

The Darwin Smoke Project



A research partnership of Charles Darwin University, the NT Government and the Bureau of Meteorology

Volume 1, Issue 5

December 2005

The CDU smoke project is funded by the Australian Research Council with generous financial and in-kind contributions from the NT Government Departments of Infrastructure Planning and Environment, Health and Community Services, and Business, Industries and Resource Development, the Bureau of Meteorology, Flinders University, Australian National University, CSIRO Division of Atmospheric Research, the Top End Division of General Practice, and Asthma NT.

Project feedback meeting

As the project is drawing to a close with all stages of data collection now complete, we had a meeting on November 11 to share and discuss the findings thus far with our funders and stakeholders. This newsletter presents the content and outcomes from that meeting.

Agenda

Introduction and welcome - *David Bowman*

Results

- Atmospheric chemistry - *David Parry*
- Darwin Asthma Study – *Fay Johnston*
- Hospital studies – *Fay Johnston*
- Smoke modeling - *Michael Foley*
- Historical changes in air pollution – *David Bowman*
- Causes of pollution – How are we managing grass fuels? - *Don Franklin and Lou Elliot*
- Darwin's pollen calendar – *Simon Haberle*
- When is our hayfever season? – *Fay Johnston*

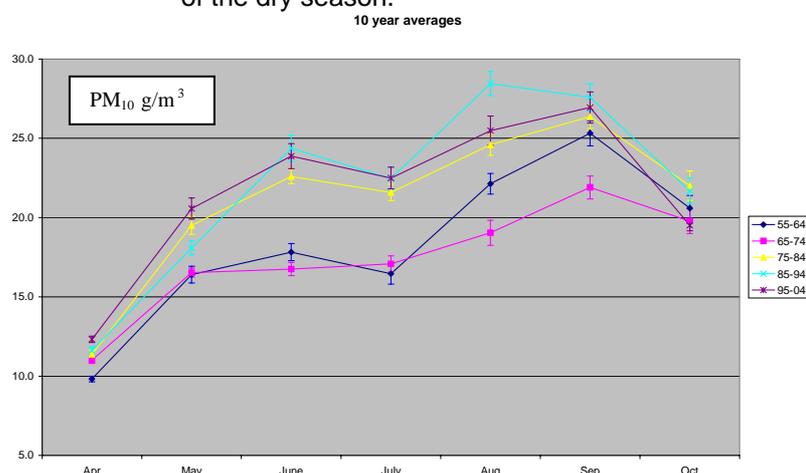
Discussion – *facilitated by David Bowman*

- Should air quality and pollen monitoring continue?
- Who pays?
- Does this study affect fire management?
- Implications of health findings for other regions
- A tool for BOM daily dry season warning system?

Key findings

Air Quality

1. Air quality in Darwin largely remained within National air quality guidelines during the last two years (with the notable exception of Territory Day 2005)
2. The air quality in Darwin has deteriorated since the 1950s and particularly since the 1970s. An analysis of meteorological data and airport visibility records has demonstrated a marked increase in air pollution in the first half of the dry season.



Modelled monthly PM_{10} averages for each decade 1955 – 2005. There has been a notable increase in smoke pollution between May and August since 1975 – this reflects the current management paradigm of 'early dry season' burning.

Fire ecology

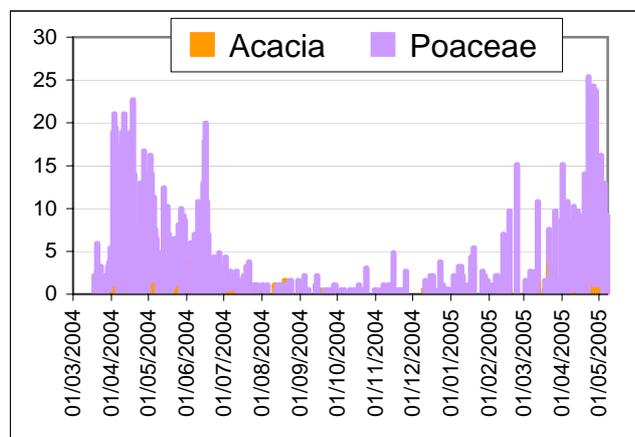
1. Higher fuel loads, especially spear grass, are present in areas managed with greater frequency of burning.

- Thus our current management may be contributing to a worsening grass / fire cycle where annual widespread burning encourages spear grass and other problem grasses such as mission grass and gamba grass. The risk is that this will gradually cause much more severe fire hazards around Darwin with adverse health and biodiversity outcomes

- grass pollens
- acacia pollens
- Alternaria spores
- smoke pollution

Health Outcomes

- Most people are unaffected by the background levels of bushfire smoke usually present in Darwin.
- A proportion of people are very sensitive to particulate pollution even at levels well within air quality guidelines. For example during 2004 the level of particulate air pollution was significantly associated with worsening of asthma symptoms and the need for additional medication such as steroid tablets in about 5% of participants in the Darwin Asthma Study.
- Admissions to RDH for heart and lung diseases were significantly associated with particulate pollution measured during 1996. The air was monitored at Charles Point but there is close correlation between pollution levels measured at Palmerston, Darwin and Charles Point.
- Our previous work in 2000 demonstrated that asthma presentations for to RDH more than doubled when air quality guidelines were exceeded.
- Further analyses of hospital data will be done during 2006.
- On a preliminary analysis, the main contributors to hay fever in Darwin appear to be:



Clear seasonal trends (grains /m³) for grass (Poaceae) and wattle (Acacia) pollens Casuarina 2004/2005 with peaks in the early dry season.

Conclusions to date

- Polluting fires demonstrably have public health consequences. Worsening pollution levels and periods during which air quality guidelines are exceeded have a measurable public health impact in Darwin.
- In terms of public health there is a trade-off between less polluting controlled burning and more polluting uncontrolled landscape fires.
- There is also a trade-off of the ecological and economic consequences of controlled and uncontrolled fires that are unclear and require further research.
- Of particular concern is the possible effect of early season burning on the proliferation of flammable grasses.

Meeting outcomes

1. A media release prepared by CDU with input from NRETA, EPA and NT Health is being finalised and will be released soon.
2. It is hoped that the monitoring of PM10 and PM2.5 at Casuarina will continue beyond 1 January 2006. EPA is exploring funding options to maintain the data flow. The TEOM may be used instead of the Partisol to bring the monitoring in line with national air quality standards.
3. The daily collection of pollen will continue at the CDU site funded by the Bushfire Project grant until 1 July 2006, when hopefully new funding will be available. The pollen samples will be sent to ANU for storage but not analysed until further sources of funding are secured. It is thought important to continue monitoring to extend the sample period thereby allowing more robust aerobiological conclusions to be made.
4. One area of research flagged by the meeting concerned the need to undertake an economic analysis of the health impact of bushfire smoke. This analysis would need to be balanced against the economic benefits and costs of fire management/asset protection. Involvement of both health and environmental economists would be required to tackle this complex problem.
5. Discussion was made of involving the Bureau of Meteorology in providing health warning on days of bad smoke haze. This issue is complicated and requires careful assessment of the cost and accuracy of such warning and the need of the Darwin community for such

a warning. An alternative option is to provide specific health education to people at higher risk from air pollution such as those with chronic heart and lung conditions. On days with low air quality as evidenced by poor visibility, people at higher risk should monitor and manage their symptoms particularly closely and avoid vigorous outdoor exercise.

6. The relative ecological costs and benefits of broad-acre early dry season burning demands more research, particularly experimental analyses, given the uncertainties associated with existing correlative analyses.
7. It is proposed to hold a meeting with all stakeholders to deliver the final results of the project in November 2006 in a single presentation. At this meeting ample time will be set aside to discuss the hand over of the project findings to the stakeholders who then can make informed decision about the continuity of the research program and the implications for policy and practice.



Dr Simon Haberle, Janelle Stevenson and Cassandra Rowe from ANU with Carmen Crossing(CDU) flying to Koolpinyah Station to collect a pollen core from a wetland. Such cores and those collected from Manton River and Darwin River Dams will help us understand the longer-term changes to bushfire activity associated with the transition from Aboriginal to contemporary fire management.

For more information about the Darwin Smoke Project contact Carmen Crossing at the School for Environmental Research, Charles Darwin University NT 0909 telephone 08 8946 7104 or email carmen.crossing@cdu.edu.au