“Are we likely to find juvenile giant crayfish in this Class 4 stream?”

This has been a question frequently asked by forest planners since measures for the conservation of habitat, thought to be important for the giant freshwater crayfish, were first recommended in 1999. The results of surveys, documented in a recent TasForests publication, help to answer this question.

The giant freshwater crayfish, Astacopsis gouldi Clark, is listed as ‘vulnerable’ under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and the Tasmanian Threatened Species Protection Act 1995. Reasons for its listing included evidence of range contraction (disappearance from the lower reaches of several rivers) and increased rarity of larger individuals due to past fishing pressure.

It is also listed as a priority species in the Tasmanian Regional Forest Agreement. Little was known about the habitat required by the species and the impacts of forestry operations at the time of listing. Despite this lack of information, management prescriptions to protect habitat considered important for the species were developed and have been applied by forest planners since 1999.

The details of the management prescriptions vary according to the class of stream, type of operation and occurrence of the crayfish or suitable habitat within the operation area. The definition of suitable habitat, provided to forest planners in 1999, was based on factors that were known to characterise prime habitat for adult crayfish. For example, pools in large streams and rivers, water shaded by riparian vegetation, snags and overhanging banks. Although

All photographs by the Forest Practices Authority, unless otherwise stated.

Juvenile Astacopsis gouldi (Photograph by Laurie Cook)
management of the habitat required by adults is important, of equal importance is the management of environments required for successful recruitment of juveniles to the adult population.

Although studies have been undertaken on adult giant freshwater crayfish, there has been little work on the juveniles. There was a perception that small headwater streams were particularly important for juvenile rearing and subsequent recruitment into mainstream populations. This followed, in part, from an observation of a mature female in a tributary stream in the Gog Range in NW Tasmania. So, in 1999 a project was initiated to find out more about the occurrence of juvenile crayfish in headwater streams relative to larger streams, and to identify the characteristics of streams with a high density of juveniles. Aquatic biologists from the consultancy company Freshwater Systems were contracted to undertake the fieldwork. After a slow start, with survey work delayed by the dry summer of 1999, fieldwork started in 2000 and 2002. The backbreaking survey work, in often cold, wet and dark conditions, yielded some interesting results. Repeated sampling of twelve sites in two catchments failed to find a seasonal peak in the number of juveniles throughout the year.

More extensive sampling of 72 sites in 35 stream catchments, 19 of which were class 4 streams, followed. These surveys showed that juvenile freshwater crayfish can be found throughout a catchment, including some headwater streams. Streams of 50–200 ha catchment area (Classes 2 and 3) had the highest numbers of juveniles. Streams with significant and sustained groundwater input, including some Class 4s (catchment area of 50 ha or less), also had higher numbers.

“Streams with significant and sustained groundwater input, including some Class 4s, also had higher numbers of juvenile crayfish.”

Higher densities of juvenile crayfish were found in streams with less than two per cent area of substrate as silt, high proportions of moss cover, moderate to high proportions (10–30 per cent) of substrate as boulders, channel slopes of less than 15 per cent, and altitudes of less than 400 m, and especially less than 250 m. Large rocks or logs overlying coarser substrates and/or having a distinct cavity underneath were favoured refuge sites. Forest planners can now use these characteristics of optimal habitat to help identify sections of stream drainage that may require additional local or upstream protection measures.

Current work is looking at the effects of forestry operations on juvenile Astacopsis gouldi populations in downstream reaches. The following publication, available via the FPA web page, provides a full account of the study mentioned in this article.


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I was commissioned by the Forest Practices Authority (FPA) in late December 2005 to carry out detailed recording of the archaeological sites at North East Peninsula, Recherche Bay as part of FPA’s research into the best management of the historical values of the area. In an approved Forest Practices Plan* the FPA had reserved a number of historic sites along the western periphery of the promontory historically known as ‘The Crescent’. Additional advice on the potential for, and the significance of, historic sites located by transects within the harvest area was also required.

North East Peninsula, Recherche Bay, has a number of archaeological sites known from the work of FPOs, local historians and the FPA. Of particular interest had been the potential for sites dating from the French expedition of 1792. I visited the area by boat in December 2005 with Denise Gaughwin, and Geoff Wilkinson, FPO Gunns Triabunna to collate the information into one report for the FPA. On this trip we found several additional sites including many tree stumps and several new hut sites. I returned in January 2006 to make detailed archaeological records. In-depth historic research was not possible in this study; however, I was able to draw on my earlier research on the archaeology of the historic timber and whaling industries at this locality. Some of the most interesting findings of the study are presented here. Details can be found in the report available from the FPA (Kostoglou 2006).

“...we found several additional sites including many tree stumps and several new hut sites.”

**Editors note**

It should be noted that the work summarised above was completed when a Forest Practices Plan (FPP) was in place. Prescriptions within the FPP protected the historic values from further disturbance by means of reserves and rules governing operations. The property has subsequently been sold and the FPP has been withdrawn.

**Bennetts Point**

Bennetts Point was the location of the observatory built by the French scientists in 1792. A large dry stone wall and the remains of a number of hut sites are still visible.

The location of the wall matches quite accurately the indicated position of a ship yard on a survey map dated May 1863 (Figures 1 and 2). The construction of a sizeable vessel matching that shown in the survey illustration (Figure 2) would have presumably required rigid support along the length of the keel in order to effect construction. The wall would have been used to provide this support. The historic survey dated May 1863 also shows three huts immediately southeast of the shipyard, which supports the argument that the site was occupied by people associated with the shipyard, as do site artefacts of bricks, glass and ceramics dating from between the mid-19th century and the 20th century.

**Figure 1. Section of dry stone wall at Bennett’s Point**

**Figure 2. Survey map of Recherche Bay, dated May 1863, showing a ship yard.**
Coal Point Bight

The Coal Point Bight archaeological site which some investigators have interpreted to be the French garden of 1792 consists of a rectangular arrangement of dolerite stones laid end to end. Several internal lines of stones divide the enclosed area into at least five internal cells (Figure 3). A rectangular plinth straddles one of the internal lines. No other features or related artefacts were noted.

The Coal Point Bight site is highly unusual. The features at the site bear no obvious relationship to any historic feature found in the Recherche Bay area or in the rest of Tasmania. It seems that the features were either built for an unusual purpose or may be some ‘normal’ feature that looks different because it was built by strangers to Tasmania.

The features evident today do not appear to be the remains of a more substantial structure because there is no evidence of multi-course construction, collapsed external walls or an internal fireplace/chimney. In addition, the outer stones appear to be too small to be a structural base course. Although the internal plinth could possibly have been used as a fireplace/platform, such a use would be unprecedented in Tasmania. An interpretation of the features as the remnant of a tent camp site is unlikely to be correct as such an explanation cannot explain the internal lines of stones dividing the shape into cells.

The use of linear stone work with internal cellular divisions does resemble garden bedding features that I have noted at other historic sites in Tasmania. Only the raised plinth seems anomalous in this regard. Further research may reveal the nature of the features at Coal Point Bight site.

Historic timber harvesting inland of ‘The Crescent’

A steam-powered sawmill is known to have operated in the area between c1899 and 1905. Sites and features relating to historic logging throughout the peninsula are typical examples of late 19th/early 20th century operations: selected trees were hand felled and the felled logs cut into manageable sections before a steam-powered log hauler located at a prepared landing dragged the trimmed sections from where they had been felled and prepared to a tramline. In contrast ‘The Crescent’ mill was a relatively small operation: the log hauler worked adjacent to the mill shed itself and no tramline was required to bring in logs from the bush. However a coastal tramline was erected to transport milled timber to the nearby wharf and to provide access to other timber stands further north.

Features associated with the timber harvesting

Numerous ‘old growth’ buttressed tree stumps bearing axe marks for foot holds and shoe boards spaced at between 10 and 30 m above ground level were located up to 400 m inland from the mill (Figure 4). We also noted tracks 3–4 m wide leading from the mill site and the forest harvest areas. The mill site itself consisted of a benched earth cutting. Mill shed post holes, sawpits and a winch base were recorded in an earlier project, as were a brick-lined forge for the mill’s blacksmith’s shop and remnants of excavated ponds that provided water for the steam powered log haulage and sawmilling machinery. Remains of a timber jetty adjacent to the mill site and the coastal tramway illustrated how timber was taken to markets. Brick chimneys of cottages for the mill employees complete the picture of a busy timber mill.
North East Peninsula, Recherche Bay – An Archaeological Story

Settlement sites between Bennetts Point & Coal Pit Bight

Remains of several fireplaces were located between ‘The Crescent’ sawmill site and Coal Pit Bight. The fireplaces fell into two distinct types. In the more southerly cluster near the mill the bricks used included modern-type house bricks that were also used in the construction of the mill forge. We concluded that these cottage fireplaces and the forge had a similar age (Figure 5), and that both relate to the mill’s operation in c1900 and no earlier.

In contrast the more northerly cluster of fireplaces appears to be older. The fireplaces are larger and tend to occur in pairs, implying a differing construction blueprint from the southerly cluster. The few bricks associated with the northern cluster are mid-19th century hand-made sandstock bricks. The older fireplaces may be the remains of dwellings used in association with coal mining known to have been undertaken in the vicinity by colonial convicts in 1841–1842. The most significant reminder of this mining is the nearby circular shaft (Figure 7).

Conclusion

This brief summary indicates that this piece of land has been used regularly in the historic period. It is of great interest as it retains evidence of historical activity ranging from the landing of the French scientists in 1792 to timber harvesting in the nineteenth century and farming and fishing in the early twentieth century. Greater detail can be found in the report below.

Further reading


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c/o Denise.Gaughwin@fpa.tas.gov.au

Figure 6. A typical southerly fireplace of a type which was made with some modern type house bricks similar to those used in the mill forge in c1900.

Figure 7. The coal mine shaft.

Editors’ Corner

We’ve included a questionnaire with this issue to identify who our readers are and what they like to read. Please take the time to fill it in - this is your chance to have some input!

There are some great contributions from FPOs and others working with forest management in this issue. So if you have something to say (whether you are an FPO or not) please get in touch. The Forest Practices News editors can help you shape it into an article. It doesn’t have to be long - many readers say they prefer shorter articles.

Please include illustrations and a photo of yourself with your contributions and ensure that figures/pictures are sent as separate files and not embedded in Word documents.

The deadlines by which to get articles to the editors are:
August issue: mid-July
December issue: mid-November
April issue: mid-March

Contributions can be supplied either as hard copy or electronically. If forwarding material electronically, the address is:
Christine.Grove@fpa.tas.gov.au
Christine Grove and Nathan Duhig
Forest Practices News Editors

Deadline for contributions for the next FPN:
Mid-July

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.
Phone:(03) 6233 7966 Email: info@fpa.tas.gov.au
We all have those days when we wonder why we are doing our jobs. And then there are those days when the task is so enjoyable that we remember just what makes it special. Recently I had two of these special field days within the span of one week.

I was contacted by Vanessa Thompson and Bernard Plumpton, Forest Practices Officers (FPOs) and cultural heritage trained staff from Forestry Tasmania’s Derwent District, informing me that while conducting eagle searches from a helicopter they had put down at Lake Echo. As soon as they emerged from the chopper they recognized a large number of Aboriginal stone tools on the lake’s margins.

"As soon as they emerged from the chopper they recognized a large number of Aboriginal stone tools on the lake’s margins."

They contacted me and suggested that I inspect the sites as the District was investigating providing greater road access to the Lake for fishing. As there was no urgency (and the weather was getting colder) we left the trip until February this year. Vanessa and Bernard had been correct in their earlier observations – there were indeed a large number of stone artefacts on the lake margins. The lake has been dammed to provide additional water for the HEC which leads to fluctuating lake levels and exposed beaches (Figure 1).

We walked for hundreds of metres around the lake and discovered artefacts on most shores. There was a concentration near Dicks Creek and along the section protected from the prevailing winds. The artefacts were mostly very large flaked pieces which led us to predict that a stone source was located nearby (Figure 2). Late in the inspection we found part of that stone source. This find was quite exciting and confirmed the prediction that lake margins were likely places to find sites. We recorded the sites, made some management decisions and enjoyed the location. All in all, a good day. Oh, and thanks for the lunch.
In the same week I was contacted by FPO Gary Brown from ECI-Consulting about an interesting find he had made at a coupe near Blackburn Creek (Figure 3). Gary has been working in forestry for a good number of years and has seen lots of interesting heritage sites so when he contacted me and related his latest find with great enthusiasm I knew that the site must be special. The photos that he emailed (aren’t digital cameras wonderful?) heightened my interest. A field visit was arranged to determine the appropriate boundary to manage the site. Dan Ryan, another FPO from ECI-Consulting, and I met at the Steppes and visited the site.

The site is the remains of a homestead beside the Blackburn Creek. The chimney and footings indicates that this was a substantial house built from stone and bricks and presumably with timber walls. A number of outbuildings were also recorded. The feature that made this site different from many other abandoned farm complexes was the massive dry stone walls that encircled the house itself (Figure 4). These walls are approximately 1 m in height and are extremely well constructed. It is the amount, circular enclosure and quality of the stone work that makes the site unique (Figure 5).

Gary had found another set of dry stone walls at the crossing point further along the creek. Dan and I investigated these and determined that they were most likely built as a stock yard for stock travelling in the annual grazing from the lowland properties to the summer pastures on the Central Plateau. It may be that the stockyard and even the home were on a former stock route to the Interlaken area.

Both sites are being managed within reserves that will protect their heritage values. These reserves were determined on the ground by negotiation between the Senior Archaeologist and the FPO. The question remains as to why this particular landowner went to so much trouble and spent so many hours building these walls. We speculated that perhaps there was not much to do in the area at the time but this answer would be a bit too simple. What we have found and managed is the result of one family’s attempt to earn a living in this forest. They appear to have settled with the intention of staying for a long time as evidenced by the size and quality of the house and the walls. The desertion of their home must have been a difficult decision but unfortunately the soil type, altitude and perhaps distance from markets probably defeated them.

Thanks to all the FPOs involved in these two sites. Two wonderful days in the field with skilled professionals! Now I remember why managing the cultural heritage in wood production forests is fun and is so worthwhile.

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Chris Grove, Forest Practices News editor, chatted to three Forest Practices Officers (FPOs) to find out their personal role on the role they play in the forest practices system. They represent the three different kinds of FPOs: Geoff is employed by a major forestry company, Vanessa is employed by Forestry Tasmania and Brett works as an independent consultant. Geoff’s story is related below. Vanessa’s and Brett’s accounts will appear in subsequent issues.

**Geoff Wilkinson**

**What job do you do?**

I’m a Senior Forest Supervisor with Gunns Forest Products – Triabunna.

**What training and experience have you had to enable you to do the job?**

I was offered a job in forestry as a teenager the day before I was offered a job in a bank. I’ve always been grateful it happened that way around because I would not have been nearly as happy in the bank as I have been working in forestry. I really think I couldn’t have a better job. I started working for the Forestry Commission in February 1974 as a technical forester and completed training in 1980. I was appointed as an FPO (Inspecting) in November 1987, and FPO (Planning) in August 1990 after doing the FPA courses.

After ten years with the Forestry Commission, I moved on to Forest Resources where I spent 13 years until moving to North Forest Products in July 1996. I’ve spent 32 years working in forestry – all except 12 months has been in Tasmania.

**What does your role as an FPO involve?**

I co-ordinate sawlog sales on private property in south-east Tasmania. This involves liaising with harvesting supervisors and contractors about the estimated volumes to be produced and preparing quotes for sawmillers. I am responsible for preparing FPPs and the supervision of harvesting and regeneration of private forest on Bruny Island. I also certify plans and am on the peer-review panel for FPPs prepared by other FPOs at Gunns Triabunna.

The bigger forest industry companies get a lot of stick but if you look at their record in terms of breaches of the Forest Practices Code (the Code) they actually perform very well. I think this is because the bigger companies can afford to train and resource their FPOs well to do the job thoroughly.

**What are the challenges in your job?**

I find it disappointing that the public does not recognise the professional work that we do, particularly in protecting special values. It takes a lot of planning to protect wedge tailed eagles in the forest and we don’t get given credit for that.

Another thing that people often don’t realise is how standards have changed. I’ve seen so many changes for the better since I started work when forest practices were very much different to what they are today. I remember many logging operations using D7 dozers to snig large logs into the landing. On the return to pick up the next drag the mud was pushed off the track over a bank or into a drainage line or creek. There where times when you could literally walk from one side of a snig track to the other across the canopy of the dozer. Skidway landings during winter in wet sclerophyll forests were a sea of mud. It was impossible to see logs on some of these operations at the landing until they where pushed out of the mud and up the skidway to be loaded. Often the best snig tracks were in drainage lines, creeks and even rivers where the mud would be washed from the machines.

Although I would never wish to condone those practices, that was simply “the way it was” - we didn’t have the excavators and know-how that we do today. Even with those “Jurassic” type methods used, you can return to those very sites today and see the healthy regrowth forests that replaced the old.

So looking back it is very easy to see that we have come light years ahead in the forest practices of today. In the earlier years it was difficult to encourage change, but change we did and we are continuing to improve year in and year out. Now the Code has guidelines for snig tracks and working in wet conditions.

“So looking back it is very easy to see that we have come light years ahead in the forest practices of today.”

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“Geoff Wilkinson in his office in Triabunna “catching up on the paper warfare”. (Photograph by Gunns Triabunna)
What are the things you really enjoy about your job?

I find the job so much more satisfying and interesting these days even with what sometimes seems like overwhelming regulation and paper warfare. Thirty years ago it would be necessary during the winter months to strip off your clothing outside when you arrived home, as you would be covered in mud from top to toe. These days, thanks to improved standards, if I get my boots muddy I’m not impressed.

Personally I think that the co-regulatory forest practices system has worked extremely well. We get accused of being like the police policing themselves but it’s not like that. There are checks and balances in the system to ensure that it works. One of the greatest things about the forest practices system is the approach of giving support to attain the standards set in the Code through a reliance on education rather than penalties.

This has encouraged greater development of ideas from harvesting contractors than would have been the case from a wholly independent regulatory system. One of the greatest examples of this is the matting and cording idea pioneered by Tony Clark. This is where logs and light logging debris and a top layer of bark is laid down to create a protective mat for the soil. This brilliant system has enabled harvesting in wet sclerophyll forests, to continue through all but the most extreme weather conditions, without adversely impacting on soils and water quality.

I believe that the FPA and FPOs have contributed far more than they are given credit for by those that seek to oppose the timber industry at every turn. Working with and advising landowners on their options for managing their private forests is an area that provides particular satisfaction. Without doubt the education of many landowners has ensured significant improvement to land management. The protection of water quality, habitat, flora, geomorphic and archaeological sites and landscape, has improved considerably since the introduction of the Code.

Educating landowners as to the asset that they have when a wedge tailed eagle’s nest is discovered on their property is one such example. Without that one-on-one education, I have no doubt that many more eagles would have been shot or their nest trees either destroyed or compromised. Over the years I have found many wedge tailed eagle nests and archaeological sites. In most cases only minor modification of harvesting boundaries is required to ensure the protection of these sites.

I am extremely proud of what I do and of the people that I have worked with over the years. We have come a long way and we have a hell of a lot to be proud of.

Are there any changes you would like to see in the role of FPOs in the forest practices system?

It is of serious concern to most of us who work in this industry that we are demonized by those that have a philosophically different point of view in relation to our production forests. I believe that most people who work in the industry do so because they love it. They do not wish to see our forests poorly managed as they know that their future relies on it. There are so many “good news” stories out there on a daily basis. I hope that we will see many more of them published regularly, the way it should be.

Forest Practices Officers authorised by the Forest Practices Authority as of June 2005

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It is probably true to say that almost all deposits on sloping land in Tasmania (Figure 1) are the result of past erosion. Which begs a question of importance to land users: if Tasmanian slope deposits have eroded in the past, are they safe to use today?

In general the answer must be yes: anyone driving up and down the predominantly farmed landscape of the Midlands Highway will see abundant evidence that most deforested slopes are stable, even where the slopes are formed from landslide debris (Figure 2). Although there are areas where wind erosion of topsoils is a problem, there is little evidence of active mass movement downslope. Even without a knowledge of geological processes and climate, we could deduce that in this area whatever caused slope instability in the past either happened so long ago, or happens so infrequently, that the risk of erosion re-occurring today is very low. We can therefore quite legitimately state that past instability is not necessarily a measure of present risk.

These deductions can be expressed more formally: (1) if the process that caused past mass movement is no longer working, and there are no signs of present-day or recent movement, it can be assumed that the risk of reactivating mass movement is low; and, (2) if experience shows that a change of land use has little or no effect on land stability, then a similar land-use change under similar environmental...
conditions elsewhere (i.e. similar rocks, climate and slopes) can justifiably be considered to have low risk of inducing instability.

In Tasmania the process causing extensive erosion in the past, over almost all the state, was the cold climate associated with the last and previous glaciations. In these times of harsh climate not only did features like cirques and moraines form at high altitudes, but intense freezing and thawing was also responsible for many mid- and low-altitude features such as block streams on Ben Lomond, fan deposits in the Huon Valley, dunes in the Fingal Valley and on the inland coastal plain between Bridport and Gladstone, and aeolian deposits near Cygnet. Several of these deposits have been dated as >25 000 years old. It is also likely that many landslide features in Tasmania developed during glaciations, but the specialist techniques required to date these deposits have not yet been applied to them.

Landslides conjure up visions of destructive debris flows like the recent Philippines landslide, moving rapidly and engulfing all before them. Such slides do occur in Tasmania, although fortunately they have all been much smaller than the Philippines landslide and have not caused loss of life. The 2001 Nive River landslide is a good example (Figure 3). Silt and clay from this landslide discoloured the Derwent River at Bridgewater for several days after it occurred. Landslides like this almost always occur on steeplands (slopes of 20° or more), usually after heavy rain. Field inspections show that most (including the Nive River landslide) have resulted from natural processes, although some have resulted from forest operations, usually from concentration of water in the ‘wrong’ place by road culverts. Without exception these active debris flows have formed by saturation of a porous layer (e.g. slope colluvium) overlying a subsurface layer of different geological composition (e.g. massive impermeable sedimentary rocks). Where land shows evidence of such debris flows, soil conservation reserves are normally applied, and the land is taken out of the commercial forest estate.

Less common, and often less obvious, are landslides formed in bedrock. These are formally named rock slides (Figure 4), although the name rotational slides is still used, to describe how the displaced rock mass has rotated and tilted.

Rock slides are often large, e.g. 200 m to 300 metres in diameter, and because of their large size may be missed in ground inspections of heavily forested terrain. They are often associated with denuded drainage and swamps (in the backwall depression) and seepages (near the toe). They generally occur on rolling and hilly land (slopes <20°). Many of these rock slides appear to be inactive and for this reason it appears likely that they were formed by a mechanism that no longer occurs. This mechanism must have involved lubrication of a slip plane with large amounts of water, and springtime melting of accumulated winter snow during glacial periods must be a likely source of water. Provided these ancient deep-seated slides show no signs of present movement, limited harvest (e.g. selective logging) is usually allowed but machine disturbance (e.g. roading) is discouraged. There is no record of forest operations ever having reactivated rock slides.

Figure 5. The toe of a debris flow formed by freeze and thaw in periglacial conditions in the Cairngorm mountains of Scotland. The seasonally-thawed bouldery debris probably advanced over a permanently frozen subsoil (permafrost table). The concentration of boulders in the steep toe, the lobate form of the toe, and the low angle of the debris flow surface are characteristic. Such debris flows advanced very slowly during the last glacial period. They are presently inactive. Photograph kindly provided by Professor Frank Ahnert, University of Heidelberg, Germany.

"There is no record of forest operations ever having reactivated rock slides."
Safe land-use on slope deposits in Tasmania

A landslide type that has not been previously recognised in Tasmania is the debris flow formed by freeze-thaw conditions in a periglacial climate. (The term periglacial is used here in its general sense to describe a climate in which freeze-thaw processes dominate.) Such debris flows occur in European uplands and Ahnert (1998) illustrates a good example, probably formed under permafrost conditions, from the Cairngorm mountains in Scotland (Figure 5).

These debris flows have three key characteristics: (1) they form on low-angle slopes, typically 3–10°; (2) they have a lobate front, indicating slow advance over rough terrain; and (3) they have boulders at the edge (toe) of their advancing front, caused by the sorting effect of ice selectively pushing the boulders forward. Recent mapping has established that such a debris flow occurs at 650 metres on the Nicholas Range in northeast Tasmania. It is a large feature, about 280 metres wide by 350 m from head to toe. The dimensions of the feature are similar to those of rock slides, but detailed mapping showed there was no bedrock disruption, and established that, like the Cairngorm example, this debris flow had a lobate toe with boulders (Figure 6).

Whether this feature formed during the last glaciation or in a previous glaciation (more than 130,000 years ago) is uncertain. What is certain is that the landslide is no longer active, and most unlikely to move in the future, as the processes that emplaced it (freezing and thawing) are no longer occurring. It seems possible that similar debris flows are more common in dolerite talus terrain than recognised until now. They would be difficult to detect where they occur over older dolerite talus. As for rock slides, the appropriate land management is selective harvest and minimum soil disturbance.

Table 7 of the Forest Practices Code (the Code) can be considered as a summary of the Forest Practices Authority’s (FPA) experience with assessing landslides. Active landslides have not been noted, or are very rare, on slope angles below those listed for the different rocks: these slopes are considered safe to harvest. Landslides have occurred and further mass movement is possible on slopes above these threshold angles and careful field checks are required before forest operations proceed on these steeper slopes.

"The Code also requires that the FPA is notified of any landslide in a coupe..."

The Code also requires that the FPA is notified of any landslide in a coupe, whether the landslide is active or inactive. This allows for a field inspection to be made, risks to be assessed and for the landslide database to be updated, so that the FPA's advice can continue to be based on a complete record of foresters' field experience.

References


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Craig Hawkins trades forestry for fish

Most forest practices officers would by now be aware that Craig Hawkins has left the FPA to devote himself full time to the challenges of helping his wife raise many thousand and three young offspring. The many thousand offspring will occupy the working portion of Craig’s new life at their commercial sea-horse farm near Beauty Point. The three other offspring (all under the age of three years) will more than occupy Craig’s domestic life.

Craig advised me that he was leaving forestry with a heavy heart. He is a forester who is passionate about forests and sustainable forest management.

Craig was inspired to become a forester during a school trip to some forests in Queensland where he and his mates attracted a large number of leeches. Craig was the hero of the day as he was the only one with salt, which made the leeches drop off.

After starting his career in NSW, he moved to Tasmania with an outstanding background in university studies and operational forestry. He completed a Master of Science degree by research whilst holding down a busy forest management position. He has been active in the professional Institute of Foresters and was the first Tasmanian and the second Australian forester to be recognised for his professional skills under the new national professional forester accreditation scheme.

Craig joined the FPA two years ago and has made an outstanding contribution in the position of Compliance Manager. He managed the FPA audit and investigation programs with great professional rigour, tempered by fairness and tact. Two years of serious investigations and reporting failed to diminish his naturally cheerful and optimistic approach to life.

We wish Craig and his family all the very best in his new venture.

Graham Wilkinson
Chief Forest Practices Officer
Working in forests in the north-west of Tasmania, I have had some dealings with an eucalypt, found in swampy areas, called Brookers Gum, or Rocka Rivulet Gum if you are on the East Coast. However, I have seen the botanical name for this species spelt in two different ways in various publications. What is even more intriguing is that the person the tree honours, Dr Brooker a eucalypt taxonomist with CSIRO, is the co-editor of two books where the tree is spelt in two different ways. One is Forest Trees of Australia (1984 and 1989 editions) where Brookers Gum is spelt as Eucalyptus brookeriana, and the other is Eucalypts Vol 1 that spells it as E. brookeriana. I decided to do a little investigating to find out which is the correct spelling. Along the way I learnt much about the naming of plants and I thought I would share this knowledge.

As part of their training, foresters become familiar with botanical nomenclature as the formal scientific naming of plants. It originated in the period when Latin was the scientific language throughout Europe. It all started with Linnaeus’ adoption of binary names in his publication Species Plantarum in 1753. Essentially this led to every known living organism having one scientific name regardless of whether it had various common names. So a system of naming and categorising organisms in a given category was born and is known as nomenclature.

Scientific names are binomial under the Linnaean system. The first component is the genus, which allows a grouping of similarities or relationships among organisms. The second component is the specific epithet (or specific reference) which can be a noun or an adjective. Usually the genus name comes from the most prominent characteristic that defines a particular group. It may also be a name that reflects the species’ origins, or that honours a person. The specific epithet may also indicate a distinguishing characteristic. When both components are combined, it forms the name of a species.

Nomenclature is closely linked to taxonomy but there is a subtle difference. Taxonomy is the scientific field that determines what constitutes a particular taxon (grouping) such as species, genus, family etc. The problem arises when taxonomists disagree over the naming of organisms and more than one scientific name is found for the same plant or animal.

For botany, The International Code of Botanical Nomenclature (ICBN) sets out the rules for naming plants to avoid this duplication. Different rules apply if plants either commemorate someone (represented by a noun in the possessive form – for example Brookers Gum) or are named in honour of someone (adjectival form such as Brookerian Gum).

In the former case, the ending of a plant name (or suffix) depends on the gender of the person being commemorated. In Latin, the conventional ending for a plant named for a person is ‘i’ and then another ‘i’ if a male is being commemorated, or ‘ae’ for a female. So E. brookeri would apply, having the literal meaning Brooker’s Gum. In this case the suffix is a singular ‘i’ because there are
exceptions where names end in a vowel, ‘y’ or ‘er’. This is just one of those quirky rules that applies to Latin and which we are so familiar with in the English language. The epithet would be *brookerae* if the Brooker in question was female.

However when naming ‘in honour of’ someone, the suffix is adjectival –*ana* (male) or –*iana* (female) is used. The suffix takes the gender of the genus, not the person being honoured.

Brookers Gum was first described by Alan Gray in 1979. He informs me he toyed with a number of epithets during the process of describing the species. He finally decided to honour his close colleague, Dr Ian Brooker, a person with whom he worked when he was with CSIRO in the 1970s, and who is arguably one of the foremost “Eucalyptologists” of our time. Since the gender of *Eucalyptus* is feminine, the suffix –*iana* is used. However, in 1979 the ending –*ana* was the accepted convention. Since that time, there has been disagreement over the years among the botanical Latin scholars about the correct construction of the –*ana*–*iana* ending. The currently accepted form is –*iana* in accordance with a later recommendation of the ICBN, and this explains the different spellings of Brookers Gum we see in different books.

I have been advised by the publishers of *Forest Trees of Australia* that the 5th edition, due for release around April 2006, will change Brookers Gum spelling to *E. brookeriana*. Also the latest *Census of Vascular Plants for Tasmania* (produced annually by the Tasmanian Herbarium) already recognises the “correct” spelling.

To further complicate our understanding of the names of plants, the English language is used for common names. The choice between nouns and adjectives is mostly based on what sounds best, rather than the degree of association or ownership of the person honoured with the species in question. In this case, the English possessive form Brookers Gum is better sounding than the Brookerian Gum and is thus used as the common name of this species. The other thing you need to be aware of in relation to common names is that there is a convention that the name of a person is “adjectival” and thus doesn’t need an apostrophe – thus Brookers gum, rather than Brooker’s gum, is the correct usage.

(Thanks to Alan Gray from the Tasmanian Herbarium, Dr Roger Spencer from the Royal Botanic Gardens in Melbourne and Dr Peter Wilson from the Royal Botanic Gardens in Sydney for their technical advice and to Mark Wapstra, Fred Duncan and Geoff Dean for their helpful comments).

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Eastern Tiers cultural heritage sites

Kathryn Hitchcock, Forest Officer, Derwent District, Forestry Tasmania

Forestry Tasmania forest planners preparing a Forest Practices Plan (FPP) for SH068C, a coupe on state forest in the Royal George area, found chimney sites from two individual trapper’s camps. The planners sent notifications and site recording forms to the Forest Practices Authority’s (FPA) Senior Archaeologist. As a result, the FPP excluded both sites from the operational area as they were located near the planned harvest boundary of the operation. If they had been in the middle of the operational area, the chimneys still would have been protected by a 10 metre machinery exclusion zone that would have been taped out around them.

The FPP noted the presence of these two heritage sites, but it also stated:

- The contractor will notify the Forest Practices Officer (FPO) responsible for monitoring this operation in the event that any new cultural heritage sites are located during the course of the operation.
- Any site found during harvesting will be excluded from operations until advice from the FPA Senior Archaeologist is obtained.

As it happened, during the harvesting operation, the tree faller felled a tree within 5 metre of another previously unknown stone wall which had been part of a trapper’s shelter. Fortunately the site was not disturbed, and the faller moved operations to another section of the coupe and notified the rest of the crew about the new site.

That night the bush boss for the job phoned up the Forest Harvesting Supervisor and reported their discovery. The harvesting supervisor went to the operation the next morning and inspected the site with the faller. He then taped it off, photographed it and sent the FPO up there to complete a site recording form. The FPA Senior Archaeologist was notified and an FPP variation indicating the additional area to be reserved was lodged with the FPA.

“These is just one example, of probably many statewide, which illustrates that FPPs and their prescriptions are understood by harvesting contractors and are adhered to during the operation.”

All credit goes to the faller for doing the right thing and moving away from the site and notifying people about it – as it is stated in the FPP. This is just one example, of probably many statewide, which illustrates that FPPs and their prescriptions are understood by harvesting contractors and are adhered to during the operation.

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### The Forest Practices Authority’s forward training program

#### Confirmed and proposed training 2006

<table>
<thead>
<tr>
<th>Course (Contact)</th>
<th>Timing</th>
<th>Duration</th>
<th>Location</th>
<th>Course Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botany Course</td>
<td>17 May 2006</td>
<td>1 day</td>
<td>Forestry Tasmania</td>
<td>Introduction to botany, species and forest type identification</td>
</tr>
<tr>
<td>Fauna field days (Ecology program)</td>
<td>Autumn 2006</td>
<td>1 day</td>
<td>To be advised</td>
<td>Accreditation in eagle nest search methods and nest activity checking methods</td>
</tr>
<tr>
<td>Fauna field days (Zoology program)</td>
<td>July 2006</td>
<td>1 day</td>
<td>North-west Tasmania</td>
<td>Update on latest A.gouldi research and management tools</td>
</tr>
<tr>
<td>Quarry Forest Practices Officer¹ (Chris Mitchell)</td>
<td>Winter 2006</td>
<td>2 days</td>
<td>To be advised</td>
<td>Train quarry managers who will then be given the authority to certify FPPs for quarries</td>
</tr>
<tr>
<td>Landscape management workshop (Bruce Chetwynd)</td>
<td>Winter 2006</td>
<td>1 day</td>
<td>To be advised</td>
<td>Train selected officers involved in landscape analysis using 3D landscape simulations</td>
</tr>
<tr>
<td>2006 Forest Practices Officer course (Chris Mitchell)</td>
<td>Winter/ Spring 2006</td>
<td>12 days total</td>
<td>Various</td>
<td>Pre-requisite course for appointment as FPO</td>
</tr>
<tr>
<td>Invertebrate field day (Zoology/Ecology program)</td>
<td>Spring 2006</td>
<td>1 day</td>
<td>North-west Tasmania</td>
<td>General introduction to invertebrate conservation via the forest practices system, with a focus on threatened invertebrates in NW.</td>
</tr>
<tr>
<td>Cultural heritage (Denise Gaughwin)</td>
<td>October or November 2006</td>
<td>4 days</td>
<td>To be advised</td>
<td>Provides accreditation in cultural heritage with emphasis on the recognition, recording and management of Aboriginal and Historic sites.</td>
</tr>
</tbody>
</table>

¹Course will be run jointly by Forestry Tasmania and Forest Practices Authority and is dependent on demand.
The year 2003 was a ground-breaking one for Tasmanian boronias. Most people will remember what they were doing the moment when Marco Duretto of the Tasmanian Herbarium stepped down from his microscope and announced to a watching world that, after extensive taxonomic revision, the number of Boronia species recognised in this state had soared from six to fifteen.

*Boronia hemichiton* (Mt Arthur boronia) and *B. hippopala* (velvet boronia) were two of the recently described newcomers (see figures 8 and 9 on back page). *Boronia gunnii* (river boronia) was re-instated as a separate species (after spending many unhappy years being lumped in with *Boronia pilosa*). These three species – all Tasmanian endemics – were listed on the Threatened Species Protection Act 1995 because of their localised distributions within the state.

“*These three species were listed on the Threatened Species Protection Act 1995 because of their localised distributions within the state.*”

*Boronia hemichiton* and *B. hippopala* share broadly similar tastes in habitat. They occur in wet heath or scrub, grading into eucalypt woodland, with an understorey dominated by teatrees (*Leptospermum* species), bottlebrush (*Callistemon viridiflorus*), paperbarks (*Melaleuca* species), guineaflower (*Hibbertia* species) and cutting grass (*Gahnia grandis*). This type of habitat is abundant in the east and north of Tasmania. However, *B. hemichiton* is restricted to the Mt Arthur area (Figure 1); while *B. hippopala* has only been recorded from a few isolated populations in the Eastern Tiers. Most populations are found on state forest.

In contrast, *Boronia gunnii* occupies dolerite riparian habitat, with known populations occurring across a range of tenures along the St Pauls, South Esk and Apsley River systems. The species has also been collected from Cataract Gorge near Launceston, but has not been recorded there for many years. Some populations are reserved, such as those in the Douglas–Apsley National Park and Mt Puzzler Forest Reserve. However, all populations are sensitive to floods and the effects of different land uses in their catchments.

The Forest Practices Authority’s (FPA) Botany program, with support from Forestry Tasmania, has almost completed a project to improve knowledge of the distribution and ecology of these threatened species, to assist with management planning. The project has seen the FPA’s “Team Flora” (helped by other devoted boronia hunters from Forestry Tasmania, the Department of Primary Industries and Water’s (DPIW) Threatened Species Section and the Tasmanian Herbarium) winding their way across the Eastern Tiers and over Mt Arthur in search of the elusive shrubs (see Figs 2 and 3).
A showy display of pink and white flowers in December and January made the plants an easy target to spot from a distance. However, as the flowering season drew to a close, the delicate olive-green pinnate foliage of the plants blended with the surrounding vegetation and left the search parties scrambling through the bush with eyes peeled and noses primed for the distinctive aroma of plants crushed by undiscerning Blundstones.

Many of the previously known Boronia sites were found by Richard Shahinger of DPIW. Some of these sites were revisited during our survey, and many other marshes and riparian habitats within the range of the species were checked. At most of these sites we drew a blank, helping to confirm the localised distribution of the species. However, significant populations were found at two sites at Flagstaff Marsh (~250 ha) in the Eastern Tiers (B. hippopala), and on a large marsh (~50 ha) near Mt Arthur (B. hemichiton).

"At most of these sites we drew a blank, helping to confirm the localised distribution of the species."

These marshes gave some useful clues about the ecology of these two species, and in particular the role of fire in their regeneration. There appeared to be two distinct age classes of Boronia in both marshes. Mature (flowering) plants were mainly located in sites that had not been burnt recently (Figure 4), while large populations of seedlings had recruited in areas which had been burnt within the last three years (Figure 5). Our observations of distribution and age structure of these populations, and some preliminary results from counts of growth rings on older stems, indicate a relationship between fire history and seed germination and subsequent seedling establishment.

Clear growth rings (Figure 6) on mature B. hippopala plants on Flagstaff Marsh suggest a consistent age of about 20 years, which coincides with a known fire event. Dense populations of seedlings were also found on this marsh but only on its northern section, which had been burnt three years ago.

The same trends were seen with B. hemichiton on the Mt Arthur marsh, most of which was burnt by a wildfire in 2003. Older plants had a localised distribution on sites which had been less affected by this fire. They were of a similar size and appearance and material has been collected for growth ring analysis. Our quadrat sampling showed that seedlings were patchily distributed. They were absent from the southern section of the marsh, despite apparently suitable habitat being present. However, in its northern section, we estimated a seedling population of about 4,000 plants per hectare. Highest densities were on bare, open areas created by the 2003 fire. Seedlings had also colonised a rough bulldozed firebreak that had been pushed into the marsh. Seedlings were sparse or absent in areas with relatively high cover of shrubs and ground layer species. On some open sites, Boronia seedlings were being out-competed by other species, including cutting grass, teatrees and bottlebrush, so its numbers will fall dramatically over time.

We still need to complete some analyses, but the results so far indicate that useful information has been
Some giant steps for threatened Boronias

Although none of the species are strongly associated with commercial forest, the distribution and habitat information can be used to ensure that populations are not indirectly affected by logging or other forestry operations (e.g. river crossings or road construction close to populations of B. gunnii). Many Boronia species are susceptible to the root-rot pathogen Phytophthora cinnamomi – another factor which will need consideration if operations are planned upslope of these species.

The species may also require active management to ensure that populations are maintained across their range. Land managers have more options for such active management with B. hippopala and B. hemichiton. The role of fire is particularly important – this includes consideration of the history of wildfires and planned burns in the vicinity of marshes containing these species. Some areas may need to be actively protected from wildfires (e.g. if a recently burnt site is being threatened by another fire, before Boronia plants have reached maturity and set seed). Other areas may need to be burnt, if mature plants are becoming senescent and there is no seedling recruitment.

The sites at Flagstaff Marsh and Mount Arthur are ideal for long-term monitoring of B. hemichiton and B. hippopala. They have large populations and contain a range of plant ages and known fire histories. Continued collaboration among stakeholders – the Forest Practices Authority, Forestry Tasmania, threatened species specialists from DPIW and the Tasmanian Herbarium – will provide further information on the distribution, ecology and management of three of our most attractive and aromatic threatened species.

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