Forest Practices news

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Update – changes to the Forest Practices Act

Graham Wilkinson, Chief Forest Practices Officer

As reported in the last FPN, the changes to the *Forest Practices Act* have been passed by Parliament and are expected to come into effect on 1/7/99. Briefings on the changes have been held in various centres around the State and will continue throughout June.

The main changes that will affect the work of Forest Practices Officers are summarised below.

1. *'Timber Harvesting Plans'(THPs) are replaced with 'Forest Practices Plans' (FPPs)*

   The existing THPs for roading and for quarries will be replaced with FPPs, with only minor changes to the coversheet. Minor changes have been made to the standard THP to allow it to serve as a FPP for harvesting and reforestation operations. Please note that any THP approved prior to 1/7/99 will remain legally valid. The new FPPs will be used for all operations that are certified after 1/7/99. There will also be some minor wording changes to the standard forms for amendments and variations to FPPs.

2. *FPPs will require a certificate of compliance*

   The new FPPs will contain a certificate that must be lodged with the Board by the applicant for the FPP within 30 days of the expiry of the plan. The certificate must be signed by a Forest Practices Officer as to whether or not the plan has been complied with. All FPOs will have the authority to sign these certificates. The aim is to ensure that all operations are monitored on a regular basis, so that any problems that may arise can be dealt with on the spot in an effective and timely manner. Independent FPOs in

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We're a year old ...

With this issue we complete our first year of Forest Practices News. Our thanks to those who have contributed articles or provided feedback. We hope this newsletter is proving useful to you, and we look forward to your suggestions as to how its usefulness can be further improved.

The year has seen some very major changes in the Forest Practices environment, most recently involving the passage of the Forest Practices Amendment Act. In the months to come we should see the advent of the new Forest Practices Plan system, and work on a draft revision of the Forest Practices Code. We have another busy year ahead. And it will be another busy year for FPOs in the field.

We will do our best to keep you fully informed as the coming year progresses. As part of that, we especially look forward to publishing the written contributions of FPOs in the field who are making the forest practices system work. This is YOUR newsletter.

Kevin Kiernan,
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the private sector should ensure that applicants for FPPs are aware of this requirement and make appropriate arrangements for the regular monitoring of their operations. The Board will continue to independently audit a sample of FPPs, including certificates of compliance.

3. *Extended power for Forest Practices Officers to enter upon lands where forest practices may have been carried out*

Forest Practices Officers from 1/7/99 will have the power to enter upon any lands where forest practices may have been carried out for the purposes of determining whether the forest practices were carried out in accordance with the Act.

4. *Extended period for the issue of notices for failure to comply with a certified plan or provisions of the Act to up to 12 months beyond the expiry date of a plan*

Notices can only currently be issued where operations are in progress. From 1/7/99, notices can be issued to require corrective action to be taken if environmental problems are detected for up to 12 months after the expiry of a plan.

The new forms for FPPs, certificates of compliance and variations were made available to FPOs in briefings during June 1999. Updated instructions on how to complete the forms will also be provided. Please contact FPB if you have any queries in relation to the changes to the Act or if you would like any follow-up information.

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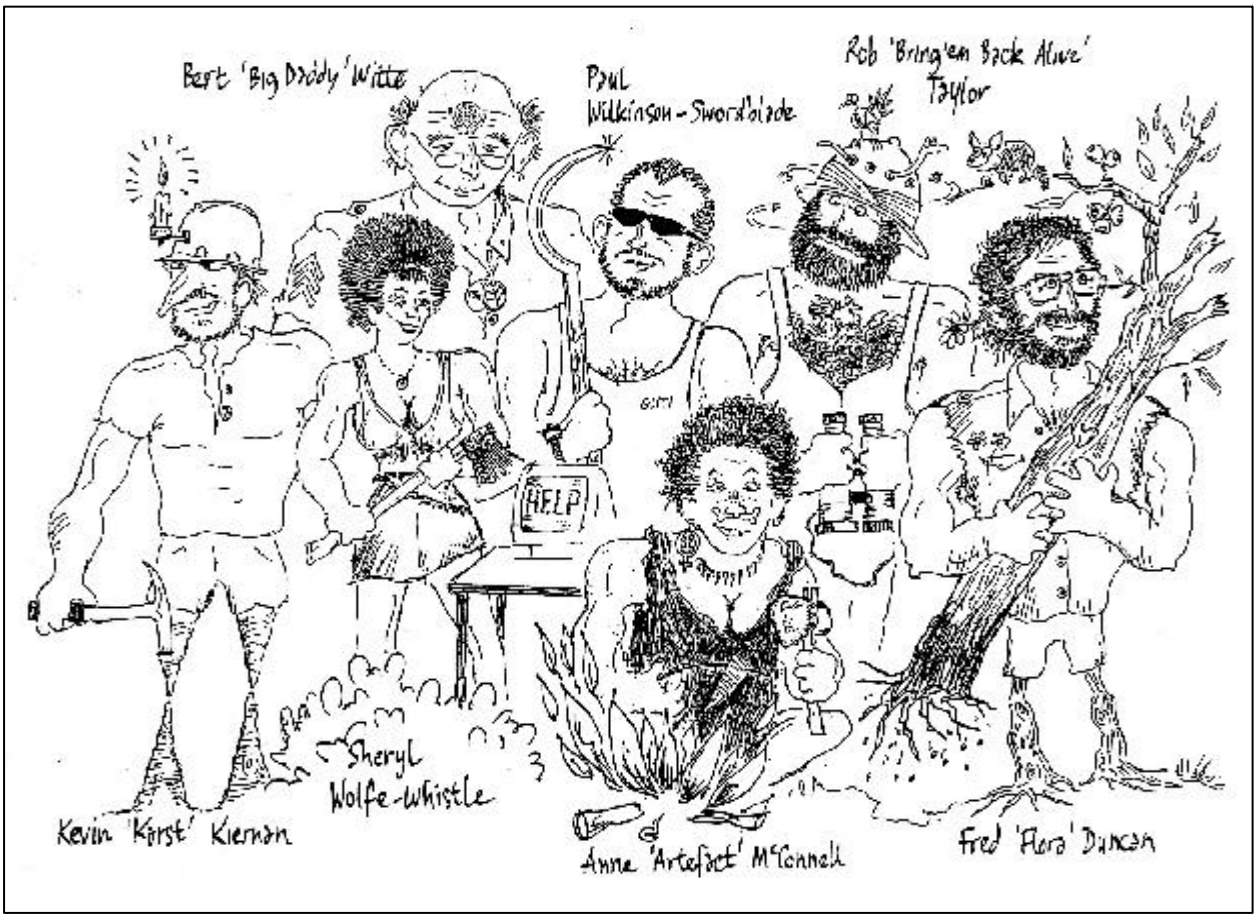
Flashback– the Forest Practices Unit, 1988



Fred Duncan's interpretation of the cast at the time of the 'Gang of Four' specialists were first appointed to the embryonic Forest Practices Unit just over a decade ago.

Developments

Forest Practices issues

Graham Wilkinson, Chief Forest Practices Officer

The forest practices system has a strong commitment to continuing review and improvement. Major changes are underway with the recent amendment of the *Forest Practices Act* and through the current revision of the Forest Practices Code. Further improvements are also under consideration by a number of working groups that have been set up with relevant stakeholders to address particular issues. These issues are as follows.

1. *Retention of hazardous trees* – Trees that are reserved from harvesting under a forest practices plan may represent a significant safety risk, particularly where a narrow corridor of trees is retained along a public road. A working group is developing guidelines for assessing and managing the safety risk of retained trees, taking into account the physical attributes of the individual trees, and the extent to which their stability may be reduced by logging damage or increased exposure to prevailing winds etc. In some situations this will mean that hazardous trees within reserve areas may need to be felled. In other situations, it may be necessary to change the location, size or shape of the reserved area, or to remove the safety risk by re-locating a landing or access road. Obviously, it is best that any major measures are taken during the planning stages of an operation, and not left until the end of the operation when options will be much more limited. The working group comprises Roger Geeves (Workplace Standards Authority), Tony Madden (Boral), Barry Chipman (Forest Practices Society), Steve Luttrell (Forestry Tasmania), Ray Walker (Tasmanian Logging Association), Bruce Chetwynd and Chris Mitchell (Forest Practices Board).
2. *Development of best practice guidelines for plantations* – The acceleration in the rate of plantation development over the past few years has created some tensions within the community with respect to issues related to local changes in land use. Many of these tensions have been eased by a sympathetic approach to the management of issues such as visual impact and edge effects. The landscape section of the Forest Practices Code deals mainly with the impacts of harvesting. The Code does not specifically provide guidelines with respect to the development of plantations within forest areas or within previously cleared land, although the broad principles of the Code are relevant to plantation development. The landscape section of the Code contains mainly 'should' statements, in recognition of the subjective nature of many visual management issues. Other issues, such as the potential shading of adjoining crops are not directly covered by the Code. The major organisations involved in plantation development have agreed to participate on a working group to develop some best practice guidelines for the planning of plantation development. (Contact Graham Wilkinson).
3. *Information required in Three Year Plans* – Details on reforestation are now required to be included in Three Year Plans under the recent changes to the *Forest Practices Act*. A working group has been formed with representatives from public and private forest managers and local government. The group is determining the type of information that is of most relevance and how this information can be most efficiently and usefully presented. The group is exploring options for using GIS technology to collate and present the information at the State-wide, bioregional and local government scales. (contact Paul Wilkinson).

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Guidelines for contributors

Forest Practices News is published quarterly by the Forest Practices Board, Tasmania. FPN provides a means for communicating new ideas and developments among those interested in the sustainable management of Tasmania's forests – it is not just as a bulletin from the FPB. We particularly welcome contributions from practicing FPOs. Let us all know about your latest innovative ideas. We welcome both feature articles and shorter contributions of even just a paragraph or two. Articles should preferably be no longer than two pages (for guidance, one page equates to about 780-800 words). Shorter contributions can be as brief as a few sentences! Please include illustrations with your contributions if at all possible. Contributions can be supplied either as hard copy or electronically. If forwarding material electronically, the address is info@fpb.tas.gov.au. We look forward to seeing you in print in FPN!

New resources

Forest botany manual – about to roll

Fred Duncan, Senior Botanist, Forest Practices Board

Good news for all those FPOs desperately waiting for the final word on how to separate OB0010 wet sclerophyll forest from OB0111 wet sclerophyll forest. Help is on the way ...

The FPB has received funding under the RFA to revise Forest Botany Manuals (FBMs) for all regions supporting significant forestry activity. The main aims of the revised manuals are:

- To allow FPOs to better understand the requirements of the Forest Practices Code with respect to flora;
- To take account of the moving goalposts of new legislation (e.g. Threatened Species Protection Act), agreements (e.g. RFA) and processes (e.g. Private Land Reserve Program);
- To take account of recent changes in conservation priorities for species and communities (e.g. because of gazettal of new reserves);
- To inform FPOs of other management issues that can affect flora within and adjacent to operational areas (e.g. maintaining biodiversity in plantation epicentres);
- To give prescriptions to reduce adverse effects of some practices (e.g. prescriptions dealing with fire management and control of weeds and disease;
- To increase interest in the flora of Tasmania's forests and other vegetation types.

The manuals will be aimed fairly and squarely at FPOs, though they will also be used more widely. Consequently, I would greatly appreciate comments from FPOs on format and content, particularly in the early stages of revision.

The manuals will probably be issued in a ring bound folder system, to make updating easier. I am thinking of using a module format as follows:

- Module 1: An introductory module which deals with the forest flora of Tasmania in general, and covers issues that are relevant to most areas of the State and most FPOs (e.g. discussion of the Forest Practices Code Guidelines for flora, what is required by different legislation etc).
- Module 2: Management issues that are relevant to most regions or most FPOs (e.g. plantation planning; hygiene prescriptions for weeds and disease). However, it may make sense to combine Modules 1 and 2.
- Modules 3 – 9: Separate modules for each of the six bioregions which support commercial operations. Each module will cover the "core issues" relevant to the region, in a similar manner to the current manuals (i.e.) they will indicate the forest communities, species and sites of flora significance occurring in each region. They will also detail steps that FPOs should take if significant flora values could be affected by operations. The regional modules will also cover "regional" management issues (e.g. management of relict rainforest in the Freycinet region).

Do FPOs have any suggestions about the "core sections" of the current manuals? Is the current layout OK? Do you want more illustrations? Pop-up profile diagrams? More complex flow charts? Please let me know.

The module system will allow FPOs to select modules that are relevant to their work. For example, apart from the general modules (1 and 2), Brian Farmer may content himself with the Ben Lomond module, taking particular note of any comments about plantation planning. Meanwhile, the wide-ranging Mark Chin will accumulate enough modules to provide light reading for many a long night.

Other possibilities include a computer or CD-ROM version for the technologically unchallenged. However, my main priority is to produce a paper version (which hopefully doesn't incorporate flora from *E. viminalis* wet forest).

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New resources

Update on revision of Forest Practices Code

We anticipate that the final report of the Review Panel on the soil and water provisions of the Code will be available on the FPB world wide web site (http//www.fpb.tas.gov.au) as of early July. In the meantime, copies are available from the FPB office, 30 Patrick Street, Hobart.

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Wind-throw disturbance – request for information

Strategies adopted for the protection of localised features within coupes commonly involve the exclusion of operations from small areas. Examples of situations where strategies of this kind are employed include the retention of undisturbed vegetation around sinkholes, and the establishment of buffers around archaeological sites. However, especially where clear-felling occurs in the surrounding forest, these reserved areas can sometimes be left exposed to potential wind-throw of the retained trees. Wind-throw has the potential to cause considerable damage, either due to soil disturbance as roots are torn out of the ground, or due to direct damage from a feature being crushed beneath a falling tree.

The safety implications of retained trees are considered elsewhere in this newsletter, but the question of how successful such retentions are in safeguarding important environmental values remains. The establishment of such buffers serves little purpose if it potentially leads to greater damage to the feature concerned than would have been caused by letting it be logged in the first place. Hence, there is a need to ensure adequate design for retained buffer areas. In order to better evaluate how wind-firm and successful buffers established in the past have proven, and how successful protection may best be achieved consistent with the least loss of timber resource, we are looking to our practicing FPOs and others in the field for advice.

First, we would be very grateful to receive any brief observations regarding the approximate extent of ground surface disturbance associated with windthrown trees of different type/height readers may encounter, whether in logged or unlogged areas. We don't need lengthy accounts and descriptions, just an occasional brief note or email with a few figures about what you are seeing in the bush. Second, we would also welcome observations regarding how wind-firm particular retained areas have proven in the past in different environmental settings (soil, wind exposure etc.) and the size, shape and vegetation structure in the area concerned. From such information it should be possible to build up a better understanding of what needs to be done to ensure important forest values are satisfactorily protected.

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Landscape advice

Due to accumulating age and years of service, Bruce Chetwynd Senior Landscape Planner will be away on Long Service Leave from 11 July until 10 October.

To ensure continued visual management functions within FPB, all issues and notifications of operations are to be directed to Gordon Bradbury who will be acting in the Landscape Planner position for most of this period. He is looking forward to his stint with FPB and will be waiting for your calls and requests for advice on harvest issues. You can contact Gordon on Bruce's phone, 6233 8187.

For those who don't know Gordon, he is a Planning Forester who has been with FT for a number of years. Although experienced as a forester, he is fortunate to have a second string to his bow with qualifications in landscape architecture. Please give him a chance to settle in and welcome him to FPB.

Dear FPN

Dear FPN: I have a major existential problem with the last FPNews, which I hope you can solve for me. On pages 8-9, there is an enthrallingly interesting article on RFA Communities with a High Priority for Conservation, written by a Mr Fred Duncan, who claims to be the Senior Botanist of the Forest Practices Board. However, on page 4 there is no mention of the same person being a contributor to this issue. How is this so?

Signed,

Concerned FPN Reader

Dear Concerned FPN Reader

Thankyou for bringing this serious lapse to our attention. The editor has been duly sacked for his incompetence in not checking the authenticity of the credentials claimed by the author of the article concerned. (Sorry about that Fred).

Signed.

Ex-editor Concerned

Contributors to this issue:

- Fred Duncan
- Humphrey Elliott
- Sarah Munks
- Graham Wilkinson
- Kevin Kiernan
- Rick Crossland

Features

Current R&D in Forestry Tasmania relevant to Forest Practices

Humphrey Elliott
Chief, Division of Forest Research and Development
Forestry Tasmania

Much of the R&D at Forestry Tasmania related to forest practices is concerned with the development of indicators of sustainable forest management. In addition there are several other projects which are relevant to existing provisions of the Forest Practices Code and/or may lead to modifications of the Code at future reviews. Summaries of some of the relevant projects are given below.

Sustainability Indicators

Potential sustainability indicators for Australian forests (commonly known as the Montreal indicators) are described in the *Framework of Regional (sub-National) Level Criteria and Indicators of Sustainable Forest Management in Australia* published in 1998. The development of practicable, cost-effective sustainability indicators using the Montreal Framework as a basis is a requirement of the Tasmanian Regional Forest Agreement. Most of the R&D on this issue is being conducted at the Warra Long Term Ecological Research (LTER) site in the Southern Forests. A major silvicultural systems trial is being established at Warra incorporating several treatments: ground and cable clearfall burn and sow with or without understorey islands, overstorey retention, strip logging and small group selection treatments. Several soils, hydrology, regeneration and biodiversity projects are using these treatments at Warra to develop sustainability indicators.

Soils

A project jointly funded by the Forest and Wood Products R&D Corporation (FWPRDC) and Forestry Tasmania (FT) is assessing soil physical and chemical properties in the Warra treatments before and after logging. This project is aimed at developing an indicator relevant to Montreal indicator 4.1e *(Area and per cent of forest land with significant compaction or change in soil physical properties resulting from human activities)*. Retrospective studies of older coupes in the Picton and Warra areas will determine the relationships between soil physical properties and subsequent productivity, concentrating primarily on bulk density and tree growth. Procedures to estimate the proportion of the area of a coupe with significant soil disturbance will be developed as part of this project.

Hydrology

The impact of forest operations on water quality and yield is being quantified at the Warra site using small logged and unlogged catchments. Weirs have been constructed on suitable streams and instrumented to obtain data over the long term.

In addition, FT staff are assisting Dr. Peter Davies to collect invertebrate samples from streams at Warra as part of the development and testing of Montreal indicator 4.1f *(Per cent of water bodies in forest areas with significant variance of biological diversity from the historic range of variability)*.

Eucalypt regeneration success

A joint project between FWPRDC, FT and forestry agencies in other States is developing cost effective, standardised measures of regeneration success (including stocking, species composition and early growth) in native forests. This three year project addresses Montreal indicator 2.1g *(Area and per cent of harvested area of native forest effectively regenerated)* and the Tasmanian component involves collation of data on the relationship between initial regeneration surveys and stocking at age 5-25 years obtained from various FT trials and coupe surveys.

Biodiversity

Several biodiversity projects are underway in the silvicultural systems trial site at Warra. These include sampling of vascular plants, mosses, liverworts and lichens, birds, mammals and invertebrates. Pre logging sampling has been conducted for most of these groups in the different treatments and post logging sampling will occur as treatments are imposed.

A joint project (part funded by FWPRDC) between FT and forestry agencies in Queensland, Victoria and New South wales is identifying species or groups which are particularly sensitive to forest management practices. This project addresses Montreal indicator 1.2c *(Population levels of representative species from diverse habitats monitored across their range)*. The Tasmanian component of this work centres on reviewing the response of invertebrates to forest operations and assessment of the BOTANY database for correlations between vascular plant species, particularly between common, easily monitored species and those which are sensitive to forest management practices. The outcome of this project is expected to be a monitoring system suitable for sensitive flora and fauna.

Another project relevant to this

indicator aims to monitor long-term trends in vascular plant species composition in plots (based on Forestry Tasmania's Continuous Forest Inventory system) stratified to sample the range of environmental domains across State forest. Two Bioregions (3 and 4a) have been sampled and the next task is to sample one of the major geological types in Bioregion 5.

Wildlife Habitat

The mortality rate of trees retained in habitat tree clumps is being monitored using plots set up in recently logged coupes. These plots will be monitored for many years and should provide an assessment of the effectiveness of habitat tree retention prescriptions over a rotation.

Trials to evaluate the value of Wildlife Habitat Strips for fauna conservation were set up in production forests at Tarraleah and Pioneeer some years ago. Pre logging sampling of vascular plants, frogs, reptiles, birds, mammals and some invertebrate groups was conducted and it is intended that post logging sampling of some of these groups will take place over the next three years at the Pioneer site.

Forest Health Surveillance

Forestry Tasmania has recently developed a forest health surveillance (FHS) capability and this technique is becoming a standard tool of forest management in State and some private forests to protect the forest estate from losses in productivity and other values caused by pests, diseases and other agents. Until now, forest health has been treated mainly on an individual problem basis and the development of FHS provides a much more comprehensive approach for integration of forest health monitoring into forest practices systems. FHS detects new or emerging health problems at an early stage before extensive losses occur; provides an accurate and objective assessment of the general health status of the surveyed forest area; and establishes a basis for initiating follow-up actions, including modifications to site selection and silvicultural practices such as timing of pruning. Apart from flagging potential problems which may require remedial action, FHS is particularly useful for establishing a benchmark of the health of an estate for comparison with future surveys over time.

Health surveillance is conducted using aerial reconnaisance, roadside cruising and ground surveys. Following the field survey, problems/organisms are identified and diagnosed and then reported to forest managers for decisions on appopriate action. The approach taken by Forestry Tasmania has been to conduct FHS on a District basis so District Managers have a coupe by coupe assessment of forest health and can consider the individual recommendations for each coupe.

Biodiversity planning for plantation development

The expansion of the plantation program in Tasmania has focussed more attention on the provision of systematic planning for biodiversity conservation in areas of major plantation development. Several projects are addressing the conservation of individual species and the broader issue of potential fragmentation of native forest resulting from plantation expansion.

R&D is being undertaken by Forestry Tasmania and the Forest Practices Board to enable the development of Management Agreements with Parks and Wildlife for the following species: the stag beetles *Lissotes latidens, Hoplogonus bornemisszai and H. vanderchoori*; the velvet worms *Ooperipatellus cryptus, Tasmanipatus barretti* and *T. anophthalmus*; and the snails *Tasmaphena lamproides* and *Helicarion rubicundus*. A pilot study of the use of class 4 streams by juvenile giant freshwater crayfish *Astacopsis gouldii* has been completed and further surveys will take place in the coming year. Surveys of bryophytes and selected invertebrates are being conducted in areas where extensive plantation development is planned so that comparative biogeographic information on some taxa can be accumulated.

The impacts of different plantation designs on fragmentation of native forests is to be investigated using fragmentation indices. The resuts of this study will be one input into the formulation of guidelines on maintaining native forest connectivity and other conservation measures in areas of plantation development.

Management of browsing animals

A high priority research area under the expanded plantation and thinning program is the development of improved techniques for managing browsing animals. A review of the browsing problem and management methods currently being used in Forest Districts has been conducted and a workshop held involving researchers and field operators to discuss the priority areas for improved operational practices and research.

In 1999/2000 the R&D focus will be on developing improved monitoring methods for browsing animals; accumulating information on the quantification of browsing damage; developing more effective delivery systems (e.g. different bait types) for 1080; and investigating alternatives to 1080 such as resistant planting stock, low-cost fencing and repellents.

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Features

Forest practices and recreation – thirty years in the Florentine Valley

Kevin Kiernan, Senior Citizen, Forest Practices Board

Forest Practices can have significant implications for some aspects of recreation. With fondness tinged by horror, I recently realised that it was thirty years to the day that, as a school kid just taking up recreational caving, and little realising it would develop into a career in geomorphology, I found my first previously unexplored limestone cave in the Florentine Valley. To try to salvage something positive out of this terrible realisation of encroaching age, I slumped into a fireside chair to contemplate the changes after 30 years in the Florentine forests, 30 years of watching forestry on karst. And, more recently, the changes that have occurred since karst was given recognition in the Forest Practices Code. I was a caver back then, not a geomorphologist, so my observations here are from my experience as a recreational user rather than as a land manager or geoscientist.

That logging can have impacts on caves and karst became pretty evident to me on that day way back in May 1969. The more experienced blokes who got to explore the furthest reaches of my new cave reported that in the final chamber there was an unusually large number of broken stalactites, which they attributed to road construction and heavy log trucks passing overhead. Not long afterwards we heard that a nearby road had collapsed into a newly-formed sinkhole. Such concerns were among the reasons karst was addressed in the FPC when it came into being a decade or so ago.

Another major cave lay right beside the F9 road. The entrance was a 50 m vertical shaft, partially choked at the top by logging debris that had been dumped into the sinkhole in which it lay. Despite the danger posed by this unstable debris the cave was too important to ignore – it proved to be the deepest cave known in Australia at that time. The equipment and techniques available thirty years ago ensured its exploration was a more protracted business than it would be today, and I still vividly remember sitting on the muddy ledge at the bottom of that entrance shaft, weekend after weekend - trying to pull all our extremities in under our helmets as rocks and logs plummeted down every time people ascended or descended using the wire ladder and rope that had to be rigged through the logging debris choke above us. There was nothing to shelter under and nowhere else to go, apart from jumping over the next 30 m drop. One day a mate and I heard a particularly loud roar. All we could do was stand up (smaller target than sitting) just in time for a log of thought-provoking size to land between us, crushing our gear packs down below the surface of the muddy floor. It brought home one of the many reasons why it is not appropriate to dump debris into sinkholes – and just one of the reasons the Forest Practices Code now prohibits it.

Sinkhole in a logging road, Junee-Florentine area.

30 m shaft in one of the 400 or so caves in the Junee-Florentine karst; caver ascending on ladder.

Apparently inconsequential features on the surface can lead to unexpected things underground. At one point in that same cave we emerged onto a balcony on the side of a huge underground shaft. It commenced somewhere beyond the reach of our torches in the darkness overhead, and below us it dropped a further 90 m into a large chamber, the walls and floor also beyond the reach of our torches. I still recall us lingering on that balcony in dread of the return trip up through the entrance debris, cynically joking about that sinkhole in the nearby logging road. And speculating whether a log truck and its load would touch

the walls of this latest monster shaft if it suddenly flashed down past us to break the Australian cave depth record just before we could. These days the FPC keeps us all safer.

In the early 1970s we explored a horizontal cave downstream from a recently clear-felled coupe near Westfield Road. There was a short constriction in the passage not far inside, beyond which it was possible to follow the underground stream for many hundreds of metres. A party that returned a year or so later found the constriction blocked by sediment eroded from the coupe, and as a result they were unable to gain access to the cave beyond. A 1976 report to the state government by Richards and Ollier of Unisearch from NSW recorded one case in which over 1 m of sediment accumulated in a Florentine Valley cave after logging. While such things may merely inconvenience cavers, they can be disastrous for the soils, aquifers and various other resources, including highly specialised cave-dwelling invertebrate species that are dependent upon the maintenance of stable conditions underground. None of us, cavers or foresters, realised all that in those days - now the Code makes sure we all remember it.

Also back about that time there occurred an incident upon which forestry people might like to reflect if they are tempted to venture without adequate training and equipment into caves they find in the bush. A logging company employee and his wife were trapped and injured when they attempted to explore a newly-discovered cave above Chrisps Road. The incident sparked a major, expensive, front-page rescue operation. The FPC doesn't preclude you capturing some headlines and medical expenses too, but hopefully the caution urged in your FPO course will.

Those caves up the top of Nine Road lie inside the Mt Field National Park. In a bid to raise revenue for park management the then National Park Board reluctantly agreed to a proposal for the logging of timber damaged by fires that had escaped from the Concession (albeit only to find that the State government kept the royalties for the Consolidated Revenue account). Other parts of the Florentine karst were earlier revoked from the same national park when the logging concession was established back in the 1940s. Organised cave exploration in Tasmania commenced in 1946, and it is since that time that the vast majority of Tasmania's many hundreds of caves, have been discovered, but there has been no systematic protection for the most important handful of them. Some new cave reserves have been proclaimed since 1969, as at Exit Cave and Junee Cave, but these were established to protect caves that were already known well prior to 1946 (1890s!). A few caves of varying significance have also fortuitously gained protection because they lay within the boundaries of areas preserved to protect other values. ANM also established some small informal reserves in the Junee-Florentine area, but their lack of legal standing may leave them insecure. Progress with systematic formal reservation of our most important caves remains painfully slow. Adherence to the Forest Practices Code, should help reduce harm from forestry in the meantime, but is powerless against such major threats as limestone quarrying.

Some years ago Australian Newsprint Mills supplied me with figures regarding the recreational destinations of people passing through their gate at Maydena. Although now out of date, the figures are worth repeating – see Table 1.

So even back in the early 1980s there was significant recreational use of the Florentine area. While some users were just passing through en route to other destinations, like bushwalkers en route to the Denison Range, there were others, especially cavers, who were active on the concession (117 trips in 1982, 110 trips in 1983). Hence, potential issues of visitor management arise, including management of formally or informally reserved areas – reservation alone does not equal management.

In the early days, Don Frankcombe maintained excellent relations with the cavers and would regularly take us out to new holes found by himself or his crews. Late in 1969 Don told us of a stream issuing from a cave entrance below Mt Field West. Just inside we found the roof dropped virtually to floor level with just a small air space above the stream. My wiser elders balked, but I was still flushed with exploratory zeal after

1982		**1983**		
Purpose		*Purpose*		
Caving	1086 (=52%)	Caving	905 (=55%)	
Scientific/educational	540	Scientific/educational	297	
Bushwalking	293	Bushwalking	216	
Other*	162	Other*	237	*(*canoeing, fishing, climbing, sightseeing, excursions, picnics, photography)*

Table 1. Recreational use of the Florentine, 1982 and 1983, data courtesy of ANM Ltd.

reading some caving book from the school library. After squeezing through on my back, sniffing at the air space against the ceiling, I emerged into a large passage adorned with stalactites. Whether they regarded me as too inexperienced to be trusted or just a devious bastard who wanted to get them as wet as I was, my companions declined to follow when I reported back. My protests continued to the car, eventually inspiring one of them to return with me to shut me up. Soon there were two of us refusing to get back into the cars. We explored ~1.5 km of richly decorated passages that afternoon – and later found a dry entrance that by-passed the wet crawl. But its not the same cave today. The passages floored by coloured flowstone that we crossed only after taking off our muddy clothes and boots, and the glistening crystal floors that we concluded were too beautiful and fragile to explore across, are now unrecognisably trampled muddy swathes. The long straw stalactites along the length of the main stream passage beneath which we had to dodge and weave were soon mostly gone, thanks to those for whom keeping their backsides dry was more important. Others who never saw that cave in its original condition are still impressed by what remains, but some of us prefer to stay away.

In later years after Don's departure some complications arose for recreational users of the Florentine Valley. For example, a restriction on being in the area overnight was a serious impediment to the exploration of caves that required a trip of 15 hours or more just to get to the frontier of new exploration. But these days the Florentine road system is open – the down side is that anyone can drive to within a stone's throw of some very sensitive places – like that once spectacularly beautiful cave below Mt Field West. The management responsibilities borne by those who construct logging roads and conduct logging operations do not stop when the logging stops. Admirably, Forestry Tasmania has gated that particular cave now, although more than once they have had to repair gate damage caused by vandals breaking in. All the other 400 or so caves known in the Junee-Florentine karst area remain open slather. In the absence of in-house professional cave management expertise within the organisations directly responsible for managing karst forests, there is an urgent need for some adequately resourced trans-tenure co-operative management arrangements, probably involving both the Parks Service and local communities, among others.

Some years ago Andy Warner took a very useful step when he distributed an information handout for prospective visitors to the Montagu caves. This highlighted the important deposits of fossil bones of extinct giant marsupials in these caves and outlined ways in which to minise damage to them. Andy backed this up with a sign on the site.

While recreational values are not specifically addressed in the Forest Practices Code, there is an obvious nexus between recreation and forest practices. Caving is only part of the recreational equation. For example, it is not unusual for bushwalking tracks to start from, or to pass through, areas where logging operations may later occur, hence, bushwalkers are another group with a stake in good forest practices. Similarly, there are many sites important to people involved in other forms of outdoor recreation that lie in or adjacent to potential forest operations. Minimising potential conflicts between forestry operations and recreational users of Multiple Use Forests provides another opportunity for FPOs to ensure that their industry is held in high regard by the wider community.

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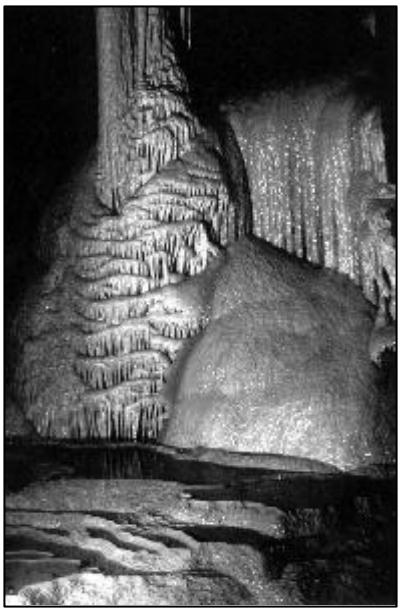


Speleothems in a Florentine Valley cave.

(above and below) Examples of cave management strategies adopted by the New Zealand Forest Service.

Flora

Native grasslands in north-west Tasmania - multiple use "forest" management

Fred Duncan, Senior Botanist, Forest Practices Board

Forest managers often have to manage non-forest vegetation as well. In many cases the non-forest vegetation can have a high priority for conservation. This may be because of its localised distribution, or because the vegetation type has been cleared or extensively modified elsewhere. Examples associated with forests include wetlands, *Sphagnum* peatlands and native grassland.

Some of Australia's most important areas of native grassland occur in the Northwest uplands, on State Forest and on North Forest Burnie's Surrey Hills property. Interestingly, *Sphagnum* peatlands and wetlands are interspersed with some of the grasslands, as well as some poorly reserved forest communities. Some of the grasslands are of pre-European origin, while others are more recent (e.g. along the route of the Emu Bay Railway). The grasslands are maintained by fire, frost and browsing by marsupials.

Why are the grasslands important? Here are some reasons:

- Over 95% of the pre-European native grassland in SE Australia has been lost;
- Two of the largest areas of native grassland in Tasmania (Knole Plain and Netherby Plain), totalling 1200 ha, are managed by FT and NFB;
- Several threatened plant and animal species have been recorded from the grasslands;
- The grasslands are extremely diverse, with over 50 different plant species being recorded from plots just 1 x 10 m in area.

Several projects have examined aspects of the ecology and management of the NW grasslands. In 1985, I worked on a Statewide survey of native grasslands, spending several days in the NW grasslands, appreciating their diversity and beauty, as well as their friendly leeches and the odd refreshing shower of rain. This survey indicated the conservation significance of these grasslands, in a Statewide context. In the mid-1990s, FT and NFB funded Louise Gilfedder (now of PWS) to undertake a more detailed inventory of the NW grasslands. This identified the most suitable areas to conserve the range of grassland communities and threatened species.

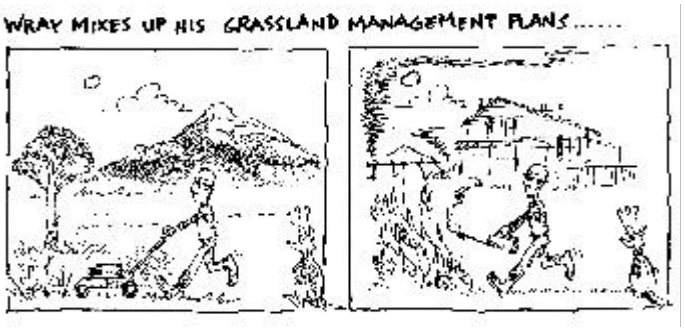
Work on the Ptunarra butterfly, which occurs in several of the NW grasslands, occurred at the same time (undertaken by Mark Neyland and Phil Bell, then working with PWS). Jennie Whinam (also of PWS) surveyed the *Sphagnum* peatlands found in some of the grasslands.

Support for these projects came from Andy Warner (then of NFB) and Bob Hamilton (FT), who appreciated the significant values of the grasslands. Andy deserves special mention for his role in crunching computer data.

In 1998, the FPB received NHT funding to develop management plans for the 20 or so grasslands (including Knole and Netherby Plain) which had been selected for conservation management. The management plans were prepared by Brooke Craven, a botanist who had previously worked on grassland ecology in NE Tasmania. Her work received good support from staff of NFB (Wray Watts particularly), FT and FPB.

The main management issues are control of weed species (particularly gorse and broom) and use of mosaic burning to maintain species and community diversity (as well as protect commercial interest such as plantations). Burning at intervals of less than 10 years prevents tussocks of *Poa* (white grass) and other grasses from crowding out the inter-tussock herbs and small shrubs. These contribute much of the flora diversity (therefore fauna diversity) to the grasslands.

It is good to see that FT and NFB GPOs (Grassland Practices Officers) have been putting the management plans into practice. They provide excellent examples of the forest industry as "multiple use" managers. Hopefully, such commitment will continue if there are changes in tenure or management philosophies in this part of the State.



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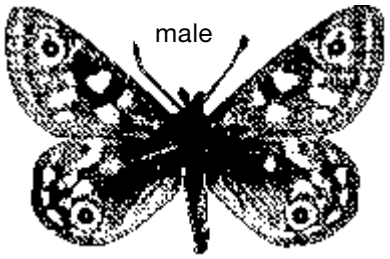
Fauna

Catching butterflies – all in a days work as an FPO

Sarah Munks, Senior Zoologist Forest Practices Board

The white gauze butterfly net operated by an athletic FPO streaked across the *Poa* grassland and pounced on an unsuspecting butterfly. 'Got one!' he cried as we all ran to investigate his catch. The Parks and Wildlife specialist Phil Bell placed it gently into an empty glass vial and examined it closely while we all waited in anticipation. He then announced that the captive was a female Ptunarra brown butterfly which verified the site at Dinner Marsh as a new locality for this threatened species. Congratulations Craig, all in a days work as an FPO/FLO?

The Ptunarra brown butterfly *Oreixenica ptunarra* is a small endemic Tasmanian butterfly with a fragmented and restricted distribution. It is listed as vulnerable in the *Tasmanian Threatened Species Protection Act, 1995*, due to loss of habitat. The males have a wingspan of 25-33mm and are dark brown with a white to yellow ground colour. Females are similar in size but their wings are light orange-yellow with



faint light brown basal areas and two short bars on the frontal margins of the fore wings. Another related butterfly commonly found with Ptunarra brown is the Common silver xenica, *Oreixenica lathoniella*. It can be distinguished from the female Ptunarra brown by a characteristic dark brown Y marking on its upper wing.

The flight period of Ptunarra lasts for about 3 weeks during the autumn. Bad weather may prolong this period while good weather shortens it. Adult males emerge before females and upon emergence the females are quickly mated. Egg-laying follows shortly after mating. These eggs are non-sticky and are dropped on to the grass tussocks, often whilst the butterflies are in flight. The larvae hatch about six weeks later and feed sporadically at night through the winter and into the following summer on the tips of the *Poa* grasses. These caterpillars are greenish-grey with an olive brown line on the back about 20mm long. Pupation takes place in February and lasts for four to five weeks. The adults are weak fliers rarely lifting above the top of the tussocks and dispersal between colonies is rare so local habitat disturbance can lead to population extinction.

Throughout its range Ptunarra is found in areas where there is a significant cover of tussock grass, *Poa* spp. Some apparently excellent sites do not carry butterflies and this may be a function of the past history of the site. A considerable reduction and modification of the butterflies' habitat has occurred throughout its range since European settlement, particularly throughout the agricultural region of the Midlands. Most remaining potential habitat for the butterfly has now been surveyed and the known localities are listed in the FPB, Threatened Fauna Manual. However there are still a few exceptions and all areas of potential habitat as described in the Threatened Fauna Manual near to a known colony should be surveyed for the butterfly before forestry operations commence, particularly before harvesting for plantation development or conversion to pasture. Such surveys, like the one Craig requested for Dinner Marsh, need to be carried out during the adult flight period, between late February and early April. So plan ahead and get in touch with us if a survey is required or if you just want a field day to get up to speed with butterfly identification. If anyone is really keen butterfly nets can be purchased from the Australian Entomological supplies Pty. Limited (Ph and Fax 02 66847188). However, please remember that a permit is required before you can catch and handle a threatened species.

For more information see:

- Threatened Fauna Manual (FPB, 1998)
- Butterflies of Tasmania (Tasmanian Field Naturalists, 1994)
- Draft Ptunarra Brown Recovery Plan, 1998 – 2003 (Parks and Wildlife, 1998)

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Soils

Roads, Rainfall and Runoff -

what happened at the Second Forest Erosion Workshop held in Warburton, Victoria

Peter D. McIntosh, Senior Soil & Water Scientist, Forest Practices Board

In May I attended the Second Forest Erosion Workshop, held in Warburton, which is about an hour's drive east of Melbourne, in the Yarra Valley. The workshop had the subtitle "Forest Management for Water Quality and Quantity." There were two days of conference papers and one day in the field. The conference papers dealt mainly with three themes: sediment production from roads, buffer strips around streams, and the influence of soils and land management on erosion and stream quality

Roads

Ten of the twenty-four papers presented were about erosion from roads. The evidence was convincing: roads are responsible for most of the sediment production in forests, and the more the roads are used, the more erosion occurs. To reduce sediment impacts drain and culvert design to high standards is essential, but the nature of the road surface is also important. Gary Sheridan showed that a layer of gravel can reduce sediment production from roads by about 80%. Jacky Croke showed that in a NSW catchment 17% of the sediment production from a roading network can end up in streams. But 50% of sediment produced can be stored in table drains, behind debris dams. So table drain design can be important way of controlling sediment flow for roads that are only going to have heavy traffic for a short period. She cautioned against putting too much reliance on measurements from rainfall simulation experiments: silt and clay moving off a road surface (or a snig track) may not end up in streams. Because sediment production is largely a consequence of road surface disturbance by passing traffic, old unused roads were found to be an insignificant source of sediment.

Streamside reserves

There were six papers on streamside reserves (also called buffer strips or riparian zones) and their effectiveness. Paul Dignan showed that simple mapping of sediment plumes entering streamside reserves from logged areas was an effective way of judging the effectiveness of the reserves. Leon Bren adopted an amusing and completely theoretical approach to streamside reserve design. He argued (tongue in cheek) that reserve width should vary on the basis of the upslope erodible area at each point along a stream, calculated using a digital terrain model - a nightmare scenario for FPOs designing THPs. Perhaps the most useful potential tool for foresters needing to assess water quality was a system devised by Phil Papas of the Department of Natural Resources and Environment, Heidelberg, Victoria, which calculated a water health index by comparing the number and types of "bugs" (macroinvertebrates) actually caught in a stream with the bugs that were expected to be present (based on earlier studies of undisturbed "control" streams with similar flow, habitat and morphology). Provided the control data is available for different districts, this method should enable water quality in forests to be simply assessed without complex and costly instrumentation.

Soils and management

Peter Fogarty and Phil Ryan of NSW, and Simon Murphy of Victoria, gave papers showing the different approaches these states use to assess erosion risk. As a result of a successful prosecution of State Forests of NSW by the EPA, State Forests of NSW has adopted a system of pollution control licences for forestry operations. Before a licence can be issued an assessment of erosion risk is required, and because of this requirement all state forests in eastern NSW have been mapped for regolith stability, using four classes (Table 1).

Table 1. Regolith stability classes in eastern NSW.

R1 Low sediment delivery High regolith coherence e.g. soils from basalt and dolerite or stony soils from greywacke	R2 High sediment delivery High regolith coherence e.g. soils from consolidated clays and siltstones
R3 Low sediment delivery Low sediment coherence e.g. soils from unconsolidated sands and strongly weathered coarse-grained rocks such as granite	R4 High sediment delivery Low sediment coherence e.g. unconsolidated silts, clay and saprolites

The regolith classification can be modified at the coupe inspection stage. In Victoria the mapping stage is less important: more weight is given to on-site tests for susceptibility to erosion and runoff, using a two-stage process based on the principles of Mike Laffan's erosion hazard assessment in Tasmania. The simple equipment necessary is issued as a soil assessment kit. This contains a colour chart to assess soil drainage and organic matter content, plastic containers to assess the stability of soil

aggregates when shaken with water, and a tape measure to measure size of aggregates. From these observations the soil's susceptibility to erosion is derived. Susceptibility to erosion plus permeability gives a *soil erodibility index*. The soil erodibility index plus site factors like slope and rainfall gives the *soil erosion hazard class*.

Field visits

The main field inspection was to see a conventionally logged coupe on gradational soils in deeply weathered granite. Interestingly almost all the forest in East Gippsland is dominated by *Eucalyptus regnans* which regenerated from an extensive fire in 1939. The rainfall simulator showed that however much rain you applied to the soils, it was virtually impossible to generate runoff, as they absorbed so much water. There were a number of less-than-perfect forest practices which were commented on: deeply rutted snig tracks on slopes of 20 degrees, streamside reserves burnt by fires, and poor culvert design.

After attending the conference one would be forgiven for thinking that erosion in forests is *the* major land-use issue in rural Victoria. In fact a field inspection of two streams in the Tarago catchment, conducted by Peter Hairsine, showed that agriculture, rather than forestry, is the major cause of sediment entry into streams and poor water quality. We stood at the confluence of the East Tarago and West Tarago streams and noted the crystal clear water of the former, emanating from forested land, and the murky brown colour of the latter, emanating from grazed land. To be fair to the pastoralists, they have recently cooperated fully with Melbourne Water in an initiative to establish streamside reserves to improve water quality. But the evidence suggested that a Code of Practice for agricultural land is needed.

For me the most memorable paper of the workshop was the wide-ranging review by Rob Vertessy (CSIRO, Canberra) of the impacts of forestry on streamflows. One of the most interesting points to emerge from this review was that as eucalypt stands age, their evapotranspiration decreases, and after about 120 years, runoff under forestry may approach that of an unforested catchment. This is called the Kuczera effect after the scientist who first detected it. Vertessy's review was published in full in the workshop proceedings, which are available from the Cooperative Research Centre for Catchment Hydrology, Monash University, Clayton, VIC 3168.

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Geomorphology

Blowing in the Wind

Kevin Kiernan, Senior Geomorphologist, Forest Practices Board

The wind plays a major role in shaping some landscapes and laying the foundations of the soils from which some forests grow. Grains of clay, silt or sand size, and sometimes even small stones, can be lifted or rolled by the wind. Mobile grains abrade the surfaces with which they come into contact, even sculpting some rock surfaces into features known as ventifacts, etching out joints in rocks, and thereby liberating more fine particles into the wind. Some of this material ends up, or more generally simply sits and rest a while, as sheets of fine sediment that are draped over the existing landscape. Some is constructed into landforms in their own right such as sand dunes and lunette ridges. Aeolian geomorphology is the name given to the study of these landforms produced by wind action (Aeoulus, wind god, from the Greek).

In Tasmania, the original sources of sand upon which the wind has acted have been the sea, sediment swept down streams (especially meltwater streams from glaciers that crushed rocks into fine particles), and sand released by the weathering of sandstones. Some aeolian landforms offer important insights into past environments and climates. For example, the large sand mass north of Strahan consists in part of sand washed down from the glaciers of the West Coast Range onto the continental shelf exposed when the sea level was lower in the past, then blown from the river bed and shelf. The dune sand reaches 145 m altitude, kilometres inland of the coast, and individual dunes are up to 90 m high. There are marked differences in the form of different dune systems, and weathering differences that reflect periods of stability as environmental conditions changed through time. Recent unvegetated blowouts are advancing across older dunes that have well developed soil profiles that attest to stability of these older dunes, some of the sand in which appears to have been through a still earlier phase of weathering. Weakly developed fossil soils in some younger dunes indicate short periods of relative stability. Further south, old shore lines up

to 22 m altitude attest to formerly higher relative sea levels. At one site close to the present shore in the northernmost part of this area ~2 m of contemporary dune sand overlies a lagoonal deposit ~1.5 m thick, rich in plant remains, that rests on previously wave-eroded bedrock. Radiocarbon dating of plant remains from the base of the deposit has given an age of 10,100 years BP (before present), at which time sea level was probably ~50 m lower than now. The upper part of the bed has been dated to ~3,500 years BP, after the sea had returned to its present approximate level, and prior to burial of the lagoon deposit beneath the present dune.

The effectiveness of the wind as a geomorphological agent is dependent upon its velocity, frequency, duration and direction. Whether a material is susceptible to wind erosion depends upon the size of the particles, the presence or absence of soil clods or binding agents such as clay or decomposing organic matter, and how easily abraded and readily transported the material is. The nature of the ground surface also exerts a major influence, including factors such as the slope angle, the length of the exposed surface, how rough the surface is, how moist it is, and the presence or the character of any vegetation cover (height, density, orientation, percentage cover etc.). In these various controls lie the keys to interpreting landforms produced by the wind, and particularly what they tell us about past climate change. Understanding these controlling factors is also fundamental to developing strategies in relation to wind-induced geohazards.

Aeolian geohazards

Some aeolian landscapes are of geoconservation significance, and virtually all pose geomorphic hazards related to the potentially extreme mobility of sand grains as the accompanying photographs from the forests of Strahan illustrate. Large scale wind-induced geohazards have found their most dramatic expression in this country as major dust storms that have darkened the skies of some cities. Overseas, the "dustbowl" disasters in the USA also attest to the potential for wind erosion to inflict serious harm

Tasmania's aeolian geoheritage

Tasmania's diverse aeolian landforms occur in a number of settings:

Coastal features

- coastal dunefields nourished by sand brought towards the shore as sea level rose after the end of the last Glacial Climatic Stage, which ended ~10,000 years ago (eg. at Seven Mile Beach pine plantation);
- cliff-top dunes and sands adjacent to the coast, formed from sand blown from the exposed continental shelf when sea level was lower than now during the Glacial Climatic Stages, possibly involving former ramps of sand up the front of some cliffs (eg. some capes on Tasmania Peninsula);
- some sand masses stranded further inland that are related to times when the sea was higher relative to the shore than is now the case, due to more water in the oceans or to uplift of the land (eg. inland from Smithton);

Relict desert dunes

- some important relict desert dunes occur in northeastern Tasmania that are akin to those in the present day Simpson Desert; they formed during the Glacial Climatic Stages when the climate was drier and windier than now and Bass Strait was dry; some have been partially modified since;

Source –bordering inland dunes and sheets

- dune and sand sheet systems formed where material was blown from the beds of river systems that have been exposed seasonally, either now or under earlier climatic conditions; especially where the streams drained from glaciers that ground rocks into sand that could be swept downstream (eg lower Derwent Valley);
- dunes around glacial lakes with a seasonally-exposed sandy beach (eg. original Lake Pedder);
- dunes around some other lakes or swamps (eg. in the Midlands and near Swansea)

Direct bedrock sources

- sand accumulations associated with weathering and decomposition of nearby rocks that were naturally rich in sand particles, such as sandstones.

In addition, sediment deposited from the wind has influenced soil development over wider areas of Tasmania without having any visible affect on the geomorphology.

Road formation blocked by advancing sand.

upon human communities. In some parts of Tasmania, one all too often sees plumes of dust when fields are ploughed under dry, windy conditions. But perhaps the most visually dramatic expression of wind erosion in Tasmania has been on the west coast where blowing sand buried the old Strahan-Zeehan railway, and continued to advance at an average rate of 17 m/year between 1953 and 1977 (no figures since). Problems have also arisen elsewhere, as at Dolphin Sands on the east coast where dune vegetation was cleared for real estate development.

Aeolian dust contributes to the productivity of some Tasmanian forest soils but forestry on dunes and sand sheets needs particularly careful planning and management. The older sands at Henty Dunes are relatively poor in nutrients and the form and the growth rates of pines on them are poorer than for those on younger, less weathered dunes. However, harvesting of pines from some of the younger dunes in the Henty River area is problematic. Some are currently playing an important role in impeding advance of the dune face, which having already engulfed the old railway formation is in some places now only a few hundred metres from the Zeehan-Strahan highway.

There are many areas in Tasmania where forestry occurs in aeolian landscapes, very often small enterprises on private land but sometimes involving larger forest areas, as around Strahan. Some are suitable areas for commercial forestry, some are not. As always, the key to safeguarding important geoheritage and avoiding geohazards is good inventory information, thoughtful planning and careful execution. The penalties for failure can be severe. Among potential strategies worth considering are:

- Ensure adequate information is available.
- Plan and execute the operation carefully
- Ensure that every effort is be made to minimise breaking through the organic soil layer and exposing the underlying sands to the wind.
- Wherever possible, orientate operations parallel to the natural grain of the topography, with minimal dragging of logs or movement of vehicles across dune crests.
- Consider the tree distribution upwind of all parts of the operation and the potential for localised "wind tunnel" effects, and plan accordingly
- Be wary of potential waterlogged ground between dune ridges near coastal lagoons.
- Remember that most coastal sand masses worldwide are currently eroding – leave a good buffer between the harvest area and the beach
- Remember too, that if some predictions of sea level rise due to the enhanced Greenhouse Effect prove accurate, the future of some low-lying coastal sand masses for commercial forestry may be limited.

Undesirable incision through organic-rich soil on a dune crest, exposing the underlying sand to wind action.

Sand invading the forest. The lighter coloured tongues are fresh dry sand avalanching onto sand damp from the previous evening

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