Appendix B

Supplementary results from the prevalence study – descriptive summary of host, environment and anthropogenic risk factors and ecological impact factors from Chapter 2

Ngā hua āpiti i tētahi mātai e tukupū ana

This appendix contains supplementary tables and descriptive summaries of some survey results, including host, environmental and anthropogenic risk factors.

B1 Host detection

Te kitenga o te papa rauropi

Table B-1. Tree species that were misclassified as kauri trees using remote sensing for host detection.

Misclassified trees common names (scientific name)	Number of tree sites	Percent of tree sites
Not recorded	132	5%
Rimu (*Dacrydium cupressinum*)	80	3%
Rātā (*Metrosideros robusta)*	35	1%
Rewarewa (*Knightia excelsa*)	32	1%
Kahikatea (*Dacrycarpus dacrydioides*)	24	1%
Pine (*Pinus radiata, P.* spp.)	24	1%
Tanekaha (*Phyllocladus trichomanoides*)	7	0.3%
Pūriri (*Vitex lucens*)	2	0.08%
Tawa (*Beilschmiedia tawa*)	2	0.08%
Matai (*Prumnopitys taxifolia*)	1	0.04%
Pōhutukawa (*Metrosideros excelsa*)	1	0.04%
Taraire (*Beilschmiedia tarairi*)	1	0.04%
Wattle (dead) (*Acacia* spp.)	1	0.04%
Total	**342**	**14%**

B2 Basal lesions

Ngā tūnga pukupuku ā-kiri

Field surveyors assessed that 16% of trees (338) had lesions that were consistent with possible or severe kauri dieback, and 6% of trees (125) had lesions that were not consistent with kauri dieback (assessed as non-symptomatic or ill-thrift) (Table B-2). There were surveyor comments for 14 of the basal bleed observations noting that bleeds were caused by physical damage. Where details were given about physical damage, the most common comments were that fallen branches and epiphytic climbers had dislodged and caused the bleed.

Table B-2. Numbers and proportion of monitored kauri trees (n=2140) with basal or lateral root bleeds present, stratified by kauri dieback field status.

Kauri dieback field status class	Disease lesions present	Disease lesions absent	Percent of trees with lesions present in each class
Non-symptomatic kauri	68	1145	6%
Kauri with ill thrift (probably not kauri dieback)	57	224	20%
Kauri with possible kauri dieback symptoms	301	304	50%
Kauri with severe kauri dieback symptoms	37	4	90%

The surveyors also added comments to 54 observations that had been scored as not having basal bleeds. These were typically referring to non-basal type bleeds that were higher up the tree and caused by physical damage (fallen branches, split trunks etc).

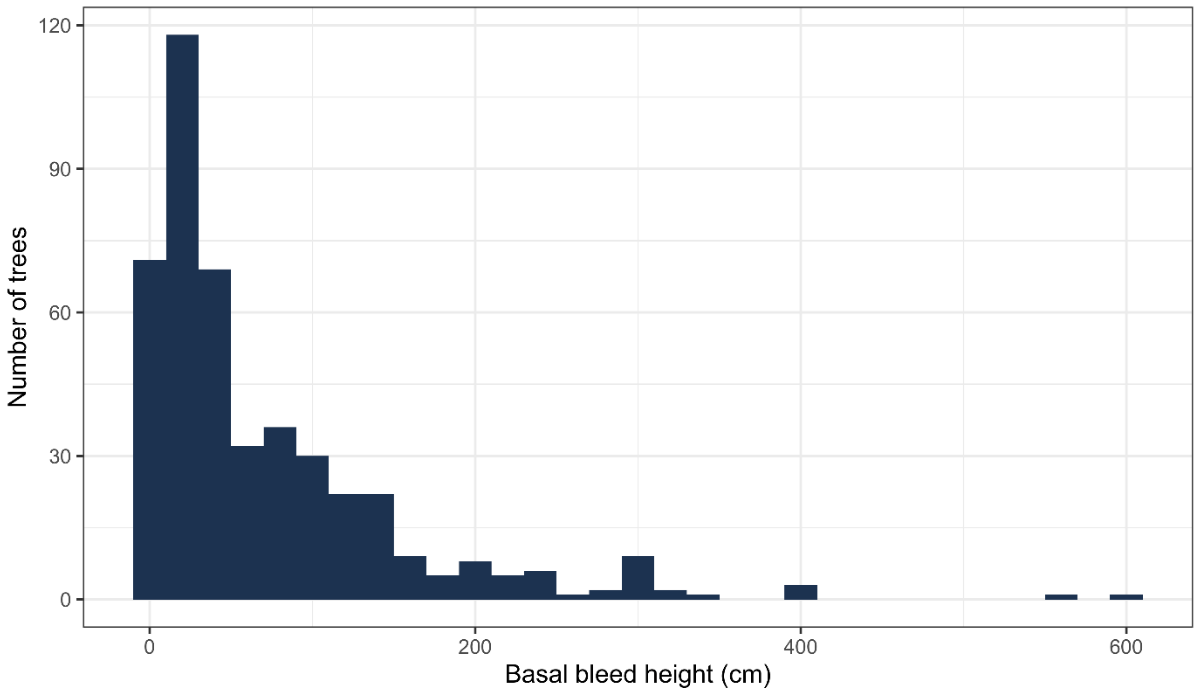

Figure B-1. Frequency histogram showing the number of trees in each 20 cm increment of basal bleed heights from 453 trees with basal bleeds present.

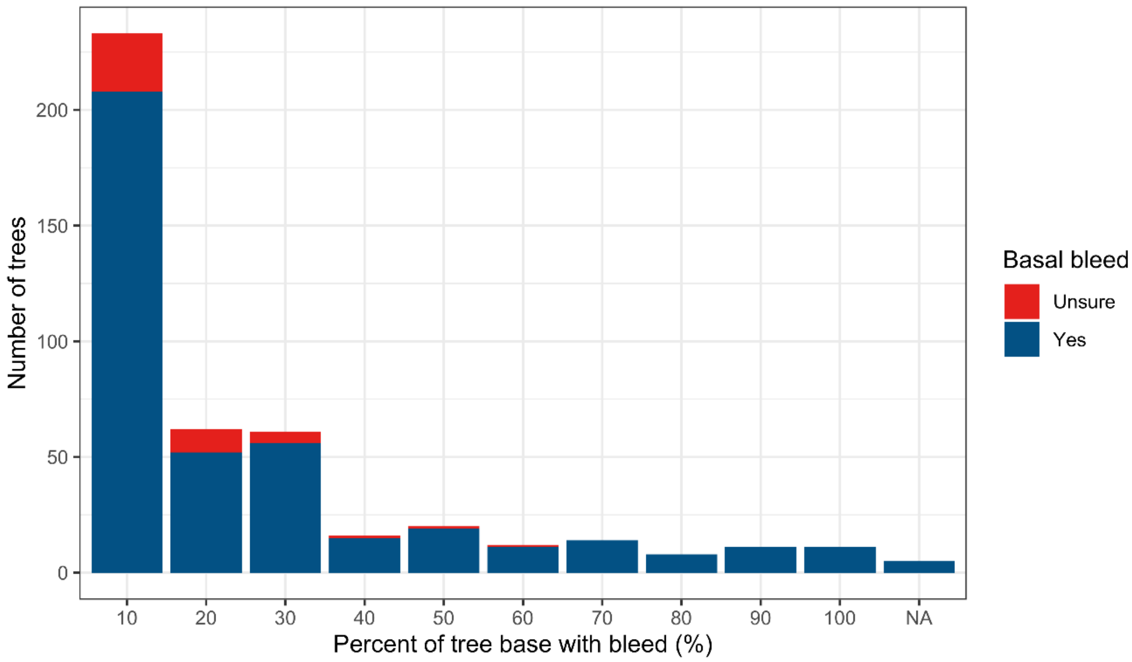

Figure B-2. Percent of the tree base affected by a basal lesion (bleed) from 453 monitored trees with basal lesions.

B3 Canopy health

Te hauora o ngā kāuru

Table B-3. Number and percent of monitored trees (n=2140) with different canopy health scores. Note that fully dead trees were reported separately.

Canopy score	Number of trees	Percent of trees
1 – Healthy crown	182	9%
1.5	845	39%
2 – Foliage/canopy thinning	652	30%
2.5	293	14%
3 – Some branch dieback	116	5%
3.5	40	2%
4 – Severe dieback	8	0.4%
4.5	4	0.2%
5 – Dead	NA	NA

B4 Approved observer kauri dieback field status

Te āhua o te puruheka patu kauri o te wā e ai ki te kaimātai kua whakaaetia

As part of the symptomatic criteria calculation, the surveyors assessed the field status of trees based on all observed symptoms of the individual tree and drawing on their experience in assessing kauri dieback in the field. Surveyors were instructed not to take the health status of nearby kauri into account as we were interested in disease expression of kauri dieback in the monitored trees. Most trees were assessed as non-symptomatic (57%) or possible kauri dieback (28%) with few showing severe kauri dieback symptoms (2%) (Table B-4).

Table B-4. Number and percent of 2140 kauri trees assessed by surveyors to have different kauri dieback field status scores.

Kauri dieback field status	Number of trees	Percent of trees
Non-symptomatic kauri	1213	57%
Kauri with ill-thrift probably not kauri dieback	281	13%
Kauri with possible kauri dieback symptoms	605	28%
Kauri with severe kauri dieback symptoms	41	2%

Basal bleeds and poor canopy scores were jointly involved in classifying the kauri dieback field status by surveyors (Figure B-3; Figure B-4). Likewise, a small number of trees that were scored as non-symptomatic and ill-thrift had canopy health scores of 2.5 and 3 but were also assessed by the surveyor to not be consistent with kauri dieback (Figure B-4). Almost all trees scored as severe dieback had basal bleeds and the 4 that did not have basal bleeds had canopy scores of 3.5.

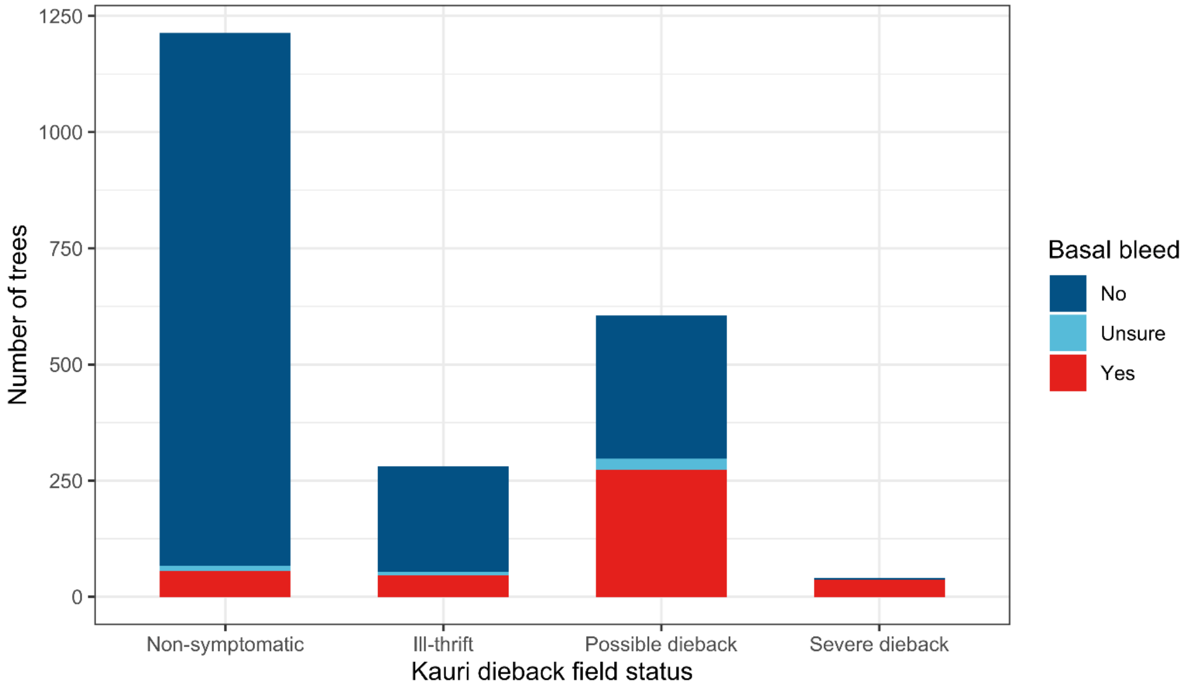

Figure B-3. Bar chart showing frequencies of kauri dieback field status assessment by presence or absence of basal bleeds.

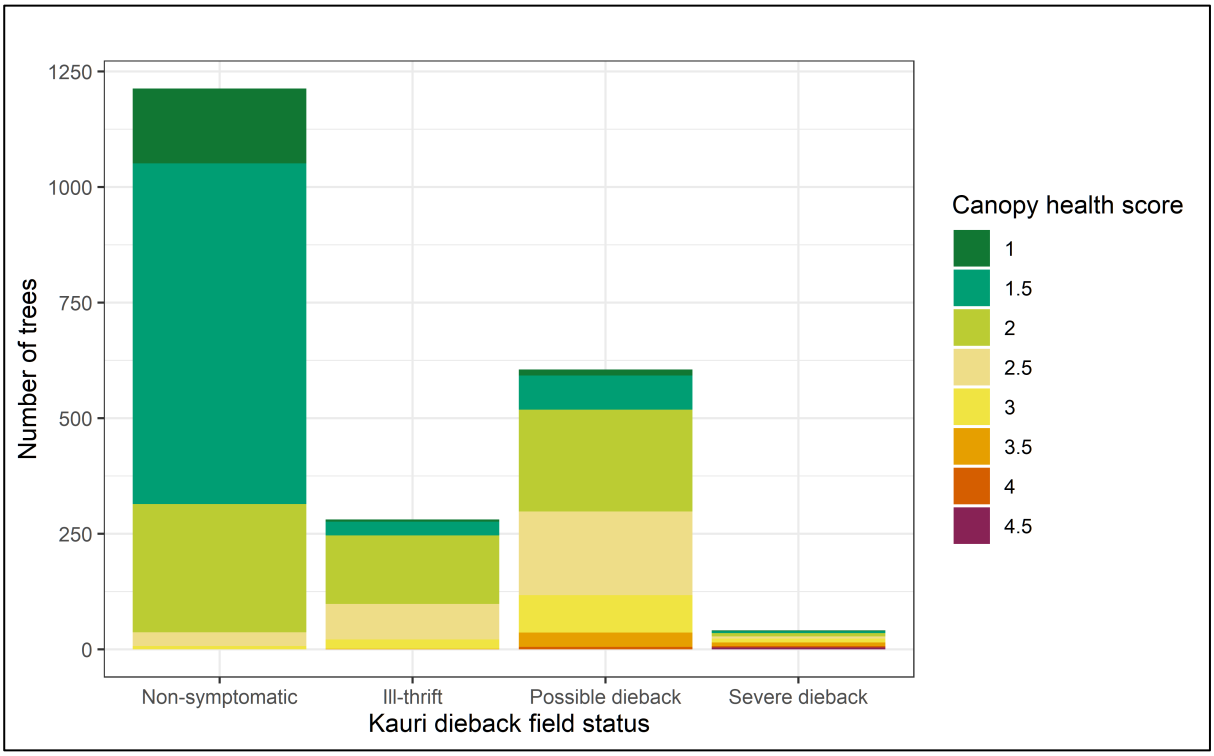

Figure B-4. Bar chart showing frequencies of kauri dieback field status assessment by canopy health scores.

B5 Host factors

Ngā āhuatanga ā-papa rauropi

B5.1 Age class

Figure B-5. Canopy images showing the range in size from one of the smallest trees in the study (DBH of 13 cm) and one of the largest trees with a DBH of 317 cm.

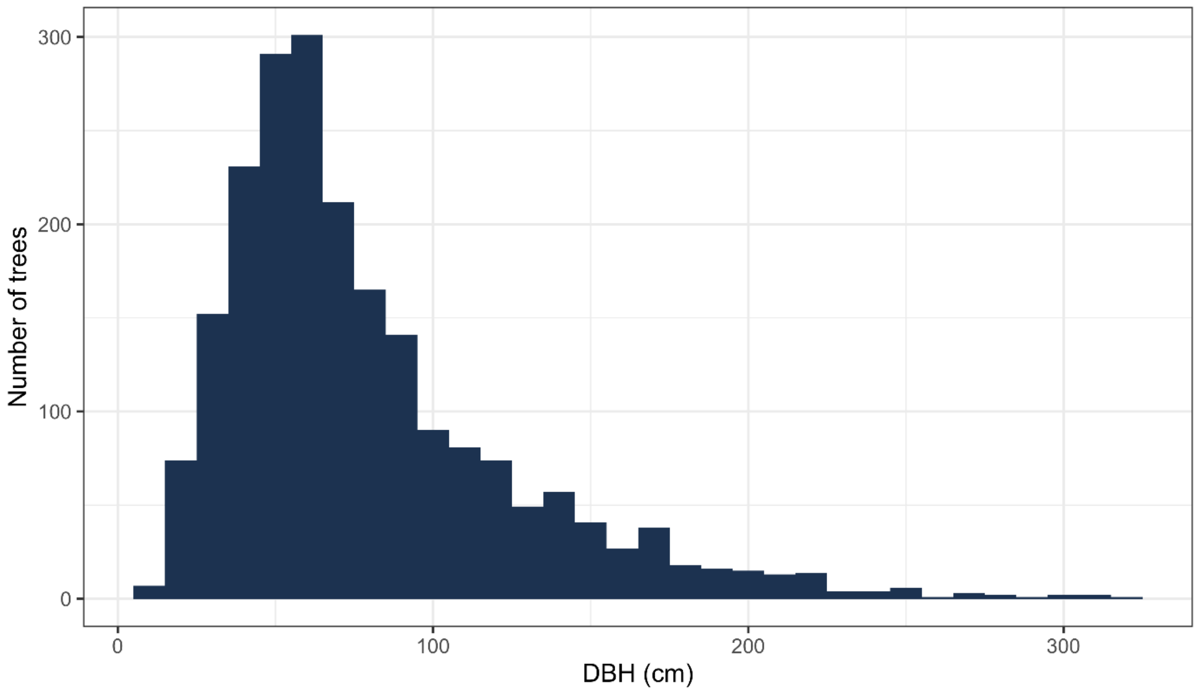

Figure B-6. Frequency histogram showing diameter at breast height (DBH) of monitored kauri trees (with a bin width of 10 cm).

Within the size classes that were eligible for monitoring (i.e., >15 m tall and >10 cm DBH) we found that the cut-over regenerating forest was dominated by intermediate size class trees with only 6% mature trees. In contrast the mature forest stand, while still dominated by intermediate trees, had a quarter of the trees in the mature size class (Table B-5).

Table B-5. Number and percent of monitored kauri trees in each size class (Ricker <150 cm; Intermediate 150-450 cm and mature >450 cm circumference), stratified by host origin forest type from 2133 observations.

Host origin	Ricker	Intermediate	Mature
Cut-over regenerating	448 (29%)	1035 (66%)	88 (6%)
Farmland	7 (39%)	11 (61%)	0 (0%)
Mature forest stand	63 (12%)	321 (62%)	130 (25%)
Other/Unsure	3 (21%)	11 (79%)	0 (0%)
Plantation kauri	3 (43%)	4 (57%)	0 (0%)
Restoration planting	3 (33%)	6 (67%)	0 (0%)
Total	527 (25%)	1388 (65%)	218 (10%)

Young seedlings were seen at 36% (524) of sites and established seedlings were seen at 24% (350) of sites. Saplings were seen at 36% of sites (525). The number of saplings present was typically between 1 and 5 when present (Table B-6).

Table B-6. Number of kauri tree monitoring sites where saplings were observed within 5 m of the trunk of the kauri tree, stratified by the range of counts of saplings per site from 1452 sites.

Range of sapling counts	Number of sites	Percent of sites
0	927	64%
1 to 5	400	28%
6 to 10	60	4%
>10	65	4%

B5.2 Epicormic growth

The presence of epicormic growth was assessed at 1453 sites and was observed at 11% of sites (153) and was widely distributed throughout the landscape (Figure B-7).

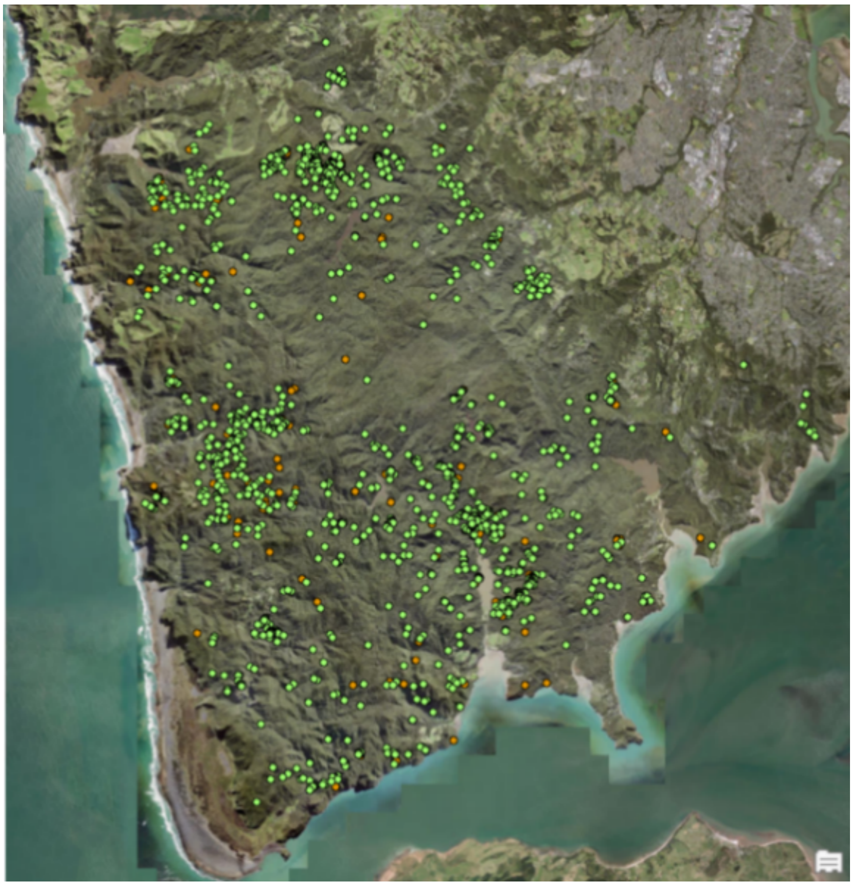

Figure B-7. Spatial distribution of monitored kauri trees in green with those showing epicormic growth in orange.

B5.3 Host phenology

A total of 1452 trees were assessed to see if they had active growth flush in the canopy. The surveyors gave feedback that it was difficult to observe growth flush in the canopy, especially if it was a dull day or if the sun was directly above the tree. Likewise female seed cones were difficult to observe. For 27% of observations (395 trees) growth flush was not able to be seen. For the remaining 1057 trees, a growth flush was observed in just under half of the trees (49%, n=522). This differed by month and was increasingly detected over time. There was a decrease in the 'not visible' category over time, possibly due to a seasonal difference in direct sunlight (Figure B-8).

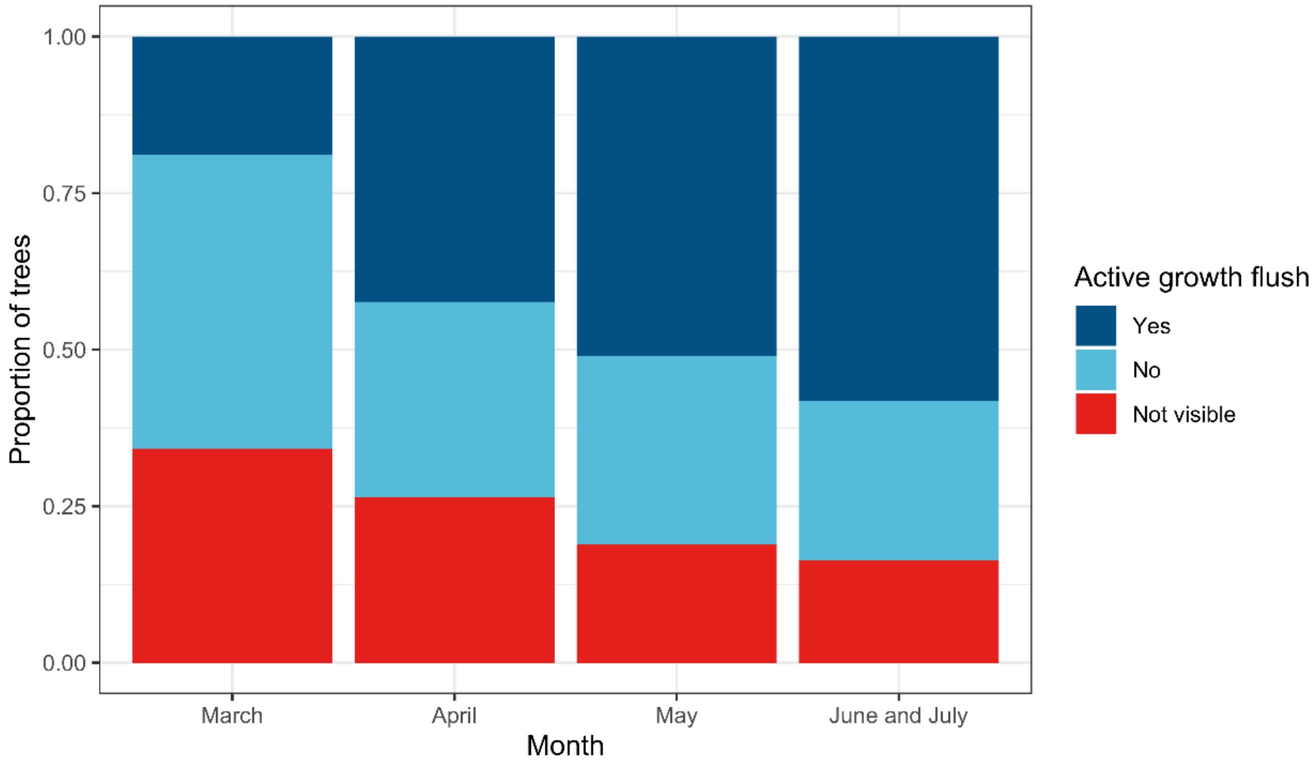

Figure B-8. Difference in the proportion of trees with active growth flush over time.

The presence of female cones was monitored on 1453 of the trees (including all soil sampled trees). They were observed on only 87 trees, were not present on 714 and were not visible for 652 of the trees. The detection of seed cones followed a seasonal pattern with 69% of cones seen in March with a drop-off over autumn (Figure B-9). Of the trees with seed cones present, 94% had visible cone scales on the forest floor from observations spanning from early-March to mid-May, indicating that the cones were mature and dropping during the survey. The 6% that did not have dropped scales spanned from late March to late June and may have included immature cones. Some monitored trees were too young to be reproductive as small ricker trees are typically not reproductive until they are 25-40 years old (Steward and Beveridge, 2010).

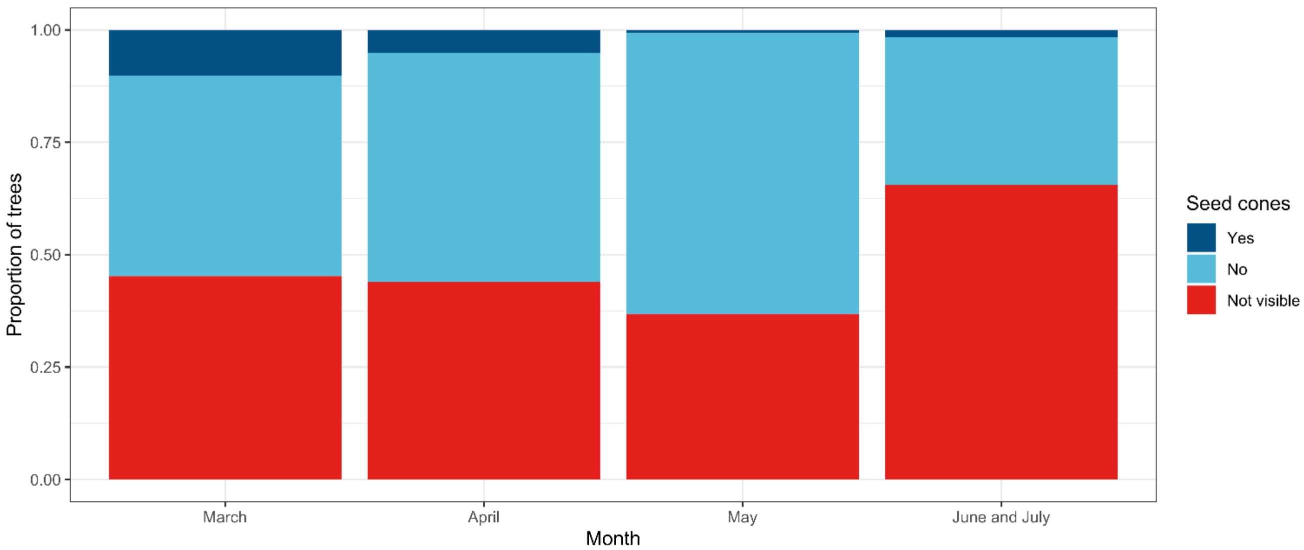

Figure B-9. Proportion of trees with female seed cones visible over time of monitoring (n=87).

B6 Environmental factors

Ngā āhuatanga ā-take taiao

B6.1 Nearby kauri with dieback

The canopy of nearby kauri showed evidence of canopy dieback in 28% of sites (597), no evidence at 41% of sites (876) and surveyors recorded that they were unsure at 5% of sites (116).

Kauri dieback basal bleeds on nearby kauri trees were difficult to observe from a distance and only bleeds visible from the monitored tree were counted. Of these, basal bleeds were observed on nearby trees of 7% of trees (145 in total, 77 near symptomatic kauri trees and 68 near non-symptomatic trees). A further 14% of trees (305) had suspected basal bleeds (where the surveyor was unsure) on nearby kauri trees. As absence was not reliably recorded, statistical significance was not calculated.

B6.2 Other species decline

Of the 1590 trees where ecological impact data were collected, there were 113 sites (7%) where other tree species were showing signs of decline and a further 86 (5%) sites where surveyors were unsure. Of the sites where decline was observed on other species, 89 had a description of the species that were showing decline, which were typically just one other species (n=71). There were 11 observations with 2 species showing decline, 6 of 3 species and 1 of 5 species. The most common species reported declining was kānuka followed by tanekaha (Table B-7).

Table B-7. Non-kauri plant species showing signs of decline at 89 kauri tree monitoring sites.

Common name	Species name	Number of sites
Kānuka	*Kunzea robusta*	48
Tanekaha	*Phyllocladus trichomanoides*	16

Māmāngi	*Coprosma arborea*	8
Lancewood	*Pseudopanax crassifolius*	8
Rewarewa	*Knightia excelsa*	7
Mingimingi	*Leucopogon fasciculatus*	5
Shining karamū	*Coprosma lucida*	4
Heketara	*Olearia rani*	4
Large-leaved māhoe	*Melicytus macrophyllus*	4
White maire	*Nestegis lanceolata*	3
Māpou	*Myrsine australis*	3
Kauri grass	*Astelia trinervia*	2
Miro	*Pectinopitys ferruginea*	2
Kirk's tree daisy	*Brachyglottis kirkii*	1
Rimu	*Dacrydium cupressinum*	1

B6.3 Distance to coastline or harbour

The distribution of trees in relation to distance to the high tide water mark of the ocean (including Manukau harbour) was bimodal in that trees were either quite close or far apart from the ocean or harbour (Figure B-10). The median distance was 3234 m (25th percentile 2021 m; 75th percentile 5944 m; min 4 m; max 8123 m).

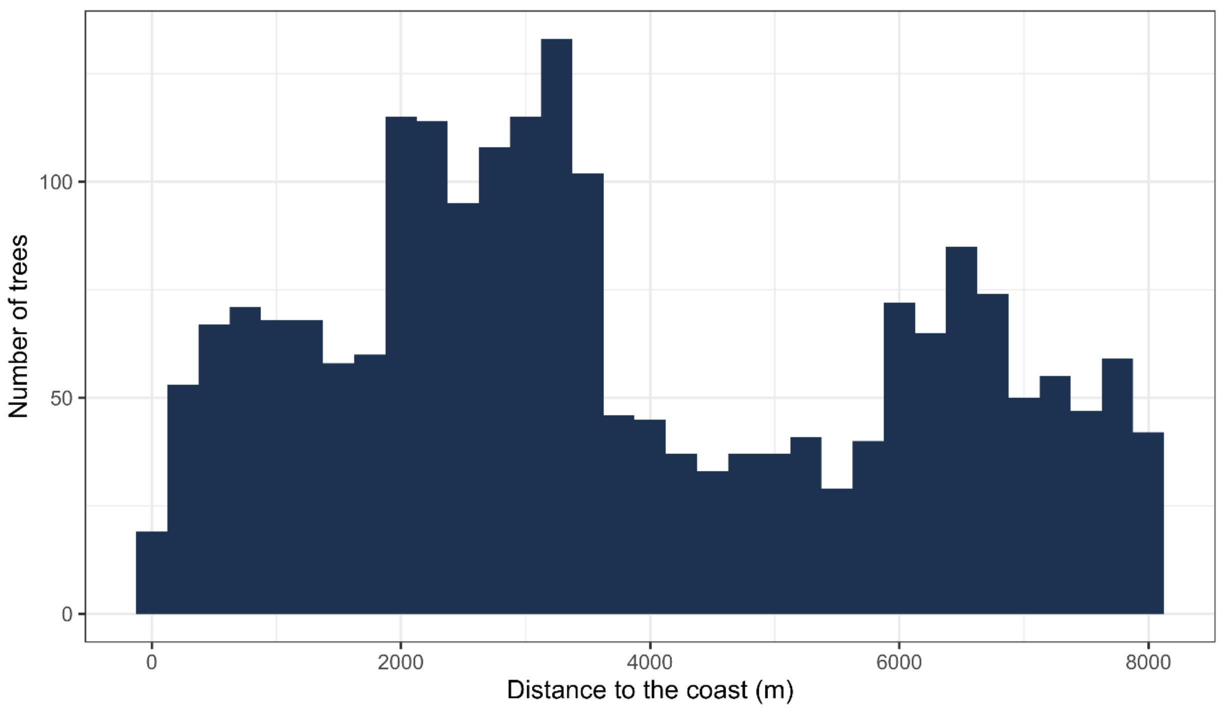

Figure B-10. Frequency histogram showing the number of trees at increasing distance (metres) from the high tide water mark of the coast (or harbour) of 2140 monitored kauri trees with a bin width of 250 m.

B6.4 Elevation

The range of elevation was slightly skewed to the left (Figure B-11) for the 2140 monitored trees with a median elevation of 182 m (25th percentile 134 m; 75th percentile 233 m; min 29 m; max 424 m). This was similar for the 761 soil sampled trees with a median of 184 m (25th percentile 135 m; 75th percentile 240 m; min 32 m; max 424 m).

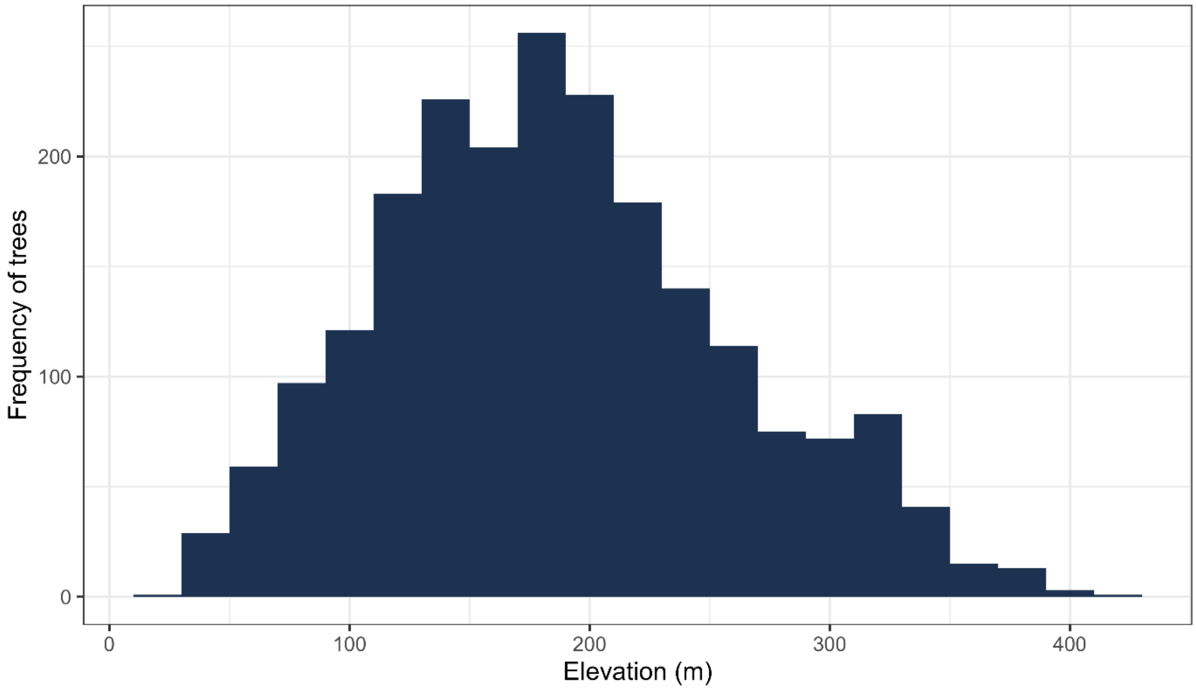

Figure B-11. Frequency histogram showing the elevation distribution in metres of 2140 kauri trees monitored in the Waitākere Ranges Regional Park.

B6.5 Aspect

The 2140 monitored trees were evenly distributed between aspects (Table B-8), with slightly more in the southwest.

Table B-8. Frequency of trees in each aspect group.

Aspect	Total in group	Percent in group
North	242	11%
Northeast	238	11%
East	274	13%
Southeast	285	13%
South	265	12%
Southwest	307	14%
West	288	13%
Northwest	241	11%

B6.6 Slope

The median slope of the 2140 trees was 25° (25th percentile 17°; 75th percentile 33°) with a maximum slope of 67°, which is extremely difficult terrain for ground surveillance teams (Figure B-12).

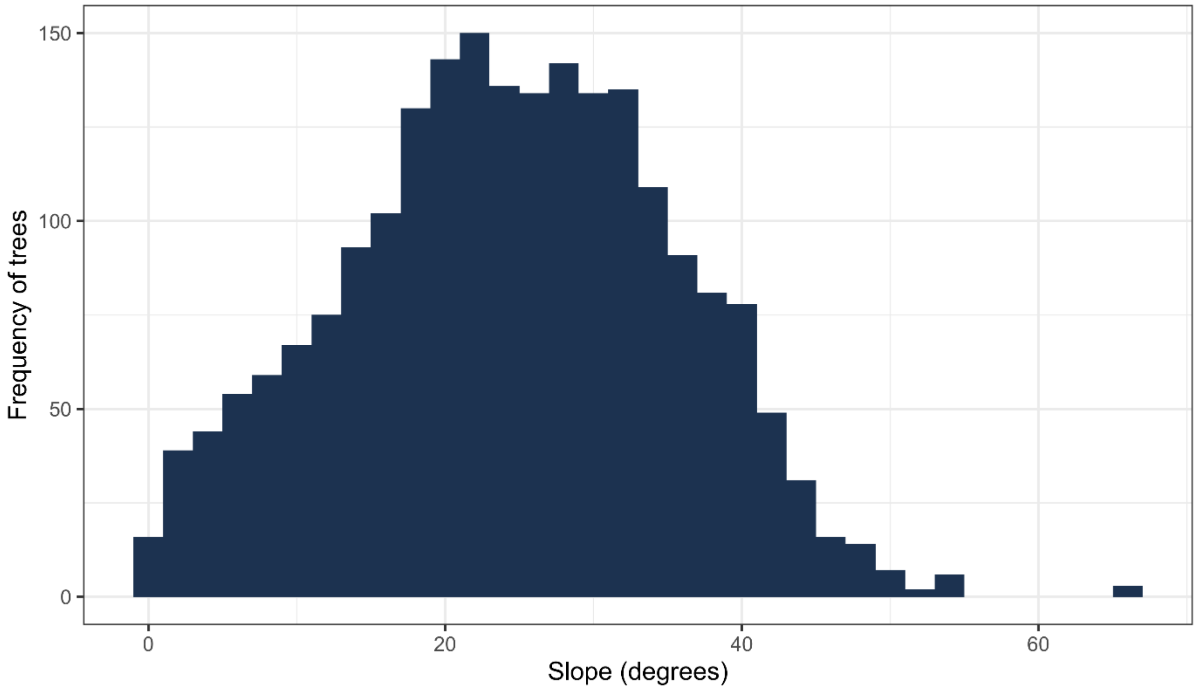

Figure B-12. Frequency histogram showing the distribution of slope in degrees of 2140 monitored kauri sites.

B6.7 Depth to water index

The cartographic depth-to-water index, which indicates how many vertical metres the base of the tree was above a saturated surface of water (overland flow path, stream, dam, wetland), was slightly left skewed with a median value for the 2140 monitored trees at 59 m above surface water (25th percentile 32 m; 75th percentile 81 m; min 0 m; max 227 m) (Figure B-13).

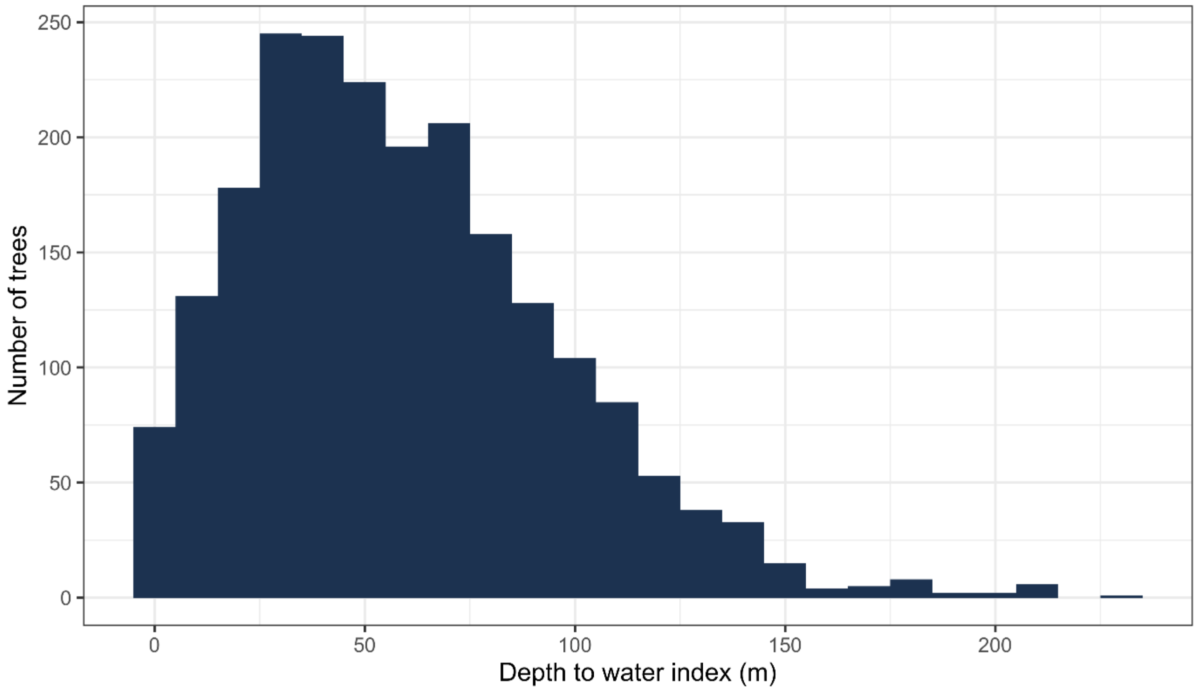

Figure B-13. Frequency histogram showing the number of trees at different depths to water using a depth to water index in metres with a bin width of 10 m.

B6.8 Distance to closest overland flow path

The distance to the closest overland flow path was left skewed with a median value for the 2140 monitored trees at 30 m (25th percentile 17 m; 75th percentile 45 m; min 0 m; max 107 m) (Figure B-14).

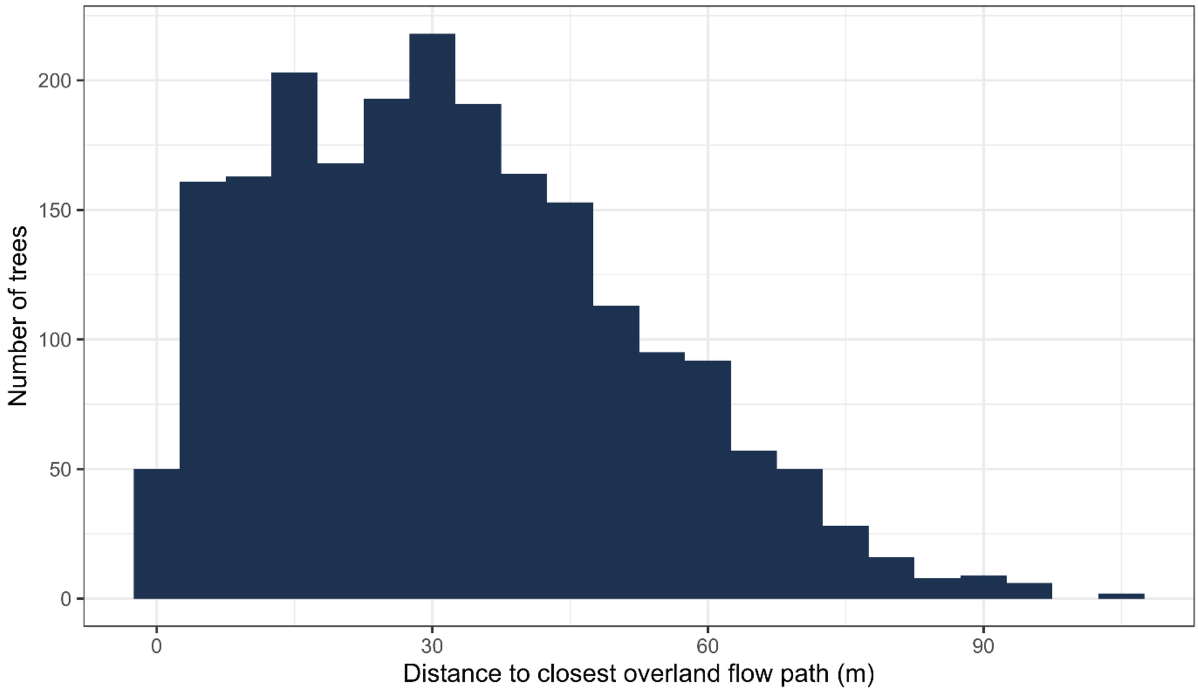

Figure B-14. Frequency histogram showing the number of trees at different distances to the closest overland flow path in metres with a bin width of 5 m.

B6.9 Distance to historic timber sites

The distance to the closest historic timber mill or sawpit sites was left skewed with a median value for the 2140 monitored trees at 1350 m (25th percentile 824 m; 75th percentile 2119 m; min 60 m; max 4605 m) (Figure B-15).

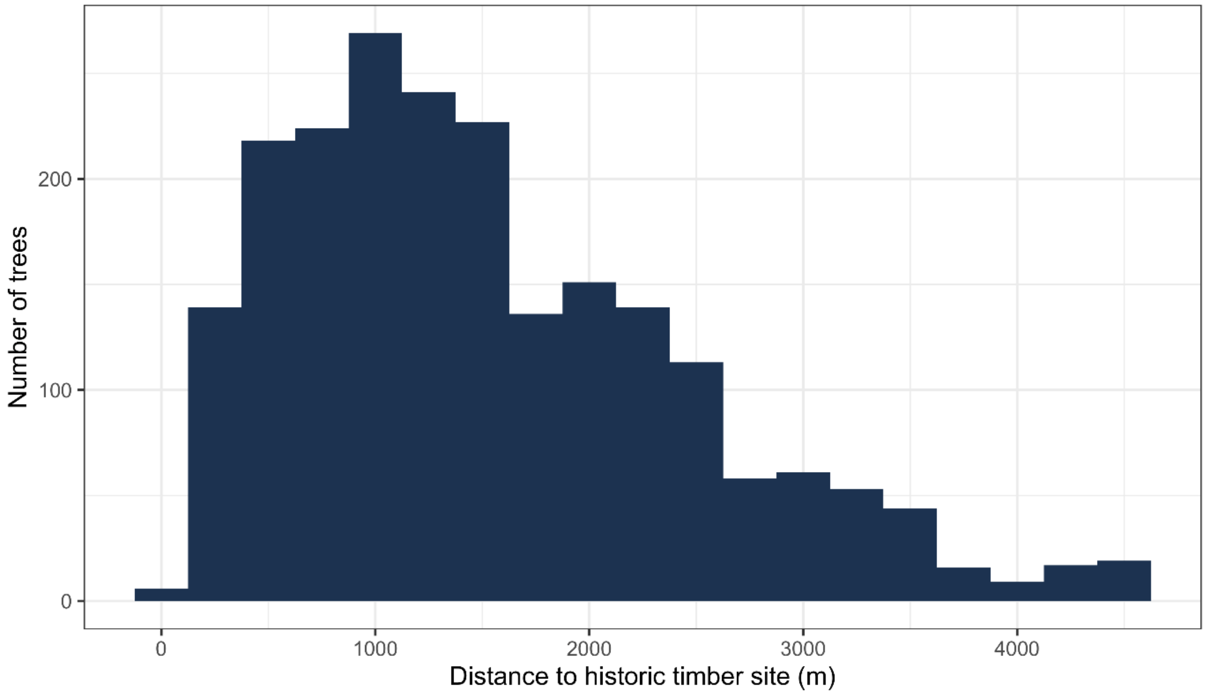

Figure B-15. Frequency histogram showing the number of trees at different distances to the closest historic timber mill in metres with a bin width of 250 m.

B6.10 Landcover database types

Of the 2140 monitored trees, 90% were within the indigenous forest class (n=1917), with only 7% in the mānuka or kānuka class (n=159), 3% in the broadleaved indigenous hardwoods class (n=63) and one tree in exotic grassland which was right on the edge of the forest adjacent to grass parkland.

B6.11 Ecosystem types

Ecosystem types are a finer classification than the landcover types (Singers and Rogers, 2014). The most common ecosystem type that the monitored trees were in was kauri podocarp broadleaved forest, followed by broadleaved scrub forest which is characterised as short forest. (Table B-9).

Table B-9. Total and proportion of trees by ecosystem type for 2140 monitored kauri trees.

Ecotype	Total	Proportion
Coastal broadleaved forest	16	1%
Kauri podocarp broadleaved forest	1320	62%

Kānuka scrub forest	166	8%
Broadleaved scrub forest	250	12%
Mānuka kānuka scrub	133	6%
Tawa kohekohe rewarewa hīnau podocarp forest	50	2%
Kauri forest	192	9%
Exotic forest	4	0%
Hebe wharariki flaxland rockland	1	0%

B7 Anthropogenic factors

Ngā āhuatanga ā-take tangata

Table B-10. Ecological origin of the kauri trees surveyed in the Waitakere Ranges, n=2140.

Host origin	Number of trees	Percent of trees
Cut-over regenerating	1576	65%
Mature forest stand	516	21%
Farmland	18	0.7%
Restoration planting	9	0.4%
Plantation kauri	7	0.3%
Unsure/other (not stated)	14	0.6%

B7.1 Evidence of disturbance

Evidence of disturbance was recorded at 23% of sites (490/2140 sites) and some sites had multiple disturbance types. Evidence of disturbance from being nearby a track was the most common (n=136), however surveyors were not asked to specify how the track was disturbing the tree. This was followed by human or animal off-track use which had 47 observations. Evidence of pest control or hoofed animals away from tracks also indicates off-track use by humans or animals and when those disturbances were added, this increased the human or animal off-track disturbance count to 281 trees. All other categories of disturbance were infrequent.

Table B-11. Number of trees with evidence of disturbance nearby.

Disturbance Type	Percent of trees	Number of trees
Animal pest control or bait-line	1.4%	29
Fallen tree or windthrow	1.6%	35
Fungal fruiting bodies	0.3%	6
Large, hooved animals (total)	2.1%	46
Hooved animals (excluding pigs)	1.0%	21
Pig damage to trunk	0.3%	7
Pig wallowing	0.8%	18

Human or animal off-track[a]	2.2%	47
Insect damage to trunk	0.4%	9
Invasive weed presence	0.3%	7
Phosphite use	0.4%	8
Poor drainage	0.0%	1
Possum browse	0.4%	9
Slip or landslide	0.6%	12
Track	6.4%	136
Track or road maintenance	0.9%	19
Other (all)[b]	3.0%	64
Other – road	0.4%	9
Other – stream	0.2%	4
Other – soil erosion	0.4%	8
Other – private land	0.2%	5
Other – tree damaged	0.3%	6
Other – neighbouring tree disturbance	0.3%	6

[a] While only 2.2% (47) of trees had human or animal off-track disturbance recorded, in total 13.1% (281) of trees that were not recorded as being near tracks had bait-lines, pest control, phosphite or research, pigs or hoofed animals recorded, which indicates additional off-track use.
[b] If other was recorded by the surveyor, they gave a description and the most common are presented.

B7.2 Closest roads

The distance to the closest road or track was highly left skewed with a median value for the 2140 monitored trees at 142 m (25th percentile 60 m; 75th percentile 274 m; min 0 m; max 981 m). All monitored trees were within 1 km of a road or foot track. The closest road or track class was dominated by foot tracks, followed by minor rural roads, which is expected with only a few main roads through the Waitākere Ranges Regional Park. There were no data on the road or track surface for most observations (94%). Access roads (urban or rural) are restricted service roads within the Ranges.

Table B-12. Prevalence of symptomatic kauri trees for different types of road classes closest to each of 2140 monitored kauri trees.

Road class	Symptomatic	Non-symptomatic	Total	Prevalence
Restricted access urban	5	7	12	42%
Minor urban	9	27	36	25%
Arterial rural	11	41	52	21%
Medium rural	5	19	24	21%
Minor rural	29	114	143	20%

Foot track	346	1452	1798	19%
Restricted access rural	6	48	54	11%
Arterial urban	2	16	18	11%
Foot path	0	1	1	0%
Medium urban	0	2	2	0%

B7.3 Closest tracks

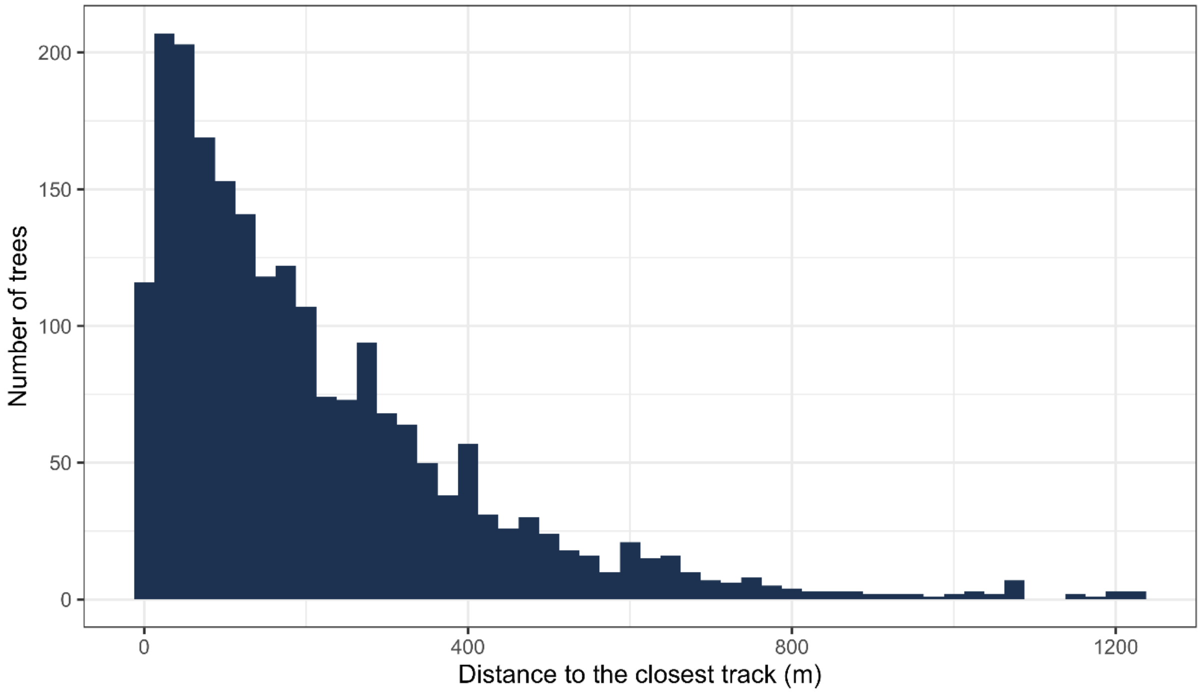

Figure B-16. Frequency histogram showing the distribution of distance to the closest track for 2140 monitored trees with a bin width set at 25 m.

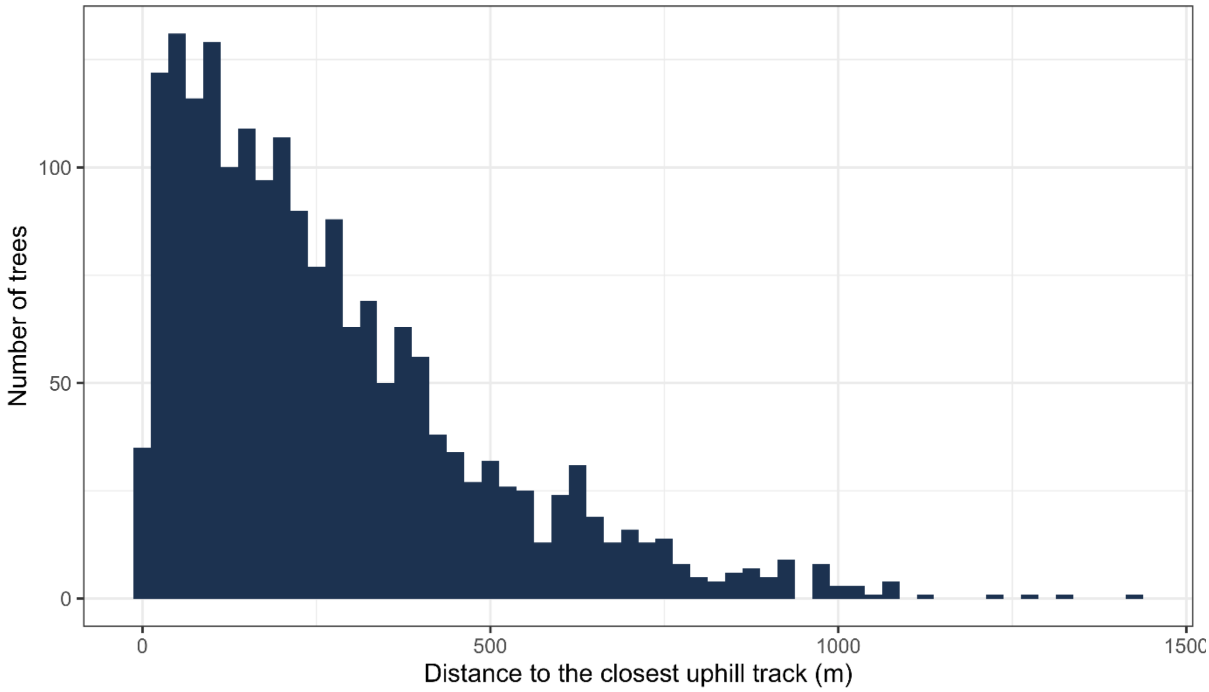

Figure B-17. Frequency histogram showing the distribution of the distance to the closest uphill track for 1895 monitored trees with a bin width set at 25 m.

B7.4 Distance to park boundary

The distance to the closest park boundary was left skewed with a median value for the 2140 monitored trees at 806 m (25th percentile 327 m; 75th percentile 1361 m; min 0.6 m; max 3191 m) (Figure B-18).

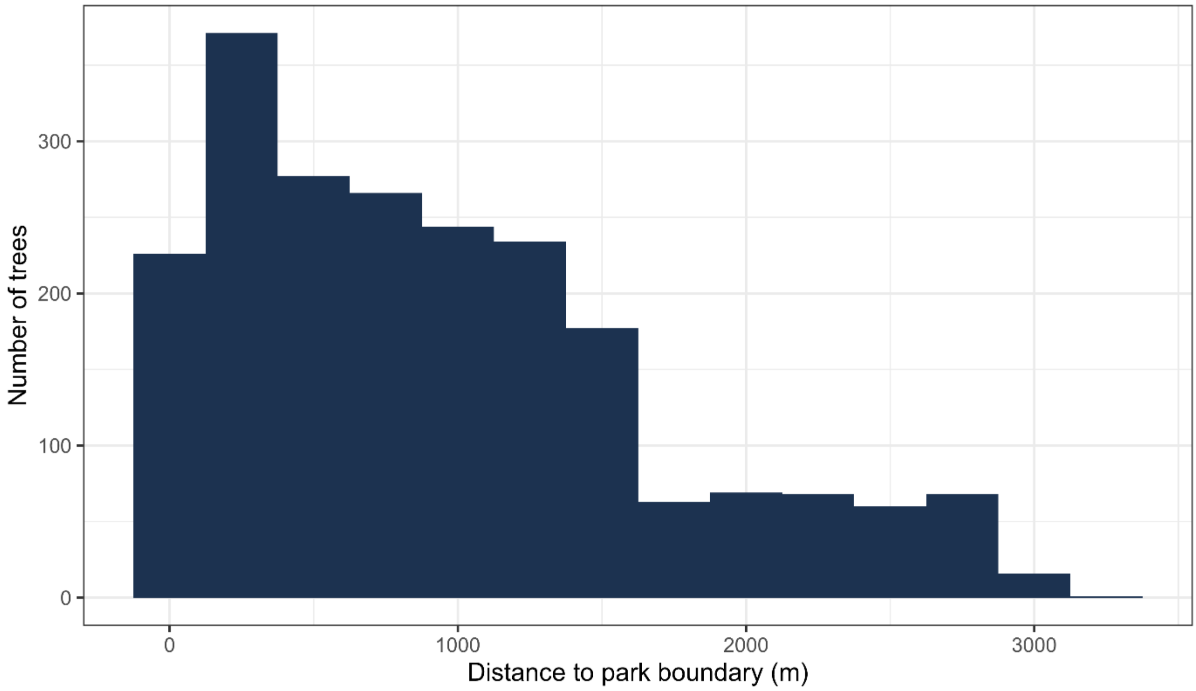

Figure B-18. Frequency histogram showing the number of trees at different distances to the closest Waitākere Ranges Regional Park boundary in metres with a bin width of 250 m.

B7.5 Within 500 m of archaeological features

Of the 2140 monitored trees, 77% (1643) were located within 500 m of one or more archaeological features. Of these, most were within 500 m of 1 or 2 archaeological features, with 2 trees being within 500 m of the maximum 35 archaeological features (Figure B-19**Figure B-19.** Bar plot of the number of archaeological features within 500 m of each of our 2140 monitored trees.

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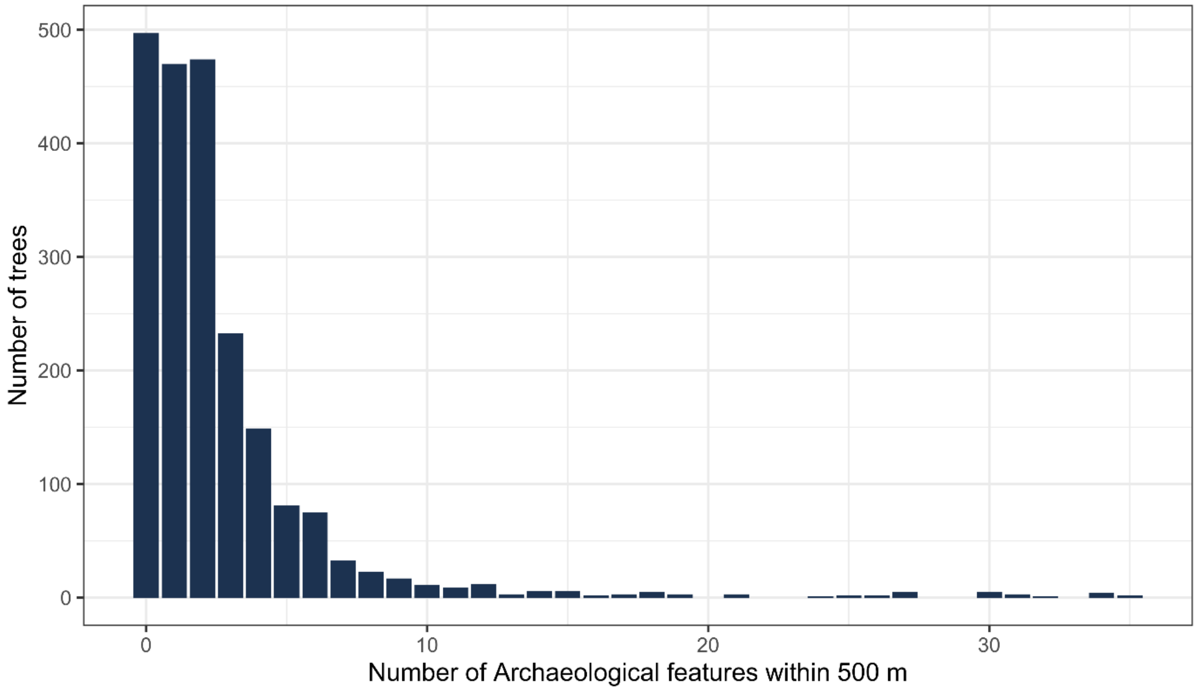

Figure B-19. Bar plot of the number of archaeological features within 500 m of each of our 2140 monitored trees.

B8 Ecological impact factors

Ngā āhuatanga nā ngā pānga ā-mātai hauropi

B8.1 Closest neighbour tree

The data for median distance to the closest neighbour had 31 scale of measurement errors (which may have been mm or cm rather than m) and these values were removed prior to analysis. Therefore, the distance to closest neighbour tree was analysed for 2109 trees. The median distance to the closest neighbour for dominant kauri trees was significantly further at 2 m (25th percentile 1 m and 75th percentile 3 m (min 0 m and max 8.5 m), compared to subdominant trees with a median distance of 1 m (25th percentile 1 m and 75th percentile 3 m (min 0 m and max 7 m), (p=0.02, Mann–Whitney test), (Figure B-20). This measurement needs to be collected in cm in the future.

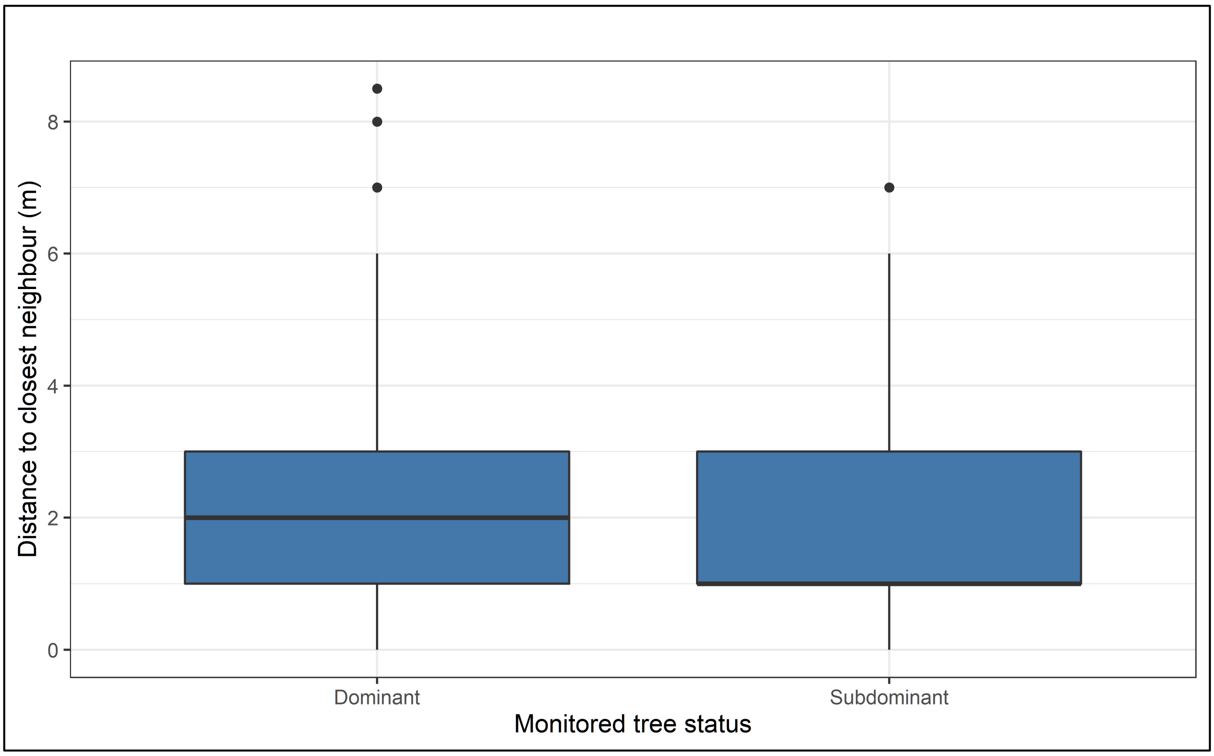

Figure B-20. Box and whisker plot showing the distance (m) between the monitored kauri tree and its closest neighbouring tree (>10 cm DBH) stratified by whether the kauri tree is the dominant or subordinate tree. Showing the median value (horizontal line), interquartile range (within box), maximum and minimum values (excluding outliers, vertical bars) and outliers (dots) for the population.

Across the closest neighbour trees, the median DBH was 18 cm (25th percentile 13 cm and 75th percentile 30 cm (min 5 cm and max 320 cm), in contrast to the median DBH of kauri of 66 cm (25th percentile 48 cm; 75th percentile 99 cm). The DBH values of the kauri trees that were dominant were significantly larger than the subdominant group ($p<0.001$ Mann–Whitney test). The median of the dominant group was 69 cm (25th percentile 51 cm and 75th percentile 103 cm (min 14 cm and max 317 cm), compared to subdominant trees with a median DBH of 39 cm (25th percentile 28 cm and 75th percentile 55 cm (min 11 cm and max 176 cm) (Figure B-21). Likewise, there was a significant difference ($p< 0.001$ Mann-Whitney test) between the DBH of neighbour species depending on whether they were the dominant or subordinate tree. Five out of the 6 closest neighbour trees with a DBH of >200 cm were neighbouring kauri trees.

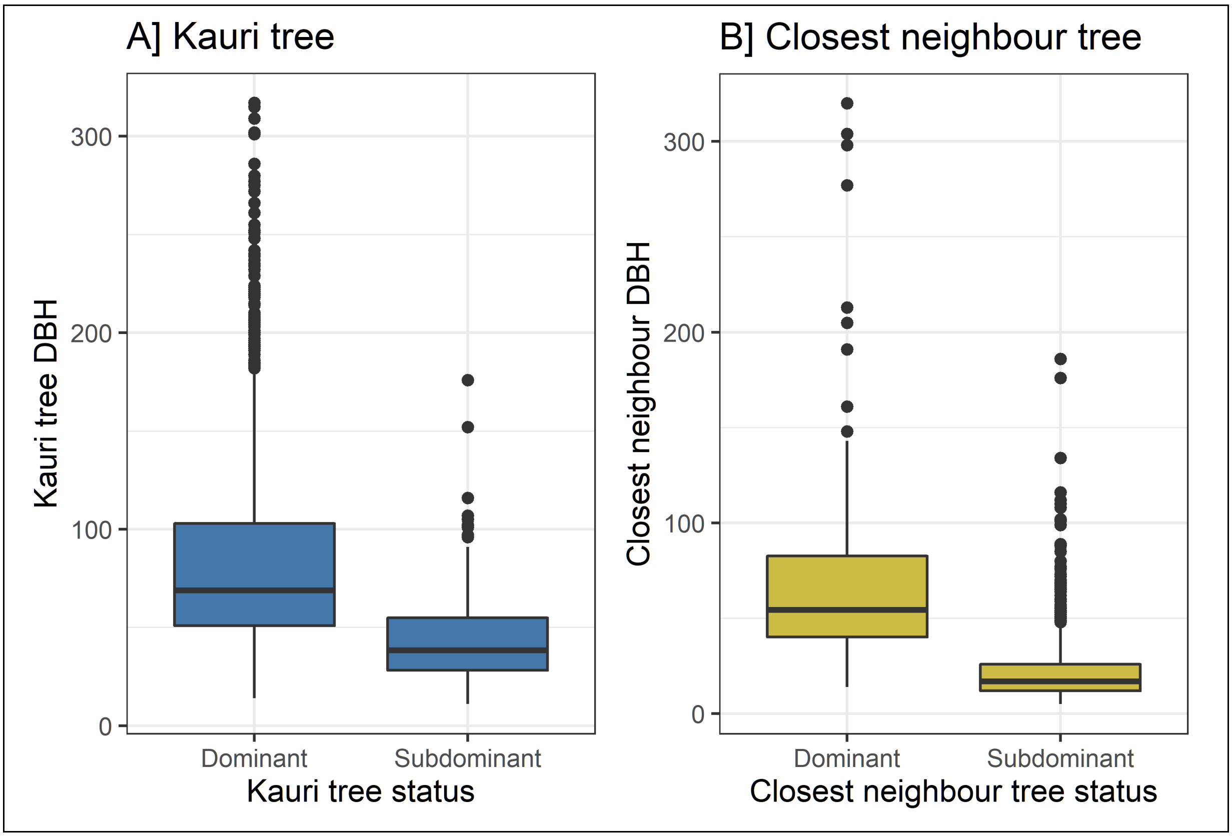

Figure B-21. Box and whisker plots showing diameter at breast height for A] monitored kauri trees where they were the dominant or subdominant tree and for B] the DBH of the closest neighbour tree where the monitored kauri tree was dominant vs subdominant. Showing the median value (horizontal line), interquartile range (within box), maximum and minimum values (excluding outliers, vertical bars) and outliers (dots) for the population.

After kauri, rewarewa and rimu were the next most common dominant species at 7% each (Table B-13). Rewarewa and tanekaha were the next most common subdominant species at 16% and 9% respectively (Table B-14).

Table B-13. Eight most common dominant closest neighbour species out of 117 sites where kauri were subdominant from 2080 monitored kauri tree sites where species was recorded.

Species	Common name	Count of sites	Percent of sites
Agathis australis	kauri	110	62%
Knightia excelsa	rewarewa	13	7%
Dacrydium cupressinum	rimu	12	7%
Kunzea robusta	kānuka	7	4%
Phyllocladus trichomanoides	tanekaha	7	4%
Dacrycarpus dacrydioides	kahikatea	4	2%
Coprosma arborea	māmāngi	4	2%
Metrosideros robusta	northern rātā	3	2%

Table B-14. Twelve most common subdominant closest neighbour species out of 1903 sites where kauri were subdominant from 2080 monitored kauri tree sites where species was recorded.

Species	Common name	Count of sites	Percent of sites
Agathis australis	kauri	334	18%
Knightia excelsa	rewarewa	295	16%
Phyllocladus trichomanoides	tanekaha	163	9%
Pseudopanax crassifolius	lancewood	124	7%
Dacrydium cupressinum	rimu	114	6%
Coprosma arborea	māmāngi	113	6%
Kunzea robusta	kānuka	103	5%
Pseudopanax ferox	fierce lancewood	86	5%
Nestegis lanceolata	white maire	80	4%
Prumnopitys ferruginea	miro	78	4%
Myrsine australis	red māpou	63	3%
Olearia rani var. *rani*	heketara	54	3%

B8.2 Common species

The most commonly observed plant was rewarewa (*Knightia excelsa*) at 86% of the sites. The least common of our common plants was toru (*Toronia toru*), seen at only 6% of sites. The other species ranged between 20% and 76% (Table B-15). There were no sites where no common plants were recorded by surveyors. There were 49 sites that had other ecological variables collected, where the common plants were not recorded; it is uncertain if they were not assessed or if the data were lost during upload.

Table B-15. Number and percent of kauri tree monitoring sites out of 1406 sites surveyed, where each of 16 common plants were observed.

Common Name	Scientific Name	Count	Percent
Rewarewa	*Knightia excelsa*	1187	84%
Lancewood	*Pseudopanax crassifolius*	1066	76%
Māpou	*Myrsine australis*	1042	74%
Kauri grass	*Astelia trinervia*	1028	73%
Shining karamū	*Coprosma lucida*	1011	72%
Rimu	*Dacrydium cupressinum*	846	60%
Māmāngi	*Coprosma arborea*	825	59%
Kānuka	*Kunzea robusta*	754	54%
Tall mingimingi	*Leucopogon fasciculatus*	732	52%
Tanekaha	*Phyllocladus trichomanoides*	691	49%
White maire	*Nestegis lanceolata*	647	46%

Heketara	*Olearia rani*	591	42%
Miro	*Pectinopitys ferruginea*	406	29%
Large-leaved māhoe	*Melicytus macrophyllus*	339	24%
Kirk's tree daisy	*Brachyglottis kirkii*	280	20%
Toru	*Toronia toru*	84	6%
None seen	–	0	0%

B8.3 Forest floor depth

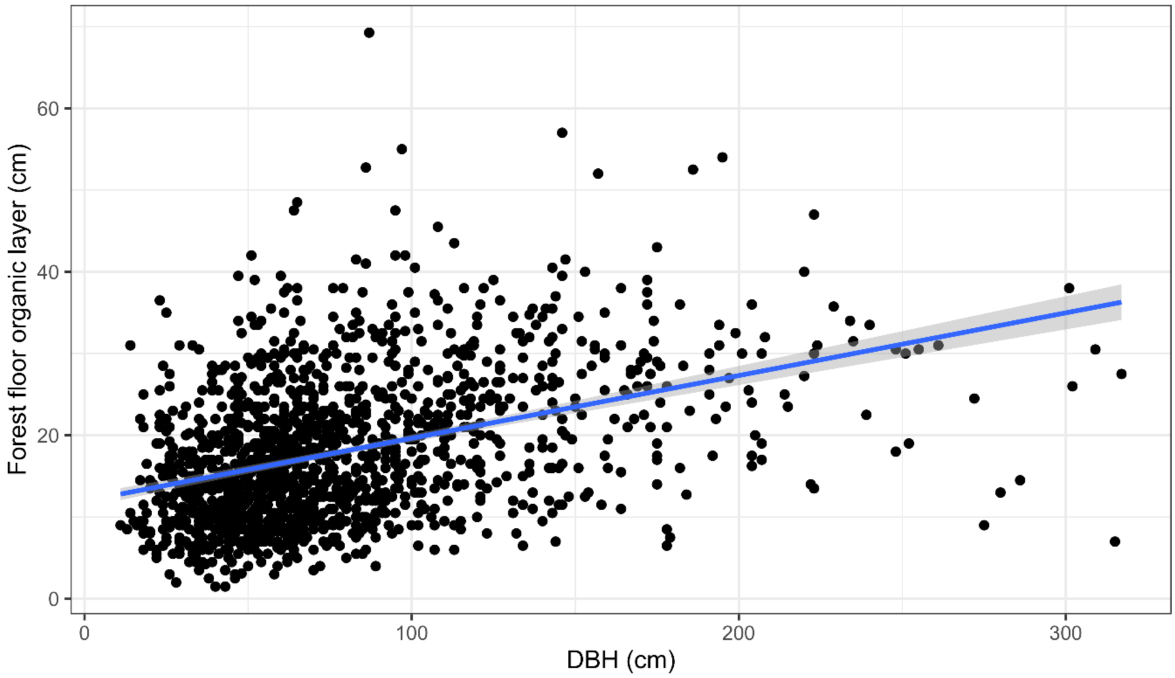

Figure B-22. Scatter plot showing average forest floor depth (cm) per tree as a function of tree size measured as DBH (cm). Superimposed on this plot is a loess smoothed linear regression line (blue) with 95% confidence intervals (grey shading).

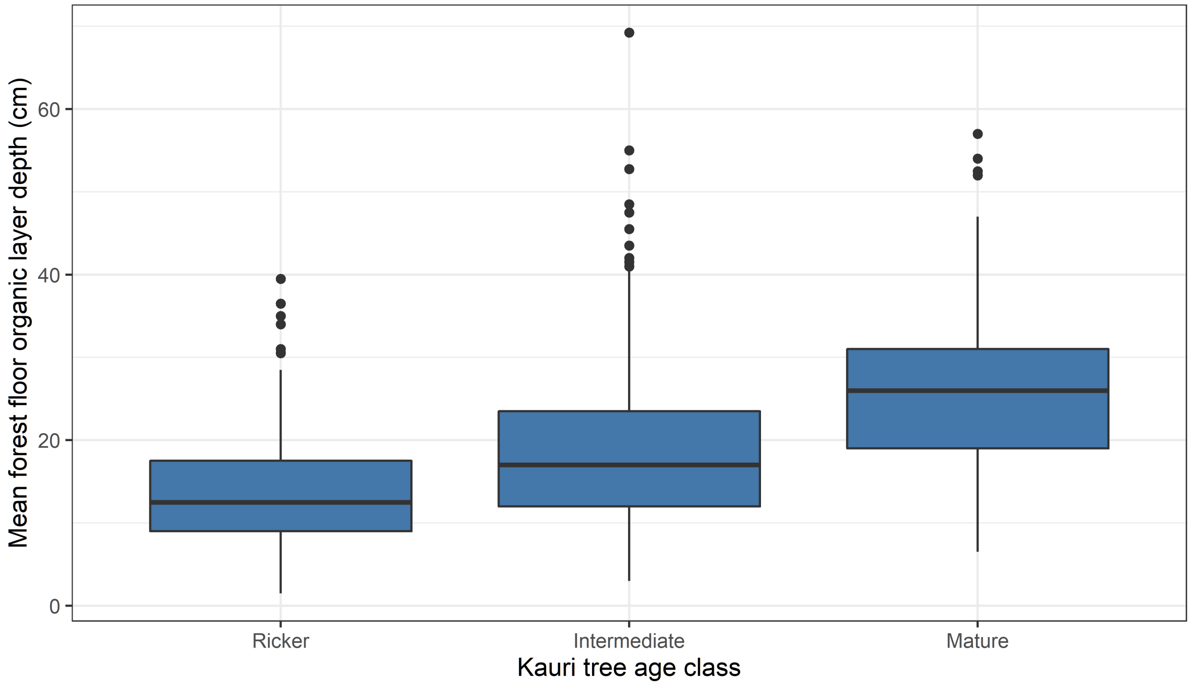

Figure B-23. Box and whisker plots showing the mean forest floor depth (cm) per tree, stratified by kauri tree size class from 2127 monitored trees where the size class value was recorded. Showing the median value (horizontal line), interquartile range (within box), maximum and minimum values (excluding outliers, vertical bars) and outliers (dots) for the population.

B8.4 Crown epiphytes

Crown epiphytes were assessed on 1452 trees, however 12% (180) of trees were unable to be assessed as the crown was not clearly visible. Climbers were assessed on 1452 trees and 63% of trees had climbing plants growing up the trunks (914).

Of the 1272 trees where the crown was visible, epiphytes were observed on 21% of trees (263). Epiphytes were more common on larger trees with a median of 136 cm DBH (inter-quartile range of 99-174 cm) than smaller trees with a median of 59 cm DBH (inter-quartile range 44-78 cm) (Figure B-24).

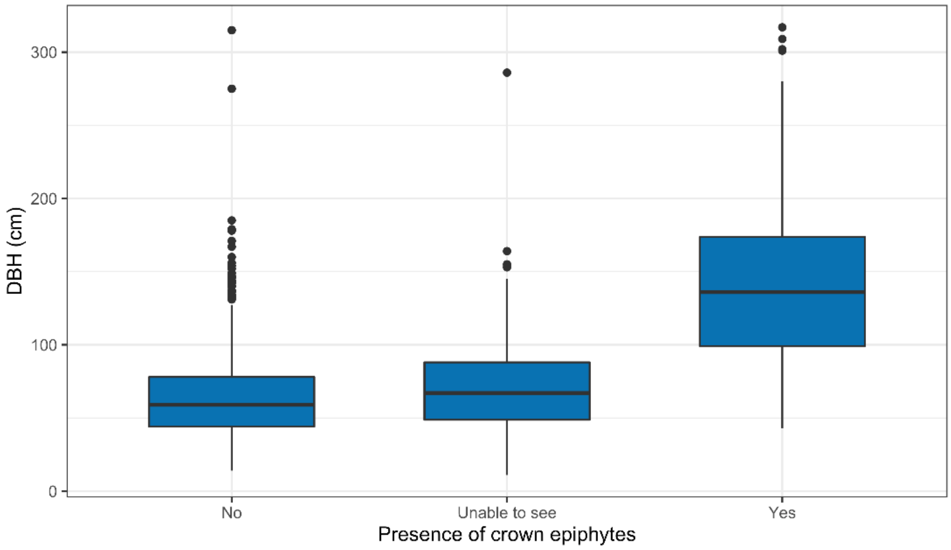

Figure B-24. Boxplot showing the median diameter (cm) at breast height (DBH) of kauri trees with crown epiphytes present, absent and where they were not visible from the ground. Showing the median value (horizontal line), interquartile range (within box), maximum and minimum values (excluding outliers, vertical bars) and outliers (dots) for the population.

B8.5 Climbing epiphytes

Climbers were assessed on 1452 trees and 63% of trees had climbing plants growing up the trunks (914). The median DBH of trees with climbers was higher at 76 cm DBH (25th percentile 54 cm; 75th percentile 113 cm) than those without climbers at 55 cm (25th percentile 41 cm; 75th percentile 72 cm) (Figure B-25).

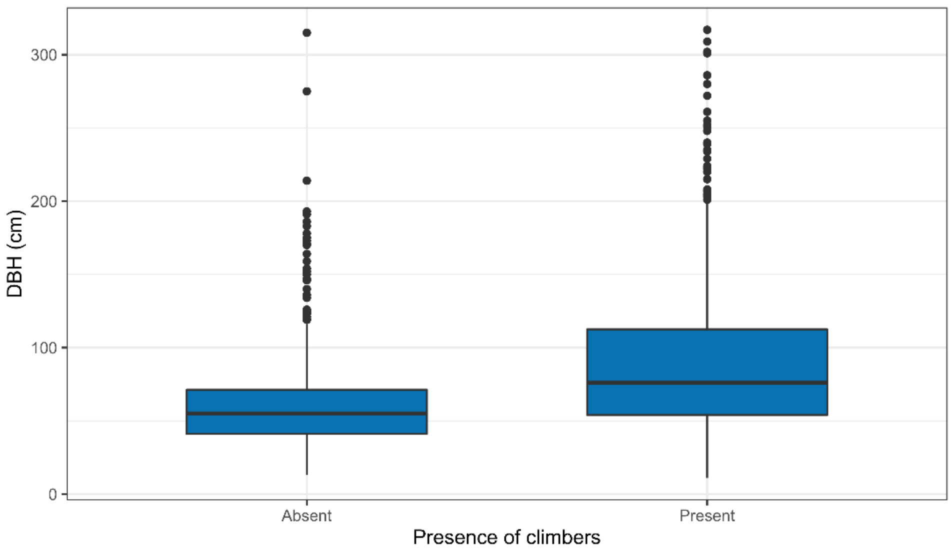

Figure B-25. Box and whisker plots of kauri tree diameter at breast height (DBH) differences between trees with climbing plants present or absent. Showing the median value (horizontal line), interquartile range (within box), maximum and minimum values (excluding outliers, vertical bars) and outliers (dots) for the population.