

# Tropical Rapid Appraisal of Riparian Condition (TRARC). Version 1: August 2006



<http://savanna.cdu.edu.au>

**Note:** Read the *User guide* before using these score sheets.  
Circle most appropriate score.

[www.rivers.gov.au](http://www.rivers.gov.au)

**Note:** This number refers to the numbered items in the *User guide*

CANOPY COVER <span style="float: right;">1</span>			
% cover of trees and tall shrubs >5 m in height. Look directly above you (approx. 5 m radius). Include weeds	Point		
	A	B	C
<5%	1	1	1
5–25%	2	2	2
25–50%	3	3	3
50–75%	4	4	4
75–100%	5	5	5

TREE SIZE CLASSES <span style="float: right;">3</span>			
Variation in trunk width/height of dominant native trees >3 m tall. Look around area (approx. 20 m up and down the <i>transect</i> ). Do not include weeds. Size groups: <10 cm, 10–20 cm, 20–30 cm, 30–40cm, >40 cm	Point		
	A	B	C
No canopy, few trees or all same size group	1	1	1
2 distinct size groups	3	3	3
3+ distinct size groups	5	5	5

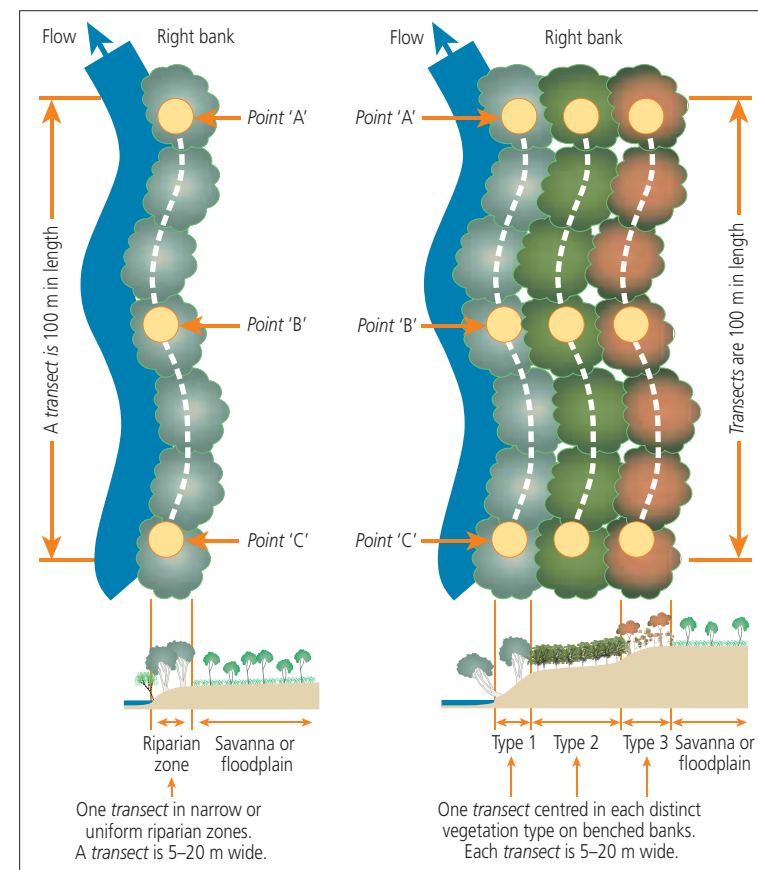
Choose a maximum of three species as co-dominants **OR** in tall closed forest with diverse species assess entire tree community

CANOPY HEALTH <span style="float: right;">2</span>			
Canopy health of surrounding NATIVE trees and tall shrubs >5 m in height. Look around area (approx. 20 m up and down the <i>transect</i> ). Do not include weeds	Point		
	A	B	C
Canopy very sparse/non-existent; shrubs and/or grasses common due to lack of canopy; dead trees may occur	1	1	1
Tree canopy sparse; individuals exhibit crown dieback; dead trees common	2	2	2
Canopy +/- sparse or lacking vigour; dead trees may be evident; minor crown dieback	3	3	3
Canopy slightly irregular and/or with some gaps; no/few dead trees	4	4	4
Tree canopy appears intact; no/few standing dead trees	5	5	5

DOMINANT TREE REGENERATION <span style="float: right;">4</span>			
Number of juveniles 0.3–3 m tall of dominant tree species. Must be same species as measured in 'Tree size classes'. (Look within approx. 5 m radius)	Point		
	A	B	C
0	1	1	1
1–3	3	3	3
4+	5	5	5

OTHER TREE REGENERATION <span style="float: right;">5</span>			
Number of juveniles present that are common riparian species, even though adult individuals of these species are not dominant within the <i>transect</i> . (Look within approx. 5 m radius)	Point		
	A	B	C
0	1	1	1
1–3	3	3	3
4+	5	5	5

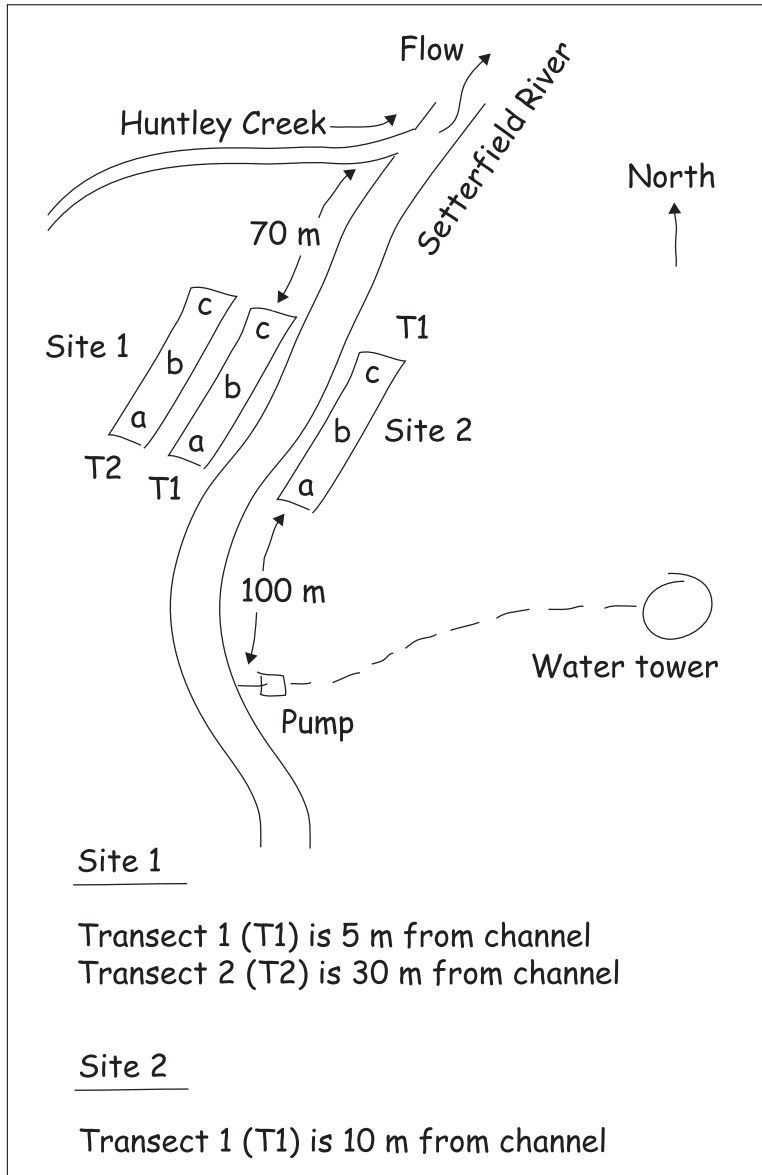
Date			
Stream name			
Site number			
<i>Transect</i> number			
Left / Right bank (when facing downstream)	Left	Right	
Assessors name/s			
GPS (start of <i>transect</i> )			
GPS (end of <i>transect</i> )			
Average channel width (m) near points A, B, C	A	B	C Ave
Average riparian width (m) or width of distinct veg. type	A	B	C Ave
Photo numbers			



# Mud map

Include the approximate distances from distinct landmarks to help others find this site in the future.

Example only, not to scale.



MIDSTOREY COVER				6		
% cover of shrubs and small trees 1.5–5 m in height (natives and weeds) (5 x 5 m square)	Point					
	A	B	C			
<5%	1	1	1			
5–30%	3	3	3			
30–100%	5	5	5			

NOTE: If no midstorey present, give WEEDS a score of 5.

MIDSTOREY WEEDS				7		
What is the proportion of weeds (same 5 x 5 m square)	Point					
	A	B	C			
75–100% weed plants	1	1	1			
50–75% weed plants	2	2	2			
25–50% weed plants	3	3	3			
5–25% weed plants	4	4	4			
<5% weed plants	5	5	5			
List most dominant weed species						

GRASS COVER				6		
% cover of grass of any height (natives and weeds) (5 x 5 m square)	Point					
	A	B	C			
<5%	1	1	1			
5–30%	2	2	2			
30–60%	3	3	3			
60–80%	4	4	4			
80–100%	5	5	5			

NOTE: If no grass present, give WEEDS a score of 5.

GRASS WEEDS				7		
What is the proportion of weeds (same 5 x 5 m square)	Point					
	A	B	C			
75–100% weed plants	1	1	1			
50–75% weed plants	2	2	2			
25–50% weed plants	3	3	3			
5–25% weed plants	4	4	4			
<5% weed plants	5	5	5			
List most dominant weed species						

UNDERSTOREY COVER				6		
% cover of shrubs, sedges, herbs and groundcovers <1.5 m in height (natives and weeds). Do not include grass (5 x 5 m square)	Point					
	A	B	C			
<5%	1	1	1			
5–30%	3	3	3			
30–100%	5	5	5			

NOTE: If no understorey present, give WEEDS a score of 5.

UNDERSTOREY WEEDS				7		
What is the proportion of weeds (same 5 x 5 m square)	Point					
	A	B	C			
75–100% weed plants	1	1	1			
50–75% weed plants	2	2	2			
25–50% weed plants	3	3	3			
5–25% weed plants	4	4	4			
<5% weed plants	5	5	5			
List most dominant weed species						

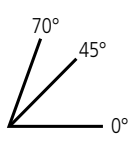
ORGANIC LITTER				6		
% cover of leaves and fallen branches <10 cm diameter, do not include ash (5 x 5 m square)	Point					
	A	B	C			
<5%	1	1	1			
5–30%	2	2	2			
30–60%	3	3	3			
60–80%	4	4	4			
80–100%	5	5	5			

NOTE: If no organic litter present, give WEEDS a score of 5.

WEED LITTER				7		
What is the proportion of weeds (i.e., litter from weed plants) (same 5 x 5 m square)	Point					
	A	B	C			
75–100% weed litter	1	1	1			
50–75% weed litter	2	2	2			
25–50% weed litter	3	3	3			
5–25% weed litter	4	4	4			
<5% weed litter	5	5	5			
List most dominant weed species (litter)						

EXPOSED SOIL		8		
% cover of exposed soil and ash. <b>Exclude</b> large natural rock formations, boulders, leaf litter and roots (5 x 5 m square)	Point			
	A	B	C	
80–100%	1	1	1	
60–80%	2	2	2	
30–60%	3	3	3	
5–30%	4	4	4	
<5%	5	5	5	
Tick box if mostly bedrock	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	









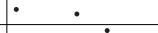
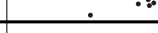


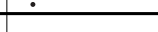
BANK STABILITY: Bank sediment size		9				
Bank sediment size (near the three points A, B, C)	Maximum			Dominant		
	A	B	C	A	B	C
Clay or silt (<0.064 mm grain size)	5	5	5	5	5	5
Sand (0.064–2 mm grain size)	4	4	4	4	4	4
Gravel (2–12 mm grain size)	3	3	3	3	3	3
Pebbles (12–64 mm grain size)	2	2	2	2	2	2
Cobbles, boulders or bedrock (>64 mm grain size)	1	1	1	1	1	1

BANK STABILITY: Bank slope		10		
Approximate bank slope (near the three points A, B, C)	Point			
	A	B	C	
	>70° slope (or undercut)	5	5	5
	45–70° slope	3	3	3
	<45° slope	1	1	1

LARGE TREES	11
Number of large trees (native and alive) with >30 cm trunk diameter when measured 1.3 m from base of trunk, do not include dead or fallen trees. (100 m transect)	SCORE
0	1
1–4	2
5–6	3
7–8	4
9+	5
TALLY	

LOGS	12
Number of logs* and large logs** (100 m transect)	SCORE
Absent	1
1–2 large logs OR <5 logs	2
3–4 large logs OR 5–9 logs	3
5–6 large logs OR 10–14 logs	4
7+ large logs OR 15+ logs	5
TALLY	
* LOGS (>10cm diameter and 1–3 m in length)	
** LARGE LOGS (>10cm diameter and >3 m in length)	

HIGH IMPACT WEEDS	13
Number of listed species (100 m transect)	SCORE
4 of listed species present	1
3 of listed species present	2
2 of listed species present	3
1 of listed species present	4
0 of listed species present	5

HIGH IMPACT WEED DISTRIBUTION	14	
Description of weed distribution within 100 m transect (up to 20 m wide)	Distribution pattern	SCORE
Continuous dense distribution in a wet/dry zone		1
Continuous dense distribution		
Continuous distribution with some spaces		
Continuous distribution of well spaced plants		
Several well spaced patches		2
A few patches plus several scattered individuals		
A few patches		3
A single patch plus several scattered individuals		
Several scattered individuals		
A single patch plus a few scattered individuals		4
A single patch		
A few scattered individuals		5
Rare		
No high impact weeds in transect		

High impact weed species (for Top End, NT and Burdekin, Qld)

- |  |   |
|--|---|
| <input type="checkbox"/> <i>Andropogon gayanus</i> (gamba grass)             | <input type="checkbox"/> <i>Panicum maximum</i> (guinea grass)            |
| <input type="checkbox"/> <i>Calopogonium mucunoides</i> (calopo)             | <input type="checkbox"/> <i>Parkinsonia aculeata</i> (parkinsonia)        |
| <input type="checkbox"/> <i>Centrosema molle</i> (centro)                    | <input type="checkbox"/> <i>Parthenium hysterophorus</i> (parthenium)     |
| <input type="checkbox"/> <i>Cryptostegia grandiflora</i> (rubber vine)       | <input type="checkbox"/> <i>Passiflora foetida</i> (wild passion fruit)   |
| <input type="checkbox"/> <i>Hymenachne amplexicaulis</i> (olive hymenachne)  | <input type="checkbox"/> <i>Pennisetum</i> sp. (mission grass)            |
| <input type="checkbox"/> <i>Hyptis suaveolens</i> (hyptis)                   | <input type="checkbox"/> <i>Ricinus communis</i> (castor oil plant)       |
| <input type="checkbox"/> <i>Ipomoea quamoclit</i> (morning glory)            | <input type="checkbox"/> <i>Senna alata</i> (candle bush)                 |
| <input type="checkbox"/> <i>Lantana camara</i> (lantana)                     | <input type="checkbox"/> <i>Stachytarpheta</i> spp. (snakeweed)           |
| <input type="checkbox"/> <i>Leucaena leucocephala</i> (coffee bush)          | <input type="checkbox"/> <i>Urochloa (Brachiaria) mutica</i> (para grass) |
| <input type="checkbox"/> <i>Mimosa pigra</i> (mimosa, giant sensitive plant) | <input type="checkbox"/> <i>Xanthium strumarium</i> (noogoora burr)       |
|  | <input type="checkbox"/> <i>Ziziphus mauritiana</i> (chinee apple)        |

<b>CANOPY WEEDS</b>		<b>15</b>
Proportion of canopy plants (>5 m tall) that are weeds, including vines in the canopy (100 m <i>transect</i> )		SCORE
75–100% weed plants		1
50–75% weed plants		2
25–50% weed plants		3
5–25% weed plants		4
<5% weed plants		5
List most dominant weed species		

NOTE: If no canopy present, give WEEDS a score of 5.

<b>CANOPY CONTINUITY</b>		<b>16</b>
Proportion of <i>transect</i> length that has a canopy. Gaps between canopies must be >5 m and span the width of the <i>transect</i> (max 20 m). (100 m <i>transect</i> )		SCORE
<50%		1
50–90%		3
90–100%		5
Tick box if bedrock mostly causing gaps		<input type="checkbox"/>

<b>EXPOSED TREE ROOTS</b>		<b>17</b>
Proportion of trees or tall shrubs with exposed tree roots (thicker than 20 mm) due to erosion. Do not include species with natural aerial roots (e.g. Pandanus and Figs). (100 m <i>transect</i> )	Average amount of plant's circumference with exposed roots (thicker than 20 mm)	SCORE
20–100% of plants	>1/3	1
	<1/3	2
5–20% of plants	>2/3	2
	1/3–2/3	3
	<1/3	4
5% of plants	>1/3	4
	<1/3	5

<b>SLUMPING</b>		<b>18</b>
Combined slumping width along 100 m <i>transect</i>		SCORE
20–100 m combined width		1
10–20 m combined width		2
5–10 m combined width		3
<5 m combined width		4
Slumps absent		5

<b>GULLYING</b>		<b>18</b>
Combined width of active, unstable gullies passing through 100 m <i>transect</i>		SCORE
20–100 m combined width		1
10–20 m combined width		2
5–10 m combined width		3
<5 m combined width		4
Gullies <b>absent</b> or <b>all with stabilised*</b> walls and head		5

\*Stabilised by vegetation, rocks or other.

<b>UNDERCUTTING</b>		<b>18</b>
Combined length of undercutting along 100 m <i>transect</i>		SCORE
20–100 m combined width		1
10–20 m combined width		2
5–10 m combined width		3
<5 m combined width		4
Undercutting absent		5

<b>ANIMALS: Managed</b>		<b>19</b>
Extent of damage (tree ringbarking; vegetation trampling; grazing; wallowing; soil compaction; track formation; instream substrate disturbance) caused by managed animals (e.g. cattle). Do not include unmanaged animals here. (100 m <i>transect</i> )		SCORE
20–100% of ground or vegetation damaged		5
5–20% of ground or vegetation damaged		3
0–5% of ground or vegetation damaged		1
Tick box if fences are present and effective <input type="checkbox"/> ; present but ineffective <input type="checkbox"/> ; not present <input type="checkbox"/>		

<b>ANIMALS: Unmanaged</b>		<b>19</b>
Extent of damage (tree ringbarking; vegetation trampling; grazing; wallowing; soil compaction; track formation; instream substrate disturbance) caused by unmanaged animals (e.g. pigs, wild cattle, horses, donkeys, buffalo). Do not score managed animals (e.g. cattle) here. (100 m <i>transect</i> )		SCORE
20–100% of ground or vegetation damaged		5
5–20% of ground or vegetation damaged		3
0–5% of ground or vegetation damaged		1
<input type="checkbox"/> pig <input type="checkbox"/> wild cattle/horse/donkey/buffalo <input type="checkbox"/> other _____		

FIRE		20
Time since fire	Average fire impact for <i>transect</i>	SCORE
Burnt in current/ most recent fire season	<b>Major impact:</b> canopy burnt and/or burnt up to channel edge	5
	<b>Moderate impact:</b> trunks charred but canopy mostly unburnt and not burnt up to channel edge	4
	<b>Minor impact:</b> some impact to riparian boundary or spot fire only	3
Burnt in previous fire season	<b>Major impact:</b> canopy burnt and/or burnt up to channel edge	4
	<b>Moderate impact:</b> trunks charred but canopy mostly unburnt and not burnt up to channel edge	3
	<b>Minor impact:</b> some impact to riparian boundary or spot fire only	2
Long unburnt (old fire scars)	—>	2
Little evidence of fire	—>	1

### Notes for TREE CLEARING 21

- \* **Buffer width** is the uncleared vegetation measured from the top of the outermost bank to the nearest cleared land away from the waterway, **OR** if no bank exists (drainage lines and wetlands), from the outer edge of seepage line or maximum flood level.
- \*\* **Clearing width** refers to areas that have had mass tree removal (e.g. for grazing, horticulture, car parks, roads, picnic grounds, camping and urban uses).
- \*\*\* **Riparian width** is measured from the edge of the channel (low flow) to where there is a distinct change in vegetation and landform.

TREE CLEARING		21	
Waterway type (pick one only)	Average buffer width (m)* for 100 m <i>transect</i> (measured away from waterway)	Average clearing width** compared to Average riparian width (RW)***	SCORE
Drainage lines and intermittent streams (1st, 2nd order)	< 15	>RW	5
		<RW	4
	15–25	>RW	3
		<RW	2
>25 or uncleared	any	1	
Creeks (3rd, 4th order)	<25	>RW	5
		<RW	4
	25–50	>RW	4
		<RW	3
	50–75	>RW	3
		<RW	2
	75–100	>RW	2
		<RW	1
	>100 or uncleared	any	1
	Rivers (5th order or greater)	<25	>RW
<RW			4
25–75		>RW	4
		<RW	3
75–150		>RW	3
		<RW	2
150–250		>RW	2
		<RW	1
>250 or uncleared	any	1	

FLOW REGIME: Large dams		22
Large dam upstream and vegetation response to environmental flows (within 100 m <i>transect</i> )	SCORE	
Large dam upstream and environmental flows ineffective at triggering recruitment events for plants high up bank: tree regeneration rare on high banks	5	
Large dam upstream and environmental flows moderately effective at triggering recruitment events for plants high up bank: some tree regeneration on high banks	3	
Large dam upstream and environmental flows effective at triggering recruitment events for plants high up bank: tree regeneration common on high banks	1	
No large dam upstream	1	

BANK STABILITY: Instream structures		23
Human-built instream structures within 200 m upstream or downstream of <i>transect</i> (e.g. bridges, culverts, weirs, small dams)	SCORE	
4+ instream structures	5	
3 instream structures	4	
2 instream structures	3	
1 instream structures	2	
No instream structures	1	

OTHER		24
Proportion of <i>transect</i> impacted by human structures or activities that have not yet been recorded. e.g. sand mining, residential/urban development, slashed grass, 4WD track or crossing, boat ramp, bush camp, hard footpath, walking track, fishing site, pumps, pipes, gauging station (100 m <i>transect</i> )	SCORE	
50–100%	5	
25–50%	4	
10–25%	3	
5–10%	2	
<5%	1	
Describe impact		