

Lower Cotter catchment draft management plan Comments from IFA (ACT)

The ACT branch of the Institute of Foresters of Australia (IFA) agrees with the stated mission to: 'restore the lower Cotter catchment to a stable condition that supports the delivery of clean water and also allows for a range of activities that are compatible with the protection of water resources' after the devastation of forest and understory on this and many other catchments by fires in January 2003.

We welcome public debate on how to achieve this. We note however, that the draft management plan published by Environment ACT refers specifically only to those parts of the lower Cotter catchment managed for softwood timber in the past, while the important job of restoring and maintaining stability in the full lower Cotter catchment - which extends right back to Aggie's Gap in the Brindabella Range - must involve planning for management of a far greater area of land, most of which is covered by native forest. Practically all of this catchment area was severely burnt by the bushfires of 2003 with similar negative consequences for water quality. Only some 8.5 % of the total water catchment for the Cotter dam was planted with pines at the time of the fires, and only some 1006 ha out of a total catchment area of 48,200 ha (2.1 %, P. Langdon, pers.comm.) has since been replanted.

The IFA joined with the Environment Institute in convening a well-attended public forum on 24 July 2006 at which some of the matters covered in this contribution were aired. Comments from individual IFA members have been collected, collated and appended to this submission. These are not necessarily endorsed by the Institute in whole or part but are included for consideration by reviewers. Comments have been grouped under the subheadings to '*Principles to guide future management*' on pages x -xii of the draft strategy management plan. There are also comments under a heading '*Economic considerations*' which were stimulated by Appendix F of the plan. The beginning and end of individuals' comments are clearly indicated.

The Institute is not satisfied that the case against continuing to plant and manage softwood species in the catchment on areas previously planted with *Pinus radiata* has been comprehensively or convincingly argued. The CSIRO report taken as a basis for the formulation of the draft management plan allows that there is very little difference between water yield from a pine plantation and native forest. The main difference is the higher levels of erosion from the pine forests principally from roads built for taking out timber. The report agrees that there has been a sincere and determined attempt on the part of plantation managers to address this problem with the closure of many kilometres of roads and installing better sediment containment structures as well as continuing to introduce better forest practices. By and large the plantations have had to be managed on shoe-string budgets in the recent past so that erosion prevention was not as effective as it might have been.

Re-establishment of over 1000 ha of radiata pine on the catchment since the fires has used best practice catchment management techniques, including the establishment of significant riparian buffer strips, so that any thinning operations conducted in the course of commercial management will not result in decreased water quality. If other areas previously under plantation are not replanted, then ways of managing mixed pine and native forest which will grow up on these areas for commercial products should be found in order to earn additional revenue for catchment restoration envisaged in the strategic management plan. At the same

time, needed softwood would be produced and there would be a concurrent contribution by skilled and experienced forestry staff to integrated fire management within the catchment.

The IFA believes that prescribed fire, used in a much more proactive and strategic way than in the period preceding the 2003 fires, is an essential management tool in the LCC and in the national parks to its west and north.

The report observes that radiata pine is killed by severe fires, supposedly leaving areas where there was pine cover more exposed than areas having a cover of natives which resprout from adventitious shoots. While it is true that radiata pine plantations were completely defoliated and subsequently died¹, eucalypts and other native species, such as acacias, were similarly stripped of all their foliage. Does it take longer for catchments to be stabilized by pine forests regenerating from seed or by native forest? Some think pines may do the job quicker, but irrespective of the answer, the fact is that pine is regenerating on some 3,100 ha of the catchment from seed shed after the fire by the now dead, mainly cleared, parent pine stock. From the point of view of water quality there is considerable merit in allowing this regeneration to grow undisturbed for the time being to protect the soil and build up organic matter, but in the absence of treatment to space trees the outcome will be overdense stands of slow-growing radiata pine in admixture with whatever native and weed species are also able to colonize the site.

Such forest will present an unacceptable fire risk on a catchment used for town water and even reduce water yields locally, although the overall impact on the water resources of the lower Cotter is not likely to be significant because of the relatively small area involved. Non-commercial thinning could be carried out without detriment to water quality, and perhaps low intensity fire used to reduce ground fuel loads and favour native vegetation over pines, but experience elsewhere in Australia, e.g. Jounama, Boboyan, show that an **expectation that pines can be completely eradicated is unrealistic**. Pines will inevitably comprise a major element of the flora of that part of the lower Cotter catchment under discussion, at least until the next major fire and beyond when the process we see now may start over again.

As well as being slow growing and a fire risk, unthinned pines would be highly susceptible to an infestation by Sirex wood wasp that would require urgent and expensive control measures to prevent spread and serious damage to nearby commercial pine plantations outside the Cotter catchment. An early thinning to waste (non-commercial thinning) at 6-8 years to a stocking of about 300-400 stems per hectare, followed perhaps by a further, commercial thinning at about 24 years, would greatly reduce the risk of Sirex, increase water yield, reduce fire hazard, and encourage the restoration of some native vegetation amongst the wide-spaced pines besides resulting in an aesthetically much more pleasing forest (*cf.* abandoned and poorly managed areas of pine forest north of Braidwood).

Any planning for revegetation needs to be underpinned by an intensive landscape analysis based on geology, soils, slope, aspect and other flora and fauna habitat attributes - in short

¹ The fires of January 2003 burned through numerous arboreta in the Lower Cotter Catchment planted with many different, mainly coniferous, species. Notable survivors included *Pinus canariensis* and *Sequoia sempervirens*, and in one arboretum, *Pinus nigra*. The first two species put on new foliage through adventitious buds, like eucalypts. There is room to consider planting with these and other known fire resistant species.

land unit ecosystem mapping which would guide species choices and establishment techniques.

In summary, the Institute of Foresters of Australia (ACT) submits that:

- 1. Pines will remain a major component of vegetation in parts of the lower Cotter catchment for decades to come**
- 2. Forest cover on the catchment, whether native or exotic, needs to be managed to reduce risk of fire and also to control pest species**
- 3. Land unit mapping is essential to guide revegetation**
- 4. The case for managing softwood forests in the catchment on a commercial basis is still strong.**

Yours sincerely

Kim Wells
Executive Committee
IFA (ACT)

About the Institute of Foresters

The Institute of Foresters is a national professional body with 1240 members engaged in all branches of forest management and conservation in Australia. The Institute is strongly committed to the principles of sustainable forest management and the processes and practices which translate these principles into outcomes.

The membership represents all segments of the forestry profession, including public and private practitioners engaged in many aspects of forestry, nature conservation, resource and land management, research, administration and education. Membership is not restricted to professional foresters. Other forestry professionals are also welcomed to the institute.

The Institute is an advocate for

- better forest management in Australia
- high professional standards in forestry
- active management of our forests for all values

INDIVIDUAL COMMENTS FROM MEMBERS

(These comments are not necessarily endorsed in whole or in part by the Institute of Foresters of Australia (ACT). They are included as viewpoints to be considered by reviewers.

Headings are taken from the Draft Strategic Management Plan for the Lower Cotter Catchment, p x-xii)

Pine plantations

[Start comment]

Site condition at the time of planting

Lower quality native forest, and particularly that on soils derived from the Ordovician sediments, was in a generally rundown condition when Canberra was established. This is, in part, the natural condition of low quality dry sclerophyll forest, but now accentuated by some 80 years of summer grazing, regular burning to encourage grass growth, ringbarking, and near complete depletion of understorey during the rabbit plague.

Under these circumstances, crown dieback was common, advance growth stagnant - despite substantial overhead gaps, and much of the soil surface was bare and eroding. Much of the natural forest was degraded beyond its capacity to maintain itself in a dynamic condition, but lower quality sites were certainly not degraded beyond the capacity of pine to develop on them. As the plantations spread through the lower catchment, pine seedlings began to colonise the eucalypt forest, most notably the lower quality sites, and to develop vigorously. As the pines grew, there developed a thick litter layer which prevented continuing erosion and might in time have helped restore the condition of the eucalypts.

Why were pines so successful?

The answer most likely lies in the pine's water use attributes. Eucalypts will continue to transpire for some part of each day, despite increasingly dry conditions. Trees become stressed – reflected in the poor condition of boles and crowns on water deficient soils. Pine, in contrast, can reduce transpiration more readily as soils dry out. In this way pine appears to be better adapted than the eucalypt to the low and variable rainfall of the Australian environment. It can better regulate water use, and can tolerate dry periods of reasonable duration without mortality. It can respond rapidly when rain falls.

Accepting and learning to live with mixtures of eucalypts and pine

Pine-hardwood communities are common in many parts of the world, and ecologically, can be an important option for the lower Cotter catchment. The eucalypt-pine mixtures which had developed naturally within the plantation surrounds are redeveloping in the wake of the fire. This is occurring quite widely.

The pine component of the mixed stands, though fire-killed, is regenerating from the seed which fell following the fire. On some upper slope sites, the natural forest adjacent to the pine plantation had been so heavily invaded by pine that it was cleared as part of the post-fire operations. Both eucalypts and pine are regenerating in these situations. I suspect this is one basis for the observation in the draft plan that native vegetation is re-establishing in the wake of the fire.

Inevitably, pines will continue to be a significant part of the vegetation of the lower Cotter catchment, that is, unless we are prepared to commit large financial resources to eradicating them! In which case, what are the options for lower quality sites? I suggest we simply accept the many advantages of pine wildlings and create mixed species stands by intermixing with eucalypts natural to the site, and let each site sort out the community best adapted to it.

Revisiting the case for commercial pine planting

I believe we should be revisiting the case for commercial pine planting – and doing so in a way which recognises community concerns. I wonder how thoroughly this matter was examined.

Let's look at some of the positives:

1. Pine plantations offer the best means of stabilising the soils of the Cotter catchment. Pine stands develop rapidly and will form a protective litter layer quickly.
2. Pine may use no more water than a eucalypt plantation on the average Cotter site, and even if it does, we should appreciate the pine areas will be only a small part of the catchment of the Cotter reservoir. For those who know the Brindabellas, the Cotter reservoir catchment extends back along the range to Aggies Gap.
3. A mosaic pattern of native forest species and pine can be designed to enhance vegetational diversity and maintain wildlife populations.
4. Plantation practice can take account of special circumstances of the catchment. Site cultivation and mounding, and use of herbicides to minimise weed competition will increase the early rate of growth, but are not essential. Until the mid to late 1970s, radiata pine was planted directly onto cleared and burned sites. Competition from fireweeds was often severe but pine always emerged through them.
5. Harvesting does not have to be based on wide area clearfelling. Greater environmental control can be achieved through dispersed small patch felling or strip felling systems.
6. It is difficult to accept that we should reject a pine plantation program because we fear future fires coming out of the national park! Protective measures can be taken – including construction of a pattern of roaded and annually burned firebreaks around and within the plantations – as was past practice elsewhere.
7. A commercial plantation program will require the maintenance of a forest-experienced workforce. This can be of great benefit in fire emergencies. The continuing reduction in forest-experienced workforces throughout Australia is a matter of considerable concern to forest resource managers.
8. Financial yield from plantations will contribute to the effective management of the catchment in many ways. Given the present circumstances of the catchment, the benefits of a plantation program are so substantial that long-term cost recovery might be a sufficient economic objective.

[End comment]

[Start comment]

There is no reason, based on CSIRO report, to not establish or manage pine plantations in those part of the catchment that are not environmentally sensitive (i.e. riparian zones, steep slopes, highly erodible soils), if fire risks outside the LCC are well-managed.

It would be better to make some management interventions - particularly thinning at around age 6-8, and probably pruning of remaining trees - in the pine plantations that have already been established, as a means of managing the fire risk they present within the LCC. Thinning would also be advantageous for water yield and would have the added benefit of enhancing the commercial value of the remaining trees. There seems no reason, given CSIRO report conclusions with respect to well-managed plantations, to not manage those plantations already established to enhance their commercial value. Such management does not need to be intensive and can be consistent with water quality goals.

[End comment]

[Start comment]

A further consideration in the management of planted pines (and indeed wildling pines) in the LCC is Sirex wasp management, as well as other forest health issues, such as Dothistroma, pine aphid. These are especially pertinent as the LCC remains nestled within a commercial pine plantation and land use area even if future management is not pursued in the LCC itself.

[End comment]

[Start comment]

It makes no sense not to manage the existing pines as a future economic crop. Because these new plantations have been established using best practice catchment management techniques, including the establishment of significant riparian buffer strips, any thinning operations that need to be conducted will not result in decreased water quality. In fact, research in the Cropper Creek catchment in north-eastern Victoria, indicates that thinned pine plantations will yield greater quantities of water than areas of adjacent native forest. In addition, it well documented that without commercial management the quality of the plantation will decline over time with the result that when the trees are felled after 35 years the plantation will produce little else but pulpwood. This strategy will therefore remove the opportunity for significant future revenues from sawlogs that could be used to fund the conversion of the plantation to native woodland. From a practical perspective, if there is no ongoing work for harvesting contractors in the ACT, it will effectively rule out the availability of equipment and skills that will be needed for treatment of large areas of wildling pines..

[End comment]

[Start comment]

I strongly urge the ACT Government to comprehensively review and revise the parts of the Draft Plan concerning pine plantations in the LCC. In particular, the statements under 4.2.2 Management policies, page 28, “The pine plantations will not be actively maintained as a commercial crop.” and “no thinning of plantations” cannot be justified in relation to the statement on the second page of the Information Sheet, “The 1285 ha of existing pine plantations will be managed on a non-commercial basis and liquidated when it is feasible to convert the area to a primarily, native vegetation cover. This may mean that the plantations will grow for a full crop cycle (30-35 years).”

An unthinned, dense stand of pines would be highly susceptible to an infestation by Sirex wood wasp that would require urgent and expensive control measures to prevent spread and serious damage to nearby commercial pine plantations outside the LCC. Early thinning to waste at 6-8 years to a spacing of about 300-400 stems per hectare, followed perhaps by a commercial thinning at about 24 years, would greatly reduce the risk of Sirex, increase water yield, reduce fire hazard, and encourage the restoration of some native vegetation under the wide-spaced pines. Besides, to most people, wide-spaced pines look much nicer than a dense stand.

If the young pine plantations are well stocked (over 90% survival) they are a valuable asset that could yield a good return from imaginative management. If they are poorly stocked (such as 60% survival) it is likely to be more cost-effective in the long term to eliminate them now and replace them immediately with the proposed grassy woodland.

[End comment]

[Start comment]

The report gives undue prominence to the concerns of a small but very vocal group of scientists and community members about the role of pines in water catchment, without undertaking any analysis of pine plantations in other water catchments. Nor does it even consider the possibility of establishing commercial plantations using native species. Rather it sets out on a strategy to re-create a pristine native forest woodland. In my considered opinion such a strategy will be very expensive, it will eliminate many options for sustainable commercial forestry, it will reduce the capacity to combat bushfires (due to a loss of skills and equipment) and it is very doubtful as to how successful it will be on some of the difficult sites in the catchment, due to the significant presence of environmental weeds and pine wildlings.

Overall the draft plan is very light on substance about practical land restoration and full of political rhetoric that pine plantations are bad, particularly in water catchments. The report selectively uses “facts” to promote the preferred strategy. For example on page 47 the report indicates that turbidity levels in the Cotter Dam have been in the range 10-120 with one peak level briefly reaching 200 NTU. By contrast, the post bushfire turbidity in Bendora Dam has returned to around 2 NTU. Conveniently no mention is made of the turbidity level in Bendora Dam that occurred in 2003 as a result of massive gully erosion which caused ACTEW to stop using Bendora Dam for Canberra’s water.

[End comment]

Native vegetation

[Start comment]

The adaptive restoration of native vegetation is a desirable and sensible strategy. However, as already evident, regeneration is variable across the LCC, and is likely to be particularly difficult on the drier poorer sites in the lower parts of the LCC. Here, as Dr Ross Florence has argued separately, a pine-eucalypt mosaic is the most likely outcome in the foreseeable future. Experience elsewhere in ACT and nearby (e.g. Boboyan and Jounama) suggests that eradicating pine is very expensive and unlikely to be successful, and we do not believe it would represent a good use of scarce resources to attempt it on other than sites of particular ecological or cultural importance.

[End comment]

[Start comment]

The ecological basis for replanting eucalypts

There are two important ecological principles to be considered:

(i) Where replanting eucalypts, species patterns should be largely consistent with those of the natural forest.

There is in the natural forest a sensitive relationship between the species composition and a considerable number of environmental factors: temperature, rainfall, soil depth and water storage capacity, and aspect and slope. It is possible in re-planting eucalypts to be flexible to some extent, but this should not be taken too far. For example, one should not plant faster-growing species (ribbon gum or even brittle gum) on sites which were dominated by slow growing broadleaved peppermint and scribbly gum.

(ii) Within the natural dry sclerophyll forest, eucalypt regrowth develops from long established, but largely static lignotuberous seedlings and other advance growth, rather than from new seedlings responding immediately to disturbance of the forest floor. This represents an important evolutionary adaptation of the eucalypt, that is, new seedlings establishing on low nutrient or dry sites must develop a substantial root system before dynamic shoot growth is possible.

Where eucalypts are planted on dry or nutrient deficient sites, they may develop a straggling form, fail to gain effective control of site in a reasonable time, and importantly, in the lower Cotter situation, fail to control surface soil movement. This may be particularly so on sites degraded by past land use.

Eucalypts can be planted wherever site conditions are appropriate. Faster-growing eucalypts can be planted within riparian zones and gullies, on lower slopes where soils are relatively fertile and deep, and where the planting will not be subject to high levels of insolation and excessive transpiration. Grass and shrub seed might be sown concurrently. The trees might be thinned out as they develop to help create more open stands and maintain individual tree vigour.

If we accept that recreation will be an important role of the catchment, then we should widen our thinking on re-vegetation and look at planting exotic hardwoods and conifers also. For example, the former arboreta containing diverse species of softwoods and hardwoods were often valued picnic areas for the public. There is a need to plant for the future recreation areas such as these.

[End comment]

[Start comment]

There will be difficulty successfully establishing lignotuberous eucalypts on some of the difficult stony sedimentary rock sites within the catchment, without some other nurse crop. I think that in this paragraph or one following we should also comment on the implication of not undertaking ripping and mounding in the reforestation operations. It is clear from Greening Australia plantings that the rapid establishment of eucalypts and other native species is greatly assisted by ripping and mounding. It is very difficult to see how "community engagement" will be achieved in reforestation programmes on a large scale without such site preparation techniques. It is simply not realistic to expect the community to

dig pits on rocky sites before they plant the seedlings. Besides this, there is no real scientific evidence to indicate that the ripping and mounding actually contributes to soil erosion and plenty of observable evidence that the rip lines have acted as sediment traps for overland soil movement in the catchment.

[End comment]

Fire management

[Start comment]

Integrated fire management within and outside the LCC is of paramount importance. Prescribed fire, used in a much more proactive and strategic way than in the period preceding the 2003 fires, is an essential management tool in the LCC and in the national parks to its west and north.

Management of pine wildling regeneration (e.g. by thinning) and of the re-established pine will be important components of effective fire management.

[End comment]

[Start comment]

Some areas of unmanaged native regeneration may represent a fire hazard equal to unmanaged pine either planted or regenerating naturally - for example areas of dense *Acacia dealbata* regeneration.

[End comment]

[Start comment]

The two dot points on fire management on page 31 give rise to grave concerns about how effective fire management will be implemented in the Lower Cotter Catchment. Firstly there is no clear statement that the current practice of removing the very significant fuel levels associated with the pine debris will be continued as a matter of priority. Secondly, while it is essential that fire management planning in the Lower Cotter is integrated with surrounding areas; elsewhere in the plan it is assumed that high intensity fires will occur at least every 24 years and therefore if both the catchment vegetation and the private assets east of the catchment are to be adequately protected there must be a strategy of implementing comprehensive fire management programs within the Lower Cotter.

[End comment]

Erosion control

[Start comment]

The processes already being undertaken and proposed should be endorsed as appropriate.

[End comment]

[Start comment]

The role of a pine/eucalypt mixture may be important for erosion control, particularly on steep eroded slopes, outweighing any improvement in biodiversity to be gained by removing the pine.

[End comment]

[Start comment]

The report does not undertake any analysis on the important issue of restoring soil organic matter to the soils in the Lower Cotter Catchment. CSIRO scientists have indicated that the three critical strategies needed to improve water quality are: reducing the intensity and improving the standard of roads; establishing effective riparian vegetation; and restoring soil organic matter through out the reforested catchment. In a natural system, the build up of organic matter is proportional to the biomass production in the forest. The plan fails to address this issue, presumably because biomass production will be significantly greater in a pine plantation than it will be in regenerating native woodland.

In addition, although the report indicates on page viii that a vegetation cover that protects soils is essential for landscape stability for water quality, there is no comparative analysis of the time it will take to achieve satisfactory forest vegetation cover under the previous or alternative restoration strategies.

[End comment]

Integrated weed management

[Start comment]

The second dot point in Section 4.2.2 contains highly impractical strategies. For example – areas not planted to pine will be progressively restored to native vegetation **and** extent of weeds in the catchment will be gradually reduced. It is well known to experienced land managers that once native seedlings are established on a site it is impossible to control weeds across large areas because the native species are equally susceptible to herbicides as are the weeds. This means that unless very large and costly hand control programmes are implemented (which I doubt given the financial constraints under which the ACT Government is working) the areas will be infested with significant weeds such as blackberry, St Johns Wort, Patterson's Curse as well as wildling pines.

Secondly the strategy to retain a mix of wildling pines and natives on the steep areas until it is feasible to remove and replace the pines with native species will mean that the wildling pines will be retained for ever because there is no feasible way to remove them on these sites once the native vegetation is established. It is unclear (and probably completely impossible) how areas with wildling pines can be burnt at age 5-7 years without killing any regenerating or planted native species.

[End comment]

Land use zoning

[Start comment]

As noted under 'Pine plantations' there is no reason for this change.

[End comment]

[Start comment]

Re-zoning may be appropriate in the future- i.e. 30-40 years out, but while the planted pine remain managed or otherwise it would be a premature to rezone the land use and restrict the flexibility for adaptive government and management.

[End comment]

Research & monitoring

[Start comment]

The CSIRO report emphasized that good land management, whatever the vegetation cover, is critical for good catchment outcomes. Research and monitoring, feeding back to adaptive management regimes, is fundamental to achieving these outcomes. There are enormous opportunities, as noted in the "Shaping Our Territory" and CSIRO reports, to engage the ACT research and education communities in this process, and establish the LCC as a world-leading research site informing world-leading catchment management practice.

[End comment]

[Start comment]

Wildlife Research and Monitoring (Environment ACT) have started to put together a 'prospectus' of research opportunities associated with the LCC and draft strategic management plan. The draft plan does place a strong emphasis on research and monitoring. The risk is that limited financial resources may see R&M as one of the first actions to be cut back. Current NAP/NHT project submissions have placed an emphasis on funding for a 2-year professional officer with appropriate botanical knowledge to undertake comprehensive vegetation surveys of the LCC.

[End comment]

Biodiversity, culture & heritage

[No comments]

Recreation

[Start comment]

The Shaping our Territory report noted the importance of the LCC for recreation, and this amenity value remains of high importance to ACT residents. Managed recreation is not incompatible with catchment goals.

[End comment]

[Start comment]

Is there an intention to reduce the recreational use on these lands? Given the high levels of public recreation that has occurred on these lands, the Government's decision to substantially increase the number of residents in the Uriarra village immediately adjacent to the Lower Cotter Catchment, and the lack of alternative proposals for recreation opportunities, how will this will be achieved?

[End comment]

Community involvement

[Start comment]

Successful community involvement strategies are already pursued, principally in partnership with Greening Australia but the scale of the LCC project requires a different order of community engagement. There is considerable relevant expertise in the ACT academic and practitioner communities so the ACT Government, NRM Council and others might be able to strengthen partnerships to tap into this expertise.

[End comment]

Economic considerations

[Start comment]

The statements in Attachment F, Future pine revenues on page 52, provide estimates used to dismiss the prospect of a good return from managed pine plantations with a number of pessimistic assumptions including, (1) an antiquated thinning schedule, (2) inflated discount rates, (3) high costs, particularly for insurance, and (4) low yields and prices.

[End comment]

[Start comment]

The whole “economic modelling” in Appendix F is very dubious. There is no direct comparable cost benefit ratio study of the two options. Every effort is made to discredit the positive economic benefit coming from the pine plantation option (for example on page 54, where it is given a NPV of only \$1.37million), but no attempt is made to prepare a comparable economic benefit of the native vegetation option. The initial revegetation costs are higher than for pine establishment and there will not be any commercial returns, hence that strategy will have a significant negative NPV. In addition, there is no allowance made in the analysis for the very significant reduction in future returns that will result from the policy of not carrying out commercial thinnings of the existing 1285 hectares of pine plantations. Under the chosen strategy the full management costs will have to be borne by the ACT Government and the community through increased water charges. Most importantly, there is limited analysis of the relative differences in improved water quality that are only attributable to the change from pines to native species. On page 54 the report indicates a NPV of \$0.6 million from the revegetation effort although there is no attempt to work out whether this amount would be any different for pines or native species.

The comments on page 46 “The impact of these policies on the regional forest industry is considered to be negligible, given that the timber resource would not be available as saw logs for at least 30 years” demonstrates virtually no knowledge of how sustainable forest industries obtain timber resources from a variety of sources in order to maintain an even supply of logs over time.

1400 hectares of well managed pine plantation in the Cotter Catchment grown on a 30 year rotation could reasonably be expected to produce at least 300,000 cubic metres of high quality sawlog when harvested and an equivalent volume of pulpwood. Using today’s prices this would be worth more than \$25 million in revenue to the plantation owner and more than \$50 million in finished product to the forest industry that processed the saw logs. Clearly this can not be considered to be a “negligible” value.

[End comment]

[Start comment]

Appendix F begins by establishing that the government plantation estate will be approximately 10,074 hectares including the pines planted in the LCC and that this is marginally above the reported minimum size to achieve international benchmark management costs. If this is true then not managing the LCC pines in this area puts continued viability of the whole plantation estate in jeopardy.

The policies associated with the 4 strategies in the draft strategic management plan clearly state that pine plantations in the LCC are not to be managed commercially yet a mean annual increment of 15 cubic metres commensurate with a managed plantation is assumed. It is not a question of adjusting the discount rate to determine a realistic NPV against risk - the reality is that an unmanaged pine plantation can not be expected to deliver any return. For example, those areas planted in 2005 within the LCC had a survival rate of approximately 60% and because of current policy these plantations are not being refill planted this season. This inaction alone jeopardizes the commercial future for these pines.

Tables 7 and 8 provide details on vegetation recovery categories and associated treatment costs. A sensitivity or risk analysis approach to these recovery costs would be appropriate as, for each estimate, the true cost will be within a wide range of values along a probability curve. A thorough probability-based risk approach to the costing would benefit government and the community in highlighting areas where the planned recovery strategy is vulnerable to excessively high costs.

For example, treatment category 1, the estimated cost is \$50/ha for grass seed and fixed wing aircraft. Firstly, on a small area like 100 ha a helicopter is more appropriate. When ferrying costs are included, just the application cost is about \$100/ha. Seed cost would be additional. CALM undertook a grass seeding rehabilitation program following the recent debris burning in the LCC. Costs using a combination of helicopter and ground based application and a mix of both exotic and native seed were about \$3-400/ha.

The 2nd paragraph on page 46 of the draft considers that removal of 1,400 ha plus 1,285 ha (already planted) from the regional forest estate will have negligible impact given that the sawlogs would not be available for 30 years. Further it states, 'This allows time for industry to adjust and/or locate an alternative resource'. This demonstrates an extremely poor understanding of strategic planning and a lack of vision for the plantation sector. Where is the ACT's commitment to the Plantations 2020 Vision? What other policy decisions are being made that will facilitate or support this 'industry relocation'? No references to any published or otherwise reported work are given to support the statements made in this paragraph.
[End comment]