Forest Practices news

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Global perspectives on world trade and the implementation of codes of forest practice

Graham Wilkinson, Chief Forest Practices Officer, Forest Practices Board

In November 2003 I was invited to present a paper to an international meeting in Chiba Prefecture, Japan.

The meeting involved about 100 experts from 22 countries who came together to review progress on the implementation of codes of practice within the Asia-Pacific region. The meeting was hosted by the Japanese Government, which has an active assistance program across 44 developing nations. Japan is of course an important trading partner for Tasmania's forest products so it is of interest to reflect upon the state of Japan's own forests.

Japan is a heavily forested country, with over 25 million ha of forest covering 66% of its land area. Nearly half of its forests are plantations established since the Second World War. Despite this substantial forest estate, Japan's forests supply only 20% of its needs, necessitating imports of 78 million m^3 of wood per annum (note that Australia supplies just 8% of Japan's imported wood). Japan's forest estate could potentially supply over 66% of its needs. The shortfall in domestic production is not because its forests are locked up in reserves. In fact Japanese Green groups are actively calling for higher logging rates in their forests. They recognise that the planted forests need ongoing management, including thinning and pruning, to remain healthy and viable. The reality is that cheap imported wood has priced local wood out of the market and Japanese forest owners can not afford to carry out management and harvesting activities. The Japanese Greens also recognise that a high proportion of Japan's imported wood comes from developing nations and Russia, where forest practices are poorly regulated. Unlike Australian Green groups, the Japanese Greens have recognised that it is hypocritical and unethical to transfer the environmental risk of forest harvesting from developed nations (which have the capacity to implement sustainable forest

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The Board Room

Nathan Duhig and Karen Richards, editors, FPNews

Many thanks are due to the outgoing editors, Fred Duncan and Mark Wapstra, who have passed on the riding crop and steel caps they inherited from Kevin Kiernan to the new riders. With David Hinley continuing to take all comers in the bookmakers ring, we hope that FPNews will almost ride herself in the issues to come with your contributions and support.

This issue features an excellent pair of articles from Mersey District on using excavator heaping to manage bark at landings, and as part of an innovative silvicultural technique.

We trust that the festive season has not left the pocket too light and the waistline too heavy, and that 2004 brings you good health, happiness and prosperity.

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Noticeboard

Forward Training Program – Forest Practices Board

Course (Contact)	Timing	Duration	Location	Course Content
Forest Botany Manuals (Fred Duncan/ Mark Wapstra)	To be confirmed	1 day	Various locations	Train FPOs in use of the new Botany Manuals
Cultural heritage (Denise Gaughwin)	March or April 2004	4 days (2 blocks each of 2 days)	To be advised	Identification and management of Aboriginal and historic cultural heritage sites
Forest Practices Manager training (Chris Mitchell)	April or May 2004	1 day	Hobart and Launceston	Update forest managers on requirements of the forest practices system
Forest practices training for supervisors (Chris Mitchell) [1]	May 2004	4 days	To be advised	General training in forest practices for forest industry supervisors
Forest Practices Officer course (Chris Mitchell)	Winter – Spring 2004	12 days total	To be advised	Pre-requisite course for appointment as FPO
Fauna field days	To be confirmed	1 day	Various locations	Identification and management of individual species and their habitat
Fauna course	September 2004	4 days	To be advised	Identification and management of Tasmanian forest dependent fauna

1. Course will be run jointly by Forestry Tasmania and Forest Practices Board and is dependent on demand.

from front page

management) to developing nations (which currently lack the capacity to implement sustainable forest management).

The meeting in Japan identified a number of serious constraints on the implementation of codes of forest practice by developing nations. Many of these constraints are related to a lack of institutional capacity and skills. These deficiencies are being addressed through continuing development and training projects, most of which are funded by international governments and donor organisations. However, there are a number of more problematic overarching constraints, which include-

- Massive rates of illegal logging. It is estimated that up to 70% of wood from countries such as Indonesia is illegally cut, costing governments and forest owners (including local communities) over $6 billion p.a. in lost revenue.
- Inefficient regulatory frameworks, compounded by institutionalised corruption.
- Low global prices for forest products, compounded by a lack of any market incentives or premium for wood from sustainably managed forests. Cheap, illegal wood directly competes in the international market place with wood from sustainably managed forests, which clearly has higher forest management overheads.

There are moves within the international community to address these issues. The solutions will require the support of both developing and developed nations. Developing nations face the challenge of formulating and implementing effective regulatory frameworks for delivering sustainable forest management. They are moving to do this with the help of developed countries. In this respect Tasmania has a continuing role to play, as our forest practices system is widely respected as a highly successful and effective model. Developed nations also need to play their part by getting serious about the international trade in forest products from developing nations. Societies in developed nations need to understand the consequences of progressively locking up their own forests whilst continuing to use cheap imported wood and paper products. The global consequences include uncontrolled deforestation, environmental harm and long-term social disadvantage within developing nations.

Feature

The excavator heaping silvicultural system

Bob Knox and Neil Denney, Forestry Tasmania - Mersey District

A silvicultural system for regenerating native forests logged under partial harvesting regimes which minimises damage to regrowth, maximises correct seed provenance and achieves best practice fire management outcomes in an environmentally sustainable and cost effective manner.

Excavator heaping in dry forest

Summary

Excavator heaping is a system which was initially developed to enable large numbers of partial harvesting coupes to be regenerated and fuel reduced each season. However, after the technique was used and developed over several years the advantages of the system were so obvious that it became the standard approach for most coupes in Mersey District. The exceptions are coupes that are too rocky and rough for excavators to operate successfully and coupes, which require a broadcast burn for other reasons e.g. Bettong habitat management.

The window of opportunity to carry out top-disposal burning on a large scale is very small, having to be fitted in at the end of the high-intensity burning program, which is normally completed about mid-April, and before the season becomes too wet in early May. Programs become impossible to complete even with the use of helicopter drip-torch burning and often result in scorch of retainers or a burn which is too light, and of no practical effect in fuel reduction or providing better silviculture conditions for regeneration. Often both extremes are seen on the one coupe.

It is generally accepted that after logging on the majority of dry sclerophyll forest coupes, adequate regeneration will occur without burning. The problem is to deal with the large fuel loads left which sooner or later will cause any fire under the valuable new crop to be intense and hard to control. The majority of top-disposal burning is done to reduce these fuels. However, this has the negative effect of killing eucalypt seed and small seedlings, which are concentrated under and around the heads being burnt. Older retained regrowth is also frequently butt damaged and scorched in this process.

The excavator heaping system involves a small excavator (12 tonne is ideal) with grabs working across the coupes once seed fall has occurred from the heads onto the ground. This point is crucial in most coupes where there is reliance on the seed, which is on the slash heads on the ground.

In coupes in which there is a good seed crop in the retained trees the slash seed is less important although it is always preferable to maximise seed and seedling numbers already on the ground. Debris is picked up (leaving seed concentrations behind) and moved into heaps in clearings and spaces and at times building on already existing concentrations of slash

A typical heap after burning in early winter showing young regeneration well underway.

away from retained stock. The heaped material should not include medium or large size branches and logs except where they are attached to fine fuels. The aim is to remove 75% of the fine flashy fuels from 75% of the area.

Because the material is in small heaps it is elevated from the ground and will burn in late autumn/early winter and will also burn the larger materials. Burning at this time removes the requirement to construct expensive and environmentally undesirable single use firebreaks in most cases.

Fire normally does not spread between the heaps and covers a tiny percentage of the surface area of the whole coupe away from retained trees, small seedlings and concentrations of ground stored seed.

"... the aim is to remove 75% of the fine flashy fuels from 75% of the area ..."

Browsing control becomes less necessary because the initial stocking of seedlings is generally high and the coupe has not been stimulated by fire to create a flush of young tender plant shoots, which attracts large numbers of wildlife. Also because the whole coupe has not been burnt, but only the heaps, there is still significant feed available, not just eucalypt seedlings.

The system has been used operationally for several years in Mersey District with consistently good results in stocking standards and costs. It is now seen as our major tool to achieve fuel reduction because fuel reduction burning is becoming harder to achieve on any scale due to concentrations of assets and constraints.

Advantages of system

1. Removes most potentially flammable fuels from stands of retained trees. Keeps retained crop in good condition and avoids damage to older trees.

2. Reduces more tons per ha of fuel than top-disposal burning. This is because more medium fuel sizes are burnt which don't get removed in top-disposal burns (stacked in elevated heaps/burnt in late autumn).

3. Removes the need to do firebreaking (which costs an average of $80/ha) as burning is done in May/June. Coupe edge firebreaks are generally only a one-use item i.e. not generally strategically in the right place. They are often long meandering tracks around a convoluted coupe edge which runs parallel, close to and through streams causing environmental and Forest Practices Code concerns.

Much fire control now is based on the increasingly dense road system and strategically placed permanent firebreaks.

4. Protects concentrations of seed and seedlings on the ground under and around slash by moving slash/shaking out seed and burning elsewhere in late autumn. With higher stockings of seedlings the need for browsing control is reduced.

5. Top-disposal burning actually attracts wildlife to the flush of young tender plant shoots it produces. Cotyledons are lost en masse in the general grazing which follows. With excavator heaping only a few small spots of burnt ground are created where the heaps are burnt.

6. Saves stream reserves/habitat clumps and other Special Values from burning and firebreaking damage.

7. Provides the opportunity to scarify compacted soils where needed.

8. Window of opportunity for burning i.e. number of burning days hugely increased. Under top-disposal burning suitable burning days are limited to get the program done in the small window available.

9. With top-disposal burning fuel moisture conditions across the coupe are variable on any given burning day – north slopes/ridges/south slopes/creeks all have requirements for different burning conditions. Some sections scorch and some sections hardly burn. Excavator heaping overcomes this totally.

10. Many retention system coupes have sections of wet forest. These can be heaped and scarified using the excavator and regeneration initiated without problem whereas successful top-disposal burning of these types is almost impossible, especially on the same day as the dry forest is being burnt.

11. System allows for any shape of coupe in difficult locations to be burnt safely.

12. System allows for burning of clearfell coupes close to partial harvest coupes as the chance of the fire spreading through a heaped area is much reduced especially if the buffer area adjacent is heaped more intensely, thus creating a ground-fuel free zone.

13. System is generally cost neutral – excavator costs are offset by savings in burning costs/firelines/sowing/browsing control as outlined below:

- Burning costs much reduced (to an average of $25/ha) as burning usually requires no suppression (ie minimal risk of escapes and therefore overtime expenses) and is only a matter of touching off heaps by hand. In the past helicopters were being used to burn slash to try to get the large number of coupes in the program done. Savings of $50 per ha are often made.
- Firelines for top disposal burns average about $80 per hectare and are no longer required under this system in most cases.
- With effective top-disposal burning (say 75% of fuels burnt) most eucalypt seed on the ground and seedlings are destroyed and there is a reliance on seed on trees. If there is a poor seed crop on trees then aerial sowing is required and this is a substantial cost over the whole program each year. Excavator heaping saves almost all eucalypt seed on the ground and seedlings and even a poor seed crop is generally good enough.

- Lower overtime costs for burning as there is generally no need to work weekends or late in the day to get the program done.
- Browsing control is rarely needed due to greater seedling numbers and lack of green pick. Savings of $40 to $60/ha are common.
- Total savings have been in the order of $150 to $200/ha. which generally covers the cost of the excavator operations.

14. Creates very good conditions for firewood gatherers as open access is provided and the wood is dry and clean. Note: This must however be carefully managed by confining firewood operations to the dry season and suitable hard ground to avoid compaction of soils and damage to germinating seedlings.

15. Low supervision costs.

16. Little risk of fire escape.

17. System leaves on-site seed in large quantities and the right species are in the right place, i.e. if dependent on seed trees all species may not be represented due to selective removal of some species in logging.

18. Burning is a safer and quicker operation. There is clear ground for walking which is safer for the crew. Less planning is required. Heaps light quickly due to elevation and fine fuels. Burning can be done in stronger winds and often this is more desirable for smoke dispersal reasons.

19. Outcomes make the forest more pleasing for recreational users, looks good and leaves more open forest for walking and horses and shooting etc.

Disadvantages of system

1. It could be argued that some natural cage effect is lost. This seems to be compensated for by large numbers of seedlings and ground stored seed being retained and by not creating favourable browsing conditions by causing the flush of young tender shoots which follows burning which is so attractive to wildlife.

2. Need to find and train suitable excavator operators although the amount of work is substantial and in a District with substantial areas of dry forest can create almost full time work for an operator and machine.

A good purpose built grab for excavator heaping designed for scooping outwards.

3. It is sometimes argued that the cost is prohibitive. This does not stand up to close scrutiny. The system has now been used on a large scale for several years with average costs being $180/ha. Cost savings in that order are being made on firebreaks/sowing/burning and browsing control. However even if there were no savings the results are so superior from an environmental, fire management and regeneration quality point of view that $180 per ha is money well spent.

Operational considerations as a basis for Standard Operating Procedure

- Correct excavator selection is very important. A 12 tonne machine is considered ideal in dry forests. In wet forest bigger machines may be more efficient. Configuration is also important and large cost savings are being made in recent times (i.e. $180/ha avg. falling to $130/ha avg.) by setting up the excavator so that it scoops material

Excavator heaping is gradually being introduced as a method of regenerating some wet forest partial logging systems.

outwards with one action and drops it straight onto heaps. The specially made rake/grab faces outwards and a single push out scoop action is used rather than the usual rake in lift out double action used by excavators.

- Excavator treatment should not start after harvesting until capsules have opened and seed fallen out.
- Experienced operators of this technique also warn not to let slash get too old and brittle after logging (say older than 3 months) as it breaks apart and requires more excavator movements to gather into heaps.
- Avoid damaging patches of young regrowth.
- Pull material away from retained trees.
- Avoid damage to retained trees.
- Ensure that the Forest Practices Plan is explained to the operator and is retained on site with the excavator.
- Ensure excavator does not enter within 10 metres of a Class 4 stream and does not remove debris from Class 4 machinery exclusion zones.
- Stack heaps in good burning places such as open spaces away from seedlings and retained trees and on existing heavy concentrations of fuels.
- Is the coupe needed for firewood gathering? If so, consider delaying excavator heaping till after the firewood operations (protect soils/ seedling from compaction caused by many vehicles). Consider closing access during the time that emerging young seedlings are vulnerable to crushing and damage from vehicles.
- If firewood gathering is to be allowed after heaping consider putting big logs at the bottom of the heaps with small materials at the top with maximum height of 3 metres. This is to make it safer for the firewood gatherers and is an agreed position with Workplace Standards.

Heaped dry forest with a range of regrowth sizes prior to winter burning.

- If there is a good crop of seed on retained standing seed trees or shelterwood trees the ground based slash seed is slightly less important although it is always preferable to maximise seed and seedlings already on the ground.
- If there is a poor seed crop on retained trees – every bit of ground stored seed is vital and should be conserved.
- In wet sclerophyll forest coupes or sections of coupes with deep soils/ wet scrub heap in the summer dry season to allow to fluff up soils and lessen compaction.
- During winter restrict excavator treatment to coupes with more robust rockier ground to avoid compaction.
- Knowledge of the seed crop is important during logging to plan heaping (Technical Bulletin 1 calls for a seed crop assessment prior to any partial harvest). Is there good or poor seed on the standing trees? Is there good or poor seed on the heads on ground? How long will it take for it to fall out at this time of the year?
- Need to plan for each coupe, taking into account various factors – seed/winter/ summer/heavy fuels, light fuels/wet forest/firewood/ adjacent burns/rockiness etc.
- Some coupes, especially high altitude E. delegatensis forests will be too rocky for excavator heaping.
- Consider the need for fire equipment and shut down protocols with weather monitoring.
- A good rule for this type of operation is 75% of fuels to be removed from 75% of area.
- Leave debris which is most suitable for habitat i.e. old downers, rotten logs and logs with hollows. Aim to heap all the finer material and to leave anything larger in diameter than 10 cm except where it is attached to finer fuels such as twigs, leaves etc. (i.e: head material goes into heaps but individual pieces of wood of a greater diameter than 10 cm may be left on the ground).
- Clarify with the excavator operator whether you want some sections of ground scarified. e.g. badly compacted tracks or grassy sections. Some types may need to be scrub rolled and heaped such as thick scrubby dry forest or wet forest sections.

Feature

Heap that and smoke it

By Tony Allwright, Forestry Tasmania - Mersey District

When contractors restore log landings, the bark debris is normally stacked in large heaps. On large landings, these heaps can be the size of a house.

CA113k small cone bark heaps ready to burn.

Bark heaps are burnt in the autumn or winter and large bark heaps can smoke for weeks, even remaining alight into the following summer. One such bark heap was found to have started a forest fire a few years ago that cost about $250,000 to control. Consequently, all burnt bark heaps on State Forest are now checked with an infra red camera to ensure they are out before the summer wildfire season. On average we have been finding three or four heaps alight in Mersey District each year.

While smoke management is an industry-wide issue it is also a major issue at a local level, where adjoining landholder's expectations need to be managed. As an industry, we need to develop methods of burning that don't inconvenience the public if we want to continue the practice.

An alternative method of bark heap construction has been trialed in the last two years. The aim was to design bark heaps that burn out faster and reduced lingering smoke. Bark was stacked in many small cone shaped heaps not more than 5 meters in diameter at the base. This results in the restored landing area looking like an Indian tee-pee village. In fact a closely settled Indian village, as the heaps were found to burn better when closely spaced. Cone bark heaps were constructed so they were touching at the base, provided this did not impede water drainage through the area. A mineral earth firebreak was constructed to surround the entire bark heap area.

Cone bark heaps were found to burn out rapidly rather than smouldering for an extended period, as can be the case with large bark heaps. In the last two years none of the cone bark heaps have been found alight in the spring. The cone bark heaps generally burnt away completely within a few days. However one heap was found smouldering three weeks after lighting in some compacted bark at the base of the heap.

Cone bark heaps stacked on slash were observed to burn faster than those stacked on bare ground. Although the preferred method of construction is to stack cone bark heaps on slash, it was not considered essential unless excessive mud had been mixed with the bark. Rapid combustion was still observed, even when some mud had been incorporated with the bark during winter logging.

The close spacing of the cone bark heaps resulted in high levels of radiant heat when burning. This helped with the rapid combustion of the bark heap area, and generally burnt the small quantities of unheaped bark remaining around the landing.

It was found necessary to stack the bark in small cone heaps five meters or less in diameter, to ensure rapid and complete combustion. Aeration of compacted bark was

CA113k after burning.

also necessary for rapid and complete combustion and this is easier to achieve with small heaps. The heaps that had not burnt out completely and rapidly were either poorly aerated or of a larger diameter.

The area required for cone heaps is generally greater than with the traditional heaps but still within the landing perimeter. On selective logging operations, with retained regrowth, the contractors have been able to locate bark heaps clear of retained stock.

Bark heap placement needs to be considered at the time of landing establishment. The contractor needs to have in his mind where the bark heap will end up, and be working towards that during the operation. The excavator, when breaking up the landing pad, can generally stack the cone heaps within boom reach. One to two hours of additional work was required to stack the bark in cone shaped heaps.

The use of closely spaced five metre diameter cone shaped bark heaps for the disposal of landing waste has been used in the Mersey Forest District for two years. This method of bark heap construction has resulted in a rapid combustion of the landing waste with all heaps burnt out in a few weeks. With a shorter rapid combustion time, lingering smoke from smouldering heaps is reduced.

The prescription used in our Forest Practices Plans for landing restoration is as follows.

Bark Management

- Bark is to be heaped on a well drained site and where possible onto a raft of light limbwood (less than 20 cm diameter). Wood greater than 20 cm diameter is not to be placed in bark heaps. See below for details.
- Design and placement of bark heaps is to be discussed between the Contractor and Forest Officer in charge at commencement of each landing, with the aim of ensuring complete combustion at time of re-afforestation.
- A number of small cone shaped bark heaps, less than 5 metres in diameter, are preferred to one large heap.
- A 3 metre firebreak is to be constructed around the perimeter of the bark and waste wood heap area.
- Bark is to be stripped from the landing pad and aerated before being added to heaps.
- If possible wet saturated bark should be placed on top of bark heaps. Small amounts may be placed on the top of wood waste heaps in such a manner that it will be readily burnt and will not affect the rapid combustion of the wood waste.

Waste Wood Management.

- Waste wood pieces (greater than 20 cm diameter) to be heaped separate from bark heaps.
- Material suitable for firewood should be left on the ground in a situation where it can be safely cut up.

RM462W small cone bark heaps ready to burn.

RM462W after burning.

Postscript:

Congratulations to Tony and staff at Forestry Tasmania Mersey District for developing a practical and effective alternative to burning large bark heaps. The dangers of burning large heaps are well known, which why the Forest Practices Code requires Forest Practices Officers to consider the broader fire management implications when prescribing whether bark is to be returned to the forest or burnt. It is noteworthy that the Board's audit over the last few years has consistently identified the management of bark heaps in drier forests as an area requiring significant improvement. Full marks to Mersey District for tackling this important issue!

Fauna

Masked Owl - a good news story!

Suzette Weeding, Scientific Officer, Forest Practices Board

The masked owl, *Tyto novaehollandiae castenops,* is a large owl endemic to Tasmania, recorded from all areas apart from the south west.

Faller Grant Walker found and protected a Masked Owl nest.

This species has recently been listed as Endangered on the *Threatened Species Protection Act 1995* due to low population densities and ongoing habitat loss. Current information suggests that there are less than 1300 mature individuals in Tasmania and there are currently only 97 recorded nest sites. Most records are from lowland, dry sclerophyll forest in the south east and central north of the state, although the masked owl has been recorded in wet eucalypt forest, non-eucalypt dominated forest, scrub and urban environments.

Although seemingly widespread across the state, known nest sites for this species are rare and can be exceedingly difficult to identify, given that the masked owl is a strictly nocturnal and secretive species and there may be no external evidence of the presence of a masked owl nest in a particular hollow. Nests may have evidence of pellets (regurgitated skin/bones) at the base of the tree, but active nest sites are frequented by scavengers which may remove evidence, similarly the presence of scratch marks at the base of the hollow, potentially indicating use, may be caused by other hollow utilising species, such as the brush-tailed possum.

Pellets containing regurgitated skin/bones may be found at the base of an active nest tree.

This difficulty in nest identification increases the importance of raised awareness of the potential presence of this species in all persons involved in forest operations, but particularly that of the forest workers including the planners, contractors, tree fallers and machinery operators.

I would like to commend the initiative of one such timber faller, Grant Walker. While operating on a selective harvest operation on State Forest in the northern midlands he noticed a large grey owl in a hollow in a nearby tree. Whilst unaware of potential implications of his discovery, given the recent listing of this species and the fact that there were no prescriptions relating to this species in the FPP, Grant adopted a proactive approach and created a large Wildlife Habitat Clump, resulting in the maintenance of the nest tree and a positive result for the species in the local area.

Old growth tree containing an active masked owl nest on the east coast.

All sightings and potential sightings of this species are important and should be reported to FPB Zoology through the company supervisor or FPO. Agreed management prescriptions for this species are in the process of being developed. In the interim it is recommended that suitable nesting trees for this species are captured in Wildlife Habitat Clumps/retained areas were practicable and if a suspected nest tree is located operations cease within 100m and FPB Zoology is contacted immediately.

A bright light on our forest floor – Thismia rodwayi *(fairy lanterns)*

Mark Wapstra, Scientific Officer (Botany), Forest Practices Board
Allison Woolley, Conservation Planner, Forestry Tasmania
Fred Duncan, Senior Botanist, Forest Practices Board
Nina Roberts, Project Officer, Forest Practices Board

Thismia rodwayi (fairy lanterns) was a species of plant that we thought we might never get to see. It is Tasmania's only subterranean flowering plant and has seldom been recorded since European settlement.

It is not the sort of species that turns up during routine botanical surveys as its growth habit makes it so inconspicuous it is virtually invisible! Recently the species was recorded by chance by Nick Fitzgerald and Sandy Tiffen on an Understorey Network field day in a proposed coupe on Archers Sugarloaf near Meander.

Figure 2 Searching for *Thismia rodwayi* (not clear on this image but there are in fact three flowers within the excavated leaf litter).

The common name ascribed to *Thismia rodwayi* is 'fairy lanterns'. This name aptly describes the appearance of the small orange and red fleshy flowers that barely penetrate the soil surface and are typically covered by leaf-litter. These brightly coloured flowers are 10-18 mm in length and have an obovate longitudinally striped floral tube (the 'lantern'), surmounted by six perianth lobes - the inner three arching inward and cohering at the top, and outer lobes spreading (Figure 1). The vegetative part of the plant is entirely subterranean and is colourless. The roots are about 1-1.5 mm thick and spread 4-15 cm. They give rise to erect flower stems (0.5-3 cm), which bear about six colourless bracts (these are the 'leaves'), which increase in size toward the terminal flower. The plant lacks chlorophyll and is therefore incapable of photosynthesis. It is considered a saprophyte, although this term is slightly misleading as it derives its energy from a fungus - the fungus being the true saprophyte.

As in most so-called saprophytic plants, the fungal hyphae exist inside some of the root cells of *Thismia* plants, and convert rotting material into sugars using specialised enzymes. The plant can obtain carbohydrates by digesting the fungi (which is known as an endophyte). The fungus inside the cortex cells accumulates fat globules in hyphal bladders, which discharge their contents into their host cells, presumably due to a digestive action of the host. The fat globules appear to be converted into a polysaccharide, probably glycogen.

Thismia rodwayi was first recorded in Tasmania (near Hobart) in 1890 and at that time caused quite a stir amongst botanists around the world because it was one of the first species in the family to be found in temperate climates (most species are tropical and subtropical). Since that first collection, the species had only been found on five other occasions from the Mt Field area, the Little Denison River area, somewhere in the northeast and two further sites on the lower slopes of Mt Wellington (the most recent being in 2002).

Thismia rodwayi is listed as Rare on the *Tasmanian Threatened Species Protection Act*. Prompted by the chance discovery of the species in the Meander area, Forestry Tasmania and the Forest Practices Board conducted a joint survey (assisted by several keen volunteers) for the species within the proposed coupe, in the wider Meander area and a few likely sites elsewhere in Tasmania.

The focus of the surveys was the proposed coupe on Archers Sugarloaf because we were uncertain of the potential impacts of the proposed harvesting and regeneration activities on the species. Searching for the species

involves getting down and dirty on the forest floor - scratching through the leaf litter and upper soil layer with the hands to gently remove the leaf litter to expose the protruding *Thismia* flowers (Figure 2). We found the species to be locally abundant in parts of the proposed coupe (Figure 3), usually associated with damper forest types (dominated by *Eucalyptus obliqua* with an understorey of *Bedfordia salicina*, *Pomaderris apetala*, *Coprosma quadrifida*, *Pultenaea juniperina*, *Pteridium esculentum* and *Blechnum nudum*). The apparently suitable habitat occupied about a third of the proposed coupe. Recognising that this forest type is also common in the wider Meander area, and to provide context for the management of the species within the proposed coupe, further surveys were conducted in the area (Figure 4). Again, we met with surprising success, finding the species at seven out of thirteen sites, all in wet sclerophyll forest dominated by *E. obliqua* or *E. delegatensis*.

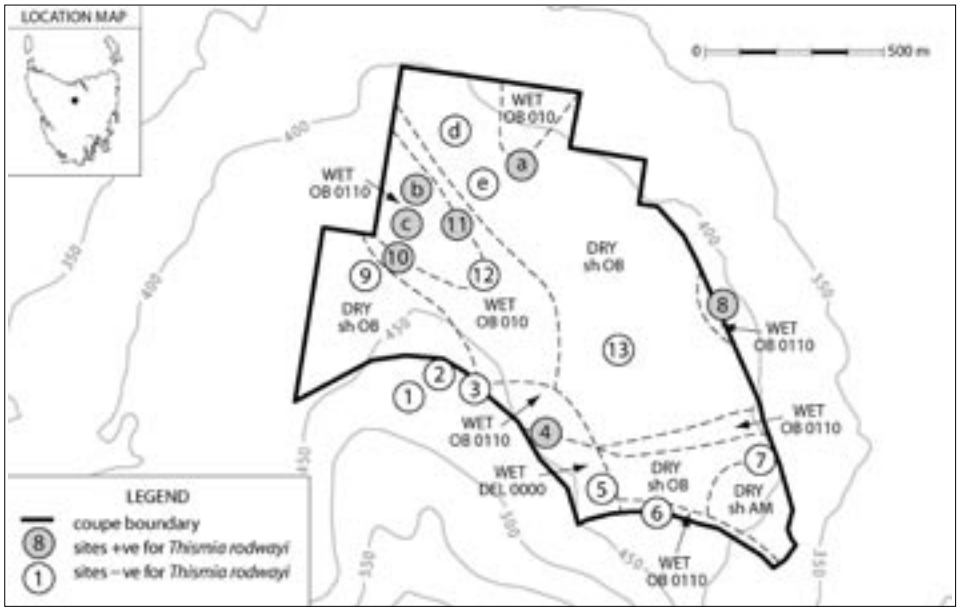

Figure 3 Coupe HU302D with sites searched for Thismia rodwayi and forest communities shown. The forest communities as mapped may contain localised areas of other communities. Numbers and letters refer to sample sites.

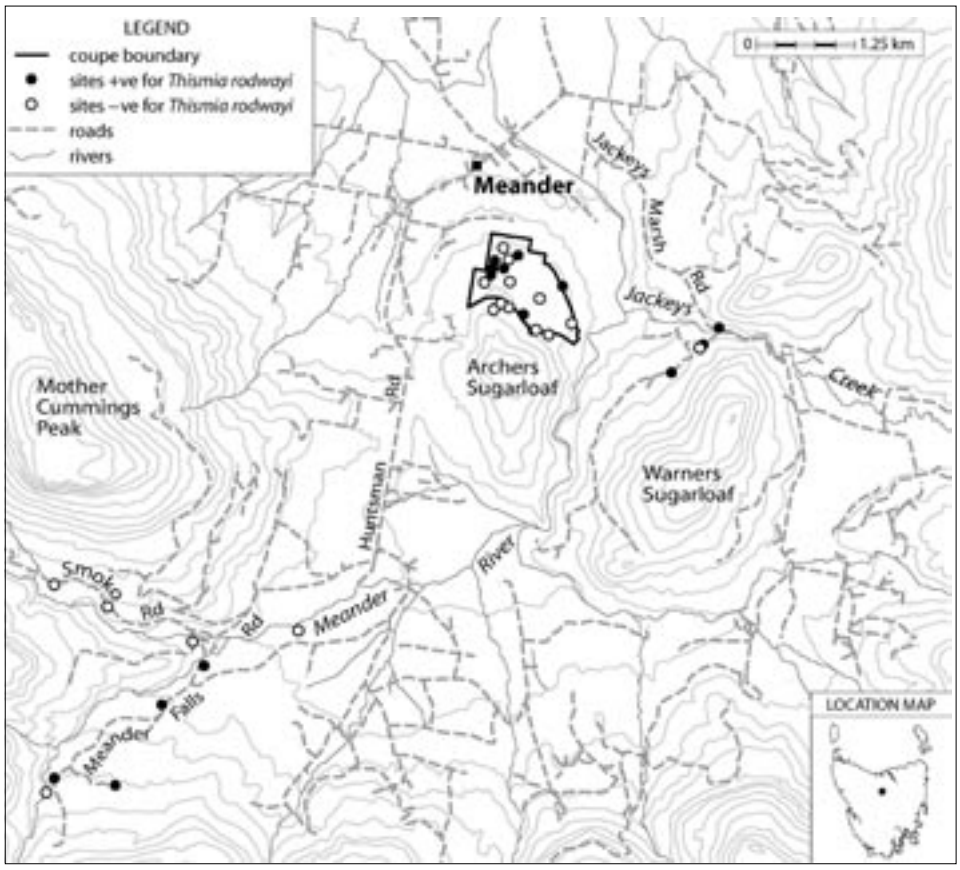

Figure 4 The Meander area, showing sites searched for *Thismia rodwayi*.

Routine botanical surveys will not detect *Thismia rodwayi* due to its cryptic habit – so we contacted several leaf litter invertebrate researchers to see if they had come across this distinctive species. A positive response came from terrestrial snail specialist Kevin Bonham who recalled seeing the species in the Franklin area in the 1980s – further searches confirmed the area supported the species.

We now had part of the "bigger picture" to begin to formulate management prescriptions for the species in areas proposed for logging (see Figure 5 for a distribution map). Almost all the sites supporting the species occurred in regrowth wet sclerophyll forest, usually dominated by *E. obliqua* – regrowth usually had resulted from burning (most sites in southern Tasmania have suffered the ravages of

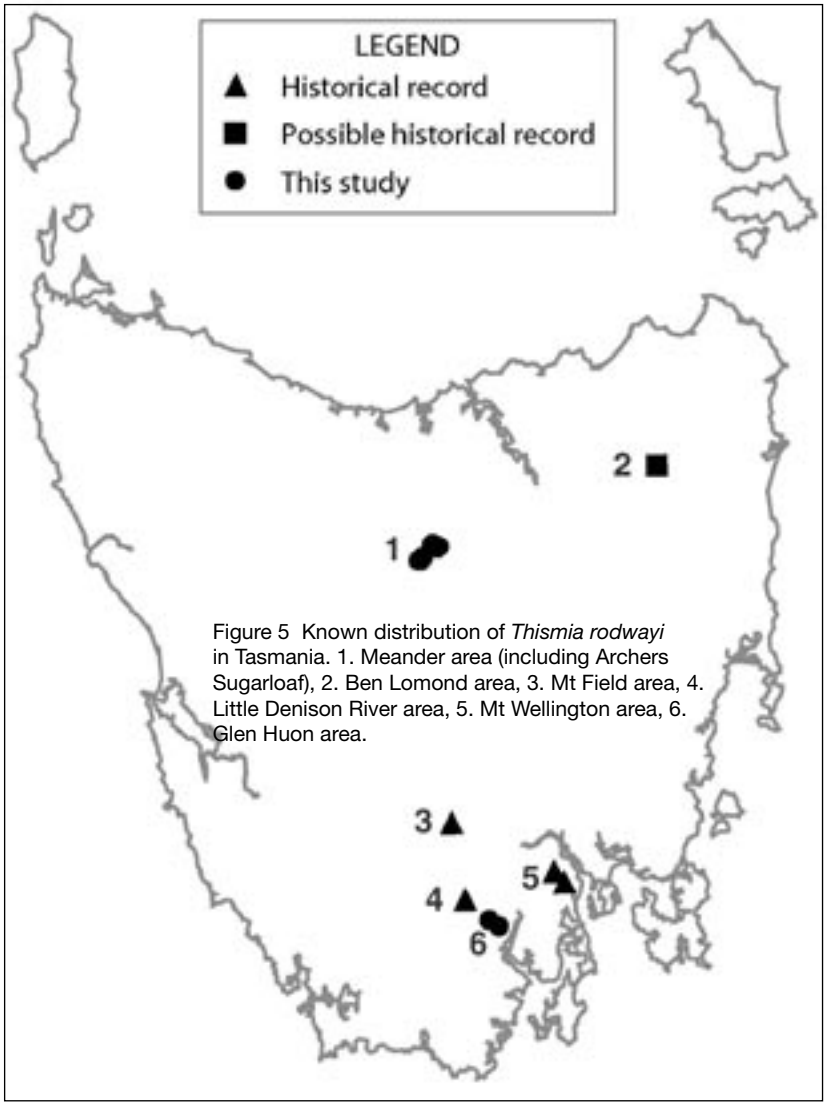

Figure 5 Known distribution of *Thismia rodwayi* in Tasmania. 1. Meander area (including Archers Sugarloaf), 2. Ben Lomond area, 3. Mt Field area, 4. Little Denison River area, 5. Mt Wellington area, 6. Glen Huon area.

the 1969 fires but also probably previous severe fire events) and from logging activities (some sites supporting the species were small remnants of relatively undisturbed forest within or adjacent to logged areas, often associated with streams).

Through a consultative approach between the Forest Practices Board, the local Forestry Tasmania District (Mersey) and the Threatened Species Unit (DPIWE), management prescriptions have been developed for *Thismia* within the proposed coupe on Archers Sugarloaf. The majority of the sites will be protected in sites excluded from roading and logging activities, and the coupe will be resurveyed after logging and regeneration is complete to determine the impact of such activities on the species. Further surveys for the species are planned for this December in the Franklin area to allow broader management prescriptions to be developed for forest supporting the species.

The forest types supporting *Thismia rodwayi* are perhaps the most widespread and well reserved forest types in Tasmania – but they are also the ones subject to intensive production forestry activities. Searching for *T. rodwayi* in all coupes is simply not practical because its appearance is probably governed by seasonal conditions (both current and preceding) affecting soil and leaf litter microclimates and it only appears to flower for a few weeks over late spring to early summer.

We still know precious little about *Thismia rodwayi* – most of the information on the habitat and distribution has been anecdotal, and little is known of its reproductive biology and life cycle. Pollination and dispersal agents, flowering interval and germination conditions are largely speculative. As such, the species remains listed as Rare, and we try to find out more about this unique little plant. If anyone "stumbles" across the species, please forward details to the Forest Practices Board Botany section (or the Tasmanian Herbarium or the Threatened Species Unit of DPIWE) so the site can be investigated.

Further reading

Roberts, N., Wapstra, M., Duncan, F., Woolley, A., Morley, J. and Fitzgerald, N. (2003). Shedding some light on *Thismia rodwayi* F. Muell. (fairy lanterns) in Tasmania: distribution, habitat and conservation status. *Papers and Proceedings of the Royal Society of Tasmania* 137: 1-12.

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(see back page for a plant from a different order that occupies a similar niche in Canada.)

Postscript

Further searching for *Thismia rodwayi* took place in mid-December in the Huon and Mersey Districts. With the willing and able assistance of Huon District staff (Kerri Spicer, Steven Reeve, Peter Garth, Shane Burgess, Amy Hallam (work experience student), Charlie Fisher (work experience student), staff of the Threatened Species Unit (DPIWE) and some volunteers, we located three new sites for the species over two days. Monitoring of the known locations in a current coupe and surrounding areas in the Meander area also occurred (with thanks to Tony Allwright who managed to find this elusive plant at the first site he searched!) The species could not be located at some of the known sites in the Meander area but was abundant at others (including one site with over 20 plants in a 2 x 2 m area).

Book review

Geodiversity – valuing and conserving abiotic nature

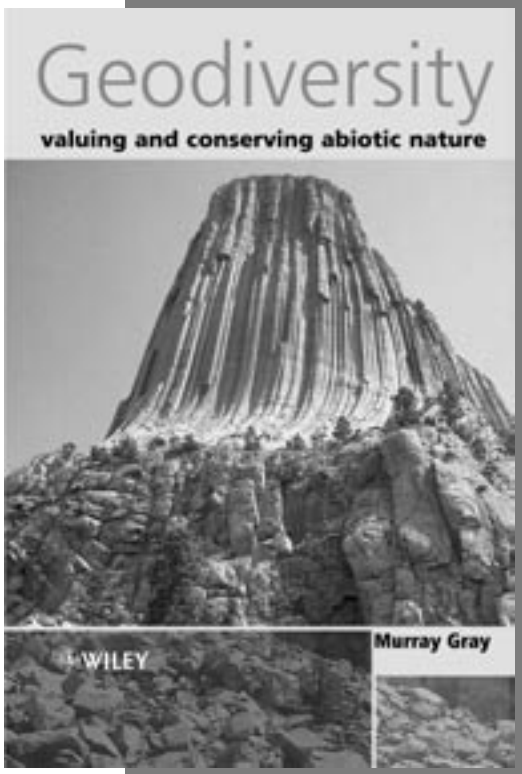
by Murray Gray, University of London

Published by John Wiley & Sons Ltd, London, 2003
PB: ISBN 0-470-84896-0 October 2003 £27.50 $41.30
HB: ISBN 0-470-84895-2 October 2003 £75.00 $112.50

Reviewed by Chris Sharples, Consultant Geoscientist

Forest Practices Officers and others in the Tasmanian forestry industry have for many years been aware of geomorphology as a special values management issue, largely thanks to the pioneering work of the former Senior Geomorphologist, Kevin Kiernan. However, what may not have been recognised by many of those whom Kevin taught to tremble at the mention of words like "karst" or "landform", is that in much of the world the recognition of geomorphic conservation as an important land management and conservation issue has lagged considerably behind the progress that has been achieved in this area in Tasmania.

A new book just published by Wiley puts Tasmanian work in the area now widely referred to as "Geoconservation" into a global context. *Geodiversity – Valuing and Conserving Abiotic Nature* is the first really comprehensive and broad – ranging international text on the ideas and practice of geoconservation to appear. Murray Gray gives a thorough discussion of the reasons for valuing geodiversity and provides an international review of the approaches and progress that have been made in geoconservation in many parts of the world. He concludes the book with a plea for greater recognition of geodiversity as an important focus of nature conservation efforts, as an important value in its own right distinct from biodiversity. At the same time – and not really paradoxically – he argues for the need to integrate geoconservation and bioconservation, for both to be seen as equally essential components of any really comprehensive approach to nature conservation.



The latter, of course, is exactly the approach that some of us have been working towards for over a decade within Forestry Tasmania, the Forest Practices Unit and DPIWE, and the author gives a glowing account of the progress we have achieved in this direction in Tasmania. Whilst the author does not discuss forestry in any detail, but rather mentions it as only one of a wide range of human activities that can potentially impact on geoconservation values, many of the theoretical and practical ideas expressed in the book were developed or elaborated within the Tasmanian Forest Practices Unit during the 1980's and 1990's. For me, perhaps the nicest thing about reading this book was the clear recognition it gives that the approaches we have taken to geoconservation in Tasmania have placed us as world leaders in this area. In essence, the approach we have taken – and achieved considerable success in gaining acceptance for on the Tasmanian scene – is the approach that Murray Gray holds up as the ideal for land management workers elsewhere to emulate.

This book is likely to become a standard text on the theory of Geoconservation globally. With many land management agencies around the world continuing to largely ignore geodiversity, and seeing "nature conservation" as essentially synonymous with "bioconservation" alone, it is to be hoped that this book will lead to a broadening of the focus of nature conservation efforts elsewhere. Whilst the book does not focus on forestry geoconservation management issues – and hence would not serve as a "manual" for implementing geoconservation in the Tasmanian forest context - it does provide an overview of theory and global practice which will prove enlightening for anybody seeking to understand what this thing called "geoconservation" is all about. And for those who came to Tasmania from elsewhere, and found this Tasmanian focus on geomorphology as a nature conservation issue a bit odd and unusual compared to practice elsewhere – you were right! It *was* unusual, because we were leading the world in the implementation of these ideas!

Geodiversity – Valuing and Conserving Abiotic Nature can be purchased from the publisher, John Wiley & Sons Ltd, or is available from http://www.amazon.com .

Geoscience

Coupe Searches – a karstic perspective

Nathan Duhig, Geoscientist, Forest Practices Board; and Chris Sharples, Consultant Geoscientist

To search or not to search: is that the question? In an area of known or suspected karst, the answer is of course yes, but the next question, and most importantly is how?

In a wet forest setting where clearfall, burn and sow (CBS) silviculture is applied, and the Forest Practices Code mandates that cave entrances and sinkhole reserves will be avoided by fire, then even in the low relief setting like the floors of the Florentine Valley or Mole Creek where significant caves are unlikely to be found, careful planning is essential to identify and protect karst features as much as possible, prior to the operation commencing.

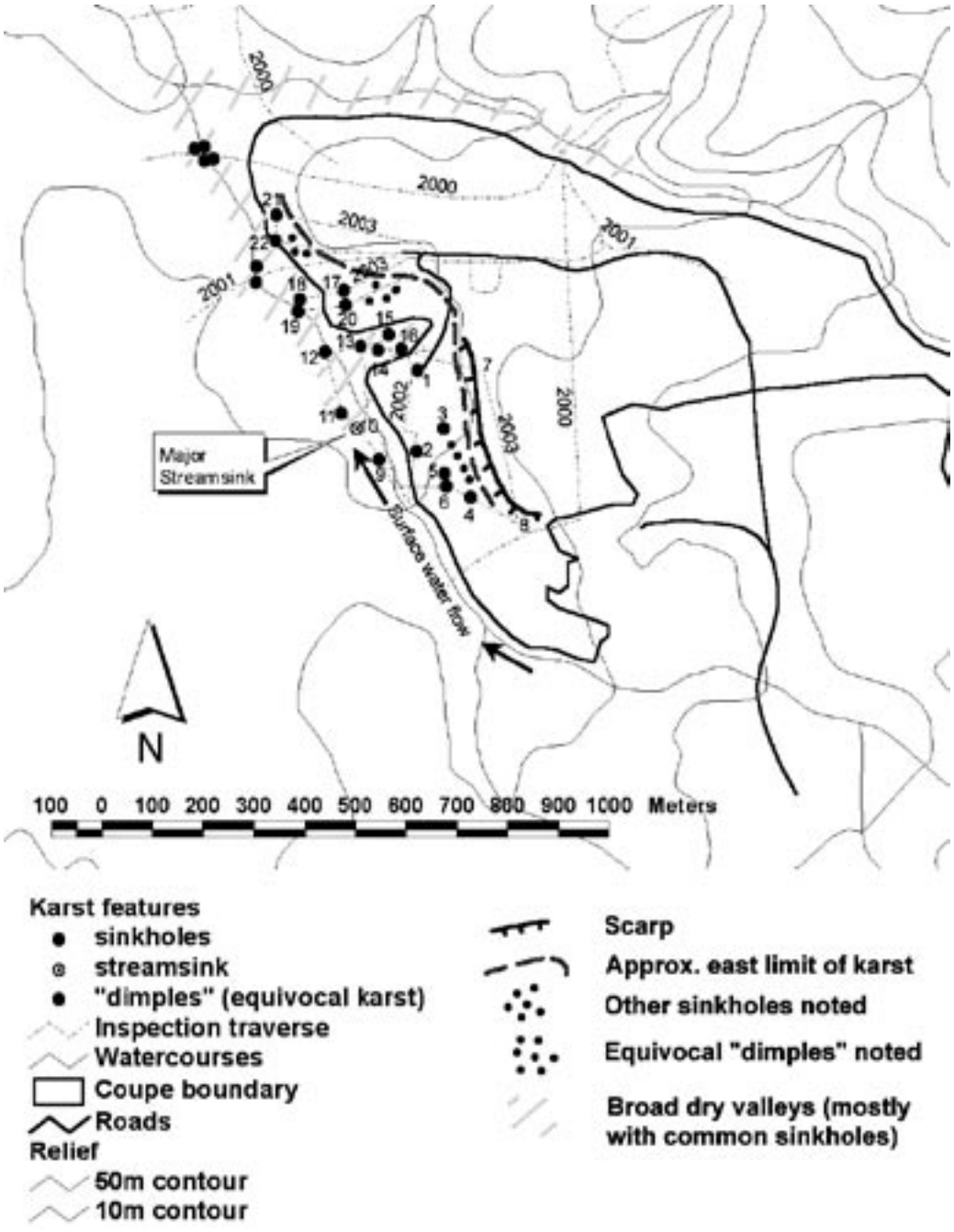


Figure 1: Map of coupe FO026A showing previous traverses (2000, 2001), and the 2002 & 2003 traverses described in this report. No karst features were identified within the indicated coupe boundaries along the 2000 and 2001 traverses, although the bounding creeks (Eden Creek to the west and a tributary to the north) were both found to be large karstic dry valleys. However, a number of sinkholes have been identified within the coupe boundary along the 2002 & 2003 traverse lines.

Paul Griffiths assesses four methods in a short paper for the British Columbia Ministry of Forests (Griffiths, 2003):

a) Reconnaissance (or traverse)

b) Strip (or transect)

c) Judgemental (or feature-oriented)

d) Total (or saturation)

These searching methodologies can of course be applied for any value. Saturation searches require little explanation, and are rarely required, unless one is looking for a lost GPS unit.

Reconnaissance searches are most common for roadlines, or are done by a traverse line across a coupe, often as the first phase of data gathering for a range of values. If the density of features is not the same across the coupe, then this method has obvious failings. They are a useful first step where little is known about the likelihood of values being present and may be useful, for example if they are oriented perpendicular to the regional geological

strike and hence may identify strike ridges that could be a focus for follow-up searches.

Strip, or transect, searches are seen as the obvious alternative, whereby a systematic search is done, often with a three-member team, with one member maintaining a centre line on a fixed bearing, perhaps with a hip chain and two other searchers work in a zigzag fashion on opposite sides of the centre line. Assuming 15 m visibility, centre lines spacing of 90 m can be achieved, and a 100% sample is theoretically possible, though, realistically a 50-80% sample is possible under optimal conditions (Griffiths, 2003).

Judgemental searches are targeted on known associations. Experienced field workers will be familiar with this technique for many other values such as searches for eagle nests or threatened plants. For example, sinking streams (swallets) are often located at upper limestone contacts. Sinkholes are sometimes found alongside limestone outcrops; in groups as clusters or chains; and rarely on steep slopes. Judgemental searchers may appear to be following hunches or acting in an intuitive way, but the behaviour is based upon previous experience that guides them to dart off erratically or unexpectedly.

In a karst setting, reconnaissance searches may be a useful first step, but cannot be relied upon as karst features are rarely distributed consistently across a coupe. In some wet forest visibility is often closer to 5 m, so strip centrelines need to be very closely spaced to achieve anything like a 50-80% sample. Needless to say, this requires a large commitment of personnel.

Judgemental searches may seem difficult to design or undertake without prior experience searching for karst features. However, by seeking advice at an early stage it may be possible to optimise searching opportunities by designing a potentially useful reconnaissance search and a follow-up judgemental search.

A variety of approaches need to be applied. For example, a reconnaissance may identify a bedrock geological control, such as strike ridges. A judgemental search can then follow up along the tops of the strike ridges (which may host cave entrances) and along the sides where sinkholes may be localised. Any suspicious depressions leading away from the outcrops should also be followed as they may lead to another area of karst development.

A judgemental search will usually give enough information to advance to the next stage of planning, sometimes leading to coupe reshaping or change in silvicultural method. Once this is done, a decision can be made about the necessity of committing personnel to a strip search (sic).

There have been a number of coupes in the floor of the Florentine Valley over the last few years where reconnaissance searches have turned up isolated karst features such as sinkholes. These areas and the areas nearby have not been known to be highly karstic. The previous edition of the FPC did not contain as strong protection for cave and sinkhole reserves, so isolated features posed few operational difficulties. Subsequent to reconnaissance searches, both across coupes and along road lines, caves (one less than 10 m from the road centreline) and many more sinkholes have been found during road construction and other preharvest work, such as soils and forest evaluation surveys, rendering some coupes virtually unmanageable by conventional CBS techniques.

Situations such as these have led to a rapid response to this new environment. A new set of karst associations have been made, broadening the knowledge base for the design of judgemental searches. The values of the entire coupe are being assessed, not just road lines, prior to road construction. As searches have intensified more fieldworkers have becoming experienced in karst surveys. Last and certainly not least, there has been a much higher awareness of karst issues amongst logging inspectors and harvesting contractors, leading to much better results on the ground.

Example – FO026a

This coupe, on the floor of the Florentine Valley, provides a good example of how reconnaissance searches may be of limited value. Traverses conducted in 2000 (general reconnaissance) and 2001 (road line reconnaissance) failed to identify any karst features of significance. However, a search in 2002 turned up a number of sinkholes and subsequent searches identified an array of features including sinkholes, caves and a streamsink, in or adjacent to the coupe. What this coupe, and nearby coupes have identified is that large dry valleys and bounding floodplains like those that border this coupe, must become the focus for judgemental searches, prior to road construction.

Reference:

Griffiths (2003) in: http://srmwww.gov.bc.ca/risc/pubs/earthsci/karst_v2/karst_risc.pdf

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*Indian pipes (*Monotropa uniflora*)*

This curious plant was photographed by Peter McIntosh on a recent visit to Canadian spruce forests in Ontario. It is quite a common plant in North America and is sometimes mistaken for a fungus. The flowers are a pale mushroom colour. The roots were traditionally used as a sedative and for nervous conditions. The plant is an angiosperm and belongs to the heather family (Ericaceae), which includes rhododendrons and azaleas. However, *Monotropa uniflora* lacks chlorophyll and obtains energy (carbohydrates) from being parasitic on mycorhizzal fungi which in turn gain energy from a host tree (probably Black Spruce at the photographed location). You could describe the relationship of the tree, the fungus and Monotropa as a *ménage à trois*. There's clearly a lot more going on underground in these shady northern forests than appears at first sight.

Senior Scientist Peter McIntosh is clearly a well rounded scholar. When he is not immersed in studying the mysteries of soils Dr McIntosh indulges his other passion in studying the mysteries of Shakespearean sonnets. Peter has recently published a book on the real author of the sonnets. You will need to read the book to solve the mystery of the sonnets. In the meantime, Peter continues to provide excellent advice on the mysteries of soils to Forest Practices Officers. I am assured that he keeps his two passions quite separate, even though he recently signed a technical soils report as Peter McIntosh, Forest Practices Bard!

FPB staff thoughts while sizing up a potential Christmas tree:

Suzette: It's not Swift Parrot habitat, but are those penguin burrows at the base?

Bruce: It's got lovely form, and pines just aren't part of the character of the beach.

Nathan: It's too big for my lounge room.

Mark: Is it *E. radiata* or *P. radiata*?

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Guidelines for contributors

Forest Practices News is published quarterly by the Forest Practices Board, Tasmania. *FPNews* provides a means for communicating new ideas and developments among those interested in the sustainable management of Tasmania's forests. We particularly welcome contributions from practising Forest Practices Officers. We welcome both feature articles and shorter contributions of even just a paragraph or two. 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. Please ensure that figures/pictures are sent as separate files and not embedded in Word documents. We look forward to seeing you in print in *FPNews*!

Forest Practices Officers: are you moving?

To help us maintain an accurate database and to ensure that circulars reach you, please advise us if you are transferring, resigning or retiring. Thanks.

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