

Final Report

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Business and RD&E plan to determine the value proposition for greater use of fire in the grazing lands of northern Australia

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Abstract

Maintaining pasture is the basis of production and profitability in the northern grazing industry. But pastures can be lost to wildfire, woody thickening, or undesirable combinations of grazing and burning causing degradation. Conversely, judicious use of fire can help to prevent wildfire spread, improve pasture condition and control woody thickening. Consultation with pastoralists and graziers indicated that many would like to burn more – or for different purposes – or to have their properties burnt-out less often. Given the fire-prone landscape, fire is an issue confronting all managers of northern grazing lands.

To decide the extent to which fire should be included or excluded, pastoralists and graziers need to consider fire effectiveness, ancillary impacts, and the relative costs and benefits compared to other options. Current impediments relate to uncertainty on fire use, post-fire conditions, ancillary impacts, and public perceptions. An RD&E program was prepared to better equip pastoralists and graziers with the knowledge and skills to incorporate fire into sustainable property management, if desired. The plan is based on information obtained from wide consultation with pastoralists, extension providers and researchers and a review of published and unpublished literature. It provides a vision for RD&E, translated into strategic objectives, priority program outcomes, project suggestions and criteria for evaluating project proposals. The plan is divided into two themes: Theme 1 focusing on consolidating and packaging existing fire management knowledge and identifying knowledge gaps; Theme 2 focusing on building fire management capacity through action research and strengthening extension networks and infrastructure. A governance structure is proposed that will ensure collaboration between all stakeholders across the region to provide a strategic approach to fire management RD&E, with Monitoring, Evaluation, Improvement and Review embedded into program operation and prioritisation.

Executive Summary

Project background and aims:

The aim of this project was to develop a business plan for conducting an RD&E program focusing on grazing, fire and rainfall interactions in northern Australia. An evidence-base for the use of fire on grazing lands was considered necessary to enable livestock producers to improve their use of fire as a potentially cost effective management tool. Given the diversity of issues, with fire recognised as an important tool for sustainable land management, yet posing both threats and opportunities to grass cover, greater emphasis on coordinated research and delivery effort is considered necessary. Pastoralists and graziers cannot decide the extent to include fire in their property management without knowing the implications – whether intended outcomes will be achieved, the ancillary impacts of fire, and the relative costs and benefits compared to other options. An RD&E program will give greater confidence in decision-making about burning if it helps pastoralists and graziers to assess the risks and benefits of using fire for different purposes, gives ready access to the best available knowledge, and assists them to gain first-hand experience of the successes and failures of fire management. It should also fill knowledge gaps where there is still uncertainty about the best ways to proceed.

The specific the objectives of the project were to:

- Provide a situational analysis that draws upon earlier work supported by MLA, including recent Northern Grazing Systems reviews, and that also identifies knowledge gaps, research providers, delivery mechanisms and funding opportunities
- Ensure that the situation analysis is derived through extensive consultation, particularly with pastoralists, to identify impediments to their current use of fire
- Describe a research program model that maximises end user participation in shaping, implementing and interpreting research as well as facilitating information delivery and adoption
- Determine an implementation framework for delivery of priority RD&E activities over 5 years, but nested within a 10 year program
- Develop a draft RD&E plan for fire and grazing management in northern Australia

Achievements

We prepared an RD&E plan for fire and grazing management in northern Australia based on a review of published and unpublished literature and wide consultation with pastoralists, researchers and extension providers. We used on-line surveys to target each of these primary audiences and conducted regional workshops and phone calls to consult directly with pastoralists. We emailed requests for information and advice to researchers and extension providers and received detailed written responses from key organisations. We also used responses from other relevant producer surveys to widen the information base. Potential funding sources were identified based on a computer search of available grants. The results were compiled into a series of supporting documents and used to develop the RD&E plan. A background paper was prepared on the uses of fire, regional profiles were prepared for each of the 14 regions in the study area to describe how fire is used or regarded in each region, and consultation with pastoralists, research providers and extension providers was summarised into three stand-alone reports.

The following impediments to burning were identified:

- Uncertainty about predicting post-fire rainfall and subsequent pasture recovery and stocking rates
- Uncertainty about being able to control the extent of fire
- Uncertainty about the impact of woody thickening if fire is not used, and how this will affect forage availability and pasture condition in the short- and long-term, which subsequently will affect production and profitability
- Uncertainty about how fire can be used to maintain or improve pasture availability and condition
- Uncertainty about the impacts of fire on other assets – carbon, soil, water quality and cultural values
- A perceived lack of institutional support for the use of fire
- Lack of confidence in the skills, experience and agenda of those providing fire management advice

The RD&E program focusses on overcoming these impediments. It sets out an RD&E investment strategy for equipping pastoralists and graziers with the knowledge and skills to incorporate fire into sustainable property management where they feel it is appropriate to do so. It provides a vision for RD&E, translated into strategic objectives, priority program outcomes, project suggestions and criteria for evaluating project proposals. The plan has a strong governance framework and is delivered in two themes: Theme 1 focusing on consolidating and packaging existing fire management knowledge and identifying knowledge gaps; and Theme 2 focusing on building industry fire management capacity by engaging pastoralists in action research projects addressing knowledge gaps and improving extension networks and infrastructure.

Pastoralists placed strong emphasis on documenting existing local knowledge and providing local examples on the practical application of fire using case studies, demonstration sites and field days. They also expressed the importance of interpreting research results in terms of day-to-day land management (social and economic aspects), and using existing networks for information delivery. Other than for climate, most expressed the need for a solid information base ahead of modelling or IT related projects. These views have been instrumental in shaping the RD&E plan.

Industry benefits: when, how and who?

The benefits from this work can flow through to the grazing industry as soon as 2014-2015, as people become aware that the plan is available, partnerships are formed and projects are developed and funded to address priority issues. Producer-driven research will ensure key questions are addressed in a meaningful way. In other cases, only an advocacy role is required to reinforce the issues, priorities and directions identified by industry and captured in the plan. For example, there are opportunities for industry input to current government initiatives, which could see early improvements in grazing and fire management. Existing knowledge can also be made available in a relatively short timeframe.

The main benefits to industry will be realised over the next five years or so, as partnerships and networks are established and operational, existing knowledge is documented and made available and new knowledge is gained. In five years' time, grazing land managers in northern Australia will be better able to confidently decide whether to use fire on their properties; how it should be used; the measures required

for implementation; and the relative costs and benefits of using this tool compared with other management options.

Highest priority has been assigned to improved rainfall forecasting and providing pastoralists and graziers with access to this information to meet their fire planning needs. This can be achieved by establishing a process for pastoralists and graziers to work with researchers to develop and test an effective rainfall forecasting service.

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1 Background

This report completes contract B.NBP.0755 between Firescape Science and Meat and Livestock Australia Limited (MLA): Business and RD&E plan to determine the value proposition for greater use of fire in the grazing lands of northern Australia. The work was instigated as an extension of the Northern Grazing System initiative which aims to increase adoption of innovative best-practice grazing management by beef producers throughout Queensland, the Northern Territory and the Kimberley and Pilbara regions of Western Australia. Earlier reports (Project B.NBP.0578 and (Project B.NBP.0579) aimed to develop grazing land management guidelines for later adoption and implementation. These reports identified fire as a priority land management issue, where it was evident that the use of fire played a role in sustainable land management, but there was limited uptake of research results. To progress adoption and effectively frame questions for further research, the obvious next step was to identify current practices and impediments to the use of fire. Addressing these impediments will aid in implementation of past research as well as identify key requirements for giving pastoralists and graziers the information and tools they need to make decisions on using fire as part of their overall property management activities.

The resulting draft RD&E Plan (Appendix 1) is intended to set direction for the investment required to clarify fire-grazing-rainfall interactions on a regional basis and provide accessible, relevant information for using fire to manage pasture condition, vegetation structure, biodiversity values and carbon budgets, and to mitigate the effects of wildfires. Undertaking activities identified and supported by pastoralists will maximise uptake and adoption.

2 Project objectives

The project objectives were to:

- Develop a draft RD&E plan in fire and grazing management that distils the value proposition for greater use of fire in the grazing lands of northern Australia, and implicitly, “on-farm” guidelines for livestock producers to utilise fire as a management tool.
- Provide a situational analysis including developing the synthesis from 2010 (MLA reports B.NBP.0578 and B.NBP.0579), recommendations from past reviews, knowledge gaps, research providers, funding and delivery initiatives.
- Undertake extensive consultation to derive the situation analysis and seek contributions and ownership of a draft RD&E plan. This will include conducting 7 workshops across 3 States, email survey and telephone follow-up.
- Determine RD&E activities, likely value proposition by region and implementation of the plan over an initial 5 years nested within a 10 year program. Scoping of the RD&E plan will include quantification of the benefits and risks including managing weeds, patch grazing, greenhouse gas budgets including issues/opportunities based on current regulatory structures.
- Describe the research program structure to maximise utility of the data generated.

- Describe the research program model that maximises end user participation in shaping, implementation, and interpretation of research as well as stimulating delivery and adoption.
- Outline an extension program to promote awareness, discussion and understanding of the issues within the value proposition amongst local networks of producers and their advisers that includes packaging and delivery of the value proposition - developing existing initiatives and updating materials.
- Recommend a governance structure and monitoring program.

3 Methodology

The following steps were undertaken to prepare the plan:

- Current issues and knowledge gaps relating to the use of fire on grazing lands were identified by reviewing industry literature and consulting with industry stakeholders.
- Consultation targeted three sectors: pastoralists, extension providers and researchers. On-line surveys on fire and grazing management were designed and publicized to each group. These investigated fire-use and perceived deficiencies or impediments across northern Australia.
- Pastoralists were also consulted via workshops and phone consultations that took place in WA, NT and Qld between August and November 2013. A background paper on the uses of fire was prepared (Appendix 2), as well as profiles summarizing available fire, grazing and climate data for each region (Appendix 3). These were used to guide discussions. Feedback on the background paper and regional profiles helped to identify regional priorities for fire management RD&E.
- Additional information was collected from researchers through a direct email requesting their response to specific questions as well as follow-up emails and telephone discussions. Formal written submissions were received from some lead agencies.
- Additional information was collected from extension providers through direct email requests, follow-up emails and workshop discussions, as extension personnel had been invited to the pastoralist-orientated workshops.
- Currently available funding sources were reviewed (Appendix 4), as were decision support tools related to fire management.
- Summary reports were prepared after consultation with pastoralists (Appendix 5), researchers (Appendix 6) and extension providers (Appendix 7). The consulting team used these to identify commonalities, analyse needs and determine priority activities.
- The above information was used to prepare the draft plan, which includes a vision statement, objectives, milestones, priorities and suggestions for integrated RD&E projects for the next 5 – 10 years. The plan also includes criteria for evaluating projects, delivery mechanisms and suggestions for measuring plan success.
- The structure of the draft plan was determined in conjunction with the MLA prior to finalisation

4 Results

The draft RD&E plan has four main sections: an introduction outlining the purpose of the plan and rationale for an RD&E program; an overview of the program structure, with each component then expanded into goals, outcomes and milestones and presented in a table; short summaries that provide greater detail on how each outcome will be delivered; and a final section relating to project management and governance.

Six goals have been identified for maintaining pasture in good condition through improved fire management. These goals are to:

- Assist northern producers manage the threats to forage availability and pasture condition through adaptive management planning and collaborative product development
- Synthesise and disseminate existing knowledge and update as appropriate
- Engage northern producers in action-research to identify issues and solutions
- Provide a long-term perspective on processes involved in pasture degradation and woody thickening
- Assist pastoral and fire agencies and consultants to support producers in their fire planning and management
- Support continuous improvement in fire management on northern grazing lands through an integrated RD&E program

Priorities have been assigned to each recommended activity for delivering these outcomes. Budget estimates have been made for each activity and potential project partners have been identified. Highest priority was given to funding a project that enabled pastoralists and graziers to work with DSITIA to develop a rainfall forecasting service that meets their fire planning needs.

This plan provides a costed program structure with goals, outcomes and prioritised activities; a governance framework; an advised Monitoring, Evaluation, Review and Improvement (MERI) process; and criteria for selecting projects and staff to meet the program's objectives. The plan is organised in two themes.

Theme 1 consolidates the existing knowledge base through the collation, synthesis and communication of existing knowledge held by pastoralists, pastoral and fire extension officers and researchers, and identifies knowledge gaps, particular from a producer perspective. It continues and extends the Kidman Springs experiment for up to five years to provide understanding of long-term interactions between fire, grazing and climate with a focus on pre- and post-fire environmental conditions. Finally, it identifies knowledge gaps that present a real impediment to the effective use of fire management on grazing properties.

Theme 2 builds industry fire management capacity by engaging pastoralists and graziers to test options developed in Theme 1 and to participate in research to fill locally-relevant knowledge gaps. Depending on research questions identified in Theme 1, the Kidman Springs research program may be further extended, or replaced by other dedicated research programs. This theme also builds regional extension capacity and provides local extension programs using producer trials as demonstration sites.

5 Discussion / Conclusion

Maintaining pasture is the basis of production and profitability in the northern grazing industry. But pastures can be lost to wildfire, woody thickening, or undesirable combinations of grazing and burning that cause degradation. Conversely, judicious use of fire can help to prevent wildfire spread, improve pasture condition and control woody thickening. Consultation with pastoralists and graziers indicated that many would like to burn more – or for different purposes – or to have their properties burnt-out less often. Therefore, given the fire-prone landscape, fire is an issue confronting all managers of northern grazing lands.

Survey results showed that fire is still widely used in grazing management across northern Australia, but its use is declining in some areas, especially when properties change hands. Significant impediments to burning were identified as:

- Uncertainty about predicting post-fire rainfall and subsequent pasture recovery
- Uncertainty about being able to control fire extent
- Uncertainty about the impact of not using fire on forage availability and pasture condition in the short- and long-term, and how this will affect production and profitability
- Uncertainty about how fire can be used to preserve or improve forage availability and pasture condition to the benefit of production and profitability
- Uncertainty about the impacts of fire on other assets – carbon, soil, water quality and cultural values
- A perceived lack of institutional and community support for the use of fire
- Lack of confidence in the skills, experience and agenda of those providing fire management advice

The RD&E plan focuses on overcoming these impediments in order to better-equip managers of northern grazing lands to use fire in the way that they believe will best suit the operations on their own properties.

All project objectives were clearly met. The resulting draft RD&E plan was compiled from a thorough review of the literature to gauge currently available information and knowledge gaps, and extensive consultation with pastoralists, researchers and extension providers, again to ascertain the current situation and identify gaps. A number of avenues were used to gather information – on-line surveys, direct email and phone consultation, workshops, presentations and reviews of other recent and relevant work. Consistent messages were received from numerous sources, which gave confidence that real priorities and concerns were being captured.

Project participants emphasised the need to document existing local knowledge and provide local examples of the practical application of fire; use case studies, demonstration sites and field days; interpret research results in terms of day-to-day land management (social and economic aspects); and use existing networks for information delivery. The desire for improved rainfall prediction was unanimous.

The views expressed and recommended solutions have been instrumental in shaping the RD&E plan. Recommendations have also been made in the plan regarding governance, project management, user participation, project partners, potential funding sources and data storage.

Impact on meat and livestock industry

Highest priority has been assigned to improved rainfall forecasting and providing pastoralists and graziers with access to this information to meet their fire planning and grazing needs. This can be achieved by establishing a process for pastoralists and graziers to work with researchers to develop and test an effective rainfall forecasting service.

Implementing the program will:

- Help pastoralists and graziers look after their grass, by improved understanding of pasture production and condition and identifying the extent to which fire has a role in pasture management;
- Ensure pastoralists and graziers have access to the best fire-related information, delivered in formats that are accessible to, and engage, producers;
- Ensure that new knowledge gained through research is focused on areas of concern to the grazing community, and that research outputs can be directly incorporated into enterprise management;
- Provide a better gauge of the trade-offs between short term activities and long term outcomes, in terms of pasture degradation, woody thickening and fire use. This will be possible by having more detailed information on the interactions between grazing and fire, and the impacts of climate variability;
- Ensure greater community and institutional support for graziers who want to use fire as a land management tool;
- Provide for better coordination and delivery of fire-related activities, with projects developed through producer input, information shared, and results presented in a useful format for practical application.

The main benefits to industry will be realised over the next five years or so, as partnerships and networks are established and operational, existing knowledge is documented and made available and new knowledge is gained. In five years' time, grazing land managers in northern Australia will be better able to confidently decide whether to use fire on their properties, how it should be used, steps required for implementation, and the relative costs and benefits of using this tool compared with other management options.

Conclusion and recommendations

RD&E to inform fire management in northern Australia should be coordinated across the various stakeholder groups with an interest in fire and grazing management at the national, state and regional level through the appointment of a steering committee, advisory panel and project coordinator. Investment should be organised under two themes: Theme 1 to consolidate and package existing knowledge and identify priority knowledge gaps; and Theme 2 to build industry fire management capacity and extend the knowledge base.

The RD&E program should actively pursue projects that address the priorities outlined in the draft plan. The following criteria should be used to develop or evaluate proposals:

- Consideration only be given to proposals that address the industry priorities highlighted in the RD&E plan
- Project objectives are clear and well defined
- The project is technically feasible or relatively easy to execute
- Regions that will benefit from the RD&E have been identified, with higher priority afforded to proposals that benefit a larger number of regions or provide cross-regional and local examples
- Landholders (and community groups) for case studies, demonstration sites or trial areas are involved from the outset, with financial incentives if possible if they are instrumental to project delivery
- Leverage is considered – the project may provide opportunities for value-adding by incorporating other research aspects
- Research proposals also commit to interpreting results in terms of regulatory, social and economic conditions (i.e. consideration is given to issues that affect adoption of the results). Bridging the gap between theory and practice is critical if long term changes to land management practices are required.
- Extension and communication activities are well defined with emphasis on approaches that maximise uptake and adoption
- Projects aimed at retaining the use of fire in the landscape include a process that enables experienced fire managers to provide training or advice to less experienced people, and have resources allocated for building-up the overall human resource base in the area
- The application is consistent with MLA project evaluation procedures.

Multi-year projects are typical for fire research, where activities need to be carried out over a number of seasons. Longer-term funding arrangements are beneficial and should be considered, with built in processes for review. Also, it is pertinent to review progress towards outcomes, successes and failures, emerging issues and changing priorities. As well as annual monitoring and evaluation, a five-year review period for the RD&E plan is recommended.

6 Relevant appendices

Appendix 1.	Fire in Northern Grazing Lands 10 year Research, Development and Extension Plan
Appendix 2.	Using fire in northern grazing lands
Appendix 3.	Fire in Northern Grazing Lands RD&E Plan - Regional Profiles
Appendix 5.	Fire management on northern grazing lands: Consultation with the pastoralists
Appendix 6.	Fire on northern grazing lands research inventory
Appendix 7.	Extension interests, priorities and communication of northern fire information

7 Bibliography

(See Appendices)