2001/NT03

Producer Research Support

Aerial Application of Herbicides for Fire Breaks

Roper River Landcare Group Inc.

This project was undertaken to provide information to cattle producers to assist them in management of firebreaks on their properties.

Roper River Landcare Group Inc. aimed to develop a cost effective and environmentally friendly system of firebreak management to improve the long term viability of cattle production in the Roper region.

The project

Fire is a prevalent part of living in the Northern Territory. Over the last 10 years an average of 241,000 km^2 of the NT was burnt each year - the vast majority by unplanned fires. For the peak year 2002, over 380,000 km^2, or 28.6% of the land area of the NT was burnt. This amount of fire damage occurs annually in the savannah regions of the Top End.

In recent years, there has been an increased recognition of the need to plan and manage the landscape to reduce wildfires on a regional scale.

For the pastoral landholder wildfires pose a major risk, and fire management can be a useful land management tool. Wildfires can cause infrastructure damage, lead to soil erosion, stress or kill stock and burn out food supplies.

Pastoral landholders seek to protect their property from the impacts of wildfires using firebreaks. In many areas of the Roper catchment this is particularly difficult as many of the properties are large, with extensive areas where land vehicle access is very difficult all year round. Other areas have limited access until well into the dry season. By this time soil may be too dry for grading, and vegetation too dry for controlled burns.

The purpose of this project was to expand the range of fire management tools for landholders – exploring the benefits of establishing firebreaks through aerial herbicide application.

Objectives

1. Determine the true cost per km of creating a firebreak through the use of aerial spraying;
2. Determine the effectiveness of firebreaks created by aerial spraying;
3. Identify effective chemicals and their application rates for use in aerial spraying over a variety of soil and vegetation types, and slopes and other landscape features;
4. Determine the most effective time for spraying (i.e. early wet versus late wet); and
5. Identify the most effective firebreak width for control and management of wildfires.

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Producer Research Support

MLA Producer Research Support offers support funding of up to $15,000 over three years for groups of producers keen to be active in on-farm research and demonstration trials.

These activities include:

- Producer Initiated Research and Development
- More Beef from Pastures demonstration trials
- Prime Time Wean More Lambs demonstration trials
- Sustainable and productive grazing grants.

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What was done

The project was carried out from 2002-2004.

The project used a series of trials to examine the following variables:

1. Time of season for spraying;
2. Land and vegetation differences;
3. Different chemicals and chemical combinations;
4. Different chemical application rates;
5. Effect over time;
6. Effectiveness of vegetation kill; and
7. Effectiveness as a firebreak.

Table 1. Details of Project Activity, outlines the project trial activities.

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Date	Activities
06/2001	Gather current information and experience on use of chemicals to create firebreaks in Top End situations and fire history of Roper region. (Assistance form Bushfires Council NT, DPIF and DLPE)
08/2001	Planning sessions for spraying activities in early wet season, including selecting trial areas, determining application rates, timing of spraying and width of sprayed firebreak. (Trial design with assistance from DPIF/DLPE and Bushfires Council NT)
22/1/2001	Undertake aerial spraying in early wet season. (Exact timing dependant on rainfall).
01/2002	Monitoring of vegetation kill and size of firebreak.
27/03/02	Undertake aerial spraying in late wet season. (Exact timing dependant on rainfall).
03/2002	Monitoring of vegetation kill and size of firebreak.
04/02	Grading and burning done
08/2002	Back burning of chemical breaks.
Sept 02	First progress report to describe effectiveness of initial spraying of firebreaks.
06/2002	Grading of some firebreaks for comparison purposes. This may be done earlier dependant on weather conditions.
08/2002 – 12/2002	Analysis of fire behaviour during dry season, accessing remote sensing data from Bushfires Council, and involvement of property managers to ground truth the data on their properties.
12/2002	Second progress report detailing results from fire season.
11/2002 – 12/2002	Early wet season aerial spraying - planned. Unable to conduct any spraying due to the unseasonal absence of storms.
03/2003	Undertake aerial spraying in late wet season. (Exact timing dependant on rainfall).
04/2003	Monitoring of vegetation kill and size of firebreak.
05/2003	Grading and back burning of chemical breaks.

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MLA also recommends

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What happened?

The results were measured against the original project objectives.

1. Determine the cost per km of aerially spraying firebreaks

Aerial herbicide application cost was $98/km, compared to $42/km for grading.

While aerial spraying cost more per kilometre, it is a valuable management option because of the flexibility of timing, ease of use and short time of completion.

Aerial spraying allows for access in early and late wet which facilitates earlier burning of fire breaks when the risk of uncontrollable fires is lowest. This may be more than two months earlier than when a grader can be used, due to the bogginess of the country.

Two cuts of a grader produces a 7m wide firebreak, but an aerial spray can achieve a more effective firebreak of 9m wide.

The project participants believe that in some cases the value of these advantages outweighs the per kilometre cost difference.

2. Determine the effectiveness of firebreaks created by aerial spraying

The effectiveness of vegetative kill was high on most sites using aerial spraying.

This did not necessarily translate into effectiveness as a firebreak – which was influenced by the size and voracity of impending wildfires.

Sites with total vegetative kill were the most effective firebreaks. Backburning with the onset of wildfires in August 2002 at the site with total vegetative kill led to an effective firebreak.

Only a few sites recorded a total vegetative kill. However, even if total kill was not achieved, the result was usually effective enough for a firebreak.

3. Identify effective chemicals and their application rates for use in aerial spraying

Only sites with total vegetative kill acted as effective firebreaks and only four of 26 applications were found to achieve total vegetative kill. In each of those four applications the following chemicals were used:

- Brushoff (75gm) with Wipeout (3.75L) and Estercide (1.25L);
- Roundup Max (2L) with Grazon (1L);
- Roundup Max (3L); or
- Roundup CT (3L) with Grazon (1L).

The results of the trials show that these chemicals and these application rates did not always achieve total vegetative kill. The results do not clarify the specific chemicals and their rates.

Project participants feel confident that all species apart from broadleaf ti-tree regrowth could be treated effectively with aerial application of herbicide.

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4. Identify effective chemicals and their application rates for use in aerial spraying over a variety of soil and vegetation types and slopes and other landscape features.

This was not determined. Project records are inconsistent in their recording of soil, vegetation types, slopes and other landscape features so it is not possible to determine this from the project data.

Project participant observations are that when the target species are grass only, the glyphosate-based chemicals are very effective. The Brushoff / Wipeout /Estercide proved the best where there was a wattle or woody weed problem at the site.

5. Determine the most effective time of spraying

This varies according to factors such as the time of the onset and extent of the wet season / growing season and the stage of plant growth.

The project planned to answer this by doing two early wet season applications and two late wet season applications. Due to an unseasonal absence of storms in December 2002 – when the second early wet spray was planned, only one early wet season application was done in January 2002. Two late wet season applications were carried out in March 2002 and March 2003.

The results indicate that a late wet spray is slightly more effective in terms of vegetation kill – but this cannot be proven from the trial results. Further testing is anticipated to show that early wet spraying would be more effective if there is significant rain in the early wet.

6. Identify the most effective width of firebreak for control and management of wildfires

This objective was not directly measured. One project participant observed that the 9m wide coverage that one helicopter flight path provided was adequate for an effective firebreak. In comparison, the normal two cuts of a grader provides a firebreak only 7m wide.

Discussion

Additional questions raised

Aerial application is generally effective. It is very easy and efficient, covering 14kms in 2.5hrs. The height of spraying is important, and a large amount of clean water is required. Chemical breaks can be used as a basis for a burn in the late wet season.

All sites need to be accessed earlier to better identify the effectiveness of different management options.

- Cost of helicopter = $550 per hour
- 14 km 2.5 hours = 5.6km/hr = $98/km
- Chemical costs range from $13.5/km to $33/km

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Additional trial questions

- What is the most cost effective herbicides in regard to repeated applications over the years?
- How to best to create a firebreak from the sprayed sections, i.e. when and how to burn – is there any difference from conventional firebreaks?
- Is the effectiveness of the firebreaks equal to that of a graded firebreak or better?
- Are there any unexpected consequences?
- Would using an agriculture plane work out to be significantly cheaper for the application of herbicides?

One of the major challenges of this project was that the project started with great enthusiasm which then dropped off when the Roper River Landcare coordinator left in September 2002. The project team was without a coordinator for some time.

The project impact may have increased with involvement and participation from supporting agencies such as Bushfires Council, or running a project field day to raise awareness.

Next steps

Project participants have since used herbicide for firebreaks – but using land based vehicles. They are considering the option of aerial application and are interested in investigating whether an agriculture plane would be cheaper than using a helicopter contractor, and still able to do the job effectively (given that spray height is an important factor).

The properties that were involved in the project experienced an intense fire season in 2004, burning out much of their properties. This highlighted the reality of fire management, and that it needs to be done collaboratively on a local and regional scale.

The outcomes of this project have been adopted by:

- Parks management;
- Neighbouring properties; and
- Regional bushfire control in remote areas.

The results of this project also contributed to the broader regional fire management knowledge base.

The project participants felt confident that using herbicide for creating fire breaks in rough country without vehicle access was an effective and cost-efficient option. In some circumstances it may be more expensive than grading, but the ease and flexibility of using this method will make it a more attractive option at certain times, in certain areas.

This trial has demonstrated that aerial application of herbicide for the construction of firebreaks is an effective management tool.

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