

Appendices

Appendix 1: Habitat Assessment Field Data Sheet and Key

Habitat Assessment - Field Data Sheet				Page 1	
Site Name:			Site ID:		
Date:			Time (NZST):		
Sampler(s):		Weather:			
Date of last sign. rainfall:		Photo No(s):			
Water Quality			Water Odour		
METER			Normal/none		
TEMP (oC)			Petroleum		
DO (mg/l)			Anaerobic		
DO (%SAT)			Sewage		
COND (uS)			Chemical		
SECCHI (m)			Water surface oils		
Pfankuch Stability Index			Anerobic sediment odour (H₂S)		
Upper Bank		Lower bank	Bottom		
Landform		Capacity		Rock angul.	
Mass wasting		Bank rock		Brightness	
Debris Jam		Obstruction		Consolid.	
Vegetation		Cutting		% Stable	
		Deposition		Scouring	
				Aquatic vege	
Riparian Vegetation			Litter present		
Predominant surrounding land use			Evidence of livestock access		
Native forest			Left bank		
Native scrub			Right bank		
Planted forest			Channel Shading (%)		
Lifestyle			Filamentous algae coverage (%)		
Horticulture					
Pasture					
Urban					
Qualitative Habitat Assess			Periphyton		
1. Aquatic hab abundance			Diatom	Rare	Common
2. Aquatic hab diversity			Mat algae		Abundant
3. Hydrologic heterogeneity			Filamentous algae		
4. Channel Alteration			Bryophytes (moss, liverworts)		
5. Bank stability			Macrophytes		
6. Channel Shade				Rare	Common
7. Riparian vege					Abundant
			Note: Rare = <10% cover Common = 10-50% cover Abundant = >50% cover		
Comments:					
<ul style="list-style-type: none"> - fish observed - fish habitat - barriers to fish passage - evidence of stable pools - catchment erosion - seeps or springs - discharges or outfalls - evidence of grazing stock access - unique features - crossings / tracks - litter, shopping trolleys, batteries, tyres - descriptions of sediment - stock / feral grazing - high water marks - Age / maturity of trees - Macrophytes identified 					

Field sheet revised Sept. 2002

Quantitative Habitat Assessment

Site: _____ Page 4

Scorer: _____

Date: _____

L e g e n d	Riparian zone (L)		Bank (True Left)	Aquatic Substrate			Bank (True Right)	Riparian zone (R)	
	5-20m	0-5m		Inorganic				0-5m	5-20m
	Canopy		Stability	Organic			Stability	Canopy	
	Understory		Bank Type	Wetted width (m)	Max depth	Flow type	Bank Type	Understory	
0									
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

REACH INVENTORY AND CHANNEL STABILITY EVALUATION FORM

Date:

Observer:

Contourancy:

River:

Reach location:

Length represented by reach:

UPPER BANKS	EXCELLENT	GOOD	FAIR	POOR
Landform slope	bank gradient <30° on both banks	bank gradient 30-35° on 1 or sometimes both banks	bank gradient >35° -50° common on 1 or both banks	bank gradient ≥ 50° common on 1 or both banks
Mass wasting (existing or potential)	no evidence of past or any potential for future mass wasting into channel	infrequent &/or very small. Mostly healed over. Low future potential	moderate frequency and size, with some raw spots eroded by water during high flow	frequent or large, causing sediment nearly year-long or imminent danger of this
Debris jam potential (floatable object)	essentially absent from immediate channel area	present but mostly small twigs and limbs	present, volume and size both increasing	moderate to heavy amounts, predominantly larger sized
Vegetative bank protection	>90% plant density. Vigor & variety suggest a deep, dense, soil-binding root mass	70-90% density. Fewer plant species or lower vigor suggests a less dense or deep root mass	50-70% density. Lower vigor and still fewer species form a somewhat shallow and discontinuous root mass	<50% density plus fewer species and less vigor indicate poor, discontinuous and shallow root mass
Sub-total				
LOWER BANKS	EXCELLENT	GOOD	FAIR	POOR
Channel capacity	ample for present & some increases. Peak flows contained. Width to depth ratio <7	adequate. Overbank flows rare. Width to depth ratio 8-15	barely contains present peaks. Occasional over-bank floods. Width to depth ratio 15-25	inadequate. Over-bank flows common. Width to depth ratio >25
Bank rock content	>65% rocks with large angular boulders >30 cm numerous	40-65% rock, mostly small boulders to cobbles 15 to 30 cm	20-40%, with most in the 8 to 15 cm diameter class, although larger ones may be present	<20% rock fragments of gravel sizes, 2.5 to 8 cm or less
Obstructions/flow deflections/sediment traps	rocks & old logs firmly embedded. Flow pattern without cutting or deposition. Pools and riffles stable	some present causing erosive cross currents & minor pool filling. Obstructions and deflections newer and less firm	moderately frequent, moderately unstable obstructions & deflections move with high water causing bank cutting and filling in of pools	frequent obstructions & deflections cause bank erosion year-long. Sediment traps full, channel migration occurring
Cutting	little or none evident. Infrequent raw banks less than 15 cm high generally	some, intermittently at outer edges and constrictions. Raw banks may be up to 30 cm high	significant. Cuts 30-60 cm high. Root mat overhangs and sloughing evident	almost continuous cuts, some over 60 cm high. Failure of overhangs frequent

Deposition	little or no enlargement of channel or point bars	4	some new increase in bar formation, mostly from coarse gravels	8	moderate deposition of new gravel & coarse sand on old and some new bars	12	extensive deposits of predominantly fine particles. Accelerated bar development	16
Sub-total								
BOTTOM	EXCELLENT		GOOD		FAIR		POOR	
Rock angularity	sharp edges & corners, plane surfaces roughened	1	rounded corners & edges, surfaces smooth & flat	2	corners & edges well rounded in 2 dimensions	3	well rounded in all dimensions, surfaces smooth	4
Brightness	surface dull, darkened or stained by algae or minerals. Bright surfaces <5% of area	1	mostly dull, but may have up to 35% bright surfaces, some on larger rocks	2	mixture, 50-50% dull & bright, ±15% (i.e. 35-65%)	3	predominantly bright, >65% exposed or scoured surfaces	4
Consolidation or particle packing of substrate	assorted sizes tightly packed &/or overlapping	2	moderately packed with some overlapping	4	mostly a loose assortment with no apparent overlap	6	no packing evident, loose assortment, easily moved	8
% stable materials	Stable materials 80-100%	4	Stable materials 50-80%	8	Stable materials 20-50%	12	Stable materials 0-20%	16
Scouring & deposition	<5% of the channel length affected by scouring & deposition	6	5-30% affected. Scour at constrictions & where grade steepens. Some deposition in pools & backwaters	12	30-50% affected. Deposition & scour at obstructions, constrictions & bends. Some filling of pools	18	>50% of the bottom in a state of flux or change nearly year-long	24
Clinging aquatic vegetation (mosses & algae)	abundant. Growth largely moss-like, dark green, year-round. In swift water too	1	common. Algal forms in low velocity and pool areas. Moss here too and swifter waters	2	present but spotty, mostly in backwater areas. Seasonal blooms make rocks slick	3	perennial types scarce or absent. Yellow-green, short term bloom may be present	4
Sub-total								

TOTAL STABILITY SCORE = _____
(sum of sub-totals)

% Substrate Composition: Bedrock = _____ Boulders (>26 cm diameter) = _____
Large cobbles (13-26 cm) = _____ Small cobbles (6-12 cm) = _____
Gravel (0.2-6 cm) = _____ Sand (<0.2 cm) = _____
Silt = _____

% Riparian Vegetation Composition: Tree left bank Tree right bank Average
Native forest _____
Exotic woodland _____
Scrub _____
Croppasture _____
Tussock _____

Quantitative Habitat Assessment

Scorer: _____

Site: _____

Date: _____

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Aquatic Habitat Abundance	> 50% of channel favourable for epifaunal colonisation and fish cover; includes woody debris, undercut banks, root mats, rooted aquatic vegetation, cobble or other stable habitat. Also includes macrophyte dominated streams.	30-50% of channel contains stable habitat.	10-30% of channel contains stable habitat.	< 10% of channel contains stable habitat. <i>Note: Algae does not constitute stable habitat.</i>
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Aquatic Habitat Diversity	Wide variety of stable 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.	Stable 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
3. 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
4. Channel Alteration	Natural channel and meander pattern; no evidence of historic channel alteration e.g. dredging, channelisation stabilisation, or other human activity.	Natural channel. Minimal channel alteration. Channel shape and form may be influenced by recent sediment deposition.	Channelised. Channel form and shape unconstrained. Channel made of natural materials.	Channelised. Channel form and shape constrained by man-made materials (e.g. culverts, gabions, concrete).
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Bank Stability (water level to bank full channel)	Stable: <5% bank effected; evidence of erosion or bank failure absent; minimal potential for future problems.	Moderately stable: 5-30% affected; areas of erosion mostly healed over; some potential for future problems.	Moderately unstable: 30-60% affected; high erosion potential during floods.	Unstable: 60-100% affected; eroded areas along runs and bends; bank sloughing and erosion scars common.
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
6. 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
7. Riparian Vegetation Integrity (within 20 meters)	No direct human activity in the last 30 years; mature native tree canopy and intact native understory	Minimal human activity; mature native tree canopy or native scrub; understory shows some impact (e.g. woods, feral animal grazing).	Extensive human activity affecting canopy and understory; trees exotic (pine, willow, poplar); understory 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, carparks).
Left bank	10 9	8 7 6	5 4 3	2 1 0
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Field sheet revised Sept. 2002

Key for field measurements

Aquatic Substrate

Code	Inorganic	Size class
BR	Bedrock	
BO	Boulder	>256mm
CO	Cobble	64-256mm
GR	Gravel	2-64mm
SS	Silt/sand/soft clay	2-0.004mm
HC	Hard packed clay	
MM	Artificial / man-made	

Code	Organic
D	Detritus (including twigs & leaves)
B	Bryophytes
M	Macrophytes
A	Algae (filaments, mats & diatoms)
W	Woody debris (>2.5cm diameter)
R	Tree roots
N	None

Bank Type

Code	Type
E	Earth
R	Rock
MX	Mixed earth & rock
MM	Man-made (concrete, gabions, timber)

Bank Stability

Code	Bank stability
S	Stable
U	Unstable

Flow Type

Code	Type
P	Pool (no detectable flow)
R	Riffle (turbulent flow)
RN	Run (laminar flow)
CW	Chute / waterfall

Riparian Zone

Code	Name	Dominant Canopy Vegetation
MN	Mature Native	Mature native trees (>30 years old).
YN	Young Native	Young native trees (<30 years old).
ET	Exotic Treeland	Exotic trees; commonly willow or poplar.
EP	Exotic Plantation	Plantation forest, principally pine.
N	None	No canopy.

Code	Dominant Understory Vegetation
DN	Dense Native
TN	Thin Native
DE	Dense Exotic
TE	Thin Exotic
N	None

Dense vegetation – difficult to walk through.

Thin vegetation – easy to walk through.

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