A MONITORING SYSTEM FOR NATURAL AREA MANAGEMENT IN WESTERN AUSTRALIA

A.J.M. Hopkins, J.M. Brown and J.T. Goodsell
W.A. Wildlife Research Centre, PO Box 51 Wanneroo 6065

Poster Paper presented at Workshop on Nature Conservation: The Role of Remnants of Native Vegetation. Busselton 22-27 September 1985.

Introduction

The Department of Conservation and Land Management exercises direct control over some 16.5 m ha of land including National Parks, Nature Reserves and State Forest. In addition it is called on to give advice on management of other areas of natural land under Crown control. Proper management of natural areas imposes a requirement to predict likely effects of any management decision (including the do-nothing option). To make effective management decisions, it is desirable to know (and understand) (a) the distribution and abundance of the various species of plants and animals over the landscape, and (b) the dynamics of the communities and ecosystems. This state of knowledge is seldom achieved for any particular area of land

One approach to improving management involves establishing a system of monitoring sites throughout the State Such a system is currently being developed with the following objectives:

i) To provide interpretable data on long-term changes in natural communities;

ii) To complement and supplement the biological survey function;

iii) To provide a simple and effective method for assessing effects of present management decisions in order to improve subsequent decisions, and

iv) To increase the interest of departmental staff and the public in particular areas by involving them in the monitoring program.

It is anticipated that the monitoring program may provide some early indications of management problems such as over-grazing, epidemics, local extinctions etc.

Observations spanning many years (>>5) are considered essential to enable one to distinguish long-term trends in the biota from year-to-year variability and changes resulting from short-term cycles. These long-term studies will also provide a sound basis for interpreting short-term inferential studies of community dynamics.

The Monitoring Method

The method selected and tested through a pilot study incorporates the following features:

i) Repeatibility - plots are permanently marked, and methods for recording are standardized;

ii) Flexibility/Adaptability - the design of the monitoring quadrat enables it to be used for a range of organisms that differ in size and abundance;

iii) User-friendliness - data recording sheets are being designed for simplicity and ease of use. A system of reporting back to observers is also planned.

v) Regularity of recording - is is proposed to structure the system so sites are visited at best annually.

A permanently marked, square quadrat is used. A photopoint is located 10 m north of the south-west corner of the quadrat; the photograph is to be taken with that corner peg in the centre of the field of view. The quadrat is expanded away from the south-west corner to suit the south the organisms of interest (Fig. 1). For recording presence/absence of vascular plant species in natural areas in the South-West Botanical Province, a 20 m x 20 m quadrat is marked off in nested quadrats to facilitate recording. Recording intercepts of canopy cover along two sides and two diagonals of the quadrat provides a repeatable indicator of abundance and biomass. Observations on life history attributes species can be recorded simultaneously with either of the two preceding steps. Measures of other attributes such as tree DBH and faunal observations over larger areas can be referred back to the initial quadrat. Note that the quadrat must be located within a community; the techniques outlined are not appropriate for measuring changes at a boundary or ecotone.

Each monitoring site is assigned a unique, identifying code. At the time of establishment, basic information to be recorded includes identity of the observer and date, purpose/status of site, locality data, and geomorphological and vegetation descriptions. Monitoring procedures to be undertaken on a regular basis are graded from a photograph (plus observer and date), through notes to supplement the photograph, a plant species list, vegetation structure and habitat data, cover values along the transect lines to fire fuels, faunal observations etc. Observations can be recorded directly onto formatted computer data entry sheets. Data processing will be fully automated with provision for feedback to each observer indicating how his/her observations has contributed to the knowledge at that site.

Studies using the Monitoring Method

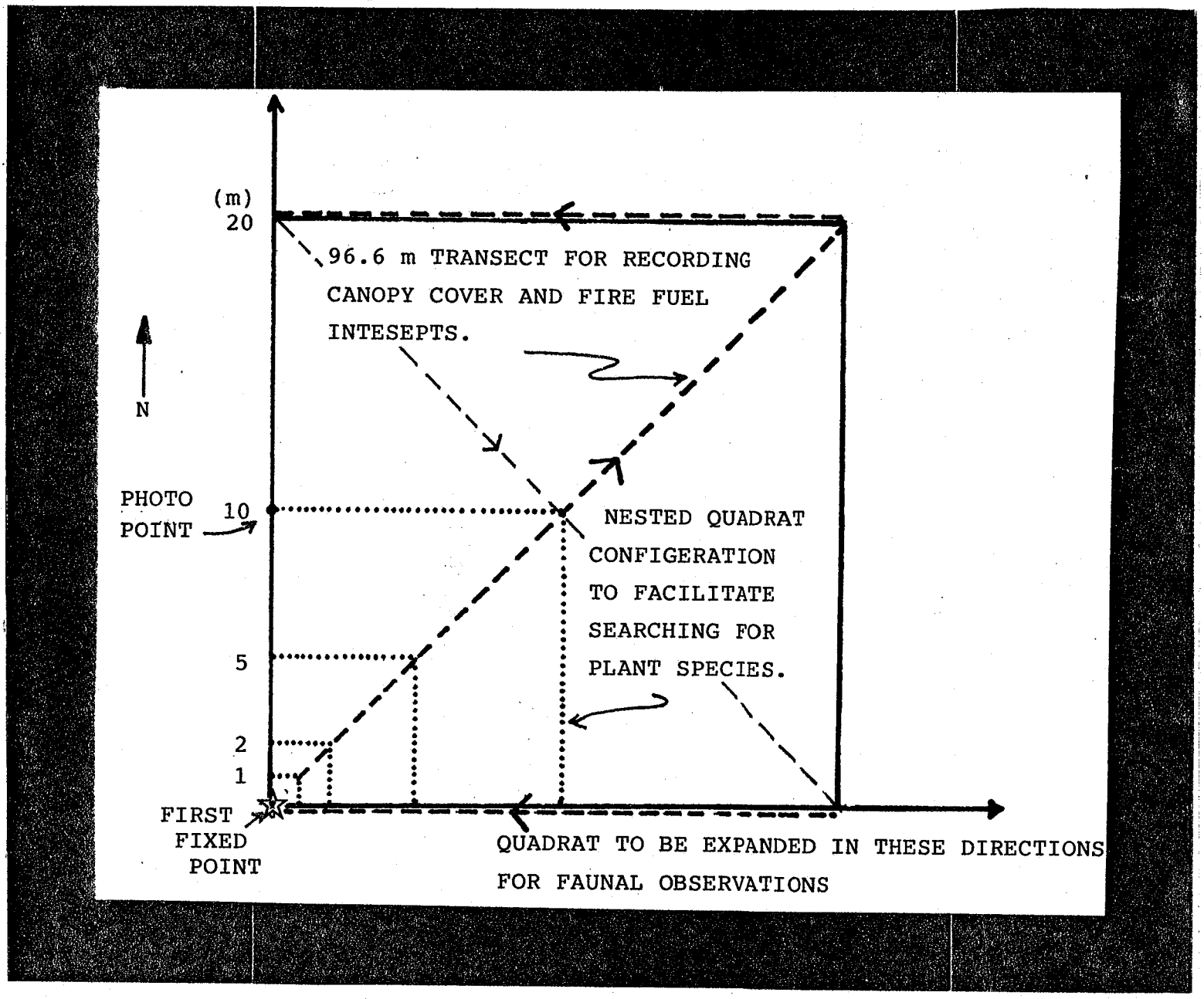
During the evaluation phase, some 26 monitoring sites have been established in the south-west using the methods described above. Objectives for these studies are:

i) to assess rates of change in natural communities in relation to major environmental gradients (climate microclimate, soil fertility eg. York Gum/Jam woodlands on loamy sands across a rainfall gradient); and

ii) to assess rates and patterns of change in different communities eg. pilot study at Clackline Nature Reserve.

In addition, about 1000 permanently marked sites already used for ecological survey are now being re-evaluated for incorporation into the monitoring program.

A major thrust of the monitoring program is towards assessing effects of management actions. Existing studies include regeneration after such things as prescribed fire eg. Two Peoples Bay, Middle Island, Dryandra State Forest and Ovens Reserve, rehabilitation, eg. Eneabba mineral sand mining, cutting and logging and effects of recreational activities. However the policy decision on the implementation of the program has yet to be made.


(m)
20
96.6 m TRANSECT FOR RECORDING CANOPY COVER AND FIRE FUEL INTESEPTS.
N
PHOTO POINT
10
NESTED QUADRAT CONFIGERATION TO FACILITATE SEARCHING FOR PLANT SPECIES.
5
2
1
FIRST FIXED POINT
QUADRAT TO BE EXPANDED IN THESE DIRECTIONS FOR FAUNAL OBSERVATIONS