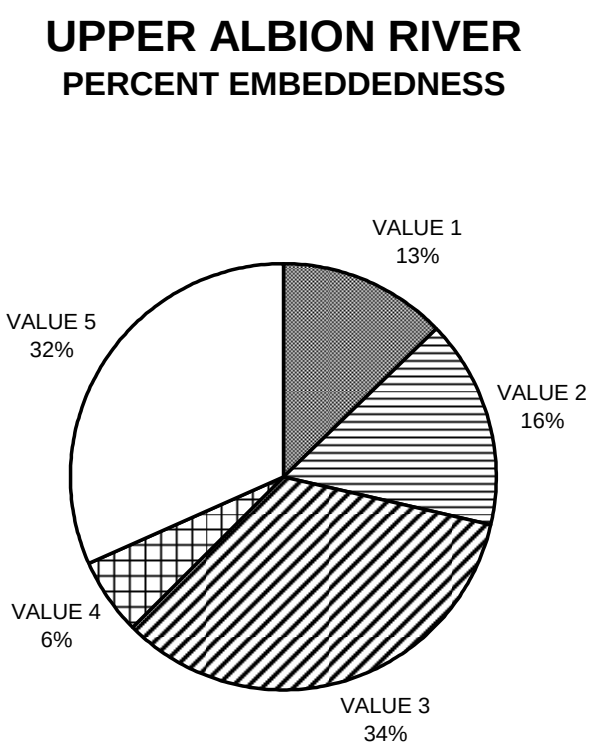
UPPER ALBION RIVER
POOL HABITAT TYPES BY PERCENT OCCURRENCE



GRAPH 4

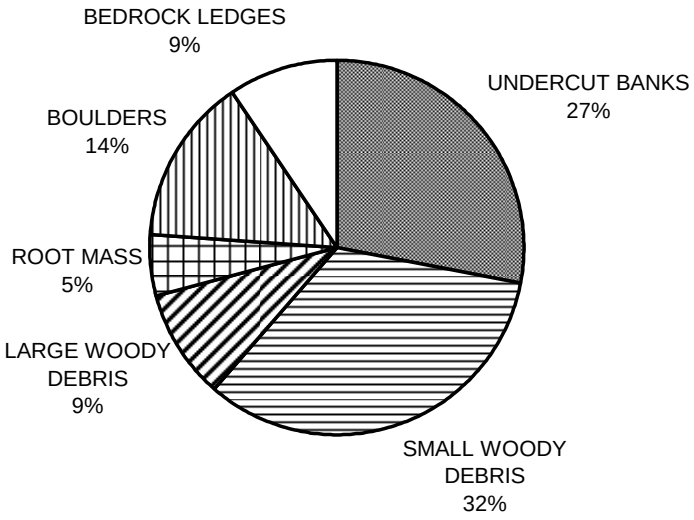


GRAPH 5



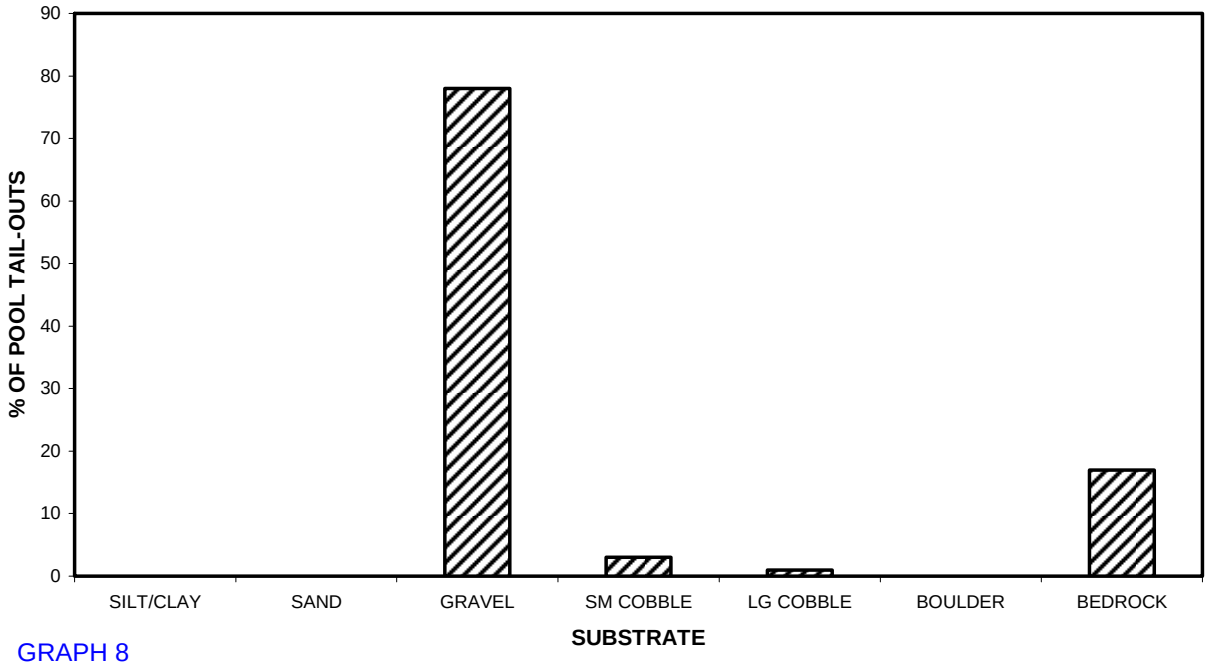
GRAPH 6

UPPER ALBION RIVER
MEAN PERCENT COVER TYPES IN POOLS



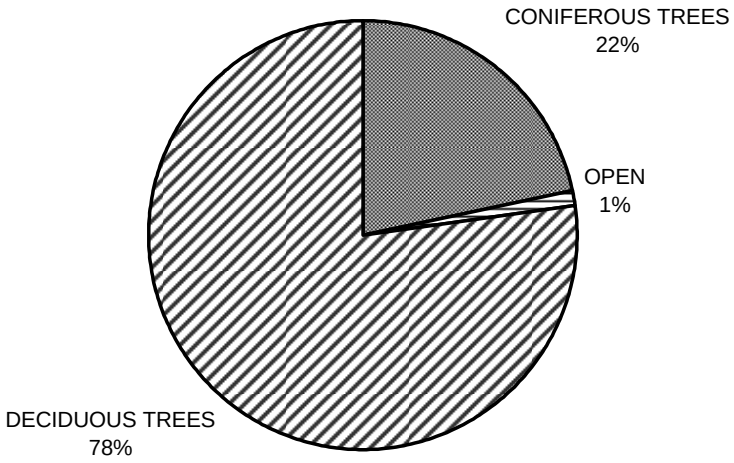
GRAPH 7

UPPER ALBION RIVER
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



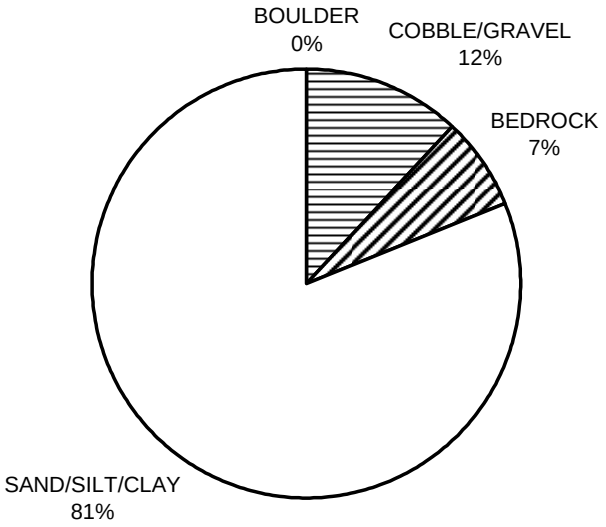
GRAPH 8

UPPER ALBION RIVER
MEAN PERCENT CANOPY



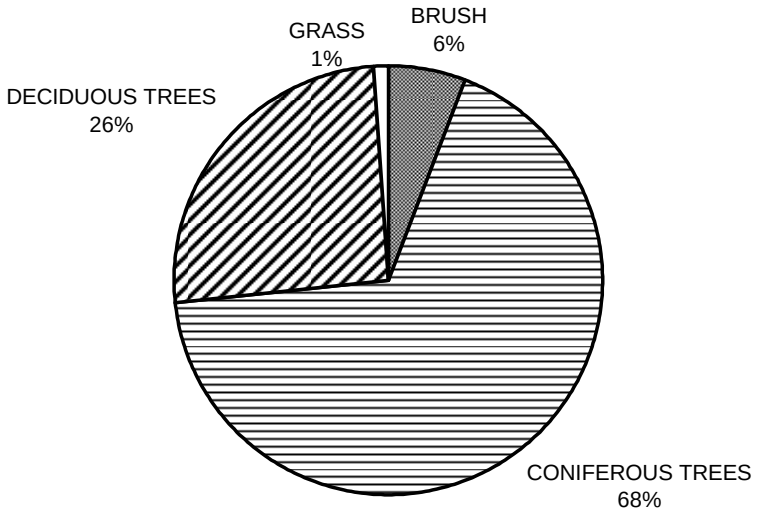
GRAPH 9

UPPER ALBION RIVER
DOMINANT BANK COMPOSITION IN SURVEY REACH



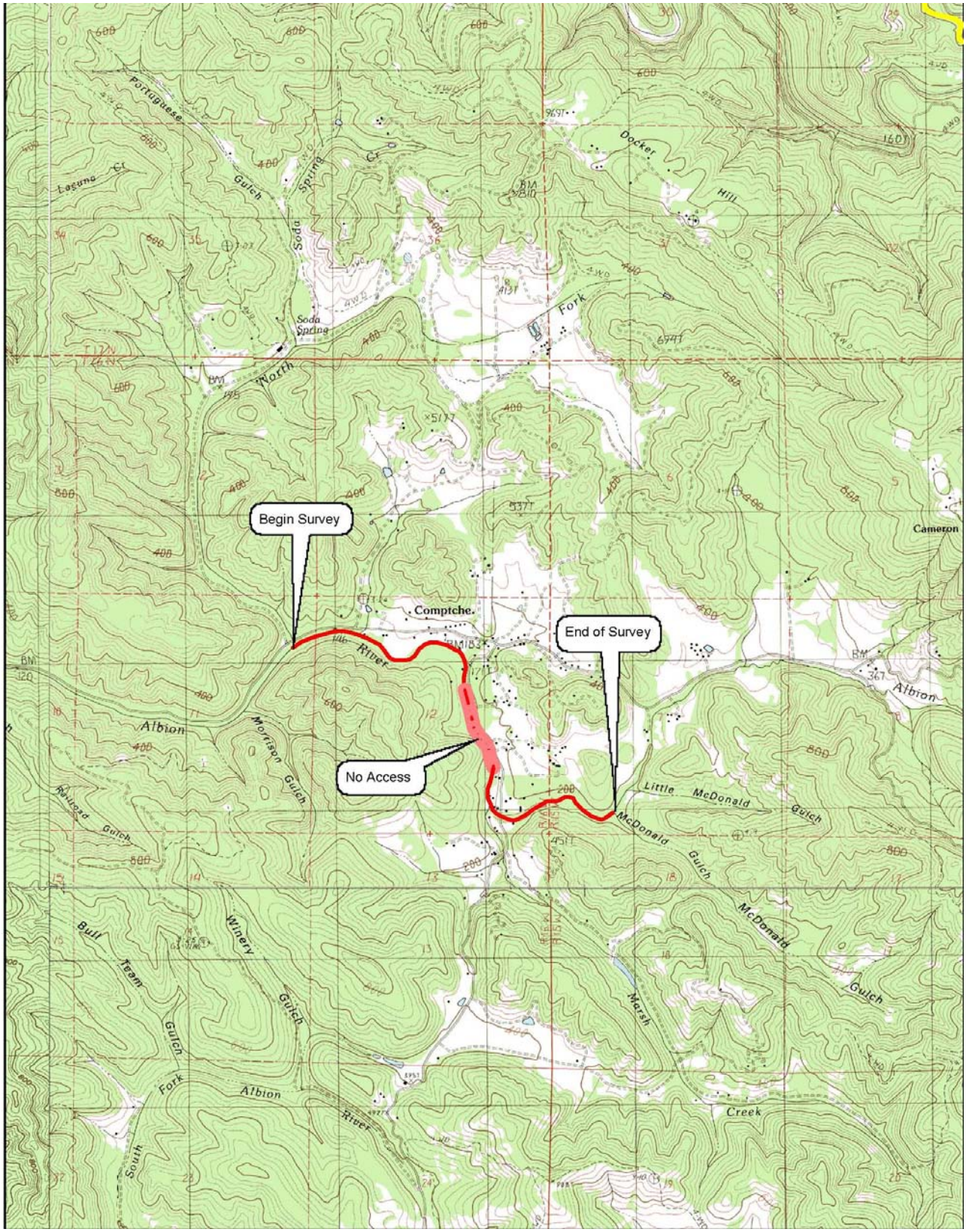
GRAPH 10

UPPER ALBION RIVER
DOMINANT BANK VEGETATION IN SURVEY REACH



GRAPH 11

Upper Albion River



Map 1. Albion River stream survey, North Fork Albion River.