STREAM INVENTORY REPORT

McKenzie Creek (Sonoma County)

INTRODUCTION

A California Department of Fish and Game (DFG) fisheries inventory was conducted in summer 1999 on McKenzie Creek and the tributaries Carson Creek, Camper Creek, and Wild Hog Canyon.

The 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. The objective of the biological inventory was to document the presence and distribution of juvenile salmonid species. This report presents the inventory results and recommends options for potential habitat improvements for coho salmon and steelhead trout. The recommendations are based on target habitat values suitable for salmonids in California's north coast streams.

A September 1964 DFG survey of McKenzie Creek described the creek as an important tributary to Sproule (Marshall) Creek, contributing important spawning and nursery area for steelhead and coho salmon (California Department of Fish and Game 1964). The report noted the presence of steelhead and California roach, but not coho salmon. The report mentioned the possibility of planting coho to re-establish a self-supporting run, which suggests that coho were present at some time prior to 1964.

WATERSHED OVERVIEW

McKenzie Creek, located in Sonoma County, California, is tributary to Marshall Creek, a tributary to South Fork Gualala River, a tributary to Gualala River, which drains to the Pacific Ocean. McKenzie Creek's legal description at the confluence with Marshall Creek is T8N R12W S05. Its mouth is located at 38E33N53.4O north latitude and 123E12N17.1O west longitude. McKenzie Creek is a second order stream and has approximately 3.43 miles of blue line stream according to the USGS Fort Ross 7.5 minute quadrangle map. From a point just below the confluence of Carson Creek, McKenzie Creek drains a watershed of approximately 6.8 square miles (Map 1)**.** Elevations range from about 700 feet at the mouth to 1300 feet in the headwater areas. Mixed coniferous/deciduous forest dominates the watershed. The watershed is predominately privately owned. Vehicle access exists via Sea View Ranch Road and Bohan Dillon Road.

METHODS

The stream inventory followed the methodology presented in detail in the *California Salmonid Stream Habitat Restoration Manual* (Flosi *et al.*, 1998). The following summarizes the methods.

HABITAT INVENTORY

The standardized habitat inventory has nine components:

1. Flow:

Flow is measured in cubic feet per second (cfs), usually at the bottom of the stream reach surveyed, using standard flow measuring equipment, if available.

2. Channel Type:

As 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.

3. Temperatures:

Water and air temperatures are taken in degrees Fahrenheit at the middle of the habitat unit, within one foot of the water surface.

4. Habitat Unit Type and Dimensions:

Habitat units are numbered sequentially and assigned a habitat type selected from a standard list of 24 habitat types (Appendix 1). Dewatered units are labeled "dry". The length of a described habitat unit must be equal to or greater than the stream's mean wetted width. Habitat unit dimensions of mean length, mean width, mean depth, and maximum depth are measured. In pool units, maximum depth at the pool tail crest is also measured. Measurements are taken to the nearest 1/10 foot using hip chains, measuring tapes, or stadia rods.

5. 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 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. A standard qualitative shelter value of 0 (none), 1 (low), 2 (medium), or 3 (high) is assigned according to the complexity of the cover. Thus shelter rating can range from 0-300.

6. Substrate Composition:

Substrate composition ranges from silt/clay sized particles to boulders and bedrock elements. Dominant and sub-dominant substrate elements in the habitat unit are estimated by eye using a list of seven size classes. In addition, the dominant substrate composing the pool tail outs is recorded in pool habitat units.

7. Embeddedness:

Embeddedness is defined as the percent of a cobble that is surrounded or buried by fine sediment. The values are 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 is assigned to substrates deemed not suitable for spawning due to inappropriate substrate particle size (e.g. bedrock) or other considerations. On this scale, a value of 1 indicates the highest quality of spawning substrate and a value of 5 indicates the tail crest is not suitable for spawning. Embeddedness, estimated by eye, is taken in pool habitat units at the pool tail crest.

8. Streambank Substrate and Vegetation:

Streambank substrate ranges from bedrock to silt/clay/sand, and may be covered with vegetation that enhances streambank stability. The dominant substrate type and the dominant vegetation type of both the right and left banks of the habitat unit are estimated by eye and recorded. Additionally, the percent of each bank covered by vegetation is estimated by eye and recorded.

9. Canopy:

Canopy density relates to the amount of stream shaded from the sun. Stream canopy density in the habitat unit is estimated using a handheld spherical densiometer. In addition, the area of canopy is estimated by eye into percentages of coniferous and deciduous trees.

SAMPLING STRATEGY

The samplers proceed in the upstream direction. Channel type is determined at the lower end, and again at upstream locations where channel shape changes significantly. Air temperature and water temperature are recorded at every tenth habitat unit (the first unit on each field form page). At a minimum, all habitat units encountered are classified according to habitat type and measured for length. The first time a particular habitat type is encountered in the survey, it is fully sampled for components 4 through 9 above. Additionally, from the ten habitat units on each field form page, one is randomly selected for full sampling. All pool units are surveyed for maximum depth, pool tail crest depth, pool tail crest dominant substrate type, and pool tail crest substrate embeddedness. Canopy density is recorded for every third unit, in addition to every fully sampled unit. The survey ends where the samplers determine anadromous salmonid habitat ends.

BIOLOGICAL INVENTORY

Biological sampling during the stream inventory is used to determine fish species and their distribution in the stream. Fish presence is observed from the stream banks during the habitat inventory survey. Additionally, selected sites are sampled using a Smith-Root Model 12-B electrofisher. The sampling techniques are described in the *California Salmonid Stream Habitat Restoration Manual*.

DATA ANALYSIS

Data from the habitat inventory form are entered into *Habitat*, a dBASE 4.2 data entry program developed by Tim Curtis, Inland Fisheries Division, DFG. This program processes and summarizes the data, and produces the following standard tables:

- Table 1. Summary of riffle, flatwater, and pool habitat types
- Table 2. Summary of habitat types and measured parameters
- Table 3. Summary of pool types
- Table 4. Summary of maximum pool depths by pool habitat types
- Table 5. Summary of mean percent cover by habitat type
- Table 6. Summary of dominant substrates by habitat type
- Table 7. Summary of mean percent vegetative cover for entire stream
- Table 8. Fish habitat inventory data summary
- Table 9. Summary of bank substrate and vegetation, pool tail crest cobble embeddedness
- Table 10. Mean percent of shelter cover types for entire stream

Graphics are produced from the tables using a spreadsheet program. Standard graphics are:

- Graph 1. Riffle, flatwater, pool habitats by percent occurrence
- Graph 2. Riffle, flatwater, pool habitats by total length
- Graph 3. Total habitat types by percent occurrence
- Graph 4. Pool types by percent occurrence
- Graph 5. Total pools by maximum depths
- Graph 6. Embeddedness
- Graph 7. Pool cover by cover type
- Graph 8. Dominant substrate in pool tail crests
- Graph 9. Percent canopy
- Graph 10. Bank composition by composition type
- Graph 11. Bank vegetation by vegetation type

Standard tables and graphics are selected for inclusion in the stream inventory report based on their importance to the particular stream.

HABITAT INVENTORY RESULTS

The habitat field inventory was conducted July 13-14, 1999 and August 18-19, 1999, by Adrianne Carr and Jennifer Jenkins (WSP/Americorps). The total length of the stream surveyed was 13,801 feet with an additional 55 feet of side channel.

McKenzie Creek is a B3 channel type for the entire 13,801 feet of stream reach surveyed. B3 channels are moderately entrenched, of moderate gradient (2-4%), dominated by riffles, with cobble dominated substrates.

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Based on frequency of occurrence of Level II habitat types, there were 23% riffle units, 29% flatwater units, and 43% pool units (Table 1,Graph 1). Based on total length of Level II habitat types there were 12% riffle units, 29% flatwater units, and 34% pool units (Table 1).

Twelve Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were mid-channel pools, 38%; step-runs, 21%; and low gradient riffles, 17% (Graph 3). Based on percent total length, mid-channel pools comprised 30%, dry units 25%, and step-runs 21%.

A total of 85 pools were identified (Table 3). Main channel pools were most frequently encountered at 99% and comprised 99% of the total length of all pools. Of the 85 pools, 42 (49%) had a depth of two feet or greater (Table 4).

In a second order stream such as McKenzie Creek, a primary pool is defined as a pool with a maximum depth of at least 2 feet, occupies at least half the width of the low flow channel, and is as long as the low flow channel width. In McKenzie Creek, primary pools totaled 2762 feet, or 20% of the total stream length surveyed.

Riffle habitat types had a mean shelter rating of 25, flatwater habitat types had a mean shelter rating of 14, and pool habitats had a mean shelter rating of 3 (Table 1). Mid-channel pools, the dominant pool type, had a mean shelter rating of 2. (Table 2).

Shelter in McKenzie Creek was provided by a mix of undercut banks, small and large woody debris, root masses, terrestrial vegetation, and boulders (Table 5). The same types also provided the main cover in pools (Graph 7).

Gravel and sand dominated substrate in the main habitat types (Table 6). In pool tail outs, gravel was most frequently the dominant substrate (68 of 85 tail outs; 80%). Small cobble was the next most frequent dominant substrate (10%) (Graph 8).

Of the 85 pool tail crest embeddedness estimates, 16 had a value of 1 (19%); 35 had a value of 2 (41%); 22 had a value of 3 (26%); 2 had a value of 4 (2%) and 10 had a value of 5 (12%) (Table 8).

Cobble/gravel dominated the streambank substrate in 47% of the fully sampled units. Other values were boulders 28%, bedrock 13%, and sand/silt/clay 12% (Graph 10). In the fully sampled units, right streambanks had an average of 70% vegetative cover, and left streambanks had an average of 65% vegetative cover (Table 7). Streambank vegetation was mainly composed of deciduous trees (52%), followed by coniferous trees (33%), and grass (15%) (Table 9).

Mean percent canopy for the stream reach surveyed was 69%, with deciduous trees and coniferous trees comprising 56% and 44%, respectively (Table 7). Water temperatures taken during the survey period ranged from 55 to 71 degrees Fahrenheit (Table 8). Air temperatures ranged from 61 to 83 degrees Fahrenheit.

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BIOLOGICAL INVENTORY RESULTS

Fishes were observed from the streambanks during the habitat surveys. Additionally, two sites in McKenzie Creek were electrofished on September 10, 1999, by Douglas Albin (DFG) and Adrianne Carr (WSP/Americorps).

In McKenzie Creek, the first site sampled was habitat unit 6, a mid channel pool 134 feet in length. The second site sampled was habitat unit 8, a mid channel pool 58 feet in length. The sites yielded four 0+ steelhead, one 1+ steelhead, one threespine stickleback and six California roach.

DISCUSSION

The suitability of B3 channel types such as McKenzie Creek for fish habitat improvement structures is: excellent for plunge weirs; boulder clusters and bank placed boulder; single and opposing wing-deflectors; and log cover. Several instances of large slides were noted, showing a potential need for restoration in these areas.

DFG data indicate that the better coastal coho streams have as much as 40% of their total habitat length in primary pools. For McKenzie Creek, the percentage of stream length in primary pools is below that desired value. Stream gradient may naturally restrict pool frequency in the stream reaches surveyed. However an increase in large instream wood (i.e. fallen conifers) could increase depths of existing pools.

An average instream shelter rating of 100 (of a maximum 300) is desirable for good quality salmonid habitat. Mean shelter ratings for flatwater, riffle, and especially pool habitats in McKenzie Creek are below that desirable level. An increase in large instream wood, particularly with attached root wads, could increase instream shelter.

In McKenzie Creek the prevalence of gravel as the dominant pool tail crest substrate is generally considered suitable for spawning salmonids. However, frequencies of embeddedness ratings of 2, 3, or 4 indicate poor spawning substrate quality due to excess fine sediments.

Water temperatures measured in McKenzie Creek appear suitable for steelhead trout. However water temperatures measured exceeded the desired upper coho temperature limit of 60 F. Continuous monitoring of temperature throughout the warm season would be needed to verify temperature suitability.

No coho salmon were found in any of the habitat units electrofished, indicating coho were absent from McKenzie Creek in 1999.

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RECOMMENDATIONS

McKenzie Creek should be managed as an anadromous, natural production stream.

Active and potential sediment delivery from roads and other sources in the watersheds should be identified, mapped, and quantified. Sources should be treated according to their potential for sediment yield to the stream and its tributaries.

Greatly increase instream wood to improve shelter rating and increase the depths of existing pools.

Increase the riparian canopy along McKenzie Creek to reduce stream temperatures and provide continuing sources of instream wood.

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 confluence with Carson Creek. Young-of-year (YOY) salmonids observed. Right bank eroding - 15' from wetted edge, right bank rises steeply 20 'high and consists of loose soil. House on right bank about 100 feet from channel.
76	YOY observed. 4' undercut bank at end of unit.
117	11’ high x 50’ wide x 9’ long bridge over channel.
133	YOY and juvenile salamanders observed. Road is 20' away from creek on right bank. It is going downslope towards channel and crosses the channel in the next unit. Road is on right bank side.
181	Road crossing. First 20' of unit are more inclined and lined with bedrock.
209	YOY observed.
343	YOY observed. Dry tributary on the left bank. Water line is suspended about 7 feet above wetted channel here. It runs from top of hill (left bank side), captures spring water and travels downslope to provide water to a hose on right bank side. Extra water drains to the right bank and slopes are full of brush. Creek is lined with bedrock. Road has been running along left bank side. It rises up to 20' above creek by HU# 008.
478	YOY and newts observed. Unit ends with a dam wall - see diagram in field notes. The dam measures 40’ wide x 9.5’ high. Cement walls bound the edges and the

middle is made of 12" by 1" boards. Water is spilling over the centerboards. There is a deck on the left bank side of dam for recreation access. It is 10' above this unit.

536 YOY, 1+ and 2+ here observed. Dam is put in on Memorial Day weekend (last weekend in May) and is taken out on Labor Day weekend by the local residents. Dam is on property of Nancy and Bill Walton. Bottom of dam wall is concrete. Pool tailout is concrete and the current depth is 7.5', but the dammed pool will be drained before spawners return.

1192 YOY steelhead, roach, and newts observed. Also, water snakes - black with yellow stripes. Big boulders line the banks of unit. Some of the substrate is bedrock. The tailout consists of pea gravel.

1323 Bedrock.

1448 Lots of YOY observed.

1500 YOY observed.

1631 YOY observed. Huge root mass on right bank side. 3.5' undercut bank there.

1680 Channel type taken at beginning of unit.

1718 YOY observed.

1770 YOY and frogs observed. Left bank is bedrock. House on right bank at the end of the unit.

1831 Lots of YOY observed.

1995 YOY observed.

2104 YOY observed. Nice undercut banks.

2161 Pool tail substrate is boulder.

2281 YOY observed.

2360 Many YOY observed.

2401 YOY and 1+ observed. Right bank is bedrock.

2470 Last 65' of unit is covered in sedge grasses. Frogs observed.

2555 Lots of YOY and 1+ observed. Road entering on right bank. Road enters 30' from creek and ends there. Main Sea View Ranch Road has been following the right bank side of the creek. It has mostly been at least 100' from wetted channel and at a higher elevation. Large debris accumulation (LDA) measures 7’ high x 15’ wide x 55’

long. Most of the debris is accumulated on right bank side. Good shelter under LDA.

2672 Erosion site on the right bank measures 15’ high x 84’ long. Large redwood stump at top with stump sprouts overhanging edge.

2878 YOY, newts, and frogs observed. Tailout is pea gravel. Left bank is bedrock.

2938 YOY observed. Most of unit covered in sedge grasses.

3006 Lots of YOY and a few 1+ observed.

3044 YOY observed.

3146 YOY observed.

3221 2' undercut under boulder on right bank. 5 cubic yard slide at end of unit.

3257 YOY and 1+ observed. 2’ high plunge over bedrock.

3330 YOY observed. Road on right bank is about 20' away from wetted channel. It heads away from creek diagonally in the upstream direction.

3396 YOY and 1+ observed.

3448 Large redwood down diagonally in channel.

3497 YOY, 1+ and newts observed.

3534 YOY and frog observed. Sedge grass covers right bank side of channel.

3585 YOY observed.

3695 YOY observed. Tree down over creek, about 6' above water surface.

3989 1+ and newts observed. Dry side channel on left bank side.

4051 YOY observed.

4076 YOY observed. Small tributary enters on right bank.

4112 Unit covered in sedge grasses.

4148 YOY and 1+ observed.

4210 Large root mass with many redwood sprouts on it. Up to 6' of shelter underneath root mass.

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4318	YOY, 1+, and frogs observed.
4606	Rootwad and downed trees in channel. Small large debris accumulation measures 5’ long x 6’ high x 10’ wide. YOY observed.
4653	YOY and 1+ observed.
4840	YOY, a frog and some newts observed. Right bank is bedrock.
4875	YOY observed.
4925	YOY and newts observed.
4982	YOY and California roach observed.
5058	Large root wad. Left bank slide.
5084	Landslide extends 20' upslope, looks fairly recent.
5099	YOY and frogs observed.
5225	Large root mass on right bank. Debris accumulation on some boulders on the left bank side.
5292	Steep unit.
5330	Pea gravel in tailout. Bedrock on left bank.
5367	YOY observed.
5381	YOY and lots of 1+ observed.
5447	YOY and a frog observed.
5581	YOY and a newt observed.
5596	YOY observed.
5655	YOY observed.
5711	Tailout is pea gravel. 1' undercut rootwad on left bank.
5750	Small large debris accumulation measures 5’ high x 5’ long x 15’ wide. Newts observed.
5766	Small tributary on the right bank. 1.5' high plunge.
5826	Hansen Creek enters left bank side. YOY and newts observed.

5857 Steep ascent.

5896 1+ and YOY observed.

5987 Spring enters right bank side.

6033 10 cubic yard slide on left bank, three cubic yards still on site. Unit has a fairly high gradient. YOY observed.

6113 YOY observed.

6150 YOY observed.

6175 3' high plunge.

6191 3' high plunge over boulders.

6285 YOY observed. Small LDA consists of one large tree, approximately 40' in length, collecting small woody debris. The large tree is lodged behind a boulder.

6319 YOY observed.

6358 YOY observed.

6393 YOY observed. See diagram on field notes for unit description.

6447 YOY observed. Left bank is eroding. See diagram on field notes.

6593 Lots YOY and 1+ observed. Newts and a frog, too. Algae in pool.

6654 YOY, 1+, and lots of newts observed. Large slide on the left bank, the hillslope is letting go of boulders and gravel. Bedrock on right bank.

6713 See diagram of unit on field notes. 11’ high bedrock waterfall. Waterfall consists of two plunges, a 7’ high plunge and a 4’ high plunge, with a small pool in between.

6769 YOY observed.

6824 YOY and newts observed. Five cubic yard slide on the left bank. This unit consists of three pools.

6924 This is the start of "the falls" as described by landowners. The right bank side is very cascade-like and the left bank side is a step run or a series of small step pools. Landowners told us that it looks drastically different during high flows. Spawning fish have been seen jumping up the falls. There is a 5.5' high plunge towards the end of the unit and behind it there are accumulated boulders and woody debris. Water is currently flowing under these boulders.

6994 Tailout is pea gravel. YOY observed.

7011 The falls continue here. See diagram in field notes. LDA behind boulders measures 8’ long x 15’ wide x 4’ high. Three cubic yards of gravel behind LDA.

7046 Two pools here. 1+ observed.

7070 Cascade has 2.5' high plunge and 5’ high plunge. Water may go around boulders to the right bank side during high flows. See diagram in field notes.

7123 Two 2’ high plunges.

7155 Cascade is now under boulders. Landowners say water flows over boulders in winter. Last part of the falls. Large slide on left bank can be viewed from this unit. Estimate 1800 cubic yards have recently gone. It is a historic slide, but much slid over the past year. This slide is about 70' from currently wetted channel and goes back several units. Landowners say that water flows at the base of the slide during winter high flows, leaving an island of boulders and deciduous trees in the middle of the channel.

7165 Right bank vegetation is moss on the boulders.

7228 Two larger steps to get up to riffle.

7268 YOY observed.

7330 YOY and newts observed.

7367 Huge gravel bar on right bank side measures 30' wide x 4' high. Landowner said that a downed tree in HU# 131 caused it this past winter.

7504 Large rootwad with attached tree down across channel. This tree marks the end of the large gravel bar accumulation.

7559 Floating newts observed.

7683 Pea gravel in pool tailout. 5' undercut bank.

7763 Shelter from algae and terrestrial vegetation. YOY observed.

7833 YOY and 1+ observed. Pea gravel in pool tailout.

7891 Step run shows little elevation gain. Tadpoles observed.

7968 YOY, newts, and tadpoles observed. 7' undercut bank with rootmass.

8067 YOY and a newt observed. Lots of algae in unit.

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8174	Tadpoles observed.
8200	YOY, tadpoles, and newts observed.
8237	Judy Canyon Creek enters at beginning of unit.
8457	Tailout is pea gravel. Newts and tadpoles observed.
8580	Newts and tadpoles observed.
8716	Road crosses creek bed.
8778	Frogs and newts observed.
8889	Algae and tadpoles observed.
9219	Pacific Giant Salamander and tadpoles observed.
9355	Pacific Giant Salamanders and tadpoles observed.
9373	Road on left bank that connects to bridge in next unit 50' from bankful edge.
10055	Bridge measures 8’ high x 60’ wide x 11’ long. Tributary enters on right bank.
10116	Foot bridge measures 8’ high x 60’ wide x 4’ long. The bridge has pylons mid-channel.
12175	YOY observed. Tailout is pea gravel.
12194	YOY observed.
12279	YOY and newts observed.
12337	Newts observed.
12404	Intake for water line, water line ends in channel.
12423	Tailout is pea gravel.
12572	YOY and newts observed. Road on right bank.
12715	Newts observed.
12864	Frogs and newts observed.
12979	1+, 2+, and newts observed.

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13062 1+ , newts, and frogs observed.

13173 Newts and frogs observed.

13239 Newts observed. Tributary enters on the right bank.

13303 YOY observed. LDA measures 12’ wide x 15’ long x 6’ high. Most of the debris is located on the left bank side.

13376 This unit almost dry.

13408 Undercut bank.

13474 Newts observed.

13567 Newts observed. Bridge measures 8’ high x 12’ long x 50’ wide.

13596 Road on left bank 10' from bankfull width. Rip-rap for road and criblog holding road back from creek. Total size including criblog and rip rap is 100’ long x 4’ high.

13703 Rip-rap measures 30’ long.

13743 Tadpoles and newts observed. House on left bank.

REFERENCES

California Department of Fish and Game. 1964. Stream Survey. McKenzie Creek. Unpublished report.

Flosi, Gary, S. Downie, J. Hopelain, M. Bird, R. Coey, and B. Collins. 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]	