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SPATIAL AUDIT OF RANGELANDS REMOTE FROM WATER

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INTRODUCTION

The pastoral lease region of South Australia comprises an extensive area of native vegetation used primarily for sheep and cattle grazing. A spatial audit of the pastoral lease lands is currently being carried out to identify and quantify areas remote from water. The catalyst for this work was the delegation to regulate clearance of native vegetation by stock grazing under the *Native Vegetation Act 1991,* from the Native Vegetation Council, to the Pastoral Board within the pastoral lease areas of South Australia. The Native Vegetation Act prohibits the grazing of native vegetation in areas that have not been regularly grazed in the past. This has focussed attention on the installation of new water points. New water points can only be installed once exemption to the Native Vegetation Act has been obtained, through developing a water point plan and having this plan approved by the Pastoral Board.

To assist in the assessment of proposed new water points, information is required about the type and extent of rangeland remote from water. In the absence of a direct measure of grazing activity, remoteness from water is used to model potential grazed area. The relationship between grazing by domestic stock, native and feral animals is well known with grazing activity shown to decrease with increasing distance away from water points.

This poster presents preliminary results on the extent of areas remote from water by Interim Biogeographic Regionalisation for Australia (IBRA) regions, sub-regions and land systems. In addition to assisting with the assessment of proposed waters on pastoral leases, this information will also assist in prioritising areas for biodiversity conservation at a regional scale.

METHODS AND RESULTS

Remoteness from water layers were produced using data from the Pastoral Program's geographic information system (GIS), following the methods used in Biograze (2000). These data comprise fence line and water point information collected or verified in the field using GPS during the pastoral lease assessment program between 1990 and 2000. Fence line and water point data for 221 stations were appended and edge matched (see Table 1). Although the mapping is the most up to date available, it is not current. Since completion of the assessment program, updates have occurred opportunistically. However new waters and fencelines have been established, particularly in the cattle areas, north of the dog fence. Fortunately, these areas are also the most recently mapped.

Table 1. Preliminary numbers of paddocks and waters for sheep and cattle properties in the pastoral lease area of South Australia.

	Number of properties	Number of paddocks	Number of waters
Sheep	171	5,204	11,538
Cattle	50	1,005	5,364

A critical decision affecting the creation of the remoteness from water layers was the selection of the water points to include in the analysis. A classification of water points is not currently available and is problematic, as the focus for grazing of individual water points can change over time. To ensure accuracy throughout the dataset, it was necessary to include all stock watering points. Hence the audit includes ephemeral waters as well as waters no longer active. This is consistent with the approach of

Biograze (2000) and Brook *et al.* (2001). Brook *et al.* (2001) demonstrated that ephemeral waters experience significant grazing impact.

Fence line and water point data were converted from vector into raster data of 50 metre cell size. All water points within 50 metres of a fence were shifted so they were included in the remoteness from water layers produced. Using ESRI software, two remoteness-from-water layers were created, one using fence lines as barriers and one without fence lines as barriers. For both layers, remoteness from water was calculated to 50 km from water. Extensive error checking was then performed. Selected properties were excluded from the audit where topography precluded the application of remoteness from water modelling.

In order to identify the type and extent of areas remote from water, a spatial layer representing biodiversity was required. IBRA regions, sub-regions and Pastoral Program land systems were chosen as surrogates for biodiversity. The choice of these data to best represent biodiversity was made in conjunction with staff from the South Australian Department for Environment and Heritage. Remoteness from water analysis was carried out using the IBRA regions and sub-regions, in accordance to the Australian Guidelines for Establishing the National Reserve System (Environment Australia 1999). Secondly, to provide the finer detail required for decision-making at a property scale, analysis was carried out using land systems.

Land system mapping was selected from other available mapping, including vegetation community and geological mapping, as it is available for the entire pastoral lease area. Importantly, pastoralists are more familiar with land systems mapping than other data. However, the land system mapping varies in scale and accuracy between Soil Conservation Districts. To improve the accuracy of land system mapping, mapping was updated based on the methods described in Brook *et al.* (2001).

Analysis of remoteness from water was carried out for all IBRA regions, sub-regions and land systems in the pastoral lease area.

CONCLUSIONS

The trigger for this work was the delegation to the Pastoral Board to regulate clearance of native vegetation by stock grazing under the Native Vegetation Act, in the pastoral lease areas of South Australia. However, since initiating the spatial audit, there has been much wider interest in the information produced. Quantification of land types and the extent of remoteness from water will:

- Assist in setting regional biodiversity conservation priorities.
- Provide information relevant to the Comprehensive-Adequate-Representative (CAR) principles.
- Provide information for catchment management.
- Provide information to assist in studies of plant and fauna relationships in relation to grazing activity.

Further refinement of the modelling method is envisaged. Some potential improvements include: the use of current water point and fenceline information, taking topographic effects into account, and the application of specific distances to land types, to more accurately identify areas remote from water and grazing.

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