

# FORMAK Vegetation Plot - *Whakawhaititana Maheuheu* Planning Instruction

## Overview

### Why do it?

- To allow changes in vegetation at specific points on the site to be tracked over time.
- To allow trends in vegetation condition, including the impacts of browsing animals, to be identified over time.
- To help identify the relative condition of vegetation under current management, and any trends with changes in future management or environmental conditions.
- To allow trends in the presence and abundance of more widespread weed species to be tracked.

### What's involved?

- Establishing a series of permanently marked vegetation plots on the site.
- Measurements of the canopy, counts of understorey stems, assessment of the forest floor, measurement of tree diameters and assessment of animal browse in the understorey and canopy are all undertaken within the plot.
- Identification of plant species is required.

### How long?

- Two to three hours per plot depending on the skill of fieldworkers and the site.

### How often?

- Measurements are normally repeated every 2 years.

### Equipment Checklist

- |  |   |
|--|---|
| <input type="checkbox"/> FORMAK Vegetation Plot Field Instruction    | <input type="checkbox"/> Nails (60mm galvanised flat head).                                       |
| <input type="checkbox"/> FORMAK Visual Guide                         | <input type="checkbox"/> Camera and film or digital camera (with sufficient memory and batteries) |
| <input type="checkbox"/> FORMAK Header Guide                         | <input type="checkbox"/> 20m measuring tape   |
| <input type="checkbox"/> FORMAK Vegetation Plot Form                 | <input type="checkbox"/> Diameter tape  |
| <input type="checkbox"/> Binoculars                                  | <input type="checkbox"/> Compass  |
| <input type="checkbox"/> GPS (optional – but use it if you have one) | <input type="checkbox"/> Location markers   |
| <input type="checkbox"/> NZMS 260 series map of the area.            | <input type="checkbox"/> Plot peg markers (5 per plot)  |
| <input type="checkbox"/> Aerial Photograph – if available            | <input type="checkbox"/> Plot pegs (5 per plot)   |
| <input type="checkbox"/> Clipboard                                   | <input type="checkbox"/> Permanent marker pen   |
| <input type="checkbox"/> Canopy scope                                | <input type="checkbox"/> Blank sheets of A4 paper   |
| <input type="checkbox"/> Measuring pole                              | <input type="checkbox"/> Plant identification references  |
| <input type="checkbox"/> Pencils                                     | <input type="checkbox"/> Plant specimen identification folder                                     |
| <input type="checkbox"/> Rubber                                      |   |
| <input type="checkbox"/> Hammer                                      |   |

### Skills

- One member of the measurement team needs to be able to identify most plant species on the site – both native and exotic species. They will be the measurer.

- You will need to know someone, or an organisation, you can take specimens of unknown plants (see Plant Identification Guideline) to - to get them correctly identified.

#### How many people?

- Two people are required to establish and measure these plots easily, one to measure, one to record. The recorder does not need plant identification skills. A good way to learn these skills is to work initially as the recorder.
- Measurement can be done with one but this is much more difficult and time consuming due to swapping between measuring and recording.
- Avoid more than two. More people increases trampling damage to the plot area.

#### Measure / Re-measure

- Measurements are normally repeated every two years.
- If this is a new measurement, you will need to work through all the steps below.
- If it is a re-measurement, sample size and plot location will already be determined.

## Planning - Before you go out into the field

#### Sampling

- Because of limitations in time and effort people can put into monitoring, it will not generally be possible to ensure that there is effective sampling of the whole area. Rather, changes will be examined for the plots being assessed, and care will be required in making judgements about the whole site based on them.
- This kit is designed to look at general trends over time by regular re-measurement of the same plots. It is not generally intended to provide assessment of differences between two individual measurements. For more detail about this see the FORMAK Overview.
- In most cases it is expected that five plots will be established on each FORMAK site. This will allow these plots to be marked out and measured in two days and re-measured in less.
- Where sites involve a small remnant (e.g. 1-2 hectares and less) it may be appropriate to have less than five plots. The number may depend on what can practically fit on the site.
- These are only very general guidelines. On larger areas and where more resources are available, 10 plots per site may be more appropriate. To design more specific sampling based on sample variability and required precision seek specialist help (see also Native Forest Monitoring pp98).
- It is also important to note that where particularly important forest vegetation is present it may be necessary to increase sample intensity to give more certainty of picking up important trends.

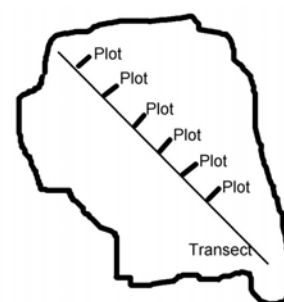
## Plot location

- Plot locations should be decided prior to beginning fieldwork. Use a map or aerial photo to help identify locations.
- The aim in establishing plots is that they are representative of the forest area being assessed and are not biased toward particular types of vegetation etc.
- When you are identifying locations on a map, think about ease of access to measure the plot, and find it again in the future for re-measurement
- Three different methods of locating plots are identified below. The method will need to be selected based on what is most practical for the particular FORMAK site. Where the site is relatively easy, flatter country, there will be a lot of flexibility in how plots are located. In very steep, broken country with heavy scrub, it may not be cost effective or practical to use a transect or grid to locate plots. Plots may need to be established subjectively to give the easiest access while being generally representative.

## Three ways to locate plots

### 1. On a "transect"

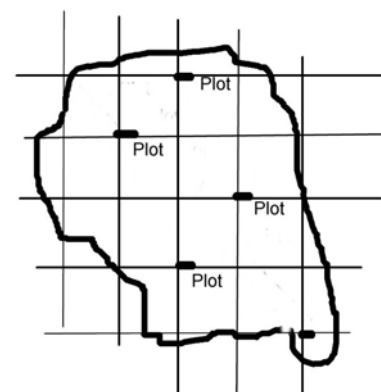
- Locate a single straight line or a series of lines that will have plots located at 100m intervals on them. See diagram below.
- Select a transect line that will start from an easily accessed point, and will generally run up or down the site (i.e not across it going up and down out of individual gullies).
- Identify the bearing of the transect on which plots are located from the map (see Map & Compass Guideline). This bearing can then be followed from the start point in the field.



### 2. Randomly on a grid

Work through the following steps:

1. Draw a grid of 100m squares on a map or aerial photo of the area
2. Number each grid intersection
3. Select the required number of plots using random numbers (e.g. see Native Forest Monitoring (NFM) pp 183).
4. Locate plot at selected grid intersections.



### 3. Subjectively (use on more difficult sites, but avoid if possible)

- This may be the only practical approach In very steep, broken country with heavy scrub or in very small (1 ha or less) areas.
- Locate the required number of plots across the block in representative locations that can be effectively accessed. (e.g. could be located x metres off either side of an access track at y metre intervals)

### Adjusting location

- Be prepared to adjust the plot location in the field away from steep and very difficult country.
- When selecting and adjusting plot locations in the field consider:
  - ◇ Is it practical to measure?
  - ◇ Is it generally representative? – i.e not specific issues that occur here but not elsewhere e.g. small wetland area in a larger forest.
  - ◇ Make sure you are not choosing it just because it is the easiest clearest flattest area!

### Plot orientation

- It is important to pre-determine the angle that the plots will be laid out from their location or start point. This avoids the possibility of plots being laid out in a direction that is easy to measure – rather than representative. Use the following approach:
  - Examine the plot locations on the map and choose a bearing that will mean most of the plots run would run along the contour lines of a map (see Map & Compass Guideline for taking bearings from a map).
  - If plots are being laid out along a transect, the bearing that is at right angles to the transect on the right hand side can be used.
  - Set the same bearing for all plots.
  - Where it is impractical to follow this line in the field, e.g. it runs up or down the slope, a more appropriate bearing is identified and recorded on the location diagram and notes on the plot form.

### Read field instructions

- Read the Field Instruction for vegetation plot measurement and make sure you are familiar with and understand the requirements.

### Check background information

- Make sure you have important background Information on the site. This will include:
  - ◇ Previous plot forms
  - ◇ Information from talking to previous assessors about the site.
  - ◇ Information from talking to owners / managers if separate from measurer. This may provide information on key issues or changes (e.g. changes in management, environmental impacts such as wind, casual observations of changes etc).

### Bush Safety

- Refer to the NZ Mountain Safety Council leaflet “Going Bush” and check you are prepared at a level appropriate for the monitoring trip.
- Make sure you leave details of where you are going, and when you will be back with a responsible person (see the NZMSC Help Form).

## Case Study 1 - A small forest remnant

A landowner is fencing a small forest remnant of approximately 2 hectares in a rough gully on the property. They are interested in setting up some FORMAK vegetation plots to see how the area changes once stock are removed. They have completed a FORMAK site assessment of the area and are now ready to plan their vegetation plots.

The area is small, and the landowner will be doing the work with the help of an interested nephew who is visiting for the weekend. Given the small area and lack of time, they decide that 3 plots will do. This should mean they can comfortably complete them in one day.

The area is a narrow gully, and some areas of it are very steep cliffs where access is difficult. They decide early on that it will not be practical to locate plots systematically on a transect or randomly over the area. They will need to choose locations that are practical, and are representative of the wider area. Using an aerial photograph of the site, they identify different areas on the site that are practical to access and have representative forest. They put six dots on each of these areas on the aerial photograph and number them 1-6. For each area in turn they roll a six sided dice, and choose the mark number on the photo that corresponds to the dice. This is their planned plot location.

They get the NZMS 260 series topographical map for the area and estimate that a bearing of 250 degrees magnetic (see Map & Compass Guideline for reading bearings) will generally run along the contour of the gully sides. They set this as their planned plot orientation.

They read through the FORMAK Vegetation Plot Field Instructions to make sure they are clear on the steps required. They check the weather forecast and leave a note for other family members letting them know where they will be and what time they will be back. After a hearty breakfast, they are ready to set off.



## Case Study 2 – A FORMAK Site in a Large Forest Area

A community group is interested in undertaking some intensive control of possums and mustelids (stoats, ferrets & weasels) on some easier, more accessible faces of a larger native forest block.

They wish to get an indication of the current condition of the area and begin to monitor broad trends on the site over a number of years as they continue with the control.

They have identified a FORMAK site and undertaken a site assessment. The site is approximately 25 hectares. They are all volunteers and don't have much time for monitoring on top of all the effort that they are putting into animal control. They decide that they can afford to establish and measure 5 FORMAK vegetation plots across the area.

They are also intending to establish a pest animal transect and bird counts on the block. They decide that it would be best if all their measurement sites are located along the same one or two lines. They identify a practical line across the site, and work out the magnetic bearing of this line from the map (see Map & Compass Guideline). They can easily locate the ends of this line, at one end it is at a bend in the stream, and at the other end where the 4WD track crosses a small side stream. They will locate vegetation plots at 100m intervals along this line.

Looking at the map, they identify the plot orientation that will mean plots generally run along the contour (on the level) and set this magnetic bearing (see Map & Compass Guideline) as their plot orientation. The terrain is broken in some places, so they may have to change this orientation in the field if it is not practical to measure. They will clearly record this on field sheets.

They read through the FORMAK Vegetation Plot Field Instructions to make sure they are familiar with the method, and collect together all the required field equipment. After checking the weather forecast, making sure they have the right bush equipment, and leaving a Help Form with the partner of one of the group – they are ready to set off.

