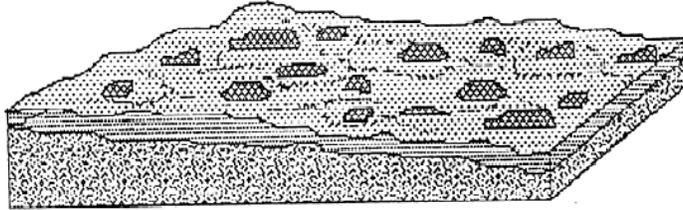


Standard Operating Procedure (SOP) 4.7.4.

By Erick Burres *

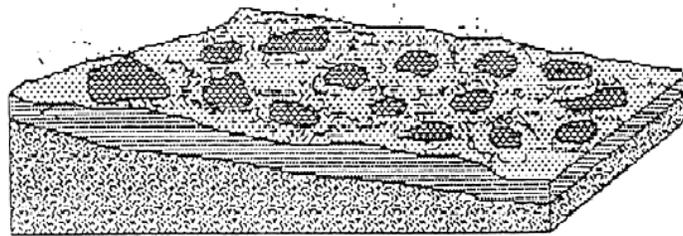
Fish Habitat Survey Definitions

Riffles



LOW GRADIENT RIFFLE - "LGR"

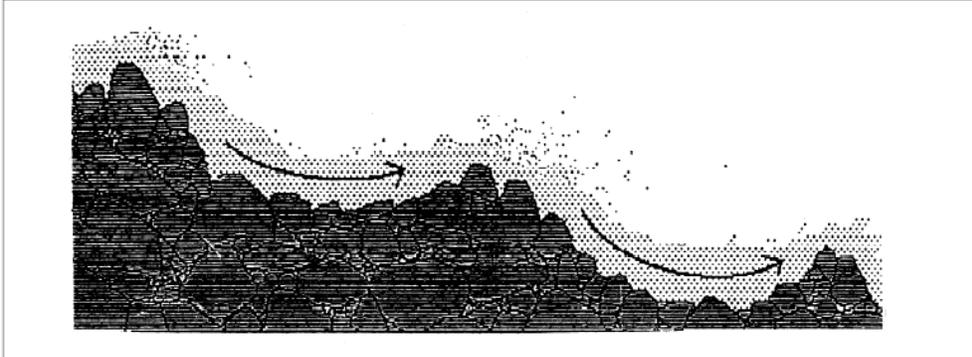
Shallow reaches with swiftly flowing turbulent water with some partially exposed substrate; gradient $<4\%$, substrate is usually cobble dominated.



HIGH GRADIENT RIFFLES - "HGR"

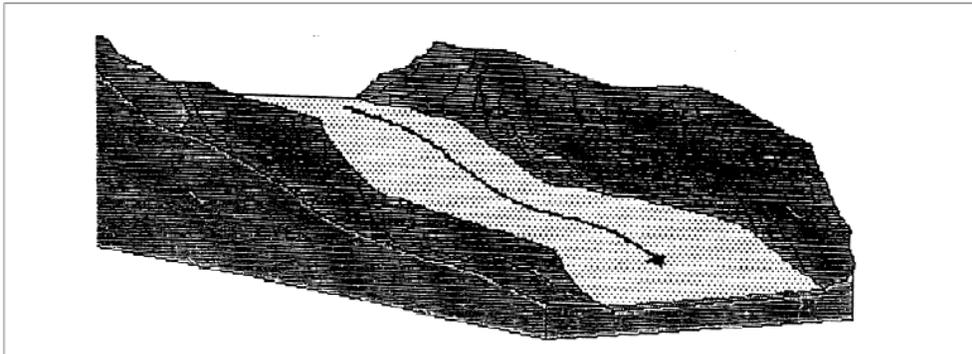
Steep reaches of moderately deep, swift, and very turbulent water, amount of exposed substrate is relatively high; gradient is $>4\%$, and substrate is boulder dominated.

Cascade



CASCADE - "CAS"

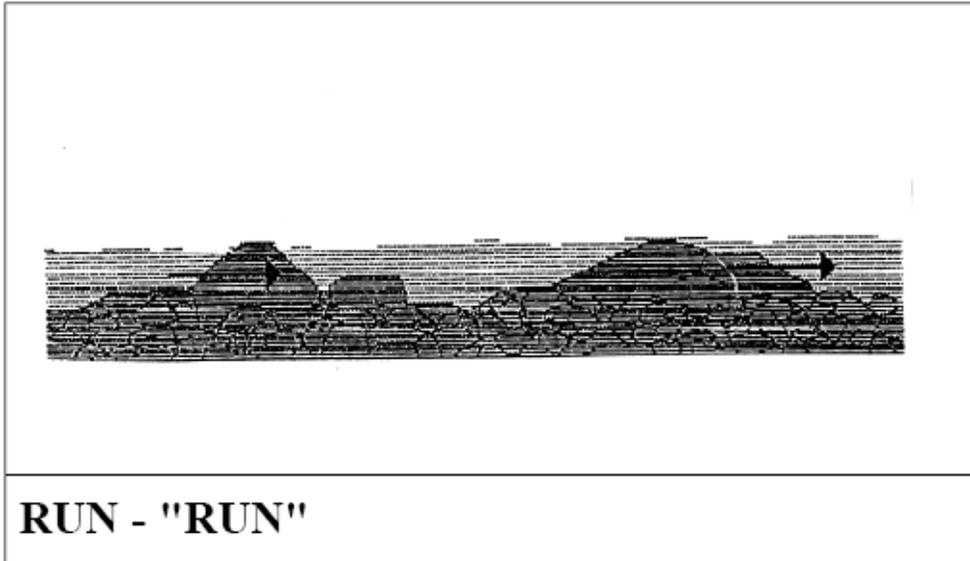
The steepest riffle habitat, consisting of alternating small waterfalls and shallow pools; substrate is usually bedrock and boulders.



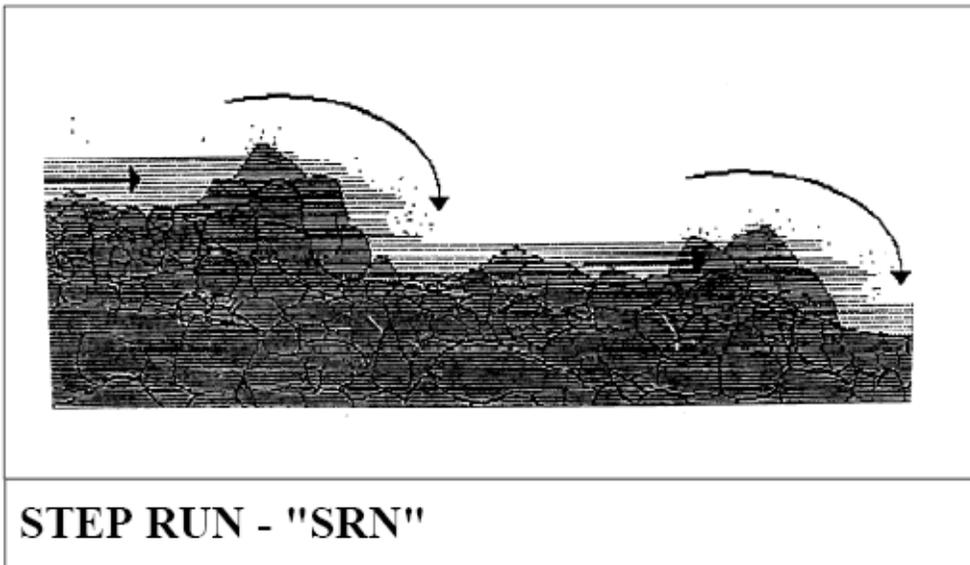
BEDROCK SHEET - "BRS"

A thin sheet of water flowing over a smooth bedrock surface; gradients are usually variable.

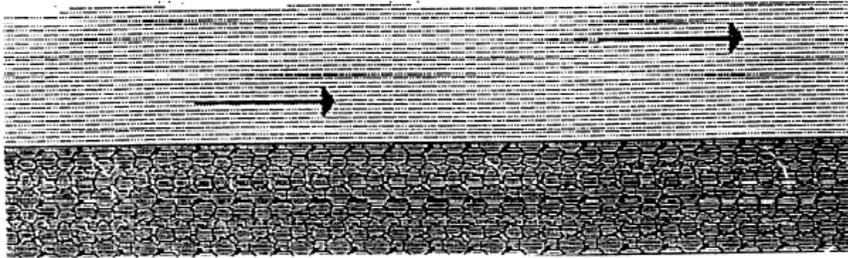
Flatwaters



Swiftly flowing reaches with little surface agitation and no major flow obstructions; often appears as flooded riffles; typical substrate consists of gravel, cobble, and boulders.

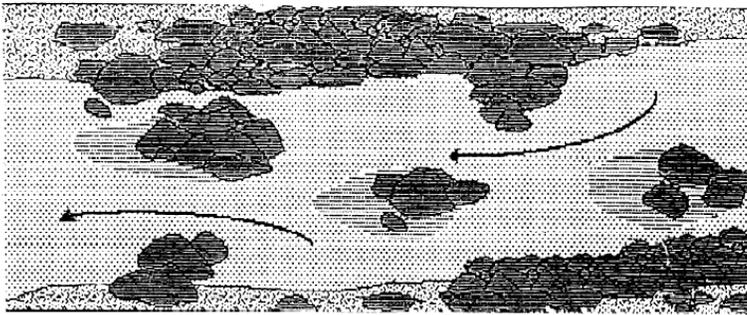


A sequence of runs separated by short riffle steps; substrate is usually cobble and boulder dominated.



GLIDE - "GLD"

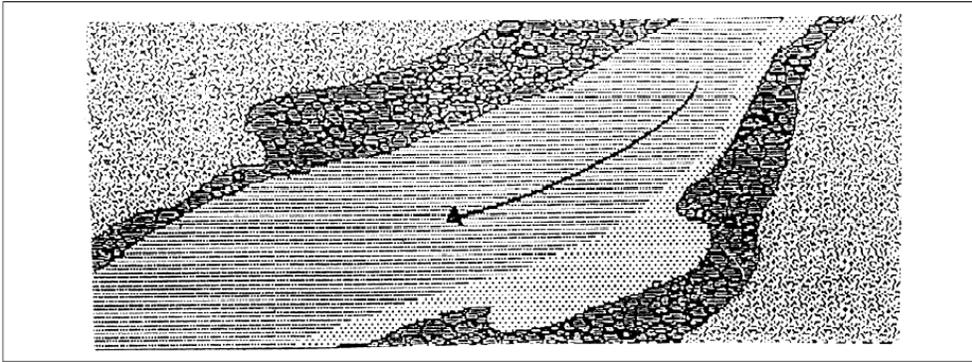
A wide uniform channel bottom; flow with low to moderate velocities; lacking pronounced turbulence; substrate usually consists of cobble, gravel, and sand.



POCKET WATER - "POW"

A section of swift flowing stream containing numerous boulders or other [large obstructions](#) which create eddies or scour holes (pockets) behind the obstructions.

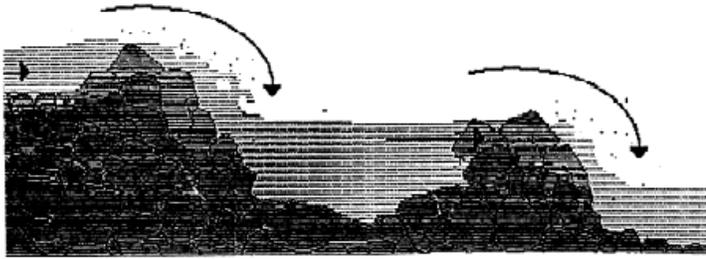
Deleted: large obstructions



EDGEWATER - "EDW"

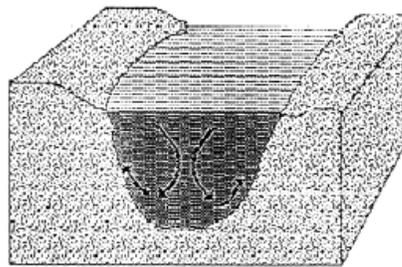
Quiet, shallow area found along the margins of the stream, typically associated with riffles; water velocity is low and sometimes lacking; substrate varies from cobbles to boulders.

Main Channel Pools



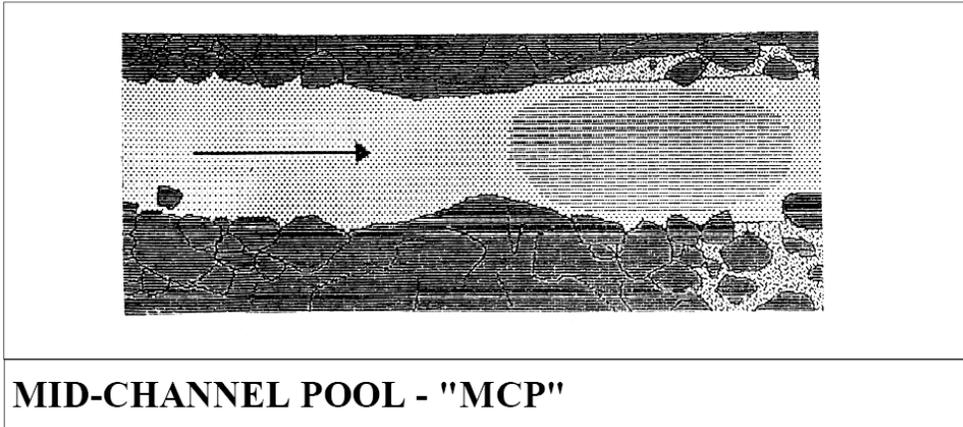
STEP POOL - "STP"

A series of pools separated by short riffles or cascades; generally found in high gradient, confined mountain streams dominated by boulder substrate.



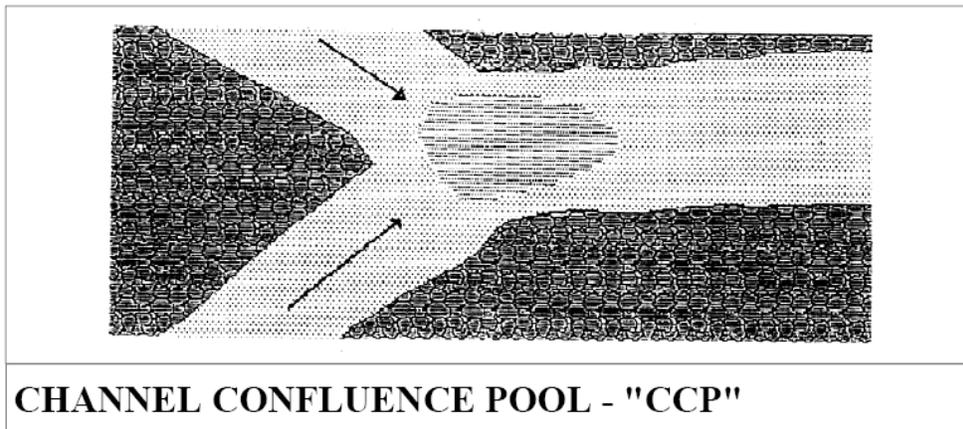
TRENCH/CHUTE - "TRP"

Channel cross-sections typically "U" shaped with bedrock or coarse grained bottom flanked bedrock walls; current velocities are swift and the direction of flow is uniform.



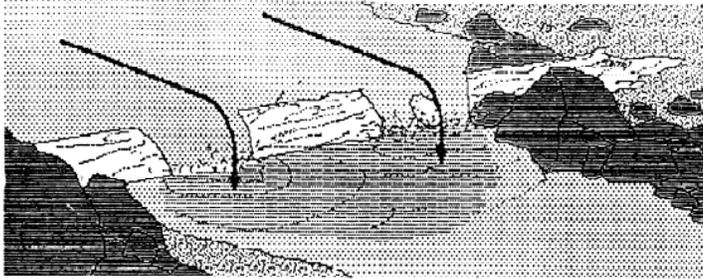
Large pools formed by mid-channel scour; the scour hole encompasses more than 60% of the wetted channel; water velocity is slow, and the substrate is highly variable.

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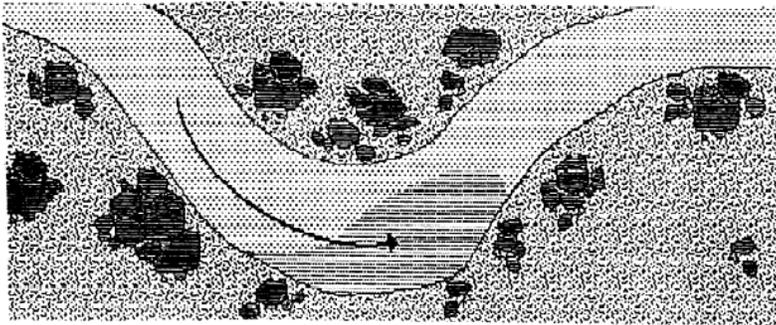
Large pools formed at the confluence of two or more channels; scour can be due to plunges, lateral obstructions or scour at the channel intersections; velocity and turbulence are usually greater than those in other pool types.

Scour Pools



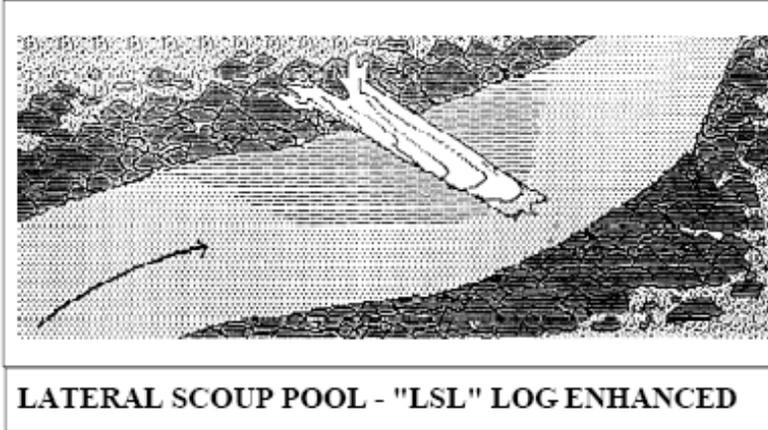
PLUNGE POOL - "PLP"

Found where stream passes over a complete or nearly complete channel obstruction and drops steeply into the streambed below, scouring out a depression; often large and deep; substrate size is highly variable.

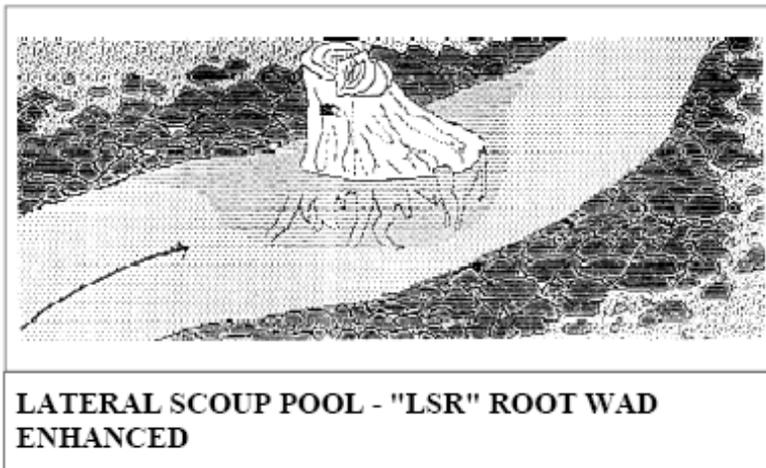


CORNER POOL - "CRP"

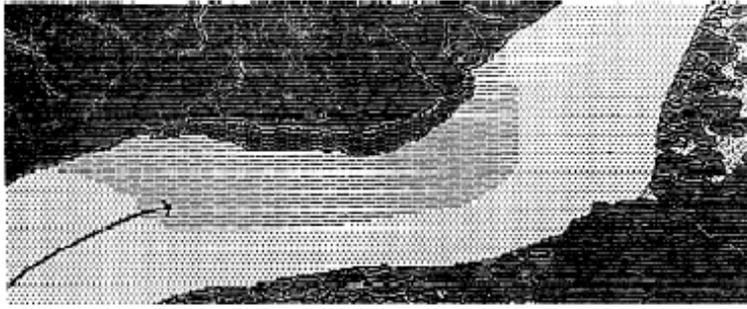
Lateral scour pools formed at the bend in the channel; these pools are common in the lowland valley bottoms where stream banks consist of alluvium and lack hard obstructions.



Formed by flow impinging against a partial channel obstruction consisting of large woody debris; the associated scour is generally confined to <60% of the wetted channel width.

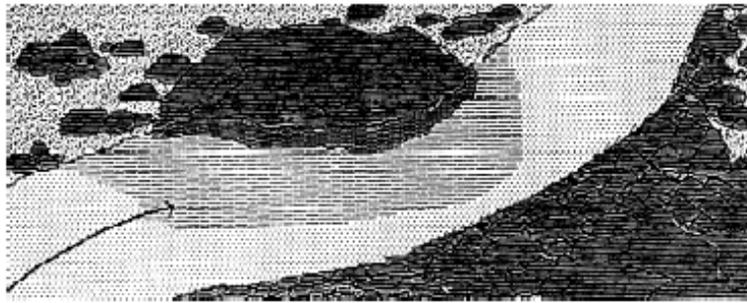


Formed by flow impinging against a partial channel obstruction consisting of a root wad; associated scour is generally confined to <60% of the wetted channel width.



LATERAL SCOUP POOL - "LSB_k" BEDROCK FORMED

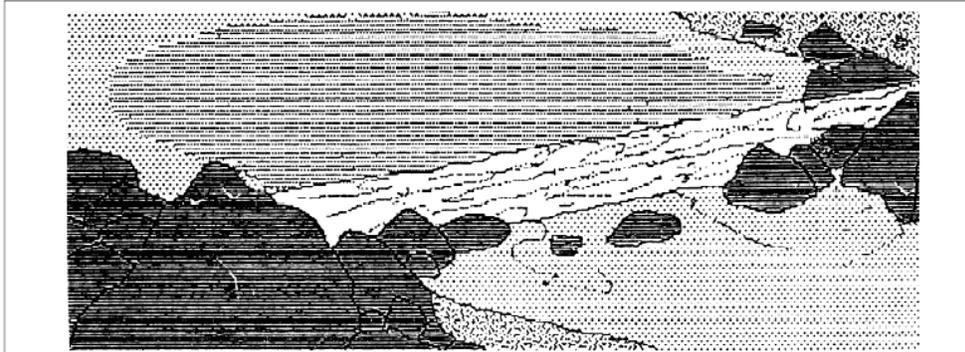
Formed by flow impinging against a bedrock stream bank; associated scour is generally confined to <60% of the wetted channel width.



LATERAL SCOUP POOL - "LSB_o" BOULDER FORMED

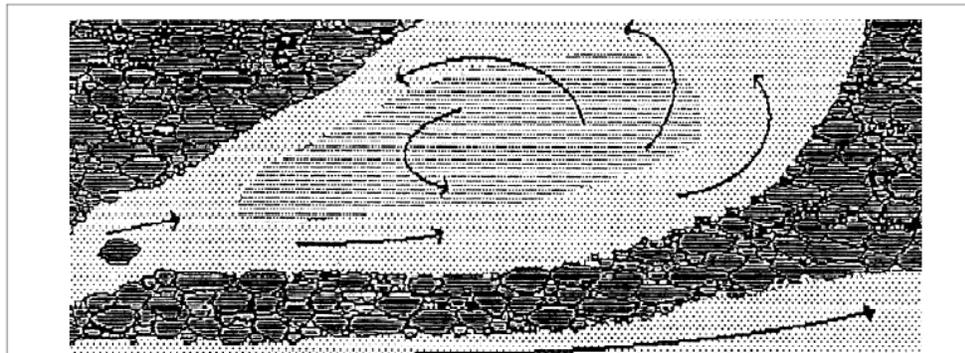
Formed by flow impinging against a partial channel obstruction consisting of a boulder; the associated scour is generally confined to <60% of the wetted channel.

Backwater Pool



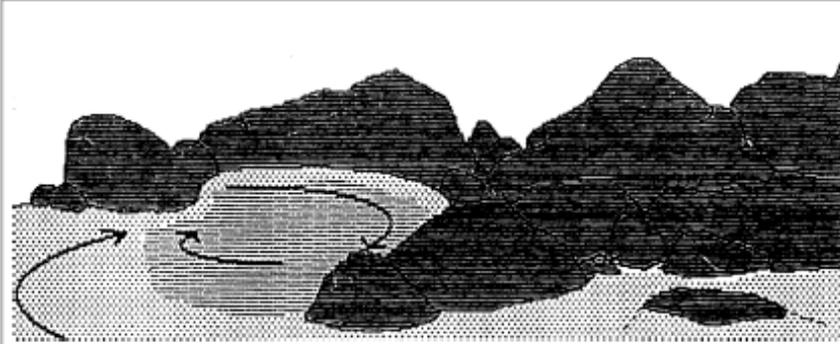
DAMMED POOL - "DPL"

Water impounded from a complete or nearly complete channel blockage (debris jams, rock landslides or beaver dams); substrate tend toward smaller gravel and sand.



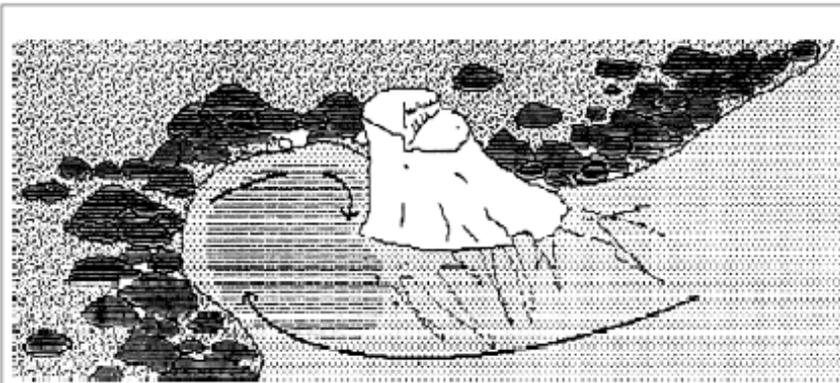
CORNER POOL - "CRP"

Typically found in the summer, these pools will dry up or have very little flow; mainly associated with gravel bars and may contain sand and silt substrate.



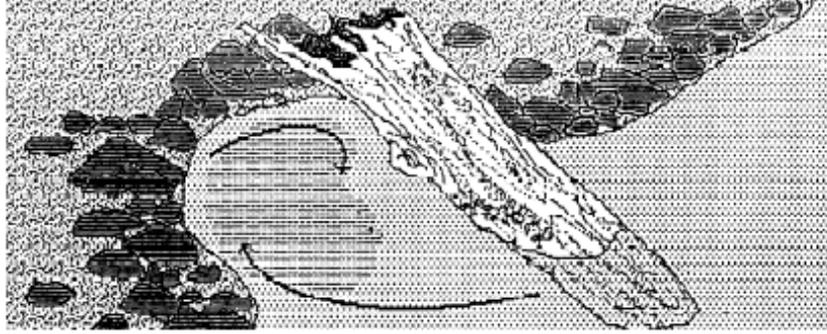
BACKWATER POOL - "BPB" BOULDER FORMED

Found along channel margins and caused by eddies around a boulder obstruction; these pools are usually shallow and are dominated by fine-grain substrate; current velocities are quite low.



BACKWATER POOL - "BPR" ROOT WAD FORMED

Found along channel margins and caused by eddies around a root wad obstruction; these pools are usually shallow and are dominated by fine-grain substrate; current velocities are quite low.



BACKWATER POOL - "BPL" LOG FORMED

Found along channel margins and caused by eddies around a large woody debris obstruction; these pools are usually shallow and are dominated by fine-grain substrate; current velocities are quite low.

* References:

Coyote Creek Riparian Station and the San Francisco Estuary Institute originally prepared this protocol for the Clean Water Team. Originally adapted from the California Department of Fish and Game's *California Salmonid Stream Habitat Manual*. 2nd Edition by from G. Flosi. and F.L. Reynolds. This SOP reflects changes made in 2006 by the Clean Water Team.