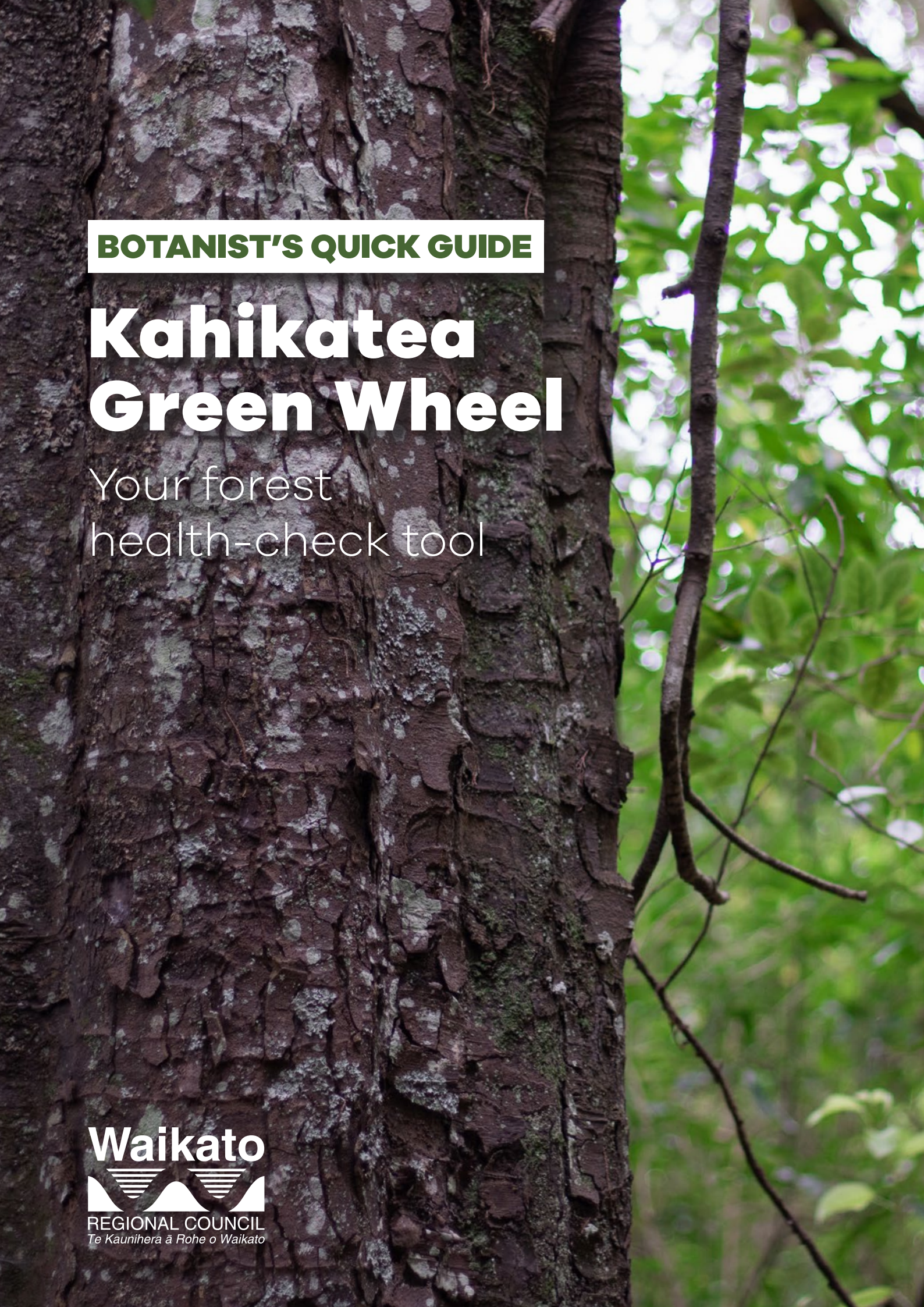

BOTANIST'S QUICK GUIDE

Kahikatea Green Wheel

Your forest health-check tool

Waikato
REGIONAL COUNCIL
Te Kaunihera ā Rohe o Waikato

Contents

About this guide

This document includes a quick instruction guide[1] for applying the Kahikatea Green Wheel botanical sub-attributes, along with blank datasheets. These include:

- a **Site datasheet** (sheet A) to write down scores for all of the Kahikatea Green Wheel sub-attributes
- a **Photopoint datasheet** for photograph details to keep a visual record of the state of your site (sheet B)
- two datasheets for **botanical indicators** (sheets C and D).

You can print out the datasheets you need to take into the field, or download the KGW spreadsheet onto a smartphone or tablet and enter your data directly in the field. For the botanical data, simply type "1" in the blank field for each species present ('Native plants' or 'Unwanted plants' tabs). The spreadsheet will automatically calculate all the botanical scores for the Kahikatea Green Wheel #8, #16, #17, #21 ,#22, and #23.

If you want to read the full Guide for Botanists that explains how the methods were developed you can download it at: waikatoregion.govt.nz/kahikatea-green-wheel.

Datasheet	Page	Sub-attributes
A: SITE Datasheet	8	All attributes
B: PHOTOPOINT RECORD SHEET Datasheet	13	None – general records
C: NATIVE PLANTS Datasheet	15	16, 17, 21, 22, 23
D. UNWANTED PLANTS Datasheet	19	5, 6, 7, 8, 16

For a full guide to the Kahikatea Green Wheel visit waikatoregion.govt.nz/kahikatea-green-wheel

Recommended field methods for botanical assessments

The Kahikatea Green Wheel is a tool to assess changes in the health of Waikato kahikatea forest stands. Many of the health indicators are based on plants. To apply the Kahikatea Green Wheel you will need to visit the kahikatea stand and create a full plant species list (native and exotic vascular plants). As the Kahikatea Green Wheel tool was developed to assess change, it is essential that up to date information is used, although older species lists may help ensure a thorough check. The Kahikatea Green Wheel should be reassessed every five years.

A Kahikatea Green Wheel **Site datasheet** (see page 8) has been developed to record scores for all 31 sub-attributes and will be a useful field tool to capture notes to justify subjective scores, such as canopy weed cover. A completed example of a Kahikatea Green Wheel **Site datasheet** is available on the Kahikatea Green Wheel **webpage**. It is based on Turney Bush, a mature kahikatea stand at Lake Rotopiko/Serpentine reserve, 15 minutes south of Hamilton on State Highway 3. We recommend first-timers take the completed example to Turney Bush and see how the sub-attributes were applied.

You can print off and complete the datasheets in the field, but for efficiency we recommend you download the **Kahikatea Green Wheel spreadsheet** to your phone or tablet and enter data directly into the tabs 'Native plants' and 'Unwanted plants'. Six of the Kahikatea Green Wheel scores will be automatically generated in the spreadsheet simply by ticking the species that are present. Note that downloading the spreadsheet may distort the Green Wheel image generator, however, you can copy the species present columns into a new KGW spreadsheet back in the office.

Recommended approach

1. Before you start

- Download, the **Kahikatea Green Wheel spreadsheet** to your device, and/or print the **Star ranking table** (see **waikatoregion.govt.nz/kahikatea-green-wheel**) and field datasheets (A, B, C, D). Ask the landowner if they have any existing species lists as a double check, but don't enter any species you do not see during the visit (they may no longer be present).
- Confirm with the landowner/site manager which of the sub-attributes you will score. There are several that could be easily included in a botanical assessment, but the landowner/site manager may prefer to assess those themselves. The full set of sub-attributes and their star ranking standards are presented in the Star ranking table 1 (and also in the Kahikatea Green Wheel spreadsheet).
- Ensure you have a suitable site safety plan. It is highly recommended that you undertake your visit accompanied by the landowner/site manager; they will help you stay safe and it's a good way for them to learn some of the more important plants (e.g. threatening weeds or rare native plants) and vegetation features.
- You will use the Star ranking table to assign a score from one to five for the attributes listed below. Familiarise yourself with the visual clues in the Landowner guide (available from waikatoregion.govt.nz/kahikatea-green-wheel).

1. **In the field – outside the forest stand**	**Relevant sub-attribute**
Note on **Datasheet D**, any regional pest management plant species within 50m of the site (but within the property boundary).	8
Optional, this may be undertaken by the landowner/site manager. Look at the condition of the canopy from outside the forest, add notes to the **Site datasheet.** Reconfirm your Kahikatea Green Wheel star rank value after looking inside the forest. Assess the extent of any buffer (adjoining native or planted forest) and edge vegetation in the dripline (vegetation margin).	5, 20, 15
Optional, this may be undertaken by the landowner/site manager Look for signs of stock, animal pests, human damage, nutrient enrichment, drainage, and waterway links. Add notes to the **Site datasheet**. Re-confirm star rank values after checking inside the forest.	1, 2, 3, 9, 10, 11, 26
Optional, this may be undertaken by the landowner/site manager Take photos to record the items above – establish at least one permanently marked photopoint. Record details on **Photopoint datasheet B.**	General record
1. **In the field – inside the forest stand**	**Relevant sub-attribute**
Generate a vascular plant species list. Record details on **Native plants datasheet (C)**, and **Unwanted plants datasheet (D)** or directly into the **Kahikatea Green Wheel spreadsheet** (Native plants and Unwanted plants tabs) on your mobile device. By moving through the entire stand to create a full species list you will gain familiarity with the site, helping you to then apply other sub-attributes.	8, 16, 17, 21, 22, 23
Indicate on the species list if a native tree or shrub species is present as a seedling. As an optional extra you may wish to also add a code for relative abundance or to indicate if a species is only present as a seedling (suggesting that seeds are recruiting into the stand from another site or from the seed bank).	23
For exotics, give a total percentage cover class (in planar view) for <u>all exotics combined</u> for each vegetation tier. Ground tier is less than 30cm. Use the **Unwanted plants datasheet D** or enter star rank and notes directly into the **Site datasheet A**.	5, 6, 7
Optional — this may be undertaken by the landowner/site manager Look for signs of stock, animal pests, human damage, nutrient enrichment, drainage. Add notes and star rank value to the **Site datasheet**.	1, 2, 3, 9, 10, 11,
Assess the condition of the canopy and intactness of each vegetation layer (canopy, shrub, ground at less than 30cm). Mentally exclude exotic species when assessing how intact a layer is in planar view. Add notes and star rank value to the **Site datasheet** and **Native Plant datasheet**.	19, 20

Take photos to record the items above – establish at least one permanently marked photopoint. Record details on **Photopoint datasheet B.**	General record
1. **Back in the office** If you did not enter your species list into the Kahikatea Green Wheel spreadsheet in the field, complete one of the following steps (Option 1 or 2) to enter botanical data.	**Relevant sub-attribute**
Option 1: Open the **Kahikatea Green Wheel spreadsheet**, enter your species list into the Native plants and Unwanted plants tabs and these values will automatically put the star rank value into the "My Green Wheel" tab.	8, 16, 17, 21, 22, 23
Option 2: If you do not wish to use the Kahikatea Green Wheel spreadsheet auto-calculator, complete your botanical datasheets (C and D), adding up numbers and filling in the summary tables. Then use the **Star Rank table** in the **Landowners Guide** to apply the star ranking to the **Site datasheet** for the botanical sub-attributes. If you want to create a Green Wheel graphic, the next step is to enter the star rank value from the **Site datasheet** directly into the "My Green Wheel" tab of the **Kahikatea Green Wheel spreadsheet**. Note that if you do enter botanical values manually into any green coloured boxes in "My Green Wheel" you will delete the formula that auto-calculates these scores.	8, 16, 17, 21, 22, 23
Complete other relevant sections of the **Site datasheet** as requested by the landowner/site manager ideally via discussion with them, and enter all the indicators you assessed into the **Kahikatea Green Wheel spreadsheet "**My Green Wheel" tab. While you can enter this information directly into the spreadsheet, we recommend also completing the **Site datasheet** so you can add extra information and sketches or maps and keep that as a master document. Take a screenshot or use the snip tool to get a copy of the Green Wheel graphic and add it to the **Site datasheet**.	As requested by landowner. Note GIS sub-attributes are on the council website

Kahikatea Green Wheel datasheet

A: SITE DATASHEET[2]: To assess kahikatea forest recovery

Site name: _____ **Date:** _____

Site UKID number[3]: _____

Assessor: _____ **Date of last assessment (n/a if first one):** _____

Location (address): _____

Location (NZTM): E _____ **N** _____

Soil type:

☐ **Peat** ☐ **Gleyed silt loam** ☐ **Pumice** ☐ **Other(state):** _____

Landform (tick all that apply and circle the predominant one):

☐ **Flat** ☐ **Gentle slope** ☐ **Basin** ☐ **Steep slope**

Original forest type[4]: _____

Birds noted during visit: _____

Special features (e.g. threatened species): _____

Tree/shrub species present only as seedlings: _____

General site description (brief notes): _____

_____

_____

Site sketch/location[5]:

2 Complete a separate datasheet for each individual kahikatea stand and for parts of a single stand if they are very different (e.g. part grazed/ part ungrazed or on separate properties).

3 Obtain UKID number from the Waikato Regional Council website: waikatoregion.govt.nz/vegetation-biodiversity-map

4 Open waikatoregion.govt.nz/vegetation-biodiversity-map
Click Biodiversity_ and_ Environment on the legend. Then click Kahikatea and tick Pre-human kahikatea dominant.
Find your stand to see which kahikatea forest type was at that location originally. This can help guide re-vegetation plans based on the type of Kahikatea forest that was likely dominant on your property before humans arrived.
Write "None mapped" if there is no pre-human kahikatea mapped at your site.

5 Draw a sketch map or insert an air photo to show the kahikatea fragment (you can take a screen shot from the Waikato Regional Council website).

SITE DATASHEET (page 2) Site name: Date:

SUB-ATTRIBUTES	RECOVERY LEVEL (1-5 or n/a)[6]	EVIDENCE FOR RECOVERY LEVEL (notes)	Method[7]
A Threats			
1 Stock access			
2 Feral ungulates			
3 Browsers			
4 Mammalian predators			
5 Canopy weeds			
6 Shrub layer weeds			
7 Ground cover weeds			
8 Pest plant presence			
9 Nutrient input			
10 Drainage			
11 Human damage			
AVERAGED SCORE			
B Physical conditions			
12 Size			*WRC website*
13 Shape			*WRC website*
14 Forest interior			*WRC website*
15 Buffering			
AVERAGED SCORE			

6 n/a = not applicable or not able to be assessed. Recovery level is the Kahikatea Green Wheel star value.
7 E.g. Visual check ¦ Landowner knowledge ¦ Species list ¦ Tracking tunnels ¦ Waikato Regional Council website

SITE DATASHEET (page 3) Site name: Date:

SUB-ATTRIBUTES	RECOVERY LEVEL (1-5 or n/a)[8]	EVIDENCE FOR RECOVERY LEVEL (notes)	Method[9]
C Species composition			
16 Dominance of native plants			
17 Characteristic plant species			
18 Indicator animal species			
AVERAGED SCORE			
D Community structure			
19 Vegetation layers			
20 Canopy condition			
AVERAGED SCORE			
E Ecosystem function			
21 Winter bird food			
22 All season bird food			
23 Plant recruitment			
AVERAGED SCORE			
F External exchanges – links to other natural areas			
24 Landscape matrix (nearby habitat)			*WRC website*
25 Habitat links (terrestrial)			*WRC website*
26 Habitat links (aquatic)			
AVERAGED SCORE			

8 n/a = not applicable or not able to be assessed. Recovery level is the Kahikatea Green Wheel star value.
9 E.g. Visual check | Landowner knowledge | Species list | Tracking tunnels | Waikato Regional Council website

SITE DATASHEET (page 4) Site name: Date:

SUB-ATTRIBUTES	RECOVERY LEVEL (1-5 or n/a)[10]	EVIDENCE FOR RECOVERY LEVEL (notes)	Method[11]
G Management regime			
27 Legal protection			
28 Management plan			
29 Animal pest control effort			
30 Invasive plant control effort			
31 Revegetation effort			
AVERAGED SCORE			
TOTAL SCORE[12] score/max	/35		
Bonus (optional)			
32 Long-tailed bats If you have been monitoring bats each year enter your score here.			

Key positive features/changes since last visit:

Key issues that could be addressed to improve the health of this forest:

10 n/a = not applicable or not able to be assessed. Recovery level is the Kahikatea Green Wheel star value.
11 E.g. Visual check | Landowner knowledge | Species list | Tracking tunnels | Waikato Regional Council website
12 Total score is the sum of the averaged scores A-G.

Paste a screen shot of your completed Green Wheel from the Kahikatea Green Wheel spreadsheet here:

Kahikatea Green Wheel datasheet

B: PHOTOPOINT RECORD SHEET

Mark the photopoint location/s in the field with a permanent cattle tag or similar on a fixed structure (e.g. fence post, established tree). Where possible, also mark photo points on map with a cross. Indicate direction of photographs taken with an arrow.

Use a high-quality camera/high resolution phone camera to capture clear images – check they are in focus before moving on.

Site name _____ NZTM _____

Date _____ Assessor _____

Photo No[13]	**General description** (e.g. photo of forest buffer for sub-attribute 15.)	**Date/time**	**Compass bearing** (direction photo taken)	**Location of photographer** NZTM Easting: NZTM Northing:

13 Use the unique photo number given to the photo file by the camera as that won't change if you delete any photos in the camera.

PHOTOPOINTS (page 2) Site name: Date:

NZTM _____ Assessor _____

Photo No[14]	**General description** (e.g. photo of forest buffer for sub-attribute 15.)	**Date/time**	**Compass bearing** (direction photo taken)	**Location of photographer** NZTM Easting: NZTM Northing:

14 Use the unique photo number given to the photo file by the camera as that won't change if you delete any photos in the camera.

Kahikatea Green Wheel datasheet

For KGW sub-attribute #s 17, 19, 21, 22, 23

C: NATIVE PLANTS

If you enter species data directly into the Kahikatea Green Wheel spreadsheet "Native Plants" tab you will not need to complete this datasheet and the scores will be automatically calculated for you.

Enter '1' for all listed species present (whether seedlings or established plants) in column 3 of the DATA TABLE. Also enter 1 in col 4 if present as seedlings. Circle Y if the species present is a characteristic and/or bird food species. Sum the 1s and circled Ys at the bottom of each page and sum all together on the last page of the DATA TABLE to complete Table A. In Table B, indicate per cent cover class per tier for all natives combined (estimate as bird's eye view).

Species are sorted by common names to assist less experienced botanists. Only species that contribute to KGW scores are listed - use the blank spaces in Table C to add additional native plant species.

Site name _____ Date _____

Site UKID number[15]: _____ NZTM _____

Assessor _____

A: from your data table

Total listed native species (to calc **#16**)	
Total characteristic species (**#17**)	
Total winter bird food species (**#21**)	
Total all season bird food species (**#22**)	
Total tree/shrub species present that occur as seedlings (**#23**)	

B: estimate in the field

% cover indigenous vegetation per tier (**#19**)	
Canopy (< 50%, 50-75% or >75%)	
Mid-tier (< 50%, 50-75% or >75%)	
Ground (< 50%, 50-75% or >75%)	

		#16	#23	# 17	#21	#22
Data table		**Enter '1' if this species is in your site**	**Also enter 1 if seedlings present**	**Circle Y if species is present**		
Common name	**Scientific name**	**Scorable native species**	**Seedlings present**	**Characteristic kahikatea species**	**Winter bird food species**	**All season Bird food species**
Black maire	*Nestegis cunninghamii*					Y
Broom	*Carmichaelia australis*					
Coprosma	*Coprosma rhamnoides*					Y
Coprosma	*Coprosma rigida*				Y	Y
Five-finger	*Pseudopanax arboreus*				Y	Y
Flax, harakeke	*Phormium tenax*		n/a			Y
Gully fern	*Cyathea cunninghamii*					
	COUNT PAGE 1					

15 Obtain UKID number from the WRC website: waikatoregion.govt.nz/vegetation-biodiversity-map

NATIVE PLANTS (page 2) Site name: Date:

		#16	#23	# 17	#21	#22
Data table		**Enter '1' if this species is in your site**	**Also enter 1 if seedlings present**	**Circle Y if species is present**		
Common name	**Scientific name**	**Scorable native species**	**Seedlings present**	**Characteristic kahikatea species**	**Winter bird food species**	**All season Bird food species**
Hangehange	*Geniostoma ligustrifolium var. ligustrifolium*			Y		Y
Hīnau	*Elaeocarpus dentatus*					Y
Houhere	*Hoheria sexstylosa*					Y
Houhere (nth Waikato)	*Hoheria populnea*					Y
Houpara	*Olearia rani*					Y
Kahikatea	*Dacrycarpus dacrydioides*			Y		Y
Kaikōmako	*Pennantia corymbosa*					Y
Kanono	*Coprosma grandifolia*				Y	Y
Kānuka	*Kunzea robusta*					
Karamu	*Coprosma robusta*				Y	Y
Kawakawa	*Piper excelsum (syn Macropiper exc var. ex)*			Y	Y	Y
Kiekie	*Freycinetia banksii*		n/a	Y		Y
Kohekohe	*Dysoxylum spectabile*				Y	Y
Koromiko	*Hebe stricta var stricta (syn Veronica)*					Y
Kōwhai	*Sophora microphylla*					Y
Lancewood	*Pseudopanax crassifolius*			Y	Y	Y
Lowland ribbonwood	*Plagianthus regius*					
Lowland tōtara	*Podocarpus totara var. totara*			Y	Y	Y
Māhoe	*Melicytus ramiflorus subsp. ramiflorus*			Y		Y
Mamaku, black fern	*Cyathea medullaris*			Y		
Māmāngi	*Coprosma arborea*				Y	Y
Mangeao	*Litsea calicaris*			Y		Y
Mānuka	*Leptospermum scoparium*					
Māpou	*Myrsine australis*			Y	Y	Y
Matai	*Prumnopitys taxifolia*			Y		Y
Mingimingi	*Coprosma propinqua*				Y	Y
Mingimingi	*Coprosma propinqua x C. robusta*				Y	Y
Mingimingi	*Leucopogon fasciculatus*					Y
Miro	*Prumnopitys ferruginea*				Y	Y
Narrow-leaved māhoe	*Melicytus lanceolatus*				Y	Y
Narrow-leaved maire	*Nestegis montana*					Y
Nīkau	*Rhopalostylis sapida*					Y
Northern rātā	*Metrosideros robusta*		n/a			Y
Patē	*Schefflera digitata*			Y	Y	Y
Pigeonwood	*Hedycarya arborea*			Y	Y	Y
Poataniwha	*Melicope simplex*			Y		Y
Pōkākā	*Elaeocarpus hookerianus*			Y		Y
Ponga, silver fern	*Cyathea dealbata*			Y		
Poroporo	*Solanum aviculare var. aviculare*					Y
Pukatea	*Laurelia novae-zelandiae*			Y		
Putaputawētā	*Carpodetus serratus*			Y	Y	Y
Ramarama	*Lophomyrtus bullata*					Y
	COUNT PAGE 2					

NATIVE PLANTS (page 3) Site name: Date:

Data table		#16	#23	# 17	#21	#22
		Enter '1' if this species is in your site	Also enter 1 if seedlings present	Circle Y if species is present		
Common name	**Scientific name**	**Scorable native species**	**Seedlings present**	**Characteristic kahikatea species**	**Winter bird food species**	**All season Bird food species**
Rangiora	*Brachyglottis repanda*					Y
Raukawa	*Pseudopanax anomalus (syn Raukaua)*					Y
Rewarewa	*Knightia excelsa*			Y		Y
Rimu	*Dacrydium cupressinum*			Y		Y
Rōhutu	*Neomyrtus pedunculata*					Y
Round-leaved coprosma	*Coprosma rotundifolia*					Y
Shining karamu	*Coprosma lucida*				Y	Y
Smith's treefern	*Cyathea smithii*					
Supplejack	*Ripogonum scandens*		n/a	Y	Y	Y
Swamp coprosma	*Coprosma tenuicaulis*			Y	Y	Y
Swamp māhoe	*Melicytus micranthus*			Y		Y
Swamp maire	*Syzygium maire*				Y	Y
Tanekaha	*Phyllocladus trichomanoides*					
Tawa	*Beilschmiedia tawa*			Y		Y
Tawhirikaro	*Pittosporum cornifolium*					Y
Thin-leaved coprosma	*Coprosma areolata*			Y	Y	Y
Tī, cabbage tree	*Cordyline australis*			Y		Y
Tītoki	*Alectryon excelsus subsp. exc*			Y		Y
Toatoa	*Haloragis erecta*					
Toropapa	*Alseuosmia macrophylla*					Y
Toropapa	*Alseuosmia x quercifolia*					Y
Tree fuchsia	*Fuchsia excorticata*					Y
Tūrepo	*Streblus heterophyllus*			Y		Y
Waiuatua	*Rhabdothamnus solandri*					
Whekī	*Dicksonia squarrosa*			Y		
Whekī -ponga	*Dicksonia fibrosa*			Y		
White maire	*Nestegis lanceolata*			Y		Y
Wineberry	*Aristotelia serrata*			Y		Y
	COUNT PAGE 3					
	ADD PAGE 1 COUNTS					
	ADD PAGE 2 COUNTS					
	TOTAL COUNTS					

Table C: Additional Native Species

Kahikatea Green Wheel datasheet

For KGW sub-attribute #s 5, 6, 7, 8, 16

D: UNWANTED PLANTS

If you enter species data directly into the Kahikatea Green Wheel spreadsheet "Unwanted plants" tab you will not need to complete this datasheet.

For all listed species present, enter 1 (non-Regional Pest Management species inside the stand) or circle Y (for RPMP species inside or within 50m of the stand on same property). Sum the 1s and circled Ys at the bottom of each page and sum all together on the last page of the DATA TABLE to complete Table A. Only species that contribute to KGW scores are listed - use the blank spaces in Table C to add additional unwanted plant species.

In Table B, indicate per cent cover class per tier for all exotics combined (estimate as bird's eye view).

Site name _____ Date _____

Site UKID number16: _____ NZTM _____

Assessor _____

Table A: from your data table

# RPMP species inside or within 50m of site but on same property (for **sub-attribute 8**)	
# Unwanted species (from this datasheet) (for **sub-attribute 6**)	
# Native species (from datasheet C)	
# All vascular species – add the two numbers above	
% native [#Native/#All vascular plants x 100] (for **sub-attribute 16**)	

Table B: estimate in the field

# RPMP species within 50m and inside the forest (for **sub-attribute 5**)	
% Total exotic cover in the mid-tier/shrub layer (for **sub-attribute 6**)	
% Total exotic cover in the ground layer (for **sub-attribute 7**)	

16 Obtain UKID number from the WRC website: waikatoregion.govt.nz/vegetation-biodiversity-map

UNWANTED PLANTS (page 2) Site name: Date:

Data table		#8	Non RPMP unwanted species
Common name	**Unwanted Species**	**Enter '1' if this species[17] is in your site[18]**	**If NOT an RPMP species enter '1' if species is within your site**
African feather grass	*Cenchrus macrourus*	y	n/a
Alligator weed	*Alternanthera philoxeroides*	y	n/a
Arum lily	*Zantedeschia aethiopicum*	n/a	
Asparagus fern	*Asparagus setaceus*	y	n/a
Australian sedge	*Carex longibrachiata*	y	n/a
Banana passionfruit	*Passiflora tripartita/ P. mixta*	y	n/a
Barberry	*Berberis glaucocarpa*	n/a	
Bat-wing passion flower	*Passiflora apetala*	y	n/a
Beggars' tick	*Bidens frondosa*	n/a	
Bindweed	*Calystegia silvatica (and hybrids)*	n/a	
Blackberry	*Rubus sp. (R. fruticosus agg.)*	n/a	
Boneseed	*Chrysanthemoides monilifera*	y	n/a
Broom	*Cytisus scoparius*	y	n/a
Broom corn millet	*Panicum miliaceum*	y	n/a
Broom sedge	*Carex scoparia*	n/a	
Bushy asparagus	*Asparagus aethiopicus*	y	n/a
California bulrush	*Schoenoplectus californicus*	y	n/a
Californian privet	*Ligustrum ovalifolium*	y	n/a
Cathedral bells	*Cobaea scandens*	y	n/a
Chilean flame creeper	*Tropaeolum speciosum*	y	n/a
Chinese knotweed	*Persicaria chinensis*	y	n/a
Chinese privet	*Ligustrum sinense*	y	n/a
Chocolate vine	*Akebia quinata*	y	n/a
Climbing asparagus	*Asparagus scandens*	y	n/a
Climbing spindleberry	*Celastrus orbiculatus*	y	n/a
Common privet	*Ligustrum vulgare*	y	n/a
Contorta pine	*Pinus contorta*	y	n/a
Crack willow	*Salix fragilis/ Salix x fraglis*	y	n/a
Creeping buttercup	*Ranunculus repens*	n/a	
Darwin's barberry	*Berberis darwinii*	y	n/a
Eel grass	*Vallisneria australis*	y	n/a
Eleagnus	*Eleagnus x reflexa*	n/a	
Evergreen buckthorn	*Rhamnus alaternus*	y	n/a
Fatsia	*Fatsia japonica*	n/a	
Fox sedge	*Carex vulpinoidea*	n/a	
Freshwater eel grass	*Vallisneria australis (syn V. gigantea and V. spiralis)*	y	n/a
Fringed water lily	*Nymphoides peltata*	y	n/a
Giant gunnera	*Gunnera manicata*	y	n/a
Giant gunnera	*Gunnera tinctoria*	y	n/a
Giant knotweed	*Fallopia sachalinensis*	y	n/a
Gorse	*Ulex europaeus*	y	n/a
Grey sedge	*Carex divulsa*	n/a	
Grey willow	*Salix cinerea*	y	n/a
Gum	*Eucalyptus sp. eucalyptus*	n/a	
COUNT PAGE 2 (ALL CIRCLED Y AND ALL '1's)			

UNWANTED PLANTS (page 3) Site name: Date:

Data table		#8	Non RPMP unwanted species
Common name	**Unwanted Species**	**Enter '1' if this species[17] is in your site[18]**	**If NOT an RPMP species enter '1' if species is within your site**
Gypsy wort	*Lycopus europaeus*	n/a	
Hawthorn	*Crataegus monogyna*	n/a	
Horse nettle	*Solanum carolinense*	y	n/a
Horsetail	*Equisetum species*	y	n/a
Hydrilla	*Hydrilla verticillata*	y	n/a
Ivy	*Hedera helix*	n/a	
Japanese cherry	*Prunus serrulata*	y	n/a
Japanese honeysuckle	*Lonicera japonica*	n/a	
Japanese knotweed	*Fallopia japonica*	y	n/a
Japanese spindleberry	*Euonymus japonicus*	n/a	
Japanese walnut	*Juglans ailantifolia*	y	n/a
Jerusalem cherry	*Solanum pseudocapsicum*	n/a	
Kahili ginger	*Hedychium gardnerianum*	y	n/a
Kiwifruit	*Actinidia deliciosa*	y	n/a
Kudzu	*Pueraria montana*	y	n/a
Lantana	*Lantana camara*	y	n/a
Large leaved privet	*Ligustrum lucidum*	y	n/a
Macrocarpa	*Cupressus sp. cypress*	n/a	
Manchurian wild rice	*Zizania latifolia*	y	n/a
Marshwort	*Nymphoides geminata*	y	n/a
Mercer grass	*Paspalum distichum*	n/a	
Mexican devil	*Ageratina adenophora*	y	n/a
Mexican water lily	*Nymphaea mexicana*	y	n/a
Mignonette vine	*Anredera cordifolia*	y	n/a
Mile-a-minute	*Dipogon lignosus*	y	n/a
Mistflower	*Ageratina riparia*	y	n/a
Monkey apple	*Syzygium smithii*	n/a	
Montbreccia	*Crocosmia x crocosmiiflora*	n/a	
Moth plant	*Araujia hortorum /Araujia sericifera*	y	n/a
Nasella tussock	*Nasella neesiana*	y	n/a
Nasella tussock	*Nasella trichotoma*	y	n/a
Nodding thistle	*Carduus nutans*	y	n/a
Noogoora burr	*Xanthium strumarium*	y	
Old man's beard	*Clematis vitalba*	y	n/a
Oval sedge	*Carex ovalis*	n/a	
Pale willow weed	*Persicaria lapathifolia*	n/a	
Pampas	*Cortaderia jubata*	y	n/a
Pampas	*Cortaderia selloana*	y	n/a
Parrots feather	*Myriophyllum aquaticum*	n/a	
Phoenix palm	*Phoenix canariensis*	n/a	
Plumeless thistle	*Carduus acanthoides*	y	n/a
Pokeweed	*Phytolacca americana*	n/a	
Prickly willow weed	*Persicaria strigosa*	n/a	
Purple loosestrife	*Lythrum salicaria*	y	n/a
COUNT PAGE 3 (ALL CIRCLED Y AND ALL '1's)			

UNWANTED PLANTS (page 4) Site name: Date:

Data table		#8	Non RPMP unwanted species
Common name	**Unwanted Species**	**Enter '1' if this species[17] is in your site[18]**	**If NOT an RPMP species enter '1' if species is within your site**
Purple nut grass	*Cyperus rotundus*	y	n/a
Ragwort	*Jacobaea vulgaris*	y	n/a
Reed canary grass	*Phalaris arundinacea*	n/a	
Reed sweet grass	*Glyceria maxima*	y	n/a
Rhododendron	*Rhododendron ponticum*	y	n/a
Royal fern	*Osmunda regalis*	y	n/a
Rum cherry	*Prunus serotina*	y	n/a
Sagittaria	*Sagittaria species (except S. subulata)*	y	n/a
Salt water paspalum	*Paspalum vaginatum*	y	n/a
Sea spurge	*Euphorbia paralias*	y	n/a
Selaginella	*Selaginella krausiana*	n/a	
Senegal tea	*Gymnocoronis spilanthoides*	y	n/a
Spartina	*Spartina species*	y	n/a
Spearwort	*Ranunculus flammula*	n/a	
Stinking iris	*Iris foetidissima*	n/a	
Strawberry dogwood	*Cornus capitata*	y	n/a
Taiwanese cherry	*Prunus campanulata*	y	n/a
Tall fescue	*Lolium arundinaceum subsp. arundinaceum*	n/a	
Tasmanian blackwood	*Acacia melanoxylon*	n/a	
Tutsan	*Hypericum androsaemum*	y	n/a
Velvet leaf	*Abutilon theophrasti*	y	n/a
Wandering dew	*Tradescantia fluminensis*	n/a	
Water celery	*Apium nodiflorum*	n/a	
Water pepper	*Persicaria hydropiper*	n/a	
Water poppy	*Hydrocleys nymphoides*	y	n/a
Water primrose	*Ludwigia peploides subsp. montevidensis*	n/a	
White bryony	*Bryonia cretica*	y	n/a
Woolly nightshade	*Solanum mauritianum*	y	n/a
Yellow cress	*Rorippa amphibia*	n/a	
Yellow flag iris	*Iris pseudacorus*	y	n/a
Yellow ginger	*Hedychium flavescens*	y	n/a
Yorkshire fog	*Holcus lanatus*	n/a	
	COUNT PAGE 4 (ALL CIRCLED Y AND ALL '1's)		
	ADD PAGE 2 COUNTS		
	ADD PAGE 3 COUNTS		
	TOTAL COUNTS		

Table C: Additional Unwanted Species (including inappropriate native species)

- for information only, these do not contribute to the KGW score

Kahikatea Green Wheel Quick Guide to Sub-attributes

Khaki rows are botanical sub-attributes.
Blue rows are spatial sub-attributes provided by WRC via their online map of kahikatea forest stands.

Sub-attribute #	Rank	
1. Stock access	(1)	No fences and heavily grazed throughout - signs include bare or mainly unpalatable plants in ground layer, heavily pugged, abundant cattle dung.
	(2)	No fences and moderately grazed - minor amounts of dung, many unpalatable plants, some pugging, but site not heavily grazed throughout.
	(3)	Fenced but not complete, or ineffective, or livestock are placed in the stand and site is heavily or moderately grazed.
	(4)	Not or incompletely fenced, but site has minor signs of stock presence, livestock access is infrequent or does not penetrate more than 10 m into the site because of impediments e.g. blackberry, wet ground, drains, thick exposed roots, dense woody vines.
	(5)	No stock have access, e.g. securely fenced or not in grazing land.
2. Feral ungulates (deer, goats, pigs)	(1)	Abundant sign of feral ungulates, dung pellets or signs of shrub browse across 75% or more of the site.
	(2)	Ungulate dung pellets or sign of shrub browse across 50-74%.
	(3)	Faecal pellets or shrub browse across 25-49% of the site.
	(4)	Minor sign, e.g. some hoof prints or dung but little sign of vegetation damage.
	(5)	No evidence of feral ungulates.
3. Browsers (rabbits, hares)	(1)	Abundant sign of rabbits or hares, faecal pellets or signs of browse across 75% or more of the site.
	(2)	Faecal pellets or signs of browse across 50-74% of the site.
	(3)	Faecal pellets or signs of browse across 25-49% of the site.
	(4)	Minor sign. Very old or just a few piles of pellets or minor browse seen.
	(5)	Fully pest fenced or pest-free island, or no sign rabbits or hares have been recently in the site.
4. Mammalian predators	(1)	Very high pest numbers, detection on 9 or 10 out of ten chew cards or tracking tunnels.
	(2)	Moderate to high pest numbers, detection on 5-8 out of ten chew cards or tracking tunnels.
	(3)	Low to moderate pest numbers, detection on 1 to 4 chew cards or tracking tunnels.
	(4)	No evidence of predators, zero detection on chew cards or tracking tunnels but site is not fully pest fenced.
	(5)	Fully pest fenced or pest-free island and monitoring shows pests are absent, or at best recorded only infrequently (incursions).
5. Canopy weed abundance	(1)	75% or more of the canopy (where visible or estimated from vine stems) comprises or is covered in exotic species.
	(2)	Exotic species cover or comprise 50-74% of the canopy.
	(3)	Exotic species cover or comprise 25-49% of the canopy.
	(4)	Exotic species cover or comprise 5-24% of the canopy.
	(5)	Exotic species cover or comprise less than 5% of the canopy.
6. Shrub layer weed abundance	(1)	Exotic species cover 75% or more of the mid-tier zone of the forest stand.
	(2)	Exotic species cover 50-74% of the mid-tier zone.
	(3)	Exotic species cover 25-49% of the mid-tier zone.
	(4)	Exotic species cover 5-24% of the mid-tier zone.
	(5)	Exotic species cover less than 5% of the mid-tier zone.
7. Ground cover weed abundance (<30 cm tall)	(1)	75% or more of the forest floor is covered with exotic species (include vine thickets).
	(2)	Exotic species comprise 50-74% of the forest floor.
	(3)	Exotic species cover 25-49% of the forest floor.
	(4)	Exotic species cover 5-24% of the forest floor.
	(5)	Exotic species cover less than 5% of the forest floor.

8. Pest plant presence	(1)	More than five regional pest plant species in the site or within 50 m of it within the property.
	(2)	Four or five regional pest plant species in the site or within 50 m of it within the property.
	(3)	Two or three regional pest plant species in the site or within 50 m of it within the property.
	(4)	One regional pest plant species in the site or within 50 m of it within the property.
	(5)	No regional pest plant species present in the site or within 50 m of it within the property.
9. Nutrient input	(1)	Site is subject to constant high nutrient enrichment. Examples: septic wastewater pipes or year-round effluent disposal, and/or is permanently stocked with grazing animals and dung heaps are abundant, and/or year-round high numbers of roosting birds and guano obvious.
	(2)	Site is subject to regular, but not constant, high nutrient enrichment. Examples: grazed on a rotational basis, regular fertiliser application or heavy grazing on adjacent paddocks, or periodic / seasonal high number of roosting birds.
	(3)	Site is regularly subject to small amounts of nutrient enrichment. Examples: slopes above moderately grazed, and/or moderate number of birds, and/or lightly grazed (e.g. sheep).
	(4)	Site is occasionally subject to small amounts of nutrient enrichment. Examples: never grazed but subject to run-off from lightly grazed slopes above.
	(5)	No obvious human-derived sources of nutrient input on the property. Examples: fertiliser not applied within 300 m radius, no upslope grazing land, no septic tanks within 300 m, no stock grazed in the stand).
10. Drainage	(1)	Site has been, and still is, subject to severe drainage with evidence of active, regularly maintained drains through, around or near the forest stand. Landowner has no plans to restore formerly higher water levels
	(2)	Drains affecting the stand are present but have not been actively maintained in the past 5 years, or are not causing severe or ongoing drainage. Landowner has no plans to restore formerly higher water levels.
	(3)	Site is subject to a plan to restore water levels.
	(4)	Drains are in the process of being blocked or filled in, although some drains remain active.
	(5)	Site has never been drained and is still subject to regular flooding, or former flooding regime has been completely restored (e.g., all drains filled in). Or site was never subject to flooding.
11. Human damage (litter, tracks, huts, native plant damage, etc)	(1)	Damage is moderate to intense across 75% or more of the site.
	(2)	Damage is moderate to intense across 50 to74% of the site.
	(3)	Damage is moderate to intense across 25 to 49% of the site.
	(4)	Damage is moderate to intense across 5 to 24% of the site. Or minor damage across 25% or more of the site
	(5)	Minimal or no visual evidence of human presence (e.g. few structures or litter). Minor damage in <25% of the stand.
12. Size	(1)	The kahikatea forest area is < 1 ha
	(2)	The kahikatea forest area is 1 to <5 hectares
	(3)	The kahikatea forest area is 5 to <10 hectares
	(4)	The kahikatea forest area is 10 to <20 hectares
	(5)	The kahikatea forest area is 20 hectares or more
13. Shape index	(1)	Shape index is 3 or more (very convoluted or narrow)
	(2)	Shape index is 2.5 to <3 (somewhat convoluted)
	(3)	Shape index is 2 to <2.5 (blocky but stretched out)
	(4)	Shape index is 1.5 to <2 (oval or round with some slight protrusions)
	(5)	Shape index is less than 1.5 (very round or square)
14. Forest interior	(1)	None of the kahikatea forest vegetation is more than 60 m from a native forest edge.
	(2)	Less than 10% of the kahikatea forest vegetation is more than 60 m from a native forest edge.
	(3)	From 10 up to 25% of the kahikatea forest vegetation is more than 60 m from a native forest edge.
	(4)	From 25 up to 30% of the kahikatea forest vegetation is more than 60 m from a native forest edge.
	(5)	30% or more of the kahikatea forest vegetation is more than 60 m from a native forest edge.
15. Buffer (>3 m tall, 10 m wide, 80% cover to qualify)	(1)	Less than 25% of the site is protected from to edge effects by a dense margin and/or forest buffer.
	(2)	From 25 to 49% of the site is protected from to edge effects by a dense margin and/or forest buffer.
	(3)	From 50 to 74% of the site is protected from edge effects by a dense margin and/or forest buffer.
	(4)	From 75 to 94% of the site is protected from edge effects by a dense margin and/or forest buffer.
	(5)	Over 95% of site is protected from edge effects by a dense margin and/or forest buffer.

16. Dominance of native plants	(1)	Fewer than 20% of species present are indigenous species that naturally occur in kahikatea forest.
	(2)	From 20 to 49% of the plant species in the forest are indigenous species that naturally occur in kahikatea forest.
	(3)	From 50 to 69% of the plant species in the forest are indigenous species that naturally occur in kahikatea forest.
	(4)	From 70 to 79% of the plant species in the forest are indigenous species that naturally occur in kahikatea forest.
	(5)	80% or more of the plant species in the forest are indigenous species that naturally occur in kahikatea forest.
17. Characteristic plant species	(1)	Up to 10 characteristic species are present.
	(2)	11-15 characteristic species are present.
	(3)	16-20 characteristic species are present.
	(4)	21-25 characteristic species are present.
	(5)	More than 25 characteristic species are present.
18. Indicator animal species	(1)	No wētā tracks recorded in seven nights.
	(2)	10% weekly tracking rate (wētā tracks in one of 10 tunnels).
	(3)	20% weekly tracking rate (wētā tracks in two of 10 tunnels).
	(4)	30% weekly tracking rate (wētā tracks in three of 10 tunnels).
	(5)	Greater than 30% weekly tracking rate (wētā tracks in four or more of 10 tunnels).
19. Vegetation layers	(1)	No vegetation tier is intact (all layers have <50% cover of indigenous vegetation).
	(2)	One tier is relatively intact (50% or more indigenous cover).
	(3)	Two tiers are relatively intact (50% or more indigenous cover).
	(4)	All tiers have 50% or more indigenous cover, but at least one of them has less than 75% cover.
	(5)	All layers have >75% cover comprising indigenous species. Emergent trees may or may not be present.
20. Canopy condition	(1)	75% or more of the native foliage in the canopy is showing signs of yellowing or defoliation.
	(2)	From 50 to 74% of the native foliage in the canopy is showing signs of yellowing or defoliation.
	(3)	From 25 to 49% of the native foliage in the canopy is showing signs of yellowing or defoliation.
	(4)	From 2 to 24% of the native foliage in the canopy is showing signs of yellowing or defoliation.
	(5)	Up to 1% of the canopy is showing signs of yellowing or defoliation.
21. Winter bird-food availability	(1)	No winter bird food species are present.
	(2)	1-5 winter bird food species are present.
	(3)	6-10 winter bird food species are present.
	(4)	11-15 winter bird food species are present.
	(5)	More than 15 winter bird food species are present.
22. All season bird-food availability	(1)	Fewer than 5 bird food species are present.
	(2)	5-9 bird food species are present.
	(3)	10-19 bird food species are present.
	(4)	20 to 40 bird food species are present.
	(5)	More than 40 bird food species are present.
23. Plant recruitment	(1)	Fewer than 25% of the native trees or shrubs in the stand are present as established seedlings.
	(2)	25 to 49% of native trees or shrubs in the stand are present as established seedlings.
	(3)	50 to 74% of native trees or shrubs in the stand are present as established seedlings.
	(4)	75 to 90% of native trees or shrubs in the stand are present as established seedlings.
	(5)	Over 90% of native trees or shrubs in the stand are present as established seedlings.
24. Landscape matrix (within 1 km radius)	(1)	There is no indigenous forest, scrub, fernland or shallow freshwater wetland within a 1km radius of the site.
	(2)	Less than 25% of the land within a 1km radius of the site is in indigenous forest, scrub, fernland or shallow freshwater wetland.
	(3)	From 25 up to 50% of the land within a 1km radius of the site is in indigenous forest, scrub, fernland or shallow freshwater wetland.
	(4)	From 50 up to 75% of the land within a 1km radius of the site is in indigenous forest, scrub, fernland or shallow freshwater wetland.
	(5)	75% or more of the land within a 1km radius of the site is in indigenous forest, scrub, fernland or shallow freshwater wetland.

25. Habitat links - terrestrial	(1)	Site is 4 km or more from another patch of indigenous forest and/or scrub > 25 hectares.
	(2)	Site is from 2 up to 4 km of another patch of indigenous forest and/or scrub > 25 hectares.
	(3)	Site is from 500 m up to 2 km from another patch of indigenous forest and/or scrub > 25 hectares.
	(4)	Site is from 100 up to 500 m of another patch of indigenous forest and/or scrub > 25 hectares.
	(5)	Site is < 100 m from another patch of indigenous forest > 25 hectares.
26. Habitat links - aquatic	(1)	No natural links remain, site no longer inundated.
	(2)	Partial links to nearby stream or wetland via extreme flood events.
	(3)	Streams or drains flow through or beside the stand, but most of them are un-vegetated, and/or have perched culverts on the property. Partial links via moderate to extreme flood events.
	(4)	All waterways are connected up and down stream (with no perched culverts on the property) but some have breaks in riparian cover on the property. Partial inundation via surface flows/flood events.
	(5)	All waterways in the stand (if any) fully connected with continuous riparian buffers and no perched culverts or other fish barriers between the site and property boundary. Regular inundation via flooding or surface flows. Or was likely never connected to a waterway.
27. Legal protection	(1)	No formal legal protection or plans for such.
	(2)	Legal protection is being pursued (e.g. application lodged with QEII National Trust or Ngā Whenua Rāhui).
	(3)	Site is not a reserve or covenant/kawenata, but it listed on a district or regional council schedule of significant areas. Or the site is partly or fully protected via a council management agreement. Or, up to 50% of the stand on this property is protected as a gazetted reserve or private covenant or kawenata.
	(4)	From 50 to 90% of the stand on this property is legally protected as a gazetted reserve or private covenant or kawenata.
	(5)	Over 90% of the stand on this property is legally protected in perpetuity as a gazetted reserve or private covenant or kawenata.
28. Management plan	(1)	No management plan exists or intended.
	(2)	Informal (unwritten) plan exists for the site, or a plan is in preparation.
	(3)	Site is subject to a wider farm or reserve plan, but with minimal specific reference to the site.
	(4)	Site is subject to a wider farm or reserve plan with specific reference and action points.
	(5)	Professionally prepared management plan exists specifically for the fragment.
29. Animal pest control effort	(1)	No animal pest control is conducted, and no plans are in place to implement animal pest control.
	(2)	No animal pest control is conducted but pest control plans are being or have been developed though not yet implemented.
	(3)	Animal pest control has been implemented but is irregular or does not target all major animal pest species present.
	(4)	Site is subject to an ongoing programme of predator monitoring and control for all major pest species likely to be present.
	(5)	Site is fully pest-fenced or on a pest-free island and animal pests are absent or managed in the event of an incursion.
30. Invasive plant control effort	(1)	Site is highly or moderately degraded (scoring average <=3 stars for sub-attributes #5, 6, 7, 8) and no invasive plant /weed control has been planned or undertaken.
	(2)	Site is highly or moderately degraded (scoring average <=3 stars for sub-attributes #5, 6, 7, 8) but plant pest control is planned or being implemented.
	(3)	Site is slightly degraded (average >3 to <5 stars for sub-attributes #5, 6, 7, 8) and no invasive plant /weed control has been planned or undertaken.
	(4)	Site is slightly degraded (average >3 to <5 stars for sub-attributes #5, 6, 7, 8), but plant pest control is planned or being implemented.
	(5)	Site has relatively few plant pests, scoring 5 stars for all sub-attributes #5, 6, 7, 8, so plant pest control is not needed or is being highly effective.
31. Re-vegetation effort	(1)	Site scores an averaged <=3 stars for sub-attributes #15, 16, 17, 19, 21, 22, 23, but no revegetation has been planned or recently undertaken.
	(2)	Site scores an averaged <=3 stars for sub-attributes #15, 16, 17, 19, 21, 22, 23, but replanting is underway.
	(3)	Site scores an averaged >3 to <5 stars for sub-attributes #15, 16, 17, 19, 21, 22, 23) and no revegetation has been planned or recently undertaken.
	(4)	Site scores an averaged >3 to <5 stars for sub-attributes #15, 16, 17, 19, 21, 22, 23), and replanting is underway.
	(5)	No revegetation is required – scoring 5 stars for all of sub-attributes #15, 16, 17, 19, 21, 22, 23.

Field prompt list

Use this for a quick check list once you are familiar with the assessment process.

With the landowner/manager	Your quick notes
1. Define the assessment site boundary	
2. Discuss current/proposed management actions (KGW #27- 31)	
3. Ask about stock access, pests, drainage, nutrient sources e.g. fertiliser (#1, 2, 3, 10, 9)	

Forest edge	
4. Take external photos (GPS them)	
5. RPMP weeds outside the stand (#8)	
6. Nutrient sources (#9)	
7. Drains/Streams (#10, 26)	
8. Canopy - weeds (#5)/ intactness (#19) /condition (#20)	
9. Buffer/margin (#15)	
10. Fencing (#1)	

Inside forest	
11. Full species list (#16, 17, 21, 22)	
12. Woody seedlings (#23)	
13. Optional relative abundance	
14. Vegetation layers (#5, 6, 7, 19)	
15. Ungulates/ (#2)	
16. Rabbits (#3)	
17. Human damage (#11)	
18. Tracking tunnels/chew cards (#4, 18)	

February 2023 #7245

Private Bag 3038, Waikato Mail Centre,
Hamilton 3240, New Zealand
0800 800 401 waikatoregion.govt.nz