



National Environmental
Research Program

NORTHERN AUSTRALIA HUB

Improving biodiversity
conservation in
northern Australia

A survey of environmental management issues and activities in the Gilbert River catchment

What was the research about?

Weeds, pests, erosion, and fire are major concerns for land managers in the Gilbert River catchment due to their impacts on pastoral production and the environment. Designing effective natural resource management (NRM) plans requires a good understanding of these threats, particularly regarding their distribution and impacts, as well as on the management activities required to prevent or minimise these issues.

This project sought to understand these issues in the Gilbert River catchment and how land managers are currently dealing with them. The study was conducted by researchers at James Cook University and supported by the Northern Gulf Resource Management Group (NGRMG).

Gathering valuable information

The researchers interviewed 48 managers from 28 cattle stations, mostly within the Gilbert River catchment. They collected a range of information associated with each land manager's property and production system, costs of managing the property and individual management activities, as well as their opinions about various land management problems. Local knowledge is critical to identify the most pressing issues and to determine management actions that are adequate for implementation by land managers.

Key information relating to surveyed stations included:

- All stations were family-run businesses and ranged between 6,000 and 475,000 hectares.
- On average, respondents had managed the property for over 20 years.
- The land tenure of most properties was rural/grazing lease.
- Grazing was the primary activity across all properties, but some also reported agriculture, tourism, conservation and mining.
- Income was mostly derived from cattle, but labour was also a significant source.
- Land management expenditure (see Fig. 1 on following page) was dominated by operational costs (e.g. livestock costs and labour) and overheads (e.g. rent and leases and taxes).
- 70% indicated parts of their land had important natural values (wildlife, springs and unique vegetation types).
- 85% identified areas of recreational value (e.g. gorges, streams and billabongs).
- 60% consider there are some areas with agriculture potential (e.g. good for improved pasture) within their property.
- There was a mixed response concerning potential for mining.



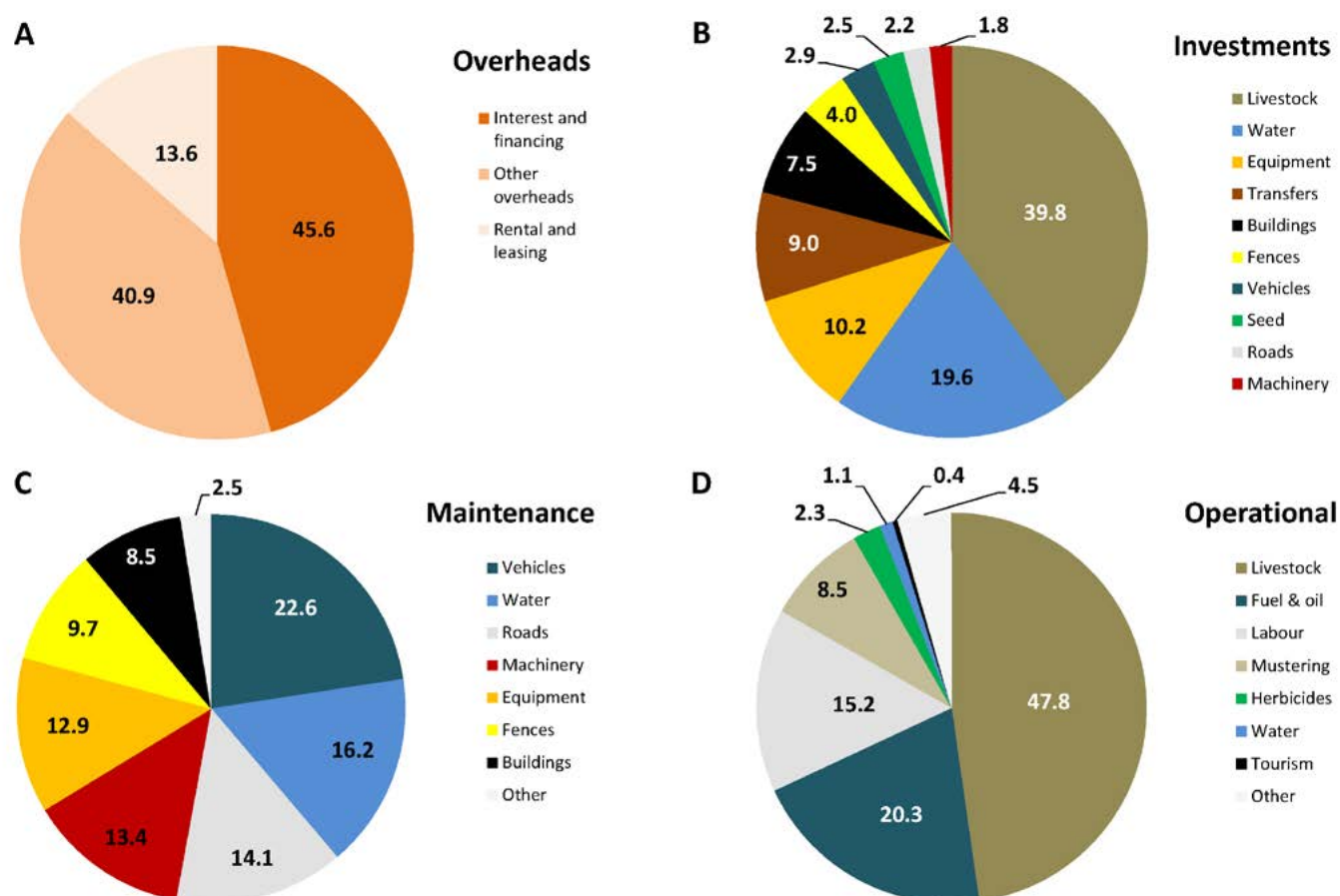


Figure 1: Average distribution of land management expenditure across properties in percentages.

A number of environmental issues were identified as important by land managers, including overgrazing, wild dogs, feral pigs, rubber vine, grader grass, neem tree, woodland thickening, and wildfire management. Controlling erosion is also problematic, especially gully erosion. To help understand the problems further, respondents were asked about the extent of the problem, the impacts on production and the environment, their current management plans, and the outcomes and goals of these plans. The following is a summary of some of the key findings.

Weeds

The two most prominent weeds noted by land managers were grader grass and rubber vine (see Fig. 2 on following page). For grader grass, there was a general perception among respondents that although cattle can eat it when the grass is young, it has low nutritional value, takes over good country and is a problem for other grasses, and can also increase fire risk. Likewise, many land managers agreed that rubber vine is a major concern and costly from a production and environmental point of view.

Most land managers had an informal plan to prevent and/or control weeds, while only 10% had a written management plan. The majority (95%) indicated their plan considered controlling and/or eradicating weeds, while about 65% also considered the prevention of new weeds a management priority. Evaluating and monitoring the existence and impacts of weeds was also common. Herbicide application was the most common management activity, followed by reducing overgrazing and then fire control. Management success varied across properties, but in most cases it was reported as being 'moderate' or 'good' for most weeds on a three-point scale (poor/moderate/good). However, rubber vine and grader grass continue to expand in some areas.





Rubber Vine - Photo by Michael Anthony



Grader Grass - Photo by Michael Anthony



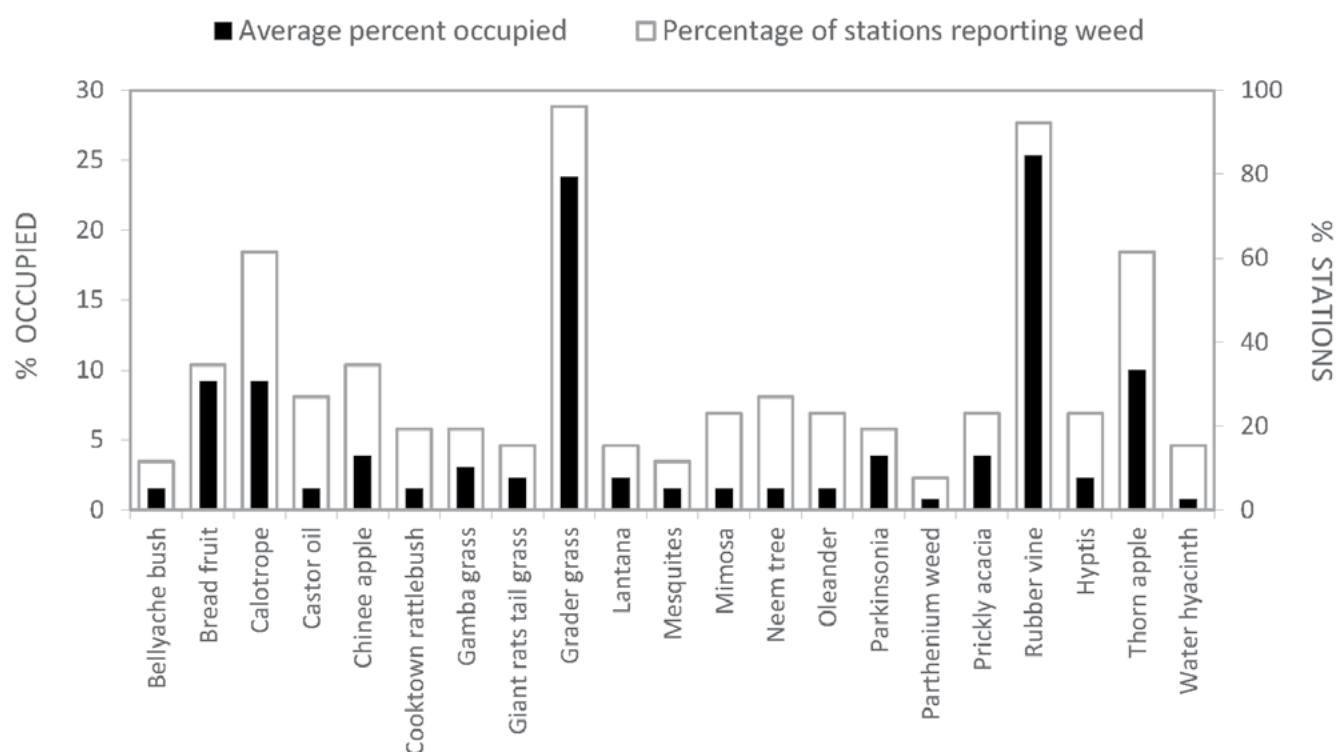


Figure 2. Occurrence and extent of weeds reported by managers.

Pest animals

The three most prominent pests identified by 100% of land managers were cane toads, feral pigs and wild dogs (see Fig. 3 on following page). On average, these three pests were spread across three quarters of each property, feral cats and rabbits occupied about 60%, while half of the respondents also noted native macropods (mainly agile wallabies) in high numbers. Managers reported a moderate increase in the abundance of five pests (feral cats, wild dogs, feral pigs, rabbits and cane toads) over the past five years.

There was a general perception that although cane toads have some environmental impacts, particularly on wildlife, overall they are not considered a major issue. On the other hand, land managers had multiple concerns about feral pigs. They were repeatedly mentioned as potential carriers of disease and majorly impacted soil. Impacts from wild dogs were mainly associated with production, in terms of killing or injuring calves.

Most managers had an informal plan to prevent and/or control pest problems, while 15% had a written management plan. Ground shooting and baiting were the most common management activities; aerial shooting was also common, mainly for feral pigs and horses. Only three pests were managed in all (wild dogs) or most properties (feral pigs and feral horses). About a third of land managers reported some form

of management of feral cats, but this was mainly opportunistic. Despite their wide distribution and environmental impacts, cane toads are not controlled. Management success varied across properties, but it was considered to be generally good for the three main target pests (feral horses, feral pigs and wild dogs) and poor for feral cats.



Feral pig - Photo by Michael Anthony

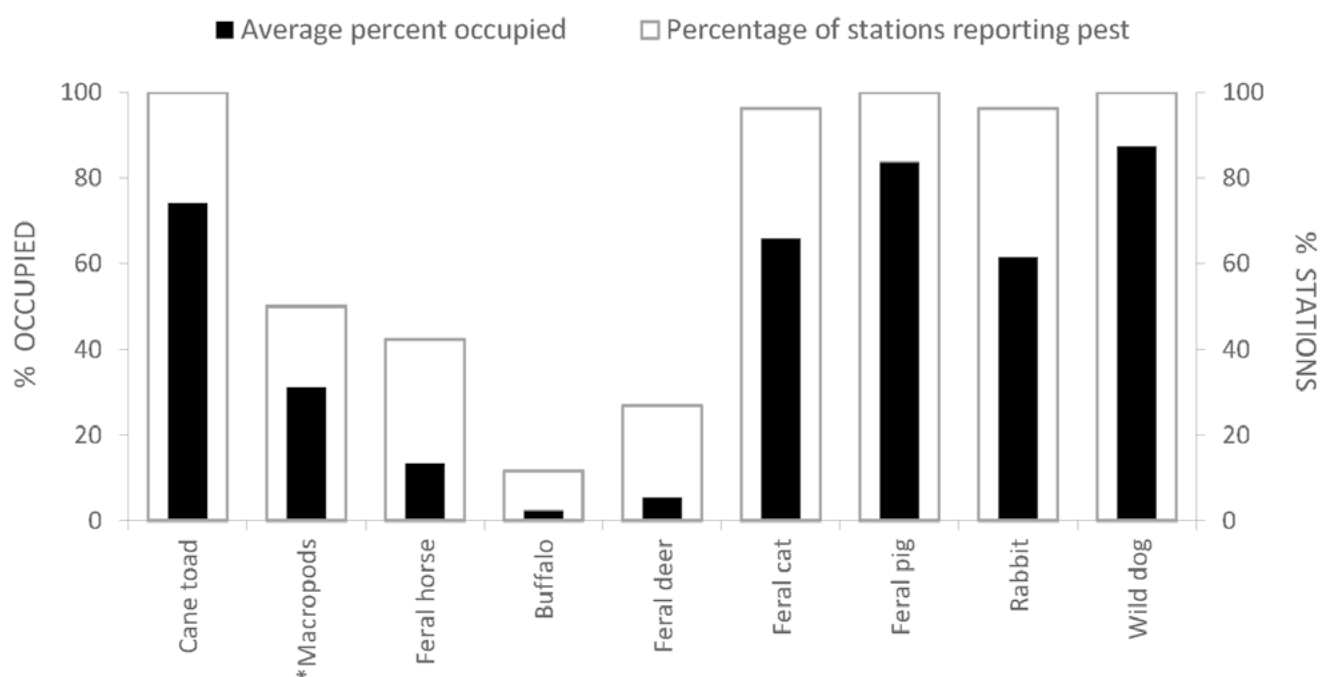


Figure 3: Occurrence and extent of pests reported by managers.

Fire

Fire management was considered for two broad goals: preventing and controlling wild fires and using fire for management purposes (e.g. weed control, grass management). Most managers indicated that their fire management plan's main goal was to prevent and control wildfires, but a majority (80%) also considered the use of prescribed burns for production purposes and 40% for environmental purposes and soil conservation.

The impacts of wild fires tend to be high on grazing production, with over 70% of managers reporting some impact and 35% rating impacts between high and extreme (Fig. 4). In contrast, most managers (60%) rated

the impact of wildfires on their property (e.g. fences) and safety as low or moderate. The majority of respondents also noted no changes in the extent, frequency or intensity of wildfires over the past five years, while 35% of respondents reported a reduction in the use of prescribed burning over the same period.

Fire breaks, prescribed burns and wildfire control were the most common fire management activities. Over half of respondents reported the use of controlled grazing as a strategy to manage fire, while about one third reported undertaking some activities to rehabilitate areas after wildfires. Management success was considered to be generally good. Overall, there is a perception that there is good commitment by land managers to keep fires under control.

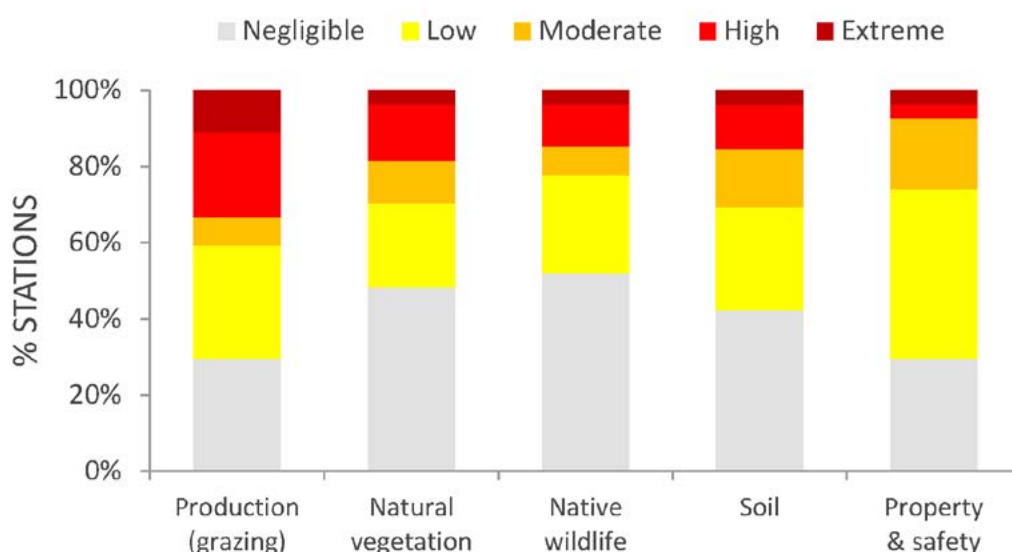
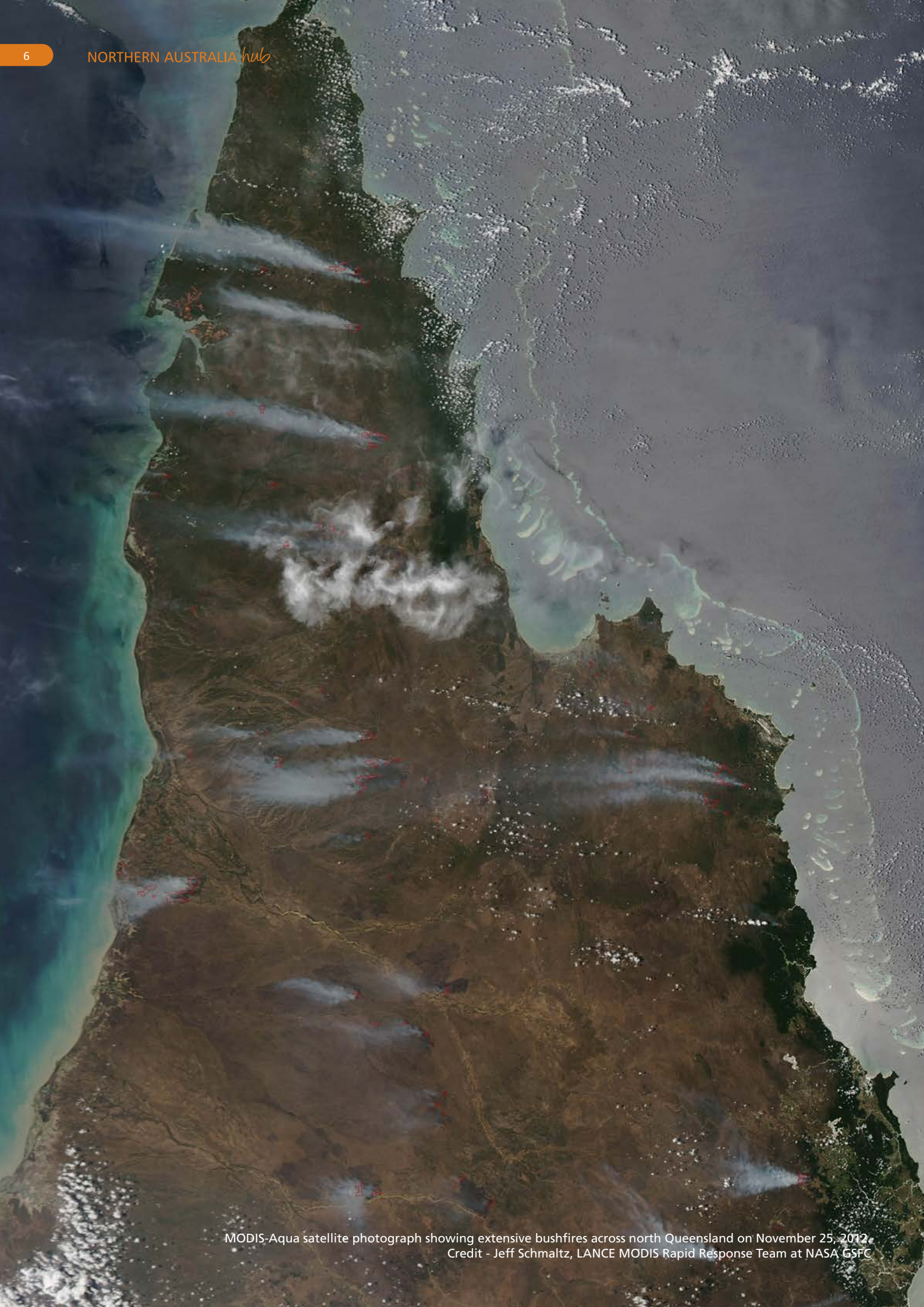


Figure 4: Rating of production and environmental impact of wildfires.



MODIS-Aqua satellite photograph showing extensive bushfires across north Queensland on November 25, 2012.
Credit - Jeff Schmaltz, LANCE MODIS Rapid Response Team at NASA GSFC

Erosion

The two most prominent erosion processes identified by land managers were gully erosion and scalding (Fig. 5), which were also the most extensive. None of the respondents rated any of the erosion processes as having a high or extreme impact on their production or the environment. While 100% of managers reported having problems with gully erosion, only 15% reported that some gullies are actively advancing and 8% indicated good progress in slowing down or reversing gully erosion in some areas following adjustments to grazing systems and active restoration. Almost a third of managers reported improvements in scalded land following management, which included destocking, spelling and seeding.

Similar to weed, pest and fire management, most managers indicated having an 'informal plan' to manage

erosion. The main goal of these plans were to prevent erosion (mainly through maintaining good grass cover as part of their grazing management system), but a majority (80%) also considered the need to control or reduce ongoing erosion on their properties. Of the erosion processes occurring in the region, only gully erosion, scalding and sheet/rill erosion were actively managed. The two main strategies to manage erosion were maintaining good grass cover and water diversion. Effective road work planning, keeping cattle away from areas that erode easily and using low impact vehicles on erodible areas were also mentioned. The overall success of erosion management was ranked as average, and limited resources and the need for additional technical guidance were mentioned as factors contributing to sub-optimal results. Over a third of managers indicated the need for further fencing to mitigate ongoing erosion processes.

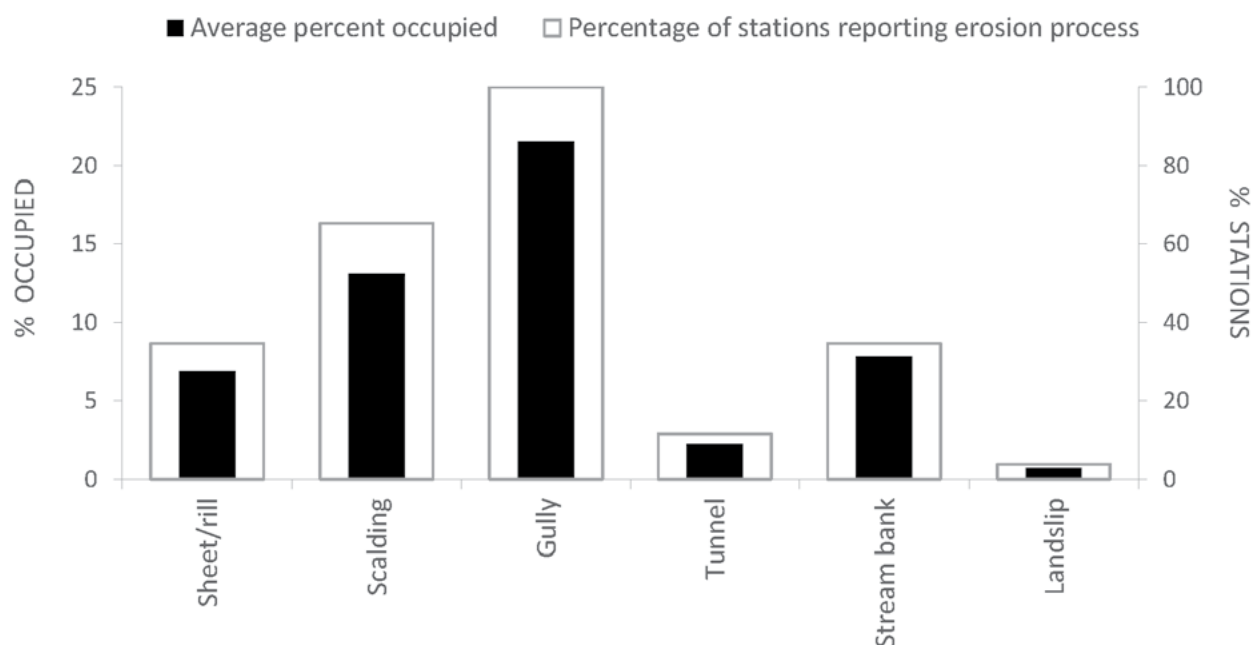


Figure 5: Occurrence and extent of erosion processes reported by managers.



Conclusion

Understanding local managers' perceptions about the extent and impacts of threats to production systems and natural values is necessary to identify and prioritise management actions. Delivering environmental goals will depend, at least partially, on the potential to bring benefits to production systems. This study indicates that mitigating some of these threats can achieve both environmental and production benefits. The researchers identified threats requiring particular attention because they are widespread and have high impacts, and in some cases continue to grow despite current actions (e.g. grader grass, rubber vine, feral pigs). Documenting ongoing management (including costs and success rates) also provided critical information to assess the cost-effectiveness of management plans and the basis to prioritise ways to reduce these threats, as part of the ongoing multi-objective planning process in the region.

Further information

Contact Jorge G. Álvarez-Romero on 07 4781 6517 or jorge.alvarezromero@jcu.edu.au

You can also visit <http://www.nerpnorthern.edu.au/research/projects/11>



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Email: nerp.northern@cdu.edu.au

Phone: 08 8946 6761



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