

## RESEARCH SUMMARY

### **Background**

The use of grazing as an effective fuel management tool has been an issue of debate for many years with a general lack of peer reviewed science to support the differing opinions. This was highlighted in the 2003 Commonwealth Government House of Representatives inquiry 'A Nation Charred: Report on the inquiry into bushfires' which recommended "... *that the Bushfire Cooperative Research Centre conduct further research into the long term effects and effectiveness of grazing as a fire mitigation practice*". In 2010, the Senate Select Committee of Agriculture and Related Industries report on 'The incidence and severity of bushfire across Australia' noted that "... *while grazing would not provide a comprehensive solution to fuel hazard reduction deficiencies, where appropriate it should be considered by public land management agencies as part of each region's fuel reduction strategy. The committee also supports further research in alpine country environments to establish the relative long term benefits to those areas of grazing, prescribed burning, or management without fuel reduction.*" The latter report suggesting that adequate progress on the issue of use of grazing in fuel management had not occurred, in particular in the Alpine areas, since the 2003 inquiry.

The *HighFire* project of the Bushfire Cooperative Research Centre (CRC) was commissioned to look at the use of fire and grazing for fuel management and the associated ecological effects. The project established two fully replicated experiments to study the ecological effects of the grazing x fire interaction, and assess their utility as management tools for controlling fuel loads, in the Snowy Mountains area of NSW. One experiment was located in Snowgum (*Eucalyptus pauciflora*) woodlands and the other in sub-alpine grasslands (dominated by *Poa* spp.). A third experiment, planned for the Dargo High Plains in Victoria, has not been initiated. Initial results of this experiment have been reported to the Bushfire CRC. There is no doubt that prescribed use of fire reduced fuel loads significantly and that this effect is likely to remain clear for a minimum of five years. Grazing impacts have been less clear and will likely take longer to establish owing to the low rate of stocking. Ecological effects were also less clear, apart from the predictable *increase* in plant diversity after fire, and again, it will likely take will likely take longer to detect significant effects, if any.

The Victorian Government wishes to test the effectiveness of grazing as a management tool for mitigating fuel loads in montane and sub-alpine vegetation in Victoria. This project would complement and build on the *HighFire* project, and aligns with the outcomes of the two Commonwealth Government committee processes.

It is proposed in the first year (2011), a limited program of summer grazing (2010/11) and will be restricted to a small number of research sites (up to 6 sites), with fuel reduction provided under contract by local graziers. The first year will be used as a proof on concept and experimental design validation phase. Any further work would be dependent upon the outcomes of the first years research.

### **Approach**

This proposal details the first year of the proposed research program and outlines suggestions for a more detailed set of studies in following years.

Given the opportunity to initiate the research in sub-alpine and montane forest in early 2010, the first year of research will focus on:

- Establishing methods and techniques for tracking cattle and for establishing their use (general habitat, grazing, resting) of different vegetation types,
- Establishing methods and techniques for measuring the effects of cattle on fuel load structure and load relative to the above (i.e. fuel load and structure vs grazing intensity),

- Completing analyses of scientific literature regarding grazing, fuel reduction burning, fuel load and structure and ecological parameters (e.g. plant diversity, soil condition and processes, hydrological processes, carbon and greenhouse gas processes),
- Establishing the feasibility of extending the study to a wider range of research sites, including other vegetation types, and the likely costs thereof,
- Planning the implementation of a grazing x fire interaction study along the lines of that established in the Snowy Mountains (as above).

### ***Plan for 2011***

The research will be initiated by visiting selected research sites and establishing both the number of cattle and their likely geographic range. The range will include fixed boundaries e.g. natural features and fences. Establishing strong working relations and lines of communication with the land managers, fire managers and the contracted graziers is critical to the success of this project.

The proposed range will then be mapped (on foot or horseback or 4wd or similar).

Given that it is now impractical to fit tracking collars to the cattle that will be grazing in forested areas this (2010/11) summer/autumn, the project will in this first season employ direct observation. At periodic intervals (e.g. fortnightly/monthly), cattle will be observed and their location recorded manually using GPS. This will be accompanied by vegetation and faecal matter sampling to establish further protocols for chemical analysis and, ultimately, to assessing intake of different plant species by feeding cattle.

At the same time, tracking collars will be installed on cattle that are under containment at their 'home' properties to test their effectiveness prior to the 2011/12 grazing season. This trial, using up to 100 collars, will enable us to predict likely data integrity and the sensitivity of automated GPS tracking, in addition to testing the reliability of the collars fitted to cattle for the first time. Our aim is to fit collars to 5-10% of each herd used in the on-going research. Data will be collected over a 6-month period and then analysed.

The other high priority (after testing methods for tracking cattle and establishing their feeding patterns), is to quantify their effects on fuel load and structure and ecological attributes.

The first year of the study will focus on testing established techniques for measuring fuel load (e.g. standard DSE Fuel Load / Hazard analysis, LIDAR analysis, direct biomass assessment) in Snowgum communities with a range of understorey types, and cross-checking these against each other (e.g. DSE Fuel Load assessment vs direct biomass analysis). Techniques for field surveys of plant diversity and for assessment of soil and hydrological properties will also be established.

At the end of the first season of grazing (Autumn 2011), techniques for fuel load and ecological condition in areas that have been grazed and representative ungrazed areas will be trialled. This trial will provide information about the logistic requirements for further, detailed assessments in the 2011/12 grazing season (and after collars can be fitted to cattle in Spring 2011).

### ***Plan for 2012-2016 (Years 2-6)***

Beyond the first year of this study, it is prudent to estimate the likely scope of the on-going research program.

The plan for Year 1 is based on monitoring attributes (fuel load, ecological condition) of up to six research sites, including reference areas. The research program should then be able to be continued at this scale for similar costs for Years 2-6 (see below for Year 1 Budget).

Fuel management in the high country is likely to require a program of prescribed burning, in addition to grazing. This brings into question the same issues – the grazing x fire interaction - addressed by the HighFire project in the Snowy Mountains region. Ideally, the research would replicate the

experimental approach established in the Snowy Mountains in the Montane forests and Snowgum forests and woodlands and grasslands of the Victorian High Country. The costs of this are estimated below and include the costs of a significant study of fire behaviour, likely led by CSIRO.

Consideration will be given to assessing grazing pressure by other hooved animals through the deployment of infra-red and motion detection cameras.