Field Form

This is one of four hard copy field forms for the national framework for community-based monitoring (CBM) of stream health. **Use this form for macroinvertebrate, physical habitat, macrophyte and shade indicators.**

All fields with an asterisk (*) need to be completed for the data to then be entered onto the following ArcGIS Survey123 electronic field form: **CBM (Streams) – B**. The electronic form will complete all necessary calculations.

Stream site visit information

Group name*:

Site name*:

Site visit date*:

Site arrival time*:

Observer*:

Second observer(s):

General conditions

Weather*:
- ☐ Clear
- ☐ Partly Cloudy
- ☐ Overcast
- ☐ Drizzle
- ☐ Rain

Wind*:
- ☐ Calm
- ☐ Light
- ☐ Moderate
- ☐ Strong

Rain in last 24 hours*?
- ☐ Yes
- ☐ No
- ☐ Unsure

Stream conditions

Stream water level*:
- ☐ High
- ☐ Normal (or base flow)
- ☐ Low

Does the water smell?*
- ☐ Yes
- ☐ No

Stream water appearance*:
- ☐ Clear and colourless
- ☐ Slightly murky
- ☐ Turbid
- ☐ Humic-stained
- ☐ Other *(describe below)*

_____

Tick any of the following that you see*:
- ☐ Stock on banks/in water
- ☐ Wildfowl in water
- ☐ Local bank erosion
- ☐ Surface scums/oil
- ☐ Rubbish on banks/in water
- ☐ Periphyton (algae) – some
- ☐ Periphyton (algae) – a lot
- ☐ Macrophytes (aquatic plants) – some
- ☐ Macrophytes (aquatic plants) – a lot
- ☐ Fish

Comments on any observations:

Photograph(s) of waterway

Notes:

Field measurements

Which of the following are you measuring or taking samples of today?*
- ☐ Macroinvertebrates
- ☐ Physical habitat quality
- ☐ Macrophytes (aquatic plants)
- ☐ Shade (canopy closure)

Macroinvertebrates

What method are you using to assess the stream macroinvertebrate community?*

- ☐ SHMAK stone method (riffle habitat, stony bottom) – *go to Box A then complete table next page*
- ☐ Kick net method – riffle (stony bottom, riffle habitat only) – *go to Box B*
- ☐ Kick net method – mixed (all/mixed habitat types, including muddy/sandy bottom) – *go to Box C*
- ☐ Other – give details of your sampling method and streambed habitat type(s) to be sampled (e.g., Surber sampler in run habitat)

_____

Box A: SHMAK stone method

Collect 10 stones from different parts of riffle habitat (where present) and place in a white tray with some stream water.

What type of assessment are you making?*

- ☐ Estimating into categories of rare, common & abundant – *complete Column A of table next page*
- ☐ Counting individual macroinvertebrates – *complete Column B of table on next page*

Names or initials of group members identifying the macroinvertebrate types present*:

Box B: Kicknet method – riffle habitat only

Box C: Kicknet method – all habitat types

Names or initials of group members collecting the macroinvertebrate sample*:

Total number of kicks (subsamples) made?*

_____

Which best describes the reach of streambed you will sample?*

- ☐ Hard stony-bottom (may include gravel, concrete)
- ☐ Soft muddy/sandy-bottom
- ☐ A mixture of stone & mud/sand but stone covers at least 50% of the stream reach
- ☐ A mixture of stone & mud/sand but there is more mud/sand than stone

Enter the number of subsamples (e.g., kicks or net jabs) made in different habitat types sampled*

Riffles		Vegetated banks	
Runs (hard-bottomed)		Roots/large wood	
Runs (soft-bottomed)		Other	
Aquatic plants			

Are you identifying macroinvertebrates live in the field?*

- ☐ Yes – *answer the questions below and complete the table over the page*
- ☐ No (sample will be identified by a professional laboratory – *macroinvertebrate survey ends*
  (Make sure your sample is well preserved and labelled so that it can be identified later.)

What type of assessment are you making?*

- ☐ Estimating into categories of rare, common and abundant (SHMAK qualitative method)
- ☐ Counting individual macroinvertebrates (SHMAK quantitative method)
- ☐ Other (e.g., identifying and counting individual macroinvertebrate taxa) – *describe below*

_____

Names or initials of group members identifying the macroinvertebrate types present*:
Also briefly describe any problems you had with identification of certain macroinvertebrate types.

SHMAK macroinvertebrate abundance (qualitative) and count (quantitative) record

For column A, enter the abundance category for each type of invertebrate you see.
Rare (R) = 1-4 animals, common (C) = 5-19 animals, Abundant (A) = >20 animals
For column B, enter the number of each type of invertebrate you see.

	Type	**COLUMN A** *Abundance: R, C or A*	**COLUMN B** *Number*	**Tolerance score**	**Score**
Mayflies	Flat mayfly			8	
	Spiny-gilled mayfly			9	
	Swimming mayfly			9	
	Tusked mayfly			8	
Stoneflies	Green stonefly			10	
	Other stonefly			8	
Caddisflies	Free-living caddisfly			6	
	Net-spinning caddisfly			6	
	Messy-net caddisfly			8	
	Stick-cased caddisfly			6	
	Stony-cased caddisfly			6	
	Smooth-cased caddisfly			9	
	Spiral-cased caddisfly			10	
	Micro-caddisfly			3	
Other insects	Dobsonfly			7	
	Dragonfly			6	
	Damselfly			5	
	Beetle			6	
	Water boatman/ backswimmer			5	
	Water treader			5	
True Flies	Crane fly			5	
	Sand fly			3	
	Mosquito			3	
	Midge			2	
	Other fly larva			3	
Spider-like	Dolomedes spider			5	
	Mite			5	
Crustaceans	Crayfish/koura			5	
	Amphipod			5	
	Isopod			5	
	Seed shrimp			3	
	Water flea			5	
	Shrimp			5	
Molluscs	Limpet			3	
	Mussel/kakahi			6	
	Fingernail clam			3	
	Flat spiral snail			3	
	Mud snail			4	
	Left-hand snail			3	
Worms	Leech			3	
	Segmented worm			1	
	Flatworm			3	

Rapid Habitat Assessment (RHA)

This is the national rapid assessment of physical stream habitat quality[1] that can be done from the stream bank in 15-20 minutes. Select a length of stream reach to assess (10-20 x the wetted stream width and a minimum of 50 m in length). Score the condition of all 10 stream habitat variables and add the scores to get a total score out of 100.

For the 8-variable SHMAK habitat assessment, use the NIWA SHMAK form.

How many of the monitoring team are assessing stream habitat?*

- □ One
- □ Two
- □ Three or more

What is the approximate wetted channel width?* _____ m
(This is the width of stream currently under water and includes non-flowing water.)

What is the approximate length of stream reach to be assessed?* _____ m

Habitat variable	Condition category										SCORE
Deposited sediment	What percentage of the visible stream bed is covered by fine sediment? (sand, silt and mud <2mm in diameter)										
	0%	5%	10%	15%	20%	30%	40%	50%	60%	≥ 75%	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Invertebrate habitat diversity	Tick all the different types of substrate present in the stream: □ Boulders □ Sand/silt □ Leaves □ Cobbles □ Mud/clay □ Macrophytes (aquatic plants) □ Gravel □ Wood □ Periphyton (algae) □ Root mats □ Other (e.g., artificial) Are there spaces between substrate such as cobbles? Yes* / No Circle the total number of substrate types ticked – if you selected *Yes*, select the asterisked number										
	≥ 5	5*	5	4*	4	3*	3	2*	2	1	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Invertebrate habitat abundance	What percentage of the stream bed is favourable for sensitive stoneflies, mayflies and caddisflies? (e.g., flowing water over gravels and cobbles clear of algae and plants)										
	95+%	75%	70%	60%	50%	40%	30%	25%	15%	5%	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Fish habitat diversity	Tick all the different types of fish-related substrate that are present: □ Woody debris □ Overhanging/encroaching vegetation □ Root mats □ Macrophytes (aquatic plants) □ Boulders □ Undercut banks □ Other (e.g., artificial) □ Cobbles Do the substrate types collectively offer diverse habitat spaces? Yes* / No *Circle the total number of substrate types ticked – if you selected Yes, select the asterisked number*										
	≥ 5	5*	5	4*	4	3*	3	2*	2	1	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Fish habitat abundance	What percentage of fish cover is there?										
	95+%	75%	70%	60%	50%	40%	30%	25%	15%	5%	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	

[1] Clapcott et al. (2011). See pages 71-72 and 106 of the CBM guidance document for more details.

Rapid Habitat Assessment (RHA) *continued…*

Habitat variable	Condition category										SCORE
Flow-related features	Tick and count all the different types of flow-related features that are present: □ Pool □ Rapid □ Backwater □ Riffle □ Cascade/waterfall □ Other □ Run □ Turbulence Are deep pools present? Yes* / No Are there fast and slow runs? Yes* / No *Circle the total number of substrate types ticked – add 1 for each Yes you circle*										
	≥ 5	5	*4	4	*3	3	*2	*2	2	1	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Bank erosion	What percentage of each stream bank shows recent/active erosion? *(TLB = true left bank, when standing looking downstream, TRB = true right bank)*										
TLB	0%	<5%	5%	15%	25%	35%	50%	65%	75%	>75%	
TRB	0%	<5%	5%	15%	25%	35%	50%	65%	75%	>75%	
Score (average)	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Bank vegetation	Identify which of the four categories below best describes how mature, diverse and natural the bank vegetation is (consider both stream banks) – then select a score within that option *(The higher the number, the better the bank vegetation)*										
	Mature native trees with diverse and intact understorey		Regenerating natives or flaxes/ sedges/ tussock dominate over exotic vegetation			Mature shrubs, sparse exotic tree cover, long grass			Heavily grazed or mown grass, bare ground or concrete/ paving, etc.		
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Riparian width	What is the width (m) of the riparian buffer based on vegetation, fence or other structure?										
TLB	>30 m	15 m	10 m	7 m	5 m	4 m	3 m	2 m	1 m	0 m	
TRB	>30 m	15 m	10 m	7 m	5 m	4 m	3 m	2 m	1 m	0 m	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
Riparian shade	What percentage of shading of the stream bed occurs during the day due to the vegetation, banks or other structures (e.g., buildings)?										
	90+%	80%	70%	60%	50%	40%	25%	15%	10%	<5%	
Score	*10*	*9*	*8*	*7*	*6*	*5*	*4*	*3*	*2*	*1*	
									Total stream habitat score (/100)		

Macrophyte abundance

Survey areas should already be defined at ongoing monitoring sites. Aim for run habitat 20 to 50 m in length.

Select which measures of macrophyte abundance you will estimate*

□ Amount of water surface area occupied by macrophytes – *complete shaded "water surface" rows*
□ Amount of water surface area AND percentage of water volume occupied by macrophytes (recommended) – *complete both the "water surface" and "volume occupied" rows of table below)*

How many of the monitoring team are assessing macrophytes?*

□ One
□ Two or more

What is the approximate length of stream reach to be assessed?* _____ m

From where are you making your macrophyte assessment?*

□ Stream bank only *(note this requires very clear water for a good view)*
□ Stream bank and/or by getting into the stream

Aim for 5 cross sections, equally spaced along the length of the stream reach. Starting at the most downstream cross section, estimate at each of 3 to 5 five points across the stream macrophyte abundance as follows:
1)At each point, first picture a square on the water surface 0.5 x 0.5 m wide, or use a quadrat of that size, and estimate the water surface reaching macrophyte cover within it (to the nearest 10%).
2)Picture a column of water under this square going down to the streambed and estimate what percentage (to the nearest 10%) of that vertical column is occupied by macrophytes.
If the stream is too narrow for 5 point observations across each cross section, increase the number of cross sections so that you complete at least 20 point observations in total.

Cross section	Macrophytes	Point 1	Point 2	Point 3	Point 4	Point 5
1	Water surface (%)					
	Volume occupied (%)					
2	Water surface (%)					
	Volume occupied (%)					
3	Water surface (%)					
	Volume occupied (%)					
4	Water surface (%)					
	Volume occupied (%)					
5	Water surface (%)					
	Volume occupied (%)					
6	Water surface (%)					
	Volume occupied (%)					
7	Water surface (%)					
	Volume occupied (%)					
8	Water surface (%)					
	Volume occupied (%)					
9	Water surface (%)					
	Volume occupied (%)					
10	Water surface (%)					
	Volume occupied (%)					

Enter any comments about the macrophytes you can see (*e.g., native vs exotic if known).*

Stream shade (canopy *closure*)

This assessment measures vegetation canopy closure as an indicator of shade. The stream reach to be surveyed should already be defined where monitoring is ongoing. Safe access is needed across entire the stream.

Make your measurements using the 17-point modified spherical densiometer method. (A standard densiometer has 24 squares and can be modified using tape – see the CBM guidance manual).

What type of densiometer are you using?*

□ Type A (convex)
□ Type B (concave)

Are you using a tripod to take your densiometer measurements?*

□ Yes
□ No

What is the approximate length of stream reach you are going to assess?* _____ m

Name or initials of the group member(s) making the measurements*

□ Stream bank only *(note this requires very clear water for a good view)*
□ Stream bank and/or by getting into the stream

Canopy closure – first measurement set*

Lay out a series of evenly placed cross sections along the stream reach.

Aim for 3-5 cross sections at a minimum (more are needed if the overlying canopy cover is not uniform).

At each cross section, take one measurement facing the left bank, four from the centre of the stream (facing upstream, downstream, the left bank and the right bank) and one facing the right bank.

If you don't have a tripod, keep the densiometer level at elbow height away from the body and at 0.3 m above the water's surface.

For each measurement, count the number of grid intersection points covered by vegetation (this will range between 0 and 17).

Tip: Also take a photo of the stream canopy cover looking upstream from the bottom of the reach and downstream from the top of the reach

Cross section	True left bank	Centre - upstream	Centre - right	Centre - downstream	Centre - left	True right bank
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Canopy closure – second measurement set* (at the same points as the first measurement set)

□ Not made – *this part of the survey ends.*
□ Made by same observer as first measurement set – *continue to table next page*
□ Made by a different observer – *name or initials of the second observer* _____
(continue to table next page)

Stream shade (canopy closure) *continued…*						
Cross section	**True left bank**	**Centre - upstream**	**Centre - right**	**Centre - downstream**	**Centre - left**	**True right bank**
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						