A great find by Huon District: the McKenzie coal mine at Catamaran 1923–1930

Denise Gaughwin, Manager, Heritage and Landscape Program, Forest Practices Authority
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In March 2007 Forest Practices Officer Trevor Seears and Michael Casey discovered a massive pile of bricks, cast iron chimney stacks and concrete foundations in the forest in coupe CM008B at Catamaran in the far south. Impressed by the amount and nature of the physical remains and unsure of what they had found, Trevor contacted Denise Gaughwin, the Forest Practices Authority’s Manager of the Heritage and Landscape Program. Between them they agreed that it was most likely a coal mine associated with the known Catamaran coal field.

Field inspections were undertaken by FPA and Forestry Tasmania Huon District staff and it was agreed that this was a very significant site that deserved further research and a detailed site recording. Clearly this was not just a coal mine because a furnace and a large chimney stack were visible. There was obviously more work to do in order to understand this site. In the meantime, the known remains of the site were placed within a reserve to protect the heritage values.

Trevor undertook some further research, in which he was helped by Greg Dickens of Forestry Tasmania staff examining the furnace and flue during the process of preparing the site plan.
Mineral Resources Tasmania (MRT). Many historic records come from various reports produced by MRT and the local historian of the Catamaran coalfields Lindsay Whitham. The site was thought most likely to be the McKenzie coal mine. The McKenzie workings commenced in 1923 and were abandoned in 1930. The historical records indicate that this was planned to be a very modern mine for the times, with the mostly Victorian and New South Wales based directors authorising the following in 1925:

1. simultaneous opening of the field from three centres by means of a tunnel, allowing for big output in the minimum amount of time
2. electric power station of 200 kw capacity
3. modern handling, storage and loading plant at a shipping point near the 'Waterhole'
4. new tramline (two miles long) connecting the collieries with the shipping point and laid out so as to be easily adaptable for ‘endless rope haulage’.

The Anne report in 1926 stated that this mine had become a regular producer, and in that year returned 9950 tons of coal which was said to be of good steaming quality. A report by McIntosh Reid in 1927 indicated that all of the directors’ instructions had been carried out: three mines were operating and the tramway and loading wharves had been completed. There were workshops and ‘full surface equipment’ with haulage and pumping plants installed.

After gaining some level of understanding of the site from the written records, it was time to attempt to make sense of the physical remains in the forest. A survey by Forestry Tasmania Forest Practices Officers Trevor Seears, Erik Martin and Penny Sangster had located the mine openings, parts of the tramway, domestic structures, mounds of finely crushed coal and what were clearly workshops. However the most impressive part of the site was a compact area (20 m x 20 m) containing a massive number of bricks (many of them fire bricks), and a very large cast iron and riveted circular flue/chimney as well as concrete slabs, machinery mounts and two cast iron pumps.

We were fairly certain that this was the site of the aforementioned power station where electricity was generated by a steam plant constructed in 1925. But first we had to get our heads around what were the component parts of such a structure. A coal-fired power station burns coal to produce heat. The heat is used to boil water to produce steam at high pressure and temperature. The steam in turn is expanded in a turbine to rotate the shaft, this rotation drives an electrical generator from which the electricity was sent to the user positions. Additionally, flues are needed to remove heat produced as a by product of the process (no emissions trading back then!).

It became clear that this part of the site was the substantial remains of this power station. The electricity generated was used in the mine and the works area and reticulated to the port. It was even said to be used in the workers’ cottages near the mine.

We have been attempting to reconstruct the power station and its processes from the extant remains on the site. So far we have identified the 7 m long cast iron riveted flue from which the gases from the combustion of the coal were discharged into the air – including carbon dioxide, fly ash and mercury. We also located the coal...
Bay or from even further afield if they were used as ballast on the inward journey of the coal carriers. Another common type was the usual industrially-made brick with the standard frog indentation. Unusually, however, no company name is impressed into any of these bricks. Both of these bricks types were commonly used in construction of chimneys, homes and the like.

The most interesting bricks recorded were the firebricks. These are bricks that can withstand high temperatures and are used to line flues, stacks, furnaces, and fireplaces. In general, such bricks have high melting points that range from about 1540°C (2800°F) for fireclay to 2200°C (4000°F) for silicon carbide. They also should resist the chemicals in slags and not spall, i.e. flake, under wide temperature changes.

The bricks come from a number of different brick works. We have managed to follow up on several of these bricks, some of which were imported from Great Britain. The Cowen bricks were made by Joseph Cowen & Co., Blaydon-on-Tyne, England and the Glenboig bricks came from Scotland.

The HB & Co bricks are all five sided with one corner cut off which indicated that these were specially produced for an arch construction. It appears that they were imported from Newark, New Jersey in the USA or, perhaps more likely, they came from the Hoffman Brick & Potteries in Brunswick, or from the Darley Fire Brick Co or the Australian Gas Retort & Fire Brick Manufacturing Co – both of which were located in South Yarra.

There is a lot more research that could be undertaken on the bricks. We would be interested to know if these bricks were ordered separately from the various brick works or came from one supplier who stocked such a wide variety from around the world.

At the time of writing we are preparing a detailed site plan of the electricity plant area from which it is hoped that we can understand how the power station worked. We will probably need to show this to experts in the field of power stations. Huon District staff are following up on some local people that have memories of the site or at least were told stories by their parents/ grandparents. Already these interviews have given some details, such as the woman who had to move her family from one cottage to another when she couldn’t get rid of the rats in the first abode. Also, we have leads that there is an additional large mine some 5 km distant from this site. We may live in hope but maybe someone out there has some photos of the plant when in operation or some of the associated mine and tramway site.

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Shaping the Forest Practices Code for the future

Graham Wilkinson, Chief Forest Practices Officer, Forest Practices Authority

Graham reports on the three regional workshops that the FPA organised in October to provide an opportunity for Forest Practices Officers to have input into the review of the Forest Practices Code.

Does the Forest Practices Code need to be reviewed? This was a pertinent question asked at the recent regional workshops and summed up best by one FPO who suggested that the only necessary change was to change one number to make the Forest Practices Code 2000 become the Forest Practices Code 2010. Although this may be regarded by many as an overly minimalist approach, it reflects a strong view that the current code is in pretty good shape and that there is no reason to have change for the sake of change.

I don’t disagree that the code is still a very effective tool for the job that it is asked to do. This is partly because it is supported by a range of planning tools and training programs, which are being constantly updated and improved. But what is the ‘job’ that the code is asked to do? Put simply, the code is the workshop manual for how forest practices should be conducted. That is, the code is about ‘how to do’. This begs the question ‘what to do?’ Herein lies the challenge.

Forest management in Tasmania is subject to a number of laws and policy devices, including the Forest Practices Act 1985, the Forestry Act 1920, the Threatened Species Protection Act 1995, the Environmental Management and Pollution Control Act 1994 and the Regional Forest Agreement. There is always a tension in seeking to deliver the objectives of this legal and policy framework in a manner that achieves a reasonable balance of environmental, economic and social benefits. This task is not helped by the lack of an overarching forest policy statement for Tasmania that would set out clear objectives and measurable outcomes for sustainable forest management. Even if there was such a statement, there is the added challenge that knowledge and attitudes change over time. Incremental change is an important part of adaptive management and continuing improvement, but it also represents a significant sovereign risk to forest managers and the timber industry, which need a secure operating environment for the long term investment and management decisions that are required in forestry.

This brings me back to the role of the code. Previous editions of the code have brought about significant improvements in the manner in which environmental values are managed in forests that are used for wood production. None of these improvements has come about without increased costs to forest managers. Further improvements in environmental outcomes and the ‘social acceptability‘ of forest practices can only be achieved if both forest managers and the broader community are prepared to accept the consequences of any increased management costs.

So what does all of this mean for the review of the code? At the FPO workshops there was a range of views about how we should deal with issues such as smoke management, the regulation of chemical use and the type and intensity of forest management regimes, including clearfelling and the size and dispersal of coupes. Some of these issues, such as smoke and chemical management, require a technical response through either the code or complementary legislation. Others, such as the type and intensity of forest management regimes, require a high level policy response because they fundamentally shape the future of the forest industry.

Discussions at the workshops also focussed on the issues of equity and certainty. On the principle of equity, FPOs want more recognition that forest practices are regulated to a vastly higher standard than comparable land uses such as agriculture and grazing. Most FPOs pride themselves on going above and beyond the minimum legal standards, only to be dismayed by the much poorer standards applied in other forms of land use. On the issue of certainty, FPOs simply want to have clear rules and guidelines to follow. They value the responsibility that they have been given by the FPA to plan and monitor their operations. However, they want good planning tools that support their decision-making processes, especially in complex and sensitive areas such as biodiversity and smoke management. They recognise that their companies and clients cannot operate in isolation and they want planning tools that provide a more integrated and strategic approach to forest planning and management across all tenures.

One of the most heartening aspects of the FPO workshops was the high level of participation and interaction of FPOs from across the various regions and organisations. The comments were positive and constructive. The ‘take-home message’ for me was that the forest practices system is in good hands. Out in the forest we have a dedicated and highly skilled body of people who take much professional pride in delivering high standards of forest practices. The onus is now on senior management within government and the private sector to deliver a policy and regulatory framework that provides a clear vision for the sustainable forest management of our native forests and plantations into the future. Once the ‘what to do’ is clear, I am confident that the ‘how to do’ can be very effectively delivered through the Forest Practices Code.

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Forest Practices Officers: are you moving?

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

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Treefern Survival Project update

Nina Roberts, Scientific Officer (Biodiversity), Forest Practices Authority

Nina fills us in on the major treefern project which was set up by the FPA’s Simon Davies in 2006. We first heard about this research in the article ‘Treefern major experiment’, Forest Practices News vol 7 no 1, February 2006.

Field work has recently recommenced for the Forest Practices Authority’s treefern monitoring project, which is examining survival of Dicksonia antarctica following logging operations. The three study coupes in which permanent monitoring plots were established (one clearfell, one aggregate retention and one cable harvest) were harvested and burnt by the end of Autumn of 2007.

During the last round of field work, which was conducted soon after the burns, it was often not possible to say whether the treeferns were alive or dead – they just looked like black stumps or (more often) logs. However our recent field foray to one of the coupes found that most of these previously lifeless trunks had sprouted a luxuriant head of green fronds, even when the trunk itself had been bowled over and ‘relocated’ by the physical disturbance associated with logging.

Whilst the resilience of these treeferns is probably no surprise to most (as they’re often among the first signs of green returning to a logged coupe), you may be surprised by just how much they move around during a logging operation. We found somewhere in the order of 60–70% of the original ‘tagged’ treeferns in our monitoring plots simply went missing, never to be seen again. This could only partially be explained by inaccuracies in re-locating the plot boundaries after logging. Other explanations include treeferns being buried too far under slash to be found or treeferns being relocated well beyond the plot boundaries by mechanical disturbance (most likely assisted by gravity when plots were on slopes).

Slightly less plausible, but not to be dismissed, is the possibility they uprooted themselves in an Ent-like fashion to move on to greener pastures. The exodus of tagged treeferns was almost balanced at the coupe scale by the arrival of new, untagged treeferns in monitoring plots.

Field work will continue into summer and survival rates will be analysed upon completion.

This article first appeared in Biobuzz, the e-newsletter of the CRC for Forestry’s Research Programme Four: Trees in the landscape.

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Proof that treeferns can uproot themselves and walk like Ents (from Lord of the Rings) comes from this photograph taken in what was Dismal Swamp by Forest Practices News’ editor Chris Grove.

Editors’ corner

The Forest Practices News’ photograph competition has been extended until March to allow time for more entries – see page 13. Hopefully some of you will find time over the summer to enter.

Also coming up are the Forest Practices Awards. Nominations will be called for in the April issue of Forest Practices News.

Forest Practices News aims to publish material that you, the reader; find relevant, useful and inspiring. The forest practices system is based on adaptive management and we are always keen to document these adaptations. If you are working on developing a new approach that you would like to share, please get in touch and we will work with you on writing an article.

We are also keen to publish case studies of challenging coupes which show the forest practices system in action. Or you may have another great idea to include in the next issue. So, please get in touch!

If you would like to send in a contribution to Forest Practices News, please contact the editors. Include illustrations and a photo of yourself with your contributions. Contributions can be supplied either as hard copy or electronically. If forwarding material electronically, please ensure that figures/pictures are sent as separate files and not embedded in Word documents. Our address is: Chris.Grove@fpa.tas.gov.au

Chris Grove and Peter McIntosh
Forest Practices News Editors

Deadline for contributions to next Forest Practices News: Monday 8 March 2010
Bats and forest remnants

Earlier this year, Lisa Cawthen began her PhD project entitled ‘The contribution of forest remnants to the persistence of micro bats in the landscape: local and landscape factors that affect their use’ (see Bats – a new PhD project in Forest Practices News vol 9 no 4, September 2009). Lisa, a CRC for Forestry supported postgraduate student, was recently awarded $3884 from the Norman Wettenhall Foundation. This funding will be used to purchase tiny microchips weighing a mere 0.067g that will be used to identify individual bats captured in Lisa’s study, enabling her to collect data on bat population demographics and abundance. Lisa has also been busy trapping bats in southern Tasmania and collecting reference calls for a bat call identification key that will be used to identify bat calls collected later in her study. To-date, Lisa has captured 73 bats and collected over 100 reference calls of Tasmania’s five bat species.

The effects of forest type and habitat disturbance on small to medium-sized mammals

Erin Flynn started her PhD in 2006 and has just presented her final seminar ‘A multi-dimensional approach to examining effects of forest type and habitat disturbance on the common brushtail possum’ to the University of Tasmania School of Zoology. This was part of the ‘Reach into Research’ program, an initiative by the school to involve undergraduates in research and engage them in a friendly and unintimidating atmosphere. Her talk was well received by the audience which included undergraduate and postgraduate students, student volunteers, academics, and interested members of community. Erin said it felt great to be able to tell people about what is going on in her sites and why her project was worth doing. Volunteers were excited to see the end result of their hard work. Erin is currently writing her thesis, which is due to be submitted mid next year.

Erin’s research focused on brushtail possums but she has also examined the faunal community of which they are part as well as the landscape that they live in. She is currently completing her first paper on the occurrence of small to medium-sized mammals in dry and wet forest in Tasmania, including areas regenerating after harvest.

Erin recorded 15 small to medium-sized mammal species across her study sites, which were located in the wet north-eastern forests and the dry south-eastern forests of Tasmania. She found no significant difference in species diversity and richness between forest types, disturbed and undisturbed sites, or the combination of forest type and disturbance. However, the presence of particular species varied according to forest type and the abundance (number of individuals) of some species varied significantly between sites. The total number of individual animals and the total captures were influenced strongly by forest type and disturbance, with most animals and captures found in dry disturbed forest sites.

The floristic community found in the disturbed sites of each forest type was found to be similar to that found in the relatively undisturbed sites. Habitat structural complexity and the forest-age profile of the landscape surrounding the research sites did not vary significantly between sites, indicating that resource (food and refuge) availability were broadly equivalent across sites. Although abundance of some habitat components changed significantly with harvesting, habitat retained in areas surrounding the harvest area appeared to mitigate the effects of harvesting on ground-dwelling mammals.

Abundance of some species (potoroo, bettong, eastern spotted quoll, and long tail mouse) is higher in disturbed habitat than in undisturbed habitat. This may be related to food availability.

Brushtail possum numbers are much lower in disturbed habitat and there is also a male-biased adult sex ratio in these sites. This is being explored in greater detail.
Where are the Quolls?

Shannon Troy started her PhD on the landscape ecology of the spotted-tailed quoll in late 2008 (see ‘Spotted-tailed quolls – closing the knowledge gap’ in Forest Practices News vol 9 no 3, June 2009). Following very low spotted-tailed quoll capture rates in north-western Tasmania during her first major stint of field data collection, Shannon is now testing the efficacy of four spotted-tailed quoll survey methods: live-trapping, remote video cameras, scat searches and hair-tubes. She plans to identify individual quolls by two techniques: (1) matching up the spot patterns of quolls caught on camera and quolls trapped; and (2) genetic testing of quoll scats, quoll hairs deposited on hair-tubes, and trapped quolls. Hair-tubes are baited open cylinders — when the animal enters the cylinder, some hair sticks to double-sided tape.

The number of individuals detected by each method will be determined. So far, data has been collected from eight 100 ha survey units located in and around Narawntapu National Park in northern Tasmania. Results are yet to be analysed, but hair-tubes detected quolls in at least three of eight survey units; cameras detected at least three individual quolls in three survey units; trapping detected just one quoll from one survey unit; and scat searches detected no spotted-tailed quolls. A further eight sample units will be surveyed during November and December this year; four around Hastings and four around Arthur River. The method that detects the highest number of individual quolls will be used in future field surveys that will test the predictive powers of Tasmanian spotted-tailed quoll distribution and habitat association models.

Ecosystem impacts of Tasmanian devil decline as a consequence of devil facial tumour disease (DFTD)

Tracey Hollings has just completed her first round of fieldwork, with 48 field sites around the state being surveyed using motion sensor cameras and hair-tubes. Results are still being analysed but they should shed some light on what devil decline will mean for the future of Tasmania’s ecosystem. The videos make for some fascinating wildlife viewing!

Aggregated retention and small mammals in old growth forest

We heard from Helen Stephens in the June 2009 issue of Forest Practices News (vol 9 no 3), where she outlined the preliminary results of the first stage in her project which is concerned with the response of small mammals to different operational treatments in State forest. Helen was recently awarded a $20 000 grant from the W V Scott Charitable Trust, which will help fund the second stage of her project: ‘Impacts of an alternative logging practice, aggregated retention, on two native rodents, the swamp rat (Rattus lutreolus) and long-tailed mouse (Pseudomys higginsi).’ We look forward to hearing more results from Helen in future issues of Forest Practices News.

Owls and freshwater snails

Updates from other FPA supported students – Mick Todd (ecology of the masked owl), Karen Richards (habitat preference of hydrobid snails) will be provided in future issues of Forest Practices News.

Quaternary deposits of the lower Huon valley

Jorge Martins, a PhD student from East Timor, is continuing his study into the stratigraphy and size characteristics of enigmatic Quaternary deposits at Home Hill and Cradoc Hill, near Huonville and Cygnet respectively. The Home Hill deposits appear to fine slope colluvium deposited prior to (but close to) the last glacial maximum. Stratigraphic studies indicate that the Cradoc Hill deposits, of about the same age, that were initially thought to be aeolian, may be fine alluvium. These deposits contain a prominent palaeosol (buried topsoil horizon) that may match with a dated palaeosol in New Zealand. Both the Home Hill and Cradoc Hill deposits are exposed in recent landslide backwalls.

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Denise reports on a conference, for which she chaired the organising committee, that was held in September at the Tramsheds, Inveresk in Launceston.

The joint conference of the Australasian Society for Historic Archaeologists and the Australasian Institute for Maritime Archaeologists was a highly successful conference, attracting over 100 delegates from Australasia. The conference was launched by the Minister for Heritage and local MP Michelle O’Byrne at a reception held at the Phenomena Factory at the Queen Victoria Museum and Art Gallery. The Minister stressed the high level of significance of Tasmania’s archaeological heritage – both historic and maritime (shipwrecks) – in her welcome to delegates.

Over three days, professional papers were presented that focussed on the role of Australasia in developing a global economy. These ranged from presentations on transporting ideas, people and culture to the internationalisation of heritage management and conflict archaeology or battlefield archaeological research. A major session chaired by Denise Gaughwin and Richard Tuffin of Austral Archaeology Tasmania centred on the extraction, exploitation, processing and transport of raw material. Archaeologists explored a range of topics including convict coal mining in Tasmania, water wheels on the Plenty River near Melbourne, gold mining in Queensland and a sawmilling community at Lake Cootharaba near Noosa.

The conference sponsored a public talk by Lt. Colonel James Brownlie, who is the project manager for the Australian Fromelles Project Group. The central aim of this group is to recover, indentify and re-inter the Australian and British soldiers discovered in a mass grave in northern France. James provided a brief background to World War I and the reasons for the Battle of Fromelles. He described the battlefield as it was in July 1916 and the orders for the troops. Although it was the first battle involving Australians on the Western Front, some of the soldiers had already had battle experience as the 5th Australian Battalion was a new battalion made up of survivors from Gallipoli.

These men were at a disadvantage as, although considered battle hardened, the soldiers and their officers had little training in artillery battle techniques, only a basic level of field communication and a poorly conceived battle plan. After a night and a day of fighting, 5533 (or 90%) of the Australian soldiers were killed, wounded or taken prisoner.

In 2008, research by an Australian amateur historian, Lambis Englezos, identified a mass grave in a field at the edge of Pheasant Wood, on the outskirts of Fromelles. Bodies had been transported there by German soldiers on a narrow gauge trench railway on 22 July 1916, before being buried in eight pits. James described the Fromelles Project from conception through to the planned Commemorative Event. The process of discovery of the graves, recovery of the remains, the identification process, reinterment and finally the commemorative event on the 94th anniversary of the battle on 19 July 2010 to honour the service and sacrifice of the men was outlined.

The FPA sponsored the prizes and awards for the best papers, posters and photographic entries presented to the conference. Book vouchers and Tasmanian produce were presented to the winners selected by all delegates to the conference.

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Tree Decline Toolbox

Neil Davidson, Senior Lecturer, School of Plant Science, University of Tasmania

‘Tree Decline Toolbox’ is an innovative new interactive computer programme designed to assist forest managers and farmers manage native forest remnants affected by tree decline or at risk of decline. The toolbox is the culmination of 10 years of research into the causes of tree decline in native forest remnants and approaches to restoration. This project, and the research behind it, has been supported by the Natural Heritage Trust, NRM South, CRC for Forestry, Bushfire CRC and Greening Australia.

The toolbox first asks a land manager to identify the current state of the forest. The choice is assisted by more than 100 photographs and notes depicting how native forest remnants are affected by each of the 12 driving ecological factors associated with tree decline. The forest is then given a score of 1–100 and is put into one of six health categories. Against each health class is a set of images showing the typical characteristics of each class.

The toolbox then asks the land manager to choose one or many treatments, each of which may improve or damage the forest. The treatments are applied at 20-year time steps and a future state of the forest is calculated as a score of 1–100. At each time step the new state of all the derived variables and the new health category is highlighted. The land manager can then compare the score of the proposed treatment (future state) with that of the current state to see if the proposed treatment is likely to be effective.

There is also a cost calculator in which the costs for every treatment have been itemised. This is editable, so managers can adjust the costs to reflect the costs of materials and labour at a local scale. The cost calculator can be used to determine whether it is better (cheaper) to act now to improve the condition of a remnant or leave the remnant unmanaged but risk forest decline.

The great advantage of this approach is that it requires no botanical knowledge and no prior knowledge of the attributes of a healthy ‘benchmark’ forest. It uses many of the same ecological factors incorporated into other forest assessment systems, such as Habitat Hectares, but requires no prior knowledge of the forest type or its plants. The toolbox is based on observation, and choices made on forest health using photographs and explanatory notes.

This is the first draft of the Tree Decline Toolbox (Tree Decline Toolbox Version 1.0) and is a pilot version distributed to gain input and advice so the program can be improved. We are about to make changes to the toolbox following advice gained from a series of four workshops we have just run in Tasmania. We will then get an independent scientific review of the toolbox. If you are interested in looking at the current version or testing out the upgraded version of the toolbox, CDs can be obtained from the author. In the future, we hope to adapt the toolbox for other regions in Australia and include a more sophisticated treatment of ecological processes that will overcome some of the limitations outlined below.

Limitations

The level of sophistication of this version of the toolbox does not allow us to accurately describe all the complex interactions between ecological factors that exist within native forest systems. The model presents linear decline and recovery profiles in response to changes in management. These processes may be non-linear. We are currently adjusting the toolbox so it takes account of thresholds (sticking points preventing recovery) that forests reach during the process of decline.

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The FPA’s Senior Landscape Planner organised a one-day workshop in Launceston in November to discuss the application of computer-based visual landscape analysis in Tasmanian forestry. A number of foresters from across the industry were invited to attend and share their recent experiences in this field.

The aim of the day was to review computer-based methods for predicting, assessing and improving the visual presentation of forest operations in the scenery. The meeting explored the opportunities for greater efficiency and effectiveness of the analysis process as well as technological constraints.

The day brought together eight of the intrepid people within Tasmania who are currently involved in computer-based visual landscape analysis. Some officers with experience in this field were not present. Most industry companies and Forestry Tasmania were represented, as well as independent forest consultants.

The participants presented examples of their visual landscape analyses covering both native and plantation forestry operations. As most of the planners have been operating independently of each other, analytical methodology and software operation varied. Good discussion occurred on software intricacies, data issues and standards achieved. The principles and techniques best suited to different forest silviculture and landscape situations were also discussed.

**Key points**

- The necessity of a basic visual landscape analysis: a basic-level computer analysis (i.e. seen-area and simple 3D review) is warranted for the majority of operations. This is relatively straightforward to carry out and ensures that no visually-prone operations and affected viewpoints are missed. Staff should routinely conduct this basic-level review to supplement their understanding of viewing exposure.

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**Case study**

Computer-aided visual landscape analysis is used to review design options for forest practices in order to develop a design which achieves good visual integration with the landscape. In this example, provided by Forest Practices Officer Scott Livingston, the original design option for conversion of native forest to a eucalypt plantation (middle image) dominated the native forest hillside because the coupe was big and had straight boundaries which were unsympathetic to the contours of the hill and it was placed quite high on the hill, approaching the skyline. Modelling was used to review different coupe options before the design in the bottom image was selected. The main features of this design which assisted in integrating the plantation into the landscape were: using an irregular, flowing and non-geometric coupe boundary in keeping with the landform; increasing the skyline reserve; and retaining strategically placed native forest stands which screened most of the coupe from view.

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*Original view of the hillside with native forest.*

*The initial eucalypt plantation proposal.*

*The final design for the plantation, after computer-aided visual landscape analysis.*
• Comprehensive visual landscape analysis is not always necessary; normally this is only required in particularly sensitive and significant viewing instances. The basic review will ensure that these situations are identified.

• The need for training: basic and comprehensive training in computer-aided visual landscape analysis would expand the use of these tools throughout the industry as well as improve the expertise of current users. The aim would be to achieve good working knowledge of ‘state of the art’ capability.

• The importance of visual landscape analysis in plantation harvesting: visual analysis and simulations would be of benefit for strategic planning and scheduling of harvests, as well as for design of individual coupes. Good examples of visual simulations for plantations by Gunns Burnie and FPA were presented and discussed at the workshop.

• Collaboration between forest planners and visual landscape analysts: close collaboration is essential in the iterative process of analysis and design of visually effective coupes by the visual analysts.

• Monitoring to ensure good standards are being achieved: this is the final step in visual landscape analysis. Comparison of the simulated predictions against post-harvest photos is an essential step in the review of the simulation accuracy as well as the quality of the recommended visual design.

• Working groups: the workshop enabled people working with the two simulations platforms of Visual Nature Studio (VNS) and EnVision to share expertise and address technical opportunities and difficulties. An FPA web page will be established to allow sharing of specific visual management data and examples of project analysis and simulations.

• Technical aspects were discussed, such as the need to sometimes adjust boundaries of PI type data for precision of vegetation modelling to match reality.

Most participants agreed that more widespread application of visual assessment, based on computer aided visual landscape analysis, is likely to reap benefits for improved forest practices and ultimately for visually appropriate presentation of the industry within the Tasmanian landscape.

So thanks to all who participated in this forum. For forestry staff not present at the workshop who are similarly involved or have an interest in computer aided visual landscape analysis, please contact the Senior Landscape Planner at FPA for the full workshop report and to be informed of future workshop and training opportunities.

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Computer-aided visual landscape analysis

Forest Practices News photo competition

The first ever Forest Practices News forest practices photo competition has been extended as we didn’t get very many entries. Hopefully some of you will have more time over the summer to send us in a few photos. The winners will be announced in the April issue.

Who can enter?
Anyone can enter. To eliminate any personal bias, the judges will not know who took the photos that they are considering. This means that even FPA staff can enter!

What kinds of photos can I enter?
You can enter as many photos as you like in any or all of the following categories:
• Working in the forest
• Natural values – flora
• Natural values – fauna
• Natural values – rocks and water
• Cultural values
• Forested landscapes
• Quirky

What format should the photos be in?
The photos must be in electronic format. Please ensure that the images are of high enough resolution to print well – if in doubt, please email Chris.Grove@fpa.tas.gov.au.

How do I enter my photos?
Please download the electronic form on the news section of the FPA website’s home page, fill it in and email it to Chris.Grove@fpa.tas.gov.au, attaching the electronic image(s). Please make sure that the file name matches the name you have entered on the form. Entries must be received by close of business on Monday 1 March 2010.

If you do not have internet access, please call Chris Grove on 6216 4455.

What are the conditions of entering the competition?
Entry is free, but the FPA may use your photo in future publications. If this occurs, you will be acknowledged as the image’s author.

What are the prizes?
There will be one winner in each category, and one overall winner. The winning photos will be published in a colour supplement of the April issue of Forest Practices News.

Who will judge the competition?
The competition will be judged by a three-member panel including the Chair of the board, an FPA staff member and an external judge.
The first year of the revamped FPO Course concluded on 22 October 2009.

The four week-long stages contained subject matter of previous years as well as three new modules: Fire Management in Forest Practices, Communication/Conflict Resolution, and Certificate of Compliance. Each module had an associated assessment. However the closed-book test in the last stage was removed this year. (This was to a great relief of some participants – I suspect they had been ‘warned’ by previous years’ attendees!) Participants were required to submit 15 pieces of work that used a range of assessment methods: multiple-choice tests (open book), projects, case studies, long or short answer questions.

The new nationally accredited FPO training course has been designed to ensure that previous years’ courses become valid and creditable. Accreditation is important: accreditation and the associated quality assurance ensure greater acceptance by various stakeholders in the national forest industry. Module assessments fall into line with five national units’ key competencies and now comply with national competency standards. To ensure that their particular assessment conformed to competency standards, each presenter used the new format to revamp their talks as well as participating in workshops. The FPO Course Coordinator undertook training in Certificate IV Training and Assessment to enable her to assist presenters.

With continual improvement in mind, the FPA will hold a workshop for course presenters in early February 2010, auspiced by our Registered Training Organisation – the Tasmanian Skills Institute. At the workshop, 2009 Course assessments and training will be validated and necessary improvements for the 2010 Course decided.

An invitation for course candidates will be sent out to forest industry organisations in March 2010. Each module has desirable prerequisite skills and knowledge and if potential candidates do not have the necessary prerequisites to attend the 2010 FPO Training Course, the FPA will run supplementary course(s) before the Course. Information on Course module prerequisite skills and knowledge can be found in the FPO Training Resource Manual on the FPA website <www.fpa.tas.gov.au> under Publications – Forest Practices Officer Training Resources. See page 14 for the courses organised for 2010.

Comments from some of this year’s Course participants ...

‘A couple modules of were a bit ‘full on’ with information, compared to the skills we may need for the field. I have taken a lot from the course, and hopefully it is a step closer to what I aim to achieve within the forest industry. I find when I talk to other FPO’s from previous courses, they also had to manage assignments as well as doing their day to day duties, so I really had to accept that side of the course with deadlines.’

‘I thought the venue locations were good – even Maydena (could have been better with dry wood, and the champagne wasn’t too good!). Every participant doing the course were [sic] great to get along with and by the time the course ended I felt I had made some good contacts. It’s an industry where we will always cross paths somewhere and it’s good to have these connections. Just hope now I get my FPO accreditation!’

‘I found the Forest Practices Officer Course really confirmed aspects of the industry that I deal with on a daily basis. It provided me with the skills and knowledge to perform tasks in areas of the industry that I don’t see often. The training and assessments suited my learning style and it was great to meet other young employees in the industry. Ultimately, the course has made me a more knowledgeable, rounded employee with the ability to provide a greater service to my employer. It has even more entrenched my already strong confidence in our Forest Practices System.’

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Jo.Field@fpa.tas.gov.au
The Forest Practices Officer training course included, for the first time, a session by the FPA’s Publication Officer on the publications and information resources produced by the FPA. The presentation focussed on Forest Practices News, with which many trainee FPOs were already familiar. The frequency with which various categories of articles have appeared between February 2006 and June 2009 was presented to the FPOs (Table 1), who were then asked to rank which categories they would most value seeing in Forest Practices News (Table 2).

The top three categories identified by the FPOs correspond exactly with the most frequent categories of article in Forest Practices News, which is reassuring as it indicates that, for this particular group of trainee FPOs at least, we are meeting the expectations of our readership.

However, after the first three categories, the neat correlation breaks down somewhat. It appears that the trainee FPOs would like to see more articles about the FPA’s specialist and compliance programs, coupe case studies and silvicultural research. Conversely, the trainee FPOs would like to see fewer articles on conference reports, the Forest Practices Awards, FPA staff and interviews with people experienced in the forest practices system.

What are your thoughts on Forest Practices News? Do you agree with this group’s assessment? We are always keen to get feedback from readers to assist in making Forest Practices News a relevant and interesting publication.

There is one more neat correlation worth pointing out – articles about Forest Practices News ranked second last in both the frequency of articles in recent issues of Forest Practices News and the FPOs’ ranking. So if that is anything to go by, this will be the last article you see in Forest Practices News about Forest Practices News for some time!

Author’s contact:
Chris.Grove@fpa.tas.gov.au

### Table 1 The most frequent article categories in FPN between February 2006 and June 2009

<table>
<thead>
<tr>
<th>Categories of articles in FPN</th>
<th>Ranking of article categories (1 = most frequent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest practices system</td>
<td>information on how the system works and updates on changes to the system</td>
</tr>
<tr>
<td>Fauna</td>
<td>general information or research reports on fauna</td>
</tr>
<tr>
<td>Botany</td>
<td>general information or research reports on flora</td>
</tr>
<tr>
<td>Forest Practices Awards</td>
<td>interviews with award winners</td>
</tr>
<tr>
<td>FPA staff</td>
<td>news on new and departing staff</td>
</tr>
<tr>
<td>Interview</td>
<td>interview with someone experienced in the forest practices system</td>
</tr>
</tbody>
</table>

### Table 2 The categories of articles in FPN most requested by trainee FPOs

<table>
<thead>
<tr>
<th>Categories of articles in FPN</th>
<th>Ranking from participants in FPO training course (1=most valued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest practices system</td>
<td>information on how the system works and updates on changes to the system</td>
</tr>
<tr>
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<td>general information or research reports on fauna</td>
</tr>
<tr>
<td>Botany</td>
<td>general information or research reports on flora</td>
</tr>
<tr>
<td>Geoscience</td>
<td>general information or research reports on geoscience</td>
</tr>
<tr>
<td>Silvicultural research</td>
<td>reports on silvicultural research</td>
</tr>
<tr>
<td>Compliance news</td>
<td>news from the Compliance Program</td>
</tr>
</tbody>
</table>
The Forest Practices Authority’s web site

Chris Grove, Publications Officer, Forest Practices Authority

Web site redesign – your input valued

The FPA will redesign and update the content on the FPA web site in the first half of 2010. It’s been almost five years since the last overhaul, which is quite a long time in cyberspace. The primary aim of the redesign will be to ensure that users of the site will be able to locate the information they are seeking as easily as possible. We would value your input on this – if you have any suggestions about how to make the web site more user-friendly, please contact the author.

The current web site

In the meantime, the FPA recently discovered that some Forest Practices Officers were not aware of some of the useful information on the FPA’s current web site. The best way to find out what is on the web site is to have a browse, but here are a few pointers…

The FPP Location map

The FPP map provides a simple interactive map showing the centre point of all active FPPs. This service is freely accessible to the general public. An area of interest can be found by searching for plan numbers, road names or towns. Alternatively, manual zoom tools can be used. Once the FPP of interest has been located, an information button will provide the details of the FPP, including the FPP number, location, commencement date, expiry date, property numbers and the easting and northing co-ordinates.

The ‘Advisory’ tab

The technical material produced by the FPA’s specialists is all under this tab. A review of the existing flora and fauna technical notes available on the FPA web site has been undertaken in recent months by Biodiversity Program staff, and the six flora technical notes that have previously been available on this web site have now been updated. The version number and date of release appears in the footer so that FPOs can quickly ensure that any hard-copy technical note they may have is current. Technical notes in the Fauna Series are also being updated and added to, so stay tuned.

The ‘Publication’ tab

This is where you will find the publications produced by the FPA, such as the famous Forest Practices News, the annual report and the State of the Forests Reports, to name but a few. The documents associated with the biodiversity review of the Forest Practices Code are also under this tab.

The ‘Information for Landowners’ tab

This tab contains links to information relevant for landowners thinking about harvesting their forest, making it easier for them to access the information they are seeking. FPOs working with landowners may find this a useful resource.

Remember to get in touch if you have any suggestions for the revamp of our web site.

Author’s contact:
Chris.Grove@fpa.tas.gov.au

<table>
<thead>
<tr>
<th>Course</th>
<th>Contact</th>
<th>Timing</th>
<th>Duration</th>
<th>Location</th>
<th>Course Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geology for Foresters</td>
<td>Peter McIntosh, Senior Scientist, Earth Sciences Program <a href="mailto:Peter.McIntosh@fpa.tas.gov.au">Peter.McIntosh@fpa.tas.gov.au</a></td>
<td>18–20 May 2010</td>
<td>3 days</td>
<td>Tullah</td>
<td>Details to be advised. Contact if interested in attending. (Attendance at this course will meet the geological prerequisite for the FPO Training Course.)</td>
</tr>
<tr>
<td>Giant freshwater crayfish field day</td>
<td>Anne Chuter, Ecologist <a href="mailto:Anne.Chuter@fpa.tas.gov.au">Anne.Chuter@fpa.tas.gov.au</a></td>
<td>10 March 2010</td>
<td>1 day</td>
<td>NE Tasmania</td>
<td>Training provided will include use of the map during planning, identification of potential habitat, identification of the giant freshwater crayfish and its conservation requirements.</td>
</tr>
<tr>
<td>Forest Botany</td>
<td>Anne Chuter, Ecologist <a href="mailto:Anne.Chuter@fpa.tas.gov.au">Anne.Chuter@fpa.tas.gov.au</a></td>
<td>March–April 2010</td>
<td>1 day</td>
<td>SE, NE and NW Tasmania</td>
<td>Flora of Tasmania: identification of species and communities, forest ecology and legislation. (Attendance at this course will meet the flora prerequisite for the FPO Training Course.)</td>
</tr>
<tr>
<td>Forest Practices Officer Training Course</td>
<td>Jo Field, Forest Practices Advisor <a href="mailto:Jo.Field@fpa.tas.gov.au">Jo.Field@fpa.tas.gov.au</a> Phone: 6336 5380 Mobile: 0428 354 061</td>
<td>2010 – July, August, Sept, Oct</td>
<td>12 days total</td>
<td>3 days each location</td>
<td>Prerequisite course for appointment as FPO. Desirable prerequisite skills and knowledge must be met by candidates prior to acceptance onto this course.</td>
</tr>
<tr>
<td>Forest practices for supervisors</td>
<td>Katie Sciberras, HR Training Officer, Forestry Tasmania <a href="mailto:Katie.Sciberras@forestrytas.com.au">Katie.Sciberras@forestrytas.com.au</a> Phone: 6235 8114</td>
<td>11–14 Oct</td>
<td>4 days</td>
<td>East Coaster, Orford</td>
<td>General training in forest practices for forest industry supervisors</td>
</tr>
</tbody>
</table>
To many people cliffs are things to fall off, for some people cliffs offer recreational value and the pursuit of a challenge, and in the past cliffs and rock shelters offered protection, but why do cliffs form? What is their significance in Tasmania’s Geoconservation estate? And how do we protect these features?

The location of sandstone cliffs

Cliffs are found throughout Tasmania in a range of rock groups. However sandstone cliffs pose the greatest range of environmental and geoconservation issues within Tasmania’s production forest. Extensive cliffs form mainly in three main sedimentary rock types: Parmeener Supergroup, Mathinna Beds and Permian siltstones and tilites.

Sandstone cliff morphology

Recently I have visited a number of coupes with sandstone cliffs when advising on planned forestry operations. Although often considered a routine and somewhat uninteresting geomorphic landform, sandstone cliffs are an important characteristic of a landscape and provide clues to its formation. In central and eastern Tasmania, cliffs are common landforms in the sedimentary Parmeener Supergroup rocks and Mathinna Beds. They typically form in horizontally-bedded sedimentary rocks through the process of knickpoint propagation and cap rock retreat caused by the preferential erosion of softer sedimentary beds. Water and wind play important roles – where beds of horizontal lying strata are exposed at the surface, the impact of sand grains or salts carried by the wind and the erosion effect of surface water preferentially dislodges grains of rock from the cliff face along structurally weak planes. Mechanical weathering along weak zones in the cliff line may be assisted by tree roots and vegetation growth. As softer and weaker beds erode, the surrounding resistant beds start to form overhangs.

This process of preferential weathering continues until the overhang collapses. Block fall from overhangs is the common form of collapse and has the effect of renewing the cliff face so that the cliff retreats into the surrounding bedrock slopes. In some parts of the state the difference between the rate of erosion of the highly erodible siltstones and the more massive and resistant sandstone beds is so great that the retreat of the cliff back into the hillside is faster than the weathering of the large blocks of coarse material left behind from past collapse, leading to extensive scree slopes downslope of the active cliff face. At Mt Blackboy in the north-east, an extensive scree slope composed of massive blocks of resistant sandstone up to 10 m wide has developed as a result of rapid erosion of siltstone beds within the 15 m tall cliff upslope. Such scree slopes may be unstable and susceptible to mass movement including boulder topple and landslides, posing management issues for harvest operations.

Tafoni and sandstone caves

Sandstone caves form where differential weathering is pronounced enough to lead to enlarged overhangs. They can form
The morphology and management of sandstone cliffs

anywhere on a cliff face but most commonly form at the base of the cliff. Meander caves can form where streams erode soft sediments at the base of a rock face. Tafoni is a word used to describe intricate pitted weathering patterns within sandstone cliffs. Tafoni are formed by the weathering effects of salts in dry to semi-arid environments. The effects of salt weathering and wind transportation and erosion can produce bizarre caves and cliff shapes within susceptible rock types. In Tasmania, areas of Parmeener Supergroup rocks are susceptible to salt weathering in the drier south-east of the state. A number of sites with tafoni are listed on the Tasmanian Geoconservation Database (see ‘Tasmanian Geoconservation Database Version 6′, Forest Practices News vol. 9 no. 1, September 2008). Landforms in areas such as the Bluff and Plenty River gorges include stacked cave systems where tiers of sandstone cliffs have been weathered to produce complexes of large overhang caves up to 10 m deep. In places within these cave complexes, the rocks form bizarre shapes including narrow rods, vertical spires and honeycomb patterns. The most delicate of these features are vulnerable to disturbance by machinery, tree felling, direct human handling and burning. Burning causes areas of bare rock to spall (fracture along planes of weakness and fall off the bedrock face), especially after hot fires. Discolouration of the bedrock resulting from burning can also detract from the aesthetic appeal of the rock formations.

**Speleothems**

Sandstone caves are usually sites of active weathering and erosion, however speleothems, including stalactites, have been documented in sandstone caves in several locations in Tasmania. In several south-east Tasmanian river gorges, carbonate stalactites have formed in the roof of caves. In other areas of Tasmania, stalactites and surface coatings have formed by the precipitation of iron-rich minerals leached from the sedimentary rocks (Figure 4). Such features are vulnerable to burning.

**Cliffs of structural origin**

In some instances, cliffs may indicate a geologic boundary or fault line. Although Tasmania is generally considered tectonically inert, there are some active fault systems: the Lake Edgar Fault, now partially drowned by Lake Pedder, has produced an abrupt scarp in the landscape and has been active in recent times (Clark et al. 2005; McCue et al. 2003). Similar fault lines may account for cliffs in other parts of Tasmania, as suggested by the cliff in the Maydena Range (Figure 5) which can be observed for some distance and parallels a mapped fault.

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Figure 3. A small sandstone cave formed through differential weathering along cracks and cliff collapse, both at Mt Blackboy.

Figure 4. A stalactite formed of iron oxide minerals on the roof of a small overhang, Mt Blackboy.

Figure 5. Dave White (FT Derwent) standing in front of a cliff in Permian sediments that may mark the line of a fault in the Maydena Range.
Management of sandstone cliffs in Tasmania’s production forest

Sandstone cliffs are generally relatively robust features within Tasmania’s environment, however they can house extremely delicate speleothems and tafoni that may require documentation and special management prescriptions.

In general, when classifying sandstone cliffs three questions should be asked:

1) The extent of the bedrock exposure: is it a cliff or bedrock exposed due to lack of soil cover? In general, a cliff should have a scarp over a metre tall and extend for several tens of metres.

2) Does the cliff show signs of recent instability e.g. bare rock faces, large boulders on the scree slope or rocky towers?

3) Are well developed tafoni, arches or speleothems present?

A quick assessment should enable these questions to be answered and indicate the protection warranted.

In general cliffs should be buffered by 10 m Machinery Exclusion Zones both above and below the scarp, to protect the cliff from machinery impacts and trees falling. The vegetative strip at the base helps to maintain the stability of the cliff face.

Reserves (full exclusion from harvest) should be established where extensive scree slopes showing signs of instability are present below the cliff.

While most of Tasmania’s extensive sandstone caves are listed on the Tasmanian Geoconservation Database and protected within reserves, any cliffs displaying well developed tafoni or speleothems may be of high conservation value. These sites may need extended reserves and require suitable burn plans.

References


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Introducing the FPA’s new Ecologist, Dydee Mann

I was raised in Tassie and ever since I was young I have had a passion for the outdoors. I spent as much time as possible out bushwalking, swimming or exploring while I was growing up, and still love the chance to get out and about; rain hail or shine. In fact, I think it was partly my fear of being confined to an office that led me to study plant science and zoology at UTAS. About the time I finished up my degree, the devastating impact of Devil Facial Tumour Disease on wild devil populations was becoming apparent. I was interested in exploring this further so I did an honours degree focusing on demographic change in Tasmanian Devil populations with DFTD, trying to gauge whether or not it was possible to detect DFTD in a population from its structure, in the absence of capturing a diseased devil.

I have spent much of the past six years working outdoors, primarily as a Scientific Officer for the Save the Tasmanian Devil Program, but also in various educational roles for the Parks and Wildlife Service across the state and more recently as a private ecological consultant. I have been lucky enough to live and work in some far-flung spots across the state, including stints in various National Parks, large private properties, forestry areas and the remote Southwest.

In my new role as an Ecologist in the Biodiversity Program, I will be providing advice on notifications in the Derwent West, Mersey and some of the Murchison areas. I’m enjoying learning more about the ins and outs of the forest practices system and getting into on-ground conservation land management. I look forward to meeting and chatting with you all!

Author’s contact:
Dydee.Mann@fpa.tas.gov.au

Dydee with a spotted-tailed quoll.
Amy Koch, Anne Chuter (Ecologist) and Sarah Munks (Senior Research Biologist) from the FPA ran two hollows training days in November – one in the south (Mount Morrow and Wielangta) and one in the north (Cluan Tier). The aim of these days was to revisit the concept of wildlife habitat trees and wildlife habitat clumps to help the participants manage habitat for hollow-using fauna. About 25–30 people attended each day; participants included industry partners, DPIW staff and consultants.

Each day started with a chat about why, as forest managers, we are interested in tree hollows – primarily because they provide important habitat for animals. Forty-two vertebrate species in Tasmania use hollows: 29 bird species, 8 bats and 5 possums. These include seven introduced species (e.g. starlings) and four threatened species (including the masked owl and swift parrot). The requirements of hollow-using species vary greatly; different species require hollows of different size, or differing heights of hollows above the ground, or certain distributions of hollows in the landscape, or hollows in particular forest types. Some species are more dependent on hollows than others, and some species need more than one hollow per individual.

After talking about the animals, we then walked into a wildlife habitat clump to talk about the hollows and the trees in which they are found. Hollows in Australia are formed by wind damage, fire, fungi and invertebrates. These processes take a long time, so trees younger than 100 years old rarely have hollows. Hollows used by animals are usually in trees at least 150 years old. The trees most likely to be used by animals (and therefore trees that make good habitat trees) are those that have hollows visible from the ground. The more hollows and the bigger the hollows, the better for biodiversity.

Hollows can often be difficult to see, particularly in wet forest, and there isn’t always time for FPOs to do thorough hollow surveys. So although a hollow survey is the best way to identify good habitat trees, a survey isn’t always practical. Research carried out by the FPA and other organisations has shown that tree attributes other than hollows often provide clues as to whether the tree is likely to contain hollows. The best way of identifying a good habitat tree is to check whether:

- the tree has visible hollows (the more the better)
- the tree is old
- the tree is large in diameter
- the tree has dead wood in the crown
- the tree has fire scars.
Talking about a hole lot of stuff

We then spoke about wildlife habitat clumps, which are the main way in which hollow-bearing trees are retained within harvested areas. The intent of these clumps, with respect to hollow management, is to maintain hollows both now and into the future. These clumps should primarily be selected for the trees they contain (both habitat trees and recruitment trees). Clumps should be located, whenever possible, in an area with a low risk of tree mortality, for example an area not exposed to high winds. In Mount Morrison we could see that some animals will use these small isolated clumps because pygmy possum nests were found in the nest boxes that had been set up for research purposes.

To reinforce the message concerning attributes of good habitat trees and wildlife habitat clumps, the participants were then asked to go and find some good locations for wildlife habitat clumps. In some areas there was a lot of regeneration but only scattered older trees, so they had to think about getting two to three good habitat trees in one patch. In other areas there were lots of good habitat trees, so recruitment and mortality had to be considered. As evidence that they were looking at good habitat trees, a brushtail possum was spotted in a hollow in one of the trees considered!

Having built up an appetite, we then got stuck in to lunch – with plenty of food for all! This was followed by a talk about the current management of hollows within coupes. The main management prescription relating to hollows is found in the Wildlife Habitat Clump Technical Note 7 (see www.fpa.tas.gov.au). We ran through the technical note, to make sure people understood the intent of the prescriptions. While the emphasis in the technical note is on the spatial distribution of clumps, this should be considered only after the quality of the clump has been determined. That is, dispersing clumps is a good idea when possible and when it captures good hollow habitat. However, sometimes it might be best to aggregate clumps to reduce tree mortality, or to capture the best habitat that is available on the site.

Retaining habitat trees in wildlife habitat clumps is only one of the ways in which hollows can be maintained in production forest areas. Formal and informal reserves also contribute to the hollow resource. This was discussed in terms of designing coupes – a slight adjustment to harvest boundaries can result in greatly improved management of habitat for hollow-using fauna. So the importance of thinking about the quality of habitat trees, the placement of habitat clumps and planning for hollows during coupe planning was really emphasised.

Participants on these field days were given a copy of the new booklet ‘Tree hollows in Tasmania – A guide’, that has been produced by the FPA and the CRC for Forestry. This booklet helps the reader identify hollows, habitat trees and recruitment trees. Copies of this booklet will be sent to the major industry partners in Tasmania. It is available on the FPA web page and hard copies can also be obtained from the FPA on request.

Author’s contact:

Amy will be on study leave in Canada for the first four months of 2010, so if you have any queries please contact:

Sarah.Munks@fpa.tas.gov.au
A recent incident at Woolnorth in which incorrect coordinates for an eagle nest resulted in a reserve being placed in the wrong location has highlighted the need to remind FPOs of the need to ground check all known sites and to advise the FPA Biodiversity Program staff if recorded sites are not found.

Both the wedge-tailed eagle and the white-bellied sea eagle are found in a range of habitats throughout most of Tasmania, but their nesting habitat is generally in sheltered mature eucalypt forest. The wedge-tailed eagle is listed as endangered under both the national Environment and Biodiversity Conservation Act 1999 and the Tasmanian Threatened Species Protection Act 1995 and the white-bellied sea eagle is listed as Vulnerable under the Tasmanian Threatened Species Protection Act 1995.

In the past, forestry operations led to the destruction of nest trees or made eagles desert disturbed nests. Since the late 1980s, the Forest Practices Code, which sets the standards for forestry operations in Tasmania, has required that eagle nests are protected and disturbance near nests is minimised.

The forest practices system develops through adaptive management, by which prescriptions are monitored and improvements are made. The measures to protect eagles are continually reviewed and improvements are made. The measures to protect eagles are continually reviewed and improvements are made. The measures to protect eagles are continually reviewed and improvements are made. The measures to protect eagles are continually reviewed and improvements are made. The measures to protect eagles are continually reviewed and improvements are made.

The forest practices system develops through adaptive management, by which prescriptions are monitored and improvements are made. The measures to protect eagles are continually reviewed and improvements are made. The measures to protect eagles are continually reviewed and improvements are made. The measures to protect eagles are continually reviewed and improvements are made. The measures to protect eagles are continually reviewed and improvements are made.

The location of any known nest sites is then verified on the ground. If there are no known nests then a survey of potential nesting habitat within the vicinity of the operational area is required.

Things can go seriously wrong if the apparent location of any known nest is not checked on the ground. There have been a few incidents over the years that illustrate this. For example, a mistake was made by a planner recently which saw the felling of a patch of forest that should have been left as an eagle nest reserve. The fault occurred because the person who originally GPS’d the nest transcribed the co-ordinates incorrectly. The planner used these incorrect co-ordinates to design the desktop reserve in the office. The location of the nest was not checked from the ground during the planning process and unfortunately the mistake was not picked up until it was reported to the FPA.

Finding nests during a pre-operation survey can be difficult irrespective of the searcher’s experience level. Consequently each year about five nests are located by forest contractors during active operations within coupes. Such circumstances are unfortunate to say the least and are difficult to manage. However, even at the last minute the disturbance of some nests could still be avoided by increasing the skill level of contractors. Even though a coupe has been surveyed, a nest may still be present. Making contractors aware of the potential presence of nests and training them to keep a look out for them could be an effective way to reduce the number of nests being accidentally disturbed.

Most nests found during harvesting are located 30–80 m from the operation, prompting eagles to desert nests. In many cases, disturbed and nervous eagles are likely to try to build new nests close to other operations because they are usually constrained by neighbouring territories, which produces a myriad of management issues. On one property, 11 nests were built over the range of one territory as a consequence of accidental disturbance, resulting in a lot of extra reserves. Where multiple nests are found, nest management can be simplified by establishing one large nest reserve (e.g. 20–30 ha). Large reserves provide a feeling of increased security for a pair of eagles and so may prevent additional nests being built.

Annually around 25 previously unknown nests are located during aerial and ground nest surveys. Interestingly a number of FPOs doing the surveys have commented that there is a trend for these nests to be located on less sheltered aspects. The reasons for this are unclear but it may be because of a shortage of optimal nesting habitat and it may also result from the building of multiple nests per territory as a result of encroaching land-use activities and associated disturbance. Finding nests on less sheltered aspects requires good knowledge of local conditions. The potential eagle nesting habitat model is currently being revised by the FPA, taking into account the characteristics of the locations in which all currently known nests are found, including those in unusual places. This model will help with locating nests in the future.

Keep eagle-eyed – the importance of pre-operation searches

Jason Wiersma, Eagle Project Officer, Forest Practices Authority
Sarah Munks, Senior Research Biologist, Forest Practices Authority

Wedge-tailed eagle carrying out a pot-hooping display – see next page. (Photograph by Bill Brown)
Keep eagle-eyed – the importance of pre-operation searches

Eagle Antics – recent observations of eagle behaviour by the FPA Eagle Project Officer

A local hang glider pilot from Hobart was ridge soaring a hill near Brighton. A pair of local eagles would often join the pilot. Eagles appear to use particular hills to get ridge lift so that they can hunt for prey with little energetic cost. From this site, the pair has a 2 km glide back to the nest, which means the hill is a vital feature of their home range as it reduces the energetic cost of feeding chicks at the nest. One particular day, while ridge soaring, the pilot noticed the adult male increase speed and stoop quickly towards him. Just before the likely impact, the female appeared from nowhere and grappled with the male’s talons, preventing the attack. Within two minutes, the male tried a counter attack and again the female grappled with the male. The incident ended with the male and female landing in a tree for a mutual preening session.

I have observed many incidents like these. While it would appear that the female just tried to keep the peace, it is common for eagles to take out their frustration on literally anything that is in front of them after territorial disputes. This displacement activity may see males ‘pot hooking’, which shows off aerial agility but also acts to deter neighbouring males. It also undoubtedly shows the female how agile the male is, which further reinforces the pair’s bond.

Another similar incident involving a hang glider and eagle was followed by a territorial dispute between two neighbouring males. In this circumstance, pot-hooking was all that was required to deter the intruder. However, while ending the series of pot-hooking stoops, the male turned his frustration on the hang glider pilot, hitting the glider’s wing a number of times. The eagle and pilot were not hurt during the incident, but the glider suffered a number of minor tears to the right outer section of the wing.

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New Forest Practices Regulations 2007 exemptions

Changes to the Forest Practices Regulations 2007 were gazetted on 25 November 2009. In the September 2009 issue of Forest Practices News, the Chief Forest Practices Officer (CFPO) wrote an article outlining these changes which relate to exemptions for Forest Practices Plans (FPPs) under certain conditions.

Why do we need to provide exemptions from the usual requirement for FPPs under certain conditions?

Over the years the Forest Practices Act 1985 has captured many ‘non-forestry’ activities, such as mining and residential subdivisions, where these activities involve clearing of forest or non-forest vegetation. These ‘non-forestry’ activities are covered by planning and approval processes under separate legislation, and the requirement to also obtain a FPP has resulted in significant additional costs and administrative duplication. In order to streamline and integrate planning and approval for these activities, the government has approved their exemption from the requirement to be covered by FPPs.

What are the new exemptions?

The new exemptions will cover clearing forest, or clearing and converting threatened native vegetation community, for the purposes of:
• mining and mineral exploration
• construction of a building/group of buildings or the carrying out of associated development related to construction of a building/group of buildings (i.e. water, sewerage, gas, electrical, telecommunications and other services provided to the building(s))
• construction and maintenance of railways
• constructing electricity infrastructure.

How will these changes work in practice?

The exemptions will only apply where approval under the relevant legislation has been obtained. For example, a person cannot clear land for a subdivision before obtaining planning approval from their local council. This means that an approved permit under the Land Use Planning and Approvals Act 1993 is necessary before they commence clearing. If no permit has been obtained the clearing remains subject to the Forest Practices Act 1985 (i.e. an FPP is still required). FPPs that are currently in place remain legally binding and must be complied with.

Exemptions are prescribed in Section 4 of the Forest Practices Regulations 2007, which is available on the following website <www.thelaw.tas.gov.au>.

To ensure that relevant organisations and government agencies are informed of the changes to the regulations, the FPA is planning information sessions for the end of January and early February 2010.

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Hymenoptera are a varied and interesting family group which is much maligned – although in the case of the introduced species, the bad reputation is well deserved. The ants belong to this group but they were considered by the authors to be of sufficient majesty to warrant their own ‘bies’ issue (Forest Practices News vol. 8 no 4, April 2008). In this, the fifth article in the series, we investigate the life of a few native wasp species that may be regarded as a threat to humans. The exotic wasp species will feature in the next issue of Forest Practices News.

**Tiphiidae: flower wasps**

Numerous species occur in Tasmania and provide an important service to the plant community as pollinators. See figures 4 and 5 on back page. They are most active in the summer months, preferring hot weather. Many of our orchid species have evolved uniquely shaped and coloured flowers designed to attract these insects. Some orchids produce chemical substances which so closely mimic the sex pheromones emitted by female wasps that males athletically attempt to mate with them and are anointed with pollen for their efforts.

*Diamma bicolor* and *Thynnus zonatus* are arguably the most impressive species found locally. Both resemble ants and, as their common names suggest, they feed on plant nectar.

*Commonly known as the blue ant or blue bottle, D. bicolor is uncommon over much of the state and is most often encountered in drier areas (see figure 6 on back page). The metallic blue females are large (25 mm), flightless and run around exhibiting a restless jerky motion, with their abdomen arched aggressively upward, as they search for burrowing mole crickets which they sting and paralyse before laying a single egg on them. The cricket guarantees a continuous food supply for the growing wasp larva. Unlike the females, males of the species fly, are small (15 mm), black with white spots, and do not sting; they are also seldom seen. Adults feed on nectar and this is when mating usually occurs. This activity is put to good use by the flowers as they liberally smear the insects with pollen. *Thynnus zonatus* females do not fly and are smaller than the males (20 and 30 mm respectively). Mating occurs in flight with females carried in copula by the winged males to feed on flowering plants in summer. After fertilisation, females seek out the soil dwelling larvae of scarab beetles (curl grubs) which are paralysed with a sting before being parasitised with a single egg. The wasp larva develops as it digests the beetle larva. After pupation it ecodes (emerges from the pupal shroud) and emerges from the ground in the following summer. Both adult *T. zonatus* are brown/black with a bright yellow aposematic (warning) patterning. They possess a powerful sting but will only sting if molested. As many scarab beetles are considered to be pasture pests, these wasps are regarded by farmers as beneficial biological control agents.

**Mutillidae: velvet ants**

These insects are an ancient group with fossilised representatives 40 million years old preserved in amber. They are small wasps (15 mm) found in drier areas and are cryptic slow moving insects that mimic ants as a means of evading predators. They are clothed with a very hard exoskeleton impervious to the stings of bees and wasps whose nests the females invade in order to deposit their eggs near the developing larvae or pupae inside. Upon hatching, the parasitic larva attaches itself to and eventually devours its host. Males are winged and much larger than females, which are often carried aloft in copula to flowers where they feed on nectar. Both sexes are covered with dense, silk-like hair which is the reason for their common name; this dense brush of hair enables these insects to be exploited by plants as pollinators. Only the females sting and some species are capable of stridulation (producing sound) to warn off would be predators.

**Pompilidae and Sphecidae: spider and caterpillar-hunting wasps**

These animals are familiar to most of us by sound if not by sight (figure 1). They are constantly present throughout the summer period; wherever you are you are likely to hear the vibration of their buzzing as they industriously build and provision their nests. Few environments are considered...
unsuitable to this varied group of insects, except waterlogged soils, and they have a vast array of different nest structures. Many species construct mud nests in any available cavity or excavate in soil, sand or decaying wood; some even plug up holes in wood with grass stems to seal the provisioned nursery. Whatever medium is utilised, the chosen structure is composed of connected compartments which are stocked with paralysed invertebrates to serve as food for the developing wasp larva. A single egg is deposited in each compartment and the amount of provision finely calculated to suit the dietary needs of each individual larva. Parasitised food remains in suspended animation for a set time, after which, if not eaten, the invertebrate dies and decays. Although they are all solitary animals and are not aggressive, most species are capable of inflicting painful stings in defence if mishandled or threatened.

Ichneumonidae: ichneumon wasps

Ichneumon wasps are mostly parasites, preying on a wide range of insect larvae. Some deposit eggs on the body of the host while others inject their eggs into the host. On hatching, external larvae burrow inside their unfortunate host and devour it while larvae injected into the host simply imbibe the nutritious soup in which they are suspended. Timing is of the utmost importance; the growing larvae are capable of secreting chemicals to extend the life of the host and are careful to not eat essential organs until they are ready to pupate. Many species are to be found in a variety of colours, often with bright spots. Although some do sting, the sometimes disproportionately long extension on the abdomen of this group is an ovipositor; not a sting (see figure 2). Ichneumon wasps are all solitary and in many species the adults do not feed, living only for a short time. As a group, these animals play a very important role in regulating the population densities of the species which they parasite and are often utilised by humans as biological control agents. Several species of these wasps were imported and subsequently released in Tasmania in the late 1960s in an attempt to control the sirex wasp which was threatening the pine plantation industry. This was successful and, after further research, nematode worms were also recruited to aid the cause. We owe much to these invertebrates for helping to save a threatened industry.

Halictidae and Colletidae: native bees

Tasmania is home to many native bees, which play an important role as plant pollinators despite being small, inconspicuous and usually dull in colour. Active throughout the warmer months, they are industrious, solitary insects that excavate hollow cells in pithy plant stems, decayed wood, sandy soil and even soft weathered stone, where they deposit their eggs singly, provisioned with pollen and nectar. Unlike exotic bee species, native bees do not form a hive, but construct solitary cells. They are not territorial but many females may choose the same log or patch of ground as a nesting site, giving the impression of colony activity. Members of the five groups listed above have the capacity to inflict multiple stings and should be treated cautiously. Envenomation will cause varied reaction in patients and medical assistance should be sought for individuals that present with severe symptoms or who have a history of insect venom allergy. Cold compresses, ice packs and the application of cool soothing preparations (aloe vera, calamine lotion etc) will be beneficial in most cases.

Pergidae: sawfly wasps

Perga affinis (figure 3) is one of the largest of the many species of ‘spitfire grubs’ well known for their habit of clustering together, mostly on eucalypt trees. They really pose no threat; but if interfered with will vomit a viscous solution that has a strong eucalypt odour which can cause skin irritation in susceptible individuals. They are interesting insects because of the strong community bond shared by the group. When travelling up their tree at night to feed on leaves, the entire column will halt and tap their abdomens on the branch to alert a straying individual of their whereabouts; they do not move on until the wayward larva rejoins the group.

Though the group is strongly bonded, it will readily accept outsiders and groups often amalgamate to form large families of unrelated animals. When fully grown, the troop descends to the ground and burrows beneath the surface where individuals pupate in a series of connected cellular cocoons constructed from silk mixed with their dried spittle. This phase usually lasts for one year but the pupae are capable of entering diapause (suspended animation) for as many as four years. Eclosion is synchronised with all males emerging and dispersing one to two weeks before the...
Bities in the bush: Hymenoptera (continued)

females, perhaps to prevent in-breeding. Adults are stingless and are not often seen. Fertilised females deposit their eggs inside surgically incised eucalypt leaves; upon hatching the tiny caterpillars immediately form a close bond and remain together throughout the growth stage of life. As with many invertebrates, the adults do not feed. They live for only a few days, their sole purpose being to locate a mate and produce a new generation.

Few people are adversely affected by sawfly larvae, and if contact occurs, the only procedure necessary is to wash the area affected by their exudate with soapy water and, if needed, apply a cool soothing preparation. Medical attention may be necessary if a strong adverse reaction presents or if eyes or mucous membranes are involved.

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