# Ord River Irrigation Area Stage 2 (M2 Supply Channel), Kununurra

# Part 1 – Biodiversity Implications

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**Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and Water Corporation of Western Australia**

**Report and recommendations of the Environmental Protection Authority**

**Environmental Protection Authority**
**Perth, Western Australia**
**Bulletin 988**
**August 2000**

ISBN. 0 73097 6611 X
ISSN. 1030 - 0120
Assessment No. 1240

## Summary and recommendations

Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia propose to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains. The proposal, modified during the assessment, includes the:

- development of 30,500 hectares (ha) for irrigated agriculture. This comprises 29,000 ha to be operated as a corporate sugarcane plantation and 1,500 ha to be made available to independent farmers on an unconditional basis with respect to the types of crops that may be grown;
- development of 3,000 ha for water supply and land protection infrastructure;
- establishment and management of 42,500 ha of land as a buffer for conservation purposes;
- construction of a raw sugar mill near the centre of the M2 Area, in Western Australia (WA). The mill will have the capacity to produce approximately 400,000 tonnes per annum (tpa) of raw sugar and 160 000 tpa of molasses; and
- development of raw sugar and molasses storage and handling facilities at Wyndham.

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.

The EPA has adopted a two stage approach for this project. The first part assesses the acceptability of clearing approximately 34,000 ha of land in terms of the potential loss of biodiversity, and the second part will focus on detailed management of the development in the short and long term. This second report is expected to be finalised later this year.

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors relevant to biodiversity.

### Relevant environmental factors

In the EPA's opinion, biodiversity is the environmental factor relevant to this stage of the assessment that requires detailed evaluation in the report.

The EPA has been guided by the National Strategy for the Conservation of Australia's Biological Diversity, particularly the commitment by all States to avoid or limit "any further broad-scale clearance of native vegetation, consistent with ecologically sustainable management and bioregional planning, to those instances in which regional biological diversity objectives are not compromised."

The EPA's assessment of biodiversity impacts has been based on the following criteria:

- no extinction of known species of plant or animal;
- adequate level of survey to identify possible risks of extinction and threats to viability of populations;
- maintaining and protecting riverine systems and riparian vegetation;
- retention of a target of 30% of mapped vegetation associations/ communities within the Project Area; and
- adequate representation of significant environmental values within protected areas.

## Conclusion

The EPA has considered the biodiversity implications of the proposal by Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains.

As part of its assessment, the EPA inspected the Project Area on several occasions, held discussions with local people, convened a workshop and undertook discussions with the co-proponents to determine whether the EPA's criteria could be met.

Development of the M2 area will lead to the loss of approximately 34,000 ha of grassland vegetation and modify the natural hydrological regime within the Project Area. Similarly development for irrigation will increase groundwater recharge within the Project Area. However, the project will protect approximately 42,500 ha from pastoral activity and irrigation development with the primary objective of management for conservation purposes. In addition, conservation reserve initiatives by the WA and Northern Territory (NT) Governments will lead to an additional 421,600 ha of land being set aside for conservation purposes.

The EPA considers that it is unlikely that any species of flora or fauna will become extinct as a result of this development, however some fauna will be affected by the loss of a large area of habitat. The buffer area will comprise and protect all vegetation associations/ communities within the Project Area following modification to the proposal design. In some instances the small size of the vegetation associations/ communities means that management will be crucial to their viability and sustainability in the long term.

As a result of the project development, the Keep River and other watercourses in the Project Area will change over the long term and the habitat will be modified. However, these changes are not expected to be significant provided comprehensive and effective management is in place.

The EPA is satisfied that the revised proposal will meet its criteria in the following ways:

- it is unlikely that any species of flora or fauna will become extinct;
- the target of 30% of vegetation association/ community and group is achieved for all but two vegetation associations/ communities;
- riparian zones around watercourses and wetlands have been excluded from the development;
- buffer areas will, in many cases, be a component of a much larger conservation system as a consequence of WA and NT Government conservation reserve initiatives; and
- where additional information on biota is required, this will be obtained and incorporated into the final project design prior to construction.

The EPA has received little information related to specific Aboriginal values and use of land. As a consequence the EPA is of the view that its advice in relation to biodiversity is not as comprehensive as it would wish it to be. The extent to which any issues relevant to Aboriginal people might result in further changes to the proposal is uncertain.

The EPA is satisfied that, on the basis of information available to it, the clearing of the land for irrigated agriculture can be managed to meet the EPA's objectives related to biodiversity, subject to the conditions and commitments set out in Section 4.

## Recommendations

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

1. That the Minister notes that the environmental issue being assessed is the biodiversity component of the proposal by Wesfarmers Sugar Company Pty Ltd, Marubeni

Corporation and the Water Corporation of Western Australia to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains.

2. That the Minister considers the report on the relevant environmental factors related to the issue of biodiversity as set out in Section 3.

3. That the Minister notes that the EPA has concluded that clearing of the land for irrigated agriculture can be managed to meet the EPA's objectives related to biodiversity, subject to the conditions and commitments set out in Appendix 3 and summarised in Section 4 including the proponent's commitments.

4. That the Minister notes that the EPA will provide a further report in relation to management aspects of the development proposal.

5. That the Minister defers imposing the conditions and procedures recommended in Appendix 3 until the EPA has provided further advice and additional recommended conditions and procedures in relation to project management.

6. That the Minister notes that the EPA recommends that the conservation initiatives, as listed in Table 3, should be implemented by the NT and WA Governments as a priority should the project be approved. In addition, the EPA recommends the following:

   - the area containing approximately 500 ha of black soil in the north west portion of the Weaber Plain be included in the proposed Weaber Range Conservation area initiative by the WA Government;
   - the tenure and management of the conservation areas and project buffer areas be resolved quickly to ensure environmental values related to biodiversity are protected; and
   - the WA and NT Governments consider opportunities to incorporate additional black soil areas to existing and proposed conservation reserves.

7. That the Minister notes the Other Advice of the EPA in relation to the need for effective consultation with the Miriuwung and Gajerrong people.

## Conditions

It is the intention of the WA and NT Governments that environmental conditions issued under the *Environmental Protection Act 1986* should be applied to the whole of the Project Area. However, the environmental conditions cannot be set for the whole of the Project Area until enabling legislation is passed by the NT Parliament. In the meantime, any Statement of Approval issued under the *Environmental Protection Act 1986* can only apply to that portion of the Project Area located within WA.

Having considered the proponent's commitments and information provided in this report, the EPA has developed the first part of a set of conditions which the EPA recommends be imposed if the proposal by Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains is approved for implementation. These conditions are presented in Appendix 3. Matters addressed in this part of the conditions include:

(a) the proponent shall fulfil the commitments set out as an attachment to the recommended conditions in Appendix 3;

(b) conservation initiative areas should be implemented by WA and NT Governments as a priority;

(c) additional surveys on aquatic fauna and terrestrial fauna within and adjacent to the project area (eg frogs, reptiles, bats) should be implemented following approval and prior to final project design, to ensure that the project design takes account of relevant additional information on rare or threatened species;

(d) the presence of vegetation associations/ communities G1, G4, ET4, Em8, Em9 and Gt2 within adjacent proposed conservation reserves outside the Project Area be established;

(e) the outcome of the Aboriginal Socio-Economic Impact Study (by the co-proponents and Aboriginal people) and other related studies should be incorporated into the final project design information;

(f) the final design of the project, including the buffer area, should be to the requirements of the EPA on advice of the Department of Environmental Protection (DEP), the Department of Conservation and Land Management (CALM), the Water and Rivers Commission (WRC) and the NT Department of Lands, Planning and Environment (DLPE); and

(g) a management plan for the buffer area should be prepared and implemented to the requirements of the EPA on advice of DEP, CALM, WRC and the NT DLPE.

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# 1. Introduction and background

This report provides the first part of the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the proposal by Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia (hereafter referred to as Wesfarmers, Marubeni and the Water Corporation) to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains, near Kununurra in the Kimberley Region of Western Australia (WA).

The development of the Ord River Irrigation Scheme in the East Kimberley region of WA and the Northern Territory (NT) was originally planned to proceed in two stages. The Ord River Irrigation Area Stage 1 was completed in 1966, and involved the construction of the Kununurra Diversion Dam to form Lake Kununurra, as well as irrigation infrastructure and associated works, and the township of Kununurra (Kinhill Pty Ltd, 2000a). The proposed Ord Stage 2 developments include the M2 Area, Green Location, Mantinea Flats and Carlton Plain, the west bank of the Ord River and extensions to Packsaddle Plain (see Figure 1).

The Ord Stage 1 development preceded the Western Australian *Environmental Protection Act 1986* and the related growth in community environmental awareness and statutory assessment. In addition, heritage legislation, water legislation reform, national and international biological diversity agreements, greenhouse gas protocols, and the national agreement on ecologically sustainable development have all been major additions to the broad context within which this Stage 2 proposal is being examined.

The Ord River Irrigation Area Stage 2 (M2 Supply Channel) development (hereafter referred to as the M2 Project is the largest of all the potential agricultural development areas in Ord Stage 2 and represents the commencement of the second stage of irrigated land development, with water supplied from the existing Ord River dams.

The M2 Project is the focus of this assessment and involves the development of irrigated farmland predominantly for growing sugar cane, the development of a sugar mill and the development of storage facilities at the port of Wyndham.

The proposal is being assessed jointly by the Western Australian EPA and the Northern Territory (NT) Department of Lands, Planning and Environment (DLPE) as an Environmental Review and Management Programme (ERMP)/ Environment Impact Statement (EIS). The ERMP / draft EIS (Kinhill Pty Ltd, 2000) was released for a ten week public review period between 24 January and 31 March 2000.

Given the complexity of the project the EPA decided to assess the proposal in two parts. The first part assesses the acceptability of clearing approximately 34,000 ha of land in terms of the potential loss of biodiversity, and the second part, to be reported on later this year, will focus on detailed management of the development in the short and long term. As a consequence of this approach, the EPA and the DLPE will be reporting twice.

In addition, the assessment reports will address the whole project area and not be limited to that portion of the project area within respective State borders. The Commonwealth through Environment Australia (EA) has been involved in the assessment under cooperative arrangements with Western Australia (WA) and NT.

In relation to water allocation planning for the project, the EPA has decided that it will formally assess the proposed M2 water supply licence to be issued by the Water and Rivers Commission (WRC) for the proposal.

The WRC is currently undertaking a programme to review the basis for proposed allocations following the EPA's review of the WRC's Draft Interim Water Allocation Plan (DIWAP) for the Ord River in December 1999. Once the review is completed, the EPA will provide advice on these allocations and the WRC will then finalise the IWAP.

Following finalisation of the IWAP, the EPA will formally assess the water licence for the M2 Project. With regard to the M2 Licence, the EPA only intends to consider the supply/ diversion of water from Lake Kununurra to the M2 channel, as this is not part of the Ord Stage 2 project being assessed. This will be undertaken formally under the *Environmental Protection Act 1986*.

It is the intention of the WA and NT Governments that environmental conditions issued under the *Environmental Protection Act 1986* should apply to the whole of the Project Area. However, the environmental conditions cannot be set for the whole of the Project Area until enabling legislation is passed by the NT Parliament. In the meantime, any Statement of Approval issued under the *Environmental Protection Act 1986* can only apply to that portion of the Project Area located within WA.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the environmental factors relevant to the issue of biodiversity. The Conditions and commitments related to biodiversity, to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's recommendations.

The summary of submissions and the co-proponent's response to submissions is provided in a separate document to this report. This is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from the submissions and response and which have been taken into account by the EPA appear in the report. The list of submitters is provided in Appendix 1. Appendix 2 lists the references cited in the report, while Appendix 3 contains the recommended conditions and proponent commitments.

## 2. The proposal

The M2 Project is located near Kununurra (see Figure 1), within the Victoria-Bonaparte Biogeographic Region. The Project Area extends over approximately 76,000 ha of land comprising the Weaber, Keep River and Knox Creek Plains, and involves approximately equal areas within WA and the NT.

The M2 project as outlined in the ERMP / draft EIS (Kinhill Pty Ltd 2000a) (see Figure 2) involved the following components:

- irrigated sugarcane plantation development by Wesfarmers-Marubeni of approximately 29,000ha with potential for future 'sell down' to independent farmers;
- the sale of 3,000ha of land by Wesfarmers-Marubeni to independent farmers on an unconditional basis with respect to the types of crops that may be grown;
- the development of 3,000 ha for irrigation, drainage and flood protection infrastructure by the Water Corporation;
- the construction and development of a raw sugar mill by Wesfarmers-Marubeni with a capacity of approximately 400,000 tonnes per annum (tpa) of raw sugar and 160, 000 tpa of molasses;
- the management of 41,000 ha of land surrounding the farm land; and
- raw sugar and molasses storage and handling facilities at Wyndham.

Since the release of the ERMP/ draft EIS, a number of modifications to the proposal have been made by the co-proponents (see Figure 3). These include:

- a reduction of total farm development to approximately 30,500ha;
- a reduction to 1,500ha of land for independent farmers;
- an increase to 42,500 ha of land to be managed as a buffer area;

- the protection and preservation of all riparian vegetation within the Project Area. This is to be achieved by wider buffer zones on portions of Border Creek and the Keep River;
- the re-design of levee configurations in relation to conservation areas north of farm unit X41, to the east of E410, east of E46 and east of farm unit W64 to enable natural flooding to occur;
- a reduction of the farm area to the south of Milligan Lagoon and a wider flood channel between Milligan Lagoon and the Keep River to the north;
- the re-design of levee HDX1 to permit surface water flow to Milligan Lagoon from the south west;
- development of a drainage corridor through farm unit X432 to enable surface water flow between Milligan Lagoon and the Keep River;
- the development of a siphon underneath the drainage corridor to permit irrigation of farm units X431, X432 and the remainder of farm units X441 and X442; and
- the re-design of farm units W36 and W65 to reduce the flow velocities and potential erosion effects.

In addition to the above, the following commitments have been made:

- the locations of all flood protection levees along Border Creek are to be reviewed in consultation with the Waters and Rivers Commission (WRC) prior to project implementation; and
- the co-proponents will investigate and verify the occurrence of vegetation associations/ communities G1, G4, and Em9 adjacent to the project area to ensure 30% of the association/ community is protected.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the original proposal is provided in Section 3 of the ERMP / draft EIS (Kinhill Pty Ltd, 2000b).

**Table 1: Summary of key proposal characteristics (Kinhill Pty Ltd, 2000b)**

| Element | Description | Amount |
|---|---|---|
| Land within the Project Area | • Project area<br>• Land managed as a buffer+<br>• Wesfarmers-Marubeni sugarcane estate<br>• Land for independent farms<br>• Infrastructure area | • 76,000 ha*<br>• 42,500 ha*<br>• 29,000 ha*<br><br>• 1,500 ha*<br>• 3,000 ha* |
| Land outside the Project Area | • M2 Channel (Lake Kununurra to Project Area)<br>• Wyndham Port Facilities | • 690 ha<br><br>• 1 ha |
| Production | • Raw sugar<br>• Molasses | • 400,000 tpa<br>• 160,000 tpa |

| | | |
|---|---|---|
| Infrastructure | • Irrigation channels | • 160 km* |
| | • Annual water requirement | • 740 GL* |
| | • Drains | • 153 km* |
| | • Flood protection levees | • 142 km* |
| | • Balancing storage dams (operating volume) | • 5.6 GL |
| | • Roads | • 161 km |
| | • Power lines | • 165 km |
| Wyndham Port | • Raw sugar store | • 180,000 t |
| | • Molasses store | • 75,000 t |

**Key:**

| | | |
|---|---|---|
| * | = | approximate |
| GL | = | Gigalitres |
| ha | = | hectares |
| km | = | kilometres |
| tpa | = | tonnes per annum |
| t | = | tonnes |
| + | = | for clarification, conservation reserve proposals by the WA and NT Governments are referred to as 'conservation areas' and the areas within the Project Area proposed by the proponent in the ERMP / draft EIS to be protected from development are referred to as 'buffer areas' |

# 3. Biodiversity

## 3.1 Relevant 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 the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The relevant environmental factors, identified by the EPA, have been grouped and assessed in relation to one significant environmental issue, biodiversity (see Table 2).

**Table 2: The relationship between the relevant environmental factors and environmental issue arising from the proposal.**

| Issue | Relevant Factor |
|---|---|
| Biodiversity | Ecosystems<br>Vegetation communities<br>Declared Rare and Priority Flora<br>Estuarine flora<br>Terrestrial fauna<br>Specially protected (threatened fauna)<br>Subterranean fauna<br>Aquatic fauna |

## 3.2 Context

Biodiversity comprises a very complex set of components and relationships. The EPA has considered the biodiversity implications of the development proposal in a number of ways. It recognises that biodiversity has two key aspects; its intrinsic value at the individual species, species assemblages and genetic levels, and its functional value at the ecosystem level.

There are a number of contexts within which this consideration is relevant. They occur at the national, regional and local levels. Information on aspects of biodiversity and the biogeographic region in which the proposal is sited is given below.

### (a) Biological diversity

Biological diversity is defined in the National Strategy for the Conservation of Australia's Biological Diversity as the variety of all life forms; the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form (Commonwealth of Australia, 1996).

The Commonwealth Government, with all State and Territory Governments, signed the National Strategy for the Conservation of Australia's Biological Diversity in 1996. The National Strategy defines 3 levels of biodiversity:

- genetic diversity – variation of genes/ genetic information contained in all individual plants, animals and micro-organisms both within and between populations that comprise individual species as well as between species;
- species diversity – the variety of individual species within a region; and
- ecosystem diversity – the diversity of all living organisms and non living components within a given area and their relationships.

The National Strategy for the Conservation of Australia's Biological Diversity adopted the following principles as a basis for the Strategy's objectives and actions:

1. Biological diversity is best conserved in-situ.
2. Although all levels of government have clear responsibility, the cooperation of conservation groups, resource users, indigenous peoples, and the community in general is critical to the conservation of biological diversity.
3. It is vital to anticipate, prevent and attack at source the causes of significant reduction or loss of biological diversity.
4. Processes for and decisions about the allocation and use of Australia's resources should be efficient, equitable and transparent.
5. Lack of full knowledge should not be an excuse for postponing action to conserve biological diversity.
6. The conservation of Australia's biological diversity is affected by international activities and requires actions extending beyond Australia's national jurisdiction.
7. Australians operating beyond our national jurisdiction should respect the principles of conservation and ecologically sustainable use of biological diversity and act in accordance with any relevant national or international laws.
8. Central to the conservation of Australia's biological diversity is the establishment of a comprehensive, representative and adequate system of ecologically viable protected areas integrated with the sympathetic management of all other areas, including agricultural and other resource production systems.

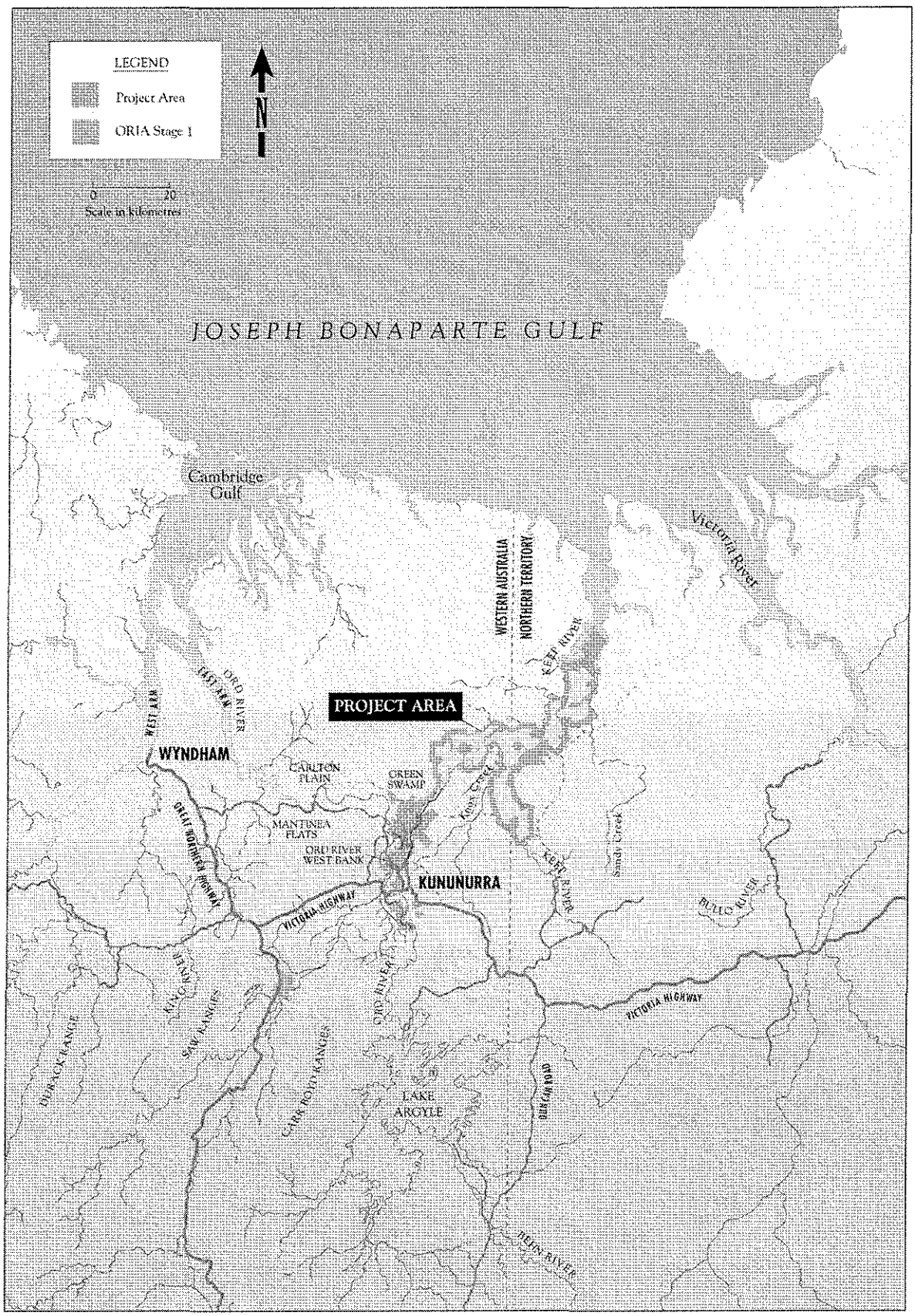



Figure 1: Overview of the Ord Region and Project Area (Kinhill Pty Ltd, 2000a)

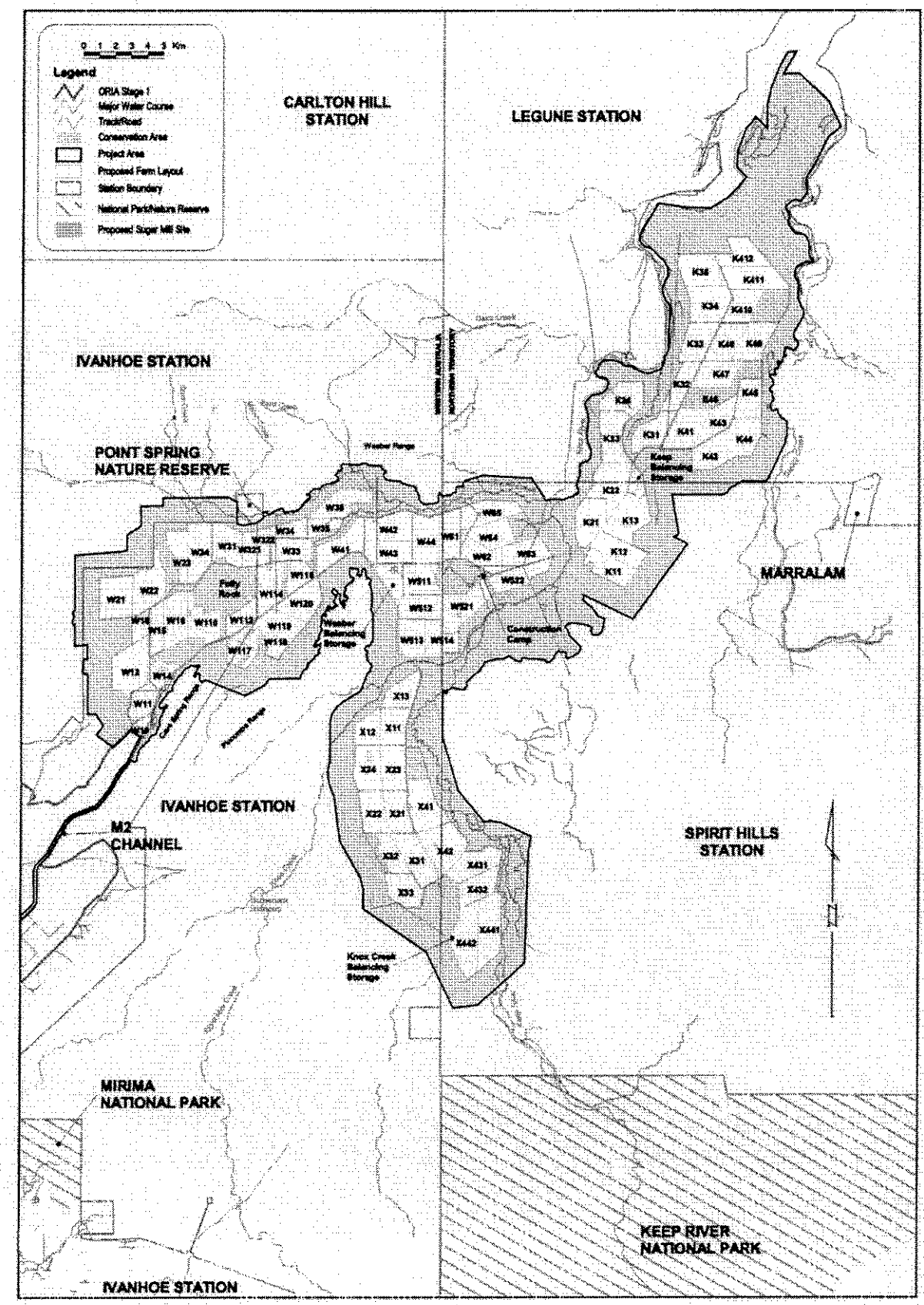



Figure 2: Project Layout (Kinhill Pty Ltd, 2000b)

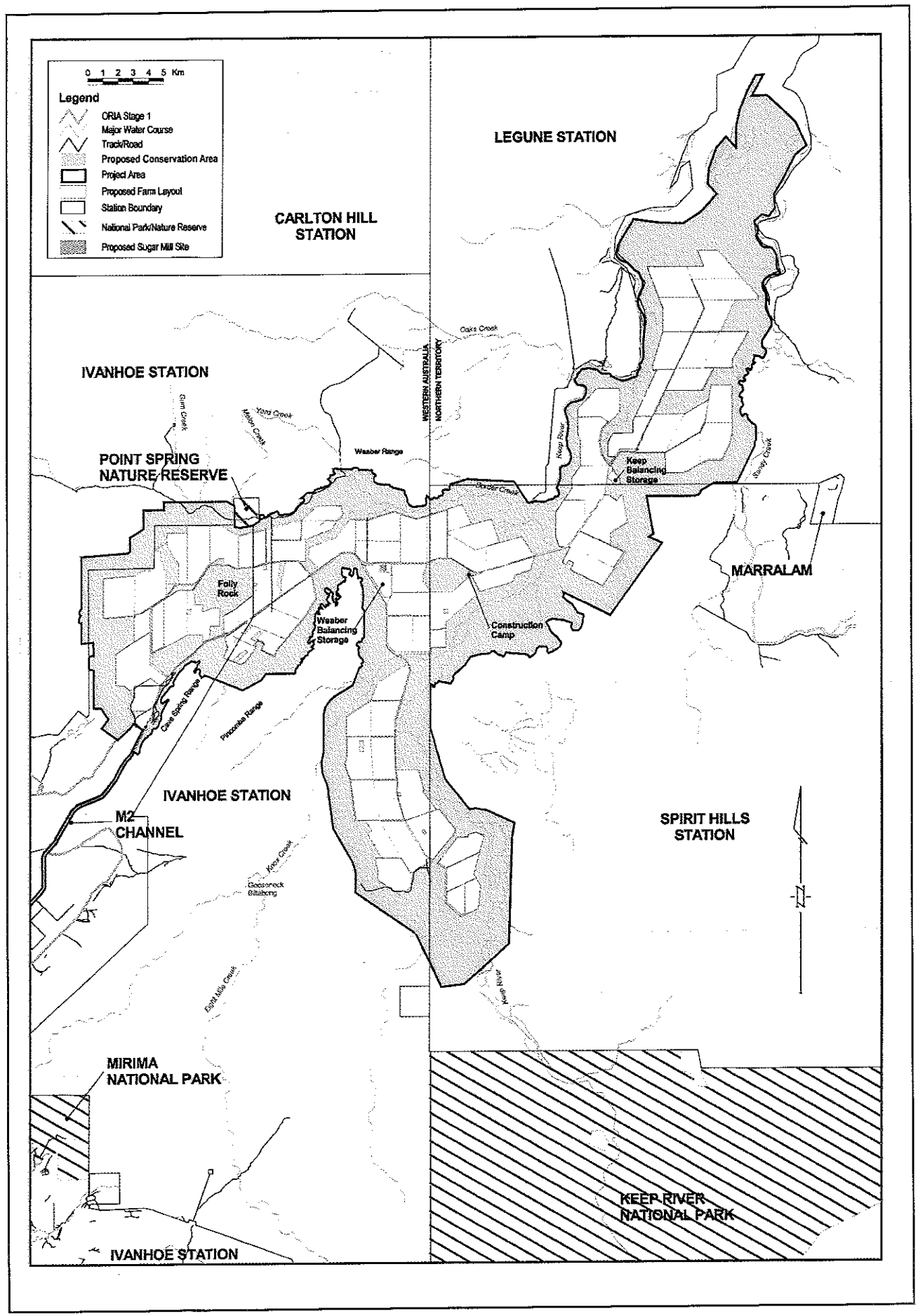



*Figure 3. Modified Project Layout (Kinhill Pty Ltd, 2000b).*

9. The close, traditional association of Australia's indigenous peoples with components of biological diversity should be recognised, as should the desirability of sharing equitably benefits arising from the innovative use of traditional knowledge of biological diversity.

In relation to land clearing, the EPA notes that Objective 7.1 of the National Strategy commits State, Territory and Commonwealth Governments by the year 2000 to, among other things:

*"(l) arresting and reversing the decline of remnant native vegetation; and*
*(m) avoiding or limiting any further broad-scale clearance of native vegetation, consistent with ecologically sustainable management and bioregional planning, to those instances in which regional biological diversity objectives are not compromised."* (Commonwealth of Australia 1996, p 42)".

### (b) Interim Biogeographic Regionalisation for Australia

The M2 Project Area is located within the Victoria-Bonaparte Biogeographic Region (VBBR). Figure 4 shows the extent of the VBBR and the WA and NT Governments' proposed regional conservation initiatives that will be discussed in Section 3.3. The VBBR covers an area of 72,970km2 (Thackwell and Cresswell, 1995), with approximately 73% of this area in the NT and 27% in WA. The VBBR contains a recognisable similarity in the mixture of landforms, geology, vegetation types and animal species (NT Parks and Wildlife Commission).

The VBBR is described by Thackwell and Cresswell (1995) in the following terms.

*"Within the VBBR Phanerozoic strata of the Bonaparte Basin in the north-western part are mantled by Quaternary marine sediments supporting Samphire – Sporobolus grasslands and mangal, and by red earth plains and black soil plains with an open savanna of high grasses. Plateaux and abrupt ranges of Proterozoic sandstone, known as the Victoria Plateau, occur in the south and east, and are partially mantled by skeletal sandy soils with low tree savannas and hummock grasslands. In the south east are limited areas of gently undulating terrain on a variety of sedimentary rocks supporting low Snappy Gum over hummock grasslands and also of gently sloping floodplains supporting Melaleuca minutifolia low woodland over annual sorghums. Dry hot tropical, semi- arid summer rainfall".*

## 3.3 Addressing biodiversity

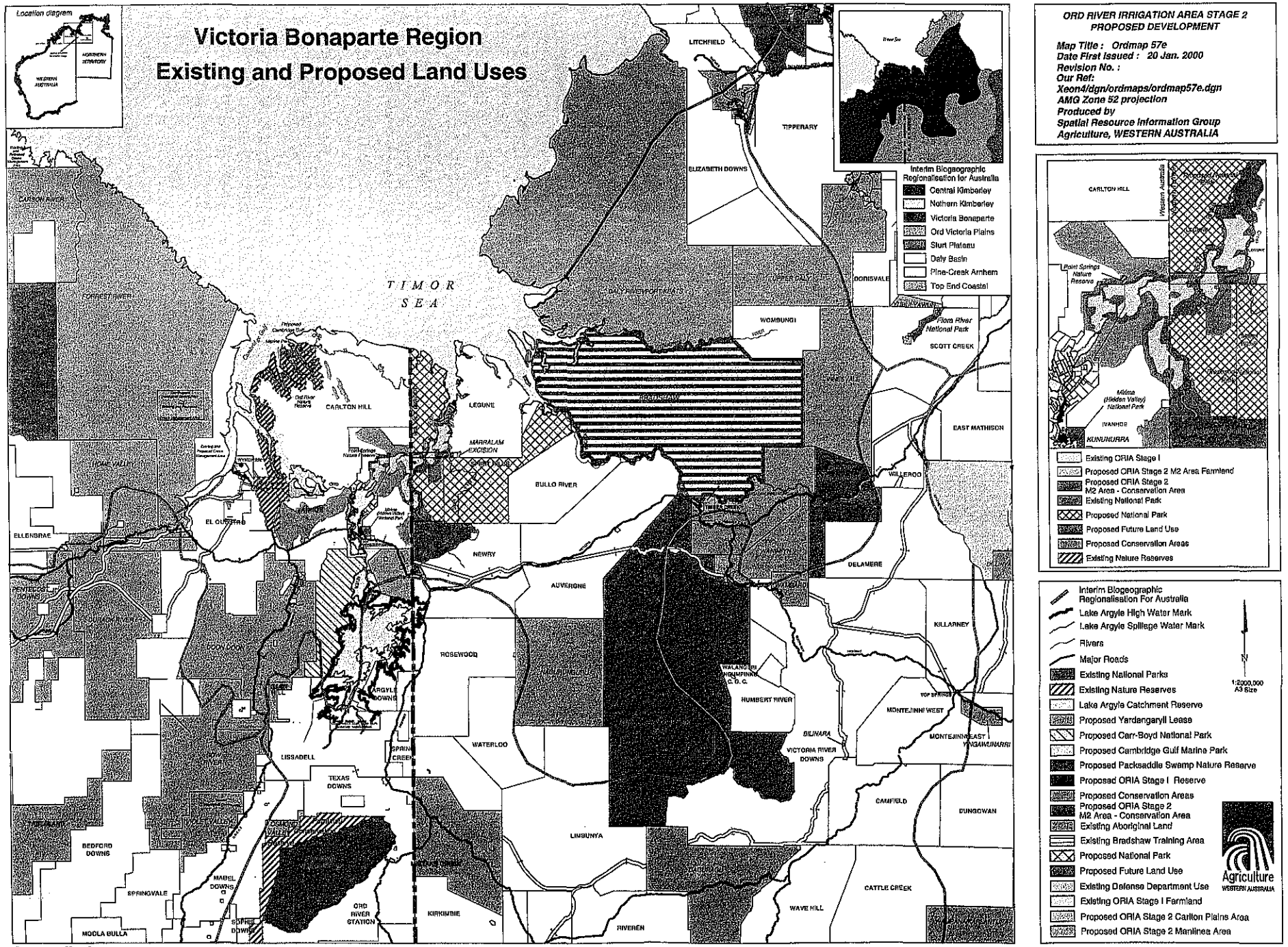
Biodiversity has been addressed at the project level by the co-proponents' ERMP / draft EIS at a regional level and by the WA and NT Governments.

For clarification in discussion, the EPA will refer to the conservation reserve proposals by the WA and NT Governments as being 'conservation areas' and the areas within the Project Area proposed by the co-proponents in the ERMP / draft EIS to be protected from development as 'buffer areas'.

### (a) ERMP/ draft EIS

The co-proponents addressed biodiversity in the ERMP / draft EIS by focussing on the identification or likely presence of species, threatening processes in the region (ie land clearing, land degradation, fire, weeds and chemicals) and constraints to development. Constraints identified included:

- areas of particular significance to the traditional owners;
- the suitability of land for agriculture from a physical point of view of development;
- recommendations from previous conservation strategies; and
- infrastructure requirements, for example gravity flows in irrigation channels.




Appendix 2

Figure 4. Victoria Bonaparte Biogeographic Region and Regional Conservation Initiatives.

This assessment resulted in some initial areas within the Project Area being set aside for protection from development. These included the southern Keep River Plain, Folly Rock, Spirit Hills homestead, the Keep River and its riparian areas, and Milligan Lagoon.

After reviewing the distribution of vegetation associations/ communities and soil types the co-proponents added further land to the buffer areas to improve the conservation of particular vegetation associations/ communities. This included:

- a reasonably large area of black soil on the southern Weaber Plain, which has been identified as having areas of wild rice stands;
- the Keep River Plain where there are some conservation areas to protect certain vegetation associations/ communities; and
- the west Knox Creek Plain.

In developing the project design the co-proponents incorporated corridors linking the various buffer areas, within the Project Area and considered whether the land being set aside as buffer areas, would be viable in the long term. The project was also designed so that the buffer areas were on the perimeter of the project, backing onto undeveloped land, to minimise edge effects. Section 10.3 of the ERMP / draft EIS (Kinhill Pty Ltd, 2000a) details the attributes of the various buffer areas.

In relation to buffer boundaries, the extent of the conservation area was also given consideration and in many cases natural boundaries were used. In other areas a 1500m buffer area was adopted as this provided a reasonable width and tract of land for management of conservation.

In addition, the co-proponents provided an understanding of the biological environment of the Project Area through a range of biological surveys. The results are documented in the ERMP / draft EIS. Where species were expected to be present but were not in surveys, provision for their likely presence was made.

### (b) Conservation initiatives

In relation to securing a comprehensive, adequate and representative reserve system the WA and NT Governments have proposed a number of conservation initiatives, (see Table 3), to complement future Ord Stage 2 developments in relation to the conservation of biodiversity in the region (see Figure 4).

Within the VBBR, more than half of the land is considered to have either medium or high status for management of biodiversity. Approximately 11% of the biogeographic region is currently gazetted as National Park or Conservation Reserve and is actively managed for biodiversity purposes by relevant government agencies and a further 15% of the VBBR is the subject of an approved Environmental Management Plan (Department of Resources Development (DRD) and Northern Territory Office of Resource Development (NT ORD), 2000).

The EPA notes that whilst some of the conservation initiatives are planned to proceed irrespective of the Ord Stage 2 development, most of the conservation initiatives would be contingent on the development of agricultural land as part of Ord Stage 2. This arises from the need to excise land from existing pastoral leases in order to facilitate further development of Ord Stage 2. The proposed additions to the conservation estate (contingent on further development of Ord Stage 2) are shown in Table 3.

**Table 3: Proposed Regional Biodiversity Conservation Initiatives (DRD and NT ORD, 2000)**

| Area | Location |
|---|---|
| **Northern Territory** | |
| Spirit Hills portion of a new National Park (226,000ha) | The Spirit Hills pastoral lease borders the Keep River National Park. This area is currently owned by the NT Land Corporation and would be destocked and upgraded to National Park status. |
| Western Legune portion of a new National Park (83,000ha) | The western portion of the Legune pastoral lease, between the Keep River and the State/Territory border. This area is owned by the NT Government and would be destocked and upgraded to National Park status. |
| **Western Australia** | |
| Livistona Range Conservation Area (55,700ha) | Located on Ivanhoe pastoral lease. This area would be destocked and upgraded to Conservation Area status. This is previously unnamed rangeland country – the name "Livistona Range" has been proposed by CALM as an interim name until a permanent name is approved. |
| Pincombe Range Conservation Area (17,900ha) | The Pincombe Range is located on the Ivanhoe pastoral lease and includes Cave Spring Range and Sorby Hills. This area would be destocked and upgraded. |
| Ninbing Range Conservation Area (6,300 ha) | The Ninbing Range is located on the Carlton Hill pastoral lease. Ninbing comprises three separate blocks that would be destocked and upgraded. |
| Weaber Range Conservation Area (22,500ha) | The Weaber Range is located on Ivanhoe pastoral lease abutting the Point Springs Nature Reserve. |
| Mt Zimmerman Conservation Area (9,400ha) | Mt Zimmerman is located on the Ivanhoe pastoral lease and abuts the existing Keep River National Park. |

The proposed initiatives add 421,600 ha to the conservation estate with 309,800 ha being in the NT and 111,800 ha in WA (DRD and NT ORD, 2000).

### 3.4 Reviewing biodiversity

The M2 Project involves substantial development of land on the Weaber Plain, Knox River Plain and Keep River Plain. There will be large-scale clearing of land, for irrigated agriculture and related infrastructure, new water-related management requirements, as well as issues associated with the introduction of agricultural crops and chemicals.

These developments will result in a substantial change in the environment in both the short-term and long-term. These include changing vegetation patterns, changes to the cracking clay environment of the black soil plains, a reduction in fauna habitat, and groundwater rise resulting from the irrigation of farm land.

The consideration of these short and long-term issues and their individual and cumulative consequences, for example the loss of up to 34,000 ha of vegetation through clearing, is one of the fundamental environmental issues, both from the point of view of the extent of clearing as well as the threats to biological diversity in doing so.

In its assessment, the EPA has considered the EPA's ERMP / draft EIS guidelines, the outcomes of a technical workshop, surveys, criteria used for assessing biodiversity and some of the key ecosystem relationships.

### (a) Guidelines

The EPA indicated in the ERMP / draft EIS guidelines that consideration of biological diversity will include the following basic elements:

- a comparison of a number of development scenarios to evaluate protection of biodiversity at the species and ecosystem levels;
- no known species of plant or animal is caused to become extinct as a consequence of the development and the risks to threatened species are considered to be acceptable;
- no association or community of indigenous plants ceases to exist as a result of the project;
- there is comprehensive, adequate and secure representation of scarce or endangered habitats within the project area and/or in areas which are biologically comparable to the project area within WA and the NT, protected in secure reserves; and
- the project area itself includes a comprehensive and adequate network of conservation areas and linking corridors whose integrity and biodiversity is secure and protected.

### (b) Workshop

In view of the significant biodiversity implications of the M2 project, the EPA convened a one day workshop comprising technical experts, government agencies and proponent representatives.

The workshop was held on 29 July 2000 and an outcome statement arising from the workshop was generated. A wide range of views and opinions were expressed by attendees, however, a clear understanding and appreciation of the workshop discussion could only be obtained by being present.

Questions addressed as part of the Outcome Statement of the Workshop were based on the EPA's guidelines, and Table 4 provides a summation of conclusions arising from discussions.

Not all attendees to the workshop agreed with all of these conclusions. However, the EPA found the discussion very constructive and of assistance in the formulation of its view on the proposal.

### (c) Surveys

The EPA notes that in relation to surveys undertaken by the co-proponents:

- no surveys have been undertaken of estuarine flora and fauna;
- no sampling of stygofauna was undertaken in the Keep River Plain or the Knox Creek Plain; and
- there is limited baseline data, particularly in relation to aquatic flora and fauna of the Keep River and Milligan Lagoon.

The EPA also notes that:

- terrestrial fauna is reasonably well known;
- vegetation and soil surveys have been comprehensive within the development area, but not for the whole of the project area;
- documentation of the biodiversity values of the area relevant to Aboriginal people has yet to be completed; and
- surveys in the Project Area have been more detailed than for most of the bioregion.

**Table 4: Summary of Conclusions arising from the Biodiversity Workshop**

| Question | Workshop Response |
|---|---|
| Will biodiversity be unacceptably affected? | • There were no specific risks of species extinction.<br>• The level of survey was not adequate to identify all possible risks to extinction with certainty, particularly in relation to species in areas subject to inundation and watercourses. |
| Does the proponent need to change the proposal? | • Black soil reservation was a critical issue.<br>• Concern expressed in relation to the small amount of black soil proposed to be held in reserved areas.<br>• Concern expressed in relation to edge effects resulting from the long linear boundary between the farmland and the buffer area around the development. |
| If there is a change to the proposal, are there any additional impacts? | • There were no specific changes to the proposal put forward at the workshop and no changes to the proposal were recommended as an outcome of the workshop.<br>• Black soil areas could be increased by allocating one or more production blocks (farm units) to conservation purposes. The engineering design of the M2 area would not need to be altered to achieve this. |
| Is there any additional information or survey work required? | • Additional survey work is required including:<br>- a survey to determine that lizard and frog species which occur within the project area also occur elsewhere;<br>- identification of down-stream impacts on migratory bird species that are the subject of international treaties. This would include identifying impacts from the proposal on Keep River outflows and tidal coastal areas; and<br>- the possible effects of drainage and rising water table on aquatic flora and fauna species.<br>• On-farm retention of water would minimise impacts, but in the absence of exhaustive surveys of aquatic species, there is the possibility of adverse impact. |
| Are the proposed Government's regional biodiversity conservation initiatives adequate? | • The adequacy of proposed regional biodiversity conservation initiatives is an issue for government to resolve.<br>• Setting aside areas for conservation reserves and national parks is a lengthy and involved process.<br>• It would be appropriate to set aside a larger discrete area of black soil.<br>• The project would not preclude the establishment of a comprehensive adequate and representative reserve for the region. |
| Under what conditions should the project proceed? | • Management arrangements by the Environmental Management Entity and ongoing auditing are vital.<br>• These arrangements would need to be addressed in any conditions of approval placed on the project.<br>• Concern expressed as to whether the buffer area around the farm units gave adequate protection of biodiversity of black soil areas. This could be improved and additional reservation of black soil areas would improve biodiversity. |

### (d) Criteria

The conservation status of regional ecosystems is based on their remaining extent in the bioregion together with their condition and presence of threatening processes (Sattler and Williams, 1999).

In Queensland, the conservation status of individual regional ecosystems has been assessed in terms of three classes:

- endangered - less than 10% of pre-European extent remains in an intact condition across the bioregion, or its distribution has contracted to less than 10% of its former range;
- of concern - 10-30% pre-European extent remains in an intact condition in the bioregion; and
- no concern at present - over 30% of pre-European extent remains in an intact condition in the bioregion (Sattler and Williams, 1999).

The EPA has recognised in its Preliminary Position Statement No 2 (EPA, 1999) that from a biodiversity perspective and taking no account of any other land degradation issues, there are several key criteria now being applied in States where clearing is still occurring:

"(i) the 'threshold level' below which species loss appears to accelerate exponentially at the ecosystem level is regarded as being at a level of 30% of the pre-clearing extent of the vegetation community;
(ii) a level of 10% of the original extent is regarded as being a level representing "endangered";
(iii) it is not acceptable for clearing to put the threat level into the class below. In effect this means that it is not acceptable to clear below the threshold level of 30% anywhere; and
(iv) from a biodiversity perspective, stream reserves should generally be in the order of 200m wide" (EPA, 1999).

### (e) Ecosystem relationships

In assessing the impact on biodiversity the EPA has attempted to distinguish whether there will be any change in environmental values as a consequence of the project, the links between various ecosystem components that will be affected; and whether the effects will be so great that the values and attributes of those components will no longer be present.

The EPA in examining biodiversity has considered the relationship between soils, climate, vegetation, fauna, hydrology and habitat. In terms of links between ecosystem components, important ecosystem drivers that relate to the M2 Project include:

- the strong wet season/ dry season cycle, with a hot, humid and wet summer (October – April) and warm dry winter (May-September);
- the high seasonal variations in rainfall which are subject to monsoon and cyclone influences, and heavy downpours that occur during the wet;
- the seasonal surface flows in rivers that relate very closely to heavy rainfall events, with rapid response and relatively short duration flows;
- seepage from saturated sub-soils which maintains low flows in some channels for some months into the dry season, particularly in larger rivers including the Ord and Keep;
- seasonal flows in rivers ranging from high-energy flood events to extended periods without surface flow;
- the influence of hydro-geomorphological processes that control channel dynamics and sediment distribution on riparian and aquatic communities;
- the quick recession of the Keep River, above the confluence with Border Creek, into semi-permanent and permanent pools following the end of the wet;

- the Keep River catchment comprising eroded sandstone ranges and erosional plains in the upper catchment and depositional plains in the lower catchment, particularly the Weaber, Keep and Knox Plains;
- the Weaber Plain contributing to an extended flow in Border Creek and the lower Keep River, past the end of the wet, due to its capacity to hold water longer than the Knox and Keep River floodplains;
- the presence of black soils on the Weaber, Keep and Knox Creek Plains;
- the dominant vegetation of Weaber, Keep and Knox Plains being grasses;
- the Weaber, Keep and Knox Plains providing a major contribution to the carbon (energy) input into the lower Keep River system, together with the grasses on the erosional plains further up the catchment;
- vegetation on the Weaber, Keep and Knox Plains being of relatively better quality and condition than that found on the other major blacksoil areas within the Victoria-Bonaparte Biogeographic Region (ie. Auvergne Station);
- irrigation of farm units during the dry season will lead to permanently wet conditions within the irrigation zone of influence;
- irrigating crops will lead to rising groundwater levels across the whole of the development, requiring groundwater discharge into the Keep River. This will affect riparian as well as aquatic communities of the lower Keep River;
- fish fauna reproduction, and spawning upriver, is triggered by the commencement of the wet season flows in the northern rivers;
- changed hydrological conditions within the Keep River may mask or alter this trigger for some aquatic species;
- rising groundwater levels may threaten the vegetation and fauna habitat values within the buffer zone surrounding the project;
- permanent flow in the Keep River may result in increased areas of riparian vegetation, extended habitat for aquatic plants and associated changes in fauna habitat in both situations; and
- flood events will still drive the dynamic interaction between sediment mobility and riparian and aquatic plant communities, particularly since the Keep River is not regulated.

## 3.5 Assessing biodiversity impacts

The area considered for assessment of biodiversity is the Victoria-Bonaparte Biogeographic Region.

### Objectives

The EPA's environmental objectives for the relevant factor of biodiversity are:

| Issue | Objectives |
|---|---|
| Biodiversity | • To maintain biological diversity meaning the different plants and animals and the ecosystems they form, at the levels of genetic diversity, species diversity and ecosystem diversity.<br>• To protect species listed under relevant WA, NT and Commonwealth legislation.<br>• A retention target of 30% of all vegetation associations/ communities mapped within the project area. |

## Submissions

The EPA received 66 submissions on the project. Of these, 37 indicated support for the project. Appendix 1 lists those people and organisations that made submissions on the ERMP / draft EIS, and a separate document, which is available to the public, summarises those submissions and the co-proponents response to those submissions.

Key issues raised in submissions, relating to biodiversity, focussed on:

- the impact of clearing particularly in relation to terrestrial biodiversity, greenhouse, and the lost opportunity to establish a comprehensive, adequate and representative reserve system;
- the superficial description of the response of the biota to clearing;
- development of the Weaber, Knox Creek and Keep River Plains and its impact on the ecosystem , wilderness value, habitats and soils;
- whether all soil and vegetation associations/ communities were represented in the buffer areas;
- the basis on which the co-proponents determined the buffer corridors;
- why four of the vegetation associations/ communities were not being represented in the buffer area;
- the lack of baseline data, particularly in relation to aquatic flora and fauna (eg frogs, fish, estuarine fauna) of the Keep River and Milligan Lagoon;
- inadequate data and sampling in relation to stygofauna;
- the impact of altered flow regimes and hydrology (from the construction of water control levees) on fish migration, riverine habitat and distribution of aquatic flora;
- the need for more extensive surveys for reptiles and frogs, prior to State Government approval of the project;
- the integrity of the buffer areas, their use for infrastructure developments, future uses, and weed incursion,
- tenure and management arrangements for the buffer area;
- the effect on the buffer area from rising groundwater and farm practices. Submissions indicated that the co-proponents have taken a commendable approach in establishing buffer areas around the farm development, however, concern was expressed in relation to how these buffer areas will survive as biodiverse areas with the influence of agriculture and elevated water tables adjacent. Submissions also queried the impact on the values of the conservation buffer area in the long-term;
- the need for a comprehensive and representative reservation of the surrounding uplands;
- the need for the proposed WA and NT Government conservation reserve initiatives to be publicly available;
- possible impacts from the development on Point Spring Nature Reserve, wetlands and watercourses;
- interbasin transfers of plant and fauna species, ie movement of flora and fauna (eg fish and weeds) down the irrigation channel from the Ord River to the Keep River;
- adequacy of design criteria for drainage and flood protection under high flow conditions, eg setbacks, scouring protection, height and location of levees;
- superficial treatment of Aboriginal issues in relation to loss of biodiversity on traditional lands and impacts on food species;
- the completion of the Aboriginal Socio-Economic Impact Assessment (ASEIA) prior to project approvals; and
- the EPA Guidelines on the project indicate that the ASEIA should be available to the EPA to consider during the assessment process and prior to reporting.

## Assessment

The EPA recognises that if the project proceeds there will be a substantial change to the environment within the Project Area. The full extent of this change and potential impacts on the environment cannot be predicted with certainty, however, it is likely that the buffer areas will be affected, groundwater will rise and adaptive management will be very constrained.

The EPA has considered the impacts on biodiversity arising from the development in terms of the consequences to individual species as well as groups of species. That is, to examine whether any species will become extinct or to consider whether any groups such as vegetation associations/ communities / communities or black soil dependent fauna (ie endemics) are lost. These questions have been considered on the basis of the relationships that exist primarily between vegetation and soils, vegetation and fauna, and hydrology and vegetation.

Given the complexity of these relationships, and the relatively limited knowledge of them, the EPA has approached the issue of biodiversity by focussing on vegetation and the consequences of its loss, and the implications to management of its retention to other dependent elements of biodiversity. For example, the clearing of a large area of black soil will lead to the loss of vegetation within the farm areas and the loss of that vegetation as habitat for fauna. If habitat is lost, increased pressure is placed on remaining comparable habitat or adjoining but different habitat by dependent fauna.

The development of land for irrigated agriculture will lead to the intentional overwatering of the soils and progressive rising of the groundwater table. At some point, rising watertables will reach the root zone of vegetation and may reach riparian areas leading to discharge unless there is intervention in the form of cessation of irrigation or other active management such as deep drains or pumping which is recognised and proposed by the proponent.

For simplicity, the EPA has presented its assessment on the ERMP / draft EIS and modified proposal in summary form in Table 5. The issues of flora and fauna, black soil, survey adequacy, wetlands and watercourses and hydrology, although separated in the Table, are fundamentally linked to each other. These are discussed below.

### (i) Vegetation and black soil

In assessing the clearing of approximately 34,000ha, the EPA has considered the M2 Project guided by its advice in EPA Preliminary Position Statement No. 2. The emphasis for Preliminary Position Statement No. 2 relates to the South West of WA where there has been substantial historical clearing to the point where many biodiversity values are endangered or have already been lost. The East Kimberley region cannot be compared directly with the South West. Direct clearing of vegetation has been limited, although long term pastoral use has had an influence on vegetation health and distribution. The EPA considers that the East Kimberley region has retained its biodiversity values and in this assessment has recognised the importance of protecting them.

The project design, as presented in the ERMP / draft EIS, identified 72 vegetation associations/ communities within 17 major groups as occurring in the Project Area. Of these:

- four out of the 72 vegetation associations/ communities would not be conserved within the Project Area;
- of the remaining 68 vegetation associations/ communities 14 would have less than 30% of the pre-development area conserved within the buffer area; and
- two of the 17 groups would not have at least 30% of their existing area within the Project Area left intact.

## Table 5: Assessment Summary

| KEY ISSUE | IMPACT - CONSEQUENCE | UNCERTAINTIES | ERMP/ draft EIS PROJECT STATUS | EPA POSITION | CO-PROPONENT RESPONSE |
|---|---|---|---|---|---|
| Flora and fauna | • Clearing of approximately 35,000ha of vegetation.<br>• Ecosystem size will be reduced for those species that occur on cracking clay soils.<br>• Impact of farms through use of pesticides, herbicides on flora and fauna and water quality within the Keep River.<br>• Habitat will be affected in areas associated with the crossings of the Keep River and Sandy Creek.<br>• Fauna displacement.<br>• Dependent black soil fauna species will loose substantial habitat area. | • The viability of isolated populations/ remnants in the buffer area.<br>• Effect on marine and aquatic fauna unknown as surveys limited.<br>• Impact of interbasin transfers of plant and fauna species (eg fish and weeds) down the irrigation channel from the Ord River to the Keep River.<br>• Aboriginal perspective on:<br>- whether individual species or communities are at risk from the project;<br>- whether their supporting ecosystems will be maintained; and<br>- whether culturally and economically important species can be restored to the area.<br>• Maintaining condition of vegetation within the project area and buffer area.<br>• Whether there are any species that are endemic.<br>• Edge effects resulting from the long linear boundary between the farmland and the buffer area around the development. | • The project area covers an approximate area of 76,000ha. There will be a dedicated buffer area of approximately 41,000ha.<br>• 72 vegetation associations/ communities have been identified within 17 major groups.<br>• 4 out of the 72 vegetation associations/ communities (133ha) will not be conserved in the project area.<br>• 1 out of 68 vegetation associations/ communities will have less than 10% representation in the buffer area.<br>• 2 of the 17 vegetation groups will not have at least 30% of their existing area left intact. Of the 2 vegetation groups, 27% of the *Bauhinia cunninghamii* woodland would be left intact, and 20% of the *Corymbia tectificia* woodland would be left intact.<br>• All hill and rock areas have been conserved.<br>• 12,000 ha out of 45,000 ha of cracking clays within buffer area.<br>• Most flora and fauna species will be protected within the buffer area surrounding the farm development.<br>• Within project area there are:<br>- no threatened vegetation communities;<br>- 16 rare and priority flora species that have been identified in WA or NT; and<br>- 11 recorded species which have formal status under either Commonwealth, State or territory legislation.<br>• Under the *Commonwealth Endangered Species Protection Act 1992* the Ghost Bat and the Purple-crowned Fairy-Wren are listed as vulnerable.<br>• Under the *Western Australian Wildlife Conservation Act 1950*:<br>- the Black Bittern is listed under Schedule 1; and<br>the Peregrine Falcon, Radjah Shelduck, freshwater crocodile and saltwater crocodile are listed under Schedule 4.<br>• Under the *Territory Parks and Wildlife Conservation Act 1998*, the Ghost Bat, Zitting Cisticola and Wailing Frog are listed under Schedule 7.<br>• The flat-headed frog is classed as rare and endangered in the NT. Two recently described subspecies (*Ctenotus rimicola rimicola* and *Ctenotus rimicola campestris)* have been rated as rare or insufficiently known in WA and NT.<br>• Two species of sawfish have been recorded in the Keep River – dwarf sawfish (conservation status unknown) and freshwater sawfish (listed as vulnerable under the Commonwealth's Environment Protection and Biodiversity Conservation Act 1999, endangered in the IUCN's Red List, and as Potentially Threatened in the 1998 Australian Society for Fish Biology's Threatened Fish list). | • No known species of plant or animal extinction based on surveys likely.<br>• The level of survey was not adequate to identify all possible risks to extinction with certainty, particularly in relation to species in areas subject to inundation and watercourses.<br>• The minimum buffer of 250m from river levees or 100m from creek levees should be maintained to protect riparian vegetation.<br>• Boundary to area ratio for the buffer area will require a high level of management to protect environmental values within the buffer area.<br>• Target protection of at least 30% of mapped vegetation associations/ communities. | • Increase protection of vegetation associations/ communities as follows:<br>- G1 – 27% → Western Legune survey<br>- G4 – 23% → Western Legune survey<br>- Gt2 - 20% → 26%* (X441 and X442)<br>- Gt3 – 10% → 88% *<br>- Gt5 – 0% → 100%<br>- Gt6 – 26% → 30%<br>- Gt8 – 27% → 100%<br>- Bc3 – 26% → >30% *<br>- Cb9 – 27% → 30% *<br>- Cc1 – 1% → >30% *<br>- Ct1 – 0% → 80% *<br>- Ct2 – 24% → 30% *<br>- Em7 – 11% → 30% *<br>- Em8 – 11% →15% (W36)<br>- Em9 – 27% → NW Weaber extension survey<br>- ET4 – 0% → >30% *<br>- ET5 – 22% → >30% *<br>- Me3 – 0% → >30% *<br>• Commitment to confirm adequate setback from Point Springs Nature Reserve.<br>• Wider riparian vegetation areas along Border Creek (ie reduce area of farm units W36 and W65), and the Keep River (ie reduce area of farm units X41, X431, X432 and X441). |

| KEY ISSUE | IMPACT - CONSEQUENCE | UNCERTAINTIES | ERMP/ draft EIS PROJECT STATUS | EPA POSITION | CO-PROPONENT RESPONSE |
|---|---|---|---|---|---|
| Flora and fauna | • | • | • 6 species of birds in the Project Area are listed under CAMBA and 2 species listed under JAMBA are expected to occur.<br>• 15 fauna species recorded or expected to occur in the project area have restricted distributions. | • | • |
| Survey inadequacy | • Potential loss of species or distribution<br>• Implications to management of unknown species present within the project area | • Representation elsewhere of soil types, flora (presence and quality) and fauna is not known. | • Incomplete surveys:<br>- no surveys have been undertaken by the proponent for estuarine flora and fauna;<br>- no sampling of stygofauna undertaken in Keep River Plain or the Knox Creek Plain; and<br>- lack of or limited baseline data, particularly in relation to aquatic flora and fauna of the Keep River and Milligan Lagoon. A combination of surveys and predictions of presence mean that the terrestrial fauna is reasonably well known.<br>• Vegetation and soil surveys have been comprehensive within the development area, but not for the whole of the project area.<br>• EA has indicated that a frog and reptile survey should be undertaken by the proponents prior to project approval.<br>• Documentation of the biodiversity values of the area to Aboriginal people has yet to be completed. | • Due to seasonal influences, it is probably too late to require additional flora/fauna surveys until April/ May 2001.<br>• The ASEIA needs to be completed. It is unlikely that the ASEIA will be completed by the end of 2000.<br>• Accept baseline monitoring commitment. This however does not ensure compliance with species protection/ precautionary approach.<br>• Require surveys prior to final design to ensure that design and management protect vulnerable and threatened species. | • Baseline monitoring commitment.<br>• Survey prior to final design to ensure that design and management protect vulnerable and threatened species. |
| Black Soil | • Clearing of approximately 35000ha of land. | • Representation of all soil types as mapped outside the project area. | • There are minimal black soil areas (in WA and NT) represented in CAR reserves managed by conservation agencies.<br>• Of the cracking clay black soils, approximately 22% of soil unit (1-1g) and approximately 32% of Soil Unit 5 (5a-5e) will be conserved in the buffer area.<br>• 52 of the 54 soil types will be represented in the buffer area. The two soil types not represented are 3b (a red brown earth) and 5d (Cununurra wetter phase clay) (combined area of 56ha).<br>• There is approximately 47000 ha of cracking clay soils within the project area. Approximately 35000ha of cracking clay soils will be developed. Therefore approximately 12000ha of cracking clay soils will be protected within the buffer area. | • More areas of black soil would be achieved through additional vegetation protection.<br>• Consider including single large area of black soils in buffer area, with relationship to conservation initiatives (eg farm units W117-W120).<br>• There should be a review of conservation areas within the Victoria Bonaparte Bioregion to incorporate additional black soil areas. | • Additional areas of black soil are provided as follows:<br>- Wider riparian areas along Border Creek (ie reduce area of Farm Units W36 (Soil Units 1 and 5) and W65 (Soil Units 1, 2 and 3), and the Keep River (ie reduce area of farm units X41 (Soil Units 1 and 7), X431 X432, X441, X442 (Soil Units 1 and 7).<br>- Keep Balancing Storage (Soil Unit 5).<br>- Farm Unit K41 (Soil Unit 5).<br>- Farm Unit W14 (Soil Units 1 and 3).<br>- Farm Unit W41 (Soil |

| KEY ISSUE | IMPACT - CONSEQUENCE | UNCERTAINTIES | ERMP/ draft EIS PROJECT STATUS | EPA POSITION | CO-PROPONENT RESPONSE |
|---|---|---|---|---|---|
| | | | | | Unit I).<br>- Commitment to confirm adequate setback from Point Springs Nature Reserve. |
| Milligan Lagoon/ wetlands/ watercourses | • Farm design isolates Milligan Lagoon from the Keep River.<br>• Change in hydrogeological environment.<br>• Erosion from construction of flood levees and increase in magnitude of frequently occurring floods.<br>• Due to farm development, the annual volume of run-off reaching the Keep River will increase.<br>• Rises in groundwater may cause some induced base flow in the lower reaches of the Keep River and Sandy Creek. | • The impact of changed hydrological regime on Milligan Lagoon.<br>• Effect of farm protection structures on flow velocities through riparian areas;<br>• Adequacy of design criteria for drainage and flood protection under high flow conditions (ie protection of riparian areas, setbacks). | • Milligan Lagoon has high cultural value.<br>• Milligan Lagoon is a surface water expression located on the Knox Creek Plain within the buffer area.<br>• Point Springs Nature Reserve is a small permanent waterbody and a surface expression of groundwater fed by infiltration from the Weaber Range.<br>• Cave Spring is recharged by infiltration through cave Spring range and is located within buffer area area CWE. Cave Spring is of cultural significance. | • Milligan Lagoon should not be affected upon by the development. An adequate connection between Milligan Lagoon and the Keep River to the north-east and south should be incorporated in the design.<br>• Flood protection levee HDX1 and FPX1 should be relocated.<br>• The minimum riparian buffer of 250m from river levees and wetlands or 100m from creek levees should be maintained.<br>• Review levee location on farm units W31, W321, W322 to ensure adequate setback from Point Springs Nature Reserve. | • Commitment to confirm adequate setback from Point Springs Nature Reserve.<br>• Wider riparian areas along Border Creek (ie reduce area of farm units W36 and W65.<br>• Wider riparian areas along the Keep River (ie reduce area of farm units X41, X431 X432, X441, X442).<br>• Provide for new channel to Milligan Lagoon along the north boundary of farm unit X431, realign HDX1 and reduce area of farm units X441, X442. |
| Hydrology | • Change in hydrogeological environment:<br>- rise in groundwater/ surface water levels;<br>- increase in groundwater/ surface water flows in Keep River;<br>- increase in 1:1 year peak flow velocities and increase in the occurrence of peak flood levels; and | • Impact of rising groundwater on vegetation and buffer area. | • Groundwater management required when groundwater is 5m below the surface. | • This is a key management issue and biodiversity issue.<br>• Within the development area groundwater can be managed, but it may be more difficult to manage groundwater within the buffer.<br>• Groundwater rise may threaten the long-term viability of the vegetation in the buffer.<br>• Project design needs to verify security of structures in the light of increased hydrological data eg February/ March 2000 flow.<br>• Flood protection levees beyond farm boundaries will change hydrology within protected buffer areas.<br>• Remove and realign flood levees:<br>- east of W64;<br>- north of X41; and | • Commitment to confirm adequate setback from Point Springs Nature Reserve.<br>• Wider riparian areas along Border Creek (ie reduce area of farm units W36 and W65).<br>• Wider riparian areas along the Keep River (ie reduce area of farm units X41, X431 X432, X441 and X442).<br>• Remove and realign flood levees:<br>east of W64;<br>- north of X41; and<br>- east of E410 and E46. |

| KEY ISSUE | IMPACT - CONSEQUENCE | UNCERTAINTIES | ERMP/ draft EIS PROJECT STATUS | EPA POSITION | CO-PROPONENT RESPONSE |
|---|---|---|---|---|---|
| | - increase in average flows during the wet season and infrequent and minor releases of good quality water during the dry season | | | - east of E410 and E46.<br>• Control groundwater to levels greater than 5m below surface to protect deep rooted vegetation and avoid riparian groundwater discharges.<br>• Wider riparian areas along the Keep River.<br>• Review levee location on farm units W31, W321, W322 to ensure adequate setback from Point Springs nature reserve. | • Commitment to control groundwater to levels greater than 5m below surface where required. |

In assessing vegetation, the EPA considered it important that the conservation target for vegetation mapped at the group and vegetation association/ community levels should be 30%. The EPA also considered that any areas of the 18 vegetation associations/ communities identified external to the Project Area within protected areas may be considered as an acceptable contribution to the conservation target. In doing so, the EPA recognised the preference for protection in-situ, in accordance with the National Biodiversity Strategy.

In an endeavour to meet this target, the co-proponents modified the project design and incorporated additional areas within the buffer area. A summary of the 18 vegetation associations/ communities that were initially proposed to have representation of less than 30% are shown in Table 6.

**Table 6: Summary Results of Proposed Supplementary Conservation Initiatives**

| **Vegetation Association/ Community** | **Conservation proposed in ERMP / draft EIS** | | | **Proposed Supplementary Conservation Initiatives** | | **Total proposed buffer area (%)** |
|---|---|---|---|---|---|---|
| | **Area proposed for development (ha)** | **Area proposed within buffer (ha)** | **Area proposed within buffer (%)** | **Additional buffer area (ha)** | **Location** | |
| Grassland | | | | | | |
| G1 | 2459 | 924 | 27 | 91 | West of Keep River | >30 |
| G4 | 1513 | 458 | 23 | 133 | West of Keep River | >30 |
| Grassland with Emergent Trees | | | | | | |
| Gt2 | 7210 | 1838 | 20 | 540 | Farms X431, X432, X441 and X442 | 26 |
| Gt3 | 208 | 22 | 10 | 180 | Farm X442 | 100 |
| Gt5 | 35 | 0 | 0 | 35 | Keep Balancing Storage | 100 |
| Gt6 | 80 | 28 | 26 | 4 | Farm K41 | 30 |
| Gt8 | 29 | 11 | 27 | 29 | Farm W65 | 100 |
| *Bauhinia cunninghamii* woodland | | | | | | |
| Bc3 | 6116 | 2136 | 26 | 225 | Farms W65, K31 | 30 |
| *Corymbia bella* woodland | | | | | | |
| Cb9 | 26 | 9 | 27 | 5 | Farm W14 | 37 |
| *Corymbia confertiflora* woodland | | | | | | |
| Cc1 | 84 | 1 | 1 | 25 | Farm W65 | 39 |
| *Corymbia confertiflora* woodland | | | | | | |
| Ct1 | 39 | 0 | 0 | 20 | Farm W65 | 62 |
| Ct2 | 145 | 45 | 24 | 12 | Farm W110 | 30 |
| *Eucalyptus microtheca* woodland | | | | | | |
| Em7 | 176 | 22 | 11 | 37 | Farm W41 | 30 |
| Em8 | 966 | 116 | 11 | 44 | Farm W36 | 15 |
| Em9 | 7026 | 2558 | 27 | 114 | Farms W14, W36, NW Weaber | 30 |
| *Eucalyptus microtheca* woodland and shrubland of *Terminalia oblongata* subsp.*volucris* | | | | | | |
| ET4 | 16 | 0 | 0 | 5 | Farm W511 | 69 |
| ET5 | 350 | 97 | 22 | 75 | Farm W14 | 34 |
| *Melaleuca* subsp. Woodland | | | | | | |
| Me3 | 43 | 0 | 0 | 13 | Farm K31 | 42 |

The EPA notes that with the modified project design that two of the 18 vegetation associations/ communities (Em8 and Gt2) do not meet the 30% target, although the retention of these associations/ communities have increased from 11% to 15 % for Em8 and 20% to 26% for Gt2. The EPA considers that although 30% is a target, the retention of these two vegetation associations/ communities is acceptable, subject to the recommended conditions.

In addition, it is also noted that in relation to vegetation associations/ communities G1, G4 and Em9, the co-proponents have made a commitment to investigate and verify the occurrence of these vegetation associations/ communities adjacent to the project area, and within proposed reserves, to ensure 30% of the association/ community is protected.

In relation to G1 and G4 the co-proponents have stated (Kinhill Pty Ltd, 2000b) that an additional 91 ha and133 ha (respectively) is required to achieve the retention target of 30%. The vegetation associations/ communities have a high probability of occurrence on an area of 3,500ha of black soil adjacent to the project area and on the west side of the Keep River. This area is within the proposed extension to the Keep River National Park.

In relation to Em9, an additional 114ha is required to achieve the retention target of 30%. The proposed amendments to farms W11, W12, W14 and W36 result in the conservation of 28% of the association, and through an analysis of aerial photography the co-proponents have indicated a high probability of the occurrence of the association on an area of 500ha of black soil adjacent to the project area on the north west portion of the Weaber Plain. The EPA understands that this area is now to be resumed from the Ivanhoe pastoral lease and incorporated into the project area as part of the buffer.

The EPA also notes that the co-proponents have protected an area of vegetation association ET4, located to the west of the Cockatoo Land System on farm W511. ET4 has a total area of 16ha and is the only occurrence of this vegetation association/ community in the project area. Whilst its protection is supported, the EPA expresses concern in relation to the long-term viability and sustainability of this small area even though the co-proponents have linked the area via a 250m corridor to the Cockatoo Land System. It is acknowledged this initiative would result in significant rework to the engineering design particularly in relation to irrigation water supply and drainage.

The EPA also notes that approximately 13,000ha of cracking clay soils will be protected within the buffer area, and that an additional black soil area of 500ha in the north west portion of the Weaber Plain will be protected.

Given the above, the EPA recommends that:

- the co-proponents determine whether ET4 is located within the proposed reserves when seeking verification of the occurrence of G1, G4 and Em9 outside of the project area;
- the co-proponents investigate and verify the presence of Em8 and Gt2 in areas adjacent to the project area within proposed secure reserves; and
- the WA and NT Government consider the opportunities available to incorporate black soil areas to existing and proposed conservation reserves.

In relation to ET4 the EPA considers that there may be the opportunity to locate the linkage between ET4 and the Cockatoo Land System closer to the infrastructure corridor to the north of farm W511.

The co-proponents have given the following additional commitments:

- all riparian vegetation within the project area is to be preserved and protected for the purposes of conservation;

- acceptance of 30% target for vegetation associations/ communities; and
- to locate G1, G4 and Em9 in protected areas.

The co-proponents have also indicated that an additional area containing at least 500ha of black soil on the northwest portion of the Weaber Plain containing Em9 will be added to the project area as part of the buffer area.

### (ii) Survey adequacy

Fundamental to the assessment of biodiversity and impacts resulting from the proposal is the level of information available. In assessing survey adequacy the EPA took into consideration views expressed at the Biodiversity Workshop, views expressed in public submissions and the view expressed by EA that a frog and reptile survey should be undertaken by the co-proponents prior to project approval.

In addition, the EPA is cognisant that due to seasonal factors additional flora and fauna surveys would not be appropriate until 2001.

The EPA notes the proponent's commitment to baseline monitoring, however it considers that the co-proponents should undertake additional surveys prior to final project design and construction, to ensure that the design and management identify and protect vulnerable and threatened species.

The EPA therefore recommends that additional surveys for aquatic and terrestrial fauna within and adjacent to the project area (eg frogs, reptiles, bats, subterranean fauna) be implemented following approval and prior to final project design, to ensure that the project design takes account of relevant additional information on rare or threatened species.

### (iii) Watercourses, wetlands, riparian vegetation and hydrology

As part of its assessment, the EPA sought clarification on hydrological aspects in relation to the project. These included:

- the setback between the development area and adjacent watercourses and wetlands;
- the viability of various buffer areas within perimeter flood protection levees;
- hydrology in the vicinity of Milligan Lagoon; and
- hydrology in the vicinity of Border Creek.

In the ERMP/ draft EIS it was proposed that the setback of the project development from the incised channel of rivers and the outer edge of the riparian zone of wetlands be 250m and 100m from the incised channels of significant creeks. The DEP, in discussions with the co-proponents, requested that consideration be given to measure setbacks from the upper levee of rivers and creeks rather than incised channels. The co-proponents advised that in many cases the upper levees were poorly defined or non-existent and that it was agreed that an appropriate alternative for determining adequate setback from watercourses would be the extent of riparian vegetation.

In response to the above points, the EPA notes that the co-proponents have redesigned the project (see Figure 3). These modifications include:

- increasing the buffer area on the Knox Creek Plain to include additional riparian vegetation. This has been achieved by reducing the size of farm units X41, X431, X432 and X441;
- re-configuring levees to the north of farm X41, to the east of E410, east of E46 and east of farm W64 to enable natural flooding to occur;

- redesigning levee HDX1 to permit surface water ingress to Milligan Lagoon from the south west;
- developing a drainage corridor along the northern boundary of farm X432 to enable surface water flow between Milligan Lagoon and the Keep River.
- constructing a siphon underneath the drainage corridor to permit irrigation of farms X431, X432 and the remainder of farms X441 and X442; and
- re-designing farm units W36 and W65 to reduce flow velocities and potential erosion effects along Border Creek.

The co-proponents have given the following additional undertakings and commitments:

- all riparian vegetation within the project area is to be preserved and protected within the buffer area; and
- the locations of all flood protection levees along Border Creek are to be reviewed in consultation with the WRC prior to project implementation.

One site of particular importance is the Point Springs Nature Reserve (A34585). This Reserve was declared in 1997 and encompasses an area of 303ha which protects a small patch of remnant rainforest and wetland supported by permanent water seepage at the base of the Weaber Range. The rainforest has high biodiversity value, as well as being of biogeographical importance for ongoing scientific research (CALM, 1999).

The EPA considers it important that all riparian vegetation in the Project Area and wetlands such as Point Springs and Milligan Lagoon be protected. The EPA notes that the co-proponents have re-designed the project to allow for the protection of these areas and the assurance given by the co-proponents that potential hydrological impacts to Border Creek and wetlands such as Point Springs Nature Reserve and Milligan Lagoon will not be significant.

Another key concern to the EPA in relation to biodiversity was the implication of rising groundwater levels on riparian zones, wetlands, watercourses and vegetation, especially in buffer zones.

Based on the following advice from the WRC that:

- vegetation associations/ communities should be able to adapt to the gradually changing groundwater conditions over time, subject to effective management actions;
- vegetation is likely to be reasonably tolerant of the increased groundwater levels and salinities;
- with the exemption of Sandy Creek initial groundwater salinities are less than 3000mg/l TDS
- there will be some additional salt discharge via groundwater to drains and water courses, even with an active programme of groundwater management;
- with adaptive management this should not lead to major vegetation death and biodiversity loss in the buffer zones; and
- in the Sandy Creek area, the riparian vegetation is dominated by *Melaleuca* subsp. which are generally tolerant of water logging and salinity,

the EPA considers that the impact of rising groundwater levels on vegetation can be adequately managed.

### Conservation initiatives

The EPA recognises that a proposal of this scale must be considered in a regional and local context and this requirement was identified in the ERMP / draft EIS guidelines. The EPA also

recognised that the co-proponents alone would not be able to protect biological diversity and that the participation of the WA and NT Governments will be required to achieve this.

The EPA considers that conservation reserves proposed by the WA and NT Governments should provide for improved representation within conservation areas of key landforms and related habitats.

The EPA notes that the five recommended areas for conservation within WA (as shown in Table 3) meet the criteria for declaration as National Park, Nature Reserve or Conservation Park and that in combination, the proposed conservation initiatives contain diverse and important representatives of East Kimberley/ Western Northern Territory flora and fauna.

It is also noted that the proposed reserves have important physical and floristic components and that the diversity of the associations include rainforest thickets, riparian, swamps, soaks, savanna woodland and cliff and rocky communities (CALM,1999).

It is also noted that the NT initiatives support improved conservation of biodiversity in accordance with the NT Parks Masterplan (NT Parks and Wildlife Commission).

Conservation reserves proposed by the WA and NT Governments, provide for improved representation within conservation areas of key landforms, vegetation species and complexes, fauna and related habitats. The conservation initiatives, as listed in Table 3, should be implemented by the NT and WA Governments as a priority, should the project be approved, as the EPA considers these to be a fundamental elements in addressing and protecting biodiversity relevant to the proposal. In addition, these initiatives should be established as early as possible.

The EPA further notes that an expansion to the project area is proposed to incorporate an area containing approximately 500 ha of black soil in the north west portion of the Weaber Plain. The EPA recommends that this area be added to the proposed Weaber Range Conservation area initiative by the WA Government.

Furthermore, the EPA notes that the tenure and management of the conservation areas and buffer areas have yet to be resolved. The EPA considers that the issue of tenure be resolved quickly to ensure environmental values related to biodiversity are protected.

The EPA also recommends that the WA and NT Governments consider the opportunities available to incorporate additional black soil areas to existing and proposed conservation reserves. Government initiatives border buffer areas and they supports their value for conservation purposes.

## 3.6 Summary

During this assessment of biodiversity, the EPA has considered the consequences of implementation of the proposal against the National Conservation Strategy and the ERMP / draft EIS guidelines.

Although the M2 Project Area is essentially grasslands over black soils, the vegetation of the area is complex in its character and distribution. There are other major habitats also present, such as the riparian and wetland areas within the Project Area and the sandstone ranges surrounding it. This has highlighted the need to review biodiversity implications at a local as well as regional level.

In summary the EPA considers that in relation to the modified proposal:

- the co-proponents' modified proposal meets basic criteria for the protection of biodiversity;
- there is little risk that known species of plant or animal will become extinct as a consequence of the M2 Project;

- no association/ community or group of vegetation will cease to exist as a result of the M2 Project;
- the co-proponents have incorporated an adequate buffer area and linking corridors within the Project Area;
- the WA and NT Governments have proposed to put in place a system of protected conservation reserve areas; and
- the co-proponents have committed to a management plan for the buffer area to address biodiversity conservation and management of threatening processes (e.g. irrigation and hydrological changes).

Based on the above, it is the EPA's opinion that that the proposal can be designed to meet the EPA's objectives related to biodiversity.

# 4. Conditions and commitments

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.

In developing recommended conditions for each project, the EPA's preferred course of action is to have the proponent provide an array of commitments to ameliorate the impacts of the proposal on the environment. The commitments are considered by the EPA as part of its assessment of the proposal and, following discussion with the proponent, the EPA may seek additional commitments.

The EPA recognises that not all of the commitments are written in a form which makes them readily enforceable, but they do provide a clear statement of the action to be taken as part of the proponent's responsibility for, and commitment to, continuous improvement in environmental performance. The commitments, modified if necessary to ensure enforceability, then form part of the conditions to which the proposal should be subject, if it is to be implemented.

## 4.1 Proponent's commitments

As the EPA is assessing this proposal in two parts, some of the commitments relate to biodiversity and some commitments relate to detailed management. The EPA has yet to finalise its assessment of this latter aspect. When it does so, current commitments by the co-proponents may well be changed.

The co-proponents' commitments as set out in the ERMP/ draft EIS and subsequently modified, are shown in Appendix 3.

## 4.2 Recommended conditions

It is the intention of the WA and NT Governments that environmental conditions issued under the *Environmental Protection Act 1986* should be applied to the whole of the Project Area. However, the environmental conditions cannot be set for the whole of the Project Area until enabling legislation is passed by the NT Parliament. In the meantime, any Statement of Approval issued under the *Environmental Protection Act 1986* can only apply to that portion of the Project Area located within WA.

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions which the EPA recommends be imposed if the proposal by Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains is approved for implementation.

These conditions are presented in Appendix 3. Matters addressed in this part of the conditions include the following:

(a) that the proponent shall fulfil the commitments set out as an attachment to the recommended conditions in Appendix 3;

(b) conservation initiative areas should be implemented by WA and NT Governments as a priority;

(c) additional surveys on aquatic fauna and terrestrial fauna within and adjacent to the project area (eg frogs, reptiles, bats, subterranean fauna) should be implemented following approval and prior to final project design, to ensure that the project design takes account of relevant additional information on rare or threatened species;

(d) establishing the presence of vegetation associations/ communities G1, G4, ET4, Em8, Em9 and Gt2 within adjacent proposed conservation reserves outside the Project Area;

(e) the outcome of the Aboriginal Socio-Economic Impact Study (by the co-proponents and Aboriginal people) and other related studies should be incorporated into the final project design information;

(f) The final design of the project, including the buffer area, should be to the requirements of the EPA on advice of the DEP, CALM, WRC and the NT DLPE; and

(g) A management plan for the buffer area should be prepared and implemented to the requirements of the EPA on advice of DEP, CALM, WRC and the NT DPE.

## 5. Other Advice

### Water Allocation

In parallel to the M2 Project, the EPA is also considering water allocation planning for the Ord River and the provision of water to the M2 project.

The WRC is currently undertaking a programme to review the basis for proposed allocations. Once the review of the water allocations is completed, the EPA will provide advice on these allocations under S16(e) of the *Environmental Protection Act 1986* and the WRC will then finalise the Interim Water Allocation Plan (IWAP).

The objectives of the interim plan are to:

- make an interim provision of water to the Lower Ord River system and its associated environment;
- determine the remaining water that may be available for diversion for consumptive uses;
- document interim allocation decisions as to how much water should be assigned to the Stage 1 and Stage 2 developments; and
- ensure those existing commitments and longer term demands for hydro-power generation can be accommodated within the interim allocations and that a feasible reservoir operating strategy can be developed that meets all commitments.

Following finalisation of the IWAP, the EPA will formally assess the water licence for the M2 Project.

## Aboriginal issues

A separate study of the social, cultural and economic impact of developments related to this project on Miriuwung and Gajerrong people is being conducted by the Aboriginal Representative Bodies with the support of the co-proponents in parallel to the ERMP/EIS. This study, however, has yet to be completed.

To ensure that there is the opportunity for consideration of relevant Aboriginal issues by the public and assessors in a timely manner, the EPA guidelines stated that information from this study and other reports should be referred to in the ERMP / draft EIS and that additional relevant information should be published prior to the EPA and NT DLPE reporting to their respective Ministers.

The EPA is aware that the terms of reference for the Aboriginal Socio-Economic Impact Assessment (ASEIA) are still being negotiated. In addition, the EPA is also aware that the co-proponents are seeking an Indigenous Land Use Agreement (ILUA), that this agreement is a fundamental component of the project, and that the co-proponents position is that without an ILUA there will be no project.

Bearing this in mind the EPA met several times with representatives of the Miriuwung and Gajerrong people to assist the EPA in understanding what was important to them in terms of values, traditional use of the project area, perception of landscape and attitudes to the project.

In these discussions, the Miriuwung and Gajerrong people expressed the view to the EPA that:

- the M2 project will significantly change their country and this will affect the Miriuwung and Gajerrong people;
- for the M2 project to proceed, developers and government must consider and understand the significance and attachment of the land to the Miriuwung and Gajerrong people;
- the development must not affect sacred sites and ongoing traditional or cultural practices that are linked to the land;
- Ord Stage 2 will have similar affects to that of Ord Stage 1 in terms of reduced water quality, weed infestation, loss of access etc;
- Environmental problems created by Ord Stage 1 must be dealt with before Ord Stage 2 can go ahead;
- the M2 project will have a bad effect on the Keep River;
- the Keep River is important for hunting and fishing;
- the Ord Stage 2 development will affect bush tucker resources, through clearing of land and the use of chemicals;
- more people in our country will push the Miriuwung and Gajerrong people out even further, and will prevent us from using our country the way we always have; and
- the development may cause problems for our people and our culture that have not been considered.

The Miriuwung and Gajerrong people also requested that they be given the opportunity by government to properly explain the significance to their people of the land in the Project Area and that they be given such an opportunity before a decision as to whether the project may be implemented is taken.

The EPA considers that it is very important that the Miriuwung and Gajerrong people concerns and views are heard, and that the results of the ASEIA and other related studies are considered by the co-proponents and government at the earliest opportunity.

# 6. Conclusions

The EPA has considered the biodiversity implications of the proposal by Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains.

As part of its assessment, the EPA inspected the Project Area on several occasions, held discussions with local people, convened a workshop and undertook discussions with the co-proponents to determine whether the EPA's criteria could be met.

Development of the M2 area will lead to the loss of approximately 34,000 ha of grassland vegetation and modify the natural hydrological regime within the Project Area. Similarly development for irrigation will increase groundwater recharge within the Project Area. However, the project will protect approximately 42,500 ha from pastoral activity and irrigation development with the primary objective of management for conservation purposes. In addition, conservation reserve initiatives by the WA and Northern Territory (NT) Governments will lead to an additional 421,600 ha of land being set aside for conservation purposes.

The EPA considers that it is unlikely that any species of flora or fauna will become extinct as a result of this development, however some fauna will be affected by the loss of a large area of habitat. The buffer area will comprise and protect all vegetation associations/ communities within the Project Area following modification to the proposal design. In some instances the small size of the vegetation associations/ communities means that management will be crucial to their viability and sustainability in the long term.

As a result of the project development, the Keep River and other watercourses in the Project Area will change over the long term and the habitat will be modified. However, these changes are not expected to be significant provided comprehensive and effective management is in place.

The EPA is satisfied that the revised proposal will meet its criteria in the following ways:

- it is unlikely that any species of flora or fauna will become extinct;
- the target of 30% of vegetation association/ community and group is achieved for all but two vegetation associations/ communities;
- riparian zones around watercourses and wetlands have been excluded from the development;
- buffer areas will, in many cases, be a component of a much larger conservation system as a consequence of WA and NT Government conservation reserve initiatives; and
- where additional information on biota is required, this will be obtained and incorporated into the final project design prior to construction.

The EPA has received little information related to specific Aboriginal values and use of land. As a consequence the EPA is of the view that its advice in relation to biodiversity is not as comprehensive as it would wish it to be. The extent to which any issues relevant to Aboriginal people might result in further changes to the proposal is uncertain.

The EPA is satisfied that, on the basis of information available to it, the clearing of the land for irrigated agriculture can be managed to meet the EPA's objectives related to biodiversity, subject to the conditions and commitments set out in Section 4.

# 7. Recommendations

## Recommendations

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

1. That the Minister notes that the environmental issues being assessed is for the biodiversity component of the proposal by Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains.

2. That the Minister considers the report on the relevant environmental factors related to the issue of biodiversity as set out in Section 3.

3. That the Minister notes that the EPA has concluded that clearing of the land for irrigated agriculture can be managed to meet the EPA's objectives related to biodiversity, subject to the conditions and commitments set out in Appendix 3 and summarised in Section 4, including the proponent's commitments.

4. That the Minister notes that the EPA will provide a further report in relation to management aspects of the development proposal.

5. That the Minister defers imposing the conditions and procedures recommended in Appendix 3 until the EPA has provided further advice and additional recommended conditions and procedures in relation to project management.

6. That the Minister notes that the EPA recommends that the conservation initiatives, as listed in Table 3, should be implemented by the NT and WA Governments as a priority should the project be approved. In addition, the EPA recommends the following:

    - the area containing approximately 500 ha of black soil in the north west portion of the Weaber Plain be included in the proposed Weaber Range Conservation area initiative by the WA Government;
    - the tenure and management of the conservation areas and project buffer areas be resolved quickly to ensure environmental values related to biodiversity are protected; and
    - the WA and NT Governments consider opportunities to incorporate additional black soil areas to existing and proposed conservation reserves.

7. That the Minister notes the Other Advice of the EPA in relation to the need for effective consultation with the Miriuwung and Gajerrong people.

# Appendix 1

## List of submitters

## State/ Local Government

- Agriculture Western Australia
- CSIRO Land and Water
- Department of Conservation and Land Management
- Department of Environmental Protection – Air Quality Management Branch
- Department of Environmental Protection – Licensing Branch
- Department of Environmental Protection – Conservation Branch
- Department of Primary Industry and Fisheries
- Department of Resources Development
- Environment Australia
- Main Roads, Western Australia
- Northern Territory Government
- Shire of Wyndham-East Kimberley
- Water and Rivers Commission
- Western Australian Museum

## Organisations

- Aboriginal Legal Service of Western Australia (Inc.)
- Australian Cotton Cooperative Research Centre
- Bardena Farms Pty Ltd
- Care of the Ord Valley Environment (COVE)
- Conservation Council of Western Australia Inc
- Ecological Society of Australia Inc
- Kununurra Chamber of Commerce
- Miriuwung & Gajerrong Families Heritage & Land Council
- Northern and Kimberley Land Councils
- Ord River District Co-Operative
- The Environment Centre N.T. Inc
- Whelans Survey and Mapping Group

## Individuals

- Mark and Sharon Albers
- Josephine Bedetti
- R B Dessert III
- Spike and Kae Dessert
- Barbara Dickey
- Stewart Dobson
- Dr Michael Douglas
- Robyn Ellison
- Bruce Ellison
- Warren Ford
- Richard Foster

# Appendix 2

## References

Commonwealth of Australia (1996) *The National Strategy for the Conservation of Australia's Biological Diversity*, Department of the Environment, Sport and Territories.

Department of Resources Development (WA) and The Northern Territory Office of Resource Development (February 2000) *Ord River Irrigation Area Stage 2, Proposed Regional Biodiversity Conservation Initiatives*, Submission to the Environmental Protection Authority of Western Australia.

Environmental Protection Authority (1999) *Environmental Protection of Native Vegetation in Western Australia, Preliminary Position Statement No. 2*, Perth, WA.

Graham G and White K (Eds) (1999) *Discussion Document on the "Proposed Conservation Areas Associated with Ord Stage Two Development – Kununurra WA*, Department of Conservation and Land Management, Kimberley Region

Kinhill Pty Ltd (2000a) *Environmental Review and Management Programme / Draft Environmental Impact Statement, Ord River Irrigation Area Stage 2, Proposed Development of the M2 Area, Main Report*, prepared for Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and Water Corporation of Western Australia, Perth, WA.

Kinhill Pty Ltd (2000b) *Responses to Public Submissions / Supplementary Commitments*, prepared for Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and Water Corporation of Western Australia, Perth, WA.

Parks and Wildlife Commission of the Northern Territory (undated) *Northern, Territory Parks Masterplan "Towards a Secure Future"*, Darwin, NT.

Thackwell, R. and Cresswell I.D (Eds) (1995) *An Interim Biogeographic Regionalisation for Australia: a framework for setting priorities in the national reserves system*, Version 4.0. Australian Nature Conservation Agency, Canberra.

Sattler P and Williams R (Eds) (1999) *The Conservation Status of Queensland's Bioregional Ecosystems*, Queensland Environmental Protection Agency, Brisbane.

- Dr H. G. Gardiner
- Jane and Greg Harman
- Jim and Judy Hughes
- Lindsay and Ann Innes
- Geoff Johns
- Barbara Johnson
- Rob Kelly
- Stuart and Libuse Lauder
- Jim and Julie Leach
- Grant Lodge
- Peter McCosker
- K. G McNair
- Patricia Muirson
- Ruth O'Connor
- Chris Robinson
- Frank Rodrigeuz
- Michael Smith
- Darryl Smith
- Paul and Elisabeth Stewart
- Kirsten Stoldt
- Andrew Trezona
- C Turner
- K Turner
- Dr N Uren
- Bruce Vandersee
- Allan Wedderburn

Plus two confidential submissions

# Appendix 3

## Recommended Environmental Conditions and Proponents Commitments in relation to Biodiversity

Department of Lands Planning and Environment and the Northern Territory Parks and Wildlife Commission.

This Plan shall address:

1. tenure of the buffer;

2. document the environmental values of the buffer;

3. methods to control human and vehicular access to environmentally sensitive portions of the buffer area;

4. methods to minimise the impacts of construction activities;

5. rehabilitation of disturbed portions of the buffer area; and

6. responsibilities for the maintenance of the buffer area.

1-2 The proponent shall implement the Buffer Management Plan required by condition 1-1 as specified in that Plan.

1-3 The proponent shall make the Buffer Management Plan required by condition 1-1 publicly available, to the requirements of the Environmental Protection Authority.

## 2 Biological Surveys

2-1 Prior to finalisation of detailed design and ground disturbing activities, the proponent shall prepare a Flora and Fauna Survey Plan to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, the Department of Conservation and Land Management, the Northern Territory Department of Lands, Planning and Environment and the Northern Territory Parks and Wildlife Commission.

The objectives of this plan are:

- to conserve and protect listed species;
- to conserve and protect vegetation associations/ communities;
- conserve and protect aquatic fauna species; and
- conserve and protect subterranean fauna species.

This plan shall address:

1. additional surveys of terrestrial fauna, including frogs, bats and reptiles;

2. additional surveys of aquatic fauna within the Keep River system (including estuarine fauna);

3. the protection of vegetation associations/ communities G1, G4, Em8, Em9, Gt2 and ET4 within proposed reserves adjacent to the Project Area; and

4. the identification and protection of subterranean fauna.

RECOMMENDED ENVIRONMENTAL CONDITIONS

# STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

Ord River Irrigation Area Stage 2 (M2 Supply Channel), Kununurra
Part 1 - Biodiversity Implications

**Proposal:** The proposal is to develop an export-based raw sugar industry on the Weaber, Keep River and Knox Creek Plains (as documented in Schedule 1 of this Statement).

**Proponent:** Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and the Water Corporation of Western Australia

**Proponent Address:** Wesfarmers Limited, 11 Floor, "Wesfarmers House", 40 The Esplanade, PERTH WA 6000

**Assessment Number:** 1240

**Report of the Environmental Protection Authority**: Bulletin 988

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.

The EPA has adopted a two stage approach for this project. The first part assesses the acceptability of clearing approximately 34,000 ha of land in terms of the potential loss of biodiversity, and the second part will focus on detailed management of the development in the short and long term. This second report is expected to be finalised later this year.

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the environmental factors relevant to biodiversity.

That the Minister notes that the EPA has concluded that clearing of the land for irrigated agriculture can be managed to meet the EPA's objectives related to biodiversity, subject to the conditions and commitments set out in this Appendix and summarised in Section 4 including the proponent's commitments.

That the Minister notes that the EPA will provide a further report on other conditions in relation to management aspects of the development proposal.

## 1 Buffer Management Plan

1.1 Prior to ground-disturbing activity, the proponent shall prepare a Buffer Management Plan to protect the environmental values of the buffer, including the protection of watercourses, wetlands, native fauna and vegetation to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, Department of Conservation and Land Management, the Northern Territory

2-2 The proponent shall implement the Flora and Fauna Survey Plan required by condition 2-1 as specified in that Plan.

2-3 The proponent shall make the Flora and Fauna Survey Plan required by condition 2-1 publicly available, to the requirements of the Environmental Protection Authority.

## 3 Final Design

3-1 Prior to ground-disturbing activities, the proponent shall prepare a Final Project Design Layout to the requirements of the Environmental Protection Authority on advice of the Department of Environmental Protection, the Department of Conservation and Land Management, the Department of Resources Development, the Water and Rivers Commission, the Northern Territory Department of Lands, Planning and Environment and the Northern Territory Parks and Wildlife Commission.

The objectives of this plan are:

- to ensure that listed flora and fauna species are protected; and
- to ensure that the Miriuwung and Gajerrong peoples' environmental values in the Project Area are documented and considered.
- 

This Plan shall address:

1. the outcomes of the surveys required under Condition 2;
2. the outcomes from the Aboriginal Socio-Economic Impact Assessment and other related studies; and
3. the boundaries of the buffer area.

3-2 The proponent shall implement the Final Project Design Layout required by condition 3-1 as specified in that Plan.

3-3 The proponent shall make the Final Project Design Layout required by condition 3-1 publicly available, to the requirements of the Environmental Protection Authority.

## Procedure

## 4 Regional Conservation Initiatives

4-1 The Government of Western Australia will create the following conservation reserves, within two years, as a priority:

- Livistona Range Conservation Area;
- Pincombe Range Conservation Area;
- Ninbing Range Conservation Area;
- Weaber Range Conservation Area; and
- Mt Zimmerman Conservation Area.

4-2 The Government of Northern Territory will create the following conservation reserves, within two years, as a priority:

- Spirit Hills as National Park; and
- Western Legune as National Park.

**Schedule 1**

## The Proposal

The M2 project is located within the Victoria-Bonaparte Biogeographic Region. The Project Area extends over approximately 76,000 hectares (ha) of land comprising the Weaber, Keep River and Knox Creek Plains, and involves approximately equal areas within Western Australia (WA) and the Northern Territory (NT) (see Figure 1).

The M2 project involves (see Figure 2):

- a sugarcane plantation development by Wesfarmers-Marubeni of approximately 29,000 with potential for future 'sell down' to independent farmers;
- the sale of 1,500 ha of land by Wesfarmers-Marubeni to independent farmers on an unconditional basis with respect to the types of crops that may be grown;
- the development of 3,000 ha for irrigation, drainage and flood protection infrastructure by the Water Corporation;
- the construction and development of a raw sugar mill by Wesfarmers-Marubeni with a capacity of approximately 400,000 tonnes per annum (tpa) of raw sugar and 160 000 tpa of molasses;
- the establishment and management of 42,500 ha of land as a buffer; and
- raw sugar and molasses storage and handling facilities at Wyndham.

## Key Characteristics Table

| Element | Description | Amount |
|---|---|---|
| Land within the Project Area | • Project area<br>• Land managed as a buffer+<br>• Wesfarmers-Marubeni sugarcane estate<br>• Land for independent farms<br>• Infrastructure area | • 76,000 ha*<br>• 42,500 ha*<br>• 29,000 ha*<br><br>• 1,500 ha*<br>• 3,000 ha* |
| Land outside the Project Area | • M2 Channel (Lake Kununurra to Project Area)<br>• Wyndham Port Facilities | • 690 ha<br><br>• 1 ha |
| Production | • Raw sugar<br>• Molasses | • 400,000 tpa<br>• 160,000 tpa |
| Infrastructure | • Irrigation channels<br>• Annual water requirement<br>• Drains<br>• Flood protection levees<br>• Balancing storage dams (operating volume)<br>• Roads<br>• Power lines | • 160 km*<br>• 740 GL*<br>• 153 km*<br>• 142 km*<br>• 5 6 GL<br><br>• 161 km<br>• 165 km |
| Wyndham Port | • Raw sugar store<br>• Molasses store | • 180,000 t<br>• 75,000 t |

**Key:**

* = approximate
GL = Gigalitres
ha = hectares
km = kilometres
tpa = tonnes per annum
t = tonnes
+ = for clarification, conservation reserve proposals by the WA and NT Governments are referred to as 'conservation areas' and the areas within the Project Area proposed by the proponent in the ERMP / draft EIS to be protected from development are referred to as 'buffer areas'

# DRAFT

**Wesfarmers Sugar Company Pty Ltd, Marubeni Corporation and Water Corporation of Western Australia**

**Environmental Management Commitments in relation to Biodiversity**

**11 August 2000**

| Relevant ERMP/EIS Section | Commitment | Timing | Responsibility * | Objective | Action | Further consultation | Compliance Criteria |
|---|---|---|---|---|---|---|---|
| **Chapter 1—Project Objectives and Background** | | | | | | | |
| 1.5.1 | The ongoing management proposed for the Project's conservation areas would include research focussed at improving environmental management systems for these areas. | Operation. | Environmental Management Entity on behalf of Westfarmers–Marubeni, Water Corporation and independent farmers. | Improve knowledge of environmental management. | By including the requirement for research in the EMP. | CALM and PWCNT. | – |
| **Chapter 3—Description of the Project** | | | | | | | |
| 3.2.4 | Westfarmers–Marubeni and the Water Corporation would prepare an EMP for the Project upon receipt of environmental approval. The EMP would incorporate all the requirements of the commitments and conditions that apply to the Project and be prepared in consultation with the DEP, the Department of Lands, Planning and Environment and other regulatory authorities. Compliance with the EMP would be mandatory for all landowners and occupiers within the Project Area. | Before construction. | Westfarmers–Marubeni and the Water Corporation. | Effective environmental management. | By preparing and implementing the EMP. | EPA and DLPE. | To satisfaction of EPA and DLPE. |
| 3.3.2 | All farms in the Project Area would be developed with irrigation tailwater management systems. Irrigation tailwater is the water leaving the end of the furrows during watering and is unavoidable if uniform water application to the crop is desired.<br>A conceptual tailwater management system proposed for use in the Project Area is shown in Figure 3.3 and would consist of the following elements:<br>• tailwater ditch that collect tailwater from the furrows and deliver it to a tailwater dam;<br>• tailwater dams. The volume of these dams would be optimised during detail design with the objective being to minimise discharges of irrigation tailwater during the dry season. As a minimum, the tailwater dam capacity would be sufficient to provide the specified first-flush stormwater retention capacity (see Section 5.5.2) for the Project—12 mm of rainfall runoff for sugarcane farms and 25 mm of rainfall runoff from other farms;<br>• tailwater return pumps and pipelines that would return irrigation tailwater to the farm head ditch or to other intermediate points in the farm irrigation system for application to the crop. The tailwater return pumps would be set to operate at partial filling of the dam, thereby reducing the volume of tailwater requiring storage. | Construction. | Westfarmers–Marubeni and independent farmers. | Virtually eliminate discharges of irrigation tailwater during the dry season. | By constructing and operating the tailwater return system. | – | To satisfaction of DEP and DLPE. |
| 3.10 | In areas where reserve widths significantly greater than those required for construction, only the sections necessary for construction and future maintenance purposes would be cleared. | Construction. | Westfarmers–Marubeni and the Water Corporation. | Avoid excessive clearing. | By including requirement in construction contracts and monitoring. | – | – |

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| **Chapter 5—Surface Water** | | | | | | | |
| 5.4.1 | Monitoring of erosion along all watercourses, including constructed drains would be undertaken as part of the EMP for the Project. Localised management of any erosion would be undertaken on an as-needed basis by the Environmental Management Entity that would be established as part of the Project | Operation. | Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation. | Minimise erosion of water courses. | By monitoring and implementing remedial measures as needed. | – | – |
| 5.6.3 | Water quality monitoring would form an important component of the environmental management programme proposed for the Project. Data collected by the monitoring programme would be assessed regularly in conjunction with management practices with the aim of minimising impacts on the receiving environment. | Operation. | Environmental Management Entity on behalf of Wesfarmers–Marubeni, independent farmers and the Water Corporation. | Provide data for improved management. | By implementing EMP. | WRC and DLPE. | To satisfaction of WRC and DLPE. |
| **Chapter 6—Groundwater** | | | | | | | |
| 6.5.5 | Groundwater monitoring for the Project would commence with delineation drilling across the interpreted position of the palaeochannel aquifers in order to define their actual position beneath the irrigation area.<br>An extensive network of groundwater monitoring bores would also be installed within and adjacent to the irrigation area prior to the commencement of irrigation. This network would include bore transects aligned perpendicular to the Keep River and Sandy Creek to acquire additional data for the better understanding of the river–groundwater interactions, and the establishment of monitoring bores adjacent to Milligan Lagoon.<br>Groundwater samples would be collected during the delineation drilling to quantify the vertical and horizontal water quality distribution. | Construction. | Wesfarmers–Marubeni and the Water Corporation. | Confirm parameters adopted for groundwater modeling. | Conduct further groundwater monitoring. | WRC and DLPE. | To satisfaction of WRC and DLPE. |
| **Chapter 10—Biological Environment—Impacts and Management** | | | | | | | |
| 10.1.3 | Any loss of or impairment to, the use of flora or fauna and other resources by Miriuwung and Gajerrong people would be addressed in an Indigenous Land Use Agreement (ILUA) to be negotiated between the Co-proponents and the Miriuwung Gajerrong people. | Before construction. | Wesfarmers–Marubeni and the Water Corporation. | Obtain agreement of Miriuwung Gajerrong people. | By negotiation. | Miriuwung and Gajerrong people. | Agreement of relevant parties. |
| 10.4.8 | To ensure that the existing environmental significance of the Point Spring Nature Reserve is maintained, Wesfarmers–Marubeni and the Water Corporation would cooperate with CALM in implementing its management requirements for the site. The overall responsibility for the management of the reserve would remain with CALM. The conservation area between the proposed farmland and Point Spring Nature Reserve would be managed for the purpose of conservation. | Before construction. | Wesfarmers–Marubeni and the Water Corporation. | Maintain environmental values of Point Spring Nature Reserve. | By providing co-operation as appropriate | CALM. | To satisfaction of CALM. |

| Relevant ERMP/EIS Section | Commitment | Timing | Responsibility * | Objective | Action | Further consultation | Compliance Criteria |
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| 10.5.1 | Permanent monitoring sites for flora, fauna and biodiversity would be established in conservation areas, along ecological corridors and in selected sites in the Project Area. Monitoring would be undertaken on a regular basis with the monitoring parameters clearly defined following consultation with the staff of CALM and the Parks and Wildlife Commission of the Northern Territory (refer to Supplementary Commitments with regard to baseline biological monitoring of the Keep River). | Before construction and operation. | Environmental Management Entity on behalf of Westfarmers–Marubeni, independent farmers and the Water Corporation. | Monitor flora, fauna and biodiversity. | As committed. | CALM and PWCNT. | To satisfaction of CALM and PWCNT |
| 10.5.2 | To limit any potential for over clearing, all areas designated for construction works would be clearly marked on development maps and on the ground prior to commencement of works.<br>Vegetation clearance would be staged so that areas are cleared only as required.<br>Designated conservation areas and vegetation buffers would be clearly established and monitored to ensure they remained undisturbed.<br>All contractors and consultants would be required to participate in a formal environmental and cultural heritage induction programme on the importance of the natural and social environment. | Before construction. | Westfarmers–Marubeni and the Water Corporation. | Limit any potential for over clearing and improve environmental awareness. | As committed. | – | – |
| 10.5.6 | Rehabilitation of any sites disturbed during development would be undertaken progressively using seed species collected from the Project Area. Areas disturbed during development of the infrastructure would be rehabilitated as each stage of the work is completed, particularly those drainage channels designated as conservation-vegetation corridors.<br>Where possible, topsoil would be utilised immediately or removed and stockpiled for later use on disturbed areas. Once the development was complete, the topsoil would be spread over the disturbed areas, allowing seeds and rootstock stored in the soil to germinate and become established. Active reseeding of some areas may also take place. Monitoring of success of rehabilitation would be undertaken. | Construction. | Westfarmers–Marubeni and the Water Corporation. | Effective rehabilitation of disturbed sites. | By including requirements in construction contracts and monitoring. | Miriuwung Gajerrong people, CALM and PWCNT | To satisfaction of Miriuwung Gajerrong people, CALM and PWCNT. |
| 10.5.7 | A seed collection programme would be undertaken before vegetation is cleared. A seed mix appropriate to the area to be rehabilitated would be prepared and scattered over the disturbed areas.<br>Alternatively, seedlings could be germinated and planted out at the commencement of the wet season. Only seeds of plant species endemic to the Project Area would be used in revegetation projects. | Construction. | Environmental Management Entity on behalf of Westfarmers–Marubeni, independent farmers and the Water Corporation. | Effective rehabilitation of disturbed sites. | Seed collection and use in rehabilitation projects. | Miriuwung Gajerrong people, CALM and PWCNT. | To satisfaction of Miriuwung Gajerrong people, CALM and PWCNT. |

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| **Chapter 12—Issues Specific to Miriuwung and Gajerrong People** | | | | | | | |
| 12.4.5 | Resolve all Native Title issues by concluding an ILUA with the Miriuwung and Gajerrong people. | Before construction. | Westfarmers-Marubeni, the Water Corporation, WA and NT Governments. | In order to ensure that Miriuwung and Gajerrong aspirations are met and to ensure that statutory land transfer processes can occur. | By formal negotiations. | Aboriginal Representative Bodies and the Miriuwung and Gajerrong people. | To satisfaction of the NNTT. |
| 12.5.2 | Comply with relevant cultural heritage legislation and the aspirations of Miriuwung and Gajerrong people. | Before construction, during construction and operation. | Westfarmers-Marubeni, the Water Corporation, Environmental Management Entity and independent farmers. | Ensure compliance. | By undertaking cultural heritage assessments. | Aboriginal Representative Bodies, Miriuwung and Gajerrong people, AAPA, HCB and AAD. | To satisfaction of the Miriuwung and Gajerrong people, the AAPA, the HCB and the AAD. |
| 12.5.8 | Establish 'green access paths'; | Before construction. | Westfarmers-Marubeni, the Water Corporation, WA and NT Governments. | Ensure that Native Title rights are maintained. | By agreement with Government. | Aboriginal Representative Bodies, the Miriuwung and Gajerrong people and relevant Government agencies. | To satisfaction of the Miriuwung and Gajerrong people and relevant Government agencies. |
| 12.5.8 | Establish the Conservation Area. | Before construction. | Westfarmers-Marubeni, the Water Corporation, WA and NT Governments. | Ensure protection of cultural heritage sites.<br>Ensure that Native Title rights are maintained. | By agreement with Government. | Aboriginal Representative Bodies, the Miriuwung and Gajerrong people and relevant Government agencies. | To satisfaction of the Miriuwung and Gajerrong people and relevant Government agencies. |
| 12.6.2 | Complete an Aboriginal Socio-Economic Impact Assessment. | Before construction. | Westfarmers-Marubeni and the Water Corporation | Ensure that the Miriuwung and Gajerrong view of the Project is understood and enable the negotiation of an ILUA. | By establishing the Working Group with Miriuwung and Gajerrong people and the Aboriginal Representative Bodies. | Aboriginal Representative Bodies and the Miriuwung and Gajerrong people. | To satisfaction of the Miriuwung and Gajerrong people. |
| **Chapter 15 – Community Issues** | | | | | | | |
| 15.4.5 | Access to the Keep River would be maintained. | Before construction, during construction and operation. | Westfarmers-Marubeni, the Water Corporation and the Environmental Management Entity. | Ensure public access to the Keep River. | By providing designated recreation sites. | Miriuwung and Gajerrong people and local recreation groups. | To the satisfaction of Miriuwung and Gajerrong people and local recreation groups. |

| Relevant ERMP/EIS Section | Commitment | Timing | Responsibility * | Objective | Action | Further consultation | Compliance Criteria |
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| **Supplementary Commitments** | | | | | | | |
| 2.4.2, 10.3.5 | Reconfigure the design of the Keep River balancing storage | Before construction | Water Corporation | Conservation of 35ha of vegetation association Gt5 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farm W511 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of 5ha of vegetation association ET4 | By implementing appropriate design | | To the satisfaction of the DEP |
| 10.3.5 | Redesign Farm W65 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of 20ha of vegetation association Ct1 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farm K31 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of 13ha of vegetation association Me3 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farm W65 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 25ha of vegetation association Cc1 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farm X442 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 180ha of vegetation association Gt3 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farm W36 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 44ha of vegetation association Em8 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farm W41 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 37ha of vegetation association Em7 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farms X41, X431, X432, X441, and X442 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 540ha of vegetation association Gt2 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farms W11, W12, W14, and the M2N irrigation channel | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 75ha of vegetation association ET5 | By implementing appropriate design | | |
| 10.3.5 | Confirm the location of vegetation association G4 outside of the Project Area | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 133ha of vegetation association G4 | By implementing appropriate survey work | | |
| 10.3.5 | Redesign Farm W110 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 12ha of vegetation association Ct2 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farms W11, W12, W14, and the M2N irrigation channel | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 5ha of vegetation association Cb9 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farms W65 and K31 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 225ha of vegetation association Bc3 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farm K41 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 4ha of vegetation association Gt6 | By implementing appropriate design | | |
| 10.3.5 | Redesign Farms W11, W12, W14, W36 and the M2N irrigation channel; and confirm the location of vegetation association Em9 outside of the Project Area | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 614ha of vegetation association Em9 | By implementing appropriate design and survey work | | |
| 10.3.5 | Confirm the location of vegetation association G1 outside of the Project Area | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 91ha of vegetation association G1 | By implementing appropriate survey work | | |
| 10.3.5 | Redesign Farm W65 | Before construction | Westfarmers Marubeni and the Water Corporation | Conservation of a further 29ha of vegetation association Gt8 | By implementing appropriate design | | |
| 5.5.2, 10.3.3 | Redesign boundaries to Farms X41, X431, X432, and X441 | Before construction | Westfarmers Marubeni and the Water Corporation | To ensure conservation of all riparian vegetation, and adequate setback of the developed area from natural watercourses | By implementing appropriate design | | |

| Relevant ERMP/EIS Section | Commitment | Timing | Responsibility * | Objective | Action | Further consultation | Compliance Criteria |
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| 10.3 | Redesign flood protection levees east of Farm X23, east of Farm W64, and east of conservation areas E46 and E410 | Before construction | Westfarmers Marubeni and the Water Corporation | To ensure the inundation of the conservation areas by natural flooding, and associated drainage | By implementing appropriate design | | |
| 5.3.1, 6.5.3 | Redesign flood protection HDX1 | Before construction | Water Corporation | To ensure minimal hydrological impact on Milligan Lagoon | By implementing appropriate design | WRC and DLPE | To satisfaction of WRC and DLPE |
| 5.3.1, 6.5.3 | Design a drainage corridor through Farm X432 | Before construction | Westfarmers Marubeni and the Water Corporation | To ensure adequate surface water flows between Milligan Lagoon and the Keep River | By implementing appropriate design | WRC and DLPE | To satisfaction of WRC and DLPE |
| 5.3.1, 5.4.1 | Complete further analysis of predicted water velocity regime and stability of soils along the lower 20km of Border Creek | Before construction | Westfarmers Marubeni and the Water Corporation | To ensure erosion effects in and around Border Creek are not significant | By implementing appropriate design | WRC and DLPE | To satisfaction of WRC and DLPE |
| 9 | Complete an additional biological survey of the Keep River in the vicinity of the Project Area | Before Project implementation | Westfarmers Marubeni and the Water Corporation | To confirm current predictive models, and provide additional baseline data for inclusion in the EMP | By implementing survey work | DEP, DLPE, NT Dept. of Fisheries | To the satisfaction of DEP, DLPE, and NT Dept. of Fisheries |

Note:

* Responsibility for implementation of the conditions rests with the proponent. However, the proponent has indicated who will oversee fulfilment of each particular commitment as indicated.