

## PUBLIC SUMMARY: PERMANENT SAMPLE PLOT IN NORTHERN GUNUNG RARA FOREST MANAGEMENT UNIT

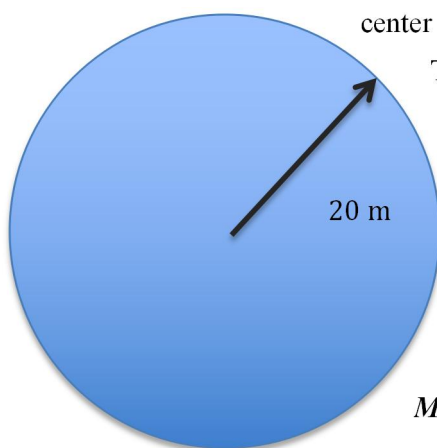
### *Background*

Permanent Sample Plots (PSPs) are advocated as an approach that is robust in documenting detailed changes in forest structure and composition. These plots also provide baseline distribution data for species and provide information on the habitats of a particular site. The continual long-term monitoring of these plots would provide valuable information on changes or the lack of changes in plant diversity and richness, growth, mortality, regeneration and dynamics of the sampled forest. Monitoring of permanent plots by measuring these characteristics of the vegetation is likely to remain relevant in the face of changing or evolving environmental issues. Often, it is commonplace for such plot data to be used to address issues beyond the original enquiries at time of establishment and are usually developed as new lines of enquiries or research avenues (i.e. measuring carbon storage, etc.).

In Northern Gunung Rara forest management plan, permanent sample plots are used for monitoring programme for forest ecosystem conservation targets in the forest management unit.

### *Plot layout*

The permanent sample plot layout consists of circular design with 20 m radius (Figure 1). The center of the plot should be clearly marked by erecting permanent post (i.e. PVC pipe, ironwood or concrete-metal post). All trees  $\leq 10$  cm diameter at breast height or 1.3 m above ground level should be enumerated by measuring the stem diameter, determine the species identity, and tree location parameters, such as distance, slope angle and also the azimuth from the center of the plot. Five (5) large and healthy trees should be selected and labelled on the ground using aluminum tags as reference trees and will be used to re-establish the center point of the plot for future enumeration if the center post are missing.



Tree number and point of measurement of all enumerated trees should be labelled with yellow paint (signal yellow).

Figure 1. A circular plot with 20m radius.

### *Maintenance of permanent plots*

Permanent plots require ongoing maintenance and when left unattended for long periods of time, they become increasingly difficult to relocate, re-establish, and to undertake accurate remeasurements. The maintenance of permanent plots consist of determining the presence of center post and tree labels with minimal disturbance to the vegetation within the plot, including look out for severe damage to the plots, and investigate its cause. The maintenance should be carried once every years.

### ***Re-measurement of permanent plots***

Experience across a range of forest types suggests a **5 to 10 year** interval is generally suitable for monitoring demography of tree populations, and changes in the forest structure and composition. However, the re-measurement interval could be shortened (every 3 years) if the management would like to investigate the respond of local weather pattern that influence forest dynamic in the region. Where possible, plots should be re-measured in the same order and over the same months as the historical measurements. Re-locating and re-measuring all the permanent plots in an existing vegetation dataset, with the same field season make analysis of vegetation change over time easy. Before embarking on plot re-measurement, it is critical to understand and employ the methods used in the original survey design. These include following the arrangement, maintaining the size and shape of the sample plots, locality and access points of the plot, and protocols for measuring and labelling the trees. Pre-fieldwork planning is essential to ensure that the fieldwork proceeds as smoothly and efficiently as possible.

### ***Baseline Information of the Permanent Plots in Northern Gn Rara SFM Project***

Plot Numbers and their corresponding geographical position points for the forest assessment and rapid plant diversity inventory in Northern Gn Rara SFM Project Area.

| Location     | Plot No | Latitude        | Longitude        | Altitude (m) | Soil Association | Forest Formation  | Remark  |
|--------------|---------|-----------------|------------------|--------------|------------------|---|---|
| Mt Magdalena | 1       | N 04° 58' 26.0" | N 117° 08' 56.6" | 197          | Lokan            | Lowland Mixed Dipterocarp Forest                              | Moderately disturbed; hilly and dissected topography  |
| Mt Magdalena | 2       | N 04° 58' 22.6" | N 117° 09' 0.7"  | 190          | Lokan            | Lowland Mixed Dipterocarp Forest                              | Moderately disturbed; hilly and dissected topography  |
| Mt Magdalena | 3       | N 04° 58' 47.3" | N 117° 08' 57.2" | 190          | Sook             | Lowland Mixed Dipterocarp Forest                              | Severely disturbed; sandy alluvial terrace            |
| Mt Magdalena | 4       | N 04° 59' 33.4" | N 117° 08' 07.8" | 223          | Lokan            | Secondary Forest (previously seasonal freshwaterswamp forest) | Severely disturbed; hilly and dissected topography    |
| Mt Magdalena | 5       | N 04° 53' 41.7" | N 117° 23' 45.7" | 307          | Crocker          | Secondary Forest (previously seasonal freshwaterswamp forest) | Severely Disturbed; undulating and hilly              |
| Mt Magdalena | 6       | N 04° 53' 55.7" | N 117° 23' 11.7" | 283          | Crocker          | Secondary Forest (previously seasonal freshwaterswamp forest) | Severely Disturbed; undulating and hilly              |
| Mt Magdalena | 7       | N 04° 50' 30.5" | N 117° 13' 54.8" | 188          | Kalabakan        | Lowland Mixed Dipterocarp Forest                              | Moderately disturbed; undulating terrain              |
| Mt Magdalena | 8       | N 04° 56' 09.3" | N 117° 10' 34.6" | 350          | Maliau           | Lowland Mixed Dipterocarp Forest                              | Moderately disturbed; Steep area                      |
| Bt Timbang   | 9       | N 04° 58' 21.9" | N 117° 05' 57.4" | 455          | Gomantong        | Lowland Mixed Dipterocarp Forest                              | Moderately disturbed; deep soil on limestone outcrops |
| Bt Timbang   | 10      | N 04° 58' 19.6" | N 117° 05' 51.8" | 532          | Gomantong        | Upland Mixed Dipterocarp Forest                               | Undisturbed vegetation; limestone outcrops            |
| Mt Magdalena | 11      | N 04° 55' 43.9" | N 117° 10' 51.4" | 267          | Maliau           | Lowland Mixed Dipterocarp Forest                              | Moderately disturbed; steep area                      |