



1. Application details

1.1. Permit application details

Permit application No.: 880/1

Permit type: Area Permit

1.2. Proponent details

Proponent's name: Mr Robert Boshammer Green Swamp Agriculture (GSA)

1.3. Property details

Property: LOT 825 ON PLAN 193645 (KUNUNURRA 6743)

LOT 424 ON PLAN 216944 (KUNUNURRA 6743)

LOT 680 ON PLAN 216944 (KUNUNURRA 6743)

Local Government Area: Shire Of Wyndham-East Kimberley

Colloquial name: King Location 680, King Location 825, King Location 424

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
1186		Mechanical Removal	Horticulture

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description
Beard vegetation association
59: Grasslands, high grass
savanna sparse tree; bauhinia &
coolabah over Mitchell, blue &
tall upland grasses (Hopkins et
al. 2001).

Clearing Description
The proposal encompasses a 1186 ha area at
the northern end of the existing Ord River
Irrigation agricultural area. This area, known as
Green Swamp, was gazetted as part of Ord
Stage 1 but has not been developed. There is
an expectation that this area will be developed to
environmental and best practice irrigation
standards as set for Ord Stage 2 by the EPA.

Vegetation Condition
Good: Structure
significantly altered by
multiple disturbance;
retains basic
structure/ability to
regenerate (Keighery
1994)

Comment
The description of the
vegetation was determined
by a flora survey (Kinhill,
2000) and additional field
observations made on a site
visit (DoE, 2005 TRIM ref.
KND841).

The vegetation includes 6 communities as
described by Kinhill (2000), including the
following:
- Woodland Community 1: Low woodland of
Eucalyptus microtheca and Excoecaria parvifolia
over a low grassland dominated by
Pseudoraphis abortiva and Iseilema
vaginiflorum. The soil in this association was
holding the water to a greater extent than
Woodland Community 2.
- Woodland Community 2: Low woodland of
Eucalyptus microtheca and Excoecaria parvifolia
over a grassland dominated by Pseudoraphis
abortiva and Sorghum timorense and sedges.
- Woodland Community 3: Open low woodland
of Eucalyptus microtheca, Excoecaria parvifolia,
Bauhinia cunninghamii over open shrubland of
Terminalia oblongata subsp. volucris over a low
grassland of mixed species.
- Woodland Community 4: Open low woodland
of Eucalyptus microtheca and Excoecaria
parvifolia over an open shrubland and grassland.

Beard vegetation association 916: Grasslands, high grass savanna woodland, greybox, *Eucalyptus confertifolia* & *E. foelsheana* over *spinifex*, white & tall upland grass on sandy plain on limestone (Hopkins et al. 2001; Shepherd et al. 2001).

- Woodland Community 5: Open low woodland of *Eucalyptus microtheca* and *Excoecaria parvifolia* over a tall grassland of *Sorghum timorense*, *Iseilema vaginiflorum* and *Dichanthium sericeum*.
- Woodland Community 6: Open woodland of *Melaleuca nervosa* over a mixed grassland and herbland dominated by *Pseudoraphis spinescens* (previously *P. abortiva*) and many annual species.

Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)

3. Assessment of application against Clearing Principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments **Proposal is not likely to be at variance to this Principle**

A total of six woodland communities were recorded from the site. Five were *Eucalyptus microtheca* and *Excoecaria parvifolia* woodlands which varied in the density of trees and dominance of understorey species, especially grasses. The sixth vegetation community was a *Melaleuca nervosa* woodland, associated with the wetter north-eastern part of the development, which adjoins a rocky slope adjacent to the proposal area (Green Swamp Agriculture, 2005).

Goodenia strangfordii (P1) was located during fieldwork but several other populations were later located off the project site (Kinhill, 2000). Two other priority species located during the survey were *Fimbristylis laxigumis* (P2) and *Fuirena incrassata* (P3), found in the northern area (Kinhill, 2000). The buffers, totalling over 180ha, set aside along the periphery of the area proposed for clearing will encompass these occurrences and provide adequate protection for the maintenance of suitable supporting habitat (CALM, 2005).

Twelve introduced plants were recorded in the survey (Kinhill, 2000).

CALM concluded, via a site visit and local knowledge of this area, that whilst the native vegetation of the proposal area was representative of the region, it has been adversely affected by cattle grazing and fire (CALM, 2005). The proposal is therefore not likely to be at variance to this Principle.

Methodology Kinhill, 2000
Green Swamp Agriculture, 2005
CALM Advice, 2005
DoE Site Visit, 2005

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments **Proposal is not likely to be at variance to this Principle**

Priority species *Burhinus grallarius* (Bush Stone-Curlew) P4 and *Ardeotis australis* (Australian Bustard, P4) were recorded within the notified area during the Kinhill Pty Ltd (2000) Biological Survey in 1999. The Bush Stone-Curlew is a well-camouflaged, ground nesting bird, which prefers to remain motionless rather than fly when disturbed. It inhabits lightly timbered open woodlands. The Australian Bustard is uncommon and may occur in open or lightly wooded grasslands.

There are seven Schedule 1 (Threatened) fauna and two Schedule 4 (Specially Protected) fauna, all listed on the Wildlife Conservation Specially Protected Fauna Notice, and seven Priority fauna that have been recorded within a 50 kilometre radius of the notified area (CALM, 2005).

The habitat in the area of application is unlikely to be considered 'significant' since it is well represented throughout the area (CALM, 2005). An additional consideration is that the area has been impacted through cattle grazing and the shrub layer is not well represented thereby reducing the habitat value of this.

This proposal is not likely to be at variance to this Principle.

Methodology CALM Advice, 2005
Kinhill, 2000
GIS Database: Threatened Fauna - CALM 30/9/05

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments Proposal is not likely to be at variance to this Principle

A total of 74 records of Priority flora have been recorded within a 50 kilometre radius of the notified area (CALM, 2005).

Three Priority Species were located during an on-site flora survey have been found in the notified area. *Goodenia strangfordii* (P1) is an erect, diffuse herb with yellow flowers which grows in seasonally wet and heavy soils. Populations of this species were also found off site. *Fimbristylis laxiglumis* (P2) is a tufted annual, grass-like herb. It has brown flowers in April and grows in black clay. *Fuirena incrassata* (P3) is an annual grass-like herb which flowers in May-August and grows in sand or sandy clay in swamps, creek beds, clay pans and semi-saline lakes. These species were all identified within the wetter, northern section of the proposed development.

The proponent will conserve the key areas within a heritage and vegetation exclusion area (Green Swamp Agriculture, 2005), see Plan 880/1.

The cracking clays/blacksoil plains and seasonally inundated areas that occur within King Locations 424, 680 and 825 may be suitable habitat for several of the Priority species that are listed as occurring within 50km of the notified area. For example, *Goodenia durackiana* (P1) occurs on black clay and grassland; *Desmodium flagellare* (P1) is found on black clay; *Echinochloa kimberleyensis* (P1) occurs on black soils and swamps; *Goodenia purpurascens* (P3) is found in clay, mud, swamps and seasonally wet depressions (CALM, 2005, Florabase).

Given the size of the notified area, the fact that three Priority flora were found in the notified area and that 74 records of Priority flora have been recorded within a 50 kilometre radius, it is possible that the proposed development will have an impact on flora taxa of conservation significance (CALM, 2005).

Negotiations with the proponent during the assessment has resulted in buffers being set aside to provide for protection of these key Priority species. The proponent has committed to exclude an area of approximately 20 hectares from the development proposal in addition to 100m buffers around the periphery of the site (Green Swamp Agriculture, 2005), specified as the 'Vegetation and Heritage Exclusion Area' on Plan 1166/1.

To address this issue the proponent will leave a 100m buffer around most of the periphery of the site that will incorporate a portion of each of the six vegetation communities (Green Swamp Agriculture, 2005). These buffers will be excluded from the clearing permit area, thereby reserving them from clearing. This would provide protection within major drainage areas, two rocky outcrops adjacent to the site, and incorporates a heritage protection area of 2.5ha into an environmental buffer. An additional ~20ha is excluded from the permit in the far north-western corner to add to the buffer protecting the northern drainage area and heritage area. The proponent has also committed to retain 10-15% of the native vegetation as wildlife corridors on site.

The retention of these buffers as well as retention of native vegetation as corridors will adequately protect local distribution of the vegetation communities and preserve key priority flora values, therefore the proposal is not likely to be at variance to this Principle (CALM, 2005).

Methodology CALM Advice, 2005

Florabase: <http://florabase.calm.wa.gov.au/>

GIS Database: Declared Rare and Priority Flora List - CALM 01/07/05

Green Swamp Agriculture, 2005

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments Proposal is not likely to be at variance to this Principle

There are no Threatened Ecological Communities occurring in the area proposed for clearing. Spring or rainforest communities occur in the region and are of high conservation value however none of these occur within the proposed clearing area (CALM, 2005; DoE, 2005).

The Point Spring and Long Swamp Ecological Community no. 79 occurs approximately 19km north-east of the proposed area: This ecological community is listed as a "Possible threatened ecological community" = Priority 1 (data deficient). The community is described as assemblages of closed canopy rainforest on permanent freshwater swamps and mound springs on alluvial floodplains and intertidal mudflats of the East Kimberley (Point Spring and Long Swamp type) (CALM, 2005). Little is known of Spring communities in the Victoria-Bonaparte Bioregion, therefore they should be vigorously protected where possible. Brolga Spring, King Gordon Spring and Attack Spring among others on Carlton Hill Station have an affinity with Long Swamp. They consist of large wetlands with *Melaleuca* forest and small patches of rainforest on mounds (CALM, 2005).

The distance between the proposal area and the identified TEC's is considered adequate to ensure protection from clearing impact, therefore the proposal is not likely to be at variance to this principle.

Methodology CALM Advice, 2005
 DoE Site Visit, 2005
 GIS Database: Threatened Ecological Communities - CALM 12/4/05

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments Proposal is not at variance to this Principle

The State Government is committed to the National Objectives and Targets for Biodiversity Conservation which includes a target that prevents clearance of ecological communities with a current extent below 30% of the pre-European settlement extent (Department of Natural Resources and Environment, 2002).

	Pre-European area (ha) *	Current extent (ha) *	Remaining %*	Conservation Status**	% in reserves/CALM-managed land
IBRA Bioregion:					
Victoria Bonaparte	1,888,102	1,870,115	~99	Least concern	0
Shire of Wyndham East Kimberley		No information available			
Beard vegetation association					
- 59	128,603	128,603	~100	Least concern	9.8
- 916	78,745	78,745	~100	Least concern	0.1

* Shepherd et al. (2001)

** Department of Natural Resources and Environment (2002)

Vegetation complexes within this application are above 30% representation. The vegetation of the site is a component of Beard Vegetation Associations 59 and 916 (Hopkins et al, 2001). There is ~100% of the pre-European extent of each Association remaining (Shepherd et al, 2001), which indicates they are well represented in the natural environment. A total of 1186 hectares are proposed to be cleared, made up of 1172.3 hectares of Association 59 and 13.7 hectares of Association 916, a loss of 0.91% and 0.017% respectively of the current extent of each vegetation Association. Given the large current extent and the small percentage loss, these vegetation types are therefore of 'least concern' for biodiversity conservation (Department of Natural Resources and Environment, 2002) in a regional context.

Regionally, 9.8% of the remaining extent of Association 59 and 0.1% of Association 916 are present in reserves, ensuring permanent preservation of these Associations (Shepherd et al, 2001). The total area of the three properties is 1381 hectares. However, 195 hectares of these lots has been removed from the proposed horticultural development and reserved for vegetation protection, therefore reducing the area to be cleared to 1186 hectares. This is made up of 91.1 hectares of Association 59 (6.6% of the vegetation on the properties) and 103.9 hectares of Association 916 (7.5% of the vegetation on the properties). This ensures further preservation of each Association in the natural environment, particularly in a local context.

Based on the small percentage (regionally) of each Association proposed to be cleared, and the areas proposed to be reserved within the properties under application, the clearing of 1186 hectares is not likely to significantly reduce the remaining extend of these Associations, therefore the proposal is not likely to be at variance to this principle.

The vegetation type is well represented in the region and not heavily cleared and therefore the clearing of 1186 would not be at variance to this principle.

Additionally, the proponent has proposed that, dependant on farm design techniques, a minimum of 100 hectares of the area proposed for clearing will also be reserved within wildlife corridors.

Methodology Hopkins et al, 2001
 Shepherd et al, 2001
 Department of Natural Resources and Environment, 2002
 GIS Database: Pre-European Vegetation - DA 01/01

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments Proposal is not likely to be at variance to this Principle

There are some sandy ephemeral creeks and wetlands of interest originating within a rocky outcrop to the north of the proposal area (DoE, 2005b). The drainage regime within the local area is likely to originate from the hill slopes in the far north with water movement towards the wetlands and creek (DoE, 2005b). As the proposed clearing is located at the lower end of the drainage system, it is not likely that the clearing will affect the hydrology of the drainage system, nor the creek and wetlands. Therefore the proposal is not likely to be at variance to this principle.

Additionally, negotiations with the proponent have resulted in approximately 20 hectares of the northern end of the proposal area to be excluded from the clearing and reserved, which will provide a buffer between the horticultural activities and the wetlands and creek.

Methodology DoE, 2005b
CALM Advice, 2005
Green Swamp Agriculture, 2005

Officer Susie Williams

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments Proposal is not likely to be at variance to this Principle

The site is situated on alluvium, with Cainozoic deposits overlain on shallow bedrock that is predominantly quartz sandstone. Importantly there is an absence of transmissive sequences that might otherwise facilitate drainage of the soil profile under irrigation, as is the case for some other parts of the Ord River Irrigation Area (DAFWA, 2005).

Soils over the majority of the area were mapped as land unit 5a (Aquitane bluish) with relatively small areas of 5b (Aquitane grey) along the southern boundary. There is a very narrow strip of 5c (Aquitane blue) close to the eastern boundary at its northern end (DAFWA, 2005).

Land units 5a and 5b subsoils are alkaline with high exchangeable sodium percentages, and there is a risk that permeability may decline after a period of irrigation unless water quality is manipulated and drainage managed (DAFWA, 2005).

The narrow strip of Land unit 5c is considered highly unsuitable for development for agricultural use and has thus been incorporated into a vegetation buffer which will remain uncleared.

If interactions between the irrigation water and soil occur that lead to a further increase in the exchangeable sodium percentage an even lower permeability could result in some of these soil types and the salinity problem could be exacerbated (DAFWA, 2005).

The proponent has submitted a drainage and irrigation management plan to the Department for Planning and Infrastructure, that has been assessed by the DAFWA and the strategies outlined within the plan are considered suitable, for management of the drainage and associated salinity issues that may arise (TRIM ref: DOC1924; EPA Public Advice, July 2006).

Issues associated with ongoing land use cannot be managed through a vegetation clearing permit. The Soil and Land Conservation Act administered by the Commissioner for Soil and Land Conservation has provision to manage impacts from irrigated agriculture.

The proposed clearing of vegetation is therefore is not likely to be at variance to principle (g).

Methodology DAFWA Advice, 2005
TRIM ref: DOC1924
EPA Public Advice, 2006

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments

Proposal is not likely to be at variance to this Principle

One National Park, three Nature Reserves, an arboretum and freehold townsite lots managed by CALM are situated within a 50km radius of the proposal area. The nearest CALM managed area is Point Spring Nature Reserve, located approximately 19km north-east of the proposal area. These are considered a significant distance away for it not to be impacted upon by the proposed clearing and there is also an outcrop of rocky hills and the Weaber Plain in between (CALM, 2005).

Lakes Kununurra and Argyle are listed both as Nationally Important Wetlands (Environment Australia, 1997) and RAMSAR sites, and are situated approximately 24 km to the south. Although the proposal area is 3km from the Ord River, it is situated downstream from the aforementioned Nationally Important Wetlands and RAMSAR wetlands. The extent of clearing in this application is unlikely to add to the cumulative impacts of clearing in the vicinity of these wetland habitats (CALM, 2005).

The Ord River broadens into the Ord River Floodplain, approximately 35km west of the proposal, which is listed as a Nationally Important Wetland (Environment Australia, 1997). There is potential for increased runoff, siltation and eutrophication, however the extent of this impact is difficult to quantify based on the level of information provided and the pre-existing impacts from clearing and cultural activities. Adequate buffering along natural and engineered drainage lines may reduce the potential for impacts to downstream wetlands and serve to provide some protection to habitat values represented in the area that is proposed for clearing (CALM, 2005).

There is 3kms of vegetated land between the proposal area and the Ord River which will provide an adequate buffer from direct offsite impacts. The drainage lines north of the proposal area will be left uncleared. Drainage will be managed to prevent any tail water leaving the site (Green Swamp Agriculture, 2005).

The buffer distances are considered adequate to protect any conservation lands and therefore this proposal is unlikely to be at variance to this principle.

Additionally, under the Ord Final Agreement there is a requirement to reserve a Heritage area located on site. This has been incorporated into an exclusion buffer and will not be cleared.

Methodology

CALM Advice, 2005
DoE Site Visit, 2005
Environment Australia, 1997
Green Swamp Agriculture, 2005
GIS Database:
- RAMSAR, Wetlands - CALM 14/02/03
- CALM Managed Lands and Waters - CALM 1/07/05

Officer

Susie Williams

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments

Proposal is not likely to be at variance to this Principle

Surface water: Significant parts of the proposal area are known to be inundated for periods during the wet season (Landsat Imagery, 2000; Green Swamp Agriculture, 2006). The area receives water draining from adjacent land in the west, north west and north. Drainage features are not well defined within the area however further north of the site sandy creeks are found draining away from hills offsite. Natural drainage from the north is collected by existing levee banks into an irrigation drainage system (DoE, 2005b).

Groundwater: The area is typically very flat with a slight slope falling to the north west. It is underlain by some shallow gravels with deep gravels underlying the existing irrigation area to the south (DoE, 2005b). Studies carried out by CSIRO in 2002 investigated rising groundwater in relation to water quality found that the Green Swamp area carried a high salinity risk, with electrical conductivity measurements being well above 750 uS/cm (CSIRO, 2003). The risks of sodicity increase if the water table rises to less than 2m from the soil surface (CSIRO, 2003). The Commissioner for Soil and Land Conservation reiterated these concerns, advising that elevated soil sodicity, particularly with waterlogged soils, can lead to destabilisation of soil structure and subsequent land degradation risks (DAWA, 2005; <http://www.science.org.au/nova>). This has been identified as a potential issue if the water table continues to rise without drainage being adequately managed (DAWA, 2005), however an Irrigation and Drainage management plan has been submitted and reviewed by DAFWA and considered to adequately manage the issue (TRIM ref: DOC1924).

Water supply within the Ord River Irrigation Area is licensed under the Rights in Water and Irrigation Act 1914 by the Department of Water to the Ord Irrigation Cooperative (OIC). The water licence ensures the OIC adheres to conditions for management of water use efficiency, water quality and ground water levels throughout the irrigation area. Water supply for Green Swamp will be licensed and managed by the OIC, and therefore must ensure the conditions of the Department of Water licence are also met. Commitment 30 of this

licence requires groundwater to be maintained 2m below the soil surface (OIC, 2004). To aid in control of groundwater the proponent intends on planting lines of deep rooted trees to act as biological pumps to assist with groundwater management. The most appropriate locations for the tree lines will be determined through the development of a detailed farm design in consultation with the OIC.

Another aspect of this irrigation proposal is to ensure appropriate tail water retention and recycling on site (Green Swamp Agriculture, 2005; EPA Bulletin 1016, 2001). Tail water recycling is suggested to provide a benchmark for best practice management for future irrigation development and water-use efficiency within Stage 2 of the Ord River Irrigation Area, however constant reuse of water 'on-farm' needs to be investigated for impacts on salinity levels. This is an ongoing management issue that will be addressed through the Ord Irrigation Cooperatives activities in water provision and tail water return.

The Department for Planning and Infrastructure (DPI) is developing a lease with conditions to address drainage and irrigation management, which has been reviewed by the Department of Agriculture and Food WA and deemed adequate (TRIM ref: DOC1924).

The Environmental Protection Authority determined that commitments made by the proponent for managing groundwater levels and the regulatory function of the Ord Irrigation Co-operative water licence, the Department for Planning and Infrastructure lease, the Department of Agriculture and Food WA and ongoing regulation through the Soil and Land Conservation Act were adequate to manage the surface and groundwater issues posed by the vegetation clearing and horticultural activities. This assessment has reached the same conclusion, therefore the proposal is not likely to be at variance to this principle.

Methodology DoE, 2005b
LandSat Imagery, 2000
Green Swamp Agriculture, 2006
<http://www.science.org.au/nova>
Environmental Protection Authority, 2001
CSIRO, 2003
DAWA, 2005
Ord Irrigation Cooperative, 2004
TRIM ref: DOC1924

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments Proposal is not likely to be at variance to this Principle

Flooding occurs seasonally over the December to March period, where the flood height and duration are lengthy and extreme. The northern portion of the proposal area, in conjunction with areas further north, is subject to regular seasonal inundation through the natural drainage regime (photos, Green Swamp Agriculture, 2006). It drains poorly in high rainfall events, and water can remain on the surface well beyond the wet season. Should this area experience flooding, there is potential for impact to the agricultural activities, however horticultural activities on Green Swamp.

The proposed clearing may exacerbate the likelihood of localised flooding in this area. The horticultural activities proposed for Green Swamp include laser levelling the area to form paddocks for level basin irrigation and the control of surface water movement by drainage infrastructure. The proponent is currently trialling this technology in partnership with the Ord Irrigation Cooperative and the results will be used to inform the development of the new farming system and irrigation design.

On site surface water movement will be controlled by drainage infrastructure and there is an expectation to collect tail water and return it to a drainage system. Drainage and irrigation management commitments will be incorporated into the lease issued by the Department for Planning and Infrastructure (TRIM ref: DOC1924), thereby this proposal is not likely to be at variance with this principle.

Methodology Green Swamp Agriculture, 2005
Green Swamp Agriculture, 2006
GIS Database: Rainfall, Mean Annual - BOM 30/09/01
TRIM ref: DOC1924

Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.

Comments

The 'Ord Final Agreement', which encompasses Green Swamp, was signed in October 2005 in Kununurra by a number of key stakeholders including the Department of Environment, other State Government agencies and the Miriuwung Gajerrong Traditional Owners. This final agreement extinguishes Native Title over the area proposed for clearing.

The Green Swamp project was referred to the Environmental Protection Authority (EPA) in October 2005 by a third party based on the National Objectives and Targets for Biodiversity Conservation (2001-2005). The EPA's decision was published on the 19th June 2006 as 'Not formerly assessed, managed under Part V of the EP Act'. Public Advice was issued as follows:

- 1) Clearing should be in accordance with any approval from DEC;
- 2) Development be in accordance with the last design provided to EPA (May 2006); and
- 3) Irrigation tail water retention on-farm be required - as proposed in the last design (Colin Murray, pers. comm. TRIM ref: DOC408).

These recommendations will be addressed through this clearing permit, the lease issued by the Department of Planning and Infrastructure and the ongoing Water Use Improvement Plan associated with the Ord Irrigation Cooperative's water licence.

The development of Green Swamp is conditional on recommendations from a Heritage Report being met, as stated in the Ord Final Agreement (October 6th, 2005). A condition of this is the reservation of a heritage site and buffer and the creation of an easement for access by local people. The reservation area and access easement have been excised from the clearing permit. The shape and size of the buffer has been designed in consultation between the proponent and the Kimberley Land Council and traditional owners. Vegetation buffers at the periphery of the block also provide contiguous access to the reservation area, thereby creating larger buffer area for protection of the Heritage area.

Environmental Protection Authority Bulletin 970 (2000): Kununurra-Wyndham Area Development Strategy (KWADS) (WAPC) CRN145595. Recommendations from the EPA when assessing the Strategy include the need for irrigated agriculture to be in line with ecologically sustainable development principles. Environmental issues associated with Ord Stage 1, including rising water table, loss of biodiversity within the plains and export of nutrients and other contaminants, need to be recognised and plans for their effective management should be incorporated into future irrigated agricultural proposals. The proposed development of Green Swamp will incorporate such requirements by employing a more water efficient irrigation system, including tail water retention on site and level basin irrigation technology, retaining native vegetation buffers on the edges of the block and retaining a buffer around a significant heritage site. These aspects of the proposed development are thus consistent with the Strategy.

A submission was received highlighting the following areas of concern: proponent's plans to burn and laser level cleared vegetation; broad scale clearing in the region; wildlife corridor dimensions, and proposed farming practices. The Department recommends that the proponent employ methods other than burning to remove vegetation cleared from the site. The proponent has committed to leaving 100m vegetation buffers on the perimeter of the property. These buffers are continuous with uncleared native vegetation on adjacent land not proposed for development, thereby enhances the effectiveness of buffers as corridors. As such, 100m buffers are considered adequate. Proposed farming practices include tail water recycling and water-use efficiencies as regulated via an Operating Strategy under a water licence administered by the Department of Water, as well as the development of sugarcane harvesting practices that will utilise cane trash to generate power, rather than burning. These commitments fit with current best practice farming and this development is being used as model for future irrigation development under Ord Stage 2.

The Department of Planning and Infrastructure (DPI) has offered a submission indicating they have no objection to the proposal to clear this area on the provision that no work will be undertaken until the lease has been issued (TRIM ref: KNI1025). DPI has requested a Drainage Management Plan and further farm and irrigation design information be submitted for consideration prior to issuing the lease. These management plans will be reviewed by the Department of Agriculture and Food to determine suitability for farming at Green Swamp (DPI pers. comm., 2006).

Green Swamp water use will be licensed and managed via the existing Ord Irrigation Cooperative (OIC) water licence, through the Rights in Water and Irrigation Act 1914. The water licence held by OIC, issued by the Department of Water, is subject to conditions to manage water use efficiency, water quality and ground water levels.

The proposed activity is not listed as a Prescribed Premises under the Environmental Protection Act 1986, therefore no Works Approvals or Licences are required.

The proposed clearing occurs in an area that is covered by the following Registered Indigenous Heritage Site: Yalijba-Minggirginja Complex (15499). It is the proponent's responsibility to comply with the Aboriginal Heritage Act 1972 and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

4. Assessor's recommendations

Purpose	Method Applied	Decision	Comment / recommendation
Horticulture	Mechanical Removal	1186	Grant The assessing officer has assessed the proposal against the clearing principles and recommends this permit to clear be granted with consideration given to management of drainage and possible salinity and sodicity risks, through water licencing and DPI lease conditions.

The proposal was referred to the EPA and a decision made not to formally assess the proposal if the development is in accordance with the design presented to the EPA in March 2006, and tail water be retained on farm.

The drainage and salinity risks will be managed through the Ord Irrigation Cooperative's existing water licence and will be reinforced by conditions in the conditional purchase lease currently being developed by the Department for Planning and Infrastructure.

The permit should also include extension of the buffer area in the northern portion by 100m which would bring the area permitted for clearing to approximately 1200ha, as this is a very poorly drained part of the subject land.

It is also recommended that the proponent use an alternative method for dealing with cleared vegetation other than burning. It is expected that the proponent implement best practice irrigation techniques including high water use efficiency and tail water recycling techniques. This would bring the development into line with the EPA's recommendations for the future irrigation development in the region.

5. References

- Ali, Riasat, and Salama, Ramsis (2003) Groundwater Quality in the Ord Irrigation Area, Its Suitability for Irrigation and Prediction of salinity and Sodicty Hazards, Technical Report No 7/03, CSIRO
- Barrett Purcell & Associates Pty Ltd (1995) Ord River Irrigation Area: Preliminary design and cost estimate for irrigation development at Green Swamp DoE TRIM ref: KN1842
- CALM (2005) Land clearing proposal advice. Advice to A/Director General, Department of Environment (DoE). Department of Conservation and Land Management, Western Australia. DoE TRIM ref IN25064.
- DAWA Land degradation assessment report. Office of the Commissioner of Soil and Land Conservation, Department of Agriculture Western Australia. DoE TRIM ref IN25334.
- Department of Environment (2005a) Site Visit. DoE TRIM ref: KND841
- Department of Environment (2005b) Surface water and Groundwater Site Report, TRIM ref: KND964
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- Environment Australia (1997) The Wetlands Policy of the Commonwealth Government of Australia.
- Environmental Protection Authority (2000) Bulletin 970: Kununurra-Wyndham Area Development Strategy
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