

Example of a completed field data sheet

AUSRIVAS Physical Assessment Protocol Field Data Sheets

Page 1 Site No. 003 Date 31/1/01

Date 31/1/01 Site No. 003 Time 9:10am Recorder's Name Melissa (+ Ben/Isobel)

River Name Murrumbidgee Location Uriarra Crossing

Weather Overcast Rain in last week? Y [✓] N []

Photograph numbers and details FILM #3
 Shot 19 Cross-section 1
 Shot 20 Cross-section 2
 Shot 21 Cross-section 3
 Shot 22 General site view

Latitude: 35° 14' 42" Longitude: 148° 56' 40"
 GPS Name and Datum Garmin II plus Datum = WGS84

PLANFORM SKETCH OF SITE
 Including bedform types, location of cross-sections, access points, landmarks and natural or artificial channel or floodplain features. Left bank is facing downstream.

LENGTH OF SAMPLING SITE
 Bankfull width 80 (m)
 x 10
 Length of sampling site 800 (m)

Notes
 Access to site easy - via Uriarra Road to picnic area.
 Access along bank easy on right bank. Assessment made from this side.

BEFORE LEAVING THE SITE, CHECK DATA SHEETS TO ENSURE THAT ALL VARIABLES HAVE BEEN RECORDED

Y

Acknowledgments - The content and layout of these data sheets are derived from the River Habitat Audit Procedure (Anderson, 1993a), AUSRIVAS, the Index of Stream Condition (Ladson and White, 1999 and DNRE Victoria) and the River Habitat Survey (Flaven et al., 1998).

Example of a completed field data sheet (cont.)

BASIC WATER CHEMISTRY		Units
Temperature	17.96	°C
Conductivity	145.8	µs/cm
Dissolved Oxygen	11.08	mg l ⁻¹
Dissolved Oxygen Sat.	115.5	%
pH	8.42	
Turbidity	3.2	FNU
Total phosphorus		
Total nitrogen		
ALKALINITY		
Amount of water	100	ml
Amount of H ₂ SO ₄	10.7	ml
Alkalinity	107	mg l ⁻¹

Valley shape	Choose one category only
	<input checked="" type="checkbox"/> Steep valley
	<input type="checkbox"/> Shallow valley
	<input type="checkbox"/> Broad valley
	<input type="checkbox"/> Gorge
	<input type="checkbox"/> Symmetrical floodplain
	<input type="checkbox"/> Asymmetrical floodplain

- Local impacts on streams**
Choose one or more categories and describe the detail of each
- Sand or gravel mining
 - Other mining
 - Road
 - Bridge / culvert / wharf
 - Ford / ramp
 - Discharge pipe
 - Forestry activities
 - Sugar mill
 - Irrigation run-off or pipe outlet
 - Sewage effluent
 - Channel straightening
 - River improvement works
 - Water extraction
 - Dredging
 - Grazing
 - Litter
 - Recreation
 - Other

Description Other = small offtake pipe for toilets
Grazing = some present slightly upstream
Bridge = Victorian Crossing concrete bridge
Slightly downstream

Local landuse
Choose one category for each bank

- | | |
|-------------------------------------|--------------------------------------------------------------------|
| Left | Right |
| <input type="checkbox"/> | <input type="checkbox"/> Native forest |
| <input type="checkbox"/> | <input type="checkbox"/> Native grassland (not grazed) |
| <input type="checkbox"/> | <input type="checkbox"/> Grazing (native or non-native pasture) |
| <input type="checkbox"/> | <input type="checkbox"/> Exotic grassland (lawns etc., no grazing) |
| <input type="checkbox"/> | <input type="checkbox"/> Forestry Native [] [] Pine [] [] |
| <input type="checkbox"/> | <input type="checkbox"/> Cropped Rainfed [] [] Irrigated [] [] |
| <input type="checkbox"/> | <input type="checkbox"/> Urban residential |
| <input type="checkbox"/> | <input type="checkbox"/> Commercial |
| <input type="checkbox"/> | <input type="checkbox"/> Industrial or intensive agricultural |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> Recreation |
| <input type="checkbox"/> | <input type="checkbox"/> Other |

Average 0 (m)

Floodplain width

Floodplain features

- Choose one or more features when present
- Sampling site has no distinct floodplain
 - Oxbows / billabongs
Body of water occupying a former river meander, isolated by a shift in the stream channel
 - Remnant channels
Formed during a previous hydrological regime. May be infilled with sediment
 - Flood channels
A channel that distributes water onto the floodplain and off the floodplain during floods
 - Scroll systems
Short, crescentic strips or patches formed along the inner bank of a stream meander
 - Splays
Small alluvial fan formed where an overloaded stream breaks through a levee and deposits material on the floodplain
 - Floodplain scours
Scour holes formed by the concentrated clearing and digging action of flowing water
 - No floodplain features present
Floodplain present at the sampling site but does not contain any of the above features

Example of a completed field data sheet (cont.)

Riparian zone composition

Assess for whole sampling site

	% Cover	Vegetation Description
Trees (>10m in height)	70	Casuarinas
Trees (<10m in height)	5	Casuarinas + some willows
Shrubs	10	Tea tree
Grasses / ferns / sedges	20	Non-native grasses in picnic area

Shading of channel

< 5% 6 - 25% 26 - 50% 51 - 75% > 76%

Extent of trailing bank vegetation

nil moderate extensive

Native and exotic riparian vegetation

% Native 90 } Total 100%
 % Exotic 10 }

Overall vegetation disturbance rating

Choose one category only. Sites with valley vegetation cleared on BOTH sides, but with riparian vegetation in good condition should be scored in the high disturbance category. Words within the drawings summarise the detailed text about the state of the riparian and valley vegetation for each category.

Extreme disturbance



Very high disturbance



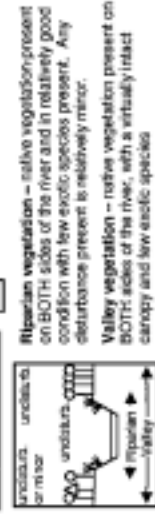
High disturbance



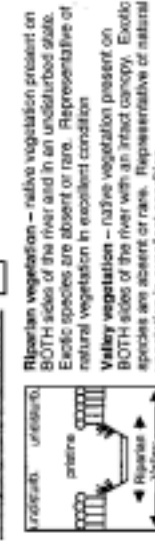
Moderate disturbance



Low disturbance



Very low disturbance



Longitudinal extent of riparian vegetation








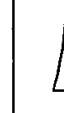


Choose one category for each bank. Do not include ground layer except where site is in native grassland.

	Left bank	Right bank
None	<input type="checkbox"/>	<input type="checkbox"/>
Isolated / scattered	<input type="checkbox"/>	<input type="checkbox"/>
Regularly spaced	<input type="checkbox"/>	<input type="checkbox"/>
Occasional clumps	<input type="checkbox"/>	<input type="checkbox"/>
Semi-continuous	<input type="checkbox"/>	<input type="checkbox"/>
Continuous	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Regeneration of native woody vegetation is the sampling site in undisturbed forest?

Y [] N []
 If no, record regeneration category
 Abundant (>5% cover) and healthy Present
 Very limited (<1% cover)

Example of a completed field data sheet (cont.)

Bank shape		Bank slope	
Choose one category for each bank		Choose one category for each bank	
Left bank	Right bank	Left bank	Right bank
	<input checked="" type="checkbox"/>		<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		<input type="checkbox"/>
	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>		
	<input type="checkbox"/>		
<input type="checkbox"/>	<input type="checkbox"/>		

Factors affecting bank stability
 Choose one or more categories

None Cleared vegetation Mining Irrigation Runoff Stock access Reservoir releases Human access Ford, culvert or bridge Feral animals Other

Artificial bank protection measures
 Choose one or more categories

None Fence structures Levee banks Rock or wall layer Rip rap Fenced human access Other

Fenced stock watering points Vegetation plantings Logs strapped to bank Concrete channel lining

Bedrock outcrops
 Assess % of each bank covered by bedrock outcrops

% bedrock outcrops Left bank 95 Right Bank 15

Sediment oils
 absent light moderate profuse

Water oils
 none flecks globs sheen slick
backwaters only, could be sunscreen derived

Sediment odours
 normal/none sewage petroleum chemical anaerobic other

Water odours
 normal/none sewage petroleum chemical other

Turbidity (visual assessment)
 Clear Slight Turbid Opaque

Is water clarity reduced by:
 Suspended material (e.g. mud, clay, organics) Dissolved material (e.g. plant leachates)

Water level at the time of sampling
 Dry No flow Low Baseflow or near baseflow High Flood (don't sample)

Artificial features at the sampling site
 Choose one or more categories

Major weir Minor weir Ford Bridge Culvert Other









Description Minor weir = rock ledges built by people swimming. Bridge = Unierra Crossing slightly downstream.

Large woody debris
 Overall % cover of logs and branches greater than 10cm in diameter 3 %
 Notes on visibility LWD present only along edges. None present in main channel.

Example of a completed field data sheet (cont.)

Extent of bedform features

Total % composition for all features must equal 100%.

 Height > 1m Gradient > 60°	<input type="text" value="0"/> % of site Est. Av. Length (m) Est. Av. Height (m) Est. Av. Gradient (°)
 Step Height < 1m Gradient 5-60° Strong currents	<input type="text" value="0"/> % of site Est. Av. Length (m) Est. Av. Height (m) Est. Av. Gradient (°)
 Gradient 3-5° Strong currents Rocks break surface	<input type="text" value="10"/> % of site Est. Av. Length (m) Est. Av. Depth (m) Est. Av. Width (m)
 Gradient 1-3° Moderate currents Surface unbroken but unsmooth	<input type="text" value="5"/> % of site Est. Av. Length (m) Est. Av. Depth (m) Est. Av. Width (m)
 Gradient 1-3° Small currents Surface unbroken and smooth	<input type="text" value="5"/> % of site Est. Av. Length (m) Est. Av. Depth (m) Est. Av. Width (m)
 Gradient 1-3° Small but distinct & uniform current Surface unbroken	<input type="text" value="85"/> % of site Est. Av. Length (m) Est. Av. Depth (m) Est. Av. Width (m)
 Area where stream widens or deepens and current declines	<input type="text" value="75"/> % of site Est. Av. Length (m) Est. Av. Depth (m) Est. Av. Width (m)
 A reasonable sized (>20% of channel width) cut-off section away from the channel	<input type="text" value="0"/> % of site Est. Av. Length (m) Est. Av. Depth (m) Est. Av. Width (m)

Macrophyte cover Assess % cover of the sampling site by each category.

Overall % cover of macrophytes % cover of emergent macrophytes % cover of floating macrophytes % cover of submerged macrophytes

Total should equal overall % cover of macrophytes

Macrophyte composition

Use a macrophyte field guide (i.e. Sainity and Jacobs, 1994) to aid identification. Listed macrophytes can be changed to reflect the common taxa present in each State or Territory. N denotes a native taxa and I denotes an introduced taxa.

Emergent macrophytes

	Present	% cover
Brachiaria (Para Grass) I	<input type="checkbox"/>	
Crassula (Crassula) N	<input type="checkbox"/>	
Cyperus (Sedge) IN	<input type="checkbox"/>	
Eleocharis (Spikerush) N	<input type="checkbox"/>	
Juncus (Rush) IN	<input type="checkbox"/>	
Paspalum (Water Couch) N	<input type="checkbox"/>	
Phragmites (Common Reed) N	<input type="checkbox"/>	
Ranunculus (Buttercup) I	<input type="checkbox"/>	
Scirpus (Clubmush) N	<input type="checkbox"/>	
Triglochin (Water Ribbon) N	<input type="checkbox"/>	
Typha (Cumbung) N	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	

Submerged macrophytes

	Present	% cover
Ceratophyllum (Hornwort) N	<input type="checkbox"/>	
Chara (Stonewort) N	<input type="checkbox"/>	
Elodea (Canadian Pondweed) I	<input type="checkbox"/>	
Myriophyllum (Water Milfoil) IN	<input type="checkbox"/>	
Najas (Stonewort) N	<input type="checkbox"/>	
Potamogeton (Pondweed) N	<input type="checkbox"/>	
Triglochin (Water Ribbon) N	<input type="checkbox"/>	
Vallisneria (Ribbonweed) N	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	

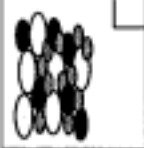


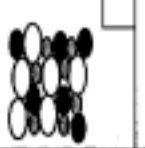
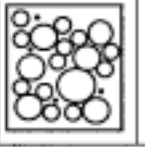

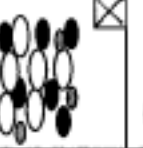
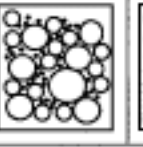

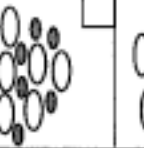
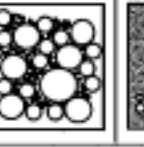

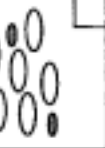



Floating macrophytes

	Present	% cover
Azolla (Azolla) N	<input type="checkbox"/>	
Callitriche (Starwort) I	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	
Other	<input type="checkbox"/>	

Overall % cover of native macrophyte taxa % cover of emergent macrophytes from above
 Overall % cover of native macrophyte taxa % cover of floating macrophytes from above
 Overall % cover of native macrophyte taxa % cover of submerged macrophytes from above

Note: An additional response variable (channel pattern) is measured in the office

Example of a completed field data sheet (cont.)

<p>Bed compaction Choose one category only</p>		<p>Sediment matrix Choose one category only</p>		<p>Sediment angularity Choose one category only Assess cobble, pebble and gravel fractions only</p>	
	Tightly packed, armoured Array of sediment sizes, overlapping, tightly packed and very hard to dislodge		Bedrock		Very angular
	Packed, unarmoured Array of sediment sizes, overlapping, lightly packed but can be dislodged with moderate effort		Open framework 0-5% fine sediment, high availability of interstitial spaces		Angular
	Moderate compaction Array of sediment sizes, little overlapping, some packing but can be dislodged with moderate effort		Matrix filled contact framework 5-32% fine sediment, moderate availability of interstitial spaces		Sub-angular
	Low compaction (1) Limited range of sediment sizes, little overlapping, some packing and structure but can be dislodged very easily		Framework dilated 32-60% fine sediment, low availability of interstitial spaces		Rounded
	Low compaction (2) Loose array of fine sediments, no overlapping, no packing and structure and can be dislodged very easily		Matrix dominated >60% fine sediment, interstitial spaces virtually absent		Well rounded
					Cobble, pebble and gravel fractions not present

In the USEPA Habitat Assessment on the following pages, be sure to use the correct form for high or low gradient streams

Bed stability rating Choose one category only

<p>← Unstable - eroding</p>	<p>Stable</p>	<p>→ Unstable - depositing</p>
<p>Severe erosion Streambed scoured of fine sediments. Signs of channel deepening. Bare, severely eroded banks. Erosion heads. Sleep streambed caused by erosion.</p>	<p>Moderate erosion Little fine sediment present. Signs of channel deepening. Eroded banks. Streambed deep and narrow. Sleep streambed comprised of unconsolidated (loosely arranged and unpacked) material</p>	<p>Bed stable A range of sediment sizes present in the streambed. Channel is in a 'relatively natural' state (not deepened or infilled). Bed and bar sediments are roughly the same size. Banks stable. Streambed comprised of consolidated (tightly arranged and packed) material.</p>
		<p>Moderate deposition Moderate build-up of fine sediments at constrictions and bars. Streambed flat and uniform. Channel wide and shallow.</p>
		<p>Severe deposition Extensive build up of fine sediments to form a flat bed. Channel blocked, but wide and shallow. Bars large and covering most of the bed or banks. Streambed comprised of unconsolidated (loosely arranged and unpacked) material.</p>

Example of a completed field data sheet (cont.)

AUSRIVAS Physical and Chemical Assessment Protocol Field Data Sheets Page 8
 Site No. 003 Date 31/1/01

USEPA Habitat Assessment
 Circle a score for each parameter

HIGH GRADIENT STREAMS

Page 1 of 2

Habitat parameter	Condition category																				
	Excellent					Good					Fair					Poor					
1. Epifaunal substrate / available cover	Greater than 70% of substrate favourable for epifaunal colonisation and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonisation potential (i.e. logs/snags that are not new fall and not transient).					40-70% mix of stable habitat; well-suited for full colonisation potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonisation (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble and boulder particles are more than 75% surrounded by fine sediment.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity / depth regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). Slow is <0.3m/s, deep is >0.5m).					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity/depth regime (usually slow-deep).					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions and bends; moderate deposition in pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel flow status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e. dredging (greater than 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Continued over

Example of a completed field data sheet (cont.)

AUSRIVAS Physical and Chemical Assessment Protocol Field Data Sheets Page 9
 Site No. 003 Date 31/1/01

USEPA Habitat Assessment
 Circle a score for each parameter

HIGH GRADIENT STREAMS

Page 2 of 2

Habitat parameter	Condition category																				
	Excellent			Good			Fair			Poor											
7. Frequency of riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.			Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.			Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.			Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.											
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.			Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.			Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.			Unstable; many eroded areas; 'raw' areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.											
SCORE	Left bank		10	9	8	7	6	5	4	3	2	1	0								
SCORE	Right bank		10	9	8	7	6	5	4	3	2	1	0								
9. Vegetative protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understorey shrubs, or non woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.			70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.			50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.			Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimetres or less in average stubble height.											
SCORE	Left bank		10	9	8	7	6	5	4	3	2	1	0								
SCORE	Right bank		10	9	8	7	6	5	4	3	2	1	0								
10. Riparian zone score (score each bank)	Width of riparian zone >18 metres; human activities (i.e. roads, lawns, crops etc.) have not impacted the riparian zone.			Width of riparian zone 12-18 metres; human activities have impacted the riparian zone only minimally.			Width of riparian zone 6-12 metres; human activities have impacted the riparian zone a great deal.			Width of riparian zone <6 metres; little or no riparian vegetation is present because of human activities.											
SCORE	Left bank		10	9	8	7	6	5	4	3	2	1	0								
SCORE	Right bank		10	9	8	7	6	5	4	3	2	1	0								

TOTAL HIGH GRADIENT HABITAT SCORE

145

Example of a completed field data sheet (cont.)

AUSRIVAS Physical and Chemical Assessment Protocol Field Data Sheets Page 10
 Site No. _____ Date _____

USEPA Habitat Assessment
 Circle a score for each parameter

LOW GRADIENT STREAMS

Page 1 of 2

Habitat parameter	Condition category																				
	Excellent					Good					Fair					Poor					
1. Epifaunal substrate / available cover	Greater than 50% of substrate favourable for epifaunal colonisation and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonisation potential (i.e. logs/snags that are not new fall and not transient).					30-50% mix of stable habitat; well-suited for full colonisation potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonisation (may rate at high end of scale).					10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Pool substrate characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.					Mixture of soft sand, mud or clay; mud may be dominant; some root mats and submerged vegetation present.					All mud or clay or sand bottom; little or no root mat; no submerged vegetation.					Hard-pan clay or bedrock; no root mat or vegetation.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Pool variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.					Majority of pools large-deep; very few shallow.					Shallow pools much more prevalent than deep pools.					Majority of pools small-shallow or pools absent.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment deposition	Little or no enlargement of islands or point bars and less than 20% of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions and bends; moderate deposition in pools prevalent.					Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel flow status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e. dredging (greater than 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.					
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Continued over

Example of a completed field data sheet (cont.)

LOW GRADIENT STREAMS

Habitat parameter	Condition category																						
	Excellent					Good					Fair					Poor							
7. Channel sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note – channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas).					The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.					The bends in the stream increase the stream 1 to 2 times longer than if it was in a straight line.					Channel straight; waterway has been channelized for a long distance.							
SCORE	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
8. Bank stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded trees; 'raw' areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.							
SCORE	Left bank		10	9	8	7	6	5	4	3	Right bank		10	9	8	7	6	5	4	3	2	1	0
SCORE	Left bank		10	9	8	7	6	5	4	3	Right bank		10	9	8	7	6	5	4	3	2	1	0
9. Vegetative protection (score each bank)	More than 80% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or non woody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-88% of the streambank surface covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimetres or less in average stubble height.							
SCORE	Left bank		10	9	8	7	6	5	4	3	Right bank		10	9	8	7	6	5	4	3	2	1	0
SCORE	Left bank		10	9	8	7	6	5	4	3	Right bank		10	9	8	7	6	5	4	3	2	1	0
10. Riparian zone score (score each bank)	Width of riparian zone >18 metres; human activities (i.e. roads, lawns, crops etc.) have not impacted the riparian zone.					Width of riparian zone 12-18 metres; human activities have impacted the riparian zone only minimally.					Width of riparian zone 6-12 metres; human activities have impacted the riparian zone a great deal.					Width of riparian zone <6 metres; little or no riparian vegetation is present because of human activities.							
SCORE	Left bank		10	9	8	7	6	5	4	3	Right bank		10	9	8	7	6	5	4	3	2	1	0
SCORE	Left bank		10	9	8	7	6	5	4	3	Right bank		10	9	8	7	6	5	4	3	2	1	0

TOTAL LOW GRADIENT HABITAT SCORE

Channel cross-sections and variables to be measured in the area around a cross section
 Detailed instructions on the measurement of channel cross-sections are provided in the protocol manual. Be familiar with these before proceeding.
 Two cross-sections are required at homogeneous sampling sites (generally lowland streams) and three cross-sections at heterogeneous sampling sites (generally upland streams).
 Where the water level at the time of sampling is at or near the water mark level, stream width at the water surface will be equal to stream width at the water mark. In this case, vertical distance between the water surface and the water mark should be entered as 0.

Cross-section number 1 of 3

Type of bedform at the cross-section

Riffle Run Pool Cascade Other _____

Bankfull channel width (m)
(=total of boxes A+B+C) 62.4

Stream width at the water mark (m) 40.6

Stream width at the water surface (m) 40.6

The channel sketch should show in cross-section the shape of the channel and include the location of the water surface, watermark and bankfull points. Also show other features such as bars, rocky outcrops and snags encountered at the cross section.

Horizontal distances (m)	Vertical water depths (cm)
0.3 2.9 4.2 8 11 12.5 15 17 19.6 22.4 25 27.4 29.7 31.8 32.8	10 40 30 20 80 100 100 100 100 100 100 100 100 100 100

Bank height (m) 1.3

Bank width (m) 10.0

Vertical distance between the water surface and the water mark (m) 0

Bank height (m) 1.2

Bank width (m) 11.8

Vertical distance between the water surface and the water mark (m) 0

Riparian zone width
 Left bank 8 (m) Right bank 15 (m)

Bank material Assess % composition for each bank

	Left bank	Right bank	
Bedrock	<u>45</u>	<u>20</u>	
Boulder (>256mm)	<u>0</u>	<u>0</u>	
Cobble (64-256mm)	<u>0</u>	<u>0</u>	
Pebble (16-64mm)	<u>0</u>	<u>0</u>	
Gravel (2-16mm)	<u>10</u>	<u>20</u>	
Sand (0.06-2mm)	<u>30</u>	<u>60</u>	
Fines (silt and clay, <0.06mm)	<u>25</u>	<u>0</u>	Total 100% each

Notes on cross-section measurement

Access in the area 5m either side of the cross section

Filamentous algae cover
 <10% 10-35% 35-65% 65-90% >90%

Periphyton cover
 <10% 10-35% 35-65% 65-90% >90%

Moss cover
 <10% 10-35% 35-65% 65-90% >90%

Detritus cover
 <10% 10-35% 35-65% 65-90% >90%

Substrate composition
 Assess % composition in the area of bed 5m either side of the cross-section.

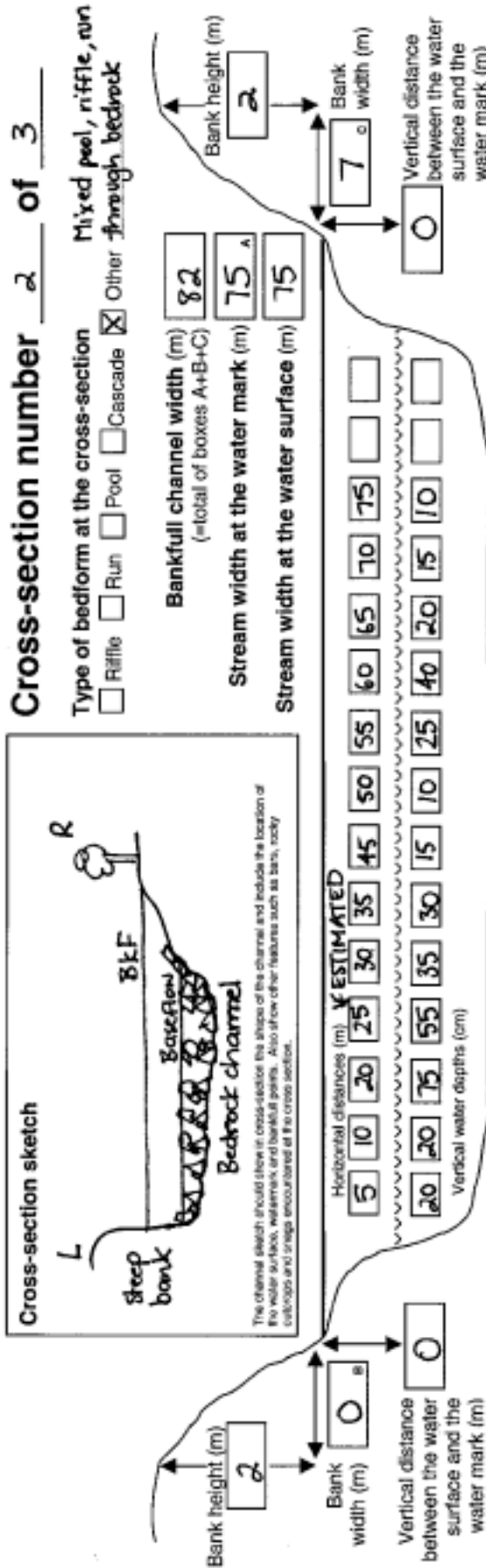
	Left bank	Right bank	
Bedrock	<u>40</u>	<u>5</u>	Total 100%
Boulder (>256mm)	<u>5</u>	<u>5</u>	
Cobble (64-256mm)	<u>0</u>	<u>0</u>	
Pebble (16-64mm)	<u>0</u>	<u>0</u>	
Gravel (2-16mm)	<u>45</u>	<u>10</u>	
Sand (0.06-2mm)	<u>10</u>	<u>10</u>	

Fines (silt and clay <0.06mm)

Example of a completed field data sheet (cont.)

Channel cross-sections and variables to be measured in the area around a cross section

Detailed instructions on the measurement of channel cross-sections are provided in the protocol manual. Be familiar with these before proceeding. Two cross-sections are required at homogeneous sampling sites (generally lowland streams) and three cross-sections at heterogeneous sampling sites (generally upland streams). Where the water level at the time of sampling is at or near the water mark level, stream width at the water surface will be equal to stream width at the water mark. In this case, vertical distance between the water surface and the water mark should be entered as 0.



Cross-section number 2 of 3

Type of bedform at the cross-section **Mixed pool, riffle, run**
 Riffle Run Pool Cascade Other **through bedrock**

Bankfull channel width (m) 82
 (=total of boxes A+B+C)
 Stream width at the water mark (m) 75
 Stream width at the water surface (m) 75

Horizontal distances (m)	ESTIMATED
5	10
10	20
20	25
25	30
30	35
35	45
45	50
50	55
55	60
60	65
65	70
70	75
75	80
80	85
85	90
90	95
95	100

Notes on cross-section measurement
 * Access difficult across stream because of bedrock + flow combination. Widths were estimated and depths taken using a weighted + marked rope.

Riparian zone width
 Left bank 10 (m) Right bank 25 (m)

Bank material Assess % composition for each bank

	Left bank	Right bank
Bedrock	85	80
Boulder (>256mm)	0	0
Cobble (64-256mm)	0	0
Pebble (16-64mm)	0	0
Gravel (2-16mm)	5	15
Sand (0.06-2mm)	10	5
Fines (silt and clay, <0.06mm)		
Total 100%	100	100

Substrate composition Assess % composition in the area of bed 5m either side of the cross-section.

	Left bank	Right bank
Bedrock	75	5
Boulder (>256mm)	5	5
Cobble (64-256mm)	5	5
Pebble (16-64mm)	5	5
Gravel (2-16mm)	0	0
Sand (0.06-2mm)	0	5
Fines (silt and clay, <0.06mm)		
Total 100%	100	100

Assess in the area 5m either side of the cross section

Filamentous algae cover <10% 10-35% 35-65% 65-90% >90%

Periphyton cover <10% 10-35% 35-65% 65-90% >90%

Moss cover <10% 10-35% 35-65% 65-90% >90%

Detritus cover <10% 10-35% 35-65% 65-90% >90%

Example of a completed field data sheet (cont.)

Channel cross-sections and variables to be measured in the area around a cross section

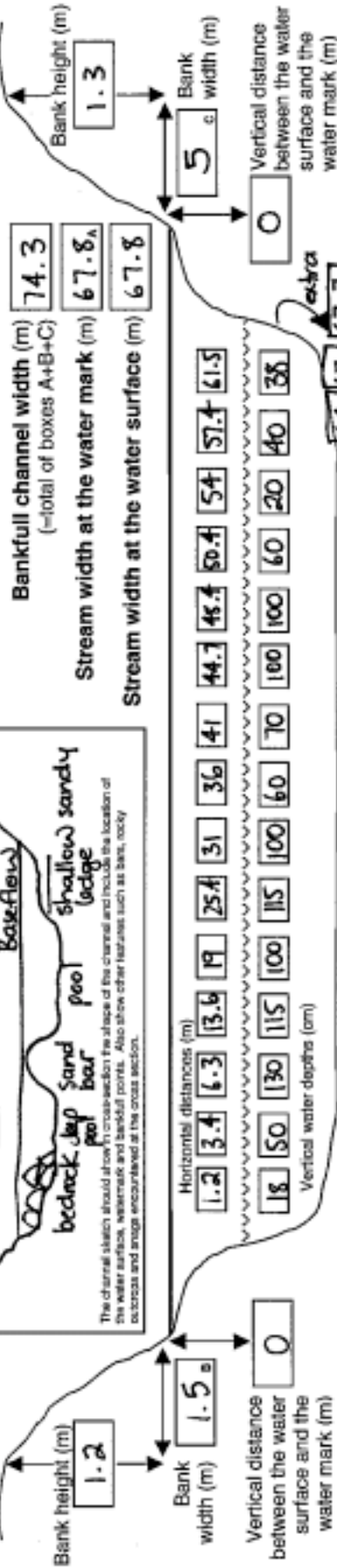
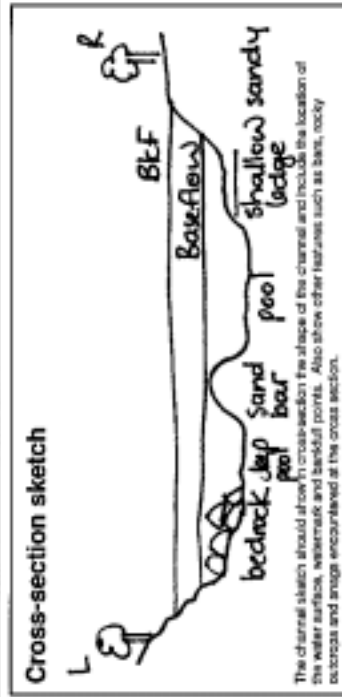
Detailed instructions on the measurement of channel cross-sections are provided in the protocol manual. Be familiar with these before proceeding.

Two cross-sections are required at homogeneous sampling sites (generally lowland streams) and three cross-sections at heterogeneous sampling sites (generally upland streams). Where the water level at the time of sampling is at or near the water mark level, stream width at the water surface will be equal to stream width at the water mark. In this case, vertical distance between the water surface and the water mark should be entered as 0.

Cross-section number 3 of 3

Type of bedform at the cross-section

- Riffle Run Pool Cascade Other



Notes on cross-section measurement

Riparian zone width
Left bank 5 (m) Right bank 20 (m)

Bank material Assess % composition for each bank

	Left bank	Right bank
Bedrock	<u>10</u>	<u>30</u>
Boulder (>256mm)	<u>10</u>	<u>0</u>
Cobble (64-256mm)	<u>0</u>	<u>0</u>
Pebble (16-64mm)	<u>0</u>	<u>0</u>
Gravel (2-16mm)	<u>0</u>	<u>5</u>
Sand (0.06-2mm)	<u>10</u>	<u>65</u>
Fines (silt and clay, <0.06mm)	<u>10</u>	<u>0</u>
Total 100%	<u>40</u>	<u>100</u>

Substrate composition Assess % composition in the area of bed 5m either side of the cross-section.

Bedrock	<u>15</u>
Boulder (>256mm)	<u>0</u>
Cobble (64-256mm)	<u>5</u>
Pebble (16-64mm)	<u>0</u>
Gravel (2-16mm)	<u>10</u>
Sand (0.06-2mm)	<u>65</u>
Fines (silt and clay <0.06mm)	<u>5</u>
Total 100%	<u>100</u>

Filamentous algae cover Assess in the area 5m either side of the cross section

- <10% 10-35% 35-65% 65-90% >90%

Periphyton cover

- <10% 10-35% 35-65% 65-90% >90%

Moss cover

- <10% 10-35% 35-65% 65-90% >90%

Detritus cover

- <10% 10-35% 35-65% 65-90% >90%