PROCEEDINGS OF THE AUSTRALIAN RANGELAND SOCIETY BIENNIAL CONFERENCE

Official publication of The Australian Rangeland Society

Form of Reference

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Author family name, initials (year). Title. *In*: Proceedings of the nth Australian Rangeland Society Biennial Conference. Pages. (Australian Rangeland Society: Australia).

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Anderson, L., van Klinken, R. D., and Shepherd, D. (2008). Aerially surveying Mesquite *(Prosopis* spp.) in the Pilbara. *In*: 'A Climate of Change in the Rangelands. Proceedings of the 15th Australian Rangeland Society Biennial Conference'. (Ed. D. Orr) 4 pages. (Australian Rangeland Society: Australia).

The Australian Rangeland Society

DESERT UPLANDS GRASS CHECK 1999-2006 MONITORING: ADEQUACY FOR CONDITION AND TREND REPORTING.

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ABSTRACT

Department of Natural Resources, Mines and Water (NRMW) is responsible for a significant component of condition and trend monitoring and assessment in the Desert Uplands. NRMW has initiated an on ground program of pasture monitoring across the Desert Uplands 1999-2006. This paper aims to raise awareness of the pasture monitoring program and report initial assessments of program condition and trend suitability. Initial assessment suggests that the monitoring program, whilst undoubtedly useful and comprehensive, requires improvement. It was found to be difficult to isolate the impact of management against climate. In addition the data is mainly qualitative and fails to comprehensively assess soil and landscape health. For these reasons it is recommended that Landscape Function Analysis be introduced.

INTRODUCTION

The Desert Uplands (DU) (75 000 km^2) is an area which extends from Blackall to Hughenden and east to the Belyando River in Central Western Queensland. It is comprised of approximately 320 properties (20 000-25 000 ha). The region has high natural resource values, with 85% remnant vegetation, high species diversity and late broad scale development (1990-2000). Importantly 40% of the area drains into the Great Barrier Reef Lagoon via the Burdekin River, with the remainder draining into the Lake Eyre Basin. The Bioregion is also believed to be a significant recharge zone for the Great Artesian Basin.

The dominant form of tenure in the Desert Uplands is leasehold and consequently the re-structuring of the process for the renewal of leasehold land means that leases come under a greater level of attention. An implication of this is that land condition assessment may become an integral feature of the lease renewals. If this occurs, natural resource monitoring in the region has the potential to become a valuable benchmark for the standard of land condition on properties.

In order to maintain productivity in the area it is important to monitor landscape health condition and trends. The Queensland Department of Natural Resources, Mines and Water (NRMW) is currently carrying out pasture monitoring in this region. The initial purpose of the monitoring program was to monitor the progress of the Desert Uplands Build-Up Scheme (Desert Upland Build Up and Development Committee, 1996). The method chiefly used is DPI Qld's GRASSCheck system (Pegler L, 1997), augmented in places by the use of Q-Graze (Pressland, 1994).

This paper aims to raise awareness of the NRMW Pasture monitoring program and report initial assessments of condition and trend suitability.

METHODS

Monitoring Methodologies

Since the initiation of the monitoring program in 1999, 115 GRASSCheck, 38 Q-Graze and 156 photo points have been installed across the Desert Uplands. Monitoring is carried out annually for four years and at planned five- yearly intervals thereafter. All the methods use different layouts however they collect the same basic information.

Both GrassCheck and Qgraze give 100 quadrats of data per transect. The data is collected using a quadrat measuring 50cm x 50cm. The recorded data summarises the occurrence frequency of species throughout the transect. The results recorded include: the frequency of each species, the amount of groundcover, frequency of desirable, intermediate, less desirable perennial and annual species, and forbs. Both GrassCheck and Qgraze data are stored on spreadsheets. In addition, the Qgraze data is also stored in the Qgraze database. Basic analysis has consisted of the calculation and graphing of pasture, cover, yield, desirable species and undesirable species.

Adequacy of monitoring for condition and trend

The existing data was examined in an informal manner for its adequacy to assess the health and functionality of the landscape. This includes initial assessment of site representation has involved calculating distribution across biogeographical land zones.

RESULTS AND DISCUSSION

Pasture Condition and Trend

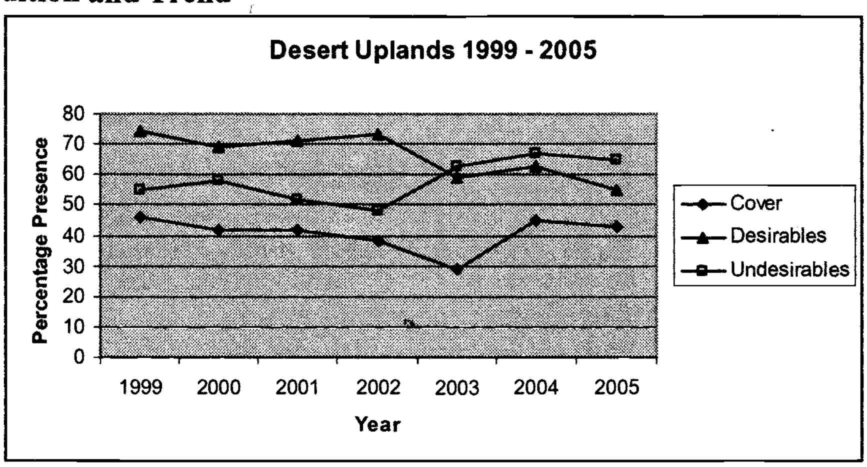

Figure 1: Desert uplands: Average Percentage of groundcover, desirables, and undesirables present 1999-2005

The cover percentage appears to follow recent climatic variation, with wet and dry years corresponding to higher and lower cover values. Desirable species have suffered a downturn in occurrence dropping from 74% to 55% between 1999 and 2005. The representation of the undesirable species present shows that overall there has been an increase in the presence of undesirable species. This correlates almost directly with the decreased desirable species in the most recent years.

Spatial Distribution of monitoring sites

The DU is dominated by land zones 3, 5 and 7 of the bioregional framework. These account for 90% of the area. The distribution of the monitoring sites across this area is as follows;

Land zone 3 (alluvials) contains 49 Grasscheck sites, 76 Photo points and 18 Q-Graze sites. Land zone 5 (loamy and sandy plains), 43 Grasscheck sites, 60 Photo points and 19 Q-Graze sites. Land zone 7 (ironstone jump-ups) 17 Grasscheck sites 16 Photo points and 1 Q-Graze site.

The selection of sites has been slightly skewed by the initial purpose of the monitoring - which was to monitor the progress of the Desert Uplands Build-Up Scheme. Thus most of the current sites are distributed according to participating landholders/properties and not selected to be representative of land zones (other than at a property level). However the properties are relatively well distributed across the land zones. Further sites could be added in order to increase knowledge across the whole of the range of land zones. In addition analysis of land zone representation needs to occur.

Adequacy to assess the health and functionality of the landscape

The data collected represents accurately the pasture condition and composition at sites. However it is difficult to isolate the impact of management against climate. Potentially this could be rectified by collecting information on stock pressure, climate, and the introduction of reference sites.

One of the areas where the methodologies have been inadequate is in the assessment of soil health and function. Both these methods do have a section which collects soil surface observations. However, in most cases these have fallen into disuse because of its rudimentary nature. Additionally this data is mainly qualitative. Whilst this is not wrong, qualitative data is difficult to compare in measurable terms. Quantitative data is therefore an easier method of comparison. With this in mind it would be better if the condition could be recorded in a numerical form. This reasoning points to the introduction of an auxiliary method of monitoring. Using Landscape Function Analysis (LFA) would enable the range of data collected to be extended to include a numerical assessment of the health of the soil environment.

LFA is a suitable option for a number of reasons. Firstly, it is an easy form of data collection. The transect details and soil surface condition assessment are quite simple to collect. The manual explains the concepts simply. Secondly, it is relatively time efficient. A site can be established and read in about 3 hours. Data processing is relatively easy as it consists of the straight data entry into the relevant spreadsheets. One of the major advantages of this method is that it quantifies qualitative data. This is done via the spreadsheets which process the data collected and generate figures which describe the level of landscape function across a number of parameters. The main qualities described by these are: energy flow, water and nutrient cycling, and soil stability. These parameters remain the same and consequently the sites can be compared over a number of years in order to determine whether the site is improving or worsening over time. Additionally the LFA data is more sensitive to managerial changes than Q-Graze and GRASSCheck due to the nature of the data collected and the method of analysis. LFA is still influenced by climatic changes but to a lesser degree than the pasture composition methodologies.

The advantage of using LFA with either GRASSCheck or Q-Graze is that a complete picture is formed of the site. The pasture composition is recorded more effectively by GRASSCheck or Q-Graze. This will allow changes in pasture composition to be tracked whilst at the same time the LFA records the level of landscape function. The methods are complementary and compensate for each other's weaknesses.

CONCLUSIONS

It is important that the time spent collecting data is reflected by the quality and usefulness of the data. Whilst the current methods of monitoring are adequate for the recording of pasture composition it is recommended that LFA be introduced in order to gain a more quantifiable and holistic picture. The two monitoring methods will complement each other and allow a full picture of both landscape function and pasture composition.

Furthermore it is recommended that the current sites be spatially reassessed as they finish their participation in the Desert Uplands Build-Up Scheme. This may allow for a more even distribution of sites across the land zones.

REFERENCES

Desert Upland Build Up and Development Committee, (1996), Position Paper: A Paper Identifying the Issues Affecting the Viability and Sustainability of the Population and Land within the Desert Uplands, Desert Upland Build Up and Development Committee, Barcaldine.

Pegler L et al, (1997), Grasscheck:Grazier Rangeland Assessment for Self Sustainability, Department of Primary Industries, Brisbane.

Pressland T,(1994), Draft Manual for QGRAZE: Monitoring the Condition of Grazing Lands, Department of Primary Industries, Rockhampton.

Tongway DJ and Hindley NL, (2004), Landscape Function Analysis: Procedures for Monitoring and Addressing Landscapes, CSIRO Sustainable Ecosystems, Canberra.