



VI. FOREST MONITORING STUDY SHEET

The forest ecosystem involves interactions between many different components. Different parts of the ecosystem, and interactions between them, can be used as indicators of ecosystem health.

When forest scientists and managers check on forest health over a period of time they find out if the forest is improving, is stable or is declining in overall health.

This is called **forest monitoring**.

People involved in forest monitoring are careful with the checks they do so that the information is accurate enough to be used to make good management decisions. For example, monitoring will be carried out on trees that are known to be favourite foods of possums, before and after a possum control programme is implemented. Results will tell if the programme was successful or not and when and what type of control, if any, will be best in the future. This enables cost effective management practises to be put in place.

For the purposes of this exercise several monitoring techniques can be tried. The methods given are not as precise as those used by scientists, however they provide good practice models.

Forest monitoring can be done at both the **1. Grey Road** and **2. Corcoran Road** sites:

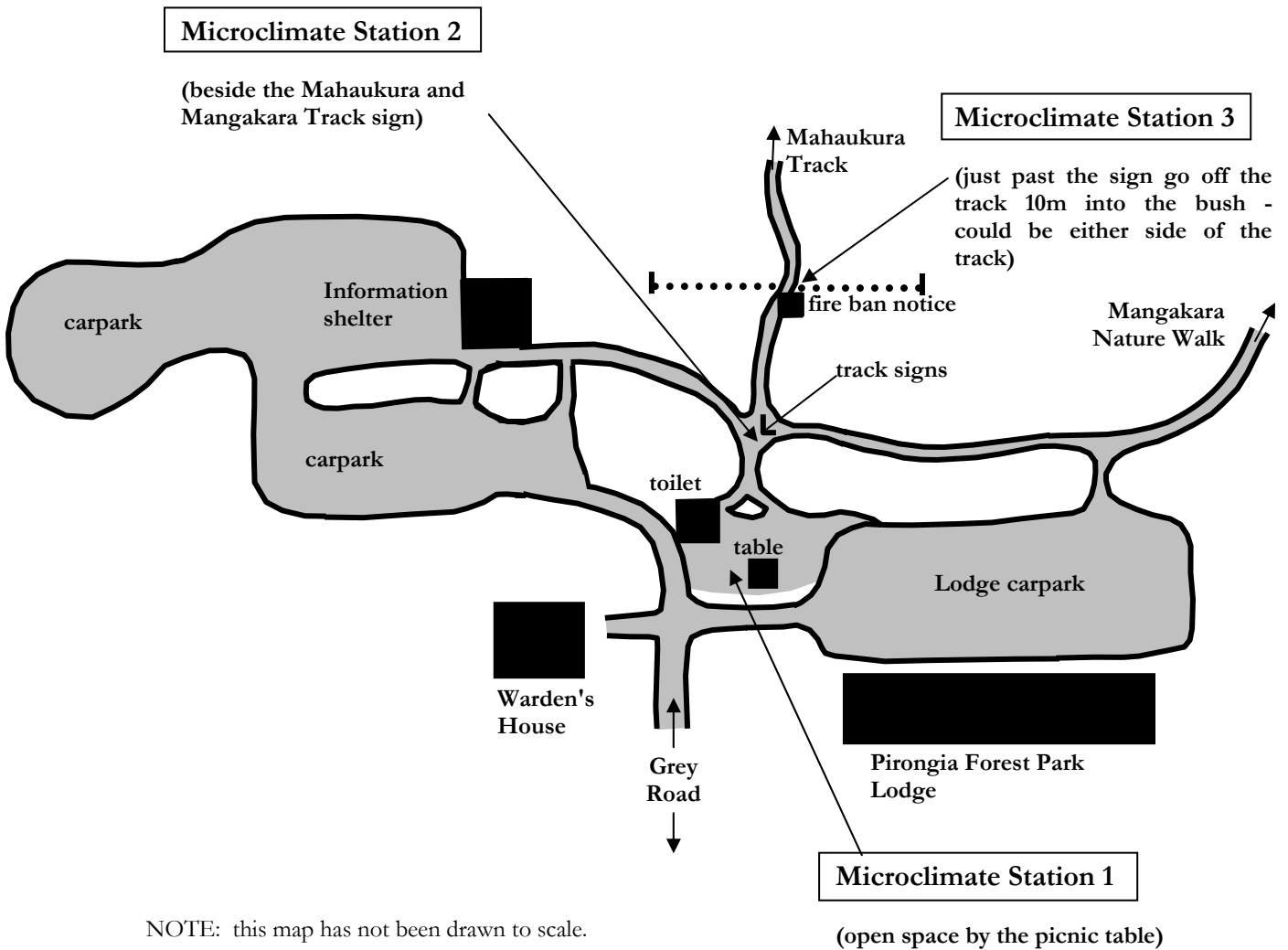
1. The map of the Grey Road site (page 32), indicates where measurements for microclimate change can be taken. These are given as Microclimate Station 1, 2 and 3.
2. The map of the Corcoran Road site (page 34) indicates key trees that can be used for monitoring Foliage Browse and Cover.

The Foliar Browse Index Sheet, examples of insect and possum damaged leaves, tawa fruit damage and the Foliar Cover Scale are given on pages 35 to 38.

For back at school *for* and *about* the environment activities, refer to page 8.



1. Grey Road Site



The following trees may be used for forest monitoring at the Grey Road site:

1a. Kohekohe

This tree is a favourite possum food! Possums eat both the leaves and the flowers of kohekohe. Some trees are so badly affected by possum browsing that twigs and branches begin to die.

We will assess:

- **Dieback** - how much of the canopy shows dead branches and twigs.

- **Foliage Cover** - use the 10 point foliage cover scale - this tells how thick the canopy leaf cover is.
- **Browse** - the proportion of possum damaged leaves. Possum damage shows leaves bitten in half, sometimes with the midrib intact. See the diagram on page 37 showing the differences between insect and possum damage.
- **Stem use** - look for scratch (claws) and bit marks on the trunk and large branches.

Tree One: At Station 2 (as given in the *Mangakara Nature Walk* guide (DOC)) on the Mangakara Nature Walk (see map on page 32). From the seat, look to the left above the nikau palm.

Tree Two: A small tree immediately on the right of the seat at Station 2. A grove of study trees can be found below the second set of steps from Station 2.

1b. Tawa

There are many tawa suitable for study on the Nature Walk. An excellent study tree is found on the right about 200 m up the Mahaukura Track. For recording purposes this is referred to as Tawa 1.

You can also use the list below to make judgements about this tree. The flowering and fruiting times for tawa are:

- Flowering - September to December
- Fruiting - October to February

On the **Foliar Browse Index Sheet** (page 36) use the information for:

- ❖ foliage cover
- ❖ dieback
- ❖ browse
- ❖ stem use
- ❖ flowering
- ❖ fruiting

Use this with your score sheet as a guide when assessing your tree.

High scores for dieback, stem use and browse together with low scores for flowering and fruiting means the tree has been badly affected by possum activity and damage.

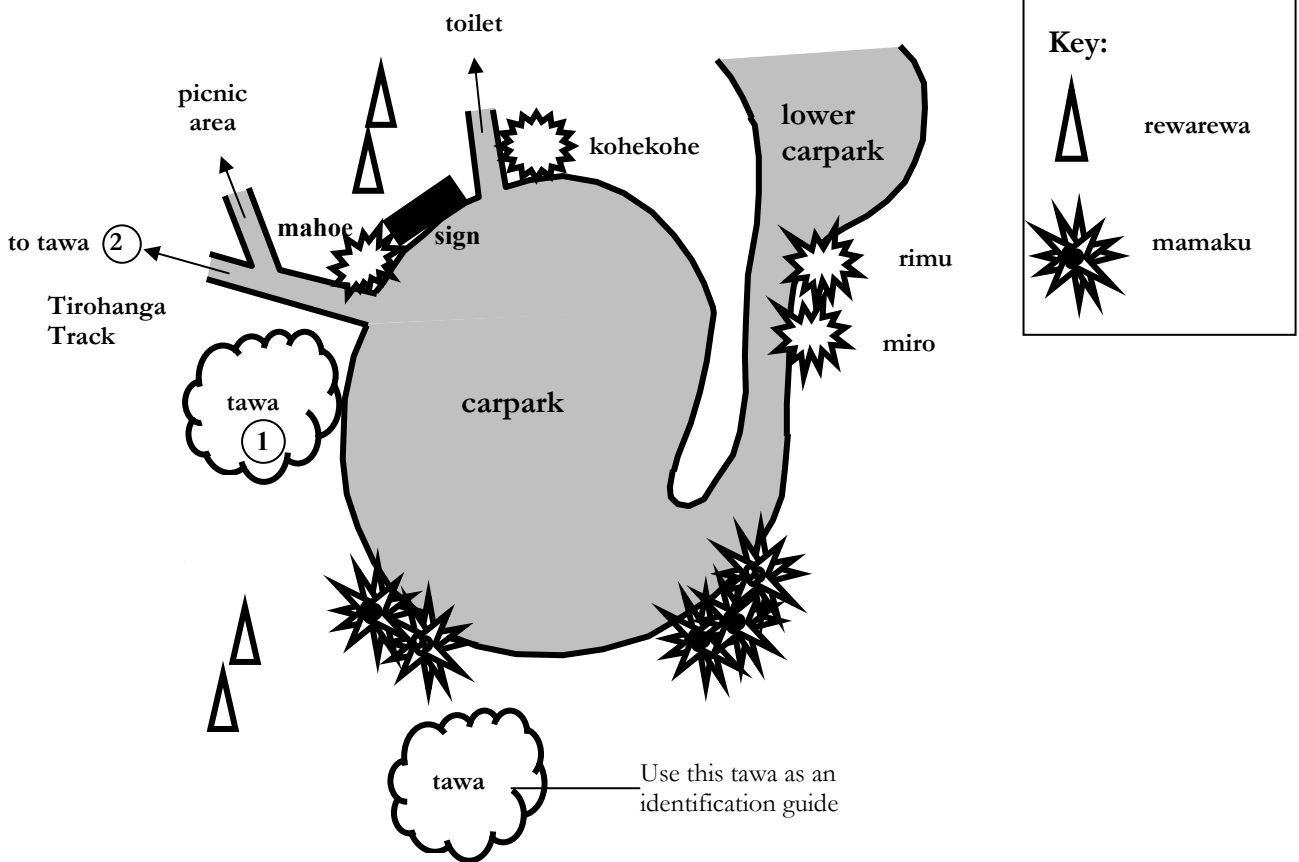
The opposite would be the case on Waiheke Island where there are no possums. The reasons for more than a score of 1 for dieback, stem use and browse would be through insect damage and drought or salt spray effects.

Examples of possum and insect-damaged leaves of northern rata, kamahi, mahoe, and tawa are given on page 37.

1c. Rewarewa

Many small trees can be observed from the car park. Assess them for flowers and look for insect activity. Check the condition of any flowers found on the tracks.

2. Corcoran Road Site



NOTE: this map has not been drawn to scale.

The following trees may be used for forest monitoring at the Corcoran Road site:

2a. Tawa:

Use the worksheet to assess the possum damage to any of the tawa. Tawa 2 is up the Tirohanga Track at the top of the third set of steps, on the right. Check this tawa for fruit. See page 35 for diagram of rat vs possum fruit damage. Compare Tawa 2 with another large tawa a few metres further along the track, on the right. Move around the track to get good views of the tree canopies.

2b. Kohekohe

Record possum damage for the kohekohe next to the toilet boardwalk.

2c. Rewarewa

Check trees for flowers and bee activity. You may have to use binoculars for distant trees.

Fruit Classes

Fruits found at the respective sites may be divided into the following **fruit classes**:

Immature: Predominantly green, hard and not ripe.

Ripe: Well-coloured and soft. Tawa fruit will be purple/black, and Hinau fruit will be purplish in colour.

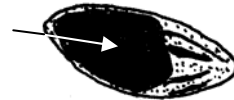
Withered / Dry: Flesh has gone and husk is dry and brown/black.

Possum Damaged: Tawa - the whole outer skin is removed. Often the husk has the centre cleanly scooped out.

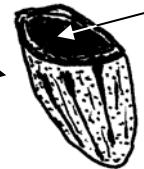


tawa fruit
(undamaged)

the middle has
been scooped
out



outer skin has
been removed

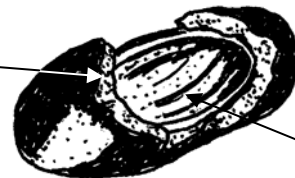


the middle has
been scooped
out

Rat Damaged:

Many ragged edges with signs of small teeth marks. Often part of the kernel remains. Rats tend to attack ripe fruit on the ground.

the outer skin has
been nibbled at



the kernel is often left

Insect damaged:

Generally one or more small entry holes about the size of a pencil lead. Inner kernel is eaten out.

Rotten:

Mature fruit is soft and rotten when squeezed and does not contain insect entry holes.

Foliar Browse Index Sheet

Foliage Cover

From the **Foliage Cover Scale** (page 38) select the square which most closely resembles the foliage cover of the canopy.

Dieback

The conspicuous presence of dead branches or branchlets over the whole of the canopy.

Record dieback as:

0	No dieback	affecting <5% of the canopy
1	Light	affecting 5-25% of the canopy
2	Moderate	affecting 26-50% of the canopy
3	Heavy	affecting 51-75% of the canopy
4	Severe	affecting >75% of the canopy

Browse

The proportion of possum-browsed leaves (**or** in the case of small-leaved species such as totara, the severity of possum-related **hedging***) averaged over the whole canopy.

0	Nil	no browsed leaves or no possum-related hedging
1	Light	5-25% browsed or lightly hedged
2	Moderate	26-50% leaves browsed or moderately hedged
3	Heavy	51-75% browsed or heavily hedged
4	Severe	76-100% browsed or severely hedged

* Trees showing signs of possum-induced hedging will have little of the current season's growth remaining.

Use

Recent possum use of the lower 2m of the trunk or stem. Record as:

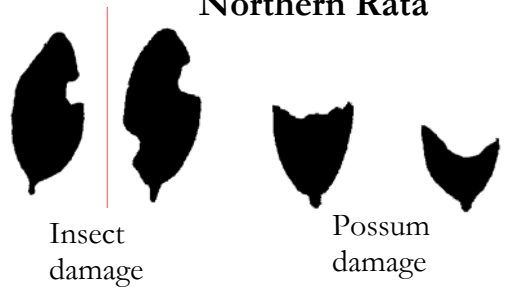
0	Nil	no scratching or bite marks on the trunk
1	Light	occasional scratch and bite marks
2	Moderate	numerous clearly defined scratch and bite marks
3	Heavy	bark worn smooth, evidence of a well developed possum "run"

Flowering and Fruiting

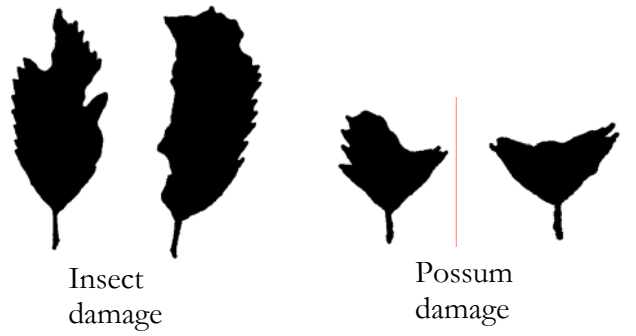
Look for the presence of flowers and fruit.

Insect vs Possum damaged leaves

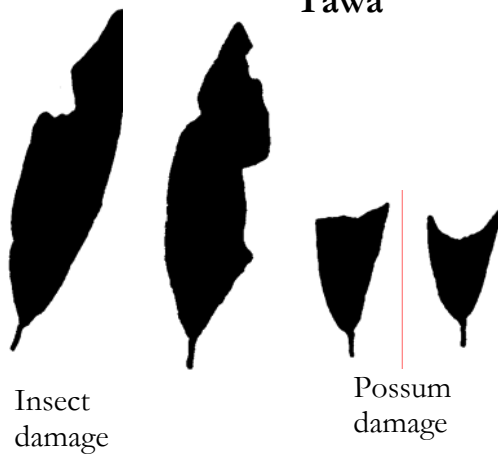
Northern Rata



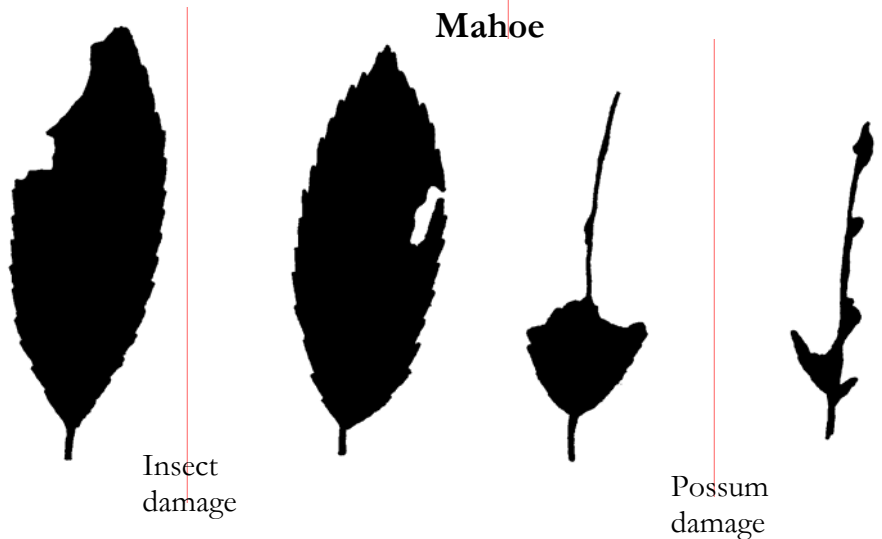
Kamaha



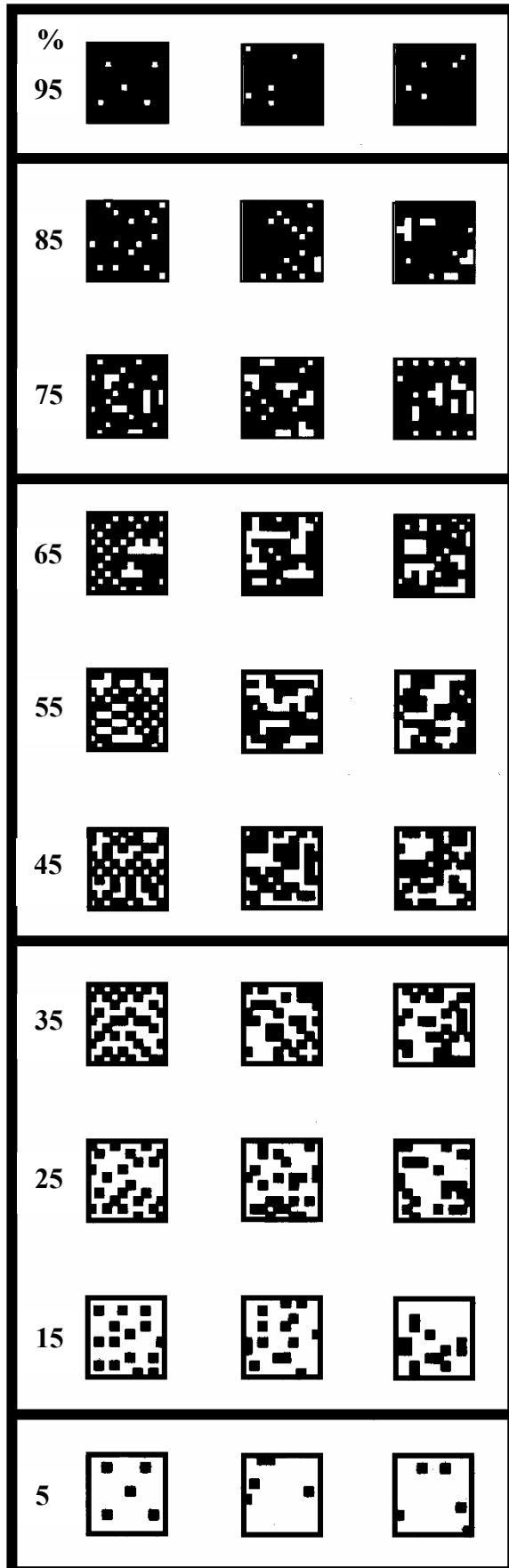
Tawa



Mahoe



Foliage Cover Scale



FIELD RECORDING SHEET



Attach to Clipboard

Name: _____ Date: _____

Location: _____

Which trees are you studying? _____
(name and number)

Foliar Browse Index:

	Tree 1	Tree 2	Tree 3
• Foliage Cover	_____	_____	_____
• Dieback	_____	_____	_____
• Browse	_____	_____	_____
• Stem Use	_____	_____	_____

Foliage Cover Scale

Write down the percentage cover for your study trees.

Tree 1 _____ Tree 2 _____ Tree 3 _____

Flowering / Fruiting

Tick the following for fruit and flowers:

	Fruit	Flowers
• 0 = none	_____	_____
• 1 = rare	_____	_____
• 2 = occasional	_____	_____
• 3 = common	_____	_____
• 4 = abundant	_____	_____
• 5 = very abundant	_____	_____

Make a note on fruit classes found and rat or possum damage from fruit observed on the ground.

Checklist:

- Field recording sheet
- Clipboard
- Pencil
- Binoculars (optional)
- Fruit classes and Fruit damage diagram (pg 35)
- Foliar Browse Index Sheet (pg 36)
- Leaf damage diagram (pg 37)
- Foliage Cover Scale (pg 38)

What birds have you seen during the fieldwork? Species most likely to be seen are: fantail, grey warbler, tui, kereru (pigeon), waxeye, magpie, rosella, blackbird, shining cuckoo.

OTHER REFERENCES AND RESOURCES



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