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MONITORING OF FOREST ECOSYSTEM CONDITION WRC LANDCARE ESTATE.

1. Introduction -Why Monitor ?

It is important to know the condition of native forests and their components, such as birds, predators, and browsing animals, and to understand how they are changing over time. This allows identification of any management intervention that is required, such as an animal control operation, and shows what impact current management is having.

This important information on the condition of the forest ecosystem is obtained through well designed monitoring that measures a range of "indicators" of forest condition. These indicators can include a wide range of aspects such as forest canopy density, abundance of particular species in the understorey, levels of fruiting of certain species, and animal pest populations.

These brief notes give a summary of some of the current monitoring being undertaken on the WRC Landcare Estate, and early information it is providing.

2. Monitoring on the WRC Estate

Monitoring of vegetation plots and animal faecal pellet lines began in the Hutt Catchment in the mid1970's. A network of vegetation plots in the headwaters of this catchment have been re - measured three times since they were first established.

In recent years a small number of permanent vegetation plots, animal faecal pellet lines, and possum trap lines have also been established in other areas of WRC forest such as the Wainuiomata and Orongorongo Catchments.

The series of permanent vegetation plots are designed to provide information on long term major changes in forest condition.

In order to provide complimentary monitoring that will give cost effective information on a range of shorter term changes in forest condition, WRC are also involved in a research project that is partly funded by the Ministry for the Environment's Sustainable Management Fund. This project is developing simple and cost effective monitoring methods for a range of indicators of forest ecosystem condition. As well as establishing trials of these methods on the WRC estate, a major outcome from this project will be the publication of a handbook on simple forest ecosystem monitoring.

These methods are designed to be used regularly by WRC field staff to build up information on the estate, and trends in indicators such as forest understorey condition, fruiting and flowering of key native species and native bird abundance.

Trials of some of these methods are established on the estate, and others will be established in the near future.

With the development and coordination of this network of monitoring WRC is developing a comprehensive system of monitoring to allow effective management of the important Landcare Estate.

Some early results from examination of both the longer term permanent vegetation plot monitoring, and also trials of simplified ecosystem monitoring are discussed below.

3. Early Results from Monitoring Data.

3.1 Permanent Vegetation Plots in the Hutt Catchment

Analysis of the existing data from measurement of these plots is currently being undertaken. Some early indications from this analysis are:

- Major canopy species and canopy cover have been maintained since 1975.

- There are indications of an ongoing decline since 1975 in particular forest understorey species such as Pseudopanax simplex that are palatable to deer and possums. A similar situation has been found previously in areas of the Tararua Range managed by the Department of Conservation (Phil Brady pers comm). These species can be important early colonisers of slips and other disturbed areas. Their poor performance may suggest slower re-vegetation of slips and other disturbed areas.

- Species that are preferred by browsing animals, such as Kamahi, an important canopy species, do not appear to be regenerating as well as less palatable species.

Analysis needs to be completed to further examine these and other trends.

3.2 Permanent Vegetation Plots in the Wainui Catchment

Eight permanent vegetation plots were established in the Wainuiomata and Orongorongo Catchments in the summer of 1996/97. Thus there is no re-measurement data available at present.

Early examination of the data from the 1996/97 measurement of these plots suggests lower levels of regeneration of species favoured by browsers, compared to unpalatable species. These browse preferred species include Kamahi, which makes up a significant part of the forest canopy in some areas.

3.3 Quick vegetation plot assessments in the Wainuiomata Catchment and Battle Hill Reserve.

A series of smaller, quickly assessed vegetation plots are being established in the Wainuiomata catchment and on some other areas of the Landcare Estate such as Battle Hill reserve. These plots will provide additional information on the forest understorey and allow changes in regeneration of different species to be more easily tracked.

Initial measurement of these plots indicates lower levels of regeneration of browse palatable species on areas of the estate such as the Wainuiomata Catchment, where a range of browsing animals are present, compared to areas with few browsing animals.

3.4 Examination of Fruiting of Key Species

Permanent sites for annual assessment of the fruiting of Tawa and Hinau have been established in the Wainuiomata Catchment.

Study of the Tawa sites will allow assessment of changes in the amount of fruit destroyed by possums and rats, as well as the total amount of fruiting. Initial assessment of the Tawa sites in the 1999 fruiting season (prior to 1080 poisoning of possums) showed the majority of Tawa fruit was destroyed by possums and rats. This compared to low levels of fruit damage where possums had been reduced to low numbers in some WRC and Department of Conservation reserves.

Assessment of Hinau sites during 1999 indicate that it was a low to moderate fruiting year. Ongoing monitoring will allow peak fruiting years to be identified and may allow future adaptations to management, such as better targeting of management in relation to possum control.

3.5 Bird Monitoring

Permanent bird monitoring transects have been established in the Wainuiomata Catchment to allow ongoing monitoring of changes in native and introduced bird populations. These transects will be measured annually and allow any impacts of management on bird populations to be considered.

3.6 Photographic Monitoring of Northern Rata Condition

Photopoints to monitor the condition of tree crowns of Northern Rata have been established in the Wainuiomata and Akatarawa catchments. This species is highly favoured by possums. Computer image analysis of these photos can be undertaken to provide precise monitoring of changes in the amount of foliage cover.

Summary

Monitoring on the WRC estate is beginning to provide useful information for management to meet a range of objectives including maintenance of biodiversity and soil and water protection.

As more information becomes available from monitoring on the WRC estate it will allow changes in a range of ecosystem condition indicators to be tracked. This will allow the impacts of management operations, such as animal control to be objectively examined. It will enable management inputs to be effectively targeted at improving forest condition, demonstrating WRC Stewardship of the Landcare Estate.

Peter Handford 5 November 1999