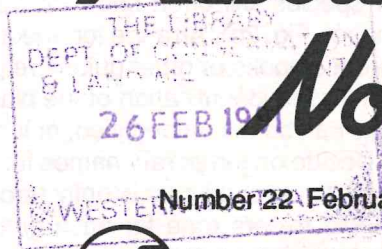
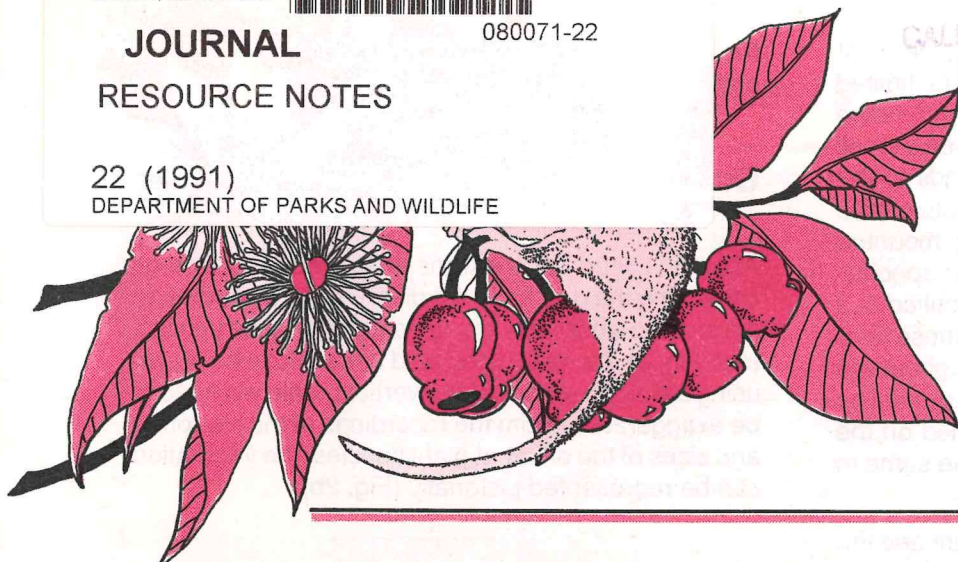




JOURNAL
RESOURCE NOTES

22 (1991)
DEPARTMENT OF PARKS AND WILDLIFE



Department of Conservation
and Land Management, W.A.

Resource Notes

Number 22 February 1991

Mapping Plants along a Transect

An excellent way to learn about plants and their environment, and habitats for animals, is to map plant species along a line, or 'transect'. This activity is useful for students at any level from upper primary to tertiary.

Choosing A Site

Almost any bush area that is not too disturbed is suitable for a transect. The best areas are those that are not uniform. By locating the transect where vegetation changes - for example, in crossing from one soil-type to another, or from valley to hilltop - more can be learnt about the effects of the environment.

The following environments are particularly suitable for transects:

- * **the coast**
If you head inland from the top of the beach, the vegetation changes markedly over a short distance, and there are comparatively few species to map.
- * **wetlands**
If you head outwards from the edge of a lake, several different vegetation types may be encountered.
- * **the Darling Scarp**
A transect that includes both granite and laterite, or a drainage line, or soils of different depths, will encounter very varied vegetation.

Conservation

A class of students can degrade vegetation by trampling, particularly where the soils are sandy. Repeated excursions to the same transect line should be avoided. One useful approach is to run the transect along an established path and confine students to that path as far as possible.

Transect Length

The length of a transect can vary from, say, 20 m to as much as 500 m, according to whether the changes in the vegetation are abrupt or gradual.

Equipment

You will need a measuring tape (or string with flagging at measured intervals), stakes, a trowel, plant-identification guides (books or mounted specimens) and recording-sheets. If elevation along the transect is to be measured, then you will also need an Abney level (Fig. 4).

Preparation

Decide where to lay the transect and how long to make it. A licence from the Department of Conservation and Land Management is needed to collect any plant specimens on public land, and approval is needed from the body that controls the land to conduct the excursion and to collect plant specimens.

Prepare the recording-sheets (Fig. 1). Decide what plant species are to be recorded. They can be limited to those that can be readily identified from reference books, such as those listed on this page. Even a small number of species will often show up trends in the vegetation (see Fig. 2b). Arrange for adequate copies of the reference books or other guides (e.g. mounted specimens) for the identification of the plant species. Some plants can be left unidentified, or identified at a later date. Decide on temporary names for these (e.g. 'prickly pea'), to be used consistently throughout the exercise. Field folders (one for each group) can be provided for specimens collected and named on the day. The name of each species must be the same in each folder.

Instruct the students on the use of equipment and the process of recording.

Field Work

The field work begins by placing a stake at one end of the transect, attaching the tape to it and stretching it out along the route. The students then divide up to undertake the following activities. Disturbance to the environment can be minimized by assigning student groups to particular sections of the transect, marked out with additional stakes.

Activity 1: Plant Distribution

This is the main task: to record where plants of the chosen species occur along the transect within a specified width to one side of it. The width can be varied according to the density of the vegetation and the particular task; for dune vegetation, 1 m is usually suitable. For each species, bars are marked on the recording-sheets to link the distance along the transect at which the cover (canopy) begins to where it ends (Fig. 2).

Activity 2: Life-Forms

For each species, record the life-forms (e.g. tree, shrub, climber - see definitions, Fig. 3) and the usual height and width. Quick sketches can be made of each species to show its shape and basic structure (Fig. 3).

Activity 3: Environmental Factors

To help relate the changes in vegetation to the changes in the environment, the soil-type and the slope of the land can be recorded at intervals along the transect.

The main soil-types of the Perth Metropolitan Region are in Information Sheet No. 1/88, listed under **References**. To determine the characteristic colour of sandy soils, examine the soil brought up around ants' nests; the surface soil is usually discoloured by humus. Or, if necessary, dig a small hole through the surface soil; make sure all such holes are carefully refilled.

The slopes can be measured with an Abney level by students in pairs (see Fig. 4). Tertiary or upper-school students may wish to record additional factors along

the transect, such as the pH, temperature and profile of the soil.

Compilation

After the excursion, the transect diagram is drawn by combining the graphs of the different plant species, in the order in which they first appeared along the transect (see Fig. 2). A profile of the land surface can be drawn using the slope readings; the vertical scale will need to be exaggerated. From the recordings of the life-forms and sizes of the different plant species, the vegetation can be represented pictorially (Fig. 2b).

Analysis

Once the transect diagram is completed, discussion of the results should cover:



- * the general character of the vegetation and how it is influenced by the general environmental conditions at the site (e.g. soil, aspect (the direction a slope faces), ground-water, salt spray, fire, soil-disturbance)
- * changes in the vegetation along the transect and how they correspond to changes in the above conditions.

References

- The Bushland Plants of Kings Park, Western Australia*, by Eleanor M. Bennett (Kings Park Board, 1988)
- Eucalypts of Perth: Field Keys*, Resource Note No. 21 (Department of Conservation and Land Management, 1990)
- A Guide to the Coastal Flora of South-Western Australia*, by G.G. Smith (Western Australian Naturalists' Club; Handbook no. 10. Revised edition, 1985)
- Leaf and Branch: Trees and Tall Shrubs of Perth*, by Robert Powell (Department of Conservation and Land Management, 1990)
- Sense of Place: A Response to an Environment: The Swan Coastal Plain, Western Australia*, by George Seddon (University of W.A. Press, 1972)
- Some Trees of the Jarrah Forest*, Resource Note No. 17 (Department of Conservation and Land Management, 1987)
- Trees and Tall Shrubs of Perth*, Information Sheet No. 1/88 (Department of Conservation and Land Management, 1988)

FIG. 1. (cont'd)

■ ACTIVITY 2: Life-Forms

SPECIES	TYPICAL SIZE		LIFE-FORM ¹	BRIEF DESCRIPTION ²	SKETCH
	height	width			
grey stinkwood	5 m	4 m	large shrub	sparse, irregular; usually has single stem	
chenille honey-myrtle	2 ½ m	3 m	large shrub	spreading, smooth outline, has several stems arising from ground	

¹ See Fig. 3.

² Consider:

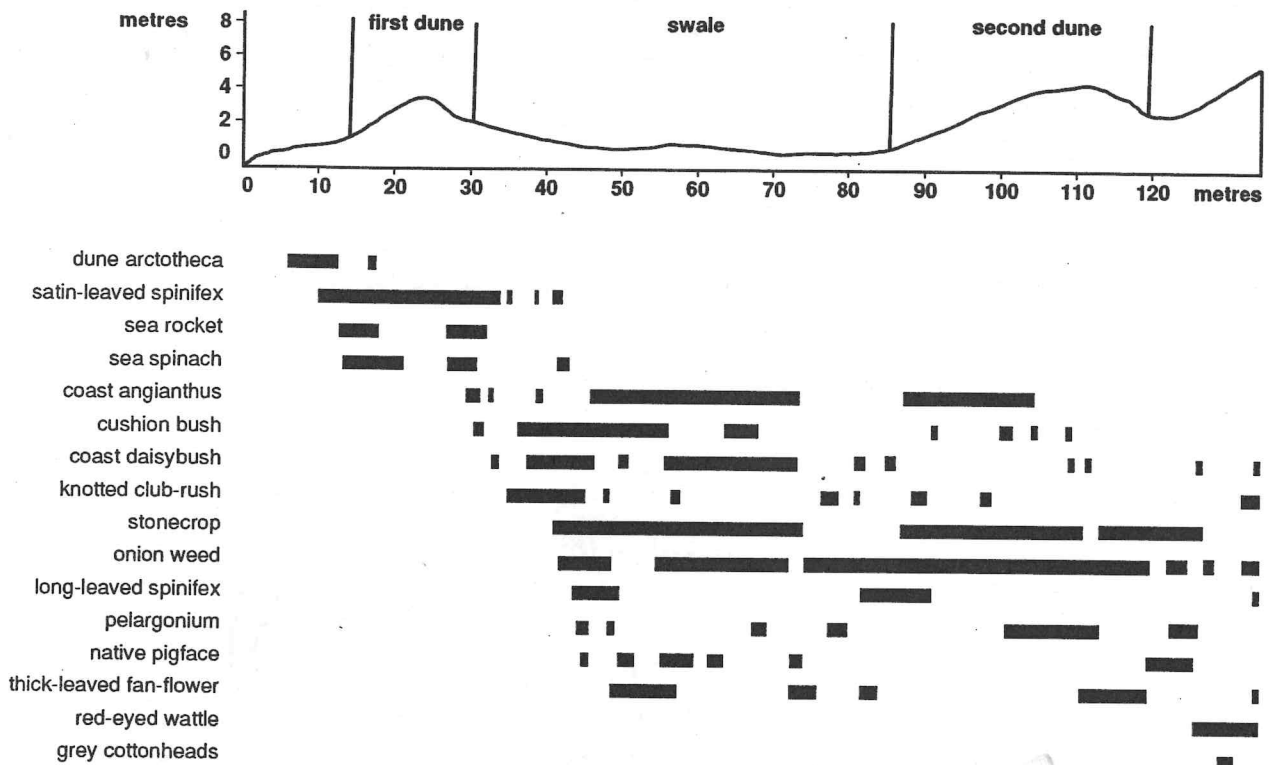
- shape, e.g. slender, upright, spreading, compact, sparse;
- outline, e.g. smooth, irregular;
- structure, e.g. has single stem, has short trunk splitting into many branches, has several stems arising from ground;
- effects of environment, e.g. burnt in recent years, asymmetrical as result of sea winds.

■ ACTIVITY 3: Environmental Factors

DISTANCE ALONG TRANSECT (m)	0	10	20	30	40	50	60
SOIL							
SLOPE							

FIG. 2. EXAMPLES OF TRANSECT DIAGRAMS

a) Transect through dune vegetation, City Beach - adapted from *A Guide to the Coastal Flora of South-Western Australia* (see References). Note the change in vegetation in the lee of the first dune.



b) Short transect up limestone hill using only trees and tall shrubs. Shows change in vegetation from tuart and blackboy to parrotbush and chenille honey-myrtle as soil gets shallower (AA = outcrops of limestone).

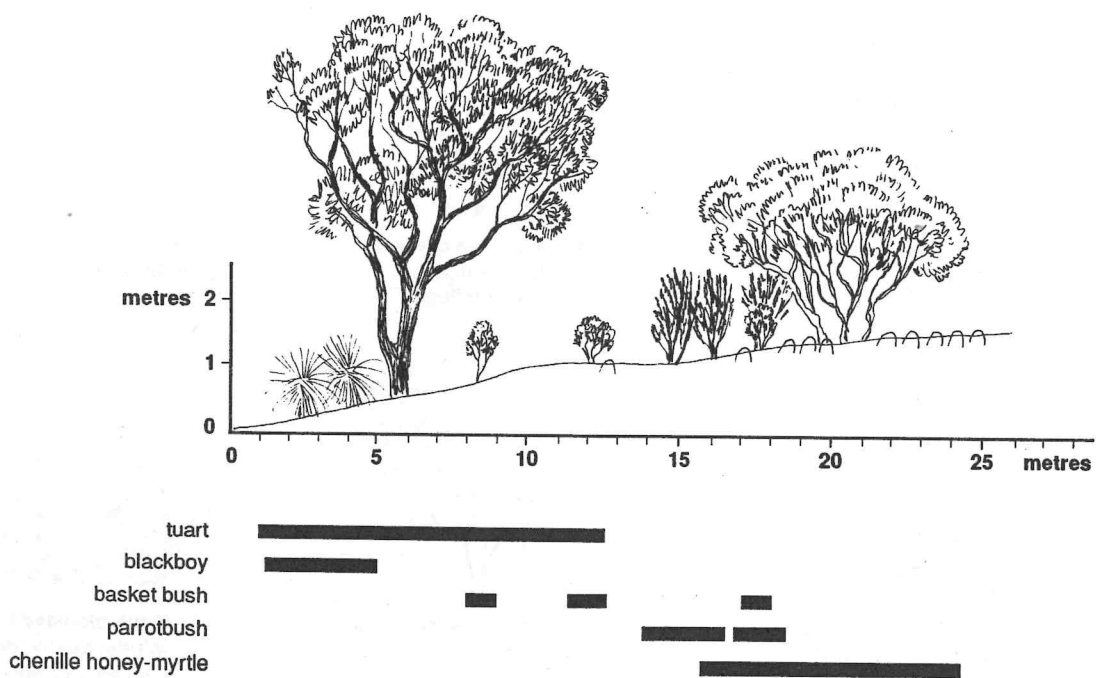


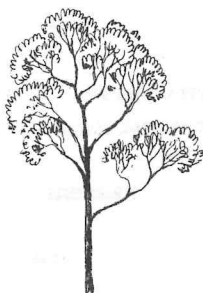
FIG. 3. PLANTS: LIFE-FORMS AND SHAPES

■ MAIN LIFE-FORMS OF PLANTS*

- Tree** More than 3 m tall, with a single stem that does not divide at the base into fairly equal stems.
- Mallee** A eucalypt (gum tree) with several, fairly equal stems arising from the ground.
- Shrub** Bushy, usually less than 5 m tall, dividing at or near the base into several, fairly equal stems. Shrubs can be classified according to size:
- large (over 2 m tall)
 - medium (1-2 m tall)
 - small (less than 1 m)
- Climber** Climbs over other plants.
- Mat-Plant** Has woody stems that spread along the ground.
- Herb** Has no woody stem (e.g. grasses, sedges, kangaroo paws).

* The plants covered here are vascular plants (which have vessels for conducting fluid and materials). Non-vascular plants such as mosses and lichens may be worth recording too.

■ SHAPES AND STRUCTURES OF SOME TREES AND SHRUBS



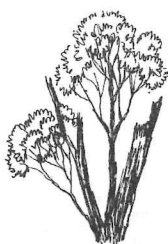
tree with trunk and side-branches (shaft structure)



tree splitting into several major branches



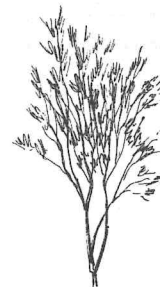
tree moulded by sea winds: leaning, with foliage concentrated into clumps or layers



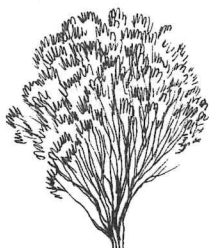
tree or shrub burnt in recent years, resprouting from underground rootstock



a young native cypress: flame-shaped, densely foliated



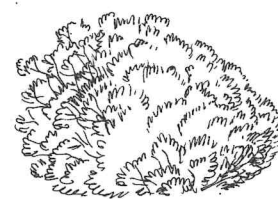
single-stemmed shrub, upright with irregular outline



shrub splitting into many thin, straight branches

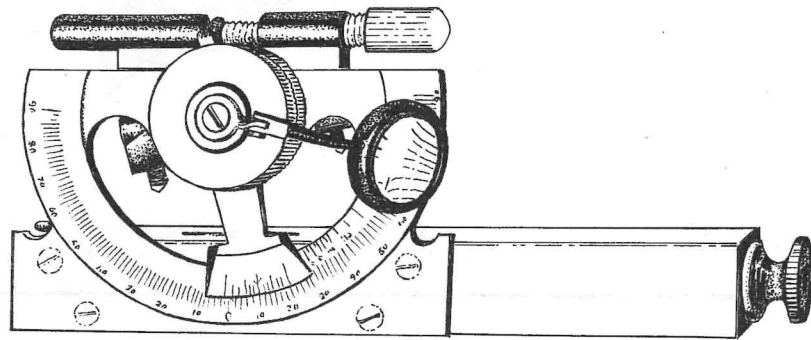


shrub with several stems arising from the ground



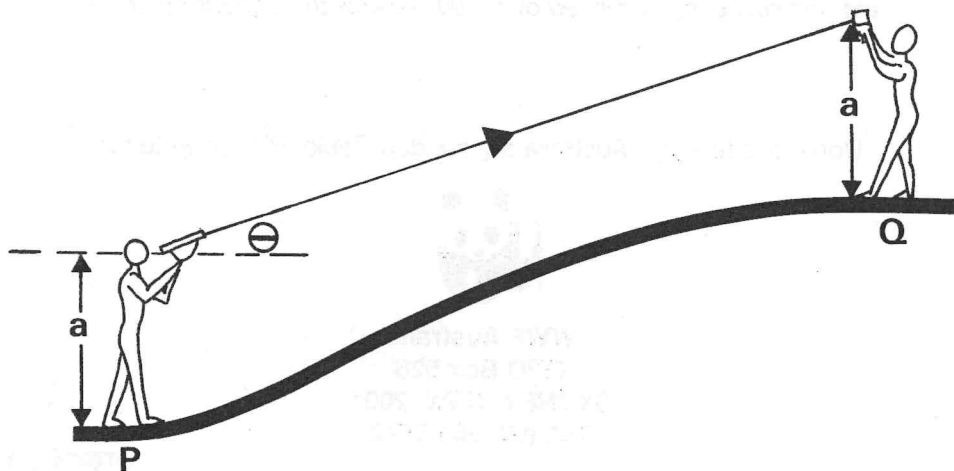
shrub moulded by sea winds: bushy, dome-shaped, asymmetrical

FIG. 4. MEASURING SLOPES



Abney level

To measure slopes, divide the transect into intervals 5 m or 10 m long. One student, with an Abney level, stands at the starting point of the first interval; and the other, with a bright object, stands at its end point. The first student records the reading of the object, held by the second student at the same height above ground as the first student's eyes. The instrument measures the angle Θ in the diagram below, which is the average slope from P to Q. Repeat for each interval.



Using the Abney level to measure slopes

*Written by Robert Powell, who has had a long interest in Perth's vegetation,
with assistance from Dr Boyd Wykes, who runs the Perth Wildlife Watch.*

Illustrations by Margaret Pieroni.

*This Resource Note has been produced as a contribution to the Perth Wildlife Watch,
a public education project of the World Wide Fund for Nature (WWF) Australia.*

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awareness of the needs of conservation. It raises funds for projects to conserve endangered species of wildlife,
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