SALMON AND STEELHEAD RESTORATION AND ENHANCEMENT PROGRAM

NORTH COAST

BASIN PLANNING PROJECT

STREAM INVENTORY REPORT

HARMONICA CREEK, BEAR RIVER, 1999

CALIFORNIA DEPARTMENT OF FISH AND GAME

SPORT FISH RESTORATION ACT

1999-2000

North Coast Basin Planning Project

NORTH COAST WATERSHED PLANNING and COORDINATION PROJECT

The North Coast Watershed Planning and Coordination Project (NCWPCP), formerly the Basin Planning Project (BPP), was begun in 1991 to develop salmon and steelhead restoration and enhancement programs in North Coast watersheds for the Department of Fish and Game (DFG). The objectives of the project conform with the goals of California's Salmon and Steelhead Restoration and Enhancement Program of 1988. The Restoration Program strives to enhance the status of anadromous salmonid populations and improve the fishing experience for Californians. The program intends to achieve a doubling of the population of salmon and steelhead by the year 2000. The project is supported by the Sport Fish Restoraion Act, which uses sport fishermen's funds to improve sport fisheries.

The NCWPCP conducts stream and habitat inventories according to the standart methodologies discussed in the *California Salmonid stream Habitat Restoration Manual,* (Flosi et.al., 1998). Biological sampling is conducted using electrofishbing and direct observation to determine species presence and distribution; selected streams are electrofished for population estimates. Some streams are also sampled for sediment composition. Collected information is used for base-line data, public cooperation development, restoraion program planning, specific project design and implementation, and for project evaluation.

The Eel River system was identified as the initial basin for project planning activities. Most anadromous tributaries to the Van Duzen, South Fork Eel, Mainstem Eel, Middle Fork Eel, and the North Fork Eel rivers have been inventoried since 1991. Initial field inventory of the Eel River system should be essentially complete in 1996. NCWPCP personnel have also worked in cooperation with the DFG Salmon Restoration Project's staff to inventory streams on the Mattole River, Mendocino Coast, and Humboldt Bay.

STREAM INVENTORY REPORT

Harmonica Creek

INTRODUCTION

A stream inventory was conducted during the summer of 1999 on Harmonica Creek 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 in Harmonica 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 salmon, coho salmon and steelhead trout. Recommendations for habitat improvement activities are based upon target habitat values suitable for salmonids in California's north coast streams.

WATERSHED OVERVIEW

Harmonica Creek is tributary to the Bear River, tributary to the Pacific Ocean, located in Humboldt County, California (Map 1). Harmonica Creek's legal description at the confluence with Bear River is T01S R01E. Its location is 40°23′03″ north latitude and 124°04′28" west longitude. Harmonica Creek is a third order stream and has approximately 4.5 miles of blue line stream according to the USGS Bull Creek 7.5 minute quadrangle. Harmonica Creek drains a watershed of approximately 4.1 square miles. Elevations range from about 1320 feet at the mouth of the creek to 3160 feet in the headwater areas. Mixed conifer forest dominates the watershed. The watershed is entirely privately owned and is managed for timber production. Vehicle access exists from Highway 101 at Dyerville via the Mattole Road to Pole Line Road, and then via Private Road controlled by Pacific Lumber Company.

METHODS

The habitat inventory conducted in Harmonica Creek follows the methodology presented in the *California Salmonid Stream Habitat Restoration Manual* (Flosi et.al., 1998). The AmeriCorps Watershed Stewards Project (WSP/AmeriCorps) 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 (Hopelain, 1995). 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, dominant substrate composing the pool tail crest, and embeddedness. Habitat unit types encountered for the first time are further 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 Harmonica Creek 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 standard flow measuring equipment, if available. In some cases flows are estimated.

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.

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". Harmonica 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. Channel dimensions were measured using hip chains, range finders, tape measures, and stadia rods. All units were measured for mean length; additionally, the first occurrence of each unit type and a randomly selected 10% subset of all units were sampled for all features on the sampling form (Hopelain, 1995). Pool tail crest depth at each pool unit was measured in the thalweg. All measurements were in feet to the nearest tenth.

5. Embeddedness:

The depth of embeddedness of the cobbles in pool tail-out reaches is measured by the percent of the cobble that is surrounded or buried by fine sediment. In Harmonica 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 unsuited for spawning due to inappropriate substrate particle size, having a bedrock tail-out, 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 Harmonica 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. 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 Harmonica 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 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 Harmonica 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 was estimated and recorded.

BIOLOGICAL INVENTORY

Biological sampling during stream inventory is used to determine fish species and their distribution in the stream. In Harmonica Creek fish presence was observed from the stream banks, and sites were electrofished using a Smith-Root Model 12 electrofisher. These sampling techniques are discussed in the *California Salmonid Stream Habitat Restoration Manual*.

SUBSTRATE SAMPLING

Gravel sampling is conducted using a 9 inch diameter standard McNeil gravel sampler. Sample sites are identified numerically beginning at the most upstream site in the stream. Gravel samples are separated and measured to determine respective percent volume using five sieve sizes (25.4, 12.5, 4.7, 2.37, and 0.85 mm)(Valentine, 1995).

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, 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 Quattro Pro. Graphics developed for Harmonica Creek 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 the pool tail outs
- 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 June 28, 29, 30, and July 07, 1999, was conducted by Greg Larson and Paul Ferns (Americorps). The total length of the stream surveyed was 18,454 feet with an additional 519 feet of side channel.

Flow was measured at the bottom of the survey reach with a Marsh-McBirney Model 2000 flowmeter at 2.16 cfs on July 7, 1999.

Harmonica Creek is a F4 channel type for the first 6225 feet, a A2 channel type for the next 2461 feet, a F4 channel type for the next 3903 feet, and a B4 channel type for the next 5780 feet of the stream reach surveyed. F4 channel types are entrenched meandering riffle/pool channel on low gradients with high width/depth ratio; gravel channel. A2 channel types are steep, narrow, cascading, step-pool streams; high energy/debris transport associated with depositional soils; boulder channel. F4 channel types are entrenched meandering riffle/pool channel on low gradients with high width/depth ratio; gravel channel. B4 channel types moderately entrenched, moderate gradient, riffle dominated channel with infrequently spaced pools; very stable plan and profile; stable banks; gravel channel.

Water temperatures taken during the survey period ranged from 52° to 67° F. Air temperatures ranged from 64° to 82° F.

Table 1 summarizes the Level II riffle, flatwater, and pool habitat types. Based on frequency of

occurrence there were 46% riffle units, 25% flatwater units, and 29% pool units (Graph 1). Based on total length of Level II habitat types there were 71% riffle units, 20% flatwater units, and 09% pool units (Graph 2).
Fourteen Level IV habitat types were identified (Table 2). The most frequent habitat types by percent occurrence were low gradient riffle, 40%; mid-channel pool, 22%; and run, 19% (Graph 3). Based on percent total length, low gradient riffle made up 65%, run 14%, and mid-channel pool 07%.

A total of sixty-four pools were identified (Table 3). Main-channel pools were most frequently encountered at 81% and comprised 83% of the total length of all pools (Graph 4).

Table 4 is a summary of maximum pool depths by pool habitat types. Pool quality for salmonids increases with depth. Forty-five of the sixty-four pools (70%) had a depth of two feet or greater (Graph 5).

The depth of cobble embeddedness was estimated at pool tail-outs. Of the sixty-one pool tail-outs measured, six had a value of 1 (09.8%); thirty-four had a value of 2 (55.7%); sixteen had a value of 3 (26.2%); zero had a value of 4 (0%) and five had a value of 5 (08.2%) (Graph 6). On this scale, a value of 1 indicates the highest quality of spawning substrate and a value of 5 indicates the tail-out is not suitable for spawning.

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 42, flatwater habitat types had a mean shelter rating of 40, and pool habitats had a mean shelter rating of 78 (Table 1). Of the pool types, the backwater pools had the highest mean shelter rating at 80. Main pools had a mean shelter rating of 80 (Table 3).

Table 5 summarizes mean percent cover by habitat type. Large woody debris are the dominant cover type in Harmonica Creek. Graph 7 describes the pool cover in Harmonica Creek.

Table 6 summarizes the dominant substrate in pool habitat types. Gravel was the dominant substrate observed in fifty-two of the sixty-one pool tail outs measured (85%). Small cobble was the next most frequently observed dominant substrate type and occurred in 6.6% of the pool tail outs (Graph 8).

The mean percent canopy density for the stream reach surveyed was 57%. The mean percentages of conifer and deciduous trees were 22% and 35%, respectively. Graph 9 describes the canopy in Harmonica Creek.

For the stream reach surveyed, the mean percent right bank vegetated was 68.8%. The mean percent left bank vegetated was 70.6%. The dominant elements composing the structure of the stream banks consisted of 06% bedrock, 08% boulder, 81% cobble/gravel, and 05% sand/silt/clay

(Graph 10). Deciduous trees were the dominant bank vegetation type observed in 70% of the units surveyed. Additionally, 70% of the units surveyed had deciduous trees as the dominant bank vegetation, and 13% had coniferous trees as the dominant bank vegetation, including down trees, logs, and root wads (Graph 11).

BIOLOGICAL INVENTORY RESULTS

No sites were electrofished during the 1999 stream inventory in Harmonica Creek. However, streambank observations were taken and salmonids were observed.

GRAVEL SAMPLING RESULTS

No gravel samples were taken on Harmonica Creek.

DISCUSSION

Harmonica Creek is a F4 channel type for the first 6,225 feet of stream surveyed, a A2 channel type for the next 2461 feet, a F4 channel type for the next 3903 feet, and a B4 for the remaining 5780 feet. The suitability of F4, A2, F4, and B4 channel types for fish habitat improvement structures is as follows: good for bank-placed boulders, fair for plunge weirs; single and opposing wing-deflectors; channel constrictors; log cover, poor for boulder clusters. A2 channel types are generally not suitable. High energy streams with stable stream banks, and poor gravel retention capabilities. B4 channel types are excellent for low-stage plunge weirs; boulder clusters; bank placed boulders; single and opposing wing-deflectors; log cover.

The water temperatures recorded on the survey days June 28-July 06, 1999, ranged from 52° to 67° F. Air temperatures ranged from 64° to 82° F. This is a good water temperature range for salmonids. However, 67° F, if sustained, is near the threshold stress level for salmonids. This does not seem to be the case here, and Harmonica Creek seems to have temperatures favorable to salmonids. To make any further conclusions, temperatures would need to be monitored throughout the warm summer months, and more extensive biological sampling would need to be conducted.

Flatwater habitat types comprised 20% of the total length of this survey, riffles 71%, and pools 09%. The pools that exist are relatively deep, with 45 of the 64 (70.3%) pools having a maximum 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 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. Installing structures that will increase or deepen pool habitat is recommended for locations where their installation will not be threatened by high stream energy, or where their installation will not conflict with the modification of the log debris accumulations (LDA's) in the stream. The LDA's in the system are retaining needed gravel. Any necessary modifications to them should be done with the intent of metering the gravel out to downstream reaches that will trap the gravel for future spawning use. Therefore, gravel retention features may need to be developed prior to any LDA modification.

Six of the sixty-one pool tail-outs measured had an embeddedness rating of 1. Sixteen of the pool tail-outs had embeddedness ratings of 3 or 4. Five of the pool tail-outs had a rating of 5 or were 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. In Harmonica Creek, sediment sources should be mapped and rated according to their potential sediment yields, and control measures should be taken.

The mean shelter rating for pools was moderate with a rating of 78. The shelter rating in the flatwater habitats was slightly lower at 40. A pool shelter rating of approximately 100 is desirable. The relatively small amount of cover that now exists is being provided primarily by large woody debris 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 improve both summer and winter salmonid habitat. Instream cover created by small and large woody debris provides rearing fry with protection from predation, rest from water velocity, and also divides territorial units to reduce density related competition.

Fifty-six of the sixty-one pool tail outs measured had gravel or small cobble as the dominant substrate. This is generally considered good for spawning salmonids.

The mean percent canopy density for the stream was 57%. This is a relatively low percentage of canopy. 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 68.8% and 70.6%, respectively. In areas of stream bank erosion or where bank vegetation is not at acceptable levels, planting native species of coniferous and deciduous trees, in conjunction with bank stabilization, is recommended.

RECOMMENDATIONS

1) Harmonica Creek should be managed as an anadromous, natural production stream.

2) The limited water temperature data available suggest that maximum temperatures are

within the acceptable range for juvenile salmonids. To establish more complete and meaningful temperature regime information, 24-hour monitoring during the July and August temperature extreme period should be performed for 3 to 5 years.

3) 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.

4) Active and potential sediment sources related to the road system need to be identified, mapped, and treated according to their potential for sediment yield to the stream and its tributaries.

5) 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.

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

7) Increase the canopy on Harmonica Creek by planting willow, alder, redwood, and Douglas fir along the stream where shade canopy is not at acceptable levels. The reaches above this survey section should be inventoried and treated as well, since the water flowing here is effected from upstream. In many cases, planting will need to be coordinated to follow bank stabilization or upslope erosion control projects.

8) There are log debris accumulations present on Harmonica Creek that are retaining large quantities of fine sediment. The modification of these debris accumulations is desirable, but must be done carefully, over time, to avoid excessive sediment loading in downstream reaches.

COMMENTS AND LANDMARKS

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

0' Begin survey at confluence with Bear River. Channel type is F4. YOY salmonids observed in Harmonica Creek and Bear River.

301' Begin right bank (RB) erosion 193' long.

429' Begin RB erosion 240' into unit, 189' long.

863' Begin 100% occurrence, out of influence of Bear River.

1372' Five 24" culverts with no rust lines. There is some flow under culverts.

1391' Pool caused by temporary (?) crossing.

3368' RB, 30' high x 50' long.

3517' Begin left bank (LB) erosion 296' long. 100' into unit, begin right bank erosion 430' long.

3928' LDA is approximately 9' wide, but not retaining bed materials.

4036' RB erosion 120' into unit. Erosion is down to "bedrock" and is approximately 45' high. 94' in side channel unit -begin left bank erosion.

5317' Right bank tributary enters at 163'. Water temperature is 54°F.

6225' Channel type change to A2; boulders, higher gradient.

6270' Begin right bank erosion down to bedrock; some large trees scattered on eroded areas.

6547' End left bank erosion at top of unit. Start 100% occurrence.

6626' 4' drop between this pool and the previous one.

7686' LDA at top of unit, 35' wide x 6' high x 9' long. Water flows under it, but it is retaining some gravel and lots of small woody debris.

7701' Flag: CCC Habitat unit 103, 6-11-97.

7932' LDA; was retaining gravel and cobble.

8408' Small, steep, right bank tributary trickles in; 87' into unit.

8456' Another right bank trickle at top of unit.

8686' Channel type change to F4.

8769' A small LDA retains fines-cobbles. Flow goes under LDA; +61' into unit.

8814' Start 100% occ.

9264' Fish of multiple age classes observed.

9409' Left bank erosion along pool.

9431' Flag: CCC Habitat unit 126

9760' Lots of aggradation in the channel.

10753' Pool under log. Right bank erosion.

11015' Pool scoured by a small, loose LDA; not retaining bed materials.

11224' Unit ends at massive LDA. There is a side channel around the right bank of the LDA.

11337' Unit ends at same massive slide. It is retaining sediment (approximately 20' high), with the water surface rising 20'. There is brush, branches, etc. over the water surface. Both channels pass through to the sides however, particularly along the right bank. This is an obstruction but not a fish passage barrier. LDA is approximately 100' wide and filled with bed materials.

11396' LDA -see last note.

11542' LDA. 8' jump out of pool. There is evidence of water going around at high flows, and it is retaining sediment. A 3-4' tall gravel bar defines the channel.

11567' LDA

11735' Left bank tributary at top of unit. Only a trickle but is likely largely sub-surface through gravel. The tributary enters through 150' gravel bank.

11778' Low gradient; water barely moving.

11854' A large percentage of the flow is subsurface at this point.

12249' Gully enters right bank, but with no water in it.

12318' Begin large right bank slope failure, several years old, grown over with grass and alders.

12345' Right bank slope failure continues.

12390' Right bank slope failure continues.

12446' End of right bank slope failure 36' into unit.

12611' Side channel enters left bank 57' into unit.

12674' Channel type change to B4; steeper and more boulders.

12740' Side channel ends at LDA retaining gravel. It looks like the origional channel. The main channel looks like it blew out around LDA and now takes 60-70% of the flow. The side channel branches from the main channel sub-surface at LDA.

12840' Riparian vegetation intact, flow no longer sub-surface.

13568' Right bank tributary enters, with high gradient, low flow. 226' -small log debris accumulation +79' into unit.

14270' Log debris accumulation at top of unit retaining gravel. It is approximately a 6' jump in water surface elevation.

14661' Small low gradient RB tributary 135' into unit.

15541' A steep right bank tributary trickles through severely eroded gully +177' into unit.

16158' Start 100% occurrence.

16535' Stream is approximately 2% gradient

16907' Left bank tributary comprising 50-60% of flow. This tributary actually looks bigger than the main channel, but because last survey went left (looking upstream) we will too. Flow of both forks very similar in volume and both are anadromous 201' into unit.

17008' We are now out of influence of tributary. Mainstem has dense canopy and well defined banks.

17244' Start 100% occurrence. Salmonids observed.

17643' Beginning of extensive right bank erosion. Lots of trees have fallen down slope.

18278' End of the right bank erosion.

18454' End of survey. LDA at top of unit is 35'W x 6'H x 20'L. LDA is likely not a barrier, but human access above is limited by time (4 hour hike) and numerous trees fallen over

water. Both banks are heavily eroded. Lots of small debris in stream. This was also the end of the 1997 survey.

REFERENCES

Flosi, G., and F. Reynolds. 1998. *California Salmonid Stream Habitat Restoration Manual, 2nd edition*. California Department of Fish and Game, Sacramento, California.

Hopelain, J. 1995. Sampling levels for fish habitat inventory, unpublished manuscript. California Department of Fish and Game, Inland Fisheries Division, Sacramento, California.

Valentine, B. 1995. Stream substrate quality for salmonids: guidelines for sampling, processing, and analysis, unpublished manuscript. California Department of Forestry and Fire Protection, Santa Rosa, California.

LEVEL III and LEVEL IV HABITAT TYPE KEY

HABITAT TYPE	LETTER	NUMBER
RIFFLE		
Low Gradient Riffle	[LGR]	1.1
High Gradient Riffle	[HGR]	1.2
CASCADE		
Cascade	[CAS]	2.1
Bedrock Sheet	[BRS]	2.2
FLATWATER		
Pocket Water	[POW]	3.1
Glide	[GLD]	3.2
Run	[RUN]	3.3
Step Run	[SRN]	3.4
Edgewater	[EDW]	3.5
MAIN CHANNEL POOLS		
Trench Pool	[TRP]	4.1
Mid-Channel Pool	[MCP]	4.2

Channel Confluence Pool	[CCP]	4.3
Step Pool	[STP]	4.4
SCOUR POOLS		
Corner Pool	[CRP]	5.1
Lateral Scour Pool - Log Enhanced	[LSL]	5.2
Lateral Scour Pool - Root Wad Enhanced	[LSR]	5.3
Lateral Scour Pool - Bedrock Formed	[LSBk]	5.4
Lateral Scour Pool - Boulder Formed	[LSBo]	5.5
Plunge Pool	[PLP]	5.6
BACKWATER POOLS		
Secondary Channel Pool	[SCP]	6.1
Backwater Pool - Boulder Formed	[BPB]	6.2
Backwater Pool - Root Wad Formed	[BPR]	6.3
Backwater Pool - Log Formed	[BPL]	6.4
Dammed Pool	[DPL]	6.5