Forest Practices news

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Effective consultation – a key to delivering good outcomes with the rural community

Edith Heiberg, Community Relations Manager, Gunns Limited

The role and responsibility of the forester is expanding as neighbours, councils and communities demand more consultation and input into forestry activities. Many of these people have little or no experience of forestry but they all have an opinion about what should and should not be done.

Documents including the Forest Practices Code and Good Neighbour Charter refer to consultation and the responsibility of foresters in delivering fair and adequate consultation as part of the process for developing an FPP. To some this task comes naturally, but for others it can be daunting, frustrating or intimidating.

According to Gunns Forest Products Community Relations Manager, Edith Heiberg, effective and efficient communication is a skill just like any other, and can be taught.

Edith became aware that seemingly simple responsibilities like knocking on neighbours' doors to notify them prior to burning was causing some foresters unnecessary stress and aggravation. In an effort to ensure the company's foresters could carry out the level of community / neighbour consultation required (in a cost and time effective manner) she devised a tailor-made training programme in consultation, conflict resolution and negotiation.

To go into a conversation unprepared, without having assessed the other parties involved or having planned precisely what you want to say, or knowing how to present the information in a way that the audience can easily understand, can only escalate conflict.

The training programme develops skills in setting objectives and limits for any discussions, asking the right questions to uncover people's needs and motives, setting priorities for negotiations, dealing with aggressive people and, more generally, how foresters should

The black box

Kevin Kiernan, editor, FPN

With this issue we complete three years of *Forest Practices News*. Many thanks to all who have helped along the way, providing articles, suggestions or encouragement.

But after three years it seems appropriate to take stock and consider the future. How might we improve *FPN*, and make it more useful and relevant? We would welcome some more feedback from readers. What are we neglecting and what are we doing well? Should we focus more on practical on-ground matters? Or should we be seeking to improve understanding of forest environments and management considerations more broadly? Would there be value in having a few editions in which all contributions focus on particular themes? If so, what themes? Is it time to re-zap the format a bit or would that just be change for change's sake? Your ideas please!

Of course the critical element in putting a newsletter together is having contributions to publish. We are particularly grateful to those who have already written for us, but there are lots more FPOs out there, a wealth of experience, many stories to tell and insights to share. FPN is not intended to be a sermon from the FPB office, but rather a vehicle for all involved in forest practices to share their ideas, experiences, issues and innovations. We look forward to hearing from you.

contents

conduct themselves in these situations.

The next step will be for each forestry 'team' within Gunns Forest Products to develop their own resource kit to supplement and support the information and arguments they are presenting. This kit could include documents from the National Registration Authority, DPIWE and PFT, plus photos illustrating the accuracy of aerial spaying applications or copies of relevant legislation.

In the forestry industry we are fortunate that most criticisms are predictable and therefore can be planned for ahead of time – but if something new comes up the foresters who have been through the programme will be armed with techniques for managing that situation too.

Edith says the programme helps protect the credibility of foresters because the coordinated responses to the common issues prevents conflicting messages from being disseminated from different parts of the business, which is a real possibility, particularly for the larger companies. It also means foresters can go into their negotiations with increased confidence and so are better able to present themselves and their arguments.

The ultimate aim of the training is to ensure foresters can address the legitimate needs of neighbours and simultaneously dispel some of the myths that underlie many objections and complaints.

Edith has been invited to guest lecture on an annual basis at Melbourne University on community communication. This will ensure each new generation of graduating foresters will come already equipped with the basics for managing the level of consultation required in Tasmania.

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Developments

Classification of Class 4 (headwater) Streams

Fiona Wells, Project Officer, Forest Practices Board

As a new Project Officer, I have recently taken on the challenge of developing a classification for class 4 (headwater) streams over the next year. My project is funded by the FIAT / Forestry Tasmania Research Fund.

Travelling around the state of Tasmania it is easy to note the variation in headwater streams (Figure 1). You may see some display an all year flow with very shallow channels, while others appear to be completely dry for most of the year. This begs the question of whether they should be managed in the same way when it comes to forest practices.

The aim of my project is to initially classify such variation in the headwater streams of the forestry estate based on a variety of geomorphological, hydrological and other environmental characteristics. The next step will be to identify the different environmental risks such streams may be subject to under different forest practices. The issue of when is a class 4 stream a 'drainage line' will also be addressed.

The classification will be conducted at a broad scale and then tested using field measurements collected for representative sub-samples. Ultimately, a key will be developed for forest planners to use when assessing streams during the preparation of an FPP. If anyone would like more information regarding this project, or have interesting examples of streams, please don't hesitate to contact me.

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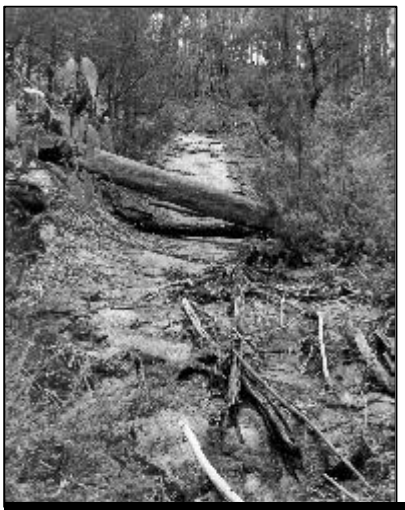

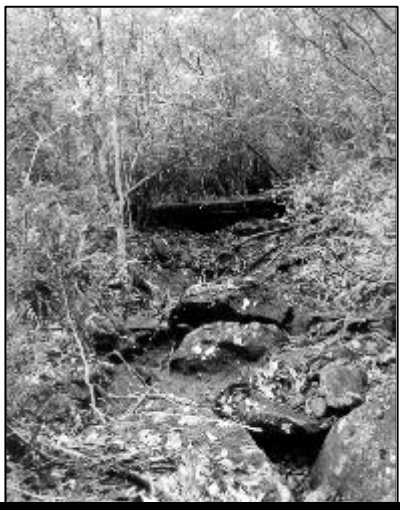

Examples of the variation in Class 4 streams with (a), left, exhibiting a granite bedrock chute, and (b), right, indicating dolerite boulders within the channel. Should these very different types of streams be treated differently in FPPs?

Developments

Field Days

Mark Wapstra, Senior Botanist, Forest Practices Board
Jeff Meggs, Conservation Planner, Forestry Tasmania
Sarah Munks, Senior Zoologist, Forest Practices Board

The forest practices system relies on the skills of people employed within the forest industry to ensure that special values are adequately catered for in forest planning. While planning manuals and research reports provide excellent background information on how to cater for different values, all too often such documents can be "abstract" and difficult to relate to the "real world". Field days are an excellent way of drawing together all available information and exploring possible management options. Field days work best when a range of different people attend including District / Company staff (who have to actually implement the specialist recommendations), Forest Practices Board specialists (who need to understand the operational issues), and specialists from other agencies such as DPIWE (who often administer the legislation related to special values).

Several field days for forest planners in different regions of the State have been held to discuss the identification and management of threatened fauna habitat (e.g. ptunarra brown butterfly, giant freshwater crayfish, grey goshawks and eagles). The first of the ptunarra brown butterfly field days was in the Central Highlands for staff of Boral Timber (now Gunns). On this particular field day a new colony of the species was actually located by Forest Practices Officer Craig Hawkins (see *Forest Practices News* July 1999). The most recent field day was aimed at foresters working in the Midlands and the Central Highlands. About 9 foresters attended along with staff from Forestry Tasmania Conservation Planning, Forest Practices Board and DPIWE. The day was run in conjunction with Phil Bell of the Threatened Species Unit (DPIWE) and focussed on habitat and species identification. The success of the day was measured by a call on the radio just after the field day ended by one of the attendees saying he had found some ptunarra brown butterflies in an area he was assessing!

Participants in a field day on the management of the northwest grasslands listen to Louise Gilfedder and Fred Duncan explain how botanical transects were used to collect data.

More recently, a field day was held in Mersey District to discuss management of the threatened *Eucalyptus radiata* (see *Forest Practices News* February 2000). The field day resulted from the recommendations of a study commissioned by the District into the distribution and conservation requirements of *E. radiata* by Katriona Hopkins (Consultant Botanist). It was attended by a variety of stakeholders including Mersey District planning staff, Forestry Tasmania Conservation Planners, the Forest Practices Board Senior Botanist, botanists from the Threatened Species Unit (DPIWE), PWS District staff, and North Forests Burnie staff.

The field day served two important purposes. It enabled specialists to train field staff in the identification of *E. radiata* on the ground using a field guide developed by Katriona as part of her project (a difficult task given that *E. radiata* forms part of species complex with *E. amygdalina* and *E. nitida*). It also enabled a free and open discussion on the various management options for the species across its range, including the possible implications of these options on both the conservation of the species and on the strategic and operational requirements of the forest industry. This discussion was greatly enhanced by actually being out in the forest viewing 30 year old *E.radiata* regenerating after clearfelling, and by visiting a planned coupe where *E. radiata* management may be an issue. The field day has led to a clear understanding by all parties of what further steps are required to develop management strategies and prescriptions for the conservation of the species and to resolve the forest industries' planning issues in this area in a timely manner.

If your District or company would like a field day to discuss a particular issue, or to train staff in habitat identification and management of a particular value, please do not hesitate to contact the relevant specialist at the Forest Practices Board or, for State forest the Conservation Planning Section at Forestry Tasmania.

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Developments

Careful plantation roading protects karst catchments

Peter McIntosh, Senior Soil Scientist, Forest Practices Board

In some areas of the central northwest ideal soils for plantations are developed in basalt that overlies limestone. Streams begin as springs in the soils formed in basalt but downstream they flow through limestone country and some flow through caves. This is the case for the basalt country around Preston, where many of the headwater streams flow south and west to Gunns Plains, some through limestone caves.

Figure 1

Roads are well known to be the main source of erosion in commercial forests. There is potential for plantation development to increase sedimentation in streams and therefore in caves. The risk to damage to the Gunns Plains caves has been greatly lessened by exemplary road construction in Forest Enterprises Australia's Preston property. Firstly, roads were cut during the summer. Roadlines were designed to minimise the necessity for sidecutting. Roads were gravelled very soon after being cut. Great care was taken to stabilise table drains and culvert openings.

Figure 1 shows a culvert outlet in course of construction. The outlet has been protected with boulders to prevent fill entering the culvert. The outlet channel has been lined with stones to slow down the water and to trap sediment.

Figure 2 shows a finished table drain and culvert inlet. Basalt boulders and stones have been hand-placed in table drains to slow water and trap sediment. The culvert inlet is lined with stones to prevent erosion during storms.

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Figure 2

Board & Advisory Council report

Graham Wilkinson, Chief Forest Practices Officer

New policy developments

The following matters are being developed in consultation with the Forest Practices Advisory Council and other stakeholders.

Regulation of forest clearing – The objective of the *Forest Practices Act* is to achieve the sustainable management of our forests. Currently, the Act is applied to 'commercial' forestry operations (where timber products are removed), but has excluded 'non-commercial' forest clearing such as where forests are pushed up and burned without the removal of timber products. This form of clearing has only occurred at very minor levels within Tasmania. Nevertheless, it represents a potentially serious 'loophole' in the overall approach of the State to maintaining a permanent forest estate and protecting vulnerable land, such as streamside reserves.

The Government has agreed to review the policy on the permanent forest estate and to extend the forest practices system to cover all forest clearing. The proposed system will not necessarily preclude clearing of forest for infrastructure or further agricultural development. However, it will ensure that all forest clearing is consistent with maintaining the thresholds for the permanent forest estate. Furthermore, all clearing will be subject to the Forest Practices Plan process in order to ensure uniform environmental assessment and standards.

Board & Advisory Council report

The policy changes will involve continuing consultation with the key stakeholder groups.

Tree Fern Management Plan- Agreement has been reached with the Department of Primary Industries, Water and Environment and the Commonwealth to provide for the regulation of tree fern harvesting under the forest practices system. Currently, persons wanting to export tree ferns need to obtain an export licence from the Commonwealth. The Commonwealth has indicated that it will not permit exports unless the harvesting is carried out in accordance with an endorsed management plan that provides an appropriate regulatory framework. At present, most harvested tree ferns end up in the Victorian market. However, the fern industry has lobbied for access into the very lucrative and environmentally-demanding European market. The proposed management plan will only allow for the commercial harvesting of tree ferns as salvage from areas being cleared for plantation, farmland or other non-forest use. Harvesting of tree ferns from other forests will not be permitted unless future research determines that a viable resource can be harvested on an ecologically sustainable basis. All harvested ferns will need to be tagged in the forest and provisions will need to be contained within Forest Practices Plans. A levy will be charged to cover the cost of regulation, monitoring and further ecological research.

Dispersal of plantation coupes – The Forest Practices Code contains guidelines with respect to the dispersal of coupes in native forests. For plantation development, the Code states that dispersed harvesting should be considered and that large blocks of plantation established at a similar time should be managed to improve dispersal over subsequent rotations. In practice, the dispersal of plantation coupes has been difficult to achieve for several operational reasons, including -

- Limited roading access in native forests that are being converted to plantation
- Cost of 'holding over' cleared land that has been purchased for plantation
- Financial maturity of existing plantations that are already located within large aggregates
- Preferential scheduling of existing plantation aggregates to achieve uniform products for processing purposes.

Despite these challenges, good dispersal should be pursued in order to ameliorate impacts on values such as water yield, water quality, biodiversity and visual management. Draft guidelines have been prepared for further discussion with the plantation sector.

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New resources

Forest Botany Website and Botany Manual Update

Brian French, Project Botanist, Forest Practices Board

After many months of scanning and sorting of hundreds of plants, the FPB botany section of the website is finally up and running. The site can be accessed via the FPB web page (www.fpb.tas.gov.au); click on research and advisory programs to access the botany page. The site currently contains planning tools (Plant species ID kit), training course information, publications (Botany program annual reports and FP news articles), research, and monitoring program information. The website should become a valuable aid for FPOs in species identification and keying out of forest communities. The site contains approximately 800 native and introduced plants. The plants are divided into categories, eg. Wet Forest species, Dry Forest species, Eucalypts, and for ease of identification, all species are listed by scientific and common names. If any FPOs have any plant specimens that they think should be added to the site, please feel free to send them down (or scan and e-mail). Please tell us how we can improve the site and any particular information that you would like to be added in the future.

The Forest Botany Manuals are now in their final edit and will be released during the mid year period. Following the release, field days will be held instructing the use of the manuals and the keying out of forest communities. The dates of the field days will be advised shortly.

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Noticeboard

Forward training program – Forest Practices Board

Confirmed and proposed training 2001

Course (Contact)	Timing	Duration	Location	Course Content
Forest botany (Fred Duncan)	July 11 2001	1 day	Hollybank	Course for people doing Diploma of Forestry, but also suitable for others wanting a background in Tasmania's vegetation and identifications of forest species.
Forest Practices Officer course (Chris Mitchell)	July – Sept. 2001	12 day	Various locations	Pre-requisite course for appointment as FPO
Risk assessment (Chris Mitchell)	July / August 2001	1 day	1 each in north west, north, and south	Train selected FPOs to complete a safety risk assessment for trees retained under the FP Code
Forest practices training for supervisors [1] (Chris Mitchell)	July / August 2001	4 day	Orford?	General training in forest practices for FT and other supervisors
Forest Practices Manager training (Chris Mitchell)	To be confirmed	2 days	To be confirmed	Update forest managers on requirements of the forest practices system
Integrated Karst Management (Kevin Kiernan)	To be confirmed	1 day	To be confirmed	Train FPOs who work in karst areas on fauna, cultural heritage and geomorph-ological requirements
Forest Botany Manuals (Fred Duncan)	To be confirmed	1 day?	Various locations	Train FPOs in use of the new Botany Manuals
Cultural Heritage refresher course (Denise Gaughwin)	Oct. or Nov. 2001	1 day	1 each in north, north west, and south?	Upgrade skills in cultural heritage management. Prerequisite is prior competency in cult. heritage (archaeology) course

[1] One or two courses, dependent on demand

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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. We particularly welcome contributions from practicing FPOs. 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. We look forward to seeing you in print in FPN!

Feature

A Multipede Ignorance Map

Bob Mesibov, Forestry Tasmania

'Multipedes' is a collective term for centipedes, millipedes and velvet worms, all of which are long and thin and have lots of legs. Multipedes aren't very fussy, generally speaking, about what kind of forest they live in, but they often have small geographical ranges with sharp edges. This makes them ideal tools for studies of Ice Age refuges, dispersal barriers and other biogeographical matters.

It also makes multipedes hard to conserve. You can't safely predict that multipede A is living in forest patch X because it was found in similar-looking forest patch Y, 10 km away. Between the two forest patches there may be a barrier that A doesn't cross (see *Forest Practices News*, August 2000). The barrier is invisible to you, but not to the multipede. The only way you can be sure that A is in X is to look for it.

Multipedes have been looked for in a great many forest patches and other habitats in Tasmania. At the end of 2000, there were museum specimens from nearly 2800 different 100 m grid squares in Tasmania. In the accompanying map I've simplified the data set by showing the 1 km squares which yielded at least one multipede species in the last 25 years.

I call this a 'multipede ignorance map' because the important bits are the blanks, where there are no multipede records at all. As you might expect, these multipede blanks correspond fairly well with the blanks for many other forest invertebrate groups. Some places have been 'done to death' by collectors (like the Cradle Mountain area), while others might as well be in Mongolia, for all we know about their invertebrate fauna.

Worse still, those blanks are rich in vulnerable forest patches — bush remnants in a cleared landscape. In 1999 I looked at a list of bush remnants identified during the RFA process (Bass Strait island remnants excluded). Of 632 remnants, 155 were at least 10 km from a well-defined record for any aquatic or terrestrial invertebrate. Even more surprising, most of the 155 were within 75 km of Hobart. (I guess Cradle Mountain is a lot more attractive as a field site than Campania!)

Have a close look at the map. If you're preparing an FPP for a block of land in the middle of a blank, please contact either Sarah Munks (FPB) or myself. Funds may be available for a quick but much-needed invertebrate survey of the block. The survey is unlikely to turn up a threatened species, but the species records will be very valuable.

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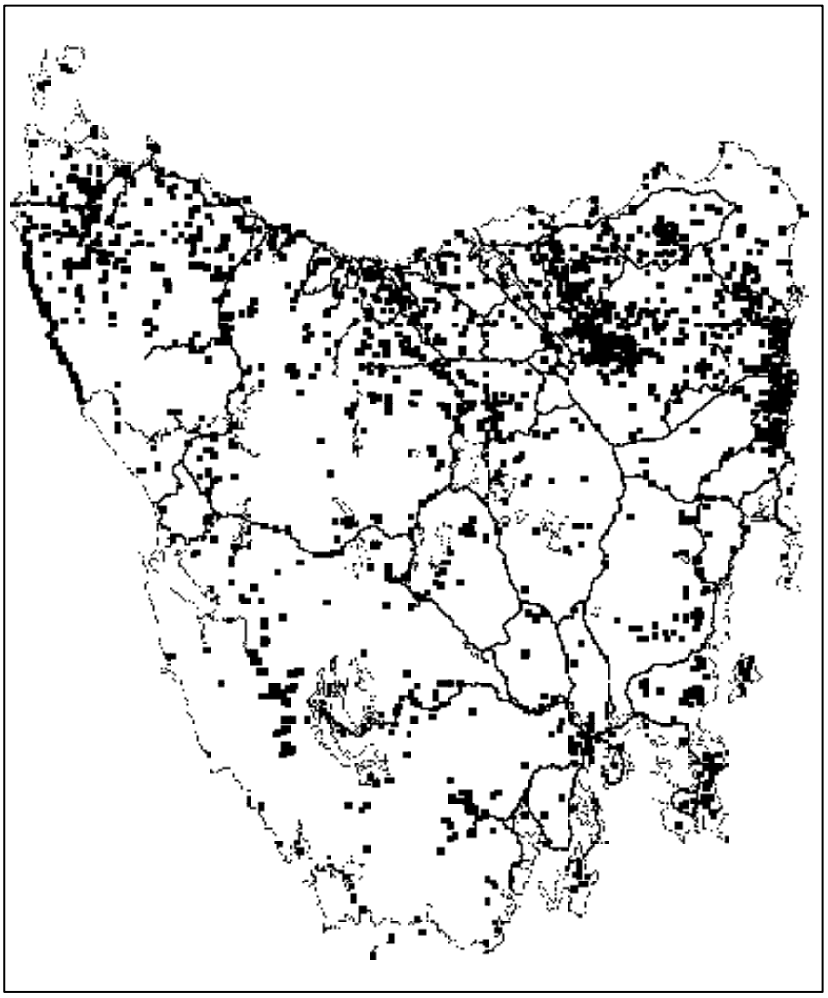

Travel log

Kuda Kuda in the swamp forests of Sarawak

Graham Wilkinson, Chief Forest Practices Officer

In February I was invited to give a paper on our forest practices system to an international conference in Kuching, Sarawak. Tasmania's system is very much regarded as a world leader and there was particular interest in how we foster a partnership approach among the various stakeholders to achieve good outcomes through cooperation and continuing improvement. It was very evident from developing nations that the introduction of codes of practice will not succeed unless the code has the support and ownership of landowners, governments, the forest industry and local communities.

Kuda kuda logging in the swamp forests of Sarawak – the logging crew pushes the log along the corded track.

It was also evident to me that this support is best built up through the development of partnerships built on mutual trust and the sharing of resources and expertise. Heavy-handed regulation has been spectacularly unsuccessful. A paper by Chris Bennett provided a graphic example - between 1967 to 1999 Indonesia had 916 forestry-related laws and decrees, with 58% of these still in force. Bennett notes that this plethora of laws has not produced good outcomes in the forest. Forest cover declined by 14% or 17.4 million ha over the period from1985 to 1997 and Bennett believes that there are continuing problems in implementing sustainable forest management practices over remaining areas of forest.

Whilst in Sarawak, I was fortunate to be able to visit the logging of swamp forests. Malaysia has very advanced forest management systems in place, with excellent GIS data and sophisticated logging technology such as helicopter logging. It also has some more unique harvesting techniques such as the kuda kuda. This system is applied in the swamp forests, which have standing water over much of their area similar to our blackwood swamp forests. Corded tracks are manually built in the forest and logs are manually placed on skid carriages and pushed along the greased tracks to a landing. At the landing the logs are manually pushed onto carriages and hauled out along small tram tracks. Kuda kuda has obvious environmental advantages, with virtually no ground disturbance or interference with natural drainage patterns. Obviously, the system relies upon very cheap and willing labour!! So whilst not practicable for our swamp forests, I think the principles are highly relevant.

Logs are hauled out of the forest by trams (when not hauling international foresters).

Travel log

Kuda kuda track- interconnecting tracks are constructed by hand to every tree that is to be harvested.

In our wet forests, the use of cording and matting gives similar benefits in terms of reducing impacts on soils and water values. The Forest Practices Code 2000 states that "snig tracks should be corded or matted during construction in wet areas". Some contractors are doing excellent work with cording and matting and these contractors should be congratulated. I would encourage all Forest Practices Officers and contractors who are not familiar with the techniques to visit operations where cording and matting is being done. Increasingly, we should be asking the question "if cording and matting is not done being done in appropriate situations, why not" ?

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Flora

What's in a name?

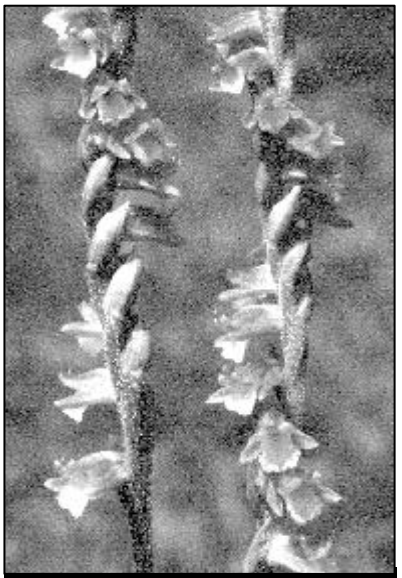
Mark Wapstra, Senior Botanist, Forest Practices Board

Tasmania is home to over 2500 different plant species. And working in the forest industry, it is impossible to avoid having to refer to at least a few of them! Referring to plants by a familiar (or common) name has its advantages. For example, most bush workers know what blue gum is, but maybe not all would know what *Eucalyptus globulus* is. And not everyone would know what *Pomaderris apetala* looks like, but use the common name of dogwood and most people would once again know the plant (except those people who refer to it as native pear).

In the last issue of *Forest Practices News*, we used orchids to illustrate some plant-animal interactions. I will also use this diverse plant group to answer the question "What's in a name?". The term orchid itself comes via Latin from the Greek word *orkhis* meaning testicle, so-called from the shape of its roots.

The common names of Tasmanian orchids are almost all descriptive of the shape of the flower. Perhaps some of the most aptly named groups are the greenhoods (*Pterostylis* species), a name derived from the characteristic "hood" shape of the flower that is almost always green; the spider orchids (*Caladenia* species), a name derived from the large flowers with long, tapered or filamentous segments usually densely covered with variously shaped and coloured glands; and the beard orchids (*Calochilus* species), named after the distinctive labellum (modified petal) covered in colourful calli and hairs resembling a beard.

But if we were to simply refer to a plant we saw as a greenhood, it does not tell us much about the species, what it looks like, where it



Spiranthes australis
(pink spiral orchid)
The generic name is derived from the Greek speira (spiral) and anthos (flower), referring to the spiral arrangement of the flower spike; the specific name means southern. Photo: H & A Wapstra

Flora

Chiloglottis triceratops (three-horned bird orchid)
The generic name is derived from the Greek cheilos (lip) and glottis (mouth of the windpipe), referring to the similarity of the labellum and callus to the human windpipe; the specific name refers to the well-known 3-horned dinosaur, in reference to the arrangement of the 3 basal calli on the labellum. Photo: H & A Wapstra

occurs, or anything of its biology. Fortunately, most plants species usually have a common and a scientific name. And as with the example of *Eucalyptus globulus* / blue gum. Which name has most meaning depends a lot on your audience. Sometimes common names help us picture a species: the nodding greenhood (*Pterostylis nutans*) has a relatively large flower with a distinct nodding habit; the bearded greenhood (*Pterostylis plumosa*) does have a "beard" (a labellum with distinct yellow hairs) and the marsh greenhood (*Pterostylis uliginosa*) does indeed grow in wet habitats such as buttongrass moorland and sedgeland. But often common names do not reveal much about a plant (or much useful in distinguishing it from other species). For example, the summer greenhood (*Pterostylis decurva*) does have a flowering period between November and March i.e. summer but so do many other species; the Snug greenhood (*Pterostylis atriola*) does occur at Snug Plains in the State's southeast but it is also known from a few other widely separated near-coastal localities; and the tiny greenhood (*Pterostylis parviflora*) is indeed very small but so are several other closely related species.

But the picture we get from a scientific name can also be as useful or confusing as using a common name. In the examples given above for instance, the nodding greenhood's specific name of *nutans* means nodding so both the common and scientific name allow us to picture the plant. But the name Snug greenhood was applied because the type specimen (i.e. the specimen from which the species was described) came from Snug Plains; its specific name of *atriola* really only has meaning to a botanist as it refers to the narrow frontal opening of the flower.

The names of some orchid species are descriptive of the plant's ecology. Perhaps the best example of this is the fire orchid (*Pyrorchis nigricans*). The generic name *Pyrorchis* is derived from the Greek *pyr* (fire) and *orchis* (to indicate an orchid). The common name refers to the abundant flowering habit of the species in burnt habitats. Interestingly, the specific name *nigricans* refers to the plants habit of becoming black when pressed. The specific name of the recently described forest fingers (*Caladenia sylvicola*) literally means inhabiting forest, and the habitat of the sagg spider orchid (*Caladenia saggicola*) is aptly reflected in its specific name, literally referring to its habitat of forest dominated by saggs (*Lomandra longifolia*).

Several genera and species of orchids have been named after someone, often the discoverer. While such names do not tell us much about what the plant looks

Pyrorchis nigricans
(fire orchid or red beaks)
The generic name is derived from the Greek pyr (fire) and orchis (indicating an orchid), referring to the abundant flowering habit of the plant in burnt habitats; the specific name nigricans refers to the plants habit of becoming black when pressed. Photo: H & A Wapstra

Flora

like or how it grows, it does sometimes tell us about how it was discovered and a bit about its history. For example, Paterson's spider orchid (*Caladenia patersonii*) is named after Colonel William Paterson. Perhaps not so interesting until the history behind the name is revealed. Robert Brown named the plant after his friend and fellow plant collector Colonel William Paterson who discovered the species at Port Dalrymple (now George Town). Robert Brown, a Scottish army surgeon, represented the botanical interests of Sir Joseph Banks back in London. He first travelled to Tasmania on board the Matthew Flinders' *Investigator* in 1803 and then again on the *Lady Nelson*, landing at Port Dalrymple on New Year's Day 1804. A quick scan of a census of Tasmanian plant names reveals much about the botanical history of the island with the same names appearing in generic and specific names of plants (e.g. Banks, de la Billardière, Gunn, Brown, Hooker, Archer). More recently, some of the recent discoveries of new species of orchids have been named after local identities such as *Pterostylis rubenachii* (after Les Rubenach, orchid specialist and photographer), *Caladenia tonellii* (after Peter Tonelli, naturalist and photographer of Tasmanian orchids and collector of type specimen), *Pterostylis wapstreorum* (after Hans and Annie Wapstra, Tasmanian orchid specialists and collectors of type specimen) and *Pterostylis ziegeleri* (after David Ziegeler, a name familiar to many readers).

So, what's in a name? At first glance, perhaps not much. But when we take a closer look, a lot can be revealed about a particular species, perhaps what it looks like, how it grows, who discovered it or how it grows. A rose by any other name may smell as sweet but we won't know what it looks like! And should we use a plant's common or scientific name in our conversations? The answer to that question largely depends on your audience (in the Forest Botany Manual, a combination of both names have been used for this reason). For anyone wanting to become more familiar with Tasmania's forest flora, visit the new botany program web page at www.fpb.tas.gov.au (see information this issue of *Forest Practices News*).

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Fauna

Plantation Design and Fauna Conservation: Summary of a Workshop

Sarah Munks, Senior Zoologist, Forest Practices Board

Plantations are becoming an increasingly common feature in landscapes throughout Tasmania. Although the state's reserve system goes a long way toward conserving our bio-diversity, off-reserve conservation needs to be encouraged at every level and opportunity as many fauna habitats, particularly those of threatened fauna remain poorly reserved (draft framework for Tasmania's nature conservation strategy, March 2000). A 'local level' approach is also required to avoid the negative effects associated with the restriction of species in isolated reserves. This requirement for off-reserve conservation includes areas being developed as part of Tasmania's plantation estate and preliminary guidelines have already been developed for the conservation of bio-diversity in areas of state forest being converted to plantation.

A one day workshop 'Fauna Issues and Plantation Design' was held at the CRC for Sustainable Production Forestry in June 2000 in order to review and discuss related work being carried out at Tumut in southern NSW and preliminary work here in Tasmania. The aim of the day was to identify the issues and ways to adapt current design and management of plantations for better fauna conservation outcomes.

The papers presented at this workshop highlighted the complexity of the issue and the difficulty of developing simple rules to balance the requirements for fauna conservation with the requirements of an increased plantation estate. It was recognised that only one element of Tasmania's natural diversity ie., fauna, was considered at this workshop and that the development of any prescriptions for the design of the plantation estate needs to take into account other elements eg., flora, geo-diversity, freshwater systems, landscape values etc.

The key speaker at the workshop was David Lindenmayer from the Centre for Resource and Environmental Studies, ANU. David presented work on the effects

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of fragmentation on populations of arboreal marsupials and birds at Tumut in south-eastern Australia. This region is characterised by a 45 000 ha plantation of exotic Monterey Pine (*Pinus radiata*) trees with patches of remnant *Eucalyptus spp*. The results of this work provided valuable information on the effect of plantation establishment on mammals and birds. The work highlighted the value to fauna of retained remnant patches and linkages (including riparian zones) of native forest in the plantation area both at the local and landscape scale. Areas of remnant eucalypt forest appeared to be valuable refugia for some species of arboreal marsupials and eucalypt fragments of all sizes and shapes had significant conservation value for birds. They contained many native species of birds, some of which were more abundant in fragments than they were in continuous eucalypt forests. Remnant patches also increased native bird populations in nearby non-native pine plantations.

Some recent work on the occurrence of leaf litter invertebrates in plantations was raised by a member of the group which also supports the value of retaining remnant patches of native vegetation in the plantation matrix (Bonham, pers. comm.). The long-term viability of such retained areas of native forest in some areas where plantations are being established in Tasmania was raised as a concern. The group recommended that the long-term viability and management of remnants needs to be taken into account when establishing new plantations. The importance of adapting the management of plantations to maintain understorey structure to enhance habitat value was also discussed.

One major concern raised was the conversion of continuous areas of native forest to plantation in Tasmania. Two presenters (Penny Wells and Rob Taylor, Forestry Tasmania) noted that as an outcome of the Regional Forest Agreement Forestry Tasmania is increasing its establishment of plantations on State forest and that this includes both conversion of native forests and development of already cleared land. The question of whether or not the objectives of both fauna conservation and the increased plantation estate in Tasmania would be best balanced by expanding existing plantation or by having a scatter of new plantations in the native forest landscape was raised. It was recommended that a risk management assessment should be undertaken to assist with planning the placement of new plantations in a particular landscape similar to the work carried out for plantation development in the range of the keeled snail, *T. lamproides* in the NW of Tasmania. The need for more information on the range and habitat requirements of sensitive species (those likely to be negatively effected by plantation establishment) was emphasised.

Two presentations by Clare McArthur and Kirsten Le Mar from the CRC for Sustainable Production Forestry highlighted the emerging conflict arising between the design of new plantation coupes to reduce impact from browsers (and hence the need to use 1080) and the design recommendations to maintain fauna diversity at the local level. It was suggested that in areas where populations of non-target species are low there may be opportunities for a trade-off between the need to reduce browsing pressure and general fauna conservation. However the group flagged the need for more work on the distribution of non-target species in the landscape and more work on the long-term impact of 1080 on populations of non-target species.

The talks revealed that there is information available which can be used in the development of general principles and recommendations for the design of plantations to aid fauna conservation in a particular landscape in Tasmania. However, the specific design of the plantation / native forest mosaic in any plantation node (where and how much) is limited by the dearth of information on the distribution and characteristics of habitat utilised by sensitive species in Tasmania. Such information is urgently required to ensure the conservation of such species. Monitoring programs also need to be developed and implemented to test and refine the current guidelines.

Recommendations were developed from information presented at the workshop as a basis for more prescriptive guidelines to be delivered through the Forest Practices System. They outline ways in which plantations may be designed and managed to achieve improved conservation outcomes for fauna in landscapes dominated by existing plantations or being developed as new plantations.

For the workshop abstracts and the principles and recommendations which were developed see:

Munks and McArthur (Convenors and Editors)(2000) Plantation design and fauna conservation in Tasmania *Tasforests*, 12, 161-180.

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Soils

Are some managed native forest soils sulphur deficient?

Peter McIntosh (Forest Practices Board) and Mike Laffan (Forestry Tasmania)

Sulphur is an essential plant nutrient, but in most soils is derived entirely from atmospheric additions rather than by soil weathering. On a regional level rainfall analysis (Martinick 1974) shows that atmospheric sulphur (S) additions in Tasmania are related to distance from the west coast: S concentrations in rainfall in Swansea are 0.54 ppm, compared to 0.77 ppm in Strahan. This distance-from-the-sea effect, combined with the higher rainfall at westerly sites, means that places like Smithton and Strahan receive 11-12 kg/ha S per annum in rainfall whereas Campbell Town and Swansea receive 3 kg/ha S per annum. A similar trend of 12 kg/ha S deposition near the coast and <2 kg/ha S deposition inland was also noted by Boswell et al. (1993) in New Zealand. In recent projects undertaken by the Forest Practices Board, both independently and jointly with North Forest Products, Gunns and Forestry Tasmania, a number of previously undescribed or poorly-characterised soils have been described and analysed. Sulphate-S (SO_4-S) analyses showed up some differences between soils (Table 1).

Even inland soils receive about 3 kg/ha S from rainfall, and if we assume these soils became stable about 10 000 years ago, at the end of the last glaciation, these soils should have received about 30 tonnes/ha of S. In fact, assuming the soils contain 1mg/kg SO_4-S in profiles to 1 m depth, and have 1.5×10^4 tonne/ha of fine soil, these soils contain only 0.015 tonne/ha S in the sulphate

SOIL 1		***SOIL 2***		***SOIL 3***		***SOIL 4***		***SOIL 5***	
Brown gradational clayey soil in dolerite under wet forest (Florentine Valley)		Red-brown uniform clayey soil in dolerite under wet forest (Florentine Valley)		Texture-contrast soil in dolerite under dry forest (near Buckland)		Gradational soil in Permian fine sandstone under dry forest (near Lake River)		Deep sandy soil in Triassic sandstone under dry forest (near Buckland)	
Rainfall c. 1200 mm		Rainfall c. 1200 mm		Rainfall c. 600 mm		Rainfall c. 850 mm		Rainfall c. 600 mm	
Depth (cm)	*SO_4-S (mg/kg)*	*Depth (cm)*	*SO_4-S (mg/kg)*	*Depth (cm)*	*SO_4-S (mg/kg)*	*Depth (cm)*	*SO_4-S (mg/kg)*	*Depth (cm)*	*SO_4-S (mg/kg)*
0-10	**31**	0-3	**30**	0-21	**1**	0-10	**1**	0-20	**1**
10-22	**21**	3-18	**23**	21-40	**1**	10-27	**3**	20-50	**0**
22-50	**28**	18-64	**110**	40-60	**0**	27-40	**1**	50-95	**0**
50-86	**33**	64-76	**290**	60-90	**0**	40-50	**0**	95-120	**1**
86-130	**17**	76-90	**246**			50-65	**1**		
						65-90	**1**		

Table 1 shows that soils at drier sites (Soils 3-5), have very low SO_4-S levels compared to soils developed in dolerite in the wet Florentine Valley (Soils 1 and 2). Not only do the Florentine Valley soils analysed receive more S, but they have greater ability to retain the S they receive, as the clay fraction in these doleritic soils is rich in poorly-ordered iron and aluminium compounds that bind with anions like sulphate and phosphate. This anion-binding ability of soils is measured by the laboratory analysis called phosphate retention. Phosphate retention levels in a suite of 13 soils, including those in Table 1, are correlated with so $_4$-S levels ($R = 0.65$; $r^2 = 0.42$), confirming a relationship of SO_4-S levels to the nature of the clay fraction in these soils.

Table 1. Sulphate-S in various soil profiles

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form. Topsoils will contain some additional S in organic matter (not measured in this study), but clearly the inland soils have retained only a fraction of the S they received. It seems likely that the drier soils have been unable to retain added S and over thousands of years losses of S have exceeded S additions. Natural losses are likely to have occurred mainly through the effects of fire and leaching. These processes are likely to have occurred together: burning would result in loss of S in smoke, and rainfall after fire would have exacerbated losses, as without uptake by roots, the mobile anions in wood ash would have been readily leached along with the more soluble cations. Erosion after fire may also have removed topsoil and wood ash.

Native forest harvesting always results in some loss of nutrients. Nutrients are removed in wood products, or mixed, eroded and leached during land disturbance, or lost to the atmosphere in fires. The SO_4-S analyses show that on drier sites that are marginal in some nutrients it may be necessary to take into account anticipated nutrient losses, nutrient deficiencies and reserves when assessing whether native forest harvesting practices are sustainable in the long term. Growth responses to S fertiliser may also occur.

In order to find out more about S distribution in Tasmanian forest soils, and improve knowledge of forest soils in general, the Forest Practices Board, Forestry Tasmania and Gunns Ltd have been jointly describing and analysing soils not previously described in the book 'Forest Soils of Tasmania' or in soil survey bulletins. This new information will be published in the form of Forest Soil Factsheets. The first eight factsheets are almost ready for publication and in the near future foresters and FPOs will be informed when they are available. Watch this space!

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Geomorphology

How big is your catchment?

Kevin Kiernan, Senior Geomorphologist, Forest Practices Board

Locating the drainage divide that defines the top of a catchment is critical to determining whether a stream is class 4, 3 ,2 or 1. There is often potential for stream catchment boundaries not to be as "obvious" as the surface topography may seem to suggest. The accompanying figures illustrate just a few of the many complications that may arise. Careful thought and field checking may be required in order to reduce the potential for error in catchment delineation, erroneously assigning a watercourse to the wrong category, and potential for environmental harm.

Water that infiltrates into the ground passes through an upper zone in which pore spaces are filled with air, and then reaches a deeper saturated zone where pore spaces are water-filled. It is effectively stored in this zone. These two zones are separated by the *water table*. Figure 1A depicts the simplest case, which applies where the terrain is flat, and water that infiltrates to the water table (dashed line) is effectively stored beneath it in the saturated zone.

But things get more complicated in hilly terrain. Where the surface landscape is not flat but is sloping instead, the water table also slopes (Figure 1B). Hence, the saturated zone beneath the water table also drains sideways, much as water flows across surface slopes. Beneath hills, the water table forms a "groundwater hill", and towards hill margins it drains away. The watertable reaches the surface where there are lakes and rivers.

If the surface hill is relatively symmetrical then the "water table hill" beneath it will mimic its shape and hence also be relatively symmetrical. Where the surface hill and "watertable hill" are symmetrical the drainage divide between water flowing to either side on the surface will be in pretty much the same position as the divide between directions of groundwater flow beneath the water table – providing there are no

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complications caused by geological structure, to which we shall return in a moment.

But if a hill is very assymmetric, then the crest of the surface drainage divide (solid vertical line) and the crest of the water table divide (dashed vertical line) will not necessarily coincide (Figure 1C). This is because water is not as rigid as rock, and hence the water table "hill" cannot closely mimic sharp changes in the contours on the land surface, and instead sort of "averages out" the contours. In the case illustrated here, the groundwater divide lies well left of the surface drainage divide.

Geological structures often further complicate the situation. For example, impermeable rock beds at depth may prevent infiltrating water from reaching the main "groundwater hill", instead deflecting it in another direction. In the example illustrated in Figure 1D the displacement of the groundwater divide to the left of the surface hill crest is much greater than might be predicted from case 1C. Of course if the impermeable rock bed sloped the other way then the groundwater divide might instead be beneath the right hand side of the hill. There are many variations on this theme, with folds, faults and other structures having the potential to deflect groundwater in various directions, much as limestone caves or lava tubes may do, but generally involving smaller subsurface conduits.

An obvious example of this effect involves the dolerite that occurs in many parts of Tasmania, which commonly rests on horizontal or gently dipping beds of sedimentary rock of Permian or Triassic age. The dolerite generally has many vertical joints, which allow water to descend to the relatively impermeable sedimentary rocks beneath the dolerite. These sedimentary rocks may then deflect this groundwater sideways, as illustrated in case 1D, to emerge as springs. But just how much water is moving in this way can be hard to discern if rather than bursting out onto the surface at a clearly defined spring the water then drains downslope through talus.

And there can be further complications. Many slopes were unstable during times of colder glacial climate when the forest biomass was less than now. In many areas very large masses of dolerite, sometimes many hundreds of metres wide, broke away from the edges of mountains and hills and slid downslope, sometimes for a kilometre or more.

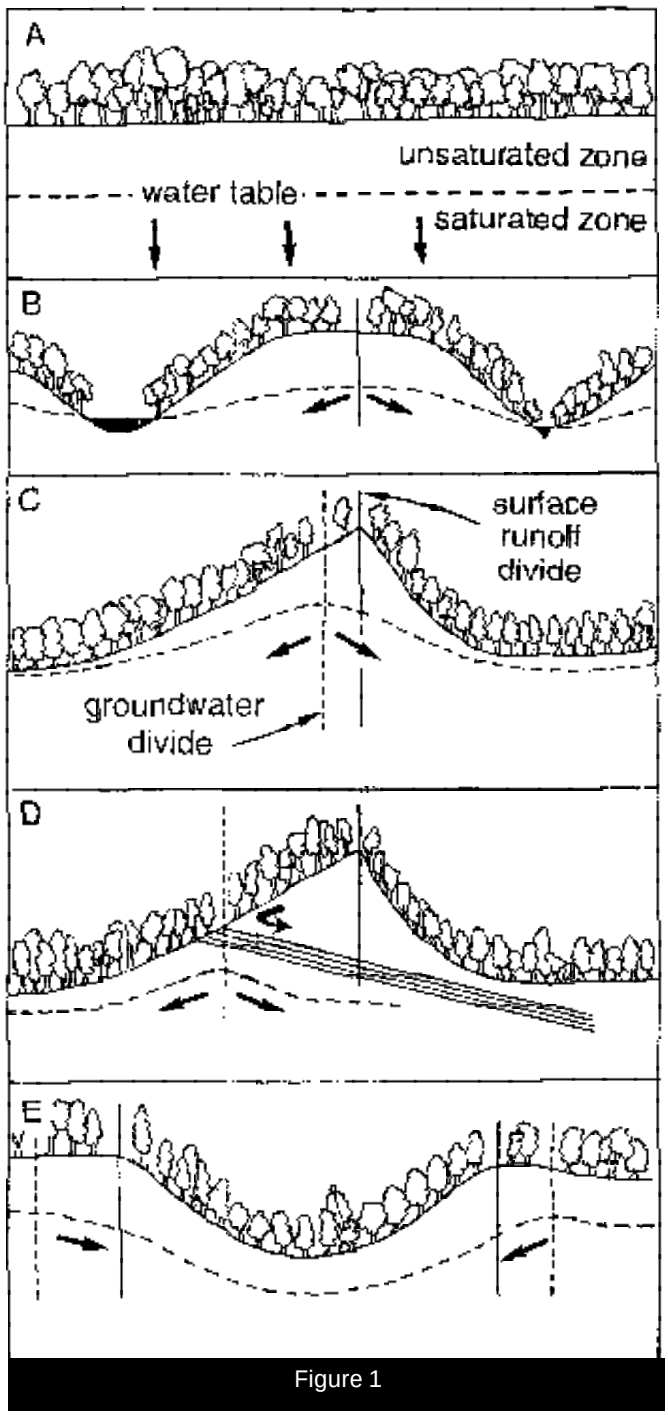

Figure 1

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Because many of these detached masses now look like respectable hills or outlying ridges in their own right, they may give a misleading impression of local drainage conditions. The crest of this detached "ridge" may appear to be the head of a local catchment, when in reality there is a considerable volume of water flowing right underneath the "ridge" down the mountain slopes down which it previously slid.

These are just a few of the many scenarios that can make for a drainage pattern that is far more complicated than initial impressions may suggest. Particularly on dolerite hillslopes where there is a known legacy of slope instability there is a strong case for erring on the side of caution in assigning categories to surface watercourses (Figure 2). And its worth being a little suspicious of outlying masses of dolerite sitting on benches of sandstones and mudstones. That little stream that seems to drain quite a small catchment might well originate much further away than the map suggests. Even if much of its water is generally hidden below talus, you may be in for a nasty surprise under very wet conditions when the pore spaces in the soil and the gaps between talus blocks become saturated, and all the runoff from the slope suddenly starts to run across the surface. That strangely incised gully with little apparent catchment might be there for a good reason after all! Small intermittent streams can cause considerable erosion when they do flow (Figure 3).

Such effects can occur at a variety of scales. Figure 1E depicts the situation at a more detailed scale, such as the edge of a stream channel or the margins of a sinkhole. Once again, the topography of the water table is muted compared to the change in the surface contours. Hence, the "groundwater divide" may not exactly coincide with the break of slope on the surface, and water that infiltrates to the water table may end up seeping in a different direction to water that simply flows across the ground surface. The exact situation will vary from case to case, but the general principle has implications for the design of buffer strips around stream channels and sinkholes.

Figure 2 Incised gully in a small catchment in northeastern Tasmania

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Figure 3 Bank erosion along an intermittent stream in the Eastern Tiers