Background briefings on emerging issues for fire managers from AFAC and Bushfire CRC.

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FIRE NOTE

ISSUE 36 AUGUST 2009

ABORIGINAL WETLAND BURNING IN KAKADU

Dense monocultures of grasses are choking wetlands in Kakadu National Park. The re-application of traditional fire management controls these grasses and dramatically increases the diversity of wetland habitats.

RESEARCH BACKGROUND

Aboriginal Australians successfully lived with landscape fire for tens of thousands of years prior to European settlement. Fire management is still an important part of the Aboriginal customary economy in northern Australia, and traditional ecological knowledge relating to fire remains strong. In the absence of disturbance, floodplain grasses such as the native mudja (*Hymenachne acutigluma*) and introduced para grass (*Brachiaria mutica*) spread unchecked and develop into dense monocultures. These grasses choke out other wetland plants, reducing the variety of habitats, preventing water birds from feeding, and limiting access for hunting and food gathering by Aboriginal people. Aboriginal people use fire to control the density of floodplain grasses, thereby maintaining habitat diversity and enhancing biodiversity and cultural resources. Project partners are CSIRO, Parks Australia North, and the Environmental Research Institute of the Supervising Scientist.

BUSHFIRE CRC RESEARCH

The project involves implementing traditional burning, monitoring its effects on wetland vegetation and biodiversity, and capturing traditional ecological knowledge through innovative modelling techniques.

Effective wetland fire management requires good preparation and planning. Prior to wetland burning commencing, the surrounding woodlands are prepared by burning throughout the early Dry Season (April – May). This ensures the floodplain margins are protected from the floodplain fires later in the year. Many visits are required to ensure the wetland has been secured, with burning reaching further into the wetlands as the water dries up. Bushfire CRC researcher Peter Christophersen said once wetlands start to dry up hot dry southerly winds can then carry fire through the grasses and over the water. "Later in the year the winds shift during the late afternoon, with winds coming from the north. This helps to drive the fire back and forth over the wetlands. The wetlands may smoulder for weeks with many areas burning two to three times over, especially if they haven't been burnt for many years," he said.

Changes in wetland vegetation have been assessed using satellite imagery, ground-based transects, fixed photograph points and historic aerial photos. Biodiversity assessments have focused on water birds, which are good indicators of wetland health from biodiversity, cultural and tourism perspectives. Water bird censuses have been conducted in permanent plots located in areas with different fire histories.

The project team has developed a Bayesian Belief Network model to capture traditional ecological knowledge, and to assist in recording and communicating research

▲ Sandra McGregor and Peter Christophersen with their children, Kallum and Delise, at Yellow Water. **Photo: Keryn Nossal**

SUMMARY

As part of the northern Australian 'Burning for Biodiversity' project, the Bushfire CRC has been working with a family of traditional owners in Kakadu National Park in the Northern Territory to examine the environmental and cultural benefits of Aboriginal fire management as it is re-applied to floodplains associated with the South Alligator River. These floodplains include the iconic Yellow Water, one of Australia's premier wetland tourist destinations. The re-application of traditional fire management dramatically enhances biodiversity and the cultural values of these wetlands for Aboriginal people. This study serves as an internationally significant model for integrating Indigenous and Western knowledge systems to achieve positive outcomes for both traditional resource use and the conservation of biodiversity.

ABOUT THIS FIRE NOTE

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This Fire Note is an update of ongoing research within Bushfire CRC Program B: Prescribed Fire and Biodiversity in Tropical Savannas.

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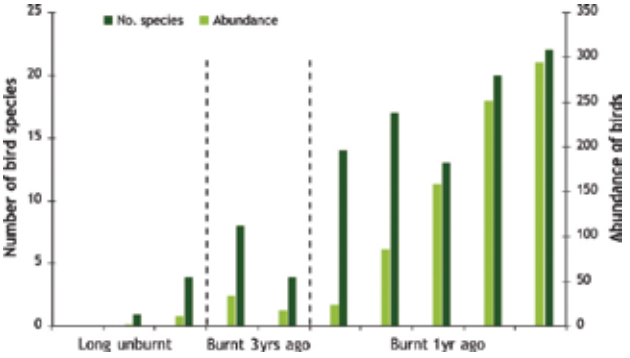
results. The Bayesian approach can use more qualitative information than the quantitative data of conventional process-based models, and so is ideal for incorporating traditional ecological knowledge.

RESEARCH OUTCOMES

Results show that the re-application of traditional fire management dramatically enhances biodiversity and the cultural values of these wetlands for Aboriginal people. The increased habitat diversity and more open water following burning has markedly increased the abundance and richness of water birds (see graph). This has significantly enhanced the tourist experience at Yellow Water, and Aboriginal burning now features in the boat commentary.

The Bayesian Belief Network model provides a tool for recording traditional ecological knowledge, applying it to wetland management, and providing an interactive educational experience for a diverse range of audiences, from Aboriginal traditional owners and park rangers, to tourists and students.



▲ Above: Wetlands at Yellow Water in Kakadu before burning. **Photo: CSIRO**

◀ Left: The effect of fire on the abundance and species richness of birds.

▼ Below: Wetlands at Yellow Water in Kakadu after burning. **Photo: CSIRO**

CRC RESEARCH AT WORK

The Bushfire CRC wetland burning project serves as an internationally significant model for integrating Indigenous and Western knowledge systems to achieve positive outcomes for both traditional resource use and the conservation of biodiversity.

Parks Australia North, the managers of Kakadu National Park, is already applying the principles of this fire research to wetlands elsewhere in the park, including helping to control the introduced weed, para grass (*Brachiaria mutica*). The wetland burning research was presented at a 2008 Fire Management Workshop convened by the park in Jabiru, NT.

Awareness among the general community of the importance of traditional Aboriginal wetland burning is a major goal of the traditional owners of the region. The Bushfire CRC and CSIRO have produced an information brochure for the 200,000-plus visitors who visit Yellow Water annually.

FUTURE DIRECTIONS

The project has developed an effective protocol for managing wetlands with fire that can be applied throughout northern Australia. Further research is required to identify when fire needs to be re-applied to control wetland grasses in different wetland systems, as the grasses begin to recolonise areas previously burnt.

▲ Sandra McGregor taking part in burning. **Photo: Randy Larcombe**

Fire Note is published jointly by the Bushfire Cooperative Research Centre (Bushfire CRC) and the Australasian Fire and Emergency Service Authorities Council (AFAC).

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