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DEPARTMENT OF FISH AND WILDLIFE
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CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

STREAM INVENTORY REPORT

Dinner Creek

INTRODUCTION

A stream inventory was conducted July 20 to July 26, 2017 on Dinner Creek. The survey began at the confluence with China Creek and extended upstream 2.1 miles.

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

The objective of this report is to document the current habitat conditions and recommend options for the potential enhancement of habitat for Chinook and 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. This report was finalized in March, 2018.

WATERSHED OVERVIEW

Dinner Creek, located in southern Humboldt County, is a tributary to China Creek, which is a tributary to Redwood Creek, which is a tributary to South Fork Eel River, a tributary to the Eel River which drains to Pacific Ocean in northern California (Map 1). Dinner Creek's legal description at the confluence with China Creek is T04S R02E S23. Its location is 40.0618° north latitude and -123.5534° west longitude, LLID number 1239262401049. Dinner Creek is a first order stream and has approximately 1.5 miles of blue line stream according to the USGS Briceland 7.5 minute quadrangle. Dinner Creek drains a watershed of approximately 1.5 square miles. Elevations range from about 660 feet at the mouth of the creek to 1,200 feet in the headwater areas. Grasslands and oak and Douglas fir forest dominate the watershed. The watershed is privately owned and managed as residential. Vehicle access exists from State Highway 101 to Briceland via Redwood Drive, Redway. The mouth of Dinner Creek is located approximately 65 feet from Briceland Road, three miles from the town of Briceland.

METHODS

The habitat inventory conducted in Dinner Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et al, 1998). The Watershed Stewards Project (WSP) members and California Department of Fish and Wildlife (CDFW) personnel that conducted the inventory were trained in standardized habitat inventory methods by CDFW. 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. Surveyors also take photos to document general habitat conditions, significant features (landslides, potential barriers, etc.), and end of survey (Appendix II).

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

1. Flow:

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

2. Channel Type:

Channel typing is conducted according to the classification system developed and revised by David Rosgen (1994). This methodology is described in the *California Salmonid Stream Habitat Restoration Manual*. Channel typing is conducted simultaneously with habitat typing and follows a standard form to record measurements and observations. There are five measured parameters used to determine channel type: 1) water slope gradient, 2) entrenchment, 3) width/depth ratio, 4) substrate composition, and 5) sinuosity. Channel characteristics are measured using a 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". Dinner Creek habitat typing used standard basin level measurement criteria. These parameters require that the minimum length of a described habitat unit must be equal to or greater than the stream's mean wetted width. All measurements are in feet to the nearest tenth. Habitat characteristics are measured using a clinometer, hip chain, and stadia rod.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out areas is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Dinner Creek, embeddedness was ocularly estimated. The values were recorded using the following ranges: 0 - 25% (value 1), 26 - 50% (value 2), 51 - 75% (value 3) and 76 - 100% (value 4). Additionally, a value of 5 was assigned to tail-outs deemed unsuitable 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. 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 Dinner Creek, a standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) was assigned according to the complexity of the cover. The shelter rating is then calculated by multiplying the qualitative shelter value by the percent of the unit covered. 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 Dinner Creek, an estimate of the percentage of the habitat unit covered by canopy was made from the center of approximately every third unit in addition to every fully-described unit, giving an approximate 30% sub-sample. In addition, the area of canopy was estimated ocularly into percentages of coniferous or hardwood trees.

9. Bank Composition and Vegetation:

Bank composition elements range from bedrock to bare soil. However, the stream banks are usually covered with grass, brush, or trees. These factors influence the ability of stream banks to withstand winter flows. In Dinner Creek, the dominant composition type and the dominant vegetation type of both the right and left banks for each fully-described unit were selected from the habitat inventory form. Additionally, the percent of each bank covered by vegetation (including downed trees, logs, and rootwads) was estimated and recorded.

10. Large Woody Debris Count:

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

11. Average Bankfull Width:

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

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence was observed from the stream banks in Dinner Creek. In addition, underwater mask and snorkel observations were made at 11 sites using techniques discussed in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into Stream Habitat 2.0.18, a Visual Basic data entry program developed by Karen Wilson, Pacific States Marine Fisheries Commission in conjunction with the California Department of Fish and Wildlife. 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 Dinner Creek include:

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

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

HABITAT INVENTORY RESULTS

* ALL TABLES AND GRAPHS ARE LOCATED IN APPENDIX I *

The habitat inventory of July 20 to July 26, 2017 was conducted by Kori Roberts (CDFW) and Chris Tevini (CCC). The total length of the stream surveyed was 10,876 feet.

Stream flow was not measured.

Dinner Creek is a B2 channel type for 1,353 feet of the stream surveyed (Reach 1), and an F4 channel type for 9,523 feet of the stream surveyed (Reach 2).

Water temperatures taken during the survey period ranged from 52° to 62° Fahrenheit. Air temperatures ranged from 60° to 74° Fahrenheit.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of occurrence there were 40% riffle units, 36% pool units, 22% flatwater units, and 1% culvert units (Graph 1). Based on total length of Level II habitat types there were 42% pool units, 29% riffle units, 23% flatwater units, 4% dry units, and 2% culvert units (Graph 2).

Five Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were low gradient riffle units (39%), mid-channel pool units (36%), and run units (22%) (Graph 3). Based on percent total length, mid-channel pool units (42%), low gradient riffle units (25%), and run units (23%).

A total of 128 pools were identified (Table 3). Main channel pools were the most frequently encountered at 100% (Graph 4), and comprised 100% of the total length of all pools (Table 3).

Table 4 is a summary of maximum residual pool depths by pool habitat types. Pool quality for salmonids increases with depth. Thirty-one of the 128 pools (24%) had a residual depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the 129 pool tail-outs measured, 124 had a value of 1 (96.1%), 4 had a value of 2 (3.1%), and 1 had a value of 4 (0.8%) (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 not suitable for spawning due to inappropriate substrate such as bedrock, log sills, boulders, or other considerations.

A shelter rating was calculated for each habitat unit and expressed as a mean value for each habitat type within the survey using a scale of 0-300. Riffle habitat types had a mean shelter rating of 0, flatwater habitat types had a mean shelter rating of 4, and pool habitats had a mean shelter rating of 14 (Table 1). Only main-channel pools were observed (Table 3).

Table 5 summarizes mean percent cover by habitat type. Terrestrial vegetation is the dominant cover type in Dinner Creek. Graph 7 describes the pool cover in Dinner Creek. Terrestrial vegetation is 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. Gravel was the dominant substrate observed in 88% of the pool tail-outs. Sand was the next most frequently observed dominant substrate type and occurred in 5% of the pool tail-outs.

The mean percent canopy density for the surveyed length of Dinner Creek was 97%. Three percent of the canopy was open. Of the canopy present, the mean percentages of hardwood and coniferous trees were 88% and 12%, respectively. Graph 9 describes the mean percent canopy in Dinner Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 97%. The mean percent left bank vegetated was 99%. The dominant elements composing the structure of the stream banks consisted of 52% sand/silt/clay, 42% cobble/gravel, 4% boulder, 2% bedrock (Graph 10). Hardwood trees were the dominant vegetation type observed in 93.7% of the units surveyed. Additionally, 6% of the units surveyed had coniferous as the dominant vegetation type, and 0.3% had no vegetation (Graph 11).

BIOLOGICAL INVENTORY RESULTS

Survey teams conducted a mask and snorkel survey at 10 sites for species composition and distribution in Dinner Creek on July 27, 2017 (Table A). The sites were sampled by Kori Roberts, Ryan Bernstein (CDFW), and Chris Tevini (CCC).

In Reach 1 which comprised the first 1,353 feet of stream, three sites were sampled. The reach sites yielded 8 young-of-the-year (YOY) steelhead trout (SH), and one YOY coho salmon.

In Reach 2, 8 sites were sampled starting approximately 1,452 from the confluence with Indian Creek and continuing upstream 10,252 feet. The reach sites yielded 58 young-of-the-year SH, and 49 YOY coho salmon.

During the survey, the upstream-most observation of juvenile coho and steelhead trout occurred at 40.09072° north latitude and -123.93671° west longitude, approximately 10,241 feet upstream from the confluence with China Creek.

Table A. Summary of results for a fish composition and distribution survey within Dinner Creek, July 24 & August 24, 2017.

Date	Survey Site #	Habitat Unit #	Habitat Type	Approx. Dist. from mouth (ft.)	Steelhead Trout			Coho Salmon		Additional Aquatic Species Observed
					YOY	1+	2+	YOY	1+	
Reach 1: B2 Channel Type										
07/24/17	1	15	Pool	786	0	0	0	0	0	
	2	17	Pool	848	4	0	0	0	0	
	3	19	Pool	900	4	0	0	1	0	
Reach 2: F4 Channel Type										
07/24/17	4	32	Pool	1,452	1	0	0	1	0	
	5	33	Pool	1,480	18	0	0	0	0	
	6	35	Pool	1,543	12	0	0	0	0	
08/24/17	7	190	Pool	6,363	1	0	0	30	0	
	8	201	Pool	6,388	7	0	0	9	0	
	9	203	Pool	6,608	3	1	0	8	0	
	10	205	Pool	6,665	13	0	0	0	0	
	11	344	Pool	10,241	3	0	0	1	0	

DISCUSSION

Dinner Creek is a B2 channel type for the first 1,353 feet of stream surveyed and an F4 channel type for the next 9,523 feet. The suitability of B2 and F4 channel types for fish habitat improvement structures is as follows: B2 channel types excellent for plunge weirs, single and opposing wing-deflectors, and log cover. 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 July 20 to July 26, 2017 ranged from 52° to 62° Fahrenheit. Air temperatures ranged from 60° to 74° Fahrenheit. This is a suitable water temperature range for salmonids. To make any further conclusions, temperatures need to be monitored throughout the warm summer months, and more extensive biological sampling needs to be conducted.

Flatwater habitat types comprised 23% of the total length of this survey, riffles 29%, and pools 42%. Thirty-one of the 128 (24%) pools had a maximum residual depth greater than two feet. In general, pool enhancement projects are considered when primary pools comprise less than 40% of the length of total stream habitat. In first and second order streams, a primary pool is defined to have a maximum residual depth of at least two feet, occupy at least half the width of the low flow channel, and be as long as the low flow channel width.

One hundred twenty-eight of the 129 pool tail-outs measured had embeddedness ratings of 1 or 2. One of the pool tail-outs had embeddedness ratings of 3 or 4. None 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-seventeen of the 128 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 is 14. The shelter rating in the flatwater habitats is 4. A pool shelter rating of approximately 100 is desirable. The amount of cover that now exists is being provided primarily by terrestrial vegetation in Dinner Creek. Terrestrial vegetation is the dominant cover type in pools followed by small woody debris. Log and rootwad cover structures in the pool and flatwater habitats would enhance both summer and winter salmonid habitat. Log cover structures provide rearing fry with protection from predation, rest from water velocity, and also divide territorial units to reduce density related competition.

The mean percent canopy density for the stream was 97%. Reach 1 had a canopy density of 97.25% and Reach 2 had a canopy density of 96.84%. The percentage of right and left bank covered with vegetation was 97% and 99%, respectively.

RECOMMENDATIONS

Dinner Creek should be managed as an anadromous, natural production stream. Recommendations for potential habitat improvement activities are based on target habitat values suitable for salmonids in California's north coast streams. Considering the results from this stream habitat inventory, factors that affect salmonid productivity and CDFW's professional judgment, the following list prioritizes habitat improvement activities in Dinner Creek. Keep in mind, watershed and stream ecosystem processes, land use alterations, changes in land ownership, and other factors could potentially change the order of these recommendations or create the need to remove/add recommendations in the future.

1) Increase woody cover in the pools and flatwater habitat units. Most of the existing cover in the pools is from Terrestrial Vegetation. Adding high quality complexity with woody cover in the pools is desirable.

2) Based on observed stream flow conditions pools may become disconnected. Since 2015, the Salmonid Restoration Federation has had grant funding to conduct a low flow stream discharge study in Redwood Creek, including a site in Dinner Creek. Streamflow should continue be monitored to determine if it is limiting for salmonids and augment low flows to optimize benefits to juvenile salmonids.

3) 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.

4) Where feasible, design and engineer pool enhancement structures to increase the number of pools or enhance the numerous, current shallow pools. This must be done where the banks are stable or in conjunction with stream bank armor to prevent erosion.

5) While the overall canopy density is near 100% on Dinner Creek, it is largely composed (88%) of hardwood trees. In order to provide more structure to the canopy, reduce water temperatures, and increase LWD recruitment consider planting appropriate native coniferous species like redwood and Douglas fir along the stream. Also where site conditions are appropriate consider cautious thinning of hardwoods to hasten the development of denser and more extensive coniferous canopy component. 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.

COMMENTS AND LANDMARKS

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

Position (ft):	Habitat unit #:	Comments:
0	0001.00	Start of survey at the confluence of China Creek. Channel type is a B2. Channel type cross-section location is at Habitat unit (HU) #25.
254	0011.00	Culvert #1 is the passage under Briceland Thorn Road, and 7.4' high x 7.4' wide x 37' long. It is composed of 1 culvert, and is made of concrete. The culvert's diameter is 7.4', its plunge height is 2.6', and it has a maximum depth of 0.2' within 5' of the outlet. The slope is 2%, and its condition is good. It is not a possible barrier to juvenile and adult salmonids.
1353	0033.00	Channel type changes to a F4 at HU #33. Channel type cross-section location is at HU #33.
1670	0044.00	Log Debris Accumulation (LDA) #1 is 5' high x 42' wide x 4.5' long and contains 1 pieces of Large Woody Debris (LWD). Water flows through the LDA and there are visible gaps in it. The LDA is not a possible barrier to salmonids. Fish were observed above the LDA.
2840	0079.00	LDA #2 is 4' high, 21' wide, 5.5' long and contains 2 pieces of LWD. Water flows through the LDA and there are visible gaps in it. The LDA is not a barrier to salmonids. Fish were observed above the LDA.
. 3040	0085.00	Briceland Road runs along the left bank.
3239	0090.00	Culvert #2 is the passage under an unnamed road, and is 6.4' high x 6.6' wide x 21' long. It is composed of 1 culvert, and is made of metal. The culvert's diameter is 6.6 ', its plunge height is 0, and it has a maximum

		depth of 2' within5' of the outlet. The slope is 0%, and its condition is good. It is not a possible barrier to juvenile and adult salmonids.
4319	0123.00	LDA #3 is 4' high x 22' wide x 7.5' long and contains 4 pieces of LWD. Water flows through the LDA and there are visible gaps in it. The LDA is not a possible barrier to salmonids. Fish were observed above the LDA.
5691	0172.00	LDA #4 is 3.5' high x 17' wide x 10.5' long and contains 4 pieces of LWD. Water flows through the LDA and there are visible gaps in it. The LDA is not a possible barrier to salmonids. Fish were observed above the LDA.
5972	0181.00	There is a Salmon Restoration Project (SRP) made of LWD at the upstream end of the pool.
6066	0185.00	The pools in Habitat Unit (HU) #185 and 186 are separated by a cement SRP.
6099	0188.00	Culvert #3 is the passage under Briceland Road, and is 6.2' high x 6.4' wide x 95' long. It is composed of 1 culvert, and is made of metal. The culvert's diameter is 6.4', its plunge height is 2.4', and it has a maximum depth of 0.3' within 5' of the outlet. The slope is 0%, and its condition is poor. The bottom is rusted out. It is not a possible barrier to adult salmonids, but is a possible barrier to juvenile salmonids.
6474	0203.00	Briceland Road runs along the left bank.
6768	0214.00	Tributary #1 enters on the right bank. The water temperature of the tributary was 62 Fahrenheit, the water temperature downstream of the confluence was 62° Fahrenheit, and the water temperature upstream of the confluence was 62° Fahrenheit. The slope of the tributary is approximately 2%. The tributary is accessible to salmonids. Fish were observed in the tributary.
7359	0239.00	There is a LWD SRP at the upstream end of the pool.
7377	0240.00	A dry tributary enter on the right bank.
7392	0241.00	There is a LWD SRP at the Upstream end of the pool.
7963	0262.00	The channel is very entrenched.
8152	0270.00	There is erosion on the left bank.

8239	0274.00	A dry tributary enter on the left bank.
8370	0278.00	There is erosion on the right bank.
9050	0306.00	Tributary #4 enters on the left bank. It contributes to approximately 50% of Dinner Creek's flow. The water temperature of the tributary was 60° Fahrenheit, the water temperature downstream of the confluence was 60° Fahrenheit, and the water temperature upstream of the confluence was 60° Fahrenheit. The slope of the tributary is 50%. The tributary is accessible to salmonids. Fish were observed in the tributary.
9680	0331.00	HU# 331 and 332 are separated by a LWD SRP spanning the channel.
9779	0334.00	A dry tributary enters from the right bank.
10304	0352.00	Tributary # enters on the right bank. It contributes to approximately 80% of Dinner Creek's flow. The water temperature of the tributary was 58° Fahrenheit, the water temperature downstream of the confluence was 60° Fahrenheit, and the water temperature upstream of the confluence was 65° Fahrenheit. The slope of the tributary is 2-4%. The tributary is accessible to salmonids. Fish were not observed in the tributary.
10405	0356.00	Culvert #6 is the passage under Briceland Road, and is 7.8' high x 9.7' wide x 71' long. It is composed of 1 culvert, and is made of metal. The culvert's diameter is 9.7'.The slope is 1%, and its condition is good. It is not a possible barrier to juvenile and adult salmonids. The creek ran dry at the downstream end of the culvert.
10476	0357.00	End of survey due to 400 feet of dry channel.

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.

REPORT CONTACT INFORMATION

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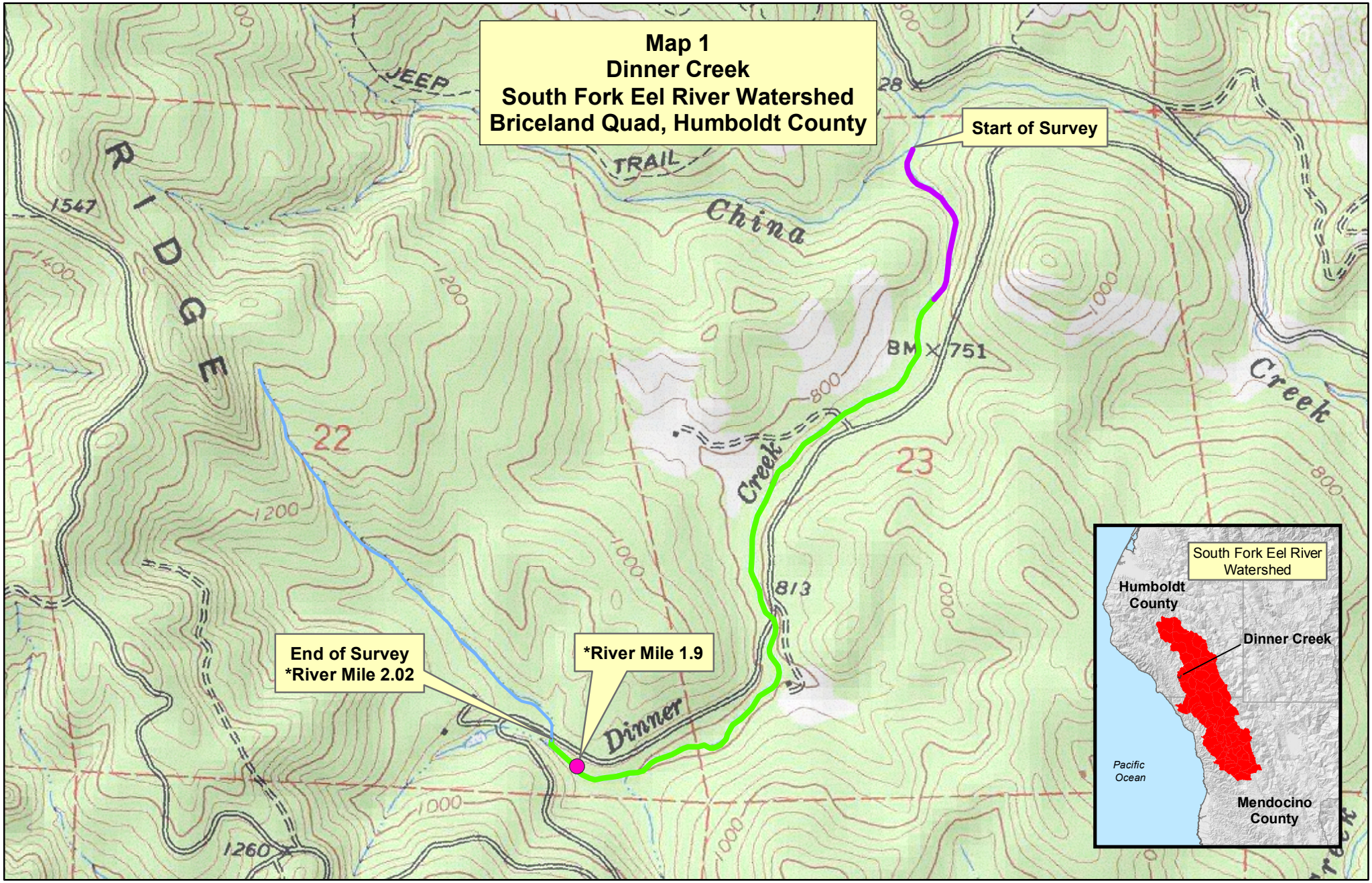
LEVEL III and LEVEL IV HABITAT TYPES

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 - Rootwad 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 - Rootwad 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]	



N
W E
S

Reach 1: B2 Channel Type

Reach 2: F4 Channel Type

Dinner Creek

Last observed juvenile coho & steelhead trout

0 0.075 0.15 0.3 Miles

0 0.15 0.3 0.6 Kilometers

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

Coordinate System: NAD 1983 California Teale Albers
Data Sources: CDFW, USGS, CalWater 2.21, CDF 24k

*River Mile indicates distance from confluence with China Creek

APPENDIX I

TABLES AND GRAPHS

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

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0

Habitat Units	Units Fully Measured	Habitat Type	Habitat Occurrence (%)	Mean Length (ft.)	Total Length (ft.)	Total Length (%)	Mean Width (ft.)	Mean Depth (ft.)	Mean Max Depth (ft.)	Mean Area (sq.ft.)	Estimated Total Area (sq.ft.)	Mean Volume (cu.ft.)	Estimated Total Volume (cu.ft.)	Mean Residual Pool Vol (cu.ft.)	Mean Shelter Rating
4	0	CULVERT	1.1	56	224	2.1									
1	0	DRY	0.3	400	400	3.7									
80	10	FLATWATER	22.4	31	2470	22.7	5.9	0.5	0.6	245	19620	115	9171		4
128	128	POOL	35.9	36	4574	42.1	8.7	0.7	1.7	314	40156	330	42273	252	14
144	13	RIFFLE	40.3	22	3208	29.5	5.9	0.2	0.4	107	15361	29	4149		0

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
357	151	10876	75138	55593

Table 2 - Summary of Habitat Types and Measured Parameters

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

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 (%)
140	13	LGR	39.2	20	2773	25.5	6	0.2	0.7	107	14935	29	4034		0	91
4	0	HGR	1.1	109	435	4.0										
80	10	RUN	22.4	31	2470	22.7	6	0.5	1	245	19620	115	9171		4	96
128	128	MCP	35.9	36	4574	42.1	9	0.7	21.8	314	40156	330	42273	252	14	98
1	0	DRY	0.3	400	400	3.7										
4	0	CUL	1.1	56	224	2.1										

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
357	151	10876	74711	55477

Table 3 - Summary of Pool Types

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

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
128	128	MAIN	100	36	4574	100	8.7	0.7	314	40156	252	32251	14

Total Units	Total Units Fully Measured	Total Length (ft.)	Total Area (sq.ft.)	Total Volume (cu.ft.)
128	128	4574	40156	32251

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

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

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
128	MCP	100	20	16	77	60	22	17	5	4	4	3

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
128	20	16	77	60	22	17	5	4	4	3

Mean Maximum Residual Pool Depth (ft.): 1.7

Table 5 - Summary of Mean Percent Cover By Habitat Type

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River-South Fork

Survey Dates: 7/20/2017 to 7/26/2017 Dry Units: 1

Confluence Location: Quad: Briceland Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

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
140	14	LGR	0	0	0	0	0	0	0	100	0
4	0	HGR									
144	14	TOTAL RIFFLE	0	0	0	0	0	0	0	100	0
80	10	RUN	35	12	0	0	53	0	0	0	0
80	10	TOTAL FLAT	35	12	0	0	53	0	0	0	0
128	127	MCP	12	27	14	4	32	0	0	11	0
128	127	TOTAL POOL	12	27	14	4	32	0	0	11	0
4	0	CUL									
357	151	TOTAL	13	27	13	3	33	0	0	11	0

Table 6 - Summary of Dominant Substrates By Habitat Type

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017 Dry Units: 1

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

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
140	13	LGR	0	8	77	0	8	8	0
4	0	HGR	0	0	0	0	0	0	0
80	10	RUN	0	0	90	0	10	0	0
128	127	MCP	3	25	65	1	1	4	1

Table 7 - Summary of Mean Percent Canopy for Entire Stream

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

Mean Percent Canopy	Mean Percent Conifer	Mean Percent Hardwood	Mean Percent Open Units	Mean Right Bank % Cover	Mean Left Bank % Cover
97	12	88	0	97	99

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

Open units represent habitat units with zero canopy cover.

Table 8 - Fish Habitat Inventory Data Summary

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017 Survey Length (ft.): 10876 Main Channel (ft.): 10876 Side Channel (ft.): 0

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

Summary of Fish Habitat Elements By Stream Reach

STREAM REACH: 1

Channel Type: B2
Reach Length (ft.): 1353
Riffle/Flatwater Mean Width (ft.): 6.8
BFW:
Range (ft.): 16 to 46
Mean (ft.): 22
Std. Dev.: 7
Base Flow (cfs.): 0.0
Water (F): 56 - 56 Air (F): 62 - 70
Dry Channel (ft): 0

Canopy Density (%): 97.3
Coniferous Component (%): 5.0
Hardwood Component (%): 95.0
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 95.8
Dominant Shelter: Boulders
Dominant Bank Substrate Type: Boulder
Occurrence of LWD (%): 1
LWD per 100 ft.:
Riffles: 0
Pools: 1
Flat: 1

Pools by Stream Length (%): 20.2
Pool Frequency (%): 31.3
Residual Pool Depth (%):
< 2 Feet Deep: 70
2 to 2.9 Feet Deep: 10
3 to 3.9 Feet Deep: 10
>= 4 Feet Deep: 10
Mean Max Residual Pool Depth (ft.): 1.6
Mean Pool Shelter Rating: 11

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 0 Gravel: 44 Sm Cobble: 0 Lg Cobble: 11 Boulder: 33 Bedrock: 11

Embeddedness Values (%): 1. 90.0 2. 0.0 3. 0.0 4. 10.0 5. 0.0

STREAM REACH: 2

Channel Type: F4
Reach Length (ft.): 9523
Riffle/Flatwater Mean Width (ft.): 5.8
BFW:
Range (ft.): 10 to 46
Mean (ft.): 16
Std. Dev.: 5
Base Flow (cfs.): 0.0
Water (F): 52 - 62 Air (F): 60 - 74
Dry Channel (ft): 400

Canopy Density (%): 96.8
Coniferous Component (%): 12.8
Hardwood Component (%): 87.2
Dominant Bank Vegetation: Hardwood Trees
Vegetative Cover (%): 98.3
Dominant Shelter: Terrestrial Veg.
Dominant Bank Substrate Type: Sand/Silt/Clay
Occurrence of LWD (%): 11
LWD per 100 ft.:
Riffles: 0
Pools: 2
Flat: 0

Pools by Stream Length (%): 45.2
Pool Frequency (%): 36.3
Residual Pool Depth (%):
< 2 Feet Deep: 76
2 to 2.9 Feet Deep: 18
3 to 3.9 Feet Deep: 3
>= 4 Feet Deep: 3
Mean Max Residual Pool Depth (ft.): 1.7
Mean Pool Shelter Rating: 14

Pool Tail Substrate (%): Silt/Clay: 0 Sand: 5 Gravel: 92 Sm Cobble: 3 Lg Cobble: 0 Boulder: 0 Bedrock: 0

Embeddedness Values (%): 1. 96.6 2. 3.4 3. 0.0 4. 0.0 5. 0.0

Table 9 - Mean Percentage of Dominant Substrate and Vegetation

Stream Name: Dinner Creek LLID: 1239262401049 Drainage: Eel River - South Fork

Survey Dates: 7/20/2017 to 7/26/2017

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

Mean Percentage of Dominant Stream Bank Substrate

Dominant Class of Substrate	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Bedrock	3	2	1.7
Boulder	6	7	4.3
Cobble / Gravel	59	68	42.3
Sand / Silt / Clay	82	73	51.7

Mean Percentage of Dominant Stream Bank Vegetation

Dominant Class of Vegetation	Number of Units Right Bank	Number of Units Left Bank	Total Mean Percent (%)
Grass	0	0	0.0
Brush	6	11	5.7
Hardwood Trees	138	127	88.3
Coniferous Trees	6	11	5.7
No Vegetation	0	1	0.3

Total Stream Cobble Embeddedness Values: 1

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

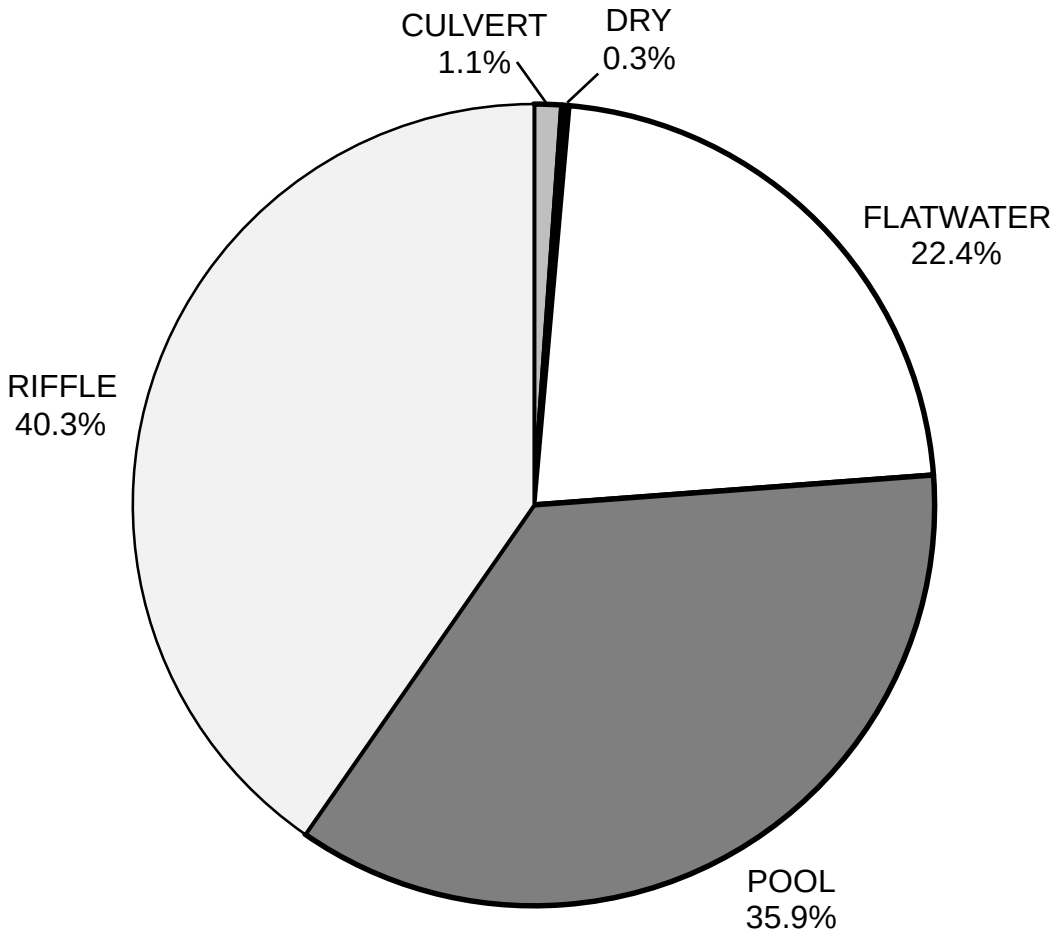
StreamName: Dinner Creek LLID: 123926401049 Drainage: Eel River-South Fork

Survey Dates: 7/20/2017 to 7/26/2017

Confluence Location: Quad: BRICELAND Legal Description: T04SR02ES23 Latitude: 40:06:18.0N Longitude: 123:55:34.0W

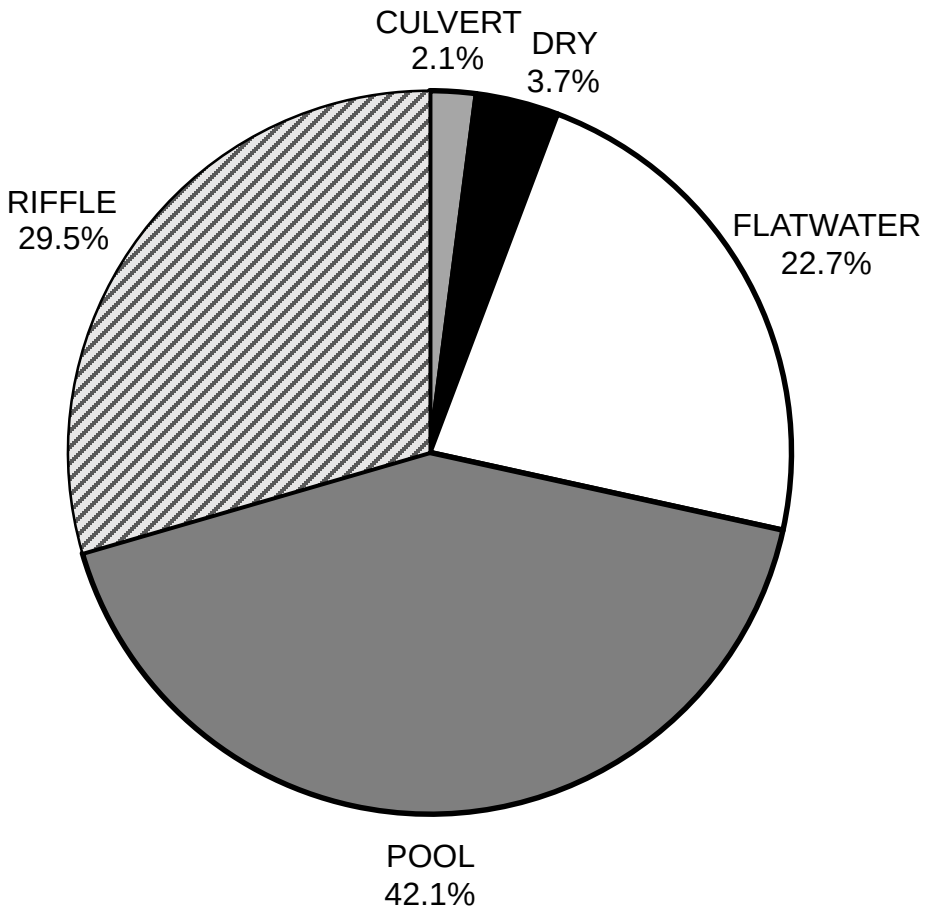
	Riffles	Flatwater	Pools
UNDERCUT BANKS(%)	0	35	12
SMALL WOODY DEBRIS (%)	0	12	27
LARGE WOODY DEBRIS (%)	0	0	14
ROOT MASS (%)	0	0	4
TERRESTRIAL VEGETATION (%)	0	53	32
AQUATIC VEGETATION (%)	0	0	0
WHITEWATER (%)	0	0	0
BOULDERS (%)	100	0	11
BEDROCK LEDGES (%)	0	0	0

DINNER CREEK 2017
HABITAT TYPES BY PERCENT OCCURRENCE



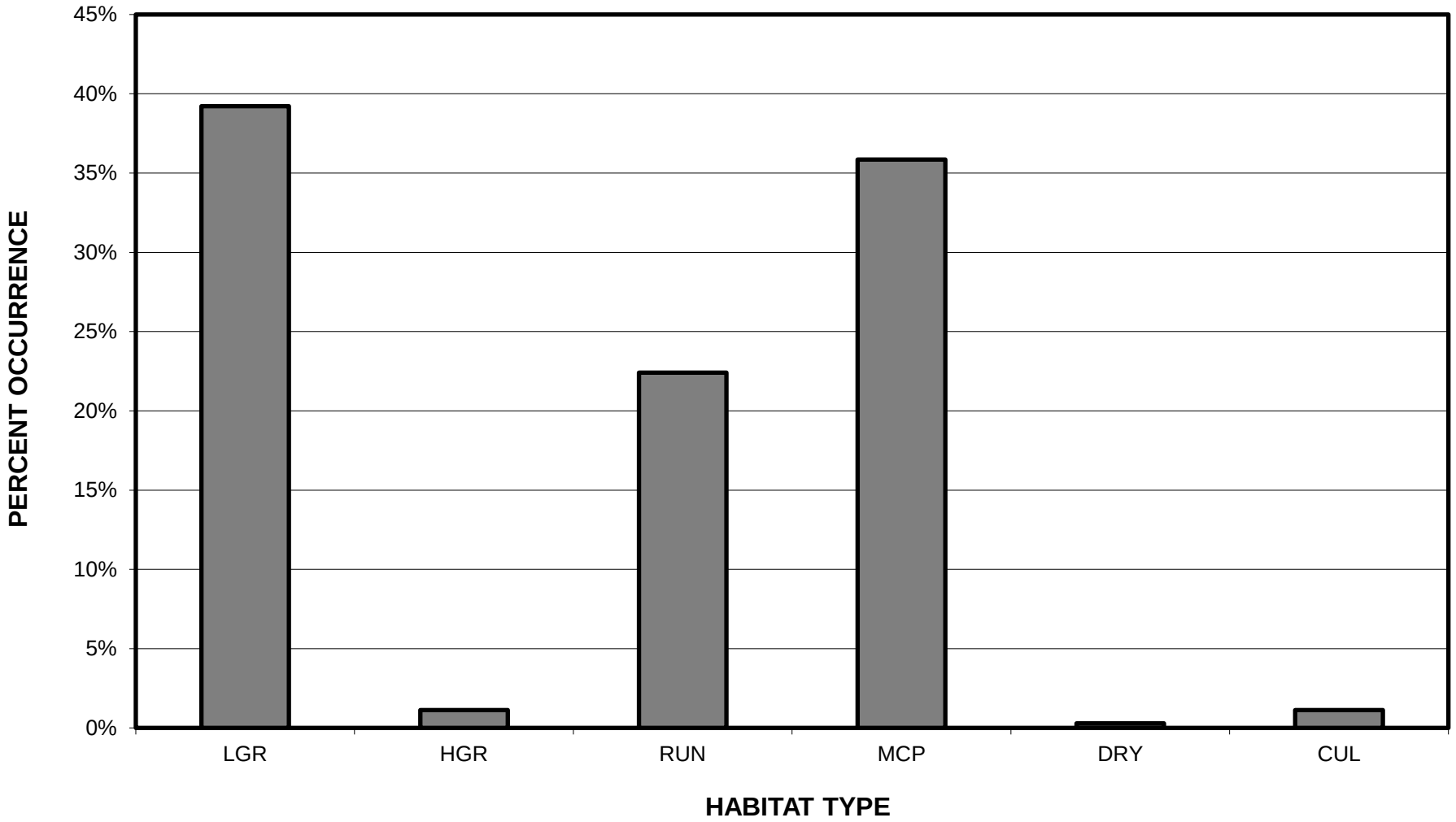
GRAPH 1

DINNER CREEK 2017
HABITAT TYPES BY PERCENT TOTAL LENGTH



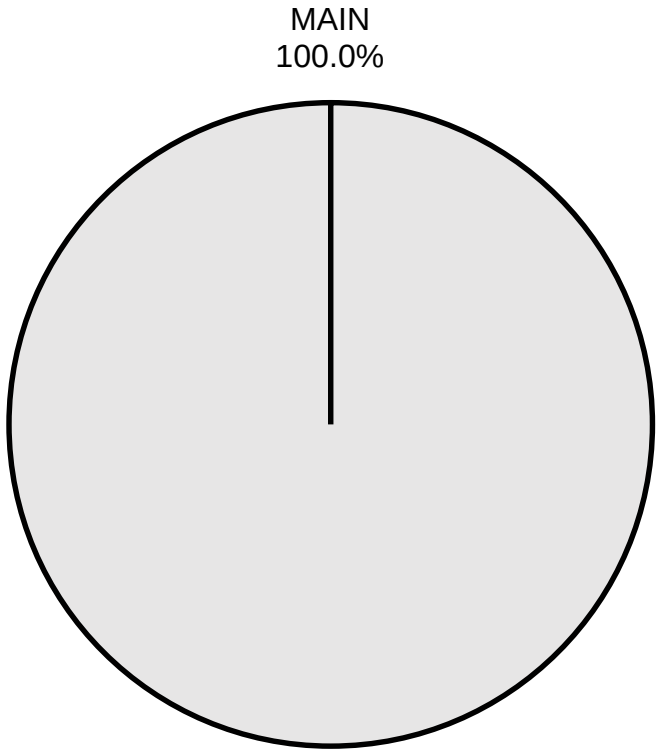
GRAPH 2

DINNER CREEK 2017
HABITAT TYPES BY PERCENT OCCURRENCE



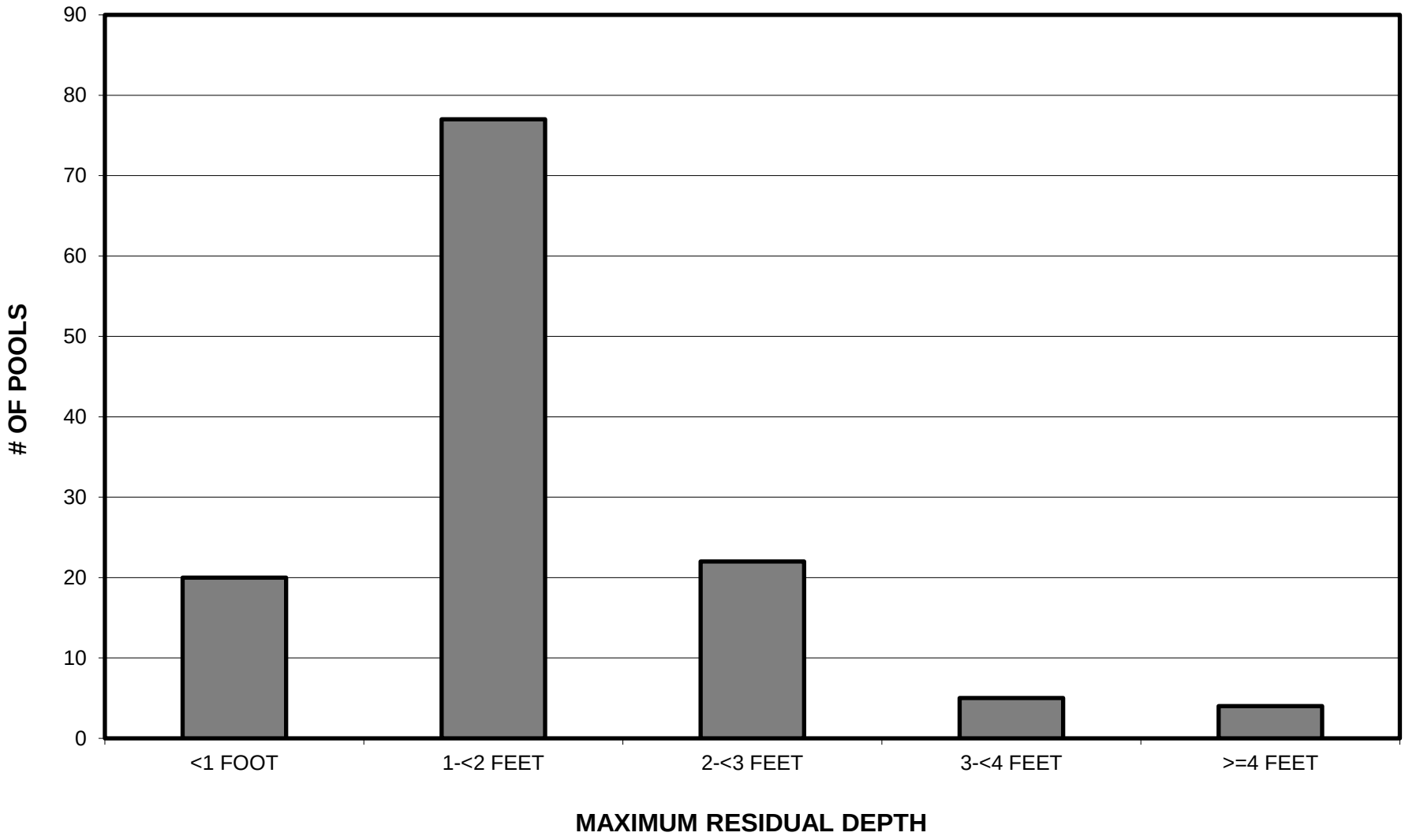
GRAPH 3

DINNER CREEK 2017
POOL TYPES BY PERCENT OCCURRENCE



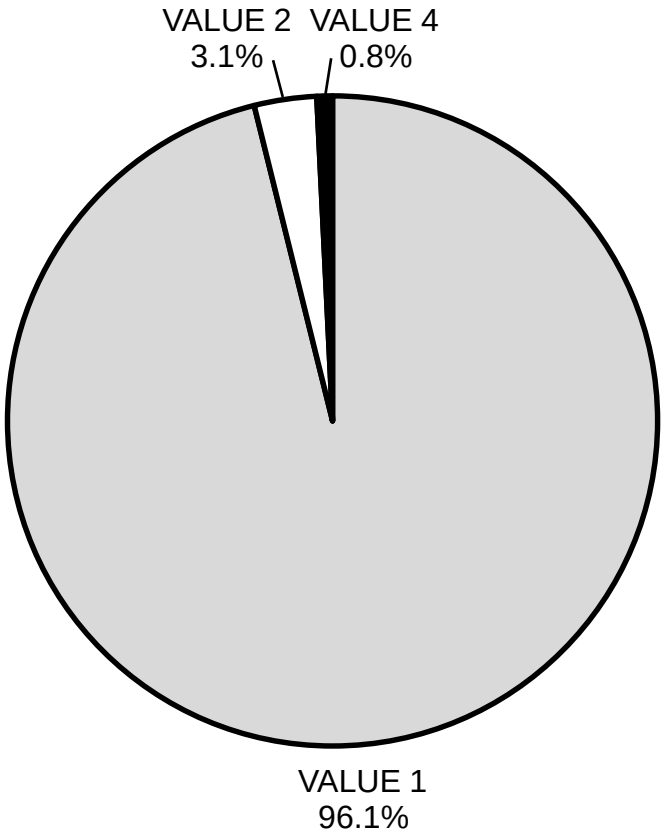
GRAPH 4

DINNER CREEK 2017
MAXIMUM DEPTH IN POOLS



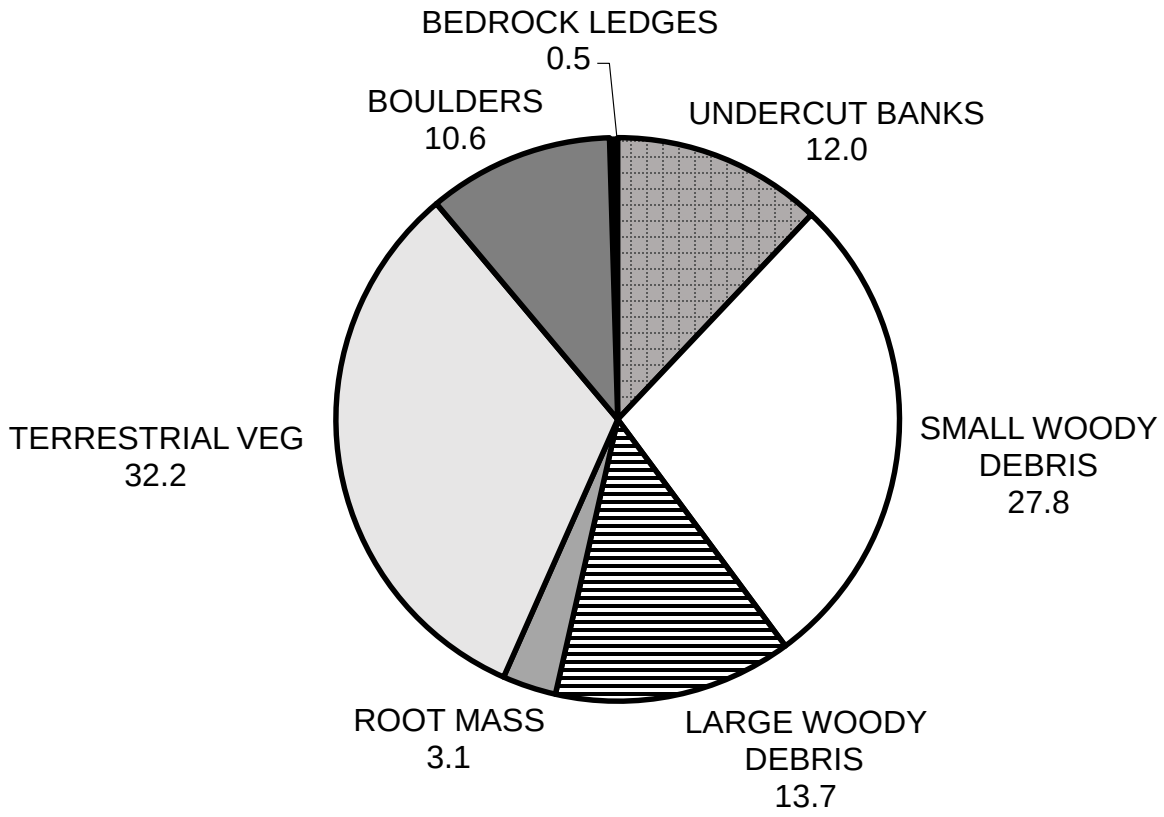
GRAPH 5

DINNER CREEK 2017
PERCENT EMBEDDEDNESS



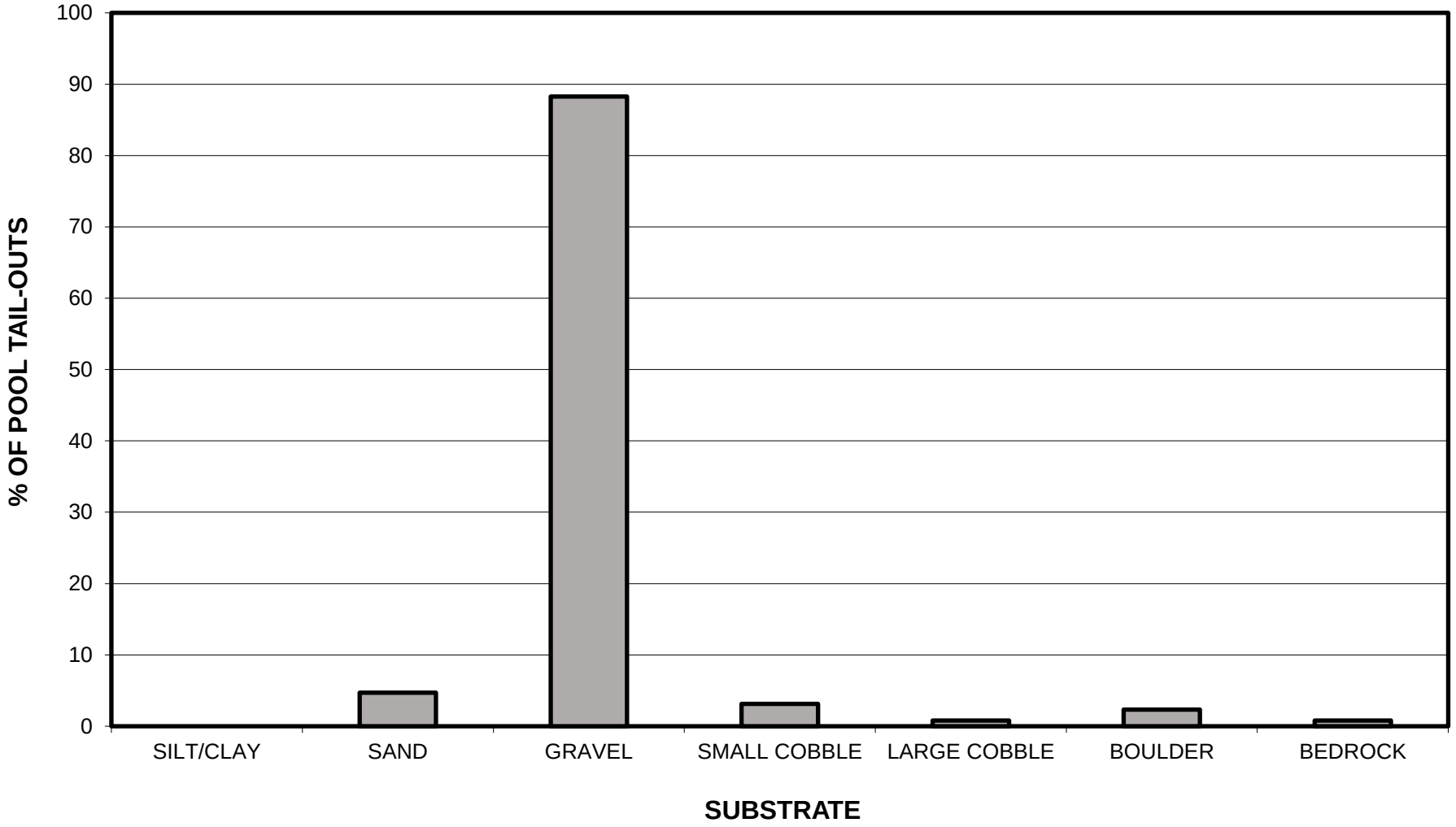
GRAPH 6

DINNER CREEK 2017
MEAN PERCENT COVER TYPES IN POOLS



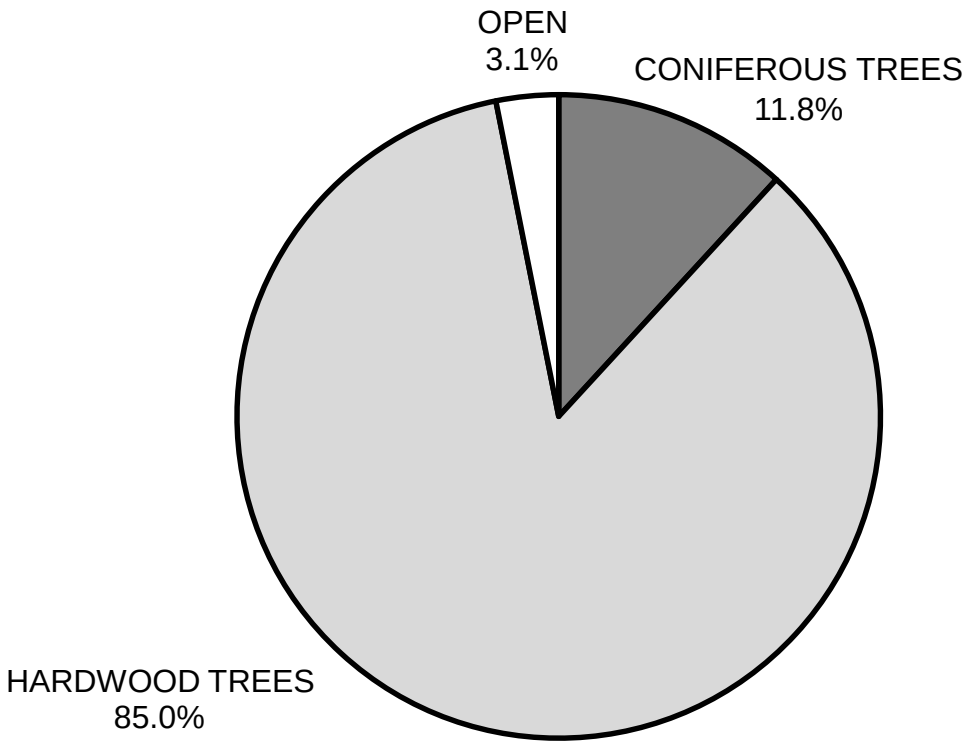
GRAPH 7

DINNER CREEK 2017
SUBSTRATE COMPOSITION IN POOL TAIL-OUTS



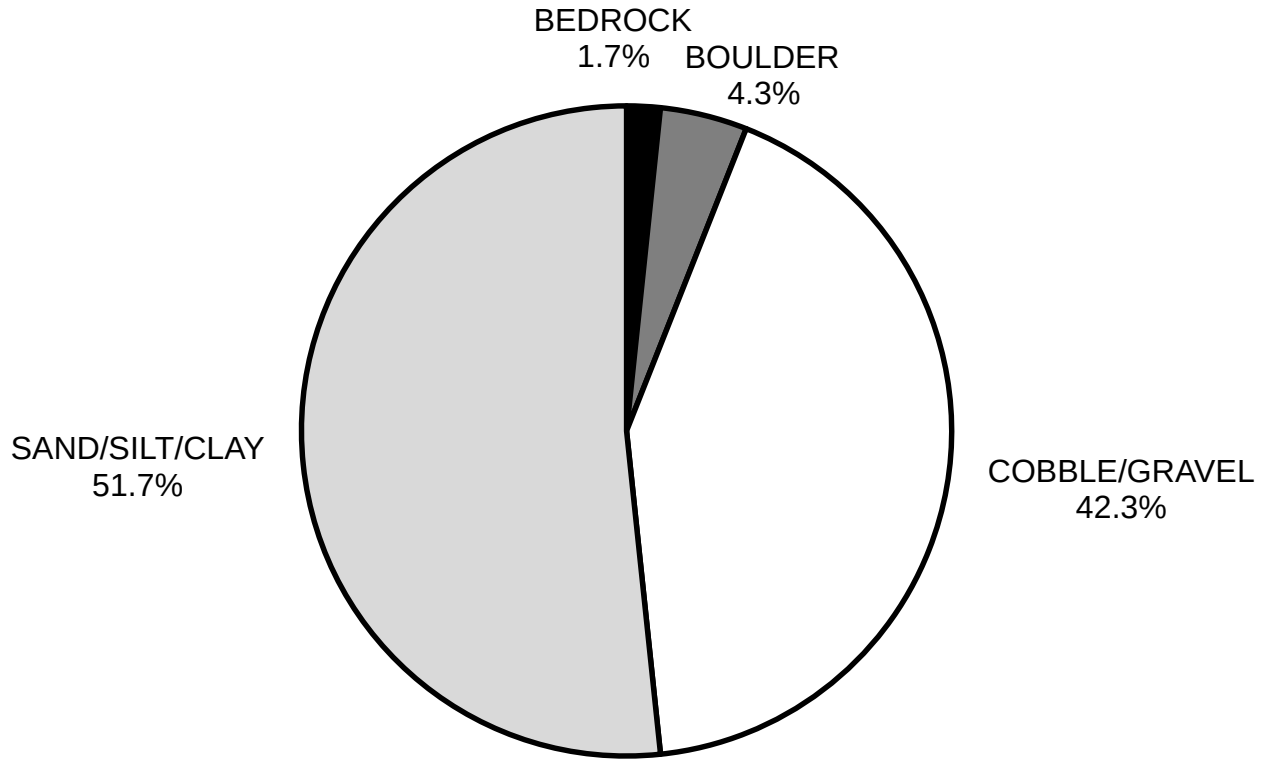
GRAPH 8

DINNER CREEK 2017
MEAN PERCENT CANOPY



GRAPH 9

DINNER CREEK 2017
DOMINANT BANK COMPOSITION IN SURVEY REACH



GRAPH 10

DINNER CREEK 2017
DOMINANT BANK VEGETATION IN SURVEY REACH

GRAPH 11

APPENDIX II

STREAM INVENTORY PHOTOS

Photo 1: Culvert #3 at habitat unit #188, 6,201' upstream from start of survey. Pools (habitat units #185 & 186) separated by a cement Salmon Recovery Plan structure. (Photo taken 7/26/17)

Photo 2: Tributary #4 at habitat unit #306, 9,250' upstream from start of survey. (Photo taken 7/26/17)

Photo 3: End of survey due to dry channel at habitat unit #355, 10,648' upstream from start of survey. (Photo taken 7/26/17)