Forest Practices news

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Evolution through devolution

the importance of training and education

Graham Wilkinson, Chief Forest Practices Officer, Forest Practices Board

The great success of the forest practices system stems from its commitment to continuing improvement through the ongoing upgrading of knowledge and skills. Forest Practices Officers are well aware of the continually increasing volume and complexity of planning information. The challenge for the forest practices system is to ensure that practitioners at all levels are sufficiently skilled and equipped to apply this information in an effective and efficient manner.

We have seen a major commitment to the training of forest practices officers over the last 15 years. What are the future challenges for training and education? I believe that there are at least three priorities for the immediate future.

1. *Continuing devolution of skills to forest practices officers, through the development of planning tools and training*

The Threatened Fauna Advisor is an excellent example of devolving highly specialised knowledge to trained and accredited officers. Similar training and accreditation systems are being developed for other areas, including visual landscape management. The model that we are pursuing is one whereby forest practices officers continue to be skilled, equipped and responsible for collecting and integrating information that allows them to make appropriate planning and operational decisions. FPOs are assisted in this process by access to planning tools and specialist advice. *It is important to remember that FPOs make decisions, specialists provide advice.*

2. *Accreditation of forest operators and contractors*

Training in forest practices at forest operator level has been rather *ad hoc* and variable to date. There are many highly skilled and professional contractors, but sadly operators who are poorly trained undermine the excellent standards and the reputation of the industry. It is time to set some minimum standards for the training of forest operators. I don't believe that

to page 2

The grey matter

Fred Duncan & Mark Wapstra, editors, FPN

This issue of *FPNews* is focussed on the earth beneath our feet – the matter (often grey) that sustains our forests and their inhabitants. Articles from a wide variety of sources describe various aspects of soil analysis and management.

We haven't worked out a theme for next issue, but please let us know if you have any ideas (ideas accompanied by an article are particularly welcome!)

Contributions from FPOs and other field workers are always well-received, by us and readers.

On a completely different matter – we're sure that everyone will be pleased to hear of the safe arrival of Yvette Duhig, late in June. So if Nathan is looking more sleep-deprived than usual, you know the reason why …

contents

from front page

training in forest practices can continue to be optional. The advent of environmental management and certification systems provides a great opportunity for the forest industry to refine and further develop appropriate 'industry standards' for training and accreditation programs. These should be pursued as a high priority.

3. Improved education of forest owners

A new client base has been brought into the forest practices system as a result of recent changes to the *Forest Practices Act* that relate to the regulation of forest clearing, firewood and tree ferns. It is important that our existing education and advisory networks capture these people. The Board and other agencies will do whatever they can to advise farmer groups, local councils and others about the changes to the forest practices system. However, under the principle of self-regulation it is imperative that all FPOs and other forest officers share responsibility for providing advice during the course of their normal contact with clients. This might be through personal contact, field days and newsletters etc.

I look forward to the support of all as we address the future training and education needs of the forest practices system.

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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
Fauna field days (Suzette Wood)	To be confirmed	1 day	Various	General information days on particular fauna issues
Forest Practices Officer course (Chris Mitchell)	2–4 July 22-25 July 30 Sept – 3 Oct	11 days total	- Kermandie - Deloraine - Orford	Pre-requisite course for appointment as FPO
Forest Practices Officer refresher course (Chris Mitchell)	30-31 July 6-7 Aug 3-4Sept 8-9 Oct 15-16 Oct 6-7 Nov	2 days each	- Hobart - Ridgley - Launceston - Hobart - Camdale - Launceston	Update existing FPOs on changes to forest practices system
Landscape Liaison Officer (Bruce Chetwynd)	Winter / Spring 2002	Two sessions of 2 days each	Various locations	Intensive training of selected Landscape Liaison Officers. Format will be workshop and field sessions with small groups
Forest practices training for supervisors (Chris Mitchell[1])	Spring 2002	4 day	To be confirmed	General training in forest practices for FT and other supervisors
Fauna values and forest management (Suzette Wood)	28-30 Oct. 2002	3 days	NE Tas.	Train FPOs in procedures for threatened species
Forest Practices Manager training (Chris Mitchell)	Late 2002	1 day	To be confirmed	Update forest managers on requirements of the forest practices system

[1]Course run jointly by FT and FPB (whether course will be run is dependent on demand)

Soils

Soils, eucalypts and forest practices in southern China

Mike Laffan, Senior Soil Scientist, Forestry Tasmania

Introduction

An Australian-Chinese research project to develop the seed supply and management systems for large-scale cold-tolerant eucalypt plantations in southern China began in 1999. The project is supported by the Australian Centre for International Agricultural Research (ACIAR) and the research partners include Forestry Tasmania and CSIRO Forestry and Forest Products.

In China, the project stretches from Yunnan province in the south-western corner to Fujian province in the south-east (opposite Taiwan), and also includes Guangxi and Hunan provinces in southern central China. The climate is tropical or subtropical along coastal parts but inland and elevated areas have a more continental type of climate with a wet spring, hot summer, dry autumn and cool winter. Droughts are common in late summer and autumn.

The aims of the project are to:

- Evaluate existing species and provenance trials and establish supplementary ones;
- Evaluate soil and site suitability for plantations;
- Develop breeding and seed production plans for promising eucalypt species; and
- Determine optimum stocking rates, tree spacing, fertiliser and pruning regimes and the potential of mixed plantings with acacias.

Eucalypts have long been favoured in China where they are used for pulp and fuel wood, sawn products and essential oils. In southern China, eucalypt plantations occupy large areas in warmer coastal sites, and also occur in cooler inland and elevated regions. However, the cooler regions can experience prolonged periods of sub-zero temperatures that restrict survival and growth of the warm temperate and subtropical species used elsewhere.

Nearly 50 million hectares of degraded 'red soils' occurring in the cooler areas, are proposed for afforestation with cold-tolerant species. Species thought to have good prospects include *Eucalyptus globulus*, *E. smithii*, *E. dunnii*, *E. nitens* and *E. camaldulensis*. These areas once supported native forests but, following clearing and long periods of cropping, most they been severely degraded by sheet erosion of topsoils and in some instances by huge gullies.

Broad zonal soil groups (e.g. Red soils, Lateritic red soils, Yellow soils) have been mapped at a scale of about 1: 1 000,000 over much of southern China, but more detailed information is lacking on the properties and distribution of soils. This article describes the soils, their potential for plantations and some of the establishment and harvesting procedures I observed during several short trips to southern China in 2000 and 2001.

Soils and land degradation

Thirty sites were inspected in southern China on landforms ranging from undulating low hills to steep mountain slopes. Elevation ranged from about 110 m to 2000 m, with all the sites inspected in Yunnan between 1500-2000 m. Substrates included sandstone, siltstone, granite and limestone. Apart from limestone, substrates on lower slopes have commonly been deeply weathered to form soft and generally unstable saprolites. Severely collapsed road batters occur in many areas.

Severe land degradation, where topsoils had been eroded to expose underlying subsoils, occurred widely in all provinces, particularly on easy slopes with a history of intensive cropping. On a three-hour drive in Yunnan, I estimated that tens of thousands of hectares on undulating, rolling and steep hillsides had been severely degraded by sheet and gully erosion (Fig.1). Severe degradation was less frequent on steep land subject to more extensive land uses. All the regions experience high intensity rainfalls in spring / early summer, and it is this high erosivity of rainfall in conjunction with poor land management that appears to be responsible for much of the land degradation in southern China.

Fig 1. Severe gully erosion, Yunnan Province

Red soils predominated on easy slopes where substrates were typically strongly and deeply weathered. They were mainly deep, well-drained and permeable with

to page 4

Soils

profiles characterised by reddish-brown heavy clay loam surface layers overlying dark red, well-structured, light clays. The soils are classified as either Red Dermosols (iron oxides <5%) or Red Ferrosols (iron oxides >5%).

Laboratory analyses of surface samples from three red soils in Yunnan shows that they all have very low levels of organic carbon, total nitrogen and available phosphorus. Even lower levels of nutrients can be expected in subsurface layers. Soils with high iron oxides (Red Ferrosols) are likely to have high phosphorus-fixing characteristics. Red soils in Hunan and Fujian will probably have similar low levels of nutrients in surface and subsurface layers.

Yellow soils predominated on steep slopes where substrates were typically only weakly or moderately weathered. The soils were well drained and permeable, but depth and stoniness varied. Profiles were characterised by brown silt loams or fine sandy clay loams overlying well-structured, silty clay loams or light clays. They are classified as Yellow Dermosols. Laboratory analyses of samples from sites with intact topsoils shows that surface layers have medium levels of nutrients. However, it is expected that deeper layers will have low nutrient levels.

There are no environmental standards or codes of practice covering forestry in China, and forest practices vary markedly from place to place. In the areas inspected, site preparation for planting involved either manual construction of small terraces or manual spot cultivation. The argument for construction of terraces, which is slow and costly, is that it improves access within plantations for carrying out silvicultural operations. Both easy sloping and steep lands have been terraced for plantation establishment. Terraces are typically 1.0-1.2 m wide and 0.4-1.5 m high depending on slope angle and they approximately follow contours. However, their construction invariably results in the loss of the relatively nutrient-rich topsoil layer and predisposes the exposed subsoils to accelerated runoff and sheet and rill erosion (Fig. 2). Defoliation of trees for production of eucalypt oils markedly decreased vegetative cover and exacerbated runoff and soil erosion on terraces.

Fig. 2 Gullying in terraces constructed for establishment of eucalypt trial. Hunan Province

Manual spot cultivation was observed on rolling and steep slopes in Hunan and Fujian. Typically an area with dimensions of about 0.5 m by 0.5 m is excavated on slopes to form a small, level cultivated spot for planting. Some displacement of topsoil occurs during excavation, but subsequent surface erosion is minimal compared to that following construction of terraces.

In the areas inspected, harvesting was carried out manually. In Fujian, where steep slopes predominate, logged coupes are small (<8ha) and logs are slid down hill slopes and then trucked to a central yard for sorting and processing. The low incidence of surface soil erosion and landslide scars observed in Fujian is attributed to a combination of various factors including manual site preparation and harvesting methods, the small size of coupes and absence of mid-slope access roads. Because of the prevalence of relatively soft, deeply weathered substrates on lower hill and mountain slopes in south-eastern China, any attempt to construct mid-slope roads on steep land would undoubtedly lead to a severe risk of mass movement and gullying.

Plantation potential

Nearly all the soils inspected in southern China had negligible soil physical limitations to tree growth. They were invariably deep and well drained with good water-holding capacity and easily penetrable by tree roots. The only exceptions were several sites where shallow and stony soils occurred over bedrock. Such sites are likely to be highly susceptible to water deficits and droughts. The main limitation to plantation growth would be the low level of soil nutrients. Preliminary information indicates that nitrogen, phosphorus, potassium, magnesium and sulphur as well as various trace elements may be deficient.

The other main limitation to site suitability is the high risk of erosion resulting mainly from high rainfall erosivity in combination with sloping land, and partly from differences in soil erodibility. However, with appropriate fertiliser and forest practices regimes, large areas of severely degraded and currently

to page 5

Soils

PET SOILS No. 1 - Sandbrook Soil

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

Podosols are among the most infertile soils in Tasmania and around the world. The name podosol (sometimes written podzol) is derived from the Russian for "ash" – referring to the ash-grey subsoil horizons of these soils. Visually the soils are usually very striking – they have black topsoils, a contrasting white or grey layer below this, and deeper still they have an iron pan with rusty brown colours.

Podosols form in conditions which favour *leaching*. Leaching is a term given to the downward movement of minerals and nutrients in soils. It happens in all soils where there is more rainfall than evapotranspiration. Leaching is most severe in high rainfall areas, where a lot of the rainfall passes through the soil. But leaching can also be severe in drier areas with gravelly and sandy soils - these do not hold on to nutrients effectively, because they contain few clay minerals. Soils formed in quartz sands are especially prone to leaching, as quartz is an inert mineral and nutrients in solution, like calcium, potassium, magnesium, do not bond to it.

As a result of leaching some minerals and nutrients are washed right out of the soil profile (to eventually end up in groundwater or streams) and some are washed out of the upper soil layers into deeper layers. Leaching is favoured where soils are *acid*, as most minerals are more soluble in acids. This process of washing out or *eluviation* can leave some horizons of the soil profile depleted of minerals and nutrients, and often depleted of organic compounds too. As a result, the eluviated layer is almost white.

The Sandbrook soil (Figure 1), developed in Triassic sandstone near Buckland, is a good example of a podosol. Details of this soil are published on the FPB web site (www.fpb.tas.gov.au) - go to the Research and Advisory Programmes button, then Soil and Water, then Forest Soil Fact Sheets, then Sandbrook soil. Despite occurring in one of the driest areas of Tasmania, Sandbrook soil has become podzolised because of its very sandy parent material. It has an extremely acid topsoil with a pH 3.6, a greyish white eluviated layer (labelled an A2 horizon in Figure 1 and divided into two parts) and extremely low levels of nutrients. By the standards applied to land for plantations, Sandbrook soil has very low total P values (13-48 mg / kg) and very low to medium total N values (0.00-0.14). It is also likely to be deficient in sulphur and

to page 6

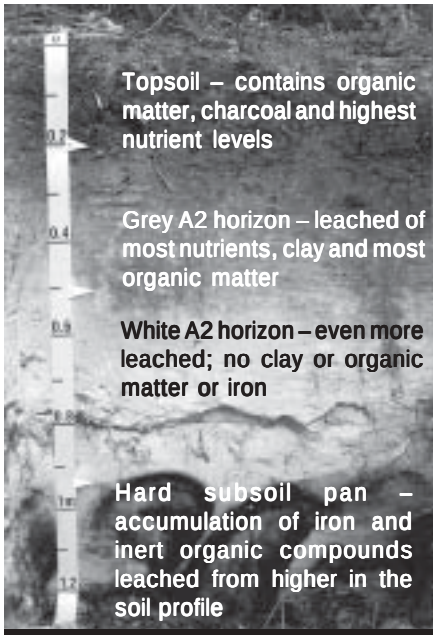

Fig. 1. Sandbrook soil. For more details and a colour photo visit www.fpb.tas.gov.au.

from page 4

unproductive soils would be suited to plantation development.

Future directions

Although red soils dominate the region, there are major differences in soil properties that have important implications for plantation establishment and management. For example, soils with high content of iron oxides (Red Ferrosols) are likely to have a much higher requirement for phosphatic fertilisers than soils with low levels of iron oxides (Red and Yellow Dermosols). Therefore, comprehensive trials must be established across a wide range of soils to determine the optimum types, rates and frequency of fertiliser application. At the same time, more detailed field mapping is needed to show the spatial distribution of the main soil types.

Significant differences may also occur in soil erodibility depending on content of organic matter, iron oxides and clay. The assessment of erodibility will allow forest practices to be specified according to soil and topography. Practices to minimise erosion include using spot cultivation instead of terracing during site preparation, and establishing protective vegetative cover on the soil surface using species such as grasses and clovers. Even steep slopes may be suitable for plantations by using a combination of practices such as small-sized and dispersed coupes, manual spot cultivation and manual harvesting techniques.

In conclusion, the conversion of vast areas of currently degraded land in southern China to sustainable commercial forest use requires a more detailed assessment of the properties and distribution of the soil resource than is currently available.

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Soils

Things of mud and wood:

matting and cording in the North West

Robert Onfray (Area Forester), Mitch Roberts (Resource Procurement Manager) and Andrew Plank (Area Forester), Gunns Forest Products

Traditionally matting and cording has not been an integral part of operations in the wet forests of the North West due to the low volumes per hectare and subsequent small volumes carted along each snig track, even though the benefits of matting and cording have been documented in previous editions of *Forest Practices News* (December 1998 and June 2000).

The *Forest Practices Code 2000* prohibits "puddling" of the main snig track. Gunns foresters from the NW recognised this and were interested in getting contractors to incorporate matting and cording during the winter months. A field trip was organised to the Southern Forests and Tasman Peninsula where matting and cording is routinely carried out. One of the differences highlighted the amount of waste wood and slash available for cording in the Southern Forests (around 250 tonnes per hectare).

Despite this, several contractors were willing participants in trials in the NW. The first trial was established in mixed hardwood forests (myrtle / sassafras) on Surrey Hills with the following equipment:

- 1 feller buncher;
- 2 excavators with cut-off saws in the bush;
- 1 forwarder;
- excavator on landing.

The trial consisted of sections of snig track treated with four different techniques:

1. No matting / cording for 30 m;
2. Cording and bark for 20 m;
3. Bark only for 20 m;
4. Cording only for 20 m

Crucial to this trial was the supply of bark. Gunns committed to fund its transport from Hampshire Mill. Ideally fibrous eucalypt bark is better than myrtle bark pieces, however availability depended on mill production requirements at the time. (There was initial concern about the environmental impacts of using foreign bark in coupes but this was allayed as the bark is benign once it has left the tree).

The feller buncher operator determined the snig track direction, cut the track, laying merchantable wood alongside the track with minimal damage to the ground, and placed some unmerchantable pieces on the track. The excavators then processed the merchantable timber (delimb and cut to length) and laid the unmerchantable pieces on the track. It was important that the cording was laid as evenly as possible and at right angles to the track direction to avoid a "lump" build-up of debris which slowed forwarder movement and created rutting. The forwarder carted bark from the landing to the snig track, using a bed of logs in the

to page 7

from page 5

available cations such as potassium (K) and calcium (Ca).

Below the pale eluviated layer is a dark wavy hard pan in which iron and organic compounds have accumulated. The iron and organic compounds in this layer have been washed out of the topsoil and A2 horizons. The hard pan forms a very effective barrier for roots. The organic compounds in the pan are highly stable humic substances that are chemically almost inert.

The topsoil in the Sandbrook soil has a high total carbon content, but the high C / N ratio in the topsoil (C / N = 39) indicates that a lot of the carbon in the topsoil is in the form of charcoal, since organic matter formed by normal decomposition processes generally has a C / N ration of below 25. So in a soil like this total carbon analysis overestimates organic carbon content.

Sandbrook soil has high erodibility – the sands in the A2 horizon are easily moved by water or by wind. But nutrients also limit land use on these soils. Preliminary calculations based on the studies of Adams and Attiwell (1998) in dry eucalypt forests show that harvest of 90 tonnes per hectare of *E. amygdalina* wood and bark would remove about 150 kg / ha of calcium from a harvest site, and this amount of calcium is five times that contained in the Sandbrook topsoil (30 kg / ha). Such calculations throw some doubt on whether repeated harvest would be sustainable. More work is needed to determine whether Adam and Attiwell's nutrient figures for *E. amygdalina* harvest apply generally to similar forests like those at Buckland, and whether sources of nutrients like additions in rainfall can make up for removals.

Tree harvesting on Sandbrook soil has to be planned with great care – erodibility and nutrient deficiencies could be a problem.

Reference

Adams, M.A.; Attiwill, P.M. 1988. *Nutrient cycling in forests of north-east Tasmania*. Research Report No. 1, Tasmanian Forest Research Council Inc., Hobart.

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Soils

from page 6

bunk to contain the bark. One of the excavators was used to unload the bark from the forwarder and spread it onto the track. Each load of bark covered approximately 3-5 m of snig track.

After about 1,000 tonnes of logs had been forwarded over the trial area, the snig track conditions were assessed. The cording and bark proved the most successful. The bark only section was unsuccessful as the bark just mixed into the soil. The cord only section had some degree of success, but mud moving through the cording was a problem. The contractor lost some production with the forwarder carting the bark, however the benefits were that the forwarder was able to continue snigging during wet weather and travel time was reduced because of a smoother track.

The contractor was pleasantly surprised at the results and became more willing to mat / cord his snig tracks and landing if Gunns supplied the bark. Overall the contractor initially lost about 15% of production in setting up the matting / cording but gained 20-25% once the snig tracks were established and was back into full production.

The second trial involved another contractor who was scheduled to harvest a eucalypt forest coupe at Nietta in winter. The contractor had used downers and slash for matting on a previous coupe and found that it was too rough on his machinery and slowed his travel times considerably. For this new coupe he decided to cut out his main snig track from the landing and use merchantable wood to cord the landing and snig track. The operation consists of the following machinery:

- processor;
- excavator with cut-off saw in the bush;
- D7 dozer;
- grapple skidder;
- excavator on landing.

The processor was used to harvest the timber on the proposed snig track and process the wood into small lengths for cording. The excavator laid the cording and debris from the processing across the track. Ideally the cording pieces sizes were in the range 20-30 cm diameter. In total, approximately 400 m of snig track and landing were corded. This equated to about 16 loads of merchantable wood which was lifted and sent to the mill at the end of the operation. About 30 tonnes of wood or one truckload covered 30 m of snig track. The contractor combined shovelling from feeder tracks to the main track during wet weather. Two full days were spent preparing and cording the landing and snig track which reduced his production by 10%. However, once the cording was in place the contractor believes he gained 20% due to lower fuel costs, faster skidding times and no shut downs due to wet weather.

to page 8

The difference between no treatment (below) and cording and matting of snig tracks (mixed hardwood forest site)

Above: cording of landing site in the Nietta trial. Below: machinery moving over corded snig track in the Nietta trial.

Streams

Class 4 (headwater) streams –

classification and risk assessment

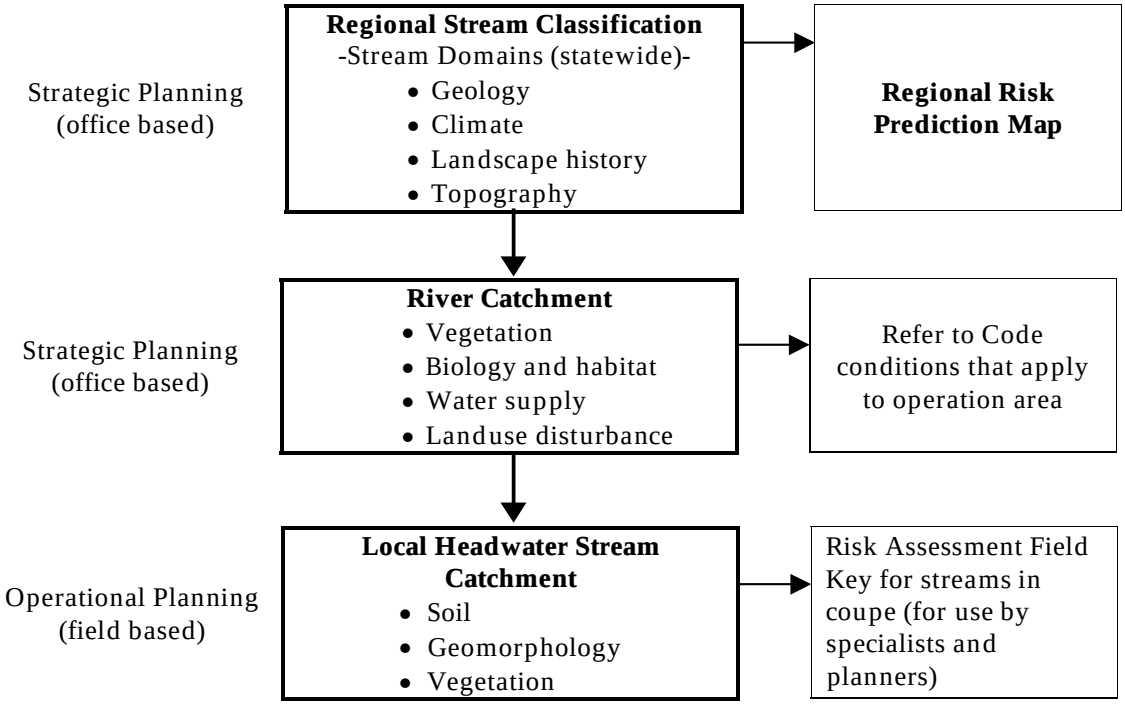
Fiona Wells, Project Officer, Forest Practices Board

Headwater streams (class 4 watercourses) and their associated riparian zones play an important role in regulating of the physical and biological processes of a river system. To better protect and manage headwater streams in the forestry estate, a draft headwater stream classification and risk assessment procedure has been developed through funding from the FIAT / Forestry Tasmania Research Fund.

The draft classification and risk assessment is designed to distinguish headwater streams in native forest according to their vulnerability to sediment erosion and deposition in relation to forestry activities. The headwater streams were classified by *regional and local causes* of sediment erosion and deposition, rather than the features themselves.

The classification and risk assessment procedure was broken down into three levels:

Expected Outputs



Examples of headwater streams are shown in the following photos. The captions provide an indication of the different regional, catchment and local sediment erosion and deposition causal factors affecting the streams, aswell as an example of potential risks to the streams.

to page 9

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from page 7

Cording in this manner was efficient and cost effective as the coupe had 350 tonnes per hectare and there was 8,000 tonnes of merchantable wood on the coupe.

These trials were not able to conclusively quantify the value of cording / matting. They did however, demonstrate that there are benefits to contractors, it can extend the harvesting during wet weather and it did allow contractors to meet Code requirements. In summary:

- Cording / matting in mixed hardwood forest can be done as long as large amounts of bark is available;
- Cording in native forest is dependent on volumes on site to justify the work;
- Machinery mix is not critical however, an excavator in the bush with a cut-off saw is definitely an advantage.

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Streams

Photo 1. Stream in granite bedrock
Regional factors: granite, high rainfall variability
River catchment factors: dry open eucalypt vegetation
Local stream factor: granite bedrock chute
Risk example: channel widening

Photo 2. Stream in dolerite talus
Regional factors: dolerite, high rainfall variability
Local stream factor: dolerite talus, stream appearing and disappearing (underground flow)
Risk example: new surface channel formation or landslip

Photo 3. Stream in mobile granite sands and gravels
Regional factors: granite, moderate rainfall variability
River catchment factors: past in-stream mining
Local stream factor: granite mobile sands and gravels
Risk example: channel bed and bank erosion and deposition downstream

Photo 4. Stream in dolerite boulders
Regional factors: dolerite, moderate rainfall variability
Local stream factor: dolerite boulders
Risk example: low risk of sediment movement

The work is in its final stages of review. The headwater stream classification and risk assessment procedure has the potential to provide a useful tool for developing more effective management objectives and prescriptions for Class 4 streams in the forestry estate.

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Landscape

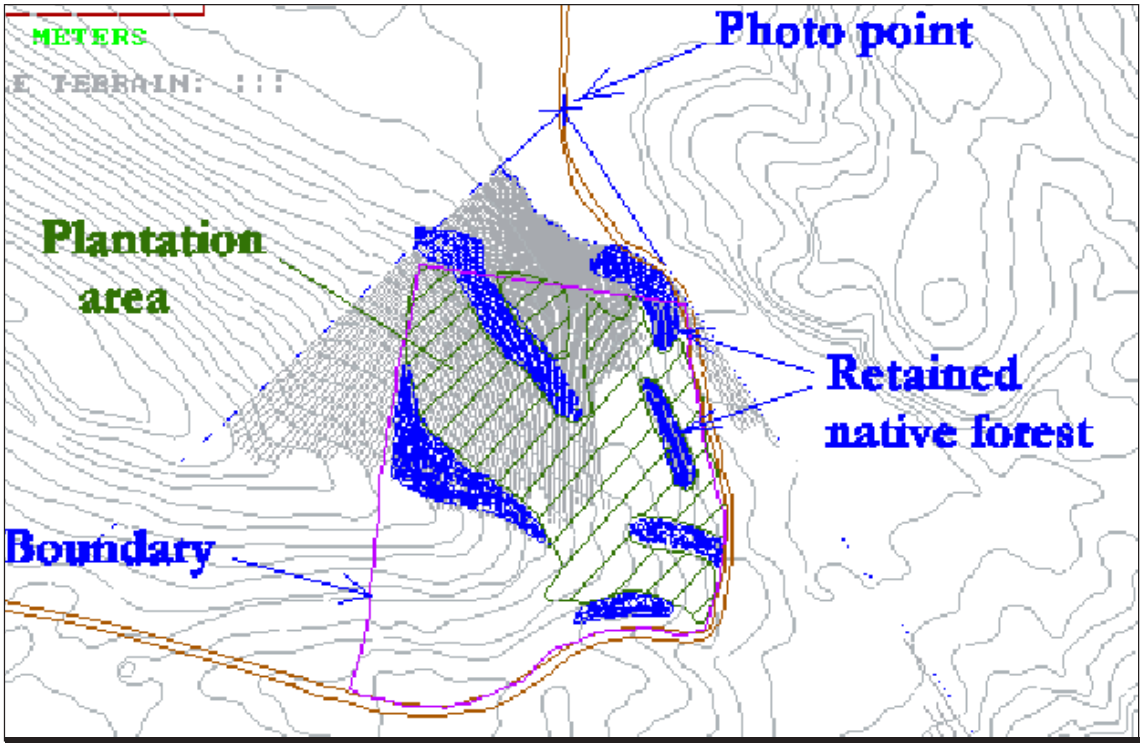
Those new plantations

Nothing is more satisfying for a forest planner than a successfully designed plantation well integrated and growing sedately in the rural scenery. Many such examples exist around the countryside where cleared or partially cleared lands ideally suited to forestry have been brought into productivity in recent years with new plantations. Lower slopes of hillsides adjacent to higher quality rolling paddocks on deeper, better soils, and lower cost land, are usually ideal for plantation development. However, steepness of slope and often close proximity to popular roads results in open exposure to viewing. This in turn means associated complexity for management of visual values. Some effort is needed to get these areas to turn out right.

One such operational area is located along the Liena Road at Ugbrook near Mole Creek. In this case the coupe was viewed ahead along the road as a foreground regrowth-forest slope and skyline. It is part of a distinctive range of low hills with a continuous forested skyline stretching east to west. This is of course a key tourist road giving access to the King Solomons Cave and the upper Mersey Valley. Viewing conditions here add up to a very sensitive if not critical situation, with expected insurmountable constraints.

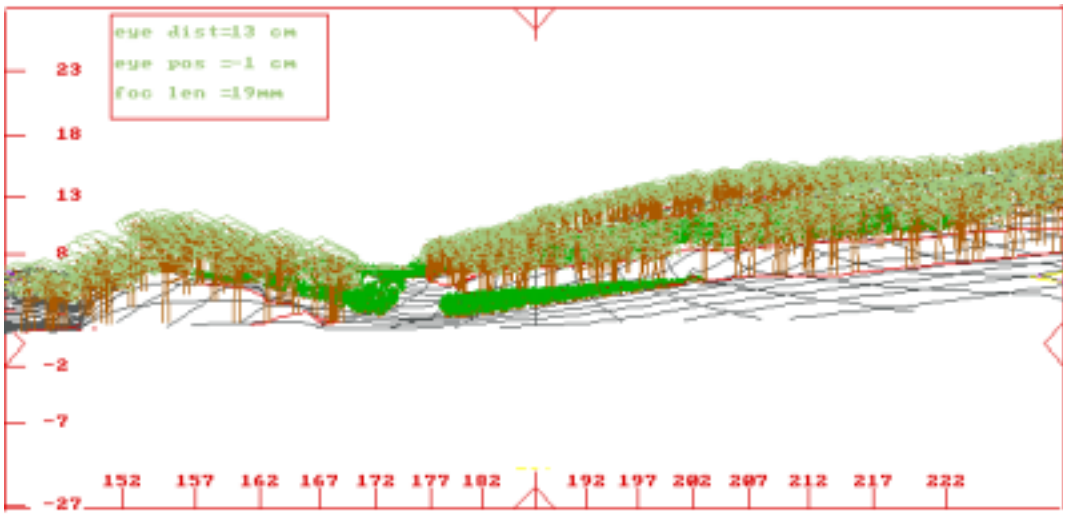
The plan required clearing of native regrowth forest and establishing plantation on newly cleared land and some previously cleared land. Viewing analysis using predictive computer perspective graphics and visible-area plans showed some options for maintaining a stable forested skyline appearance. This did not mean total forest retention but simply some extensions to already retained areas (due to karst values) and addition of a screening zone along the lower edge with the paddock. (see diagrams and photographs).

Now that the harvest is completed, the results are very good, with little or no effect on the skyline appearance and partial screening of cleared slopes close to the primary viewing (see photo). The key players in this successful result have been the FPO (wearing his 'multi-faceted' forestry hat) and the cooperative, well informed land owner. Nothing could have been achieved without the combined effort of these two. Well done FPO ……!



Computer-generated plan of visible area from Liena Road showing retained forest zones for management of karst and landscape character.

Landscape



Prediction of harvest effect (3D graphic simulation)

Before forestry ...

After forestry ... (all from a similar viewpoint)

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Flora

Strategic planning for threatened flora on State forest

Allison Woolley, Conservation Planner, Forestry Tasmania

Introduction

There are almost 1800 native higher plant species in Tasmania. 454 of these are currently listed on the Tasmanian *Threatened Species Protection Act* (1995). Eleven species of lichens are also listed. About half of the threatened species have the potential to occur on State forest.

Locations and management requirements for many threatened forest species were documented during the RFA process. Most known sites are managed by a combination of reservation (in formal or informal reserves) and management prescription. There are many advantages with adopting a strategic approach to management of threatened species.

How does the Forest Practices System deal with threatened species?

The Forest Practices Board (FPB) and Department of Primary Industries, Water & Environment (DPIWE) have jointly developed protocols to manage threatened species in production forests to accord with the requirements of the Tasmanian *Threatened Species Protection Act* (1995) and the Commonwealth *Environment Protection and Biodiversity Conservation Act* (1999).

Under the agreed procedures, management prescriptions for individual species or groups of species can be "endorsed" by the Director of the National Parks and Wildlife Service, the Scientific Advisory Committee established under the *Threatened Species Protection Act* (1995) and the Forest Practices Advisory Council. These prescriptions will be consistent with Recovery Plans or Threat Abatement Plans developed for species. Where no endorsed prescriptions exist, or they are not appropriate for an operation, prescriptions are developed in consultation with FPB and DPIWE specialists, the FPO and the landowner.

FPOs can consult a range of information to determine whether a threatened species is present or might occur in an operational area. They include Forest Botany Manuals, databases (FT's CONSERVE database; DPIWE's GTSPOT database), and local knowledge. If threatened species are likely to be present, advice on the management must be sought from the FPB's Senior Botanist.

So why do we need strategic planning?

Standard management prescriptions for flora species have yet to be formally endorsed via the above process – so there are still many decisions being made on a coupe by coupe basis. A more strategic approach could lead to more effective management of a threatened species, by considering its populations, distribution, management opportunities and potential effects of forestry activities across the whole of its range.

What is the Strategic Planning Process?

The strategic planning process developed by Forestry Tasmania (FT), FPB and DPIWE for threatened flora (and fauna) on State forest examines the current situation for a given species, and assesses the potential effects of different land use scenarios. The aim is to develop management prescriptions to minimise further endangerment of the species on State forest.

Two species, *Tetratheca gunnii* (shy Susan) and *Eucalyptus radiata* (narrow-leaf peppermint), are currently being assessed by a FT / FPB / DPIWE strategic flora planning group. The strategic planning process for *Tetratheca gunnii* will be presented as a case study in the next issue of *FPNews*. Information on the distribution and conservation management of *E. radiata* was given in *FPNews* 2(3) – February 2000 (for all those people out there who have archived their collection!).

Steps involved

Step 1: Identifying the need for strategic planning for a threatened species

The need for strategic planning may be identified by a range of stakeholders (e.g. DPIWE, FPB, FT District, FT Conservation Planning Section, Tasmanian Conservation Trust). On State forest, issues that may indicate the need for such planning include:

- habitat of a species;
- a large proportion of habitat or range is on State forest;
- coincidence of potential habitat with zone of high plantation potential;
- difficulty in locating the species during survey.

Flora

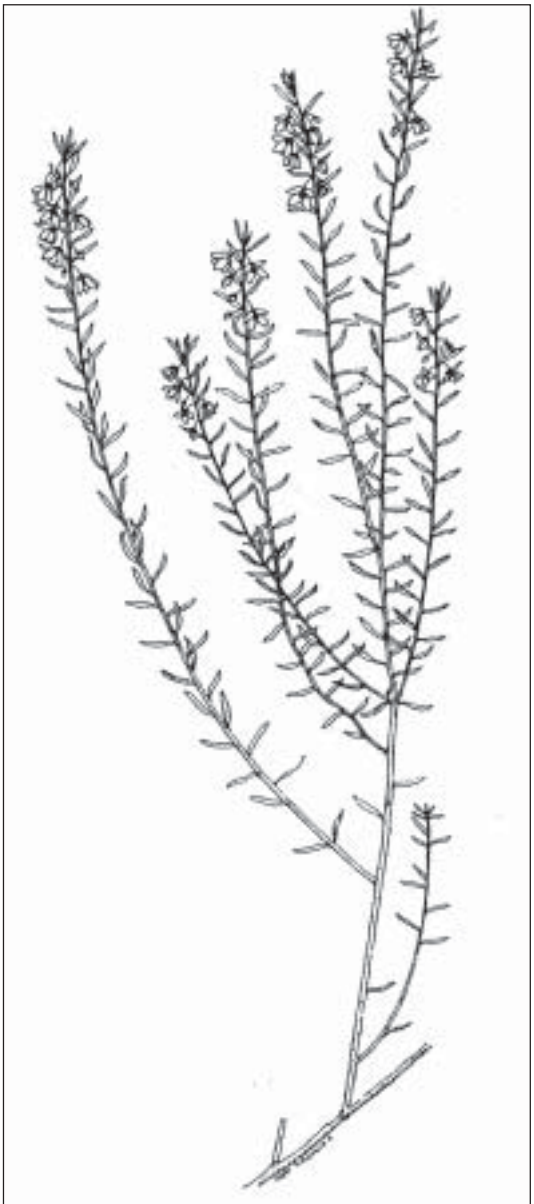
Step 2: Reviewing knowledge of the species

A review of publications, discussion with experts and species modelling are used to:

- validate known range of the species;
- refine habitat characteristics;
- review its conservation and reservation status.

Step 3: Analysing potential impacts

Potential impacts of planned forestry activities on the species and its habitat are assessed by looking at tenure [including Management Decision Classification system (MDC) zoning] and potential use of areas with known or predicted habitat. Issues such as plantation programs, intensive forest management and other forest practices are all considered during the analysis. Catchment analysis may also be undertaken to indicate the proportion of a given catchment that may be affected by planned activities. By assessing the impacts over a larger area than just a coupe, strategic opportunities for best management outcomes can be identified.



Tetratheca gunnii, a threatened species of the flora that occurs almost wholly on State forest in the Beaconsfield area, is likely to benefit from strategic management planning. See the next issue of *Forest Practices News* for more information on this species.
Line drawing: Fred Duncan.

Step 4: Compiling spatial information and identifying information gaps

After compiling all spatial information related to the species, information gaps are identified. The need for further investigations is prioritised, based on resources available, operational requirements and the degree that further information is needed.

Step 5: Developing an interim strategic plan

Using information from Steps 1 to 4, prescriptions can be developed for activities on State forest that are likely to affect the species or its habitat. In developing the prescriptions, levels of allowable change are set. Monitoring procedures are also developed to ensure compliance with the prescriptions and to assess their effectiveness. An update process, to allow new information to be incorporated, is also developed.

Step 6: Implementing a strategic plan

Once agreement has been reached, the strategic plan can be implemented and monitored through the Forest Practices System and FT's internal systems (including the Environmental Management System). Within FT, implementation is via the MDC system, and CONSERVE and coupe databases. The strategic flora planning group provides a forum to resolve problems that may come up in implementing the plan.

The final word on merits of strategic planning

Strategic planning allows management requirement of species to be taken into account over the whole range of the species. It allows the movement away from case by case prescriptions, towards area-based management of habitat. This provides:

- better consideration of the ecological requirements of a species;
- greater certainty at the operational level.

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Book review

We will try to feature a book review in each issue of FPNews. We welcome reviews from our readers on books/articles on forestry-related subjects, particularly those relevant to forest practices planning.

Tasforests Vol. 13 No. 1 & 2

Various authors on various subjects

(published by Forestry Tasmania – available from Forestry Tasmania)

Reviewed by Mark Wapstra

From its inception in September 1989, the *Tasforests* journal (published by Forestry Tasmania) has been an excellent forum for a range of topics from pure and applied scientific forest research to descriptive and technical information relevant to Tasmanian forests. The latest two-volume issue (Vol. 13 No. 1 & 2) published in December 2001 is a special edition dedicated to the Warra Long-term Ecological Research Site. The Warra LTER project is an internationally significant research site that forms part of a worldwide network of similar long-term research sites "dedicated to multi-disciplinary, long-term, site-based research that incorporates a range of scales, from the molecule to the landscape and from the nano-second to the century". The introductory article provides an excellent overview of the Warra LTER site including reasons for its establishment, its location and management, together with a list of the research projects being conducted.

Articles describe the wide range of research being undertaken, which includes projects on silviculture, soils, hydrology, biodiversity, ecological process and social and economic issues. More than 60 individuals from over 20 organisations are conducting research on the site. A quick scan of the contents pages of the two volumes shows a strong focus on biological and ecological research at the site. This double volume is an excellent one-stop shop for information on the internationally significant research site established at Warra.

Web sightings

A regular column on sites containing information on forest practices and management. We invite your suggestions (site address and short summary). The FPB does not necessarily endorse the content of the sites. We will try to maintain a balance of local, national and international sites.

www.pfrp.tas.gov.au

This is the web page for the Private Forest Reserves Program, the section of the Department of Primary Industries, Water and Environment, responsible for implementing the RFA requirement to develop a representative private land reserve system. Many FPOs are aware of the Program and its role (mainly through advice on botanical values). This is a useful site to refer landowners/managers for further information on the aims and methods of the program. The 'Questions and Answers' section deals with the most commonly asked questions and there is a useful contact details page with a 'rogue's gallery' to put facse to names. Other information includfes media releases, details of new reserves, and progress reports.

www.forestrystandard.org.au

For anyone interested in keeping up-to-date with the development of the Australian Forestry Standard, this site is well worth a visit. For those unaware of the concept of the Standard, these words from the web site may be useful: *"This Standard is being developed to provide a basis for voluntary, independent third-party certification against auditable forest management performance criteria that support sustainable management of forests for wood production. It is intended that the Standard would be suitable for use in both native and planted forests regardless of tenure or scale of ownership. It is also intended that the Standard should provide a basis for third party auditing, either separately or in conjunction with the ISO 14001 Environmental Management System Standard."* The site gives the background to the concept, the participants, the process involved, the time line and links to related sites.

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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 practising 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. Please ensure that figs/pics are sent as separate files and not embedded in Word documents. We look forward to seeing you in print in FPN!

Flora

Forestry and the trailing rice-flower – a good news story

Mark Wapstra, Scientific Officer, Forest Practices Board
Karen Adamczewski, Honours student, School of Plant Science, Uni. Of Tas.

A recent research project has shown that conservation of rare plants does not necessarily mean that areas must be "reserved" from logging. Karen Adamczewski, an Honours student at the School of Plant Science at the University of Tasmania, recently completed a project examining the effects of different forest practices on the trailing rice flower *Pimelea filiformis*.

Pimelea filiformis is a somewhat unobtrusive trailing herb/undershrub that occurs in the Reedy Marsh-Deloraine area and also in the Hollybank-Nunamara area. It has a trailing habit over and through the leaf litter and understorey plants. It has distinctive dark green, slightly glossy, opposite leaves and small white flowers. The species has an extremely strong affinity for Jurassic dolerite (at one site, the species is abundant on the dolerite-based slopes but is absent within metres of a substrate change at the break of slope). *Pimelea filiformis* occurs in a range of forest types from dry sclerophyll dominated by *E. amygdalina, E. obliqua* and *E. pauciflora* to wetter forest types dominated by *E. obliqua* and *E. delegatensis* (the damp sclerophyll forest complex common in the Reedy Marsh area is ideal habitat).

Pimelea filiformis (trailing rice-flower). Note this is a "captive" specimen from the Botanical Gardens and "wild" individuals are often less vigorous. Photo: H & A Wapstra.

More typical growth habit of *Pimelea filiformis*. Note the trailing habit over leaf litter. This specimen is from a hardwood plantation. Photo: Fred Duncan.

Karen's project examined the impact of 4 different forestry activities on the species: plantations (softwood and hardwood), recent native forest harvesting and pre-Code native forest harvesting. Some of the key results are presented below.

Softwood plantations

The species has a patchy distribution in softwood plantations 4 to 20 years old, and seems to be limited to the edge of older (28 year old) plantations. The combined effect of reduced light under dense canopy of old pines and high cover of pine needles may impede the growth of *Pimelea filiformis*. The number of sample sites available was too low to conduct a detailed assessment of the impact of pine plantations on the species but it is good news that the species was present in different ages of plantation.

Hardwood plantations

There was no significant difference in the abundance of *Pimelea filiformis* in first rotation hardwood plantations and adjacent undisturbed native forest (of similar aspect and topography).

Recent native forest coupes

Coupes about 8-11 years old were placed into two classes: heavily logged (clearfelling, seed tree retention type operations) and lightly logged (advanced growth retention, regrowth retention type operations) based on site inspections and aerial photographs. There was no significant difference in the abundance of *Pimelea filiformis* in first rotation hardwood plantations and adjacent undisturbed native forest (of similar aspect and topography).

Flora

Pre-Code native forest coupes

The abundance of *Pimelea filiformis* in coupes about 14-20 years old that were harvested prior to the introduction of the Forest Practices Code was significantly lower than in adjacent control areas. Karen also carried out detailed work on the habitat factors affecting the distribution of the species. This part of her study may help to explain why *Pimelea filiformis* appears unaffected by more recent logging practices but deleteriously affected by older logging. She found that three habitat variables significantly affected the species at the local scale. The species is more abundant where there is increased vegetation cover less than 2 m tall, and where there is less litter and less bare ground. Perhaps the older style logging where there was less control on ground disturbance, soil compaction, size of landings and number of snig tracks created a substrate less suitable for *Pimelea filiformis*.

A field day was held recently in the Deloraine area to discuss the management of *Pimelea filiformis* (and three other threatened *Pimelea* species that also occur in native forests and plantations in this area). The field day was useful in providing foresters with the most up-to-date information on the potential impacts of forestry operations on these species and bringing together researchers, forest planners and staff of the Threatened Species Unit (DPWIE). The assistance of forest planners from Mersey District, Rayonier and Gunns Tamar is gratefully acknowledged.

For more information on threatened forest *Pimelea* species, visit the FPB web page, navigate to the Botany Picture Gallery and select *Pimelea filiformis, P. pauciflora, P. flava* or *P. curviflora* images and notes pages from the threatened species drop-down box.

They say two heads are better than one. But that depends on the heads! This genetically modified organism, photographed at the *Pimelea* field day, might be the perfect way to find a rare *Pimelea* or two; discover an unknown fern species and to distinguish between *Eucalyptus radiata* and *Pinus radiata*. Photo by Naomi Lawrence.

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