Clearing of 580 Hectares of Native Vegetation on Melbourne Location 3544, Rowes Road, Shire of Dandaragan

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Mr R & Mrs P Powell

Report and recommendations
of the Environmental Protection Authority

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Summary and recommendations

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the proposal by Mr R & Mrs P Powell (the proponents and landowners) to clear approximately 580 hectares (ha) of native vegetation on Melbourne Location 3544 within the Shire of Dandaragan for agriculture. Specifically, the stated purpose of the proposed clearing is to allow for grazing and a timber plantation.

Following consideration by the Inter Agency Working Group under the '*Memorandum of Understanding (MOU) for the protection of remnant vegetation on private land in the agricultural region of Western Australia,*' the proposal was referred to the EPA by the Commissioner of Soil and Land Conservation in view of the likely impacts of the proposal on nature conservation and biological diversity values.

As the proposal appeared unlikely to meet the EPA's environmental objectives, the Authority set the level of assessment for the proposal at Proposal Unlikely to be Environmentally Acceptable (PUEA) in July 2001. At that time a brief statement of the reasons for the PUEA level of assessment was made publicly available as set out in the EPA's Administrative Procedures for Environmental Impact Assessment.

No appeals were received on the level of assessment and therefore the next stage in the assessment process is this report, which is the EPA's report to the Minister for the Environment on the proposal, pursuant to Section 44 of the *Environmental Protection Act 1986*.

Environmental Factors

It is the EPA's opinion that the environmental factors relevant to this proposal are:

- Nature conservation and biological diversity - impacts due to loss of native vegetation;
- Land degradation – potential for adverse on site and off site impacts on land productivity and ecological processes; and
- Greenhouse gas emissions – carbon loss from vegetation clearing and soil.

Conclusions

The EPA has considered the proposal by Mr and Mrs Powell to clear approximately 580 ha of native vegetation on Melbourne Location 3544 for agriculture and a timber plantation with reference to the relevant environmental factors.

The EPA considers the proposal is environmentally unacceptable for the reasons set out in Section 4 of this report.

As indicated in the EPA's Position Statement on the protection of native vegetation, the EPA has been concerned about the environmental consequences of clearing in the agricultural area for some time and, whilst it appreciates that there are matters of equity to be considered, it holds strongly to the view that from an environmental perspective it is unreasonable to allow further clearing to be undertaken for agricultural purposes.

Furthermore, the EPA advises that while it will continue to consider and provide advice to the Minister on the environmental factors relevant to proposals for clearing of native vegetation in accordance with the requirements of Part IV of the of the Environmental Protection Act, further future proposals for agricultural clearing of native vegetation located with the agricultural area, that are referred under Section 38 are likely to receive the 'Proposal Unlikely to be Environmentally Acceptable' level of assessment.

The EPA is strongly of the view that the challenge now is to establish a response to the array of clearing applications in terms of addressing the equity issue, rather than continue to allow clearing in the agricultural area.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister considers the report on the relevant environmental factors of:

   (a) Nature conservation and biological diversity;

   (b) Land degradation; and

   (c) Greenhouse gas emissions,

   as set out in Section 4 of this report.

2. That the Minister notes that the EPA has concluded that the proposal cannot meet the EPA's objectives for nature conservation and biological diversity or Land degradation and that the proposal would not assist Australia in meeting national targets for greenhouse emissions in the long term unless approval of clearing was contingent on a requirement to maintain a permanent forestry land use.

3. That the Minister notes that the EPA has also concluded that the vegetation proposed to be cleared should be retained and conserved because, as outlined in the EPA's Position Statement Number 2 on environmental protection of native vegetation, further clearing for agricultural purposes in the agricultural area is likely to lead to the continued loss of nature conservation and biological diversity values of vegetation and may also contribute to land degradation problems.

4. That the Minister not issue a statement that the proposal may be implemented.

5. That the Minister notes the other advice provided in Section 5 of this report.

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the proposal by Mr R & Mrs P Powell (the proponents and landowners) to clear approximately 580 hectares (ha) of native vegetation on Melbourne Location 3544 within the Shire of Dandaragan for agriculture. Location 3544 is located 15 kilometres (km) west of Moora near the corner of Rowes and Kaganaba Roads within the Shire of Dandaragan (Figures 1 & 2). Specifically, the stated purpose of the proposed clearing is to allow for grazing and a timber plantation.

Under the *Soil and Land Conservation Act 1950* (the Soil and Land Conservation Act), any landholder wishing to clear greater than 1 hectare of native vegetation is required to notify the Commissioner of Soil and Land Conservation (the Commissioner). The Commissioner then decides whether or not to object to the clearing depending on whether or not land degradation is likely to occur and may issue a Soil Conservation Notice to prevent that clearing taking place.

The proponents notified the Commissioner of their intention to clear the subject land on 9 April 2001. Following consideration by the Inter Agency Working Group (IAWG) in accordance with the Memorandum of Understanding for the Protection of Native Vegetation on Private Land, the proposal was referred to the EPA by the Commissioner in view of the likely impacts of the proposal on nature conservation and biological diversity values.

As the proposal appeared unlikely to meet the EPA's environmental objectives, the Authority set the level of assessment for the proposal at Proposal Unlikely to be Environmentally Acceptable (PUEA). At that time, a brief statement of the reasons for the PUEA level of assessment was made publicly available, as set out in EPA's Administrative Procedures for Environmental Impact Assessment. A copy of the EPA's statement of reasons is provided in Appendix 2 of this report.

On 23 June 2001 the EPA was advised by the Commissioner of Soil and Land Conservation that a Soil Conservation Notice had been issued to prohibit the proposed clearing and to direct the owner to refrain from undertaking 'any agricultural pursuit' within the clearing area. Attached to the Commissioner's letter was a report by the Department of Agriculture's regional hydrologist which concludes that "there is currently an escalating salinity problem within Melbourne Location 3544 and any further clearing in the catchment, particularly of the valley flanks to the north and south, will accelerate and extend salinity development". A copy of the Commissioner's letter and the accompanying hydrologist's report is provided within Appendix 4.

While the Commissioner's decision to impose a Soil Conservation Notice on the property presently has the effect preventing the implementation of the proposal, there is provision under the Soil and Land Conservation Act for the proponent to appeal to the Minister for Agriculture to have the Soil Conservation Notice quashed. As a result, there remains a proposal that has potential to be implemented. The EPA is therefore required to carry out an assessment of environmental impacts under Part IV of the *Environmental Protection Act 1986* (the EP Act).

This report is the EPA's report to the Minister for the Environment and Heritage on the proposal, pursuant to Section 44 of the EP Act. The EPA is of the view that consideration by the Minister for Agriculture, of any soil conservation appeals that are submitted following the determination on this proposal by the Minister for the Environment and Heritage under Section 45 of the EP Act would need to take into account the results of the determination.

2. The proposal

A locality plan for Location 3544 is provided as Figure 2 and a site plan illustrating the area of native vegetation proposed for clearing is provided as Figure 3.

The main characteristics of the proposal are summarised in Table 1 below.

Table 1 - Summary of key proposal characteristics

Element	Description
Total area of property	1310 hectares
Area of property currently uncleared	810 hectares (62 % of the property)
Area to be cleared (area estimated by DoA)	580 hectares (44% of the property)
Area of native vegetation estimated remaining after proposed clearing	230 hectares (17% of the property)
Area of native vegetation proposed to be protected under an Agreement To Reserve (ATR)	0 hectares
Purpose of clearing	Establishment of *Pinus pinaster* and pasture
Condition of vegetation	Described as 'remnant vegetation' in Griffin (1990).
Mapped description of the Beard vegetation type to be cleared	*'Low woodland; Banksia prionotes'* (approximately 580 hectares) (DoA, CALM, GIS data)
Total representation in (IUCN Category I to IV) reserves of Beard vegetation type/s to be cleared	*'Low woodland; Banksia prionotes'* (approximately 14131 hectares or 16% of Pre-European extent) Hopkins et al (1996)
Total mapped extent of Beard vegetation type now supporting woody vegetation (any condition)	*'Low woodland; Banksia prionotes.'* (approximately 30975 hectares or 36% of original extent remaining under 'woody vegetation' cover) (CALM, DoA GIS data)
Mapped Soil / Landscape System classification of area to be cleared according to the Department of Agriculture (1999)	*Rowes System* (approximately 580 ha) (DoA GIS data)
Total Representation in (IUCN Category I to IV) reserves, of Soil / Landscape Systems affected	*Rowes System* (approximately 94.4 hectares or 0.25% of Pre-European extent) (DoA GIS data)
Total mapped extent of Soil / Landscape Systems now supporting woody vegetation (any condition)	*Rowes System* (approximately 3927 ha or 10% of Pre-European extent) (DoA GIS data)

Abbreviations: CALM: Department of Conservation & Land Management; DEP: Department of Environmental Protection; DoA: Department of Agriculture; GIS Geographic Information System; IUCN International Union for the Conservation of Nature

3. Strategic context

3.1 Development of Government policy on protection of native vegetation

It is now well recognised that broad-scale land clearing and consequential salinity have had a dramatic effect on biodiversity in the agricultural area through the direct loss of vegetation communities and plant species, and the associated loss of mammals, birds, and other animals which depend upon large enough areas of healthy bush for food and shelter. These impacts have been reported in both the State and Commonwealth State of the Environment reporting (Government of Western Australian 1998, Cth of Australia, 1996).

In response to impacts on biological diversity and nature conservation, as well as land and water degradation, the State and Commonwealth Governments have over recent years developed and implemented various policy positions and programs to provide a strategic context for the protection of remnant vegetation.

These include:

- *Western Australian State Government position on land clearing (Government of Western Australia, 1995);*
- *National Strategy for the Conservation of Australia's Biological Diversity (Commonwealth of Australia 1996a);*
- *Memorandum of Understanding for the Protection of Native Vegetation on Private Land in the Agricultural Region of Western Australia (MOU 1997);*
- *Natural Heritage Trust partnership agreement, Western Australia (Commonwealth of Australia 1997);*
- *Commonwealth State of the Environment report (Commonwealth of Australia 1996b);*
- *Western Australian State of the Environment report (Government of Western Australia, 1998);*
- *WA Salinity Strategy (Government of Western Australia, 2000); and*
- *National Greenhouse Strategy (Commonwealth of Australia, 1998b).*

In addition, the Western Australian Government's 2001 election policy statements included statements on agricultural land clearing as follows:

- The clearing of remnant native vegetation is one of the main pressures on biodiversity as well as contributing to salinity and other forms of land degradation.
- Clearing native vegetation within the agricultural area is generally not acceptable other than relatively small areas where alternative mechanisms for biodiversity are addressed.
- Applications for clearing should be assessed on their scientific merits.
- Preventing farmers from clearing remnant native vegetation raises issues of equity which must be addressed.

The most recent development in Government Policy on protection of native vegetation is the agreed document entitled *National Objectives and Targets for Biodiversity Conservation stemming from the National Strategy for the Conservation of Australia's biodiversity 2001-2005* (Commonwealth of Australia, 2001). Within this document, the Commonwealth Government and the majority of the States, including Western Australia, have agreed to pursue the target of ensuring that, by the end of this year, all jurisdictions have clearing controls in place that will have the effect of reducing the net national rate of land clearance to zero.

While the EPA recognises the importance of the resolution of equity issues relating to farmer proponents, it is unable to consider these issues in undertaking environmental assessments under Part IV of the Environmental Protection Act.

3.2 The EPA's position on environmental protection of native vegetation

The EPA has assessed a number of land clearing proposals over recent years. Based on the issues arising from information presented during these assessments, the strategic framework provided by government policy positions and programs referred to, and general scientific information which has become available on the potential cumulative impacts of broadscale clearing on the environment, the EPA has developed Position Statement Number 2 regarding 'Environmental Protection of Native Vegetation in Western Australian' (EPA, 2000).

Melbourne Location 3544 lies within the agricultural area as defined by Position Statement No 2 and therefore the EPA Position Statement in relation to clearing in the agricultural area and clearing for establishment of deep rooted perennial crops is relevant to this assessment .

Specifically in relation to the agricultural area, as illustrated in Figure 1 of Position Statement No 2, the EPA's current position on clearing in the region includes the following:

1. *"Significant clearing of native vegetation has already occurred on agricultural land, and this has led to a reduction in biodiversity and increase in land salinisation. Accordingly, from an environmental perspective any further reduction in native vegetation through clearing for agriculture cannot be supported.*
2. *All existing remnant native vegetation should be protected from passive clearing through, for example, grazing by stock or clearing by other means such as use of chemicals including fertilisers.*
3. *All existing remnant native vegetation should be actively managed by landholders and managers so as to maintain environmental values.*
4. *Because of the extent of over clearing in the agricultural area, development of revegetation strategies at a landscape level, including the provision of stepping stones, linkages and corridors of native vegetation should be a priority.*
5. *Clearing of deep rooted native vegetation for replacement with non native deep rooted crops (eg Tagasaste or bluegums) is generally not regarded as acceptable and these alternative deep rooted crops should be planted on already cleared land."(EPA 2000)*

The EPA recognises that in addition to being within the agricultural area as referred to in EPA Position Statement Number 2, the present clearing proposal is located in the Shire of Dandaragan, where there is approximately 50% of the original vegetation cover remaining. However, much of the area of the Dandaragan Shire, including the location of the present proposal, is located within the Geraldton Sandplains Bioregion (Thackway & Creswell, 1995) which has long been recognised as having very high nature conservation and biological diversity values (eg Burbidge et al, 1990).

EPA Bulletin 424 (Burbidge et al 1990) describes the significance of the vegetation in the Mt Lesueur area within the Geraldton Sandplains Bioregion, which has been identified as an area of world, national, state and regional conservation significance, as do subsequent EPA reports relating to agricultural land clearing such as EPA Bulletin 894 (EPA, 1998). Bulletin 894 refers to evidence that native vegetation in the region exhibits a number of characteristics of high environmental significance including high numbers of endemic plants, species richness of vascular plants and vertebrate animals, and diverse vegetation associations and communities. Although the average level of species richness and endemism in the Geraldton Sandplains Bioregion is less than that occurring at Mt Lesueur, it is still regarded by the EPA as being high by national and international standards. For this reason and because a significant portion of the region contains primarily cleared landscapes, that portion of the Geraldton Sandplains Bioregion outside the rangeland pastoral zone has been included in the 'Agricultural area' defined in the EPA's Position Statement.

While the cumulative impacts of land clearing within the agricultural area, as described in the EPA's Position Statement, would normally be such that the present proposal for clearing of native vegetation on Melbourne Location 3544 be regarded as environmentally unacceptable, the EPA has considered the proposal on its individual merits and made an assessment of the environmental factors relevant to the present proposal, as discussed in Section 4 of this report.

4. Environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

It is the EPA's opinion that the environmental factors relevant to this proposal are:

- Nature conservation and biological diversity - impacts due to loss of native vegetation;
- Land degradation – potential for adverse on site and off site impacts on land productivity and ecological processes; and
- Greenhouse gas emissions – carbon loss from vegetation clearing and soil.

These relevant environmental factors are discussed in Sections 4.1 to 4.3 of this report.

4.1 Nature conservation and biological diversity

Significance of vegetation directly impacted

No specific botanical survey of the vegetation on Location 3544 has been carried out. However, regional mapping covering the area proposed to be cleared has identified the area as predominantly supporting the 'Low woodland*; Banksia prionotes*' vegetation type. Approximately 36% of the original (Pre-European) extent of this vegetation type currently supports 'woody vegetation' according to analysis using Beard Vegetation Mapping and the Department of Agriculture's 1996 'Woody Vegetation Cover' geographic data set. However, the EPA is aware that the quality of the mapped areas of 'woody vegetation' identified in the woody vegetation data set is undefined and that the information used in the dataset is now approximately 5 years old. The current area of native vegetation occurring within remnants with long-term viability for biodiversity conservation is therefore likely to be significantly less than this figure. Approximately 16% of the original extent of the 'Low woodland; *Banksia prionotes*' vegetation type is believed to occur in conservation reserves (Hopkins et al, 1996).

Within the Geraldton Sandplains Bioregion, the Department of Agriculture's geographic database of Soil / Landscape Systems also provides indicative information on the distribution of plant communities. Similar groups of plant communities have been found to occur on similar soil and landscape sequences within each Soil / Landscape System (EA Griffin, Pers comm. July 2001). In some areas, the boundaries of Soil / Landscape Systems may more closely approximate the boundaries of floristic (taxonomically based) plant community groupings than do those of the Beard Vegetation Types. Therefore the level of protection of native vegetation occurring within the area covered by each Soil / Landscape System provides an indicator of the level of biodiversity conservation which is complementary to, and at a more detailed level than, that provided by evaluation using Beard vegetation types.

The proposed clearing area occurs within the Rowes Soil / Landscape system, which has an approximate woody vegetation coverage level of only 10% of the original extent. Of this approximately 25% occurs in secure conservation reserves (Department of Agriculture GIS data, DEP GIS analysis). Therefore a total of only about 2.5% of the Rowes Soil / Landscape System is estimated to support native vegetation occurring within conservation reserves.

Based on the available information, it therefore appears that the area of native vegetation proposed for clearing is likely to contain plant communities that are poorly conserved overall, particularly in vegetation remnants with long term viability for biodiversity conservation. These communities are therefore also likely to be inadequately represented in secure nature conservation reserves, such that any further clearing may have irreversible consequences for the conservation of biodiversity.

Significant flora

The EPA notes that no specific surveys have been carried out that would identify the presence of significant flora within the area of native vegetation proposed to be cleared. Geographic database information made available by the Department of Conservation and Land Management (CALM) indicates, however, that approximately 16 populations of priority flora and 1 population of Declared Rare Flora (DRF) occur within the local area (within a 15 km radius of the property). Populations of significant flora may therefore occur within the vegetation proposed to be cleared and accordingly, the proposal appears to have potential to impact on significant (rare, threatened or poorly known) flora species.

The EPA is unable to establish whether the proposal will impact significantly on significant flora species from available information. Given the likelihood that populations of DRF and priority flora may be present within the clearing area, the EPA is of the view that the proposal could not be judged to meet the EPA objectives for biodiversity conservation unless the presence or absence of significant flora species is established by surveys carried out or sponsored by the proponent. However, in view of the EPA's general position in relation to clearing of native vegetation within the agricultural area, as set out in Position Statement No 2, and the level of significance of the vegetation types present as discussed earlier in this section, the EPA does not consider this investigative work to be warranted for the present proposal.

Viability of remaining native vegetation and effect on biodiversity conservation in the local context

A general appreciation of the local impacts of the proposal on biodiversity conservation can be gained from consideration of the values located within the proximity of the property up to a 15 km radius, centred on the clearing area (see Figure 2).

Within a 15 km radius of the present proposal (an area of approximately 70 000 ha), approximately 12% (8 800 ha) of the landscape is now occupied by 'woody vegetation' (Department of Agriculture GIS data). Approximately 3140 ha of this (4.5% of the landscape) was estimated to occur within areas identified as 'remnant vegetation' (as opposed to 'modified remnant' or 'scattered trees') in the report on a regional vegetation survey by Griffin (1990). The vegetation remnant on Location 3544 forms one of the few viable native vegetation remnants within a predominantly cleared agricultural landscape, and would (if protected) serve as an important linkage or 'stepping stone' for genetic connectivity between conservation reserves and other large areas of native vegetation which are widely dispersed in the locality.

The proposed clearing would result in the loss of approximately 580 ha of native vegetation on the property, which is approximately 70% of that currently remaining on the property. This would leave approximately 230 ha of native vegetation (17% of the property area) remaining, located mostly within a low lying corridor of remnant vegetation approximately 250 to 400 metres wide, running across the centre of the property from east to west. The proponent has not indicated an intention to protect any of the remaining native vegetation under the terms of an Agreement to Reserve (ATR).

The uncleared areas that would remain on the property following clearing under the present proposal would have very limited ongoing viability as they are located low in the landscape and have a high perimeter to area ratio. In the short to medium term these areas are likely to be subject to the impacts of increased waterlogging and/or salinisation, threats which are currently present in the immediate locality of the property. As discussed in Section 4.2, although the impacts of the clearing proposal on water use on the property are likely to be offset in the medium to long term by establishment of pine trees or other deep rooted perennial crops, the short to medium term increases in waterlogging and /or salinity may have longer term consequences for the remaining native vegetation both on and off site.

The very small Jam Hill Nature Reserve (285 ha), which is vested in the Conservation Commission of Western Australia, is located immediately to the south west of Location 3544. The long term viability of this reserve for biodiversity conservation is already likely to have been significantly affected by the results of fragmentation and surrounding land use. Jam Hill is currently the only conservation reserve with an area greater than 200 ha within approximately 28 km of Location 3544. Significant conservation reserves in the area include the 620 hectare Eneminga Nature Reserve approximately 30 km to the south west, the 215 hectare Manaling Nature Reserve, 28 km to the north east and the very large Watheroo National Park and Watheroo Nature Reserve area 31km to the north.

Much of the native vegetation currently remaining on Location 3544 has potential to maintain its viability and to provide linkage as a 'stepping stone' between the Jam Hill Nature Reserve and the other conservation reserves referred to above. The proposed clearing would effectively remove the majority of the vegetation on the property and significantly decrease the size and increase the boundary to area ratio of remaining areas. Clearing would thus significantly reduce the potential for areas of native vegetation on Location 3544 to act as stepping stones or, in combination with revegetated areas, as a corridor.

On the basis of the above information the EPA has formed the view that the proposal has the potential to significantly affect the conservation of biodiversity in the regional context by leading to:

- an increase in the already high level of biodiversity and habitat loss in the local area;
- further fragmentation of remnant vegetation on the property, significantly decreasing the viability of the vegetation on the property;
- further increase in the level of isolation of areas of native vegetation in the local area, including the Jam Hill Nature Reserve.

Assessment

In view of the available information on the potential impacts of the proposal on nature conservation and biodiversity which indicate that:

1. the area of native vegetation proposed for clearing is likely to contain plant communities that are poorly conserved overall, particularly in vegetation remnants with long term viability for biodiversity conservation and inadequately represented in secure nature conservation reserves, such that any further clearing may have irreversible consequences for the conservation of biodiversity;
2. the proposed clearing has the potential to significantly affect the conservation of biodiversity in the regional context by increasing the already high level of habitat loss and isolation and fragmentation of remaining native vegetation in the area; and
3. a significant number of populations of significant flora occur in the local area and some of these may occur on Location 3544

the EPA is of the view that the proposal is unable to meet the EPA's objectives for nature conservation and biodiversity.

It would not be possible to definitively establish whether or not the proposal will impact significantly on significant flora species unless surveys were carried out or sponsored by the proponent.

4.2 Land degradation

Description

Information provided to the EPA by the Commissioner of Soil and Land Conservation at the time of referral of the clearing proposal indicates that the locality of the proposal is associated with significant mean annual rises in groundwater levels (approximately 30 cm/annum) and increasing evidence of secondary land and water salinisation and waterlogging. The property is located in a sub-catchment in which less than 20% by area is occupied by deep rooted native vegetation (Department of Agriculture data).

While research and field experience has shown that deep rooted perennial tree crops such as pines have significant ability to increase interception and evapo-transpiration and decrease groundwater recharge, the success of the present proposal to offset the increase in groundwater recharge associated with clearing, by establishment of pine trees is subject to some uncertainty. There is currently significant evidence of salinity and waterlogging within the immediate vicinity of the area proposed for clearing which may affect the success of establishment, survival and/or viability of the trees. Saline or waterlogged sites are unsuitable for establishment of either *Pinus radiata* or *Pinus pinaster* (CALM / DoA, 1999).

Well established *Pinus pinaster* plantations are understood to provide a level of water use at least equivalent to native vegetation at age 13 years (eg Carbon et al, 1982). However, in reviewing research on moisture relations in *Pinus pinaster* plantations on the Swan Coastal Plain near Gnangara, north of Perth, McArthur & Associates (1986) observed that water table levels under newly established plantations on recently cleared native bushland took approximately 6 years to approach pre-clearing levels.

Based on currently available information, it is therefore considered that in the short to medium term, increased land degradation would result from salinity and waterlogging following clearing, particularly if groundwater rises affect the success of pine establishment.

The Water and Rivers Commission (WRC) has advised that it is of the view that the salinity risk in the locality of the proposal is 'high and is likely to be increased' by the proposed clearing. The WRC advised the Level 3 Interagency Working Group that it objected to the clearing on the basis of salinity risk.

Assessment

The EPA considers that it can not be confidently determined that the subject clearing proposal would not lead to increased land degradation, particularly in the short to medium term following clearing. Rather, there is evidence that in the short to medium term, increased land degradation would result from salinity and waterlogging following the proposed clearing. The EPA therefore considers that the proposed clearing should not be permitted.

4.3 Greenhouse gas emissions

Description

Emissions from clearing of native vegetation

The clearing and burning of approximately 580 ha of native vegetation will lead to the emission of greenhouse gases including carbon dioxide.

The prediction of the amount of greenhouse gas emissions attributable to a specific proposal for a land use change from native vegetation to agriculture or tree plantations is complex and involves the estimation of emissions from the above ground biomass to be removed, decay of surface and subterranean material such as tree roots, emissions from the soil profile, the long term carbon sink effect of vegetation retention and carbon fluxes generated by agricultural activities such as grazing.

The National Greenhouse Gas Inventory Committee (NGGIC) has developed a simplified methodology for calculating greenhouse gas emissions from clearing in order to assist land managers and decision making agencies in broadly assessing the effects of land management and development. These are discussed in the booklet *Land Use Change and Forestry: Workbook for Carbon Dioxide from the Biosphere* (Commonwealth of Australia, 1997b).

By adapting the methodology outlined in the NGGIC workbook, and making the assumption that essentially all of the above ground biomass from clearing will be burned or otherwise converted into greenhouse gases within a ten year period following clearing, it is estimated that approximately 8352 tonnes of carbon would be emitted from the initial clearing of the native vegetation on Location 3544, a further 7888 tonnes in the ten year period following clearing, and a further 6960 tonnes lost from the soil over the subsequent 10 year period. An approximation of the potential carbon emissions from clearing (which excludes the effect of change in land use) was therefore given as 23 200 tonnes (Appendix 3).

This is equivalent to the emission of approximately 85 000 tonnes of carbon dioxide (CO_2) (referred to as carbon dioxide equivalent or CO_2-e). The carbon sequestration associated with possible future tree establishment was not included in these calculations.

Carbon sequestered by a Pine plantation

Tree or plantation establishment following clearing is also likely to lead to the sequestration of carbon, although the amount and period of sequestration is subject to a number of factors, including the site, prevailing climate, the nature and timing of silvicultural management and the end use of any timber products harvested.

The Forest Products Commission of Western Australia (FPC) has provided an estimate of the amount of carbon likely to be sequestered in a 20 year period commencing 2003, following the establishment of a 580 ha *Pinus pinaster* plantation by the Commission in the Moora area.

In providing this estimate, the FPC has advised that, having adopted the principles of environmental care contained in the *Code of Practice for Timber Plantations in Western Australia*, the Commission is not an advocate of clearing of native vegetation for plantation establishment

The calculations, which were based on the FPC's growth prediction models for Maritime Pine (*Pinus pinaster*), included the following assumptions:

- Growth over a 30 year rotation of 10 m3/ha/yr mean annual increment (MAI) of stemwood (considered a reasonable growth rate in the area of the proposal);
- The entire 580 ha is established with Pine;
- Establishment takes place in 2003 (seedlings would have to be grown in 2002);
- Thinning at years 12 and 18 (the third thinning at age 24 and final harvest at age 30 are not an issue in a 20-year scenario);
- Following thinning, the stand continues to grow at the same rate as it would have done had it not been thinned; and
- No effective carbon sequestration is achieved through products yielded by thinning operations.

The amount of carbon that would be sequestered during this period is estimated at 187 000 tonnes CO_2-e.

This figure, though significantly greater than the emissions from clearing, does not allow for any carbon emissions resulting from fire, pests or diseases affecting the plantation, the harvesting of the final tree crop, or long term emissions caused by disposal of paper, timber and other plantation products. Over the long term, and particularly if there is only one tree crop rotation, these losses are expected to be a high proportion of the carbon sequestered, because plantation products will at some time in the future, reach the end of their serviceable life and be disposed of or converted into energy. If there is a long term or permanent change to the forestry land use for the subject land however, net sequestration may occur over time through accumulation of stored carbon in increasing volumes of long lived products such as furniture and building components.

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Assessment

The EPA is aware of the commitment made by Australia under the Kyoto protocol to ensure that greenhouse gas emissions do not increase by more than 8% over 1990 levels for the first reporting period of 2008 to 2012. The EPA is aware that Australia will be reporting in 2005 on progress towards meeting that target. The National Greenhouse Strategy also encourages the retention of native vegetation and the establishment of tree plantations as a carbon sink.

While the EPA recognises the emissions lost through clearing associated with this proposal may be temporarily or permanently offset by the establishment of pine trees (assuming that establishment is successful on this site), the EPA is strongly of the view that timber plantations should be established on previously cleared land, as this will contribute more effectively to the goal of increased carbon sequestration. If clearing of the native vegetation was permitted in order to establish a timber plantation, it is likely that several 30 year tree crop rotations would be required, with the resulting timber from each harvest used in long lived products such as furniture and building components, before the carbon emissions resulting from clearing were permanently offset.

The EPA therefore concludes in relation to greenhouse emissions, that unless approval of clearing was contingent on a permanent requirement to maintain a forestry land use, implementation of this proposal would not assist Australia in meeting its commitment to greenhouse emission reductions in the long term.

5. Other advice

5.1 Final report of the Native Vegetation Working Group

The Native Vegetation Working Group was established by the Minister for Primary Industry to 'develop mechanisms that minimise the economic burden carried by individual landholders in the protection and retention of privately owned bushland in agricultural areas'. The Working Group reported in January 2000 (Government of Western Australia, 2000b).

In the Report Introduction, the Working Group set out that:

"Most of Western Australia's farmland has been cleared and developed in the past 100 years. We have now reached the limit of expansion, and there is now a high level of agreement across the community, rural and urban, that the time of broadacre clearing has passed. Amongst the challenges facing us is to determine a useful and well supported future of bushland in our farming areas. Indeed, unless there is a substantial increase in tree and bush cover many of the farms established in the last hundred years may fall victim to increasing salinity."

The Report discusses a range of mechanisms aimed at both assisting in the protection and management of bushland, and ensuring that the costs are spread more equitably across the whole community. The Working Group put forward fifteen recommendations.

The EPA commends the Working Group on its report on mechanisms and encourages government to give active consideration to the recommendations (Government of Western Australia, 2000b).

As noted in the EPA's recent advice to the Minister for the Environment on environmental issues arising from the assessment of individual land clearing proposals (EPA, 1999a), "the challenge now is to establish a response to these applications in terms of addressing the equity issue rather than continuing to allow clearing". The EPA sees the Working Group's report and recommendations as clearly progressing this issue.

6. Conclusions

The EPA has considered the proposal by Mr and Mrs Powell to clear approximately 580 ha of native vegetation on Melbourne Location 3544 for agriculture and a timber plantation with reference to the relevant environmental factors.

The EPA considers the proposal is environmentally unacceptable for the reasons set out in Section 4 of this report.

As indicated in the EPA's Position Statement on the protection of native vegetation, the EPA has been concerned about the environmental consequences of clearing in the agricultural area for some time and, whilst it appreciates that there are matters of equity to be considered, it holds strongly to the view that from an environmental perspective it is unreasonable to allow further clearing to be undertaken for agricultural purposes.

Furthermore, the EPA advises that while it will continue to consider and provide advice to the Minister on the environmental factors relevant to proposals for clearing of native vegetation in accordance with the requirements of Part IV of the of the Environmental Protection Act, further future proposals for agricultural clearing of native vegetation located with the agricultural area, that are referred under Section 38 are likely to receive the 'Proposal Unlikely to be Environmentally Acceptable' level of assessment.

The EPA is strongly of the view that the challenge now is to establish a response to the array of clearing applications in terms of addressing the equity issue, rather than continue to allow clearing in the agricultural area.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister considers the report on the relevant environmental factors of:
    a) Nature conservation and biological diversity;
    b) Land degradation; and
    c) Greenhouse gas emissions,

    as set out in Section 4 of this report.

2. That the Minister notes that the EPA has concluded that the proposal cannot meet the EPA's objectives for nature conservation and biological diversity or Land degradation and that the proposal would not assist Australia in meeting national targets for greenhouse emissions in the long term unless approval of clearing was contingent on a requirement to maintain a permanent forestry land use.

3. That the Minister notes that the EPA has also concluded that the vegetation proposed to be cleared should be retained and conserved because, as outlined in the EPA's Position Statement Number 2 on environmental protection of native vegetation, further clearing for agricultural purposes in the agricultural area is likely to lead to the continued loss of nature conservation and biological diversity values of vegetation and may also contribute to land degradation problems.

4. That the Minister not issue a statement that the proposal may be implemented.

5. That the Minister notes the other advice provided in Section 5 of this report.

Appendix 1: References

References

Agriculture WA (1997) *The Protection of Remnant Vegetation on Private Land in the Agricultural Region of Western Australia*, Agriculture Western Australia: Albany, WA.

Beard J. S. (1979). *The vegetation of the Moora and Hill River area, Western Australia : Map and explanatory memoir. Vegetation Survey of Western Australia*. Vegmap publications, Perth.

Burbidge, AA., Hopper S.D. and Van Leeuwin, S (eds) (1990). *Nature Conservation Landscape and Recreational values of the Mt Leseur area. A Report to the Environmental Protection Authority from the Department of Conservation and Land Management*., Environmental Protection Authority , Bulletin 424, Perth.

Carbon, B.A., Roberts, F.J., Farrington, P. and Beresford, J.D. (1982). *Deep Drainage and Water Use of Pastures Grown on Deep Sands in a Mediterranean Environment.* Journal of Hydrology 55: 53-64. Elsevier Amsterdam.

Commonwealth of Australia (1996). *National Strategy for the Conservation of Australia's Biodiversity*. Canbera

Commonwealth of Australia (1996b). *State of the Environment Report*

Commonwealth of Australia and State of Western Australia (1997). *Partnership Agreement between the Commonwealth of Australia and the Sate of Western Australia addressing jointly agreed natural heritage objectives and the provision of financial assistance under the Natural Heritage Trust of Australia Reserve and related programs*, Environment Australia: Canberra, ACT.

Commonwealth of Australia (1997b) *Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks, Land Use Change and Forestry, "Workbook for Carbon Dioxide from the Biosphere", Workbook 4.2 Revision 2*. National Greenhouse Gas Inventory Committee.

Commonwealth of Australia (1998). *National Greenhouse Strategy - Strategic Framework for Advancing Australia's Greenhouse Response*, Australian Greenhouse Office: Canberra, ACT.

Commonwealth of Australia (2001). *National objectives and Targets for Biodiversity Conservation (2001-2005)*. Environment Australia, Canberra.

EPA (1994). *Clearing of Native Vegetation on Victoria Location 10598 Cockleshell Gully Road, Shire of Dandaragan – Reassessment under Section 43 of the Environmental Protection Act Report and Recommendations of the Environmental Protection Authority.* EPA Bulletin 894,. Perth WA.

EPA (1998). *Clearing of Native Vegetation on Victoria Location 10598 Cockleshell Gully Road, Shire of Dandaragan – Reassessment under Section 43 of the Environmental Protection Act: Report and Recommendations of the EPA* (EPA Bulletin 894, Perth WA, May 1998)

EPA (1999). *Clearing of Native Vegetation – Environmental advice on the issues arising from the use of Section 38 to assess clearing proposals in the agricultural area, and implications for other areas of Western Australia. Advice to the Minister for the*

Environment from the EPA under Section 16(j) of the Environmental Protection Act 1986. EPA Bulletin 966, December 1999

EPA (2000). *Environmental Protection of Native Vegetation in Western Australia: Clearing of native vegetation, with particular reference to the agricultural area.* EPA Position Statement No. 2, Perth WA, December 2000

Government of Western Australia (1995). Press release: Land Clearing in Western Australia

Government of Western Australia (1998). *Environment Western Australia 1998 - State of Environment Report*, Western Australian Government: Perth, WA, 1998.

Government of Western Australia (2000a). *Natural Resource Management in Western Australia: The Salinity Strategy*. State Salinity Council March 2000

Government of Western Australia (2000b). *Final Report of the Native Vegetation Working Group*. Perth, WA.

Griffin E. A. (1990). *Floristic Survey of Remnant Vegetation in the Dandaragan Area, Western Australia.* Department of Agriculture Resource Management Technical Report No 143, South Perth WA.

Griffin, E. A. (1998). *Interim Bioregions West Midlands.* Unpublished report for Department of Environmental Protection. AGWEST Land Management Job 98/155.

Hopkins, A.J.M, Coker, J, Beeston, G.R, Bowen, P, and Harvey, J.M, (1996). *Conservation Status of Vegetation Types Throughout Western Australia (Final Report).* Department of Conservation and Land Management, Department of Agriculture Western Australia and Australian Nature Conservation Agency, May 1996.

McArthur & Associates (1986). *Commercial Forests of the Northern Swan Coastal Plain*. **In** Dames & Moore 1986. 'Gnangara Mound Groundwater Resources Environmental Review and Management Programme' Water Authority of Western Australia Report No WM 4 .

Memorandum of Understanding (MoU) (1997*) between the Commissioner for Soil and Land Conservation, Environmental Protection Authority, Department of Environmental Protection, Agriculture Western Australia, Department of Conservation and Land Management and the Water and Rivers Commission for the protection of remnant vegetation on private land in the agricultural region of Western Australia.* Agriculture Western Australia: Perth, WA.

Safstrom R and Craig G F (1996). *'Environmental Evaluation of native vegetation in the Wheatbelt of Western Australia : Principles and Criteria Used to Appraise Land Clearing Proposals'* (in MoU, 1997)

Thackway, R.D, & Cresswell, I.D, (1995) *An Interim Biogeographic Regionalisation for Australia.* Australian Nature Conservation Agency, Canberra.

Appendix 2

Public statement of reasons for the PUEA level of assessment

Appendix 3

Calculation of greenhouse emissions for proposal to clear native vegetation:

Melbourne Location 3544

Calculation of estimated greenhouse gas (carbon) emissions:

Proposal to clear native vegetation: Melbourne Location 3544

Methodology and data from the CNGGIC workbook (Commonwealth of Australia, 1997b)

Assumptions used in calculations

Calculations of emissions from proposals to clear native vegetation require several assumptions:

1. It is assumed that where vegetation is cleared for agricultural purposes, all burning occurs in the year of clearing;
2. The net result from CO_2 uptake during subsequent regrowth is zero;
3. If the area was cleared, there is no indication of the portion of the cleared biomass which will be burnt. Some might be burnt in the field to facilitate clearing (on-site burning) and some may be removed and used as fuel (off-site burning);
4. A fraction of any material burned off-site is assumed to be completely oxidised and builds up in the soil as charcoal, undergoing no further CO2 release; and
5. Any above ground biomass which remains on site but is not burned, will oxidise in approximately a decade.

Estimating Above Ground Biomass

In estimating the above ground biomass the following approach was taken:

- Biomass estimates for each vegetation type vary widely partly because of variation in growth with climatic and soil conditions and also because of the range of species within vegetation type;
- Actual values vary even within a State. For example, in the Northern Territory, 'woodland and scrub' biomass changes from about 25t dm (dry matter)/ha near the coast to a lower value in the drier inland, with an average that might be as low as 17.5 dm/ha;
- IPCC default methodology assumes that original above ground biomass is destroyed after conversion from native vegetation to agricultural lands, 90% occurring immediately and 10% over 10 years. New above ground biomass is given the default value of 10t dm/ha ; and
- Average estimated before clearing above ground biomass for 'woodland and scrub' is 21tC/ha.

Estimating Below Ground (including roots) Carbon Release:

For the estimation of below ground carbon release the following approach was taken:

- Even within one area, the magnitude and rate of loss of soil carbon after the conversion of native vegetation to cleared agricultural land is highly variable due to a strong dependence on regional rainfall, soil water and isolated soil physio-chemical characteristics;
- From the limited data available, it is estimated that 30% of soil carbon is lost upon conversion of native vegetation to cleared agricultural land;

- The assumed time span for loss of soil carbon following clearing is 20 years – it is assumed that soil carbon release is linear over the 20 year period (however, the rate of decay will be much faster in (say) the Northern Territory;
- The assumed time span for CO_2 release from decaying roots is 10 years;
- For crops and pastures, the root biomass is assumed to be half of the above ground biomass (default value of 10t C/ha);
- The soil carbon content of unimproved pasture is 50 tC/ha and improved pasture 62.5t C/ha;
- The soil carbon of 'woodland and scrub' is estimated at 70 tC/ha; and
- For calculating the annual CO_2 flux associated with the loss of soil carbon following vegetation clearing, it is assumed that soil carbon release is linear over a 20 year period. The rate of carbon released from below ground (including roots) after land clearing, the area of land clearing is multiplied by the change in soil carbon between a vegetation system and a 20 year old regrowth system, in this case initially to pasture (The Algorithm for this is located at Section 3.4, page 28, NGGIC workbook, 4.2)

Calculations

The calculated values from this approach was as follows:

- The carbon sequestration associated with possible future tree establishment was not included in these calculations;
- Above ground biomass carbon is estimated to be 21 tC/ha;
- Assume that new pasture above ground biomass is about 5tC/ha;
- Assume 580 ha;
- Emitted by clearing is 16 x 580 = 9280 tC;
- Of this amount, 90% (8352 tC) will be released immediately and 10% (928 tC) over 10 years;
- The below ground biomass soil carbon of 'woodland and scrub' is estimated at 70t C/ha;
- Assume 580 ha;
- Assume that new pasture below ground regrowth is 10t C/ha;
- Assume 30% of soil carbon is lost upon clearing (in actual fact, the change in soil carbon is a complicated calculation of the difference between a vegetation system and a 20 year old regrowth system, in this case initially to pasture);
- Then 30% x (70–10) x 580 = 13920 tC would be lost from below ground biomass, in a linear fashion over 20 years after clearing (ie 696 tC/yr);

Therefore, total carbon emissions occurring as a result of clearing and conversion to pasture is estimated to be:

- 8352 tC released immediately, a further 7888 (6960+928) released over 10 years and a further 6960 (696 x 10) released over the next 10 years ie a total of approximately 23 200 tC over 20 years.

Appendix 4

Report of Department of Agriculture Regional Hydrologist: