Government of Western Australia
Department of Mines, Industry Regulation and Safety

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8046/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: **Tronox Mining Australia Limited**

1.3. Property details

Property: Mining Lease 70/360
Mining Lease 70/569
Local Government Area: City of Busselton
Colloquial name: Wonnerup North Mineral Sands Mine

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
38.9		Mechanical Removal	Mineral sands mining and associated activities

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 5 September 2019
Reasons for Decision:

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description

The vegetation of the application area is broadly mapped as the following Beard vegetation associations (GIS Database):

949: Low woodland; banksia;
973: Low forest; paperbark (*Melaleuca rhaphiophylla*); and;
1136: Medium woodland; marri with some jarrah, wandoo, river gum and casuarina.

The application area is also mapped as being comprised of four finer scale vegetation complexes as mapped by Mattiske and Havel (1998), which provide a more detailed description of the vegetation:

Abba (AB): Woodland and open forest of *Corymbia calophylla* on flats and low rises in the humid zone.

Abba (Ad): Woodland of *Corymbia calophylla*, *Agonis flexuosa*, *Allocasaurina fraseriana* and *Nuytsia floribunda*.

Abba (AF): Woodland of *Corymbia calophylla-Agonis flexuosa* and tall shrubland of Myrtaceae-Proteaceae spp. on terraces and valley floors in the humid zone.

Abba (Aw): Tall shrubland of *Melalauca viminea* and woodland of *Eucalyptus rudis*, *Melaleuca rhaphiophylla* with occasional *Corymbia calophylla*.

A flora and vegetation survey was conducted over the application area by Astron Environmental Services during June, 2013. The following vegetation associations were recorded within the application area (Astron, 2013):

AB: Woodland dominated by marri (*Corymbia calophylla*) on flats and low Rises;

AF: Woodland dominated by marri (*C. calophylla*) and peppermint (*Agonis flexuosa*) on the terraces and valley floors of the low undulating Abba Plains;

AW: Dominated by tall shrubland of *Melaleuca viminea* and woodland of flooded gum and paperbark (*E. rudis*, *M. rhaphiophylla*) with the occasional marri (*C. calophylla*) located on the broad depressions of the Abba River;

LW: Dominated by an open woodland of Paperbark (*M. rhaphiophylla*) and sedgelands of Cyperaceae and Restionaceae species on broad depressions; and

Paddock Trees (est. 270 trees at 0.02 ha/tree).

A followup vegetation survey was undertaken by Onshore Environmental on January 2018 over the northern most remnant patch of native vegetation. The following addition vegetation associations were recorded (Onshore Environmental, 2018):

BAW: Low Closed Woodland of *Banksia attenuata* and *A. flexuosa* (*Eucalyptus marginata*, *C. calophylla*, *B. ilicifolia*, *Nuytsia floribunda*) over Scattered Tall Shrubs of *A. flexuosa* and *Xylomelum occidentale* over Low Open Shrubland of *A. flexuosa* and *X. occidentale* over Bunch Grassland of **Briza maxima* and **Ehrharta calycina* on grey sand on lower sandy slopes;

BAE: Low Closed Woodland of *B. attenuata* and *A. flexuosa* (*C. calophylla, B. ilicifolia*, *N. floribunda*, *Kunzea glabrescens*) over Closed Bunch Grassland of **Briza maxima* and **Ehrharta calycina* on grey sand on lower sandy slopes; and

Cc: Open Forest of *C. calophylla* (*Eucalyptus marginata*) over Scattered Tall Shrubs of *X. occidentale* over Low Open Shrubland of *Xanthorrhoea preissii*, *X. occidentale* and *Leucopogon propinquus* over Open Bunch Grassland of **Briza maxima* and **Ehrharta calycina* on orange sand on low sandy rises.

*denotes weed species.

Clearing Description

Wonnerup North Mineral Sands Project.
Tronox Mining Australia Limited proposes to clear up to 38.9 hectares of native vegetation within a boundary of approximately 360 hectares, for the purpose of mineral sands mining and associated activities. The project is located approximately 10 kilometres east of Busselton, within the City of Busselton.

Vegetation Condition

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

To:

Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment

The vegetation condition was derived from vegetation surveys conducted by Astron (2013) and Onshore Environmental (2018).

The proposed clearing is for stage 2 of Tronox Mining Australia Limited's Wonnerup North mineral sands project. Stage 2 of the project involves extending mineral sands mining north from the existing Wonnerup and Wonnerup North operations, relocating the Wonnerup concentrator, and construction of supporting infrastructure such as pipelines and access roads.

The clearing permit was applied for by Cristal Mining Australia Ltd. However, during the assessment the Cristal Mining Australia Ltd was acquired by Tronox Limited and the name of the company changed to Tronox Mining Australia Ltd.

3. Minimisation and mitigation measures

On 18 October 2018, the Department of Mines, Industry Regulation and Safety wrote to the applicant to advise that the assessment against the Principles had raised the following issues:

- The vegetation within the application area is considered a significant remnant of vegetation in an area that has been extensively cleared.
- The northern edge of vegetation within the application area currently acts as a buffer for the Ruabon Road-Tutunup Rail Reserve which is a significant regional linkage. The vegetation within the application area currently provides a buffer to edge effects and its removal may impact on the reserve.
- The northern part of the application area is within the mapped extent of the 'Banksia woodland of the Swan Coastal Plain' Threatened Ecological Community (TEC). A vegetation survey of this area concluded that the vegetation was in a 'degraded' to 'completely degraded' condition, thereby ruling out the vegetation as representative of a TEC.
- Cristal Mining Australia Ltd has a current Threatened Fauna Management Plan which details management actions for the Western Ringtail Possum. It was highlighted that it is no longer considered appropriate to encourage displaced animals towards trees that are to be retained, or attempt to capture animals and release them within undisturbed vegetation in the vicinity of the clearing, as very little native vegetation will be left following the proposed clearing. There is also no information to determine the capacity of surrounding native vegetation to support additional animals following relocation, or if alternative relocation sites have been identified.
- The Southern Brush-tailed Phascogale is known to occur within the application area and no information has been provided on how impacts to this species will be managed during clearing.

The applicant subsequently made the following amendments to the application to minimise the impacts to the environment:

- Reduced the clearing size from 41.5 hectares to 38.9 hectares.
- Amended the clearing permit boundary to exclude vegetation within 200 metres of the Ruabon Road-Tutunup Rail Reserve, additional paddock trees in proximity to the Abba River, additional areas of remnant vegetation to leave a linkage with roadside vegetation and additional areas of vegetation where Western Ringtail Possum and Southern Brush-tailed Phascogale have been recorded.
- Revegetate the Ruabon Road set back area and place under a conservation covenant.

- Provide financial and in-kind support to assist with the Ruabon-Tutunup Rail Reserve Operational Plan 2018-2023.
- Undertake management of several large mobs of kangaroos that are impacting on the native vegetation within the Ruabon Road-Tutunup Rail Reserve.
- Reduced clearing of the 'Banksia woodland of the Swan Coastal Plain' TEC by an additional 4 hectares and expanded the Banksia woodland offset area to 16 hectares.
- Undertaken further surveys for Western Ringtail Possums and assessment of suitable habitat for potential relocation.

4. 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

The application area occurs within the Perth subregion of the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion (GIS Database). This subregion is dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains and paperbark in swampy areas (CALM, 2002). The outwash plains, once dominated by *C. obesa*-marri woodlands and Melaleuca shrublands, are extensive only in the south (CALM, 2002).

Most of the remnant vegetation found within the application area is completely degraded, with the majority of areas parkland cleared or consisting of individual paddock trees (Astron, 2013). Some small areas of remnant vegetation that retain some understory are located along Ruabon Road, which forms the northern boundary of the application area (Astron, 2013).

Two vegetation and flora surveys have been undertaken over the application area, whereby seven vegetation types were identified (Astron, 2013; Onshore Environmental, 2018).

The northern most remnant patch of native vegetation contains vegetation mapped as Banksia woodland (Onshore Environmental, 2018). This vegetation is likely to represent the Priority 3 Ecological Community (PEC) community type 21b, which is described as 'Southern Banksia attenuata woodlands' (DBCA, 2019). DBCA (2018) advise that although the boundaries of this PEC have not been mapped, the community is likely to be quite restricted in extent due to high levels of land clearing in the community's range. As part of conserving this patch of vegetation, the applicant has reduced the clearing permit boundary to establish a 200 metre buffer adjacent to Ruabon Road (Cristal Mining Australia Ltd, 2019a). This will retain a large proportion of this vegetation. The remaining vegetation that will be cleared is in a degraded to completely degraded condition (Keighery, 1994). Therefore, the proposed clearing is not likely to significantly impact on this PEC.

The northern most patch of remnant native vegetation, adjacent to Ruabon Road, contains a Banksia community which is in the mapped extent of the 'Banksia Woodlands of the Swan Coastal Plain' which is listed as a Threatened Ecological Community (TEC) under the *Environment Protection and Biodiversity Conservation Act 1999* (GIS Database). This TEC is described as a community with a dominant tree layer of Banksia, with scattered eucalypts and other tree species, and an understory consisting of a rich mix of sclerophyllous shrubs, graminoids and forbs (Threatened Species Scientific Committee, 2016). The TEC occurs mostly on the Swan Coastal Plain, and extends across the entire bioregion, from north of Jurien to west of Busselton (Threatened Species Scientific Committee, 2016). The extent of this community in the Bunbury-Busselton region has experienced a relatively high rate of decline due to clearing (Threatened Species Scientific Committee, 2016).

A targeted survey of the Banksia remnant patch was undertaken by Onshore Environmental (2018) to determine if the vegetation was representative of the TEC. The survey found that the remnant patch comprises three vegetation types:

- Ba West – Low Closed Woodland of *Banksia attenuata* and *Agonis flexuosa* (*Eucalyptus marginata*, *Corymbia calophylla*, *Banksia ilicifolia*, *Nuytsia floribunda*) over Scattered Tall Shrubs of *Agonis flexuosa* and *Xylomelum occidentale* over Low Open Shrubland of *Agonis flexuosa* and *Xylomelum occidentale* over Bunch Grassland of **Briza maxima* and **Ehrharta calycina* on grey sand on lower sandy slopes (4.73 hectares in Degraded condition);

- Ba East - Low Closed Woodland of *Banksia attenuata* and *Agonis flexuosa* (*Corymbia calophylla*, *Banksia ilicifolia*, *Nuytsia floribunda*, *Kunzea glabrescens*) over Closed Bunch Grassland of **Briza maxima* and **Ehrharta calycina* on grey sand on lower sandy slopes (3.78 hectares in Completely Degraded condition); and

- Cc - Open Forest of *Corymbia calophylla* (*Eucalyptus marginata*) over Scattered Tall Shrubs of *Xylomelum occidentale* over Low Open Shrubland of *Xanthorrhoea preissii*, *Xylomelum occidentale* and *Leucopogon propinquus* over Open Bunch Grassland of **Briza maxima* and **Ehrharta calycina* on orange sand on low sandy rises (6.78 hectares in Good condition).
  *denotes weed species.

Ba West and Ba East were found to be the same vegetation unit, but differentiated by vegetation condition and degree of alternation of the understory strata (Onshore Environmental, 2018).

The two areas of *Banksia attenuata* woodlands are considered closely aligned to the 'Banksia Woodlands' TEC. To reduce potential impacts to Banksia woodlands, The applicant has removed the higher-value vegetation associated with the Ba West vegetation type out of the project area.

The Ba East vegetation type was considered to be in a Completely Degraded (Keighery, 1994) condition (Onshore Environmental, 2018). When compared with the key diagnostic criteria for the TEC, the vegetation is not considered representative of the TEC due to its vegetation condition rating (Onshore Environmental, 2018). DBCA (2018) found the assessment undertaken by Onshore reasonable.

A total of 201 flora species representing 49 plant families and 130 genera were recorded in the application area (Astron, 2013). There were no species of Threatened flora recorded in the application area (Astron, 2013). Four individuals of the Priority 4 flora species *Tripterococcus* sp. Brachylobus (A.S. George 14234) (formerly called *Tripterococcus paniculatus*) were recorded in the survey area. This species is found in a number of bioregions, including the Geraldton Sandplains, Jarrah Forest, Swan Coastal Plain and Warren (Western Australian Herbarium, 2019). There are only four existing records of this species occurring in the Busselton area; the nearest other record is in the Bunbury area approximately 50 kilometres north (GIS Database). The individuals recorded during the flora survey will not be directly impacted by the proposed clearing as they are located outside of the clearing permit boundary, in the buffer area adjacent to Ruabon Road.

A total of 38 weed species were recorded, four of which are listed as declared plants under the WA *Biosecurity and Agricultural Management Act* 2007 (Astron, 2013). Although the application area is highly degraded from historical agricultural activities, vehicle and soil movements associated with the proposed clearing may impact on areas of remnant vegetation that have been excluded from the application area through the potential spread of weeds, thereby reducing the biodiversity of the area. Potential impacts from weeds may be minimised by the implementation of a weed management condition.

A Level 2 vertebrate fauna survey was undertaken over the wider Wonnerup North project area, which includes the application area (Cristal Mining Australia Ltd, 2018b). Database searches and literature reviews indicate that 222 native fauna species have the potential to occur in the general area, comprising: 147 bird species, 42 reptile species, 22 mammal species and 11 amphibian species (Biologic, 2014). During the field component of the fauna investigation, 77 vertebrate fauna species were recorded, consisting of 50 bird species, 11 mammal species, 10 reptile species and 6 amphibian species (Biologic, 2014). The high number of bird species recorded in the area may be attributed to the close proximity of the Vasse-Wonnerup Wetland System, which is a RAMSAR listed wetland system known to support a large and diverse bird population (Department of Environment, 2011). The application area has been severely degraded by historical agricultural activities, and is not likely to contain a relatively high level of fauna diversity.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology

Astron (2013)
Biologic (2014)
CALM (2002)
Cristal Mining Australia Ltd (2018b)
Cristal Mining Australia Ltd (2019a)
DBCA (2018)
DBCA (2019)
Department of Environment (2011)
Keighery (1994)
Onshore Environmental (2018)
Threatened Species Scientific Committee (2016)
Western Australian Herbarium (2019)

GIS Database:
- IBRA Australia
- Pre-European Vegetation
- Threatened and Priority Flora
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers

(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 at variance to this Principle

The following six fauna habitats have been recorded within the application area (Biologic, 2014):

- Cleared pasture;

- Marri – Jarrah – Peppermint open forest;
- Flooded Gum – Melaleuca spp. – Marri open woodland;
- Melaleuca low open woodland;
- Marri – Jarrah – Banksia forest; and
- Non-native planted vegetation.

The habitats of the application area are predominantly mapped as cleared pasture with small or scattered remnants of "Marri – Jarrah – Peppermint open forest" and "Melaleuca low open woodland" (Cristal Mining Australia Ltd, 2018b). Vegetation across the application area is considered degraded or completely degraded (Keighery, 1994), however the forest and woodland habitats are considered to retain important habitat value to conservation significant fauna species.

A two phase fauna survey was undertaken over the Wonnerup North project area by Biologic in Autumn and Spring 2013 (Biologic, 2014). The following conservation significant fauna species were recorded in the project area:

- Southern Brush-tailed Phascogale (*Phascogale tapoatafa wambenger* – Conservation Dependent under the *Biodiversity Conservation Act 2016* (BC Act));
- Western Ring-tailed Possum (*Pseudocheirus occidentalis* - Critically Endangered under the BC Act, Vulnerable under the EPBC Act);
- Carnaby's Cockatoo (*Calyptorhynchus latirostris* - Endangered under the BC Act and EPBC Act);
- Baudin's Cockatoo (*Calyptorhynchus baudinii* - Endangered under the BC Act and EPBC Act).

The Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso* – Vulnerable under the EPBC Act and BC Act) is also considered likely to use vegetation within the application area for habitat (Biologic, 2014).

Southern Brush-tailed Phascogale was found in the Marri – Jarrah – Peppermint open forests towards the south-west of the application area, adjacent to Wonnerup South Road (Biologic, 2014). This species may also utilise the other vegetated areas in the application area, including Marri-Jarrah-Banksia forest (Biologic, 2014).

Western Ringtail Possum (WRP) was observed six times in the Autumn phase of the fauna survey, and a number of dreys were also identified (Biologic, 2014). Observations were in the Marri-Jarrah-Peppermint forest and Marri-Jarrah-Banksia forest, but possums may also utilise the Flooded Gum-Melaleuca-Marri woodland as well as other scattered trees (Biologic, 2014). An additional targeted survey for WRP was undertaken in March 2019. A total of 35 WRPs were located within the greater survey area, sixteen of which were within the application area (Harewood, 2019). A further five individuals were recorded within vegetation along the Abba River (Harewood, 2019).

Carnaby's Cockatoo and Baudin's Cockatoo were both observed foraging within the application area (Biologic, 2014). The two species, together with the Forest Red-tailed Black Cockatoo are likely to forage in all habitat types, including remnant paddock trees. Suitable breeding habitat also exists within the application area. A total of 470 mature trees were recorded in the application area which can be considered potential habitat trees (Biologic, 2014). Of these, 58 trees had a total of 107 hollows, which includes 27 trees containing hollows considered suitable for nesting (Biologic, 2014). No individuals were observed nesting at the time of the survey (Biologic, 2014).

The proponent has developed an offset package to address impacts to WRP and black cockatoo species, as required under conditions imposed under the EPBC Act approval for the project (EPBC No. 2014/7205). The offset will place two areas of comparable habitat into protection via a conservation covenant; Abba River offset area, which runs adjacent to the application area, and Gwindinup offset area, which is an area of native vegetation on the Whicher Scarp approximately 23 kilometres north-east of the application area (Cristal Mining Australia Ltd, 2018b). The proponent will also implement an Offset Management Plan, which will result in the enhancement and ongoing management of vegetation and habitat within the two offset areas. The permit boundary has also been amended to retain additional areas of habitat for WRP and includes establishing more linkages to existing areas of native vegetation. The Banksia Woodland offset area in the north of the site has also been expanded from approximately 5.8 hectares to 16 hectares (Cristal Mining Australia Ltd, 2019a).

To further minimise impacts to WRP and black cockatoo species, the proponent will also implement a Threatened Fauna Management Plan (TFMP) (Cristal Mining Australia Ltd, 2018b). The TFMP sets out clearing protocols for threatened fauna, including the relocation of individuals to nearby remnant vegetation, preservation of significant habitat and avoiding clearing activities during breeding times (Cristal Mining Australia Ltd, 2019b).

DBCA advised that it was no longer considered appropriate to encourage displaced WRP towards trees that are to be retained, or attempt to capture and relocate animals to undisturbed vegetation in the vicinity of the clearing, as detailed in the TFMP (DBCA, 2018). The proposed clearing will remove most of the vegetation in the immediate area (DBCA, 2018), and clearing approvals granted since the EPBC Act approval has further impacted on surrounding habitat. There is also a lack of information on the capacity of surrounding vegetation to accommodate translocated WRP (DBCA, 2018). As part of the targeted survey in 2019, an assessment was undertaken on the suitability for WRPs of the habitat within the application area and adjacent areas (Harewood, 2019). The assessment determined that the majority of the vegetation within the application area is of medium

suitability (supporting 2-5 WRP per hectare) for WRPs (Harewood, 2019). There are some small areas of vegetation within the application area with high suitability (supporting 5-10 WRP per hectare) adjacent to the Abba River and Wonnenup South Road (Harewood, 2019). There are significant areas of WRP habitat with high suitability adjacent to the application area within the Ruabon-Tutunup Rail Reserve, Tuart Forest National Park and Abba River (Harewood, 2019). It was concluded that the surrounding vegetation is unlikely to be at full capacity and provided WRPs are relocated individually or in small numbers, negative interaction issues would not be anticipated (Harewood, 2019).

The applicant has revised the TFMP to incorporate DBCA's advice and included recommended relocation sites based on the habitat suitability assessment. Potential impacts to Western Ringtail possum and black cockatoo species as a result of the proposed clearing may be minimised by the implementation of the existing offset required under the federal approval EPBC No. 2014/7205, and the implementation of a fauna management condition requiring implementation and adherence to the revised TFMP.

The proposed clearing has the potential to impact on habitat and individuals of Southern Brush-tailed Phascogale. The fauna survey (Biologic, 2014) made several observations of Southern Brush-tailed Phascogale in a remnant patch of native vegetation towards the south-west corner of the project area. A portion of this patch has been marked as a retention area under the EPBC Act approval and has therefore been excluded from the application area by Cristal Mining Australia Ltd (2018b). The original TFMP did not adequately address impacts to the Southern Brush-tailed Phascogale and has been revised to include additional management measures for this species (Cristal Mining Australia Ltd, 2019b). Potential impacts to Southern Brush-tailed Phascogale will be managed by the implementation of a fauna management condition requiring implementation and adherence to the revised TFMP.

Based on the above, the proposed clearing is at variance to this Principle.

Methodology
Biologic (2014)
Cristal Mining Australia Ltd (2018b)
Cristal Mining Australia Ltd (2019b)
DBCA (2018)
Harewood (2019)

(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

There are no known records of Threatened flora within the application area (GIS Database). Flora surveys of the application area did not record any species of Threatened flora (Astron, 2013).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology
Astron (2013)

GIS Database:
- Threatened and Priority Flora

(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 known Threatened Ecological Communities (TECs) within the application area (GIS Database). The nearest mapped TEC, 'Shrublands on dry clay flats', is located within one kilometre of the application area (GIS Database). The vegetation survey identified vegetation consistent with the 'Banksia Woodlands of the Swan Coastal Plain' which is listed as a Threatened Ecological Community (TEC) under the *Environment Protection and Biodiversity Conservation Act 1999* (Onshore Environmental, 2018). However, no TECs listed under the *Biodiversity Conservation Act 2016*, have been identified in the application area (Onshore Environmental, 2018).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology
DBCA (2018)
Onshore Environmental (2018)
Threatened Species Scientific Committee (2016)

GIS Database:
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers

(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 at variance to this Principle

The application area falls within the Swan Coastal Plain Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 38.62% of the pre-European vegetation still exists in the IBRA Swan Coastal Plain Bioregion (Government of Western Australia, 2019). This has a conservation status of 'Depleted' (Department of Natural Resources and Environment, 2002).

The application area has experienced extensive historical clearing for agricultural activities. The vegetation is restricted to five remnant patches, and isolated paddock trees (GIS Database). The application area has been broadly mapped as the following Beard vegetation associations:

949: Low woodland; banksia;

973: Low forest; paperbark (*Melaleuca rhaphiophylla*); and

1136: Medium woodland; marri with some jarrah, wandoo, river gum and casuarina (GIS Database).

The vegetation within the application area predominantly occurs within the mapped area of Beard vegetation complex 1136 (GIS Database). Beard vegetation association 949 only marginally intersects with the application area, the largest area being the northern most remnant patch. This area has been described by Onshore Environmental (2018) as 'Low Closed Woodland of *Banksia attenuata* and *Agonis flexuosa*', and is not considered representative of Beard vegetation association 949.

Beard vegetation 973 intersects with the eastern extent of the application area (GIS Database). This area has undergone significant clearing from agricultural activities and very little vegetation remains (Astron, 2013; GIS Database).

The application area is located within the following vegetation complexes, as mapped by Mattiske and Havel (1998), which provide a more detailed description of vegetation:

AB: Woodland and open forest of *Corymbia calophylla* on flats and low rises in the humid zone.

Ad: Woodland of *Corymbia calophylla*, *Agonis flexuosa*, *Allocasuarina fraseriana* and *Nuytsia floribunda.*

AF: Woodland of *Corymbia calophylla-Agonis flexuosa* and tall shrubland of Myrtaceae-Proteaceae spp. on terraces and valley floors in the humid zone.

Aw: Tall shrubland of *Melalauca viminea* and woodland of *Eucalyptus rudis*, *Melaleuca rhaphiophylla* with occasional *Corymbia calophylla*.

Approximately 30% of the Ad vegetation complex remains, however the remaining vegetation complexes range between 5.26% (Aw) to 11.29% (Ad) (see table below).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DBCA Managed Land (and post clearing %)
IBRA Bioregion - Swan Coastal Plain	1,501,222	587,997	~39	Depleted	18 (38)
IBRA Subregion - Perth	1,117,757	465,509	~42	Depleted	21 (39)
Local Government - Busselton	146,478	60,013	~41	Depleted	32 (67)
Beard vegetation associations - State					
949	218,194	123,104	~56	Least Concern	42 (56)
973	5,003	1,896	~38	Depleted	6 (13)
1136	48,125	3,346	~7	Endangered	1 (4)
Beard vegetation associations - Bioregion					
949	209,983	120,287	~57	Least Concern	43 (56

973	2,511	410	~16	Vulnerable	8 (42)
1136	48,118	3,341	~7	Endangered	1 (4)
Beard vegetation associations - subregion					
949	184,476	104,128	~56	Least Concern	46 (59)
973	2,511	410	~16	Vulnerable	7 (41)
1136	48,118	3,341	~7	Endangered	1 (4)
Mattiske and Havel vegetation complex					
AB	8,007	657	~8	Endangered	0
Ad	1,208	368	~30	Vulnerable	0
AF	1,905	215	~11	Vulnerable	0
Aw	9,094	478	~5	Endangered	0.25
Lw	186	6	~3	Endangered	0

* Government of Western Australia (2019)
** Department of Natural Resources and Environment (2002)

The condition of the vegetation has been identified as degraded to completely degraded, and not likely to be representative of the Beard or Mattiske and Havel (1998) vegetation associations (Astron, 2013). Despite the condition, it has been identified that the remnant patches of native vegetation contain habitat for fauna in a mostly cleared landscape, therefore still plays a significant role as a remnant of native vegetation.

In response, the applicant has amended the proposed clearing permit boundary to exclude more areas of native vegetation in the Ad, AF and AB vegetation associations, whilst also retaining additional linkages to surrounding native vegetation. The proposed clearing area has also been reduced from 41 hectares to 38.9 hectares.

Furthermore, the proponent is required to provide an environmental offset as part of their EPBC Act approval. A component of the offset plan is to revegetate approximately 55.92 hectares of land along or in the vicinity of the Abba River (Cristal Mining Australia Ltd, 2018a). The intent of the rehabilitation works is to establish fauna habitat, restore riparian values and ecological linkages.

The application area is adjacent to the Ruabon-Tutunup rail reserve, which has been identified as a significant regional ecological linkage (WALGA, 2009). The rail reserve is one of only two intact vegetated transects across the Swan Coastal Plain, and connects significant vegetation in the Wonnerup-Vasse RAMSAR area and tuart conservation areas in the west to the Ruabon Nature Reserve and Whicher Scarp to the east (Astron, 2013; DBCA, 2018; GIS Database). The rail reserve is known to contain habitat for conservation significant flora and fauna (DBCA, 2018).

The Ruabon-Tutunup rail reserve is separated from the application area by Ruabon Road, which itself contains a vegetated road reserve. A portion of the road reserve was surveyed and found to contain reasonable stands of native vegetation in 'excellent' condition (Astron, 2013). Vegetation within the road reserve is considered to be significant, as it contains Abba vegetation complexes which have critically low representation, and Priority flora species (Astron, 2013).

The proposed clearing will not directly impact on the Ruabon-Tutunup rail reserve. The permit area will retain a 200 metre vegetative buffer along Ruabon Road, which will be fenced to prevent grazing and encourage regrowth. Indirect impacts to the Ruabon road reserve may be minimised by the implementation of a weed management condition.

The application area intersects with the Abba River (GIS Database). Rivers in the Geographe Catchment have been heavily modified as a result of extensive clearing and grazing, however sections that retain riparian vegetation can provide some connectivity across the landscape (Hanran-Smith, 2002). The Abba River retains some native vegetation in the application area, mostly towards the western section (GIS Database). The applicant has excluded a 100 metre buffer around the Abba River, with the exception of some areas for vehicle crossings (Cristal Mining Australia Ltd, 2018b). As part of the EPBC Act approval, the applicant will be enhancing the Abba River by undertaking fencing, weed and erosion control, and planting native vegetation that will provide habitat for conservation significant fauna species (Cristal Mining Australia Ltd, 2018a). This work will complement the foreshore restoration work undertaken by Cristal at the Wonnerup mine site towards the west (Cristal Mining Australia Ltd, 2018b), thereby improving the function of the Abba river as an ecological linkage.

Based on the above, the proposed clearing is at variance to this Principle.

Methodology

Astron (2013)
Cristal Mining Australia Ltd (2018a)
Cristal Mining Australia Ltd (2018b)
DBCA (2018)
Department of Natural Resources and Environment (2002)
Government of Western Australia (2019)
Hanran-Smith (2002)
Mattiske and Havel (1998)
Onshore Environmental (2018)
WALGA (2009)

GIS Database:
- IBRA Australia
- Pre-European Vegetation
- Hydrology, linear

(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 at variance to this Principle

The Abba River runs through the centre and southern portion of the application area (GIS Database). The Abba River eventually discharges into the RAMSAR-listed Vasse-Wonnerup System, which is located approximately two kilometres north of the application area (GIS Database). The Vasse-Wonnerup System is a significant wetland that supports tens of thousands of resident and migrant waterbirds and has the largest regular colony of Black Swan in south-western Australia (Department of the Environment, 2011).

Vegetation along the Abba River has been heavily degraded from historical clearing and grazing (Hanran-Smith, 2002). This section of the Abba River retains some native vegetation, mostly towards the western section, but is in a 'degraded' condition (Astron, 2013).

The proponent has excluded an approximate 100 metre buffer around the Abba River from the application area, with the exception of three areas for access/haulage crossings (Cristal Mining Australia Ltd, 2018b). Clearing for these roads will likely be minimal given vegetation is sparse in those sections (Astron, 2013).

Based on the above, the proposed clearing is at variance to this principle. The EPBC Act approval for the project requires the applicant to develop and implement an offset management plan to revegetate the Abba River. As part of this Offset Management Plan, the applicant will be fencing the Abba River buffer area and undertaking weed and erosion control and planting native species that will restore riparian values and support fauna habitat (Cristal Mining Australia Ltd, 2018a). Potential impacts on riparian vegetation from the proposed clearing will be managed by conditions on the federal approval EPBC No. 2014/7205, and implementation of the existing offset management plan.

Methodology

Astron (2013)
Cristal Mining Australia Ltd (2018a)
Cristal Mining Australia Ltd (2018b)
Department of the Environment (2011)
Hanran-Smith (2002)

GIS Database:
- Hydrography, Lakes
- Hydrography, linear

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

Comments

Proposal may be at variance to this Principle

The area under application has been mapped as soil type Cb38 and MT7 (GIS Database), which Northcote et al. (1960-1968) describes as:

Cb38 - Sandy dunes with intervening sandy and clayey swamp flats: chief soils are leached sands, sometimes with a clay D horizon below 5 feet, on the dunes and sandy swamps. Associated are various soils in the clayey swamps: and

MT7 - Plain: chief soils are acid Fey earths often in fairly intimate association with leached sands that have a clay D horizon at depths of 3-8 feet.

Broad scale mapping undertaken by the Department of Primary Industry and Regional Development (DPIRD) describes the application area as Abba flats phase 213 AbAb1, Abba wet vales phase 213 AbABvw, Abba wet flats phase 213 AbABW and Bassendean gold course deep sandy rises phase 212 BsGCd2 (DPIRD, 2018). DPIRD (2018) has advised that the proposed clearing poses a moderate risk of causing appreciable land degradation.

Potential land degradation may be minimised by the implementation of a staged clearing condition.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology DPRID (2018)
Northcote et al. (1960 - 1968)

GIS Database:
- Soils, Statewide

(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 may be at variance to this Principle**

There are no conservation areas in the vicinity of the application area. The nearest DBCA managed land is the Ludlow State Forest and Tuart Forest National Park, both approximately 1 to 1.5 kilometres north-west from the application area (GIS Database). The proposed clearing is unlikely to impact on the environmental values of these conservation areas.

The application area is adjacent to the Ruabon-Tutunup Rail Reserve and approximately three kilometres from the Ruabon Townsite Nature Reserve (GIS Database). The Ruabon-Tutunup Rail Reserve forms a continuous vegetated corridor between the nature reserve and the application area (GIS Database). The Ruabon-Tutunup Rail Reserve and Ruabon Townsite Nature Reserve are considered regionally significant, as they contain habitat for conservation significant flora and fauna species, vegetation complexes that have critically low representation, and several Threatened Ecological Communities (Astron, 2013; Keighery et al., 1996).

The northern extent of the application area contains a remnant patch of native vegetation that currently enhances the rail reserve and provides a buffer from edge effects (DBCA, 2018). The applicant is proposing to retain a 200 metre buffer to protect the Ruabon-Tutunup Rail Reserve from indirect impacts from the proposed clearing (Cristal Mining Australia Ltd, 2019a).

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology Astron (2013)
Cristal Mining Australia Ltd (2019a)
Keighery et al. (1996)
DBCA (2018)

GIS Database:
- DPaW Tenure
- Imagery

(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**

There are no Public Drinking Water Source Areas within or in close proximity to the application area (GIS Database).

The application area intersects with the Abba River, which ultimately flows into the RAMSAR listed Vasse-Wonnerup wetland system (GIS Database). The applicant is proposing to clear some riparian vegetation to establish vehicle crossings, which may cause a temporary decline in water quality through increased soil erosion. However, as part of an offset management plan required under the federal approval for the project, the Abba River will be enhanced by fencing, weed and erosion control and revegetation (Cristal Mining Australia Ltd, 2018a). The required offset will likely result in an increase in water quality over the long term.

The groundwater salinity within the application area is approximately 500 – 1000 mg/l Total Dissolved Solids, which is considered brackish (GIS Database). The proposed clearing of 38.9 hectares of remnant patches of native vegetation and isolated paddock trees is not likely to significantly alter the quality of groundwater.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology Cristal Mining Australia Ltd (2018a)

GIS Database:
- Groundwater Salinity, Statewide
- Hydrography, Linear
- Public Drinking Water Source Areas

(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

The proposed clearing will remove isolated patches of remnant vegetation and paddock trees. The surrounding landscape has been extensively cleared for agricultural purposes (GIS Database). The removal of the remnant vegetation is not likely to cause or exacerbate the incidence or intensity of flooding.

The applicant is proposing to clear some riparian vegetation within the Abba River to establish vehicle crossings. However, as part of an offset management plan required under the federal approval for the project, the Abba River will be enhanced by fencing, weed and erosion control and revegetation (Cristal Mining Australia Ltd, 2018a). The required offset will likely result in a decreased risk of flooding over the long term.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology Cristal Mining Australia Ltd (2018a)

GIS Database:
- Imagery

Planning Instrument, Native Title, previous EPA decision or other matter.

Comments

The clearing permit application was advertised on 14 May 2018 by the Department of Mines, Industry Regulation and Safety (DMIRS), inviting submissions from the public. There was one response received in relation to Aboriginal Heritage sites. There is one registered Aboriginal Site of Significance within the application area (DPLH, 2019). 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.

The permit area is within the South West Native Title Settlement area (DPLH, 2019). This settlement resolves Native Title rights and interests over an area of approximately 200,000 square kilometres within the south west of Western Australia. The mining tenure has been granted in accordance with the future act regime of the Native Title Act 1993 and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

The Wonnerup North Mineral Sands project was referred to the Environmental Protection Authority (EPA) by Cristal Mining (14-780092). On 3 June 2014, the EPA set the level of assessment as 'Not Assessed – Public Advice Given'. The EPA advised that the proposal is situated on farmland and the majority of the remnant native vegetation on site is in a degraded parkland condition and/or fragmented and is likely to be of limited conservation or fauna habitat value in comparison to other nearby areas (in particular the Tuart National Park). On balance the EPA considered that the potential impacts were not so significant as to require assessment by the EPA and could be regulated and mitigated effectively through other statutory processes (EPA, 2014).

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity, Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

It is noted that the proposed clearing may impact on protected matters under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) namely the Western Ring-tailed Possum, Carnaby's Cockatoo, Baudin's Cockatoo and Forest Red-tailed Cockatoo. The Wonnerup North Mineral Sands project was referred to the federal Department of the Environment and Energy (DoEE) for environmental impact assessment under the EPBC Act. DoEE imposed a number of conditions upon approval of the project (EPBC No. 2014/7205), including conditions to mitigate impacts to local fauna species of conservation significance, river systems and areas of remnant native vegetation. The EPBC Act approval also requires Cristal Mining Australia Ltd to develop and implement an Offset Management Plan. The proponent is advised to contact the Department of the Environment for further information regarding responsibilities under the EPBC Act that may arise from any clearing permit approvals.

Methodology DPLH (2019)
EPA (2014)

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6. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DBCA	Department of Biodiversity, Conservation and Attractions, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DBCA and DWER)
DEE	Department of the Environment and Energy, Australian Government
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia

DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora
DoE	Department of the Environment, Australian Government (now DEE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DEE)
DWER	Department of Water and Environmental Regulation, Western Australia
EPA	Environmental Protection Authority, Western Australia
EP Act	*Environmental Protection Act 1986*, Western Australia
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	*Rights in Water and Irrigation Act 1914*, Western Australia
TEC	Threatened Ecological Community

Definitions:

{DBCA (2019) Conservation Codes for Western Australian Flora and Fauna. Department of Biodiversity, Conservation and Attractions, Western Australia}:-

T **Threatened species:**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**
Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**
Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**
Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct Species:

EX **Extinct species**

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW **Extinct in the wild species**

Species that *"is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species:

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI **Migratory species**

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD **Species of special conservation interest (conservation dependent fauna)**

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS **Other specially protected species**

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P **Priority species:**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

P1 **Priority One - Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

P2 **Priority Two - Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

P3 **Priority Three - Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

P4 **Priority Four - Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.