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Buffel Grass Management in Indigenous Communities.

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Abstract

Buffel grass has been recognised as one of the greatest threats to biodiversity in South Australia's arid and semi-arid rangelands. It has the capacity to transform ecosystems through habitat loss, competition with native plants and alteration of natural fire regimes. Buffel grass is increasingly impacting on the culture, health and safety of Indigenous communities and new approaches to the management of this devastating weed are being employed.

Advances gained from South Australian research and development have resulted in the application of new control options, increasing the efficiency and effectiveness of herbicide application. The emergence of new technologies has resulted in the use of drones and user friendly platforms for the mapping of buffel grass infestations in Indigenous communities and throughout SA's arid rangelands.

Building the capacity of Indigenous communities through both formal and informal training is a key focus of the Alinytjara Wilurara Natural Resources Management Board. Anangu Pitjantjatjara Yankunytjatjara Land Management and Spinifex Land Management. Training provided includes the use of herbicides, mapping equipment and a range of other land management tools, with a southern desert ranger forum planned in 2017 to provide an opportunity for indigenous rangers from SA, NT and WA to learn from the experiences of fellow rangers and traditional owners.

In addition, 'healthy country planning' is being used to develop achievable management objectives for a range of cultural and environmental issue, such as weed management. This planning process has a strong emphasis on traditional owner engagement.

A focus on building the capacity of Indigenous communities has seen a changing face of Indigenous managed lands. New and innovative ways of effectively managing buffel grass are being employed to improve the condition of country and manage the threats posed to the environment and culture in Australia's rangelands.

Introduction

Buffel grass, *Cenchrus ciliaris and C.pennisetiforums,* are deep-rooted, perennial grasses which are believed to have originally arrived in Australia with cameleers in the 1860s. They are native to eastern Africa, Saudi Arabia, Afghanistan, Pakistan and India. Buffel grass was widely planted between the 1960's and 1980's across vast expanses of central Australia as both a pasture grass and dust suppressant in remote communities. It has since spread across large areas of Northern Territory, Queensland, South Australia and Western Australia.

Considered one of the world's worst invaders (Williams, 2000), buffel grass is listed as a key threatening process to Australia's biodiversity (Department of Environment, 2015) and is considered the most significant invasive grass of the Australian arid heartlands (Grice, 2000) with the capacity to alter entire ecosystems in a relatively short-time frame. It has been recognised as one of the greatest threats to biodiversity (Williams, 2000) in South Australia's arid and semi-arid rangelands with the ability to transform native ecosystems across vast areas.

One of buffel grass's most significant impacts is that it alters fire regimes across entire landscapes. It is more flammable than most Australian native grasses and invades areas at high density. Buffel grass promotes high intensity fires, and due to its flammability, increases fire frequency. It has adverse impacts on ecosystems which have never been exposed to such extreme conditions i.e. increased fire frequency

results in an inability of native plants such as Spinifex (*Triodia sp.)* to grow, mature and set seed due to their evolution under less frequent fire events. In wooded areas, this altered fire regime shifts woodland communities towards degraded grasslands dominated by buffel grass unable to support the native species that once thrived. Buffel grass threatens species of high conservation and cultural importance, such as the Everard Garland Lily, Black-footed Rock Wallaby and Malleefowl.

Cultural impacts on Indigenous communities include the loss of bush foods and bush medicines, reduced hunting opportunities through species decline and the reduced ability to track prey and infestation of sites of cultural significance i.e. rock holes as depicted in this short film *Storm on the Horizon* https://vimeo.com/206163898. With an increase in fire intensity and frequency fire also threatens the health and safety of remote indigenous communities.

Momentum has been building over the last 5 years for an integrated and united approach to the management of buffel grass in Australia. Stakeholders are motivated by the negative impacts of the weed and are developing new approaches to its management. A three-year project titled 'Buffel Grass Control in Arid Rangelands' funded by the Native Vegetation Council (SA) commenced in 2013, with a focus on developing best practice buffel grass control options through community engagement and extensive trials.

Trials/Research

In 2014, herbicide trials were undertaken in three locations throughout the state including the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands (a remote indigenous community in North-Western South Australia). Indigenous students studying Conservation and Land Management were involved in monitoring of the trials and regular trial site visits were undertaken with traditional owners to clearly explain the effectiveness of the various treatments. A key learning from the trials includes the identification of a grass selective residual herbicide (flupropanate$^{(ai)}$) effective in controlling mature buffel grass tussocks and suppressing new germinations for approximately 18 months (Figure 1- RTH and RTL). Use of flupropanate$^{(ai)}$ enables treatment all year round as opposed to the limited window when buffel grass is actively growing and dramatically reduced the amount of follow-up control required.
Further trials have recently been undertaken in the APY Lands to refine the application rate and assess the effectiveness of aerial application of a granular form of flupropanate$^{(ai)}$ based herbicide, enabling efficient treatment of buffel grass in remote, difficult to access terrain and without a requirement for large quantities of water (often a limiting factor in the arid rangelands of central Australia).

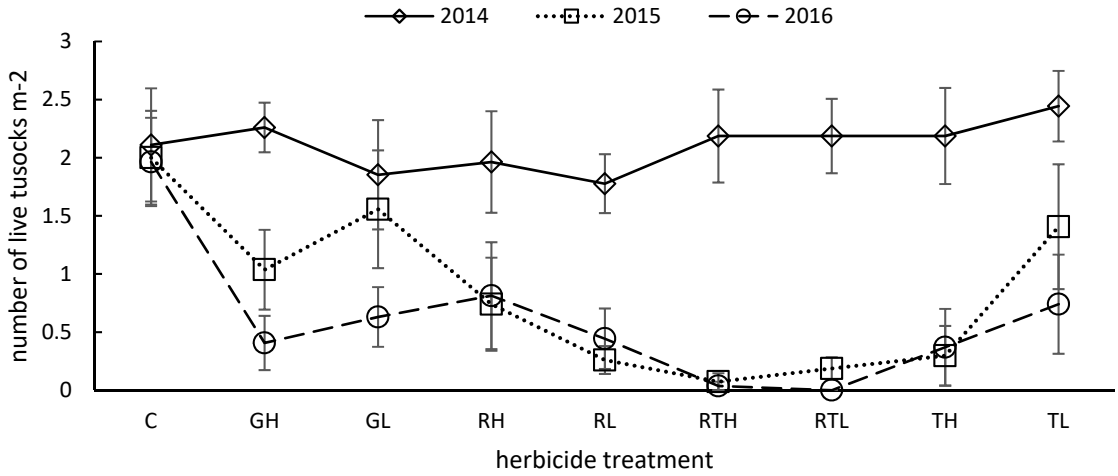

Figure 1: Results of the buffel grass herbicide trials.

Following consultation with the SA Buffel Grass Taskforce, a university of Adelaide student undertook trials of an organic herbicide (Bioweed™) which proved to be effective in destroying both aerial and surface seed, improving control options by dramatically reducing the seed bank and the amount of follow up control required (Tschirner, 2016). This work also included trials identifying the temperature and duration of exposure required to destroy buffel grass seed, undertaken to inform the best practice use of fire in controlling buffel grass infestations (Tschirner, 2016). Results showed that the quantity of biomass and resulting duration of fire is equally as important as temperature in destroying buffel grass seed (Figure 2).

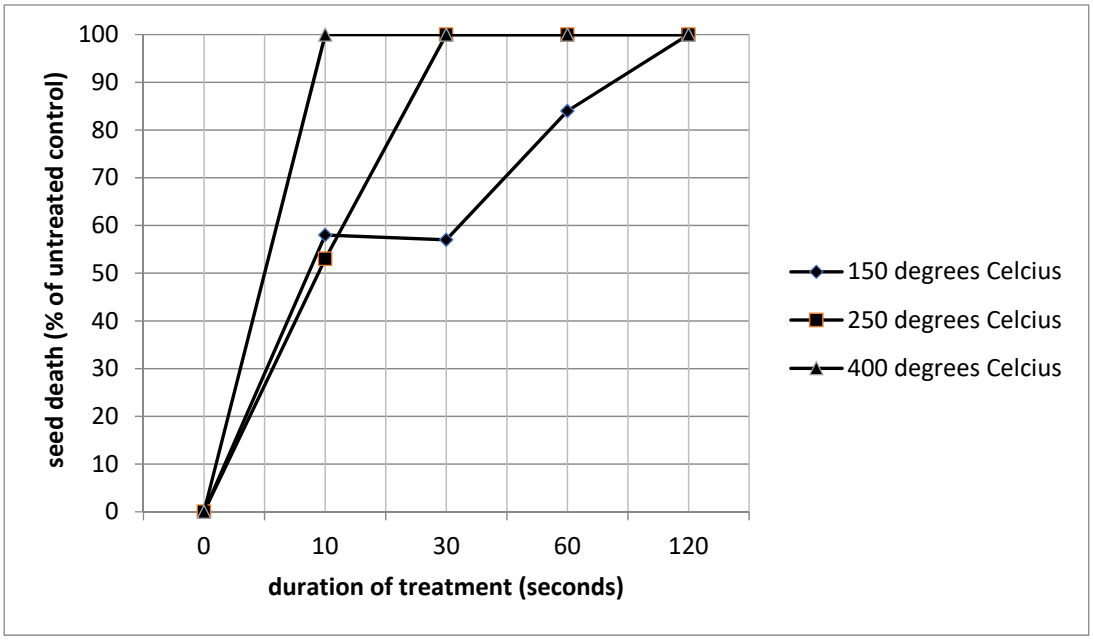

Figure 2: Temperature and duration of exposure required to destroy buffel grass seed.

Planning/Engagement

Extensive Healthy Country Planning (HCP) is being undertaken in indigenous communities throughout the Great Victoria Desert (GVD) in an effort to identify threats to the health of indigenous culture and the environment in which it is intrinsically interconnected. Healthy Country Plans are developed in close consultation with communities in an effort to build ownership over land management issues such as fire management, rock hole management, threatened species management and predator control.
Buffel grass management has been rated the highest priority in many of the Healthy Country Plans with aspirational goals identified to eradicate buffel grass from the region within a 10-year period. Supported by Ten Deserts org, Rangelands NRM WA, Indigenous Desert Alliance, Alinytjara Wilurara (AW) NRM Board and others, project planning is underway for a collaborative cross border *Buffel Free GVD* project.

The *Buffel Free GVD* project will provide opportunities for indigenous land managers and ranger groups from across the GVD (both WA and SA) to prioritise and implement buffel control strategies together, not only through on-ground control efforts but through planning and ranger exchanges to build capacity within all groups. Indigenous land managers will be able to communicate with others about the negative impacts of buffel grass and the long-term goals of *Buffel Free GVD* to encourage community ownership and long-term stakeholder support across the region.

The development of a 'GVD Bioregional Buffel Grass Eradication and Control Plan' will guide the key activities of the project. It will incorporate existing plans, consult stakeholders and develop an integrated plan to highlight priority areas such as biodiversity hotspots, cultural sites and infestation pathways (roads, tracks, rail corridors and other disturbed areas) for control both at an individual organisational level. The development of the plan will involve digital and cloud based data collection and monitoring.

Building Capacity

Indigenous communities throughout South Australia and the Great Victoria Desert are increasingly adopting new tools and technologies for managing buffel grass. Communities have undertaken extensive mapping and monitoring of infestations through the use of tablets and mobile phones, and in the case of Spinifex Land Management, recently undertaken aerial mapping of the Tjuntjuntjara community through the use of a drone. Spinifex Land Management have mapped buffel grass

infestations along a total of 2,078 km of roads and tracks in 2016, representing 79% of known tracks (up from 22% in 2015).

Communities are moving toward an integrated approach by using liquid and granular flupropanate in combination with organic herbicides and burning to destroy aerial and surface seed. Spinifex rangers have not only proactively tackled buffel grass infestations, they have also been instrumental in delivery of training to other indigenous communities in the region. This peer to peer training methodology has proven successful and has been praised by those involved

Indigenous communities are increasingly involved in opportunities to share learnings and experiences to improve the condition of country at a landscape scale. The inaugural Southern Deserts Ranger Forum was held in Ilkurlka in January 2016. The event attracted more than 85 people from across Western Australia, South Australia and the Northern Territory – 60 of whom were indigenous rangers. Collectively the ranger groups in attendance manage an area of 1.2 million square kilometres across Western Australia and South Australia. In addition to oral and practical sessions on buffel grass management, the forum was an opportunity for ranger groups to discussed camel management, rock hole and threatened species management, firearm use and safety, predator control and the importance of monitoring and data management.

AW NRM Board are the authority responsible for planning, coordinating and facilitating buffel grass management in indigenous communities of north-western South Australia. The region is committed to eradication of all infestations in the Maralinga Tjarutja (MT) Lands and protection of key sites of cultural and environmental significance in the APY Lands (Tschirner et al. 2012). Over the last 5 years, the AW NRM Board have been instrumental in working with communities, indigenous contractor groups and other key stakeholders to consistently control buffel grass in the MT Lands. The Board is building the capacity of indigenous communities through the purchase of field equipment, provision of jobs on country and formal and informal training in best practice buffel grass control, chemical handling, use and storage, mapping and monitoring.

Conclusions

Successful and meaningful indigenous engagement is integral to the effective management of buffel grass on Aboriginal lands. Recent initiatives have proven successful with a significant increase in our understanding of buffel grass as a weed and the development of best practice control methods and strategies over the last 5 years. Such initiatives and engagement strategies have been instrumental in the changing face of indigenous land management projects in South Australia, which have seen an adoption of new technologies, valuable training opportunities and a marked increase in ownership of buffel grass management in indigenous communities.

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