



# TREES THAT COUNT

## PODOCARPACEAE

### RESTORATION

#### ABSTRACT

First year monitoring results (plant survival and growth) of three native Podocarp species planted in an area within the Tuhaitara Coastal Park in Woodend, South Island, New Zealand.

*Anna Paula Rodrigues, PhD*

<b>SITE INFORMATION SHEET</b>
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<b>Site location and contacts</b>	
Name of planting site <i>Identifier</i>	Tuhaitara Coastal Park
Location <i>Planting site address, region</i>	1 Woodend Beach Road WOODEND BEACH Tel: 03 3131768
Site contact/tenure <i>Owner/manager...</i>	Greg Byrnes ( <a href="mailto:tkot.enquiries@farmside.co.nz">tkot.enquiries@farmside.co.nz</a> )
Grid reference/GPS	43°19'52.18"S, 172°42'13.35"E
Notes on site access	

<b>Planting details</b> <i>Could be several years of planting on same site</i>	
Planting year(s)	April/2016
Planted by <i>e.g. community, contractor, landowner, council...</i>	Student Volunteer Army ( <a href="http://tkot92.wixsite.com/tuhaitara/projects">http://tkot92.wixsite.com/tuhaitara/projects</a> )
Area planted (ha)	
Total number TTC natives planted	2,000 (two thousand)
Average spacing or stems/ha	1 to 3-m
Notes <i>e.g. any other planting, animals, other features</i>	<ul style="list-style-type: none"> <li>- The area was covered by invasive grass and weed species that were partially removed/sprayed before planting;</li> <li>- There is a constant weeding, mulching and herbicide application to keep invasive grass and weeds under control;</li> <li>- The area is not fenced off against predators, although there are predator traps in the surroundings;</li> <li>- There are several native bird species in the area.</li> </ul>

<b>Site description</b> <i>Brief description of planting site, previous landuse, current vegetation cover e.g. riparian zone in rank grass, recently logged exotic steep hillcountry forest, scattered native shrubland, dense low woody scrub weeds dominated by gorse, urban/periurban/rural...</i>	
Altitude (m)	19m (average)
Aspect of site (N, S, E, W)	NE

**Diagram, map or aerial photo of planting site**

Indicate access points, local roads, geographical features, etc...

**History of activities undertaken**

e.g. site preparation, planting, species planted, site inspection/notes, weed control, animal control... (continue on separate sheet)

Date

- Planting of 2,000 native Podocarpaceae plant species was carried out in April-2016 with the help of the Student Volunteer Army, as ecological restoration and carbon sequestration projects with the cooperation of Crimson Trust as part of their Trees That Count Project (<http://projectcrimson.org.nz/projects/trees-that-count/>)
- Three species were selected: Totorā (*Podocarpus cunninghamii*), Kahikatea (*Dacrydium dacrydioides*) and Matai (*Prumnopitys taxifolia*), all of which belong to the Gymnosperm group of vascular seed-producing plants that reproduce via an exposed seed – instead of producing seeds protected by a fruit as in the Angiosperm group.
- The area selected for planting was cleared from the invasive grass and weed species prior to planting of the native seedlings.
- Hand weeding and herbicide spraying was carried out as part of the restoration maintenance between November and December-2016.
- The first count of survivors and height measurements were carried out in December-2016.
- Further monitoring are scheduled (as proposed by Crimson Trust) to take place a year after planting (summer-2017), then again five years after planting.

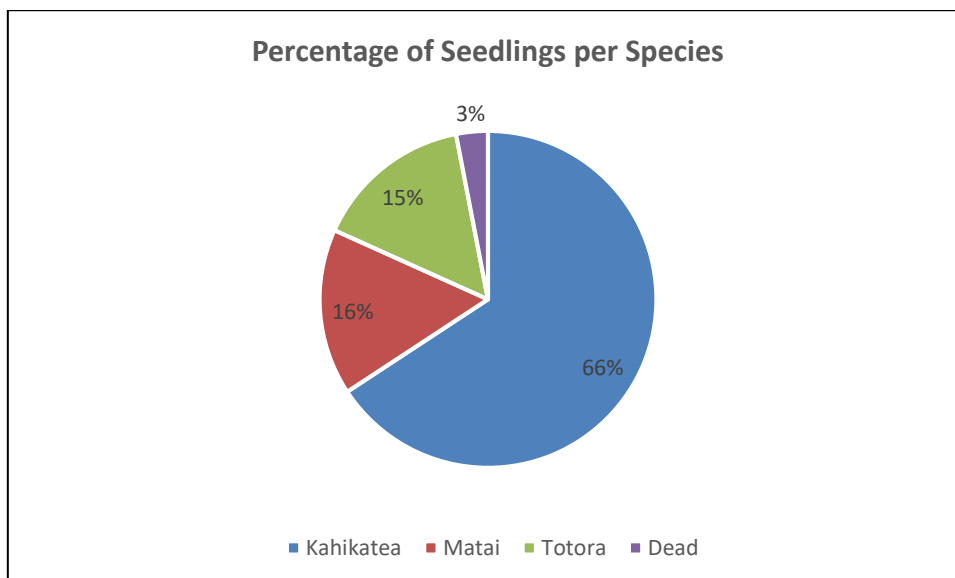
## Results of first monitoring (Summer-2016)

### 1. Survival

- Fifteen (15) 10m- radius plots were randomly established in the area, marked with Y-posts and geo-referenced;
- A total of 657 seedlings were measured in the sampling area: 433 Kahikatea, 105 Matai and 100 Totorā.
- A total of 20 dead seedlings were found, which represent 3.04% mortality rate for the total number of seedlings that were sampled:
  - 4 Totorā
  - 9 Kahikatea
  - 7 Matai

**Table 1 – Total number of seedling per species per plot.**

<b>Plot/Species</b>	<b>Kahikatea</b>	<b>Matai</b>	<b>Totorā</b>	<b>Dead</b>	<b>Total</b>
1	3	17			20
2	7	22			29
3		1	47	3	51
4	15	9	20	1	45
5	7	4	22		33
6	24	13	11		48
7	24	24		13	61
8	47	14			61
9	56	1		1	58
10	32			1	33
11	35				35
12	50				50
13	50				50
14	49			1	50
15	33				33
<b>TOTAL</b>	<b>432</b>	<b>105</b>	<b>100</b>	<b>20</b>	<b>657</b>



**Figure 1 – Percentage of surviving seedlings per species and percentage of dead seedlings in the sampling area.**

## 2. Height

- The average heights of Matai (*Prumnopitys taxifolia*), Totorā (*Podocarpus cunninghami*) and Kahikatea (*Dacrycarpus dacrydioides*) seedlings in the first monitoring period were  $40.5 \pm 6.9$  cm,  $39.5 \pm 5.0$  cm and  $33.7 \pm 3.8$  cm, respectively.
- The tallest Matai seedling was found in plot 9 (one individual measuring 50.cm). Matai seedlings in plot 6 were, on average, the second tallest individuals of the sampled area (13 seedlings =  $47.7 \pm 12.5$  cm).
- The most abundant seedling species in the sampled area (Kahikatea = 432 individuals) had the lowest estimated seedling height for the period. This species' tallest individuals tended to concentrate in plots 13 and 14 (both  $37.8 \pm 10.3$  cm, on average).
- The average height of dead seedlings was:  $28.3 \pm 4.75$  cm (three Kahikatea, plots 7, 9 and 10),  $31.4$  cm (one Matai, plot 7) and  $34.2 \pm 4.17$  cm (two Totorā, plots 3 and 4).

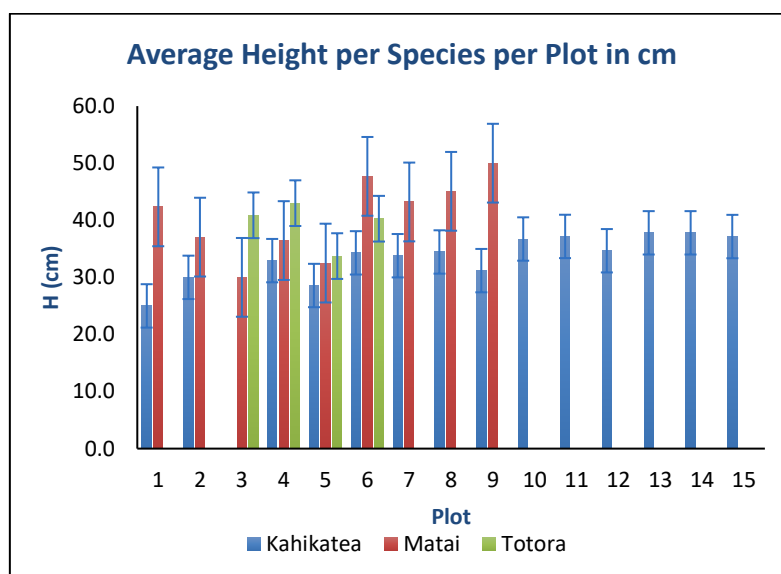


Figure 2 – Average heights (cm) of Matai (*Prumnopitys taxifolia*), Totorā (*Podocarpus cunninghami*) and Kahikatea (*Dacrycarpus dacrydioides*) seedlings in the first monitoring period, per plot.



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## Trees That Count - Monitoring of planted natives - Fieldsheet

Complete one for each plot or transect

Planting site name/identifier Tuhaitara Coastal Park/ Anna Paula Rodrigues, Daniel Racle							Date planted		
Transect No.					Plot No. 2				
Notes on sampling <i>Flat surface, dry, covered in grass</i>									
Transect/grid bearing (degrees)					Transect/grid line no.				
Plot point distances									
Transect type and size									
Plot type and size CIRCULAR – 10 m radius									
Average plot slope (degrees)					Average plot aspect (degrees)				
GPS Reference S 43°19.60', E 172° 42.212', elev. 15m			GPS Make & Model			GPS Accuracy			
Easting					Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:			
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes	
<i>Matai</i>	35								
<i>Matai</i>	25								
<i>Matai</i>	35	border							
<i>Kahi</i>	30								
<i>Kahi</i>	20								
<i>Matai</i>	55								
<i>Matai</i>	40								
<i>Matai</i>	30								
<i>Kahi</i>	35								
<i>Matai</i>	40								
<i>Matai</i>	40								
<i>Matai</i>	35								
<i>Matai</i>	40								
<i>Kahi</i>	30								
<i>Matai</i>	35								
<i>Kahi</i>	40								
<i>Matai</i>	40								
<i>Matai</i>	40								
<i>Matai</i>	20								
<i>Matai</i>	20								
<i>Matai</i>	30								
<i>Kahi</i>	30								
<i>Matai</i>	40								
<i>Kahi</i>	25								
<i>Matai</i>	45								
<i>Matai</i>	45								
<i>Matai</i>	40								
<i>Matai</i>	50								



<i>Matai</i>	35							

### Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 3				
Notes on sampling layout Flat surface, sandy soil, more open areas, lower grass cover								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size CIRCULAR – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.936', E 172° 42.220', elev. 16m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Tot</i>	50							
<i>Tot</i>	35							
<i>Tot</i>	40							
<i>Tot</i>	50	dying						
<i>Tot</i>	55							
<i>Tot</i>	35							
<i>Tot</i>	60							
<i>Tot</i>	45							
<i>Tot</i>	50							
<i>Tot</i>	50							
<i>Tot</i>	50							
<i>Tot</i>	45							
<i>Tot</i>	45							
<i>Tot</i>	50							
<i>Tot</i>	35							
<i>Tot</i>	50							
<i>Tot</i>	60							
<i>Tot</i>	40	Looking dry						
<i>Tot</i>	28							
<i>Tot</i>	40							
<i>Tot</i>	45							
<i>Tot</i>	25	Halfway dead						
<i>Tot</i>	43							
<i>Tot</i>	40							
<i>Tot</i>	45							
<i>Tot</i>	30							
<i>Tot</i>	54							



## Trees That Count - Monitoring of planted natives - Fieldsheet

Page of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 4				
Notes on sampling layout e.g. location of baseline, start point of each transect/plots...								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size CIRCULAR – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.931', E 172° 42.205', elev. 14m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Kahi</i>	34							
<i>Kahi</i>	30	Dry tips						
<i>Matai</i>	40							
<i>Tot</i>	34							
<i>Tot</i>	45							
<i>Kahi</i>	35							
<i>Tot</i>	48							
<i>Tot</i>	50							
<i>Tot</i>	55							
<i>Matai</i>	30							
<i>Matai</i>	25							
<i>Tot</i>	31							
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Matai</i>	29							
<i>Matai</i>	44							
<i>Tot</i>	45							
<i>Kahi</i>	40							
<i>Matai</i>	37							
<i>Kahi</i>	30							
<i>Tot</i>	35							
<i>Matai</i>	34							
<i>Tot</i>	55							
<i>Tot</i>	50							



## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 5				
Notes on sampling layout on a bit of a rise, but mostly flat surface; presence of short grass								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances e.g. 5, 10, 20, 30m... along transect								
Transect type and size e.g. belt, 4m wide...								
Plot type and size CIRCULAR – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.922', E 172° 42.215', elev. 13m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Tot</i>	25							
<i>Tot</i>	50							
<i>Tot</i>	33							
<i>Tot</i>	20							
<i>Kahi</i>	15							
<i>Matai</i>	37							
<i>Matai</i>	30							
<i>Kahi</i>	30							
<i>Kahi</i>	40							
<i>Matai</i>	15							
<i>Kahi</i>	30							
<i>Kahi</i>	35							
<i>Tot</i>	25							
<i>Tot</i>	40							
<i>Kahi</i>	28							
<i>Tot</i>	32							
<i>Tot</i>	43							
<i>Tot</i>	30							
<i>Tot</i>	30							
<i>Tot</i>	25							
<i>Tot</i>	50							
<i>Tot</i>	25							
<i>Tot</i>	50							
<i>Tot</i>	19							
<i>Tot</i>	25							
<i>Tot</i>	45							
<i>Tot</i>	50							
<i>Matai</i>	48							



# Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 6				
Notes on sampling layout Flat surface, sandy soil, tall grass								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.910', E 172° 42.225', elev. 9m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	35							
<i>Kahi</i>	40							
<i>Kahi</i>	40							
<i>Kahi</i>	40							
<i>Kahi</i>	35							
<i>Kahi</i>	35							
<i>Kahi</i>	31							
<i>Kahi</i>	25							
<i>Kahi</i>	34							
<i>Tot</i>	46							
<i>Tot</i>	35							
<i>Kahi</i>	40							
<i>Kahi</i>	24							
<i>Kahi</i>	35							
<i>Kahi</i>	45							
<i>Kahi</i>	30	border						
<i>Matai</i>	50							
<i>Matai</i>	55							
<i>Matai</i>	31							
<i>Tot</i>	45							
<i>Matai</i>	45							
<i>Matai</i>	32							
<i>Matai</i>	40							
<i>Matai</i>	50							
<i>Tot</i>	35							
<i>Kahi</i>	45							
<i>Matai</i>	27							
<i>Matai</i>	45							





## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 7				
Notes on sampling layout Flat surface, dry, low grass and presence of weeds								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.897', E 172° 42.211', elev. 7m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Matai</i>	20							
<i>Kahi</i>	20	dead						
<i>Kahi</i>	37							
<i>Matai</i>	40							
<i>Matai</i>	50							
<i>Matai</i>	30							
<i>Matai</i>	45							
<i>Kahi</i>	30							
<i>Matai</i>	60							
<i>Kahi</i>	24							
<i>Matai</i>	35							
<i>Matai</i>	30							
<i>Kahi</i>	30							
<i>Kahi</i>	40							
<i>Matai</i>	58							
<i>Kahi</i>	35							
<i>Matai</i>	70							
<i>Kahi</i>	37							
<i>Kahi</i>	40							
<i>Matai</i>	20	Mostly dead. Measured from where the green bit ends						
<i>Matai</i>	47							
<i>Matai</i>	60							
<i>Kahi</i>	30							
<i>Kahi</i>	30							
<i>Kahi</i>	40							
<i>Matai</i>	35							
<i>Matai</i>	45							
<i>Matai</i>	30							

<i>Kahi</i>	31							
<i>Matai</i>	35							

### Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 7 (continues)				
First measurement (soon after planting) Date:			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	Dead							
<i>Kahi</i>	33							
<i>Matai</i>	42							
<i>Matai</i>	30	Mostly dead						
<i>Matai</i>	30	dead						
<i>Kahi</i>	25							
<i>Matai</i>	30	Mostly dead						
<i>Matai</i>	35							
<i>Kahi</i>	31	Mostly dead						
<i>Matai</i>	51							
<i>Matai</i>	40	dead						
<i>Matai</i>	50							
<i>Kahi</i>	26	Mostly dead						
<i>Matai</i>	30	Dead						
<i>Kahi</i>	30	border						
<i>Kahi</i>	30							
<i>kahi</i>	25							
<i>Kahi</i>	54							
<i>matai</i>	40	Mostly dead						
<i>Kahi</i>	34	Mostly dead						
<i>Kahi</i>	39							
<i>Matai</i>	45							
<i>Kahi</i>	46							
<i>Kahi</i>	31							
<i>Matai</i>	35							
<i>Kahi</i>	35							
<i>Kahi</i>	38	dead						
<i>Matai</i>	30	Mostly dead						
<i>Kahi</i>	24							
<i>Kahi</i>	33							
<i>Matai</i>	59							

## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 8				
Notes on sampling layout Creek runs through the plot; mostly flat surface, short grass and presence of weeds								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.881', E 172° 42.218', elev. 8m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	40							
<i>Kahi</i>	30							
<i>Matai</i>	40							
<i>Kahi</i>	45							
<i>Matai</i>	50							
<i>Kahi</i>	31							
<i>Matai</i>	30							
<i>Matai</i>	60							
<i>Kahi</i>	15							
<i>Matai</i>	35							
<i>Kahi</i>	19							
<i>Kahi</i>	40							
<i>Matai</i>	35							
<i>Matai</i>	40							
<i>Kahi</i>	30							
<i>Matai</i>	37							
<i>Kahi</i>	30							
<i>Matai</i>	55							
<i>Kahi</i>	35							
<i>Matai</i>	40							
<i>Matai</i>	50							
<i>Kahi</i>	35							
<i>Matai</i>	49							
<i>Kahi</i>	30							
<i>Kahi</i>	32							
<i>Kahi</i>	45							
<i>Kahi</i>	50							
<i>Kahi</i>	27							

<i>Kahi</i>	35							
<i>Kahi</i>	30							

### Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 8 (continues)				
First measurement (soon after planting) Date:			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	31							
<i>Kahi</i>	50							
<i>Kahi</i>	35							
<i>Kahi</i>	19							
<i>Kahi</i>	47							
<i>Kahi</i>	40							
<i>Kahi</i>	30							
<i>Kahi</i>	50							
<i>Kahi</i>	25							
<i>Kahi</i>	25							
<i>Kahi</i>	40							
<i>Kahi</i>	45							
<i>Kahi</i>	50							
<i>Kahi</i>	32							
<i>Kahi</i>	35							
<i>Kahi</i>	26							
<i>Kahi</i>	49							
<i>Kahi</i>	30							
<i>Kahi</i>	30							
<i>Kahi</i>	23							
<i>Kahi</i>	51							
<i>Matai</i>	70							
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Kahi</i>	47							
<i>kahi</i>	22							
<i>kahi</i>	30							
<i>Kahi</i>	34							
<i>Kahi</i>	29							
<i>Matai</i>	40							
<i>Kahi</i>	30							

## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 9				
Notes on sampling layout Mostly flat surface								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.875', E 172°42.231', elev. 9m			GPS Make & Model			GPS Accuracy		
Easting NE 10.66km				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	39							
<i>Kahi</i>	40							
<i>Kahi</i>	30							
<i>Kahi</i>	34							
<i>Kahi</i>	42							
<i>Kahi</i>	40							
<i>Kahi</i>	41							
<i>Kahi</i>	30							
<i>Kahi</i>	41	border						
<i>Kahi</i>	35							
<i>Kahi</i>	17							
<i>Matai</i>	50							
<i>Kahi</i>	32							
<i>Kahi</i>	25							
<i>Kahi</i>	27							
<i>Kahi</i>	35							
<i>Kahi</i>	35	border						
<i>Kahi</i>	28							
<i>Kahi</i>	42							
<i>Kahi</i>	40							
<i>Kahi</i>	30							
<i>Kahi</i>	29							
<i>Kahi</i>	15							
<i>Kahi</i>	25							
<i>Kahi</i>	30							
<i>Kahi</i>	32							
<i>Kahi</i>	30							
<i>Kahi</i>	35							

<i>Kahi</i>	30							
<i>Kahi</i>	32							
<i>Kahi</i>	30							
<i>Kahi</i>	22	Mostly dead						
<i>Kahi</i>	3							
<i>Kahi</i>	40							
<i>Kahi</i>	35	Dead						
<i>Kahi</i>	25							
<i>Kahi</i>	15	Halfway dead						
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Kahi</i>	35	Mostly dead						
<i>Kahi</i>	31							
<i>Kahi</i>	30							
<i>Kahi</i>	32							
<i>Kahi</i>	35	Mostly dead						
<i>Kahi</i>	34							
<i>Kahi</i>	35							
<i>Kahi</i>	21							
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Kahi</i>	54							
<i>Kahi</i>	28							
<i>Kahi</i>	23							
<i>Kahi</i>	18							
<i>Kahi</i>	31							
<i>Kahi</i>	31							
<i>Kahi</i>	30							
<i>Kahi</i>	20							
<i>Kahi</i>	25							

## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 10				
Notes on sampling layout Mostly flat surface, damp								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 10 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.857', E 172° 42.228', elev. 8m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 29/11/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	54							
<i>Kahi</i>	44							
<i>Kahi</i>	30							
<i>Kahi</i>	50							
<i>Kahi</i>	30							
<i>Kahi</i>	43	Border						
<i>Kahi</i>	32							
<i>Kahi</i>	34							
<i>Kahi</i>	30							
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Kahi</i>	32							
<i>Kahi</i>	30							
<i>Kahi</i>	35							
<i>Kahi</i>	37	Border						
<i>Kahi</i>	45							
<i>Kahi</i>	32							
<i>Kahi</i>	44							
<i>Kahi</i>	32							
<i>Kahi</i>	40							
<i>Kahi</i>	25	Dead						
<i>Kahi</i>	40							
<i>Kahi</i>	24							
<i>Kahi</i>	35							
<i>Kahi</i>	34							
<i>Kahi</i>	32							
<i>Kahi</i>	40							
<i>Kahi</i>	30							

<i>Kahi</i>	50							
<i>Kahi</i>	40							
<i>Kahi</i>	30							
<i>Kahi</i>	41							
<i>Kahi</i>	40							



## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 11				
Notes on sampling layout Mostly flat surface, wet/damp soil, low grass								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 20 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.861', E 172°42.207', elev. -60m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 02/12/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
Kahi	52							
Kahi	27							
Kahi	32							
Kahi	48							
Kahi	25							
Kahi	30							
Kahi	37							
Kahi	42							
Kahi	39							
Kahi	33							
Kahi	34							
Kahi	54							
Kahi	30							
Kahi	31							
Kahi	37							
Kahi	29							
Kahi	42							
Kahi	46							
Kahi	54							
Kahi	44							
Kahi	31							
Kahi	38							
Kahi	32							
Kahi	25							
Kahi	37							
Kahi	23							
Kahi	35							
Kahi	35							

<i>Kahi</i>	32							
<i>Kahi</i>	48							
<i>Kahi</i>	47							
<i>Kahi</i>	40							
<i>Kahi</i>	40							
<i>Kahi</i>	34							
<i>Kahi</i>	38							

## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 12				
Notes on sampling layout Mostly flat surface, damp								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 20 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.849', E 172°42.240', elev. 5m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 02/12/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
Kahi	20							
Kahi	23							
Kahi	22							
Kahi	25							
Kahi	22							
Kahi	33							
Kahi	26							
Kahi	31							
Kahi	50							
Kahi	41							
Kahi	19							
Kahi	60							
Kahi	37							
Kahi	22							
Kahi	34							
Kahi	50							
Kahi	34							
Kahi	32							
Kahi	32							
Kahi	47							
Kahi	46							
Kahi	33							
Kahi	44	border						
Kahi	32							
Kahi	42							
Kahi	32							
Kahi	40							
Kahi	40							

<i>Kahi</i>	31							
<i>Kahi</i>	24							

## Plot 12 (continues)

<i>Kahi</i>	50							
<i>Kahi</i>	52							
<i>Kahi</i>	50							
<i>Kahi</i>	47							
<i>Kahi</i>	27							
<i>Kahi</i>	25							
<i>Kahi</i>	24							
<i>Kahi</i>	31							
<i>Kahi</i>	35							
<i>Kahi</i>	40							
<i>Kahi</i>	14							
<i>Kahi</i>	44							
<i>Kahi</i>	44							
<i>Kahi</i>	29							
<i>Kahi</i>	32							
<i>Kahi</i>	50							
<i>Kahi</i>	25							
<i>Kahi</i>	21	Border						
<i>Kahi</i>	29							
<i>Kahi</i>	40							

# Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 13				
Notes on sampling layout Mostly flat surface, wet								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 20 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.832', E 172° 42.242', elev. 6m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 02/12/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
Kahi	31							
Kahi	35							
Kahi	48							
Kahi	45							
Kahi	35							
Kahi	30							
Kahi	34							
Kahi	42							
Kahi	40	Under water, looks quite unhealthy						
Kahi (?)	0	Dead, couldn't find seedling						
Kahi	24	Under water, looks alright						
Kahi	53							
Kahi	45							
Kahi	46	Under water, looks alright						
Kahi	42							
Kahi	53							
Kahi	50							
Kahi	32							
Kahi	45							
Kahi	36							
Kahi	59							
Kahi	32							
Kahi	31							
Kahi	39							
Kahi	31							
Kahi	29							
Kahi	34							
Kahi	56							

<i>Kahi</i>	40							
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### Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 13 (continues)				
First measurement (soon after planting) Date:			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	45							
<i>Kahi</i>	32							
<i>Kahi</i>	32							
<i>Kahi</i>	40							
<i>Kahi</i>	40							
<i>Kahi</i>	31							
<i>Kahi</i>	45							
<i>Kahi</i>	30							
<i>Kahi</i>	23							
<i>Kahi</i>	30							
<i>Kahi</i>	33							
<i>Kahi</i>	50							
<i>Kahi</i>	42							
<i>Kahi</i>	37							
<i>Kahi</i>	30							
<i>Kahi</i>	33							
<i>Kahi</i>	40							
<i>Kahi</i>	60							
<i>Kahi</i>	31							
<i>Kahi</i>	37							
<i>Kahi</i>	32							

# Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 14				
Notes on sampling layout Mostly flat surface, wet								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 20 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.817', E 172° 42.242', elev. 7m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 02/12/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	31							
<i>Kahi</i>	35							
<i>Kahi</i>	48							
<i>Kahi</i>	45							
<i>Kahi</i>	35							
<i>Kahi</i>	30							
<i>Kahi</i>	34							
<i>Kahi</i>	42							
<i>Kahi</i>	40	Under water, looks quite unhealthy						
<i>Kahi</i> (?)	0	Dead, couldn't find seedling						
<i>Kahi</i>	24	Under water, looks alright						
<i>Kahi</i>	53							
<i>Kahi</i>	45							
<i>Kahi</i>	46	Under water, looks alright						
<i>Kahi</i>	42							
<i>Kahi</i>	53							
<i>Kahi</i>	50							
<i>Kahi</i>	32							
<i>Kahi</i>	45							
<i>Kahi</i>	36							
<i>Kahi</i>	59							
<i>Kahi</i>	32							
<i>Kahi</i>	31							
<i>Kahi</i>	39							
<i>Kahi</i>	31							
<i>Kahi</i>	29							
<i>Kahi</i>	34							
<i>Kahi</i>	56							

<i>Kahi</i>	40							
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### Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 14 (continues)				
First measurement (soon after planting) Date:			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	45							
<i>Kahi</i>	32							
<i>Kahi</i>	32							
<i>Kahi</i>	40							
<i>Kahi</i>	40							
<i>Kahi</i>	31							
<i>Kahi</i>	45							
<i>Kahi</i>	30							
<i>Kahi</i>	23							
<i>Kahi</i>	30							
<i>Kahi</i>	33							
<i>Kahi</i>	50							
<i>Kahi</i>	42							
<i>Kahi</i>	37							
<i>Kahi</i>	30							
<i>Kahi</i>	33							
<i>Kahi</i>	40							
<i>Kahi</i>	60							
<i>Kahi</i>	31							
<i>Kahi</i>	37							
<i>Kahi</i>	32							



## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 15				
Notes on sampling layout Mostly flat surface, dry, on a higher ground								
Transect/grid bearing (degrees)				Transect/grid line no.				
Plot point distances								
Transect type and size								
Plot type and size Circular – 20 m radius								
Average plot slope (degrees)				Average plot aspect (degrees)				
GPS Reference S 43°19.837', E 172° 42.222', elev. 5m			GPS Make & Model			GPS Accuracy		
Easting				Northing				
First measurement (soon after planting) Date: 02/12/2016			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	34							
<i>Kahi</i>	54							
<i>Kahi</i>	48							
<i>Kahi</i>	23							
<i>Kahi</i>	25							
<i>Kahi</i>	28							
<i>Kahi</i>	59							
<i>Kahi</i>	38							
<i>Kahi</i>	54							
<i>Kahi</i>	30							
<i>Kahi</i>	44	Border						
<i>Kahi</i>	33							
<i>Kahi</i>	40							
<i>Kahi</i>	38							
<i>Kahi</i>	56							
<i>Kahi</i>	32							
<i>Kahi</i>	32							
<i>Kahi</i>	22							
<i>Kahi</i>	37							
<i>Kahi</i>	26							
<i>Kahi</i>	39							
<i>Kahi</i>	32							
<i>Kahi</i>	24							
<i>Kahi</i>	30							
<i>Kahi</i>	41							
<i>Kahi</i>	24							
<i>Kahi</i>	17							
<i>Kahi</i>	33							

<i>Kahi</i>	44							
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## Trees That Count - Monitoring of planted natives - Fieldsheet

Page .... of.....

Complete one for each plot or transect

Planting site name/identifier						Date planted		
Transect No.				Plot No. 15 (continues)				
First measurement (soon after planting) Date:			Second measurement Date:			Third measurement Date:		
Species	Height (cm)	Notes	Species	Height (cm)	Notes	Species	Height (cm)	Notes
<i>Kahi</i>	45							
<i>Kahi</i>	50	Border						
<i>Kahi</i>	50							
<i>Kahi</i>	44							