

Record the substrate at 10 points across each cross section. Vsurf (Vgobspwn). Page 14

Inorganic and wood categories should total 10 points for each cross section; organic categories can be between 0 and 10 dependent on the occurrence of organic material over the bed substrate

Substrate category	Inorganic material categories									Wood categories			Organic material categories		
	Silt/sand (SI/SA)	Small gravel (SG)	Small medium gravel (SMG)	Medium large gravel (MLG)	Large gravel (LG)	Small cobble (SC)	Large cobbles (LC)	Boulders (B)	Bedrock (BR)	Small (SW)	Medium (MW)	Large (LW)	Leaf litter	Periphyton, moss, submerged macrophyte	Roots, non-submerged macrophytes
Substrate size (mm)	<2	2-8	8-16	16-32	32-64	64-128	128-256	>256	n/a	< 50	50 – 100	> 100			
Cross section 1															
Cross section 2															
Cross section 3															
Cross section 4															
Cross section 5															
Cross section 6															
Cross section 7															
Cross section 8															
Cross section 9															
Cross section 10															
Example	///	//		/	/					/	//		//	/	

This assessment contributes to the Fish Spawning Habitat (Vsurf; FSH) and Decontamination of Pollutants (Vgobspwn; DOP) functions.

The aim is to determine the relative proportion of different particle sizes and organic materials within the test reach . This is achieved by recording the size of 10 particles across each of the 10 cross sections (100 particles in total). Woody debris is included with the inorganic categories for the purposes of this assessment. Refer to page 14 of the SEV User Guide for further information.

If organic matter overlies the inorganic or wood substrate record the type of organic material in the appropriate column under the “organic material categories”. It is possible to record between 0 and 10 particles in the organic material columns for each cross section dependent on the occurrence of organic material over the dominant bed substrate

Assess the following variables at each of your 10 cross sections

	V_{depth} (Page 14)					V_{macro} (Page 21)		V_{veloc} (Page 23)			V_{shade} (Page 17)	V_{decid} (Page 48)
	Record depth (in metres) at five equally spaced locations at each cross section					Assess proportional cover of macrophytes in a 1 m band at each cross section (0-1)		Estimate maximum current velocity at each cross section using the ruler method or floating particle method (if ruler $d_2 - d_1 = < 2\text{mm}$)			Assess shading at stream surface from vegetation and topography	Assess the permanence of vegetation shading at each cross section
	10%	30%	50%	70%	90%	Surface-reaching, emergent and bankside	Below surface macrophytes	Ruler method ($d_2 - d_1$) in mm	Floating particle method		One category for each cross section (see shade category descriptors below)	Record proportion of canopy cover that is Not deciduous (0-1)
								Distance travelled (m)	Time taken (s)			
Cross section 1												
Cross section 2												
Cross section 3												
Cross section 4												
Cross section 5												
Cross section 6												
Cross section 7												
Cross section 8												
Cross section 9												
Cross section 10												
Example	<i>0.32</i>	<i>0.24</i>	<i>0.46</i>	<i>0.31</i>	<i>0.15</i>	<i>0.2</i>	<i>0.1</i>	<i>12</i>	<i>n/a</i>	<i>n/a</i>	<i>moderate</i>	<i>0.8</i>

V_{shade} categories			
Very high shading	> 90%	Low shading	31 – 50%
High shading	71 – 90%	Very low shading	11 – 30%
Moderate shading	51 – 70%	No effective shading	< 10%

V_{chann} ($V_{\text{chanshape}}$ V_{retain})	Type of channel modification (Page 29)	Proportion of channel (0 – 1)
Contributes to NFR, IPR & CGW	Natural channel with no modification	
	Natural channel, but flow patterns affected by a reduction in roughness elements (e.g. woody debris, or boulders)	
	Channel not straightened or deepened, but upper banks widened to increase flood flow capacity (score for the worst bank)	
	Natural channel, but evidence of channel incision from flood flows	
	Natural channel, but flow patterns affected by increase in roughness elements (e.g. excessive macrophyte growth)	
	Flow patterns affected by artificial in-stream structure (e.g. ponding due to culvert, weir or unnatural debris)	
	Channel straightened and/or deepened	

V_{pipe}	Size and number of piped inflows (Page 27)	Tick one
Contributes to NFR	No piped inflows to stream channel	
	One piped inflow, smaller than 20cm in diameter	
	Multiple piped inflows or inflow greater than 20cm in diameter	

V_{barr}	Barrier type (Page 45)	Tick one
Contributes to CSM	No barriers to migration	
	Partial or intermittent barrier to migration	
	Total barrier to migration	

V_{bank}	Floodplain description (Page 38)	Proportion of channel (0 – 1)
Contributes to FLE	Movement of flood flows onto and across the floodplain is not restricted by any artificial structures or modifications	
	Floodplain present, but connectivity to the full floodplain is restricted by modification (e.g. stop banks or urban development)	
	Floodplain present, but connectivity to the floodplain reduced by channel incision or bank widening so that most flood flows are unlikely to reach the floodplain	
	No hydrological connectivity with the floodplain as all flows are likely to be artificially contained within the channel	

V_{lining}	Type of channel lining (Page 34)	Proportion of channel (0 – 1)
Contributes to NFR & CGW	Natural channel with no modification	
	Bed with unnatural loading of fine sediment	
	Bank OR bed lined with permeable artificial lining (e.g. gabion baskets)	
	Bank OR bed lined with impermeable artificial lining (e.g. concrete)	
	Bank AND bed lined with permeable artificial lining	
	Bank AND bed lined with impermeable artificial lining	

V_{dod}	Indicators of oxygen reducing processes (Page 47)	Tick one
Contributes to DOM	Optimal •No anaerobic sediment •No odours or bubbling when sediments are disturbed •Little or no macrophyte biomass (in summer), or no areas of slow flow, low shade and soft substrate (in winter)	
	Sub-optimal •No anaerobic sediment •Some bubbling when sediments are disturbed, but no sulphide odour •Moderate macrophyte biomass (in summer), or moderate areas of slow flow, low shade and soft substrate (in winter)	
	Marginal •Small patches of anaerobic sediment •Some sediment bubbling and sulphide odour when sediments are disturbed •Some sewage fungus may be present •Dense macrophyte biomass (in summer), or large areas of slow flow, low shade and soft substrate (in winter)	
	Poor •Much black anaerobic sediment •Extensive bubbling with sulphide odour when sediments are disturbed •Surface scums present •Abundant sewage fungus may be present	

For “proportion of channel (0 – 1)” assessments the sum of values in the proportion of channel column should always be 1

V_{rough} ($V_{ripcond}$)	Riparian zone vegetation (20m wide on each bank) (Page 40)	Proportion of bank length (0 – 1)
Contributes to FLE & RVI	Mature indigenous vegetation with diverse canopy and understorey	
	Regenerating indigenous vegetation in late stage of succession	
	Natural, diverse wetland vegetation on banks	
	Mature native trees, but damaged understorey	
	Mature exotic trees (e.g. Willows and plantation forest)	
	Low diversity regenerating bush with stock excluded OR tall exotic shrubs (> 2m)	
	Mature flax, long grasses and sedges	
	Low diversity regenerating bush with stock access OR Early stage restoration planting OR Short exotic shrubs (< 2m) OR Immature plantation forest	
	Mainly long grasses (not grazed or mown)	
	Grazed wetlands	
	Mainly short grasses	
Disturbed bare soil or artificial surfaces		

$V_{ripconn}$	Connection between riparian zone and stream channel (Page 61)	Proportion of reach (0 – 1)
Contributes to RVI	Assess the proportion of the stream reach where the connection between riparian zone and stream channel is not obstructed by artificial structures (e.g. culverts, or channel lining) or prevented by channel incision (e.g. the water level is below the root zone of existing riparian vegetation) . If there are no impediments to connection then the score should be 1, if there is no connection the score should be 0	

$V_{ripfilt}$	Riparian zone description (Page 48)	Proportion of bank length (0 – 1)
Contributes to DOP	Very high filtering activity Dense ground cover vegetation OR thick organic litter layer under a tree canopy AND run-off into stream diffuse, with only minor defined drainage channels AND width of buffer greater than 5x channel width	
	High filtering activity Dense ground cover vegetation OR thick organic litter layer under a tree canopy AND run-off into stream diffuse, with only minor defined drainage channels AND width of buffer less than 5x channel width	
	Moderate filtering activity Uniform ground cover vegetation OR abundant organic litter layer under a tree canopy AND run-off into stream mostly diffuse, with few defined drainage channels	
	Low filtering activity Patchy ground cover vegetation OR little organic litter layer under a tree canopy AND/OR some run-off into stream in small defined drainage channels	
	Very low filtering activity Short (mown or grazed) vegetation with high soil compaction AND/OR run-off into stream mostly contained in small defined drainage channels	
	No filtering activity Banks bare or impermeable	

V_{ripar}	Intactness of riparian zone (Page 48)	Proportion of zone (0 – 1)
Contributes to OMI	Assess the proportion of the riparian zone (defined as 20m on each bank) that is covered by trees or bush. If the riparian zone is covered entirely in trees or bush then the score should 1, if there are no trees or bush in the riparian zone the score should be 0.	

For “proportion of bank length (0 – 1)” assessments the sum of values in the proportion of channel column should always be 1

V_{galpwn} Extent of Galaxiidae spawning habitat (Page 54)		Length (m)
Contributes to FSH	Assess the length of near-flat (slope < 10°) on both banks that would be inundated by floods or high tides. Assess the length for both banks and add the two lengths together .	
	Total length of sample reach	

$V_{galqual}$ Quality of Galaxiidae spawning habitat (Page 56)			Tick one
	Tidally influenced reaches	Above tidal influence	
Contributes to FSH	<ul style="list-style-type: none"> Nearly flat (< 1°) stream bank, with near total (> 60%) cover by dense stemmed, low growing vegetation Inundated by spring tides and/or floods 	<ul style="list-style-type: none"> Under a dense tree canopy (> 80% shade) Nearly flat (< 1°) stream bank, with heavy cover (> 50%) of dense stemmed, low growing vegetation, twigs or gravels Inundated by high rainfall events 	High
	<ul style="list-style-type: none"> Gently sloping (1 - 5°) bank, with moderate (20 - 60%) cover of low growing vegetation Inundated by spring tides and/or floods 	<ul style="list-style-type: none"> Under a moderate tree canopy (50 - 80% shade) Gently sloping (1 - 5°) stream bank, with moderate cover (20 - 50%) of low growing vegetation, twigs or gravels Inundated by high rainfall events 	Medium
	<ul style="list-style-type: none"> Sloping (5 - 10°) bank, with sparse (10 - 20%) cover of low growing vegetation Inundated by spring tides and/or floods 	<ul style="list-style-type: none"> Under a partial tree canopy (10 - 50% shade) Sloping 5 – 10°) bank with sparse cover (1 - 20%) of low growing vegetation, twigs or gravels Inundated by high rainfall events 	Low
	<ul style="list-style-type: none"> Bank slope > 10°, or less than 10% cover of low growing vegetation 	<ul style="list-style-type: none"> Less than 10% shade from tree canopy, or slope > 10° or < 1% cover of low-growing vegetation, twigs or gravels 	Unsuitable

$V_{physhab}$ Physical habitat quality (Page 58)				
Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Aquatic Habitat Diversity	Wide variety of favourable aquatic habitat types present including: woody debris, riffles, undercut banks, root mats, rooted aquatic vegetation, cobble or other stable habitat.	Moderate variety of habitat types; 3-4 habitats present including woody debris.	Habitat diversity limited to 1-2 types; woody debris rare or may be smothered by sediment.	Favourable habitats lacking or limited to macrophytes (a few macrophyte species scores lower than several).
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Aquatic Habitat Abundance - proportion of stream channel occupied by suitable habitat features for in-stream fauna	> 50% of channel favourable for macroinvertebrate colonisation and fish cover; includes woody debris, undercut banks, root mats, rooted aquatic vegetation, cobble or other stable habitat.	30-50% of channel contains favourable habitat.	10-30% of channel contains favourable habitat.	< 10% of channel contains favourable habitat. Note: Algae does not constitute stable habitat.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Hydrologic Heterogeneity	Mixture of hydrologic conditions i.e. pool, riffle, run, chute, waterfalls; variety of pool sizes and depths.	Moderate variety of hydrologic conditions; deep and shallow pools present (pool size relative to size of stream).	Limited variety of hydrologic conditions; deep pools absent (pool size relative to size of stream)	Uniform hydrologic conditions; uniform depth and velocity; pools absent (includes uniformly deep streams).
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Channel Shade	>80% of water surface shaded. Full canopy.	60 - 80% of water surface shaded; mostly shaded with open patches.	20 - 60% of water surface shaded; mostly open with shaded patches.	<20% of water surface shaded. Fully open; lack of canopy cover.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
Riparian Vegetation Integrity (within 20 metres)	No direct human activity in the last 30 years; mature native tree canopy and intact native understorey	Minimal human activity; mature native tree canopy or native scrub; understorey shows some impact (e.g. weeds, feral animal grazing).	Extensive human activity affecting canopy and understorey; trees exotic (pine, willow, poplar); understorey native or exotic.	Extensive human activity; little or no canopy; managed vegetation (e.g. livestock grazing, mowed); permanent structures may be present (e.g. building, roads, car parks).
Left bank	10 9	8 7 6	5 4 3	2 1 0
Right bank	10 9	8 7 6	5 4 3	2 1 0