



IFA WA Division
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18 March 2002

The Environmental Protection Authority
P.O Box K822
Perth WA 6842

Attention: Mr Murray Hogarth


**RE: CABLE SANDS PROPOSAL TO DEVELOP A MINERALS SAND MINE
AT LUDLOW**

Dear Mr Hogarth,

Please find attached a submission on the above proposal from the Institute of Foresters, WA Division. Please do not hesitate to contact me on 0417 952 817 (email john_tredinnick@urscorp.com) if you wish to discuss this submission further.

Yours sincerely

John Tredinnick
Chairman WA Division



**Objection to
mining in the
Ludlow tuart
forest**

Institute of Foresters of Australia

SUMMARY

The Institute of Foresters, WA Division recommends that mining in the Tuart Forest at Ludlow as outlined in the Cable Sands (WA) Pty Ltd ERMP should not be approved for the following reasons.

- In terms of tuart, the area is far from degraded and, for the most part, it is well stocked. Many areas of tuart require no further regeneration (see below)
- When the pines are removed the tuart stocking, structure and health will be much better than many parts of the tuart forest in existing National Parks
- Mining would replace a well stocked woodland of predominantly 80-100 year old trees with 0-6 year old trees
- The age class of tuart in the mining area is poorly represented in the remainder of the tuart forest
- When the pines are removed the weed species present in the area will be the same as most other areas of the Ludlow tuart forest
- Given similar control measures, weed infestation will be no worse than in other parts of the Ludlow forest
- Removal of soil as a means of removing weeds is a novel approach but unnecessary
- The undesirable dominance of peppermint is less in this area than in other parts of the tuart forest
- Mining of the forest estate cannot be justified on the grounds of providing funds for the Department of Conservation and Land Management to carry out its statutory obligations on that land
- There is no certainty of successful tuart growth and development on sites that have been mined
- The most appropriate tenure for ongoing management of the area is considered to be State Forest. However, higher reservation levels could also be considered for the tuart forest in the future. Although present reservation exceeds the 15% JANIS criteria, it is noted that:
 - ⇒ The total extent of tall tuart woodland on crown land is less than 2,500 ha
 - ⇒ The tuart forest meets the JANIS criteria of 'vulnerable' on the grounds that ecosystem processes have been altered to the

extent that it is incapable of regenerating itself under current management practices

- ⇒ Substantial areas of the tuart forest in National Park and State Forest are dying at the present time, the trigger for which is not completely understood.
- ⇒ The tuart forest is regarded as a public 'icon' because of its rarity, its location near areas of high population, its aesthetic value and its importance for tourism
- ⇒ 100% of karri/red tingle and karri/yellow tingle on crown land has been reserved because of their rarity - the former is three times the area, and the latter six times the area of tall tuart woodland
- ⇒ The land proposed for a gift is mostly cleared, and many of the mature trees on it are showing the same symptoms as the trees at Yalgorup. This is no substitute for the area proposed for mining.

1. INTRODUCTION

1.1 Institute of Foresters.

The Institute of Foresters, WA Division is the peak body representing the forestry profession in WA. Members are professionally trained forestry specialists from a wide range of occupational interests and experience. Some of us work for research institutions, such as CSIRO, some of us teach in Universities, some of us are independent forestry consultants, some work in the forest products industry and some are employed in government agencies.

The Institute does not claim to have a special position in relation to final decision-making on forest management issues but we believe our training and experience means that we are a credible source of information on forest issues. With respect to the use of forests, the Institute has long supported the principle of multiple use. However, the overriding principle is that any one use does not destroy the forest.

1.2 Extent and Distribution of tuart forest in Western Australia.

The tuart forest, unlike the jarrah and karri forest types, is not an extensive forest. It is estimated that there is only about 2,500 hectares of tall tuart forest on crown land left in WA. This is far less than is in reserves nominated under the WA Regional Forest Agreement for tree species such as Tingle. In fact, there is probably more tuart planted overseas (in the Middle East specifically) than in WA.

Tuart trees in the Yalgorup National Park in the Lake Clifton area south of Mandurah have been dying over the last few years for reasons that are not completely understood. Consequently, the question of whether mining should proceed at Ludlow should not be viewed in isolation but in light of the overall viability of the entire tuart forest in WA.

Problems of tuart regeneration have been recognized for many years and it is now accepted that management intervention is necessary if the tuart forest is to be sustained. Viewed from this perspective, there is a strong case that all tall tuart forest in WA such as at Ludlow, which is still healthy, should not be considered for mining.

1.3 Certainty of success in rehabilitating tuart forest at Ludlow after mining.

There is considerable uncertainty as to the likely success of re-establishing a sustainable tuart forest following sand mining at Ludlow. There are many examples of failed tuart plantings on mined over areas on soil types similar to that at Ludlow.

Claims of success on previously mined over areas relate to completely different soil types. For example, planted tuart has been growing for a few years on a mined over area just south of Capel, however the soil profile was completely different to that in the Ludlow Tuart forest. In this case the ore body was several metres below the surface and was overlain by several metres of topsoil, which had built up after decades of agricultural use. After mining this topsoil layer was replaced into the pit and trees planted have grown satisfactorily so far.

At Ludlow the site does not have a history of soil improvement resulting from decades of agriculture. There is no topsoil and the soils are sand to surface level. Previous attempts to replant tuart on similar sand types just to the east of the proposed mining area were not successful.

For several decades the Forests Department has been recommending to the various sand mining companies wanting to mine at Ludlow that, before anything could be considered, the companies should purchase private land that formerly carried tall tuart forest, mine it and then demonstrate that a sustainable tuart forest could be established. This would require a period of several decades to satisfactorily demonstrate that re-establishment had succeeded. None of the companies involved ever pursued this option, even though there is private land available in the Capel area that contains mineral sands and which once carried tall tuart forest.

In the view of the Institute of Foresters there is nothing in the ERMP that increases the certainty of successful rehabilitation. We believe that the Forests Department advice of over 20 years ago is still applicable. To allow mining to proceed at Ludlow without demonstrated broad scale success on similar soil types is simply gambling. The State is taking a risk that the area of tuart forest will be lost.

1.4 Portrayal of the tuart forest as being severely degraded

Tuart forest in the area proposed for mining is described in the ERMP as being degraded or severely degraded. It is inferred that mining is the only vehicle to restore the forest to its original state. The basis for this position may relate to the presence of exotic species but it has no relation to the stocking or structural condition of tuart and its condition following the removal of the pines.

On the majority of the mining lease there is a very adequate stocking of largely 80 to 100 year old tuart trees. These are not immediately visible to the untrained eye as they are "masked" by the existing pine trees. Once the pine trees are removed it will become much more obvious to people that a well-stocked area of tuart is in place. The details of this are discussed later. If desired, an understorey of the original vegetation can be introduced after removal of the pines.

If mining proceeds the existing tuart tree component would be removed. Following mining the area would be planted with tuart seedlings etc. and it would take about 80 years to attain the same degree of development of tuart trees that already exists.

The density and structure of tuart over much of the area to be mined is as good as the best of the tuart forest. Under the ERMP definition of degraded, all of the tuart forest would be a candidate for mining.

1.5 History of pine establishment in the tuart forest

In 1928 it was reported that excessive regeneration of peppermint was making tuart regeneration difficult and a primary reasons for the planting of pines at Ludlow, as outlined in the Empire Forestry Journal of 1928, was, " to introduce a rotation of Pines, retaining only vigorously growing young tuart as standards, with the object of restoring satisfactory conditions for the future regeneration of Tuart".

This strategy has been very effective in reducing the peppermint component. In the areas where pines have been removed in recent times an excellent stand of tuart is now fully visible. The same will become apparent once all the pine trees are removed from the area being proposed for mining.

Statements that the planting of pine has degraded the ecosystem irrevocably and the only solution is to mine are very misleading. It was a very definite strategic move by the Conservator of Forests at the time, Stephen Kessell, and it has worked exactly as planned. Today, with the advent of bulldozers, it is possible to physically remove peppermint trees by pushing them over, stacking them into heaps and burning them to create an ash bed suitable for seeding to tuart. Selection of the pine planting strategy was about the only cost effective method that could have been used in the 1920's.

It is possible that the predominance of peppermint understorey in the tuart forest at Lake Clifton could be contributing to the tuart deaths in that area but it is certainly the primary reason for the failure of tuart to regenerate itself. Peppermints compete vigorously for soil moisture and also induce non-soil wetting characteristics in coastal sands. Few people would dispute that a reduction in peppermint understorey is beneficial to the health of tuart trees. Peppermint removal has been an integral part of successful regeneration activities in recent years at Ludlow.

1.6 Future management of Ludlow Tuart Forest.

Government funds should be made available to carry out essential management of the Ludlow Tuart Forest. Permitting mining on a section in State Forest tenure to finance the preparation of a management plan is akin to a person selling his/her eye to fund essential dental work.

In the areas under State Forest tenure at Ludlow from which pines have now been removed, it is not recommended they be converted into National Park. By remaining as State Forest tenure activities such as pushing down of unwanted peppermint and tuart trees can take place in the process of rehabilitating the tuart forest. Once the land tenure changes to National park it becomes considerably more difficult to carry out the necessary management. We believe that this area should be retained as State Forest, at least until all of the rehabilitation has been completed, after which its tenure could be reviewed.

2. COMMENTS ON SPECIFIC SECTIONS IN THE ERMP.

Page 12-15. Section 2.9. History of the Proposal. Figure 2.8 shows an example of one of the classes of tuart trees left after pine harvesting. This is the basis for the new "tuart forest" and with many trees over 80 years of age a "mature" tuart forest appearance could be achieved within a few years without mining. The alternative would be to wait another 80 years after mining to allow newly planted seedlings to attain this same size.

Page 19. Section 3. Community Consultation. Cable Sands, paragraph 2, claims to have embarked on an extensive program of community consultation". The Institute of Foresters, the professional body representing the forestry profession and containing within it's ranks some of the most in depth understanding of tuart forest management in WA, was not approached.

Page 19. Section 3.2. Stakeholder Identification. Similar comments as above. Cable Sands have possibly been of the view that the voice of the forestry profession would be expressed via the Department of Conservation and Land Management. Although there are many competent foresters within the Department, many of whom are members of the Institute of Foresters, it does not follow that they can openly express their viewpoints whilst representing a government authority.

Page 20. Section 3. Table 3.3.1. The Ludlow Working Party. Similar comments as above. While the groups represented are no doubt well meaning and interested in the tuart forest, their scientific knowledge and experience in tuart forest management is, in many cases, very limited.

Page 20. Table 3.3.2. Example of Working Party initiated Strategies during the consultation process. Item 7. "Cable Sands Managing Director has made a commitment to sign a legally binding agreement never to pursue mining in the Ludlow Tuart Forest National Park." Firstly, the chances of mining in National Park tenure would be almost impossible on a legal basis. Secondly, Cable Sands have not said that they won't mine "State Forest tenure" at Ludlow. To have any substance, Cable Sands should have said that they would not pursue mining in the Ludlow Tuart Forest, regardless of tenure.

Page 27. Section 3.4 Ludlow Information Brochure. The brochure received in a copy of local newspapers was received some months ago. It should be seen for what it is - a presentation of the case for mining with little discussion of alternative viewpoints.

The Institute of Foresters decided not to respond but to wait until formal requests for comments on the ERMP were called for.

Page 27. 3.5 Ludlow Site Tours. Although the South West Environment Centre and the Bunbury Naturalist Society have done some good work in raising community awareness about tuart forest issues, they have very limited professional forestry understanding of tuart forest management. Accordingly, they are unlikely to have the background and experience to be able to ask penetrating questions and interpret the information provided by the mining company.

Page 27. 3.6 Consultation with significant historians. Whilst all the people mentioned are understood to have a keen interest in the tuart forest, the fact they were consulted should not be portrayed as an endorsement of mining.

Page 30. Section 4. Benefits of the Proposal. Information collected during preparation of the ERMP has contributed to the bank of knowledge about the tuart forest, however little is new.

The main benefits of mining are economic but, while economic development is supported by the Institute of Foresters, these benefits must be balanced against the availability of alternative sites and the scarcity of tall forest woodland. There are few remnants of tall tuart forest in the South West and a considerable degree of uncertainty regarding whether restoration of a tuart forest after mining would be successful. By contrast, it is understood that mineral sands deposits are still reasonably common in the South West and alternative deposits could easily be mined.

Page 30. Section 4.1.2. Expansion of the Tuart National Park. While any addition of land to the forest estate is beneficial, it should be noted that the 56 hectares proposed for donation by Cable Sands is very marginal tuart land. Some tuart have been planted on the land in the past but recent examination reveals these to be suffering severe insect attack and some of

the older tuart trees are dying. The site is on the western edge of the forest and is more a site suited to *Eucalyptus rudis* than tuart vegetation.

Page 32. Section 4.1.3. Financial returns for tuart management. Cable Sands are offering \$80,000 to contribute to the preparation of a management plan for the Ludlow Tuart Forest in return for mining approval. Whilst it would be nice to have an up-to-date management plan available, it is not the lack of an up-to-date plan that has prevented arum lily control and ongoing management such as tuart regeneration.

The reason why limited action has taken place in recent decades is the lack of funding provided to the Department of Conservation and Land Management by successive governments for tuart forest management. Few people appreciate the size of the conservation estate in WA and the scarcity of resources to manage them. Although the 1979-1985, Ludlow Tuart Working Plan prepared by the then Forest Department is out of date in some respects, it is still a useful source of knowledge to guide management and lack of action has not been due to the absence of a plan.

In recent years to their credit, the Department of Conservation and Land Management and FPC have carried out some very successful regeneration work in areas of State Forest at Ludlow where pines have been removed.

Weed eradication: Arum lilies are an eyesore but to say they prevent regeneration of tuart is not correct, as ash beds are required to establish tuart seedlings. In the process of ash bed preparation arum lilies are temporarily controlled. The suggestion that mining is a solution to arum lily control is not one that can be endorsed. If arum lilies are seen as a major problem they should be controlled by a separate program from government or by enlisting community action. Mining to raise some funds for weed is not logical.

Page 62. 4.1.3. Timber revenue for CALM. It could be more appropriate for the areas of State Forest to remain as State Forest so that they could be managed for multiple use values including timber production. There is a significant area of the Ludlow Tuart Forest already in National park tenure. Tuart timber is now becoming scarce and a small sustained supply of tuart timber for a boutique market could be used to provide a regular source of

revenue to fund management and protection of the Ludlow Forest, while still retaining all of the tuart forest values.

Page 4.14. Restoration of a heavily degraded ecosystem. Too much is being made of degradation of the ecosystem. One of the main changes to the ecosystem from aboriginal times has been the dominance of a peppermint understorey in much of the tuart forest at Ludlow, due almost certainly to lack of regular burning since European settlement.

While peppermint seedlings are small they are very vulnerable to fire, however once established they will usually reshoot after a fire. In James Paddock, some of the best examples of tuart forest at Ludlow are seen. Following a wildfire in 1974/75 in James Paddock there was prolific regeneration of tuart, which has developed well. By contrast peppermint stems are much fewer in James Paddock.

On the South Coast, aboriginal practices of burning at least every second or third year was continued by European graziers and ensured that development of peppermints, which are very common inside the sand dunes, was restricted. Since regular burning by graziers stopped some years ago, peppermints have developed into dense thickets through a combination of lack of burning or intense fire. It is very likely that regular burning in the past kept peppermints under control at Ludlow. The continuation of grazing leases up until recent times meant that burning did not take place, as the leaseholders wanted the grass retained for stock.

In 1928 it was reported that excessive regeneration of peppermint was making tuart regeneration difficult and a primary reasons for the planting of pines at Ludlow as outlined in the Empire Forestry Journal of 1928 was, " to introduce a rotation of Pines, retaining only vigorously growing young tuart as standards, with the object of restoring satisfactory conditions for the future regeneration of Tuart". This strategy has been very effective in reducing the peppermint component. In the areas that have had pines removed in recent times an excellent stand of tuart is now fully visible. The same will become apparent once all the pine trees are removed from the area being proposed for mining.

Statements that the planting of pine has degraded the ecosystem irrevocably and the only solution is to mine it so that rehabilitation of the

tuart forest can take place is very misleading. It was a very definite strategic move by the Conservator of Forests at the time, Stephen Kessell and it has worked exactly as planned. Today with the advent of bulldozers it is possible to physically remove peppermint trees by pushing them over, stacking them into heaps and burning them away to create an ash bed suitable for seeding to tuart. Selection of the pine planting strategy was about the only cost effective method that could have been used in the 1920's.

Page 66. Item 5.2 Mining Objectives. The first 4 objectives are attainable. The fifth, *restoration of a sustainable landscape and vegetation with environmental values consistent with those in surrounding values*, is a rather vague statement.

No mining company has ever demonstrated that tuart forest as at Ludlow (i.e. on tuart sands) can be restored after mining to a sustainable tuart forest ecosystem. Tuart has been established (but not grown on to any age of consequence) on former agricultural south of Capel. However, these examples are completely different to the sands in Ludlow. In the case of the former agricultural land south of Capel, the ore body was at considerable depth and before mining several metres of topsoil, which overlaid the minerals, was removed and stockpiled. After mining the several metres of topsoil etc was returned to the pit. Any trees would be expected to grow well in such a situation. The site, however, is completely different to the sands in the Ludlow Tuart where there is no topsoil and the land has not been under agricultural crops for many years.

In sand dune areas south of the existing mineral sands plant (which more closely resembles the tuart sands in Ludlow), several attempts were made to establish and grow tuart on mined over areas but all were without success. Consequently, it is very much an unproven article of faith by Cable Sands that they can successfully restore mined over areas at Ludlow to a sustainable tuart forest. The State is being asked to gamble that Cable Sands will succeed.

Page 83. Section 6.3.1. As commented previously, weeds need to be controlled if understorey species are to be introduced, however this can be achieved by means other than first mining the area.

Page 84 Section 6.3.2 Feral Animals. There is no reason why the Ludlow Tuart Forest should not be included in the Department of Conservation and Land Management's Western Shield baiting program. The area does not have to be mined to allow this to happen.

Page 85. Figure 6.8. Cable Sands say, quite correctly, that the success of rehabilitation depends on availability of funding from the Department of Conservation and Land Management, not technical understanding. It is a rather sad state of affairs if the State cannot afford to fund the necessary rehabilitation but would be prepared to gamble the future of the Tuart Forest at Ludlow in order to obtain these funds from the mining company.

Page 92 Section 6.4.2. Conservation significance of Vegetation. Justification for mining is heavily dependant on the assertion that the area to be mined is 'degraded' or 'completely' degraded. It is not clear how this conclusion has been arrived at. Table 6.4.1 shows the percentage of tuart, pine, peppermint, jarrah/marri, arum lilies, weeds and native vegetation apparently on the basis of stem numbers. This is a totally inappropriate means of estimating tuart site occupancy once the pine is removed.

The Institute of Foresters has acquired from Cable Sands the map that was prepared for them showing the position of all the tuart stems by maturity class. This map has not been included in the ERMP documents. We have stratified this map for the area to be mined, into three classes - Dense, Moderate and Open (see Figure 1). Thirty variable radius plots (1 factor) were established throughout the area to determine the basal area of tuart in each category. This is a more appropriate measure of tuart site occupancy. The results are indicated in Table 1.

Table 1. Tuart stocking in the area to be mined

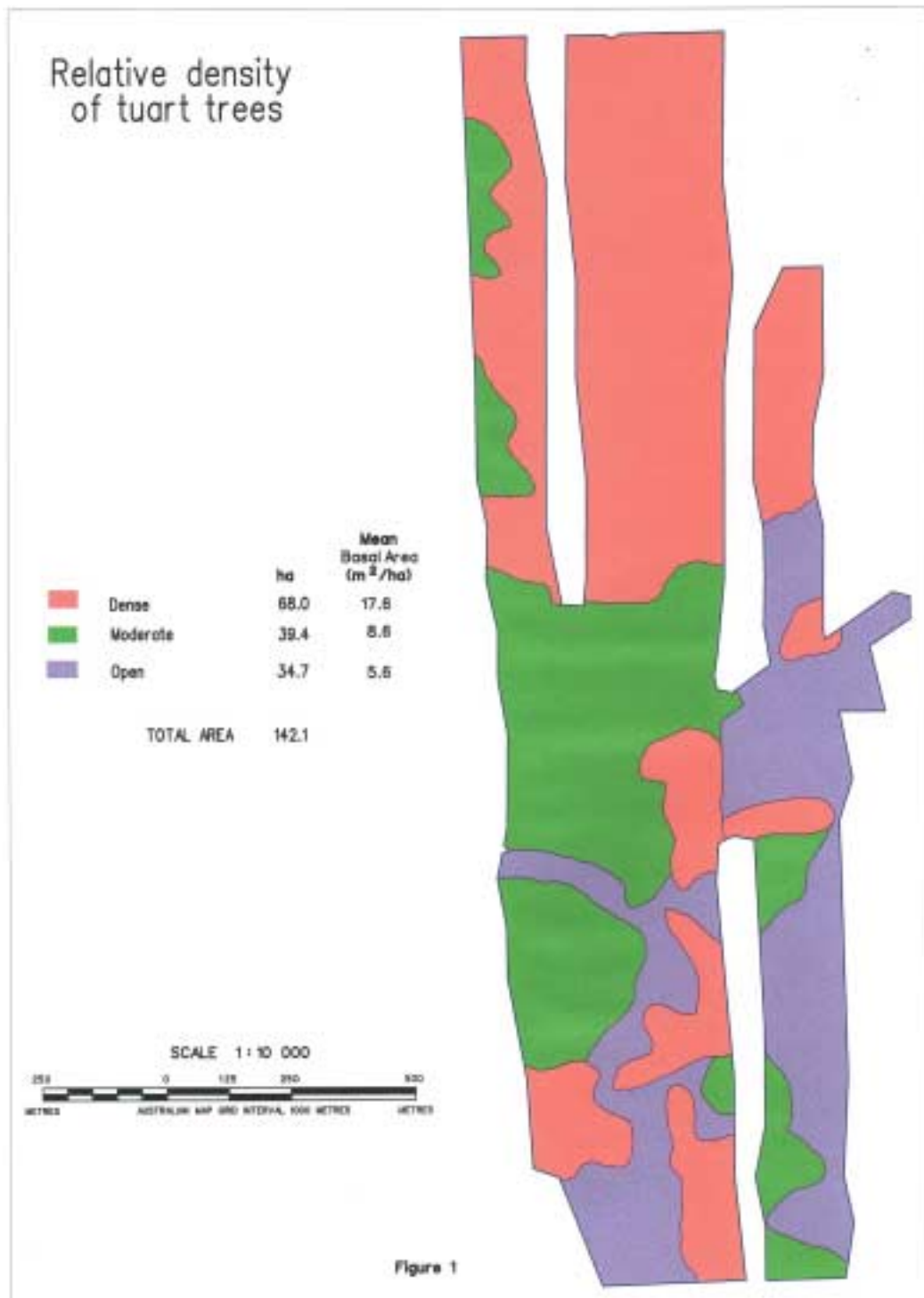
Strata	Area (ha)	% of total area	Mean basal area (m ² /ha)	Comment
Dense	68	48%	17.6	Fully stocked
Moderate	39.4	28%	8.6	Regeneration required to 1/3 of area
Open	34.7	24%	5.6	Regeneration required throughout

Nearly half of the area is fully stocked with tuart, mostly in the mature and senescent category and is as fine a stand of tuart as will be found anywhere. Twenty eight percent is classified as partly stocked and an examination of the spatial distribution of the trees suggests that about 1/3 of it constitutes gaps which require regeneration to bring it to a condition of adequate stocking. This is typical of the tuart forest in general.

Twenty five percent has few tuart and broad scale regeneration is required. Regeneration activities would require the removal and burning of the pine plus some peppermint in some areas. Following these regeneration activities the area would be adequately stocked with tuart and its condition in terms of weeds would be similar to the rest of the tuart forest. Its subsequent condition in terms of ongoing development and sustainability would be better than most of the existing tuart forest.

We therefore conclude that the assertion that the area to be mined is 'degraded' or 'completely degraded' cannot be supported and that only a modest proportion (25%) requires significant regeneration activity.

Figure 1: Relative density of tuart trees



Page 95. Section 6.4.6 Regional representation of Tuart. Although the intention of the Table is probably to give the impressions there is 23,090 hectares of Tuart Forest so that there should not be a problem in mining a small portion at Ludlow, the fact remains that there are only 2500 hectares of Tall Tuart Woodland left on crown land (ERMP Table 8.3.2). All of the proposed mining area falls into this Tall Woodland category. As a tourist attraction etc. it is well known that it is the large trees of any vegetation complex that visitors want to see. Although of interest to botanists, stunted vegetation types are not of much interest to tourists.

The area of Tall Tuart Woodland remaining on crown land is less than the area of any other major eucalypt type in the South West. The karri/red tingle is three times the area and the karri/yellow tingle is six times the area. One hundred percent of the karri/red tingle was reserved under the RFA and 100% of the karri/yellow tingle was subsequently reserved because of their rarity. Both of these types are healthy and regenerate naturally under current management practices. Tuart, on the other hand, is being attacked and killed by insects, the trigger for which is not understood. Changes to the understorey conditions brought about by changes to fire management practices means that the tuart forest will not regenerate (except by stand replacing fires) without management intervention. It is therefore unsustainable without management intervention and must be considered vulnerable on these grounds.

Page 98. Section 6.4.8 Study of Mature Tuart Profiles. The only proven way of testing a theory in the case of rehabilitation and re-establishment of a forest ecosystem after mining is to demonstrate the theory in action. In the case of a forest ecosystem, it is probably necessary to prove at least 50 years of successful growth after mining to give an indication that the methods are succeeding. This is the advice that all sand mining companies have been given by the Forests Department and EPA over the years. Companies have been advised to purchase some cleared land that once supported tall tuart forest, mine it and demonstrate that successful replacement of a tuart forest after mining could be achieved. No companies have ever done this on land identical to that which occurs at Ludlow.

3. CONCLUSION

The Institute of Foresters of Australia opposes sand mining of the tuart forest on the grounds that:

- The tuart forest constitutes a very small area and qualifies for the description of "vulnerable".
- The area in question is generally well stocked with 80+ year old tuart and modest regeneration activity is required following pine removal to return the area to high quality tuart forest
- Re-establishment of tuart on mined areas has not been proven and, even in the best of circumstances, it would take 80+ years to return it to its existing condition
- Mineral sands are not so rare as to warrant the removal of this forest.



These photographs of well stocked tuart forest were taken within the area described in the ERMP as degraded or completely degraded. The bottom photograph shows the tuart forest remaining after pine removal.