INTRODUCTION TO USING THE SWAMP 2007 BIOASSESSMENT AND PHYSICAL HABITAT MONITORING SOP FOR THE BASIC GROUPING OF PYSICAL HABITAT MODULES

APRIL 2007

Erick Burres

Citizen Monitoring Coordinator

SWRCB-Clean Water Team

eburres@waterboards.ca.gov

(213) 576-6788

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Bioassessment SOP

Table 1. Summary of physical habitat and water chemistry and proposal for basic, full, and optional levels of effort.

Survey Task	Parameter(s)	Basic	Full	Option	Comments
REACH DELINEATION and WATER QUALITY [Conducted before entering stream to sample BMIs or conduct any habitat surveys]	Layout reach and mark transects, record GPS coordinates	X	X		Use 150-m reach length if wetted width ≤10 m; Use 250-m reach length if wetted width > 10 m
	Temperature, pH, specific conductance, DO, alkalinity	X	X		Multi-meter (e.g., YSI, Hydrolab, VWR Symphony)
	Turbidity, Silica			X	Use test kit or meter
	Notable field conditions	X	X		Recent rainfall, fire events, dominant local landuse
CROSS-SECTIONAL TRANSECTS BASIC Measurements at main 11 transects only FULL Measurements at 11 main transects (A, B, C, D, E, F, G, H, I, J, K) or 21 transects (11 main plus 10 inter-transects) for substrate size classes only	Wetted width	X	X		Stadia rod is useful here
	Flow habitat delineation	X	X		Record proportion of habitat classes in each inter-transect zone
	Depth and Pebble Count + CPOM		X		5-point substrate size, depth and CPOM records at all 21 transects
	Cobble embeddedness		X		All cobble-sized particles in pebble count. Supplement with "random walk" if needed for 25
	Slope (%)	See reach scale	X		Average slope calculated from 10 transect to transect slope measurements. Use autolevel for slopes ≤ 1%; clinometer is OK for steeper gradients
	Sinuosity		X		Record compass readings between transect centers
	Canopy cover	X	X		Four densiometer readings at center of channel (facing L bank R bank, Upstream +Downstream)
	Riparian Vegetation		X		Record % or categories
	Instream Habitat		X		
	Human Influence		X		
	Bank Stability	X	X		Eroding / Vulnerable / Stable
	Bankfull Dimensions		X		
	Excess Sediment Transect Measures (optional)				
	Bankfull width and height, bank angles			X	
	Large woody debris counts			X	Tallies of woody debris in several size classes
	Thalweg profile			X	100 equidistant points along thalweg
Survey Task	**Parameter(s)**	**Basic**	**Full**	**Option**	**Comments**
DISCHARGE TRANSECT	Discharge measurements		X		Velocity-Area Method or Neutrally Buoyant Object Method
REACH SCALE MEASUREMENTS:	EPA-RBP visual scoring of habitat features	*		X	*Used for citizen monitoring and comparison with legacy data
	Selected RBP visuals:		X		Channel alteration, sediment deposition, epifaunal substrate (redundant if doing EPA-RBP scoring)
	Slope (%, not degrees)	X	See transect scale		Single measurement for entire reach only for BASIC. Use autolevel for slopes ≤ 1%, clinometer is OK for higher gradients
	Photo documentation	X	X		Upstream (A, F, K) Downstream (F)
OTHER OPTIONAL COMPONENTS					
FOOD RESOURCE QUANTIFICATION	Periphyton (3 replicates)			X	Qualitative characterization of diatom growth and filamentous algal growth, quantification of biomass (AFDM, chl-a)
	CPOM & FPOM (3 replicates)			X	CPOM field measure of wet mass >1 mm particles, FPOM as 0.25 – 1 mm fraction (AFDM in lab)

The Current California State Water Resources Control Board recommendation for bioassessment monitoring Standard Operating Procedure has three levels of action. This presentation is on the Basic modules.

SWAMP Bioassessment Procedures 2007

Standard Operating Procedures for Collecting Benthic Macroinvertebrate Samples and Associated Physical and Chemical Data for Ambient Bioassessments in California

February 2007

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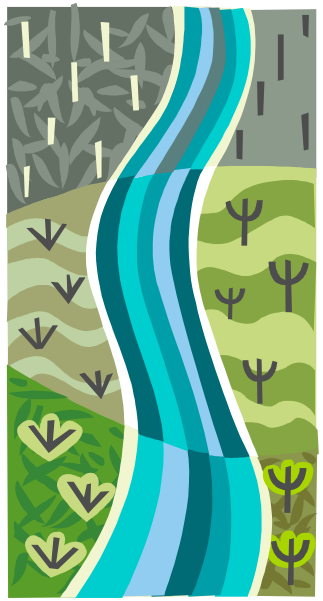
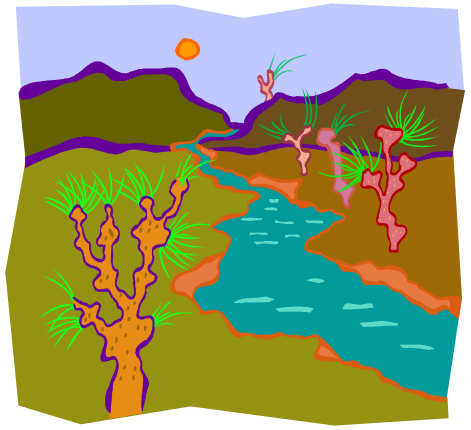
Reach Documentation:
Stream Reach Determination

REACH DOCUMENTATION	Standard Reach Length (wetted width ≤ 10m) = 150 m	Distance between transects = 15 m
	Alternate Reach Length (wetted width >10m) = 250 m	Distance between transects = 25 m





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Reach Documentation:
Field Crew and Site Information

Project Name:		Date:	Time:
Stream Name:		Site Name/ Description:	
Site Code:		Crew Members:	
Latitude: °N	datum: NAD27 NAD83		
Longitude: °W			

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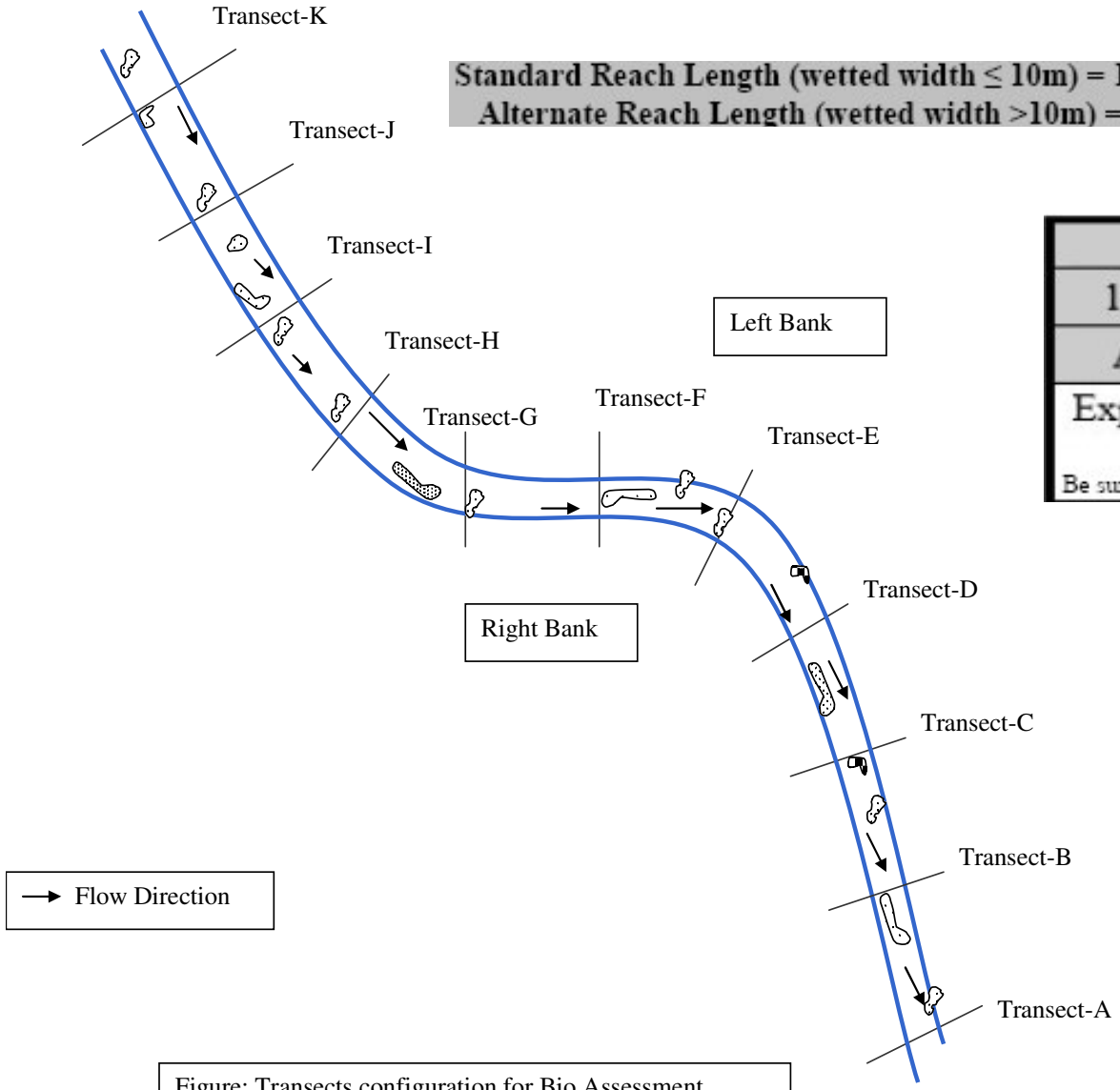
Reach Documentation: Reach Length



Standard Reach Length (wetted width ≤ 10m) = 150 m Distance between transects = 15 m
Alternate Reach Length (wetted width >10m) = 250 m Distance between transects = 25 m

REACH LENGTH			
150 m		Other	
Actual Length (m)			
Explanation:			
Be sure to have all 11 transects.			

Figure: Transects configuration for Bio Assessment

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Reach Documentation: Ambient Water Quality Measurement

Ambient water quality measurements are to be taken at one site within the reach.

AMBIENT WATER QUALITY MEASUREMENTS							
Temperature (°C)		pH		Alkalinity (mg/L)		Turbidity (optional)	
Dissolved O_2 (mg/L)		Specific Cond. (µs)		Salinity (ppt)		Silica (optional)	

Images are for illustration purposes only.

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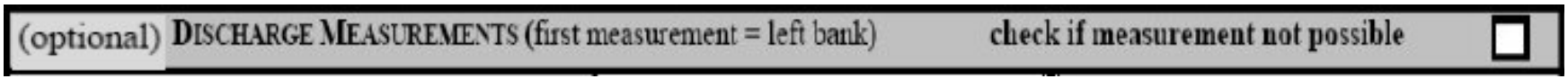
Reach Documentation: Discharge Measurement



Discharge measurements are optional.

If discharge is to be measures, two methods are given within the SOP: Velocity Area Method (VAM)

Buoyant Floatable Method.

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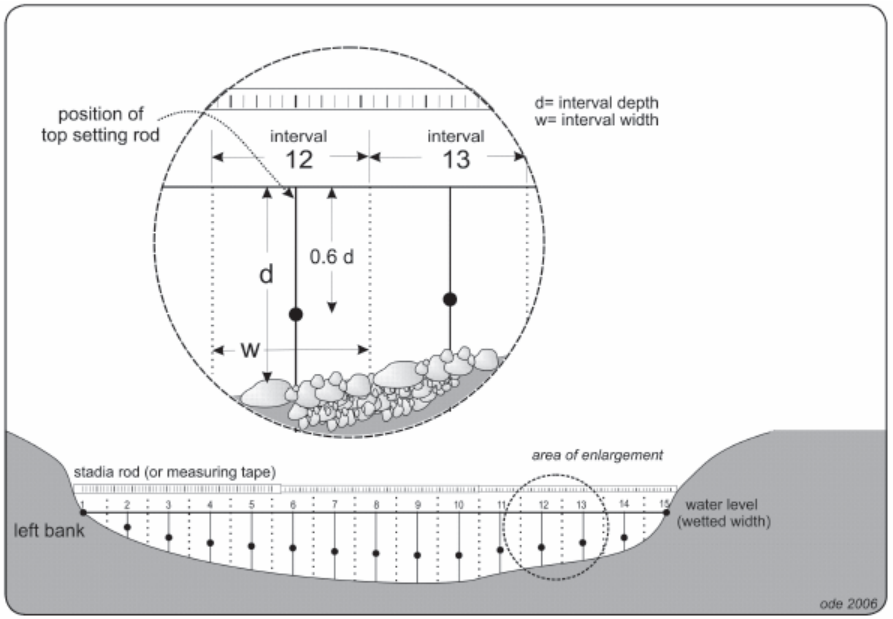
Reach Documentation: Discharge Using VAM

VELOCITY AREA METHOD (preferred)				Transect Width:			
	Distance from Bank (cm)	Depth (cm)	Velocity (m/sec)		Distance from Bank (cm)	Depth (cm)	Velocity (m/sec)
1				11			
2				12			
3				13			
4				14			
5				15			
6				16			
7				17			
8				18			
9				19			
10				20			



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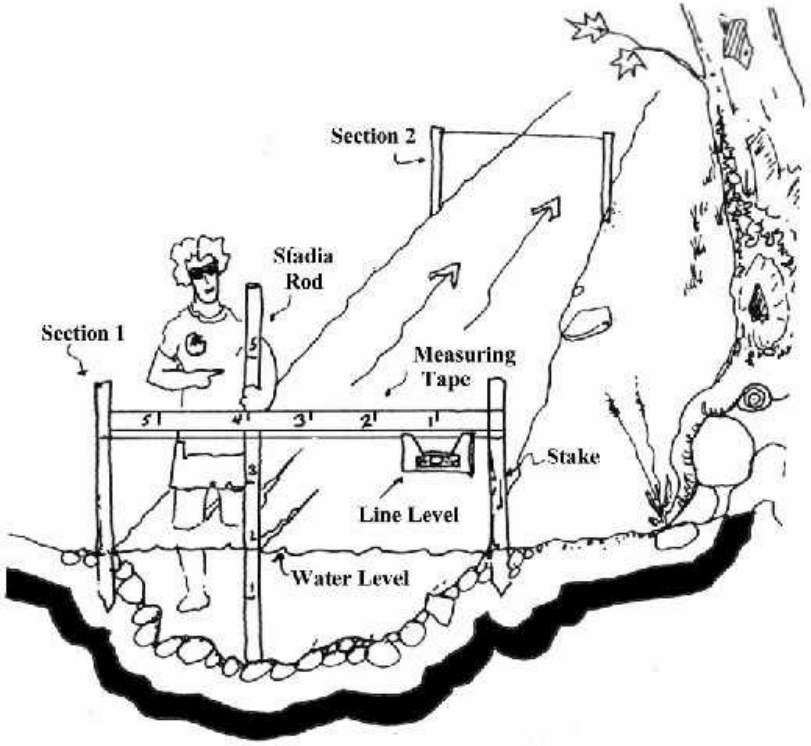
Reach Documentation: Discharge Using BFM

Bouyant Object Method			
	Float 1	Float 2	Float 3
Distance			
Float Time			

Float Reach Cross Section			
width (m) depth (cm)	Upper Section	Middle Section	Lower Section
Width			
Depth 1			
Depth 2			
Depth 3			
Depth 4			
Depth 5			



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Reach Documentation:
Notable Field Conditions-Rain & Fire

NOTABLE FIELD CONDITIONS (check one box per topic)						
Evidence of recent rainfall (enough to increase surface runoff)	NO		minimal		>10% flow increase	
Evidence of fires in reach or immediately upstream (<500 m)	NO		< 1 year		< 5 years	

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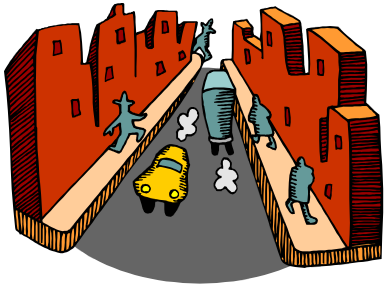
Reach Documentation:
Notable Field Conditions-Land Use/Cover

NOTABLE FIELD CONDITIONS (check one box per topic)					
Dominant landuse/ landcover in area surrounding reach	Agriculture		Forest		Rangeland
	Urban/ Indus		Suburb/Town		Other



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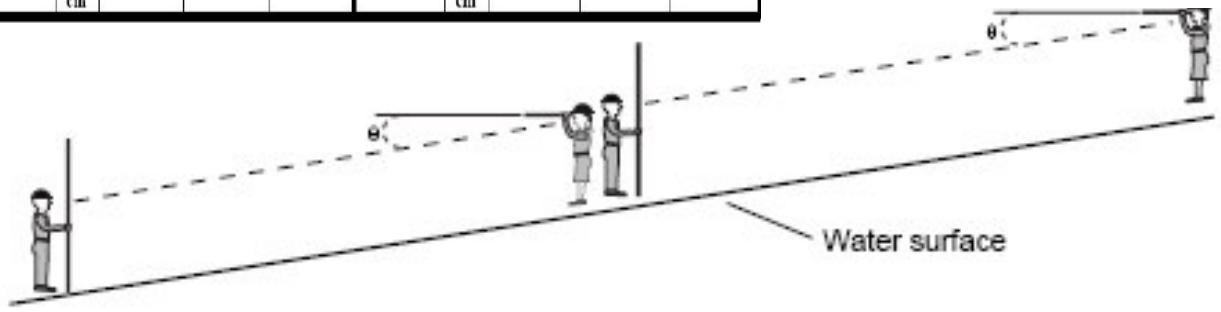
Reachwide Measurement: Slope and Sinuosity

CL=clinometer OT=other TR=autolevel HL=handlevel		Main Segment				Supplemental Segment			
Transect	Method	Slope (%) or Elevation Difference (cm)	Segment Length (m)	Bearing (0°-359°)	Proportion (%)	Slope (%) or Elevation Difference (cm)	Segment Length (m)	Bearing (0°-359°)	Proportion (%)
K-J	CL TR HL OT	% cm				% cm			
J-I	CL TR HL OT	% cm				% cm			
I-H	CL TR HL OT	% cm				% cm			
H-G	CL TR HL OT	% cm				% cm			
G-F	CL TR HL OT	% cm				% cm			
F-E	CL TR HL OT	% cm				% cm			
E-D	CL TR HL OT	% cm				% cm			
D-C	CL TR HL OT	% cm				% cm			
C-B	CL TR HL OT	% cm				% cm			
B-A	CL TR HL OT	% cm				% cm			

Slope and sinuosity measurement are taken throughout the entire reach from transect A upstream to transect K downstream.

(Source: Tetra Tech, Inc.)



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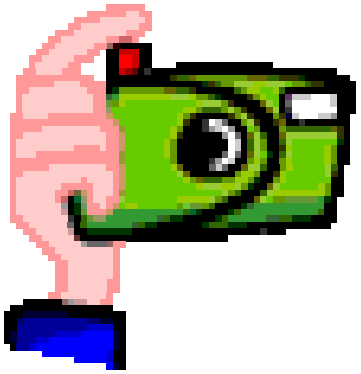
Reachwide Photographs

Four photographs are recommended and two optional photographs are suggested.



PHOTOGRAPHS:	A (up): ☐	F (up): ☐	F (down): ☐	K (down): ☐
Additional Photographs (optional):	A (down): ☐	K (up): ☐	Others:	

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Transect Description & Measurements: Wetted Width, Bankfull Width & Height

Site Code:	Site Name:		Date: ___/___/_____
Wetted Width (m):	Bankfull Width (m):	Bankfull Height:	Transect: A

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Transect Descriptions & Measurements: Bank Stability

BANK STABILITY 5m up and 5m downstream of transect and from bankfull to wetted width			
Left Bank	eroded	vulnerable	stable
Right Bank	eroded	vulnerable	stable

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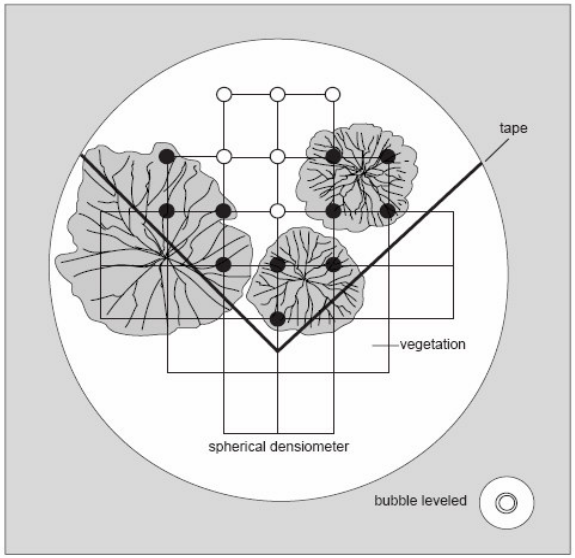
Transect Description & Measurements:



DENSIOMETER READINGS (0-17) *count covered dots*	
Center Left	
Center Upstream	
Center Down-stream	
Center Right	

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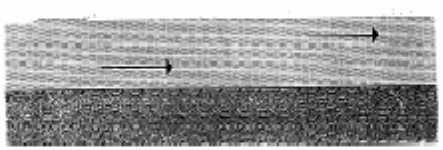
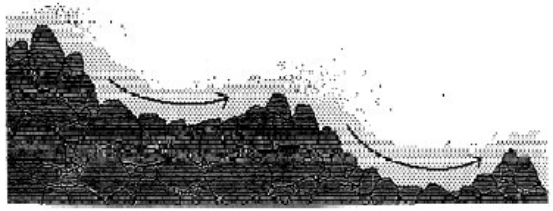
Transect Description & Measurement: Flow Habitats

Flow Habitat Type	Description
Cascades	Short, high gradient drop in stream bed elevation often accompanied by boulders and considerable turbulence
Falls	High gradient drop in elevation of the stream bed associated with an abrupt change in the bedrock
Rapids	Sections of stream with swiftly flowing water and considerable surface turbulence. Rapids tend to have larger substrate sizes than riffles
Riffles	Shallow sections where the water flows over coarse stream bed particles that create mild to moderate surface turbulence; (< 0.5 m deep, > 0.3 m/s)
Step-Runs	A series of runs that are separated by short riffles or flow obstructions that cause discontinuous breaks in slope
Runs	Long, relatively straight, low-gradient sections without flow obstructions. The stream bed is typically even and the water flows faster than it does in a pool; (> 0.5 m deep, > 0.3 m/s)
Glides	A section of stream with little or no turbulence, but faster velocity than pools; (< 0.5 m deep, < 0.3 m/s)
Pools	A reach of stream that is characterized by deep, low-velocity water and a smooth surface ; (> 0.5 m deep, < 0.3 m/s)

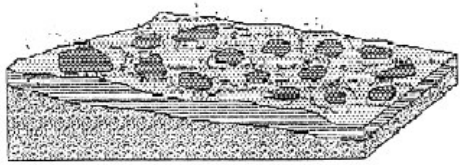
FLOW HABITATS (% between transects, T=100%)	
Channel Type	**%**
Cascade/ Fall	
Rapid	
Riffle	
Run	
Glide	
Pool	
Dry	



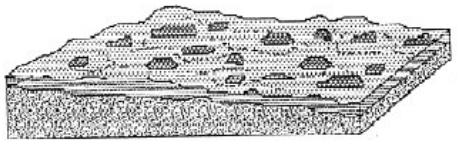
GLIDE - "GLD"



CASCADE - "CAS"



HIGH GRADIENT RIFFLES - "HGR"



LOW GRADIENT RIFFLE - "LGR"

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END

http://www.waterboards.ca.gov/nps/volunteer.html

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