GOVERNMENT OF WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 818/15
Permit Holder:	Commissioner of Main Roads Western Australia
Purpose of clearing:	Clearing for *project activities*
Duration of Permit:	12 December 2005 – 30 June 2023

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The Permit Holder is authorised to clear native vegetation for the above stated purpose, subject to the conditions of this Permit, including as amended or renewed.

PART I - TYPE OF CLEARING AUTHORISED

1. Type of clearing authorised

(a) In accordance with this Permit, the Permit Holder may clear native vegetation for *project activities*, which means any one or more of the following:
- (i) to construct new *roads*;
- (ii) to construct *road* transport corridor infrastructure, including all buildings, depot sites, fences, gates, posts, boards, overpasses, underpasses, erections and structures placed upon any *road* that are associated with the use of the road;
- (iii) to install new road signs, as defined in regulation 3 of the *Road Traffic Code 2000*;
- (iv) to install new traffic-control signals, as defined in regulation 3 of the *Road Traffic Code 2000*;
- (v) to establish new *sightline areas* and *crossover area*;
- (vi) to re-establish *sightline areas* and *crossover area*;
- (vii) to establish new *lateral clearance areas*;
- (viii) to re-establish or expand *lateral clearance areas*;
- (ix) to establish new *temporary works*;
- (x) to construct and maintain new public roadside facilities, including principal shared paths and cycle paths;
- (xi) to establish new *rest areas* and *camps*;
- (xii) to re-establish *rest areas* and *camps*;
- (xiii) to establish and maintain new *firebreaks*;
- (xiv) to maintain the efficacy of new and existing *road* transport corridor infrastructure, to the following extents:
  - (A) for a building or structure – 20m from the building or structure;
  - (B) for a *drain* or fence line – 5m from the *drain* or fence line;
  - (C) for a vehicle track – 5m track width;
- (xv) clearing for *revegetation*;
- (xvi) extracting *road building materials*;
- (xvii) *road realignment*;
- (xviii) *road widening.*
- (xix) *project surveys*; and
- (xx) *pre-construction activities*.

(b) This Permit authorises the Permit Holder to clear native vegetation for the *project activities* described in condition 1(a) of this Permit to the extent that the Permit Holder has the power to carry out works involving clearing for those *project activities* under the *Main Roads Act 1930* or any other *written law*.

2. Clearing not authorised

(a) This Permit does not authorise the Permit Holder to clear native vegetation where:
- (i) the clearing is likely to be seriously at variance with one or more of the clearing principles;
- (ii) the clearing and the associated effect on the environment would be inconsistent with any approved policy (as defined in section 3 of the *EP Act*);

(iii) a *proposal* incorporating a *project activity* described in condition 1(a) of this Permit has been *referred* to and assessed under Part IV of the *EP Act* by the *EPA*; or
(iv) the clearing is determined to be a *Controlled Action* under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) as it may have a significant impact on a *matter of national environmental significance*.

(b) If a *proposal* incorporating a *project activity* described in condition 1(a) of this Permit has been *referred* to the *EPA*, this Permit does not authorise any clearing for that *project activity* unless:
(i) the *EPA* has given notice under section 39A(3) of the *EP Act* that it has decided not to assess the *proposal*; and
(ii) either:
(A) the period within which an appeal against the *EPA's* decision may be lodged has expired without an appeal being lodged; or
(B) an appeal has been lodged against the *EPA's* decision not to assess the proposal and the appeal was dismissed.

(c) If the Permit Holder intends to clear native vegetation under this Permit for a *project activity* that forms part of, or is related to a *proposal* referred to in condition 2(b) of this Permit, then the Permit Holder must have regard to any advice or recommendations made by the *EPA* under section 39A(7) of the *EP Act*.

3. Application

This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit. The Permit Holder remains responsible for ensuring compliance with the conditions of this Permit.

4. Limits on authorised clearing

The total amount of native vegetation cleared pursuant to this Permit and the current version of Clearing Permit CPS 817 together, per *region*, must not exceed the *regional clearing* limits unless authorised in writing by the *CEO*.

PART II - ASSESSMENT PROCEDURE

5. Avoid, minimise and reduce impacts of clearing

(a) The Permit Holder must demonstrate that it has considered alternatives to clearing.

(b) In determining the amount of native vegetation to be cleared, the Permit Holder shall have regard to the following principles, set out in order of preference:
(i) avoid the clearing of native vegetation;
(ii) minimise the amount of native vegetation to be cleared; and
(iii) reduce the *impact* of clearing on any environmental value.

6. Assessment of clearing impacts – desktop study

(a) Once the Permit Holder has complied with condition 5 of this Permit, a *desktop study* shall be conducted for the native vegetation to be cleared against each of the clearing principles in accordance with the Department's "*A guide to the assessment of applications to clear native vegetation under Part V Division 2 of the Environmental Protection Act 1986*" provided in Annexure 1.

(b) The *desktop study* must be conducted having regard to:
(i) any approved policy (as defined in section 3 of the *EP Act*); and
(ii) any planning instrument (as defined in section 51O of the *EP Act*), that applies to the area of native vegetation to be cleared.

(c) The *desktop study,* must include production of a *Desktop Report*, unless advised in writing by the *CEO* that a *Desktop Report* is not required or an *Assessment Report* that has been prepared in accordance with condition 7(i).

(d) The *Desktop Report* must set out:
  (i) The Permit Holder's consideration of alternatives to clearing, and management measures and actions implemented to avoid and minimise the *impacts* of the clearing in accordance with the condition 5 of this Permit;
  (ii) the manner in which the Permit Holder has had regard to any approved policy and planning instrument in accordance with condition 6(b) of this permit;
  (iii) the area (in hectares) of clearing required for the *project activity*;
  (iv) for an area greater than 0.5 hectares, the boundaries of clearing required for the *project activities* recorded as a *shapefile*;
  (v) for an area of 0.5 hectares or less, a co-ordinate of the location of clearing required for the *project activities*;
  (vi) how the Permit Holder has had regard to the clearing principles through the *desktop study*;
  (vii) whether the outcome of the *desktop study* indicates that the clearing is at variance, may be at variance, not likely to be at variance or not at variance with each of the clearing principles;
  (viii) any *impacts* likely to occur as a result of the clearing, including a description of those *impacts* that are at variance or may be at variance with one or more of the clearing principles; and
  (ix) whether:
    (A) *rehabilitation* and *revegetation* is likely to be required under condition 9 of this Permit; and
    (B) the management of *dieback* is likely to be required under condition 10 of this Permit.

(e) An *Assessment Report*, must be prepared in accordance with condition 7 where:
  (i) the outcome of the *desktop study* indicates that the clearing is likely to be at variance or may be at variance with one or more of the clearing principles, except where the variance relates to condition 6(f); or
  (ii) the available information is insufficient to allow the Permit Holder to assess the proposed clearing against one or more of the clearing principles,

(f) Where the clearing is at variance or may be at variance to clearing principle (f) and no other clearing principle, and the area of the proposed clearing is less than 0.5 hectares in size and the clearing principle (f) *impacts* only relate to:
  (i) a minor non-perennial watercourse(s);
  (ii) a wetland(s) classed as a *multiple use management category wetland(s)*; and/or
  (iii) a wetland that is not a *defined wetland*;

  the preparation of an *Assessment Report*, as required by condition 6(e), is not required.

(g) An *Assessment Report* shall be prepared as required by condition 6(e), unless advised in writing by the *CEO* that an *Assessment Report* is not required, or where the clearing meets the criteria described in condition 6(f).

7. Assessment of clearing impacts- environmental assessment

(a) Where:
  (i) the outcome of the *desktop study* indicates that the clearing is likely to be at variance or may be at variance with one or more of the clearing principles, except where the variance relates to condition 6(f); or
  (ii) the available information is insufficient to allow the Permit Holder to assess the proposed clearing against one or more of the clearing principles,

  the Permit Holder must conduct an *environmental assessment*, unless advised in writing by the *CEO* that an *environmental assessment* is not required.

(b) The *environmental assessment* must be conducted in accordance with the *Department*'s "*A Guide to the assessment of applications to clear native vegetation under the Environmental Protection Act 1986*" provided in Annexure 1.

(c) An *environmental assessment* must include:
  (i) a *biological survey* if the *desktop study* identified that the clearing is at variance or may be at variance with clearing principles (a), (b), (c), (d) or (f);
  (ii) *vegetation condition mapping* and vegetation mapping by delineating on a map the *ecological communities* formed within a given area, and the nature and extent of each combination, within the area to be cleared at the scale of the best available mapping information, if the clearing is likely to be at variance or may be at variance with clearing principle (e);
  (iii) a *dieback survey* if the area proposed to be cleared may introduce or spread *dieback* into *dieback* free areas;
  (iv) a *wetland field assessment* if the clearing may have a detrimental *impact* on the environmental values of a *defined wetland*; and
  (v) any additional surveys and field assessments that are required to determine the *impacts* of the clearing on any environmental value protected by the clearing principles.

(d) a *biological survey* is not required if the clearing is at variance or may be at variance to only clearing principle (f) and no other clearing principles, that the area of the proposed clearing at variance is less than 0.5 hectares and the clearing principle (f) *impacts* only relate to:
  (i) a minor non-perennial watercourse(s);
  (ii) a wetland(s) classed as a *multiple use management category wetland*(s); and/or
  (iii) a wetland that is not a *defined wetland*.

(e) A survey or field assessment carried out pursuant to condition 7(c) of this Permit must be conducted by an *environmental specialist.*

(f) Any *biological survey* carried out pursuant to condition 7(c) of this Permit that relates to flora must be conducted having regard to *EPA's Technical Guidance – Flora EIA.*
  (i) where a *biological survey* is required to be submitted in support of an *Assessment Report* in accordance with condition 7(i), the *biological survey* is to be prepared in a data package which meets the requirements of the *Index of Biodiversity Surveys for Assessments.*

(g) Any *biological survey* carried out pursuant to condition 7(c) of this Permit that relates to fauna must be conducted having regard to *EPA's Technical Guidance – Terrestrial Fauna EIA.*
  (i) where a *biological survey* is required to be submitted in support of an *Assessment Report* in accordance with condition 7(i), the *biological survey* is to be prepared in a data package which meets the requirements of the *Index of Biodiversity Surveys for Assessments.*

(h) The *environmental assessment* must include production of an *Assessment Report.*

(i) The *Assessment Report* must set out:
  (i) all of the information required to be provided in a *Desktop Report* in accordance with condition 6(d) of this Permit;
  (ii) a summary of results of all surveys and field assessments carried out pursuant to condition 7(c) of this Permit;
  (iii) whether the outcome of the *environmental assessment* indicates that the clearing is at variance, may be at variance, not likely to be at variance or not at variance with each of the clearing principles;
  (iv) a *Vegetation Management Plan* (VMP), subject to condition 7(j), for the clearing, designed by an *environmental specialist*; and
  (v) any *offset proposal* developed pursuant to condition 11 of this Permit.

(j) Where the outcome of the *Assessment Report* indicates that the clearing is likely to be at variance or may be at variance with one or more of the clearing principles, except where the variance relates to condition 6(f), the *Assessment Report* must include a VMP.

(k) Where a VMP is required by condition 7(j), a VMP must include the following:
   (i) The scope of the *project activities* and of the VMP;
   (ii) management actions to be taken by the Permit Holder to avoid, mitigate or manage the *impacts* of the clearing;
   (iii) allocation of responsibilities for implementation of the management actions to avoid, mitigate or manage the *impacts* of the clearing;
   (iv) timeframes for completion of each management action;
   (v) a monitoring and maintenance program for assessing the implementation of management actions;
   (vi) actions to be taken in the event of non-compliance with management actions; and
   (vii) details of revegetation to be undertaken, where required under condition 9 of this Permit.

(l) VMP management actions to be taken by the Permit Holder pursuant to condition 8(b)(i)(ii) to avoid, mitigate or manage land degradation, water quality deterioration, or flooding must be developed in consultation with the Commissioner of Soil and Land Conservation in the Department of Primary Industries and Regional Development.

(m) Where the outcome of the *Assessment Report* indicates that the clearing is likely to be at variance or may be at variance with one or more of the clearing principles, except where the variance relates to condition 6(f), no clearing must be undertaken in relation to *project activities* unless an *Assessment Report* relating to those *project activities* has been approved by the *CEO*.

(n) Where the outcome of the *Assessment Report* indicates that the clearing is likely to be at variance or may be at variance with one or more of the clearing principles, except where the variance relates to condition 6(f), submissions shall be sought in accordance with condition 8, unless advised in writing by the *CEO* that seeking submissions is not required.

8. Submissions – interested parties

(a) Where required pursuant to condition 7(n) of this Permit, the Permit Holder must:
   (i) publish on its website a notification regarding the *project activities* and inviting submission from the public with respect to the proposed clearing; and
   (ii) invite submissions from the following parties about those *impacts* of the proposed clearing that are likely to be at variance or may be at variance with one or more of the clearing principles:
      A. the local government responsible for the area that is to be cleared;
      B. the owner (as defined in section 51A of the *EP Act*), or occupier (as defined in section 3 of the *EP Act*), of any land on which the clearing is proposed to be done;
      C. any environment or community groups that the Permit Holder considers may have an interest in the clearing that is proposed to be done; and
      D. any other party that the Permit Holder considers may have an interest in the clearing that is proposed to be done.

(b) Where required pursuant to condition 7(n) of this Permit, in addition to the requirements of condition 8(a) of this Permit, the Permit Holder must invite submissions:
   (i) from the Office of the Commissioner of Soil and Land Conservation in the Department of Primary Industries and Regional Development about those *impacts* of the proposed clearing that are at variance or may be at variance with clearing principles (g), (i) or (j);
   (ii) the *Department's* Drainage and Waterways Branch about those *impacts* of the proposed clearing that are likely to be at variance or may be at variance with clearing principles (f), (i) and (j).

(c) Submissions under conditions 8(a) and 8(b) are not required to be sought if the clearing is at variance or may be at variance to only clearing principle (f) and no other clearing principles, that the area of the proposed clearing at variance is less than 0.5 hectares and the clearing principle (f) impacts only relate to:
   (iv) a minor non-perennial watercourse(s);
   (v) a wetland(s) classed as a *multiple use management category wetland*(s); and/or

(vi) a wetland that is not a *defined wetland*.

(d) The Permit Holder is not required to publish submissions if the *CEO* advises so in writing.

(e) The Permit Holder must provide the following information to the parties from whom it invites submissions under conditions 8(a) and 8(b) of this Permit:
   (i) a copy of the *Assessment Report* required by condition 7(h) of this Permit;
   (ii) management actions to be taken by the Permit Holder to avoid, mitigate or manage the *impacts* of the clearing;
   (iii) an outline of any *rehabilitation, revegetation,* or *offset proposal* proposed to be implemented in relation to the clearing;
   (iv) a summary of the results of any surveys and field assessments carried out pursuant to condition 7(c) of this Permit; and
   (v) instructions for making a submission on the proposed clearing.

(f) The information required by condition 8(e) must also be included on the Permit Holder's website.

(g) The Permit Holder must allow a period of at least 21 days for submissions to be made.

(h) The Permit Holder must publish on its website a summary of all submissions received pursuant to condition 8(a) and 8(b) of this Permit and a statement addressing each of those submissions.

(i) The Permit Holder is not required to comply with conditions 8(a)(i), 8(f) and 8(h) of this Permit for the clearing of *project activities* undertaken or authorised under this Permit prior to 31 December 2020.

PART III – MANAGEMENT

9. Revegetation and Rehabilitation

(a) The Permit Holder must *revegetate* and *rehabilitate* areas cleared for *temporary works* as soon as possible, but no later than 24 months after the area is no longer required for the purpose for which it was cleared.

(b) The Permit Holder is not required to *revegetate* and *rehabilitate* an area specified in condition 9(a) of this Permit if the Permit Holder intends to use that cleared area for another *project activity* within 24 months of that area no longer being required for the purpose for which it was originally cleared under this Permit.

(c) The Permit Holder must *revegetate* and *rehabilitate* areas cleared for temporary works specified in condition 9(a) by:
   (i) retaining the vegetative material and topsoil removed by clearing authorized under this Permit;
   (ii) re-shaping the surface of the land so that it is consistent with the surrounding five metres of uncleared land;
   (iii) ripping the ground on the contour to remove soil compaction;
   (iv) laying the vegetative material and topsoil retained under condition 9(c)(i) on the cleared area(s);
   (v) establishing quadrat monitoring sites within the *revegetated* and *rehabilitated* area in accordance with the methodology described in the *Department's* '*A Guide to Preparing Revegetation Plans for Clearing Permits*' provided in Annexure 2;
   (vi) implementing hygiene protocols by cleaning earth-moving machinery of soil and vegetation prior to entering and leaving the *revegetated* and *rehabilitated* area;
   (vii) undertake annual weed control activities; and
   (viii) achieving the below *completion criteria* within ten years within the *revegetated* and *rehabilitated* areas;

Criterion	Aspect	Scale	Completion criteria	Monitoring frequency
1	Per cent weed cover	Average of quadrat data	Per cent of weed cover to be no greater than that observed within the *biological survey* of the proposed clearing area/adjacent areas.	After year 1, 2, 3 and 5
2	Declared *weeds*	Site traverse	Absence of declared *weeds*.	After year 1, 2, 3 and 5
3	Native species cover	Average of quadrat data	The native species cover equal to at least 60% of that observed within the *biological survey* of the proposed clearing area/adjacent areas by year 10.	After year 1, 2, 3 and 5
4	Vegetation Condition	Site traverse	For sites were the *biological survey* observed *Good or better condition* vegetation, the condition of the vegetation to be in *Good condition.*	After year 1, 2, 3 and 5
5	*Native Species Richness* (Diversity)	Average of quadrat data	The *native species richness* of the vegetation to equal at least 60%, to a maximum of 20 species, than that observed within the *biological survey* of the proposed clearing area/adjacent areas.	After year 1, 2, 3 and 5
6	*Vegetation Structure*	Site traverse	The final *vegetation structure* of the vegetation is trending towards that observed within the *biological survey* of the proposed clearing area/adjacent areas.	After year 1, 2, 3 and 5

(d) Permit Holder must undertake *remedial actions* for areas *revegetated* and *rehabilitated* where monitoring, after year five, indicates that *revegetation* is unlikely to meet the *completion criteria*, outlined in condition 9(c), including;
   (i) *revegetate* the area by deliberately *planting* native vegetation and/or *direct seeding* native vegetation at an *optimal time* that will result in the minimum target in 9(c) and ensuring that only *local provenance* species are used;;
   (ii) undertake further weed control activities; and
   (iii) monitoring of the *revegetated* and *rehabilitated* site, by an *environmental specialist,* is to be undertaken after year 1, 2, 3 and 5 of remedial actions to ascertain if *completion criteria* outlined in 9(c) are met.

(e) If condition 9(d)(iii) monitoring identifies that *completion criteria* has not been met, the Permit Holder must undertake *remedial actions* described in condition 9(d).

(f) The Permit Holder is not required to *revegetate* and *rehabilitate* areas cleared for temporary works if the CEO advises so in writing.

(g) The Permit Holder may seek approval from the *CEO* of alternative *completion criteria* as outlined in condition 9(c) of this Permit.

(h) The Permit Holder is not required to comply with condition 9(c)(v)-(ix) and 9(d) if the area to be *revegetated* and *rehabilitated* is:
   (i) 0.5 hectares or less; and
   (ii) is either not or not likely to be at variance with all of the clearing principles.

10. Dieback, other pathogen and weed control

(a) When undertaking any clearing, *revegetation* and *rehabilitation*, or other activity pursuant to this Permit in any part of a *region* that has an average annual rainfall of greater than 400 millimetres and is south of the 26th parallel of latitude, the Permit Holder must take the following steps to minimise the risk of introduction and spread of *dieback*:
   (i) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
   (ii) ensure that no known *dieback*-affected soil, *mulch, fill* or other material are brought into an area that is not affected by *dieback*; and
   (iii) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

(b) If movement of soil is necessary in conditions other than *dry conditions* and the clearing will *impact* land managed by Department of Biodiversity, Conservation and Attractions (DBCA), the Permit Holder must, prior to clearing, implement a *dieback* management plan endorsed by DBCA for minimising the spread of *dieback.*

(c) If movement of soil is necessary in conditions other than *dry conditions* and the clearing will *impact* land other than DBCA managed land, if the area proposed to be cleared may introduce or spread *dieback* into *uninfested* areas, in addition to the requirements of condition 10(a), the Permit Holder must minimise the risk of the introduction and spread of *dieback* by:
   (i) mapping dieback areas, including *infested*, *uninfested* and *uninterpretable*, within the area to be cleared, prior to clearing;
   (ii) ensuring that no clearing occurs in *infested* areas during *rain events* where there is a risk of transporting material into *uninfested* areas;
   (iii) demarcating all *dieback* areas, including *infected*, *uninterpretable* and *uninfested*, with flagging tape and appropriate signage prior to clearing;
   (iv) establishing clean on entry points to ensure machines and other vehicles are clean of soil and vegetation prior to entering *dieback uninfested* and *uninterpretable* areas;
   (v) establishing clean on exist points to ensure machines and other vehicles are clean of soil and vegetation prior to existing *dieback infested* and *uninterpretable* areas;
   (vi) ensuring that drainage is directed away from *uninfested* areas; and
   (vii) monitoring the implementation of dieback management actions through daily visual inspections and keeping an inspection log.

(d) Where the Permit Holder is notified by the *Department* or in a written report provided to the Permit Holder, from an *environmental specialist*, that the area to be cleared may be susceptible to a pathogen other than *dieback*, the Permit Holder must:
   (i) obtain the advice of an *environmental specialist;*
   (ii) take appropriate steps in accordance with that advice to minimise the risk of the introduction and spread of that pathogen.

(e) When undertaking any clearing, *revegetation* and *rehabilitation*, or other activity pursuant to this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds*:
   (i) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
   (ii) ensure that no known *weed*-affected soil, *mulch*, *fill* or other material is brought into the area to be cleared; and
   (iii) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

(f) At least once in each 12 month period for five years from the commencement of clearing for a *project activity* under condition 1(a), the Permit Holder must remove or kill any *weeds* growing within areas cleared under this Permit, where those *weeds* are likely, on the advice of an *environmental specialist*, to spread to and result in environmental harm to adjacent areas of native vegetation that are in *good or better condition*.

PART IV – OFFSETS

11. Determination of offsets

(a) If part or all of the clearing associated with a project activity is at variance with any one of the clearing principles (a), (b), (c), (d), (e), (f) or (h), the Permit Holder must prepare an *offset proposal*, designed by an *environmental specialist*, unless advised in writing by the *CEO* that an offset proposal is not required.

(b) In preparing an *offset proposal*, the Permit Holder must ensure consistency with the principles in the WA Environmental Offsets Policy (September 2011) and have regard to the WA Environmental Offsets Guidelines (August 2014).

(c) An offset proposal is not required if the clearing is at variance to only clearing principle (f) and no other clearing principles, that the area of the proposed clearing at variance is less than 0.5 hectares and the clearing principle (f) impacts only relate to:
   (i) a minor non-perennial watercourse(s);
   (ii) a wetland(s) classed as a *multiple use management category wetland*(s); and/or
   (iii) a wetland that is not a *defined wetland*.

(d) If it is necessary to modify the *offset proposal* approved by the *CEO*, then the Permit Holder must provide that modified *offset proposal* to the *CEO* for the *CEO's* approval and prior to implementing the modified *offset.*

(e) The Permit Holder must implement the latest version of the *offset proposal* approved by the *CEO*.

PART V – MONITORING, REPORTING & AUDITING

12. Monitoring

(a) The Permit Holder must monitor:
   (i) areas *revegetated* and *rehabilitated* under this Permit to determine compliance with the relevant *Revegetation Plan* and the conditions of this Permit; and
   (ii) areas that are the subject of an *offset* implemented under this Permit to determine compliance with the relevant approved *offset* and the conditions of this Permit.

13. Records of assessment and clearing

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

(a) In relation to the clearing of native vegetation pursuant to condition 1(a) of this Permit:
   (i) description and justification of the actions and management measures taken to avoid, minimise and reduce the impacts and extent of clearing pursuant with condition 5 of this Permit;
   (ii) a copy of any *Desktop Report* and *Assessment Report* produced pursuant with condition 6 and 7 of this Permit;
   (iii) the dates and list of interested parties where submissions were requested in accordance within condition 8(a) and 8(b);
   (iv) the location where the clearing occurred;
   (v) the size of the area to be cleared (in hectares) for the *project activities*;
   (vi) for a cleared area greater than 0.5 hectares, the boundaries of the area of clearing required for project activities recorded as a shapefile;
   (vii) for a cleared area of 0.5 hectares or less, a co-ordinate of the location where the clearing occurred;
   (viii) the total amount of clearing done (in hectares) in each *region* between 1 January and 31 December of the preceding year; and
   (ix) the dates on which the clearing was done.

(b) In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 9 of this Permit:
   (i) the location of any area *revegetated* and *rehabilitated*

(ii) the boundaries of the area of revegetation required for *project activities* recorded as a *shapefile;*
(iii) a description of the *revegetation* and *rehabilitation* activities undertaken;
(iv) the size of the area *revegetated* and *rehabilitated* (in hectares); and
(v) results of the monitoring report against the *completion criteria* in accordance with condition 9(c); and
(vi) *remedial actions* undertaken in accordance with condition 9(d).

(c) In relation to the control of *weeds*, *dieback* and other pathogens pursuant to condition 10 of this Permit:
(i) a copy of any *dieback* management plan prepared in accordance with condition 10(b) of this Permit;
(ii) a map of the *dieback* management areas and associated clean on entry and exist points in accordance with condition 10(c);
(iii) description of the *dieback* management actions undertaken in accordance with condition 10(c);
(iv) for any pathogen other than *dieback*, the appropriate steps taken in accordance with condition 10(d) of this Permit; and
(v) for any *weed*, the appropriate steps taken in accordance with conditions 10(e) and 10(f) of this Permit.

(d) In relation to each *offset* implemented pursuant to Part IV of this Permit:
(i) a copy of each *offset proposal* approved by the *CEO* in accordance with condition 11 of this Permit;
(ii) the location of any *offset* implemented;
(iii) the boundaries of the area of *offset* required for *project activities* recorded as a *shapefile;*
(iv) a description of each *offset* implemented; and
(v) the size of the area of each *offset* (in hectares).

14. Reporting

(a) The Permit Holder must provide to the *CEO*, on or before 30 June of each year, a written report of activities done by the Permit Holder under this Permit between 1 January and 31 December of the preceding year.
(i) The Permit Holder must publish this report on its website.

(b) The report must set out the records required to be maintained pursuant to condition 14 of this Permit.

(c) The Permit Holder must publish on its website the total amount of clearing done (in hectares) in each *region* between 1 January and 31 December of the preceding year in accordance with this Permit.

(d) For a 12 month period after clearing is completed, the Permit Holder must publish on its website a clearing summary report detailing:
(i) a copy of the *Desktop Report* required by condition 6(c) or when prepared, an *Assessment Report* required by condition 7(h) of this Permit;
(ii) a summary of submissions received for each *project activity* required by condition 8(h)*;*
(iii) the location where the clearing occurred;
(iv) the size of the area to be cleared (in hectares) for the *project activities*; and
(v) the dates on which the clearing was done.

(e) The Permit Holder is not required to comply with conditions 14(a)(i), 14(c) and 14(d) of this Permit for the clearing of *project activities* undertaken or authorised under this Permit prior to 31 December 2020.

15. Internal auditing

(a) The Permit Holder must engage an *internal auditor* to conduct *internal environmental audits* for areas specified in condition 15(c) of this Permit to determine the Permit Holder's compliance with the conditions of this Permit, with particular emphasis on:
  (i) the location and extent of native vegetation cleared;
  (ii) the implementation status of any *offsets* imposed;
  (iii) the effectiveness of any VMP implemented; and
  (iv) the implementation status of any *revegetation* or *rehabilitation* undertaken.

(b) The Permit Holder must conduct *internal environmental audits* annually for the *term* of this Permit.

(c) The areas to be audited under condition 15(a) must be selected by the auditor using a structured and documented risk-based selection framework, and must, where clearing occurs within a region, include at least one cleared area in each *region* in which clearing has been done under this Permit within the previous 12 months.

(d) The Permit Holder must implement *corrective action* required to address any non-compliance with conditions of this Permit identified from the *internal environmental audits.*

(e) The Permit Holder must provide written reports of the *internal environmental audits* conducted pursuant to this condition 15 of this Permit to the CEO on or before 30 December of each year for the *term* of this Permit. The reports must include details of *corrective action* taken by the Permit Holder to address any non-compliance with conditions of this Permit.

16. External auditing

(a) The Permit Holder must engage an external accredited *lead environmental auditor* to undertake environmental audits of the Permit Holder's compliance with the conditions of this Permit for each of the *regions* in which clearing is done under this Permit.

(b) The *external environmental audits* must be done on or before 30 November of every second year for the *term* of this Permit and/or as otherwise required by the *CEO*.

(c) The Permit Holder must implement *corrective action* required to address any non-compliance with conditions of this Permit identified from the *external environmental audits*.

(d) The Permit Holder must provide the *lead environmental auditor's* written reports of the *external environmental audits* to the *CEO* on or before 30 December of each year that an *external environmental audit* is conducted.

(e) The Permit Holder must publish the *lead environmental auditor's* summary of findings of the *external environmental audits* on its website for the *term* of this Permit.

PART VI – INTERPRETATION & DEFINITIONS

17. Interpretation

The following rules of interpretation apply to this Permit:

(a) a reference to any *written law* includes a reference to that *written law* as amended, repealed or replaced from time to time; and

(b) if a word or phrase is defined, other parts of speech and grammatical forms of that word or phrase have corresponding meanings.

18. Severance

It is the intent of these conditions that they shall operate so that, if a condition or part of a condition is beyond the *CEO*'s power to impose, or is otherwise ultra vires or invalid, that condition or part of a

condition shall be severed and the remainder of these conditions shall nevertheless be valid to the extent that they are within the *CEO*'s power to impose and are not otherwise ultra vires or invalid**.**

19. Inconsistency

(a) The *EP Act* prevails to the extent of any inconsistency between its provisions and the conditions of this Permit.

(b) Subject to condition 19(a) of this Permit, this Permit prevails to the extent of any inconsistency between its conditions (including its Schedules), and the provisions of any other document referred to in this Permit.

DEFINITIONS

The following meanings are given to terms used in this Permit and the attached Advice:

Assessment Report	means the document produced as an outcome of conducting an *environmental assessment* in accordance with condition 7 of this Permit, or, until 31 December 2020, documents prepared as a requirement of condition 6 of Clearing Permit CPS 818/14;
authorised survey	has the meaning given to it in section 3 of the *Licensed Surveyors Act 1909*;
biological survey	means a site visit undertaken by an *environmental specialist* to: (a) verify *desktop study* information; (b) identify significant flora, fauna, soil, and groundwater and/or surface water values and potential sensitivity to impact; (c) undertake vegetation condition mapping; and/or (d) undertake vegetation mapping by delineating on a map the ecological communities formed within a given area, and the nature and extent of each combination, within the area to be cleared at the scale of the best available mapping information
camp(s)	means any facilities required to be established by the Permit Holder at the site of a project activity such as offices, storerooms, workshops, toilets, washing facilities, accommodation, change rooms, shelter sheds, drying conveniences, mess rooms;
CEO	Chief Executive Officer of the *Department* responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*
completion criteria	means a measurable outcome based on a suitable *reference site*, used to determine *revegetation/rehabilitation* success;
controlled action	where a proposed clearing activity is considered to have a significant impact on a Matter of National Environmental Significance;
corrective action	means action to eliminate the cause of non-conformity detected in an *internal environmental audit* or an *external environmental audit*;
crossover area	has the meaning given to it in Schedule 2 clause 1 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*;
defined wetland	has the meaning given to it in clause 3 of the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*;

Department	means the Western Australian government agency responsible for the implementation of the clearing provisions under Part V, Division 2 of the EP Act.
desktop study	means a literature review, including a map-based information search of all current and relevant literature sources and databases;
desktop report	means the document produced as an outcome of conducting a *desktop study* in accordance with conditions 6(a) of this Permit and, until 31 December 2020, documents prepared as a requirement of condition 6 of Clearing Permit CPS 818/14;
dieback	means the effect of *Phytophthora* species on native vegetation;
dieback survey	means a site visit undertaken by an *environmental specialist* to: (a) verify *desktop study* information; (b) identify indicator species; and/or (c) carry out soil sampling in areas significantly affected by *dieback*;
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species;
drain	means a conduit on or under any land or channel provided it is wholly constructed, which was or is used or intended to be used to carry surplus water, and includes any part of such conduit or channel but does not include a watercourse as defined in the *Rights in Water and Irrigation Act 1914*;
dry conditions	means when soils (not dust) do not freely adhere to rubber tyres, tracks, vehicle chassis or wheel arches;
ecological community	means a naturally occurring biological assemblage that occurs in a particular type of habitat (English and Blythe, 1997, 1999). The scale at which ecological communities are defined will depend on the level of detail in the information source, therefore no particular scale is specified;
engineering survey	means any inspection or measurement taken by a surveyor engaged by the Permit Holder for the purpose of planning, investigating and design for a *project activity*;
environmental assessment	means assessment of *impacts* of the clearing against the clearing principles, and in accordance with the *Department's 'A guide to the assessment of applications to clear native vegetation under Part V Division 2 of the Environmental Protection Act 1986"* provided in Annexure 1
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who does not hold a tertiary qualification in environmental science or equivalent, and has a minimum of 5 years work experience relevant to the type of environmental advice that an environmental specialist is required;

EP Act	means the *Environmental Protection Act 1986* (WA);
EPA	means the Western Australian Environmental Protection Authority;
EPA's Technical Guidance – Flora EIA	means the publication *"Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*, Environmental Protection Authority (2016);
EPA's Technical Guidance – Terrestrial Fauna EIA	means the publication *"Technical Guidance – Terrestrial Fauna Surveys for Environmental Impact Assessments*, Environmental Protection Authority (2016);
ESA	means an environmentally sensitive area, as declared by a notice under section 51B of the *Environmental Protection Act 1986*;
external environmental audit(s)	means an audit conducted by a *lead environmental auditor* in accordance with condition 16 of this Permit;
extraction sites	includes gravel pits, borrow pits, water bores and other sites from which *road building materials* are extracted;
fill	means material used to increase the ground level, or fill a depression;
firebreak	means a firebreak established in accordance with the *Bush Fires Act 1954*;
geological survey	means a survey conducted in order to obtain information about the suitability of the ground for a *project activity*, and includes geotechnical surveys;
good or better condition	means that the vegetation is in either pristine, excellent, very good or good condition according to the *Keighery scale*;
Interim Biogeographic Regionalisation for Australia or ***IBRA***	means the national and regional planning framework for the systematic development of a comprehensive, adequate and representative 'CAR' National Reserve System within Thackway and Cresswell 1995, 'An Interim Biogeographic Regionalisation for Australia: a framework for establishing the national system of reserves';
Index of Biodiversity Surveys for Assessments (IBSA)	The Department of Water and Environmental Regulation's online portal providing an index of land-based biodiversity surveys in Western Australia.
Impact(s)	means any impact of clearing on environmental values;
infested	means areas that have been determined to have plant disease symptoms consistent with the presence of the *Phytophthora* species by an *environmental specialist;*
internal auditor	means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of audit required under this Permit;
internal environmental audit(s)	means an audit conducted by an *internal auditor* in accordance with condition 15 of this Permit;

Keighery scale	means the vegetation condition scale described in *Bushland Plant Survey: A Guide to Plant Community Survey for the Community (1994)* as developed by B.J. Keighery and published by the Wildflower Society of WA (Inc). Nedlands, Western Australia;
land degradation	means salinity, nutrient export, erosion, soil acidity and waterlogging;
lateral clearance area	has the meaning given to it in Schedule 2 of the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*;
lead environmental auditor	means an individual certified as a lead environmental auditor by either: (a) RABQSA International; or (b) an organisation accredited to ISO/IEC 17024 by, or by a body recognised by, the Joint Accreditation System of Australia and New Zealand);
local provenance	means native vegetation species that are known to occur within 50 kilometres and the same IBRA subregion of the area cleared;
matter of national environmental significance	A matter of national environmental significance is any of the following: (i) a declared World Heritage property (ii) a national Heritage place (iii) a declared Ramsar site (iv) a listed threatened species or endangered community (v) a listed migratory species (vii) the marine environment These terms have the same meaning as they do in the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;
multiple use management category wetland	meaning as defined as 'Multiple Use' within the *Guidance Statement No. 33 Environmental guidance for planning and development*, Environmental Protection Authority, 2008.
native species richness	means the number of different species represented in an ecological community, landscape or region. It is a count of the total number of species per quadrat.
offset	means a direct offset as described in the Government of Western Australia, WA Environmental Offsets Policy, September 2011;
offset proposal	means a documented plan that addresses the principles outlined in the Government of Western Australia, WA Environmental Offsets Policy, September 2011;
optimal time	means the optimal time for undertaking *direct seeding* and *planting* as set out in the table in Schedule 2 of this Permit;
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species;
pre-construction activities	means establishing storage areas, erecting fences and doing similar activities that are required to be done prior to, and in association with, the carrying out of a project activity;

project activity/activities	means those activities described in condition 1(a) of this Permit;
project surveys	means *authorised surveys*, *engineering surveys* and *geological surveys*;
proposal	has the meaning given to it in section 3 of the EP Act;
quadrat	means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density and condition;
rain event	means more than 0.1 mm of rainfall within a single rainfall;
referred	means referred to the Environmental Protection Authority under Part IV of the *Environmental Protection Act 1986*;
regeneration	means *revegetation* that can be established from in situ seed banks contained either within the topsoil or seed-bearing *mulch*;
region	means one of the following regions as designated by Main Roads Western Australia at the date of issue of this Permit and depicted in the maps that form part of this Permit in Schedule 3: (a) Metropolitan; (b) South West; (c) Wheatbelt; (d) Great Southern; (e) Goldfields-Esperance; (f) Midwest - Gascoyne; (g) Pilbara; and (h) Kimberley;
regional clearing limits	means the maximum amount of clearing, carried out pursuant to this Permit and the current version of CPS 817, allowed per *region* per calendar year as set out in the table in Schedule 1 of this Permit;
rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area;
remedial actions	means any activity that is required to ensure successful re-establishment of vegetation to its pre-clearing composition, structure and density, and may include a combination of soil treatments and revegetation;
rest area	means a cleared area adjacent to a stretch of *road* for the purpose of allowing *road* users to safely exit from the *road* for a temporary stop;
revegetation	means the re-establishment of a cover of native vegetation in an area such that the species composition, structure and density is similar to pre-clearing vegetation types in that area, and can involve *regeneration*, *direct seeding* and/or *planting*;
road	has the meaning given to it in section 6 of the *Main Roads Act 1930*;
road building materials	means rock, gravel, soil, stone, timber, boulders and water;
road formation	means the finished surface of a *road*, including the shoulders of the *road* and associated *drain*;

road realignment	an activity that adjusts the location of an existing *road* or portions of an existing *road*;
road widening	an activity associated with widening of an existing *road formation*;
sightline area	means the area between the edge of a stretch of *road* and the line of sight necessary for the safe use of the stretch of *road*;
shapefile	means a shapefile consisting of polygons using the Geocentric Datum of Australia (GDA).
term	means the duration of this Permit, including as amended or renewed;
temporary works	means access tracks, spoil areas, side tracks, site offices, storage areas, laydown areas, *extraction sites*, *camps*, *project surveys*, *pre-construction activities* and similar works associated with a project activity that are temporary in nature;
uninfested	means areas that have been determined to be free of the pathogen *Phytophthora* by an environmental specialist (all susceptible indicator plant species are healthy; no plant disease symptoms normally attributed to *Phytophthora* are evident);
uninterpretable	means areas situated in locations which received an average annual rainfall of greater than 400 millimetres and is south of the 26th parallel of latitude where indicator plants are absent or too few to determine the presence or absence of disease caused by the pathogen *Phytophthora;*
vegetation condition mapping	means to delineate on a map the condition attributes of vegetation within an area, according to the *Keighery scale*;
vegetation condition	means the rating given to native vegetation which refers to the impact of disturbance on each of the layers and the ability of the community to regenerate (Keighery 1994);
vegetation structure	means to determined by the dominant strata of the vegetation community through considering the height of the plants and the area of ground covered by the canopy.
Vegetation Management Plan	means vegetation management plan, as described in condition 6 of this Permit;
water quality deterioration	means sedimentation, turbidity, eutrophication, salinity, or any alteration of pH affecting surface water or groundwater;
weed	means any plant - (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

wetland field assessment	means a site visit by an *environmental specialist* to: (a) verify *desktop study* information; and (b) delineate key flora and fauna values of *defined wetlands* and their potential sensitivity to impact.
written law	has the same meaning as it is given in section 5 of the *Interpretation Act 1984*.

Mathew Gannaway
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

25 June 2020

SCHEDULE 1

Regional Clearing Limits

Region	Maximum Annual Limits of Clearing under CPS 818/15
Metropolitan	100ha
South West	75ha
Wheatbelt	120ha
Great Southern	75ha
Goldfields-Esperance	200ha
Midwest - Gascoyne	300ha
Pilbara	150ha
Kimberley	500ha
Total	**1,520ha**

SCHEDULE 2

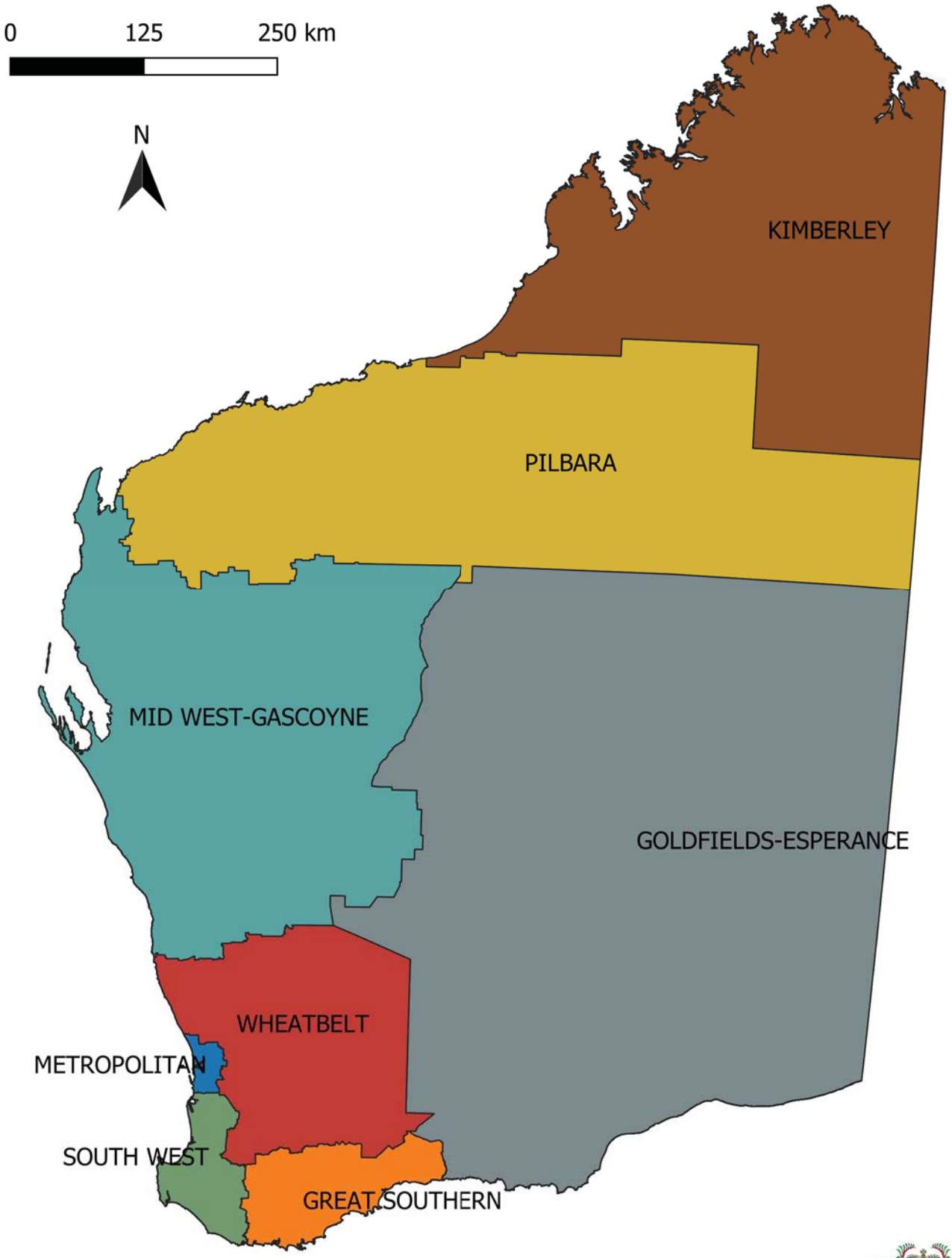
Optimal Timing for Seeding and Planting

	Optimal timing	
Area of state	***Direct seeding***	***Planting***
Goldfields – Esperance	April-May. Earlier in south than in north.	No *planting* without irrigation.
Great Southern	April-May throughout region. *Direct seeding* during September-October within 30km of the coast can also be successful due to warm temperatures and spring coastal showers.	May-June.
Kimberley	October-December, preferably just before rain.	No *planting* without irrigation.
Metropolitan	April-June.	May-July.
Midwest - Gascoyne	April-May in south of Midwest region; November-December in extreme north of Midwest region. May in south of Gascoyne region; November-December in north of Gascoyne region.	May-June in southern part of region only. No *planting* without irrigation in the Gascoyne region.
Pilbara	November-December but preferably just before rain.	No *planting* without irrigation.
South West	April-June.	May-June.
Wheatbelt	May – June and April-June in the south of the region.	June- July and May- June in the south of the region.

SCHEDULE 3

Regional Maps

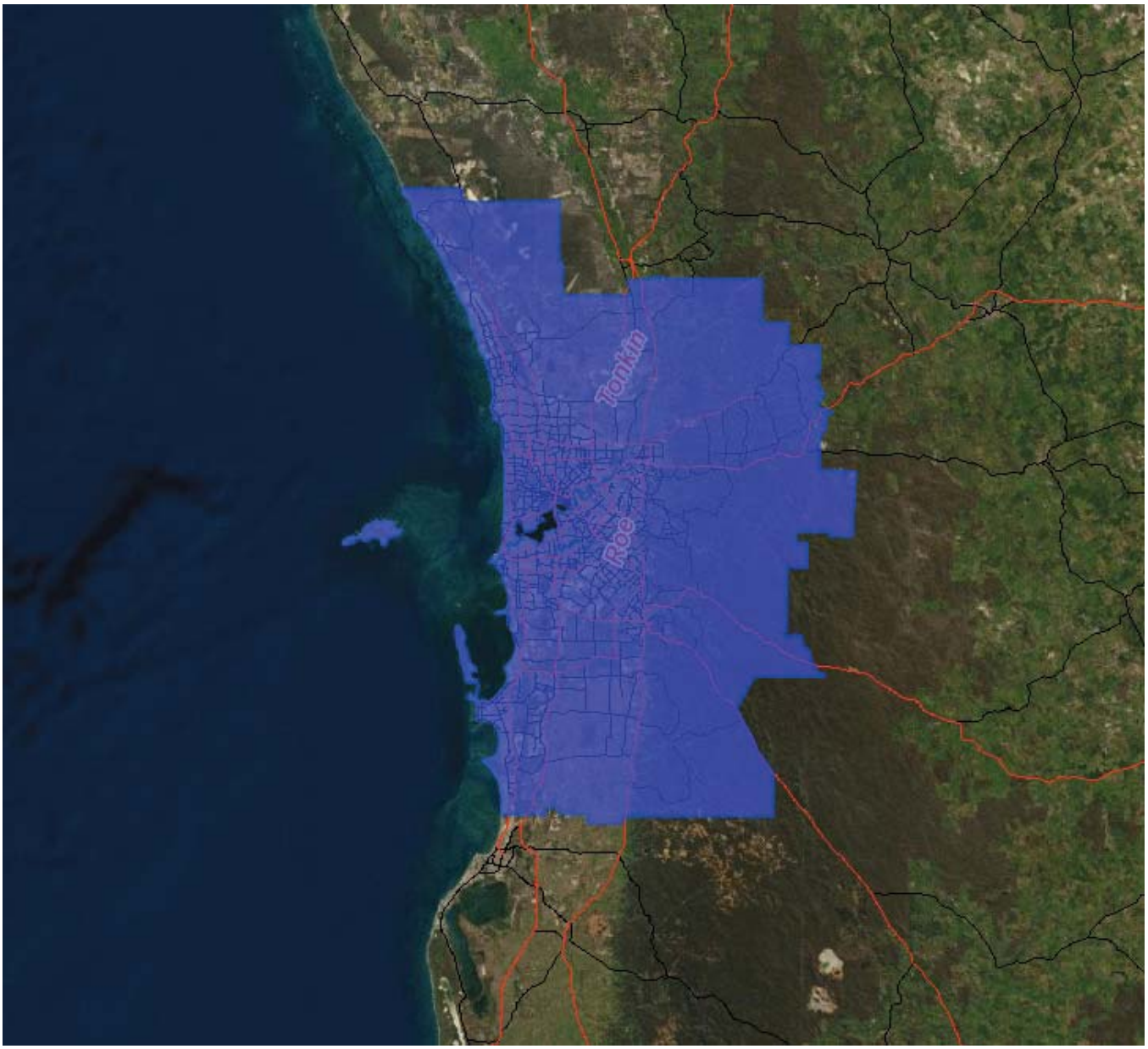
MRWA Regional Road Responsibility Areas



GOVERNMENT OF WESTERN AUSTRALIA

Schedule 3A: Metropolitan Region Map

Metropolitan Region



Legend

- Roads - State Roads
- Roads - Major Roads

31.8 15.89 31.8 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986.

Locality Map

Government of Western Australia
Department of Water and Environmental Regulation

Schedule 3B: South West Region Map

South West Region

Legend

- Roads - State Roads
- Roads - Major Roads

63.6 31.78 63.6 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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Locality Map

Government of **Western Australia**
Department of **Water and Environmental Regulation**

Schedule 3C: Wheatbelt Region Map

Wheatbelt Region

Legend

- Roads - State Roads
- Roads - Major Roads

127.1 63.56 127.1 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

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Locality Map

Government of Western Australia
Department of Water and Environmental Regulation

Schedule 3D: Great Southern Region Map

Great Southern Region

Legend

- Roads - State Roads
- Roads - Major Roads

117.4 0 58.70 117.4

Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

Government of Western Australia
Department of Water and Environmental Regulation

Schedule 3E: Goldfields-Esperance Region Map

Goldfields - Esperance Region

Legend

- Roads - State Roads

254.2 127.12 254.2 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986.

Locality Map

Government of Western Australia
Department of Water and Environmental Regulation

Schedule 3F: Midwest – Gascoyne Region Map

Mid West - Gascoyne Region

Legend

- Roads - State Roads

254.2 127.12 254.2 Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

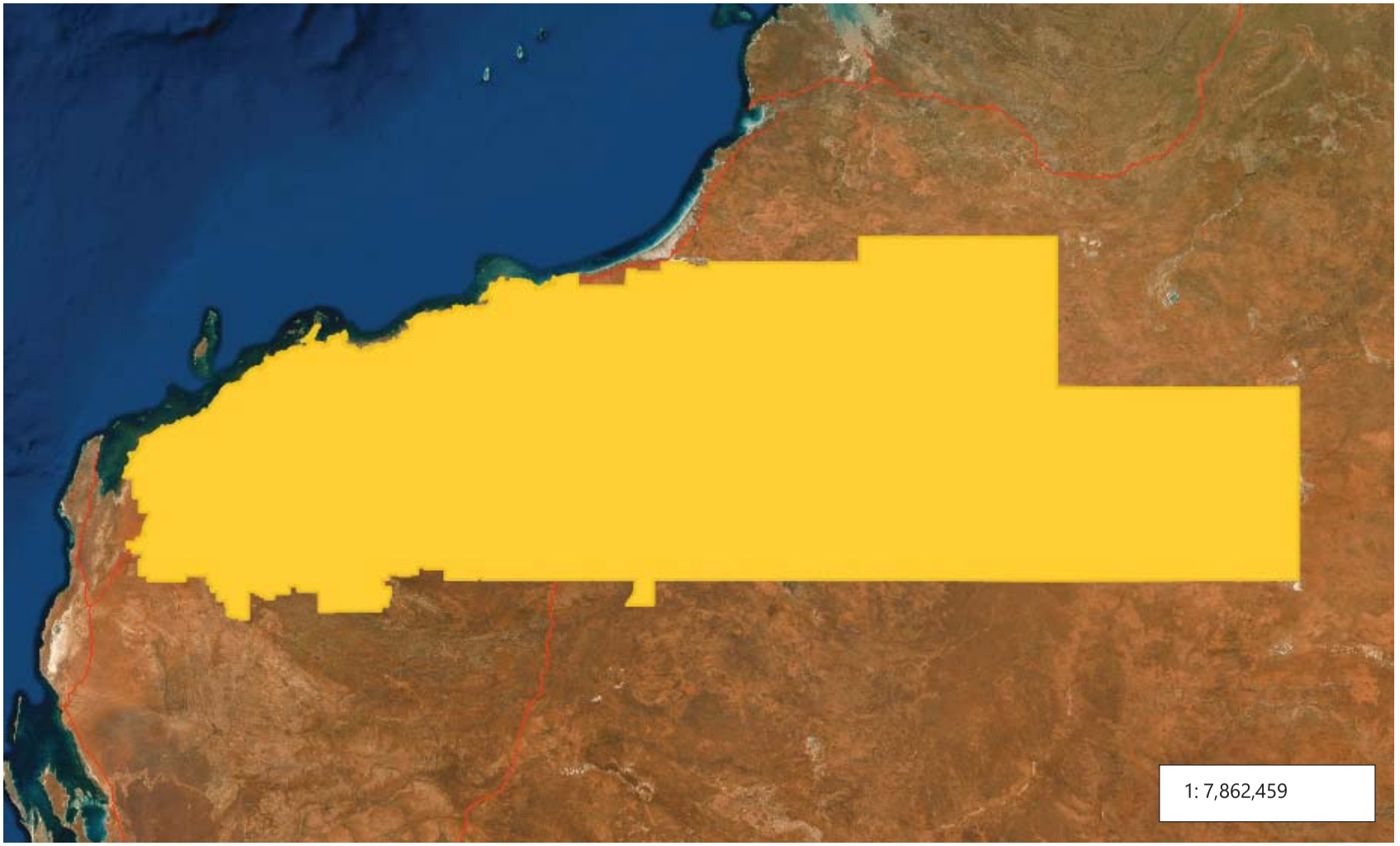
Officer with delegated authority under Section 20 of the Environmental Protection Act 1986.

Locality Map

Government of Western Australia
Department of Water and Environmental Regulation

Schedule 3G: Pilbara Region Map

Pilbara Region



Legend

— Roads - State Roads

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

399.4 0 199.71 399.4

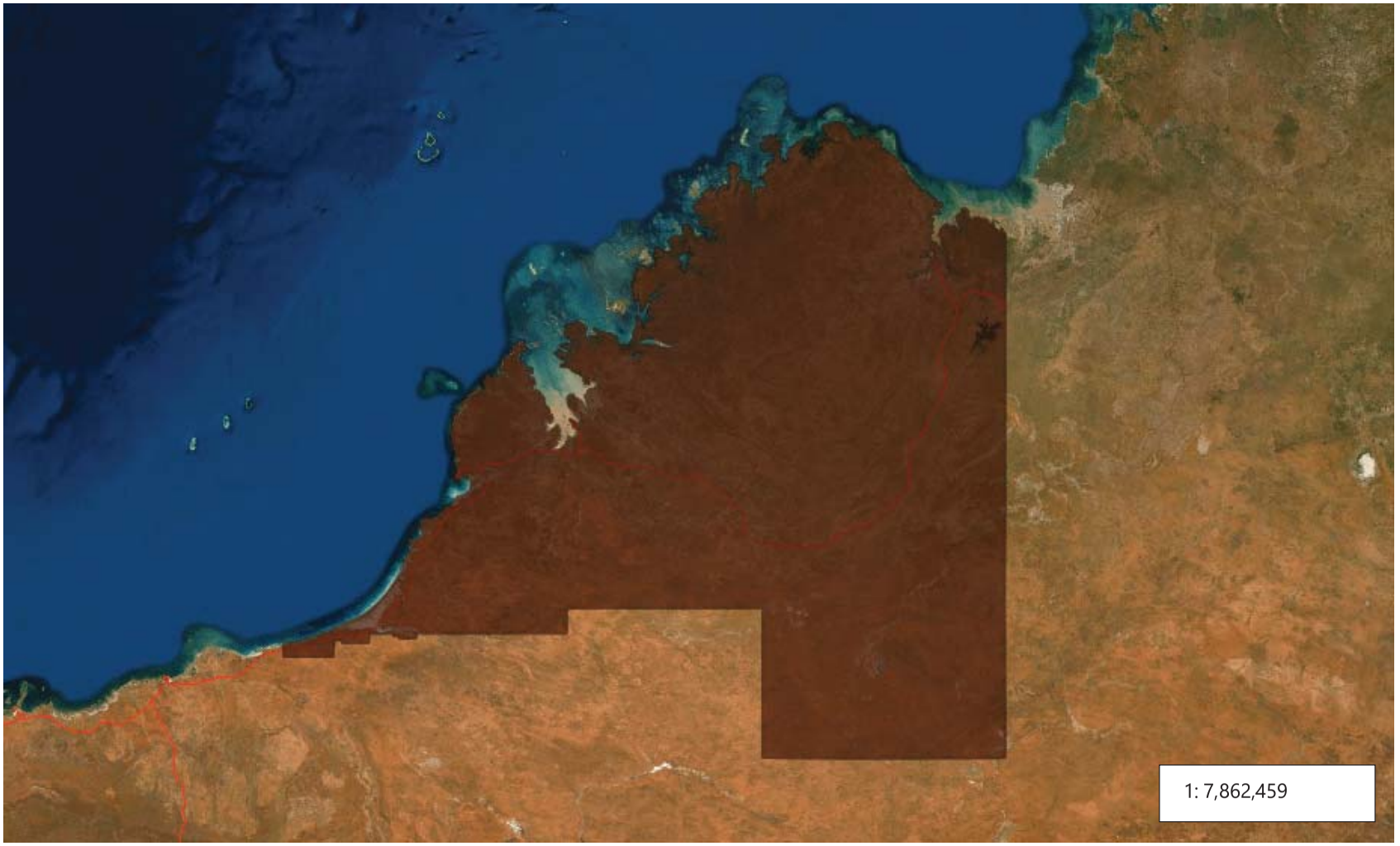
Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

Government of Western Australia
Department of Water and Environmental Regulation

Schedule 3H: Kimberley Region Map

Kimberley Region



Legend

— Roads - State Roads

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986

399.4 0 199.71 399.4

Kilometers

WGS_1984_Web_Mercator_Auxiliary_Sphere

Government of Western Australia
Department of Water and Environmental Regulation

ANNEXURE 1

A Guide to the assessment of applications to clear native vegetation under the *Environmental Protection Act 1986*

A guide to the assessment of applications to clear native vegetation

under Part V of the *Environmental Protection Act 1986*

Under the *Environmental Protection Act 1986* (EP Act), clearing of native vegetation is an offence unless you have obtained a clearing permit or an exemption applies.

Further information on exemptions from the requirement for a clearing permit is contained in the Department of Environment and Conservation's (DEC) *Guide to Exemptions and Regulations for Clearing Native Vegetation under the Environmental Protection Act 1986* published on its website.

If no exemption applies, you will need to apply for a clearing permit.

This Guide sets out DEC's recommended approach for assessing an application to clear native vegetation against the requirements of the EP Act. It is intended to assist proponents including landowners, consultants, local government authorities, and State government agencies to:

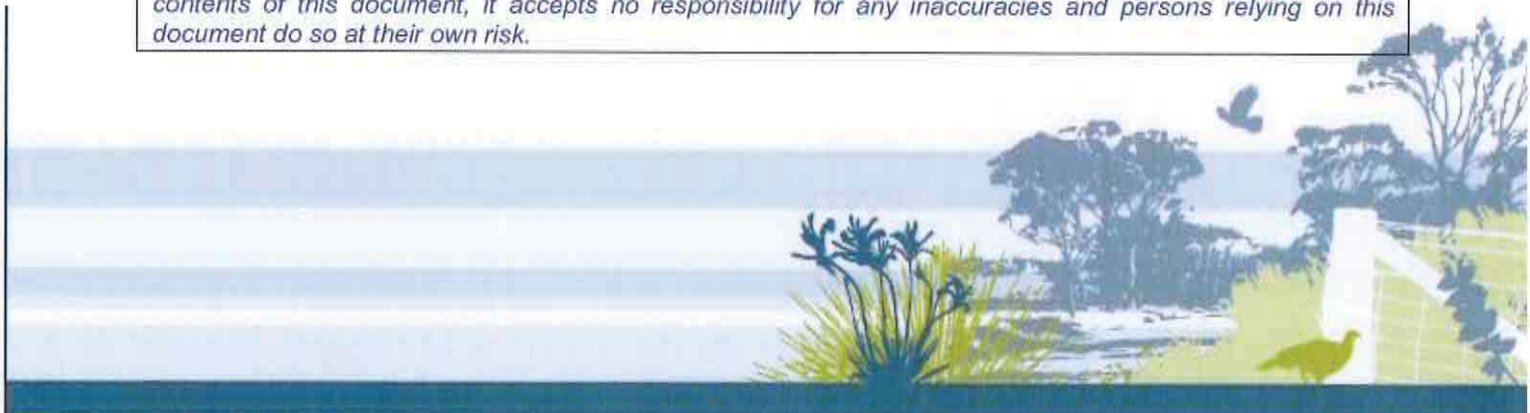
- understand the assessment process;
- plan to undertake appropriate studies for projects that involve clearing; and
- provide advice and recommendations to the Chief Executive Officer (CEO) of DEC or the responsible officer under the delegation to the Department of Mines and Petroleum (DMP).

Where a word has a specific meaning in the context of this guideline, the first time it is used it is in bold font, andit is explained in the *Glossary* on page 28.

Further information

If you have any questions about this guide or are not sure if you can clear under an exemption, contact DEC's Native Vegetation Conservation Branch on 9334 0333. More general information about clearing native vegetation can be found at http://www.dec.wa.gov.au/nvc.

Please note.....
The following information provides a general guide to the assessment of applications to clear native vegetation under Part V Division 2 of the Environmental Protection Act 1986. *Persons who intend to undertake activities that may involve clearing are advised to consult the actual legislation and seek advice, including legal advice, where necessary. Whilst DEC has endeavoured to ensure the accuracy of the contents of this document, it accepts no responsibility for any inaccuracies and persons relying on this document do so at their own risk.*



Introduction

Under section 51C of the EP Act, clearing of native vegetation is an offence without a clearing permit or exemption. Exemptions for clearing that is a requirement of a written law, or authorised under certain statutory processes are contained in Schedule 6 of the EP Act. Exemptions for low impact routine land management practices are contained in the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. These exemptions do not apply within environmentally sensitive areas declared by the Minister for Environment under section 51B of the EP Act. Environmentally sensitive areas can be viewed at http://maps.dec.wa.gov.au/idelve/nv/index.jsp

The CEO, in making a decision about a clearing permit application under section 51O of the EP Act, shall have regard to the clearing principles contained in Schedule 5 of the EP Act so far as they are relevant to the matter under consideration.

Under section 51O of the EP Act the CEO shall also have regard to any **planning instrument** or other matter that the CEO considers relevant (see the 'Planning Instruments and Other Relevant Matters' section on page 25).

If a proposal is likely to have a significant environmental impact, the proposal may require referral to the Environmental Protection Authority (EPA) under section 38 of the EP Act. If the EPA decides to assess a significant proposal, the CEO may not make a decision that is contrary to the implementation decision made following the EPA's assessment. Clearing in accordance with an implementation decision does not require a clearing permit.

Guidelines

This Guide includes information that has been developed to facilitate the application of the clearing principles in the clearing assessment process. Tools have been identified to assist assessors and proponents in determining the significance of the native vegetation under each clearing principle.

This Guide provides the basis for assessment and is not intended to be an exclusive or exhaustive list of relevant considerations and information. In addition, while this Guide is based on the best available scientific information and ecological principles, it is recognised that scientific knowledge is constantly evolving and therefore this Guide may be subject to change.

In assessing a clearing application, assessors are to give consideration to each clearing principle and any planning instrument or other matter and note the extent to which they have been addressed. This includes the methodologies used, the limitations that apply to the assessment, and the relevance of the principle to the current application. The results of the assessment are documented in a decision report, which is published on DEC's website at https://secure.dec.wa.gov.au/cps_reports/

Assessment

The assessor undertakes an initial assessment, which includes a review of all current and relevant literature sources, databases and GIS information.

In most circumstances a site visit is required to:

- verify information obtained during the initial assessment;
- delineate key flora, fauna, soil, and groundwater and surface water values and potential sensitivity to impact; and
- undertake broad-scale vegetation and vegetation **condition** mapping based on selected sites.

A site visit may involve more than one government agency in order to identify the multiple **environmental values** of an area. These agencies could include:

- DEC;
- DMP;
- Department of Agriculture and Food WA; and
- Department of Water

Surveys and gathering additional information

A survey and additional information may be required where the scale and nature of the clearing proposal is likely to have at least a moderate or high impact on the environment, and where information obtained through the initial assessment is insufficient to make an informed decision on the application.

It is the responsibility of the proponent to provide any required additional information, which might include flora and fauna surveys or detailed investigations of land degradation or water issues. Some key considerations include:

- the study must be carried out by a **suitably qualified person**;
- the methodology used should be consistent with the EPA's standards and policies as outlined in Position Statements and Guidance Statements, and with established standards for analysis. These methodologies and standards are referenced where relevant to a clearing principle.

Assessment against the clearing principles, planning instruments and other matters

This Guide provides advice in relation to the factors for consideration during assessment of proposed clearing against the clearing principles, planning instruments and other relevant matters to determine the significance of the clearing. Each of these is addressed on the following pages.

Assessment is a judgement in accordance with the requirements of the EP Act on whether or not a clearing permit application is likely to have a significant effect on the environment. The guidelines and tools assist assessors in making that judgement.

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

Guidelines

This principle aims to protect areas of high **biodiversity**. This principle protects intact natural systems with naturally occurring high levels of **species diversity**, **ecosystem diversity** or **genetic diversity** and natural systems that may be degraded but contain high levels of diversity compared with the remaining native vegetation of that **ecological community**.

The Threatened Species Scientific Committee for the Australian Government has identified areas as Biodiversity Hotspots for priority action. Many of these areas of outstanding biodiversity occur within Western Australia. These hotspots in WA include:

- North Kimberley;
- Hamersley – Pilbara;
- Carnarvon Basin;
- Geraldton to Shark Bay sand plains;
- Mount Lesueur – Eneabba;
- Central and Eastern Avon Wheat Belt;
- Busselton Augusta; and
- Fitzgerald River Ravensthorpe.

Assessment of biodiversity is complex because of the huge number of species, genetic variation within species and associations of species that exist within Western Australian ecosystems. In general, there are only reasonable data on the diversity and distribution of vertebrates, limited data on the diversity and distribution of vascular plants, and little data on invertebrates and micro-organism diversity.

It is recognised that this principle may concentrate on vascular flora as information on vascular plant biodiversity is relatively easy to collect and there are sufficient regional datasets available to allow for the comparisons that are inherent in the principle. This focus does not exclude other measures of biological diversity.

Genetic diversity is poorly understood and adequate information to assess this criterion is difficult to obtain. Taxon diversity (species, subspecies, variety and forms) is an alternative approach to address this issue where genetic diversity data are not available.

The EPA has noted that ecosystem diversity is harder to measure than species or genetic diversity because the boundaries of communities (ie. variety of unique assemblages of plants and animals and ecosystems) are hard to define. As long as a consistent set of criteria is used to define communities and ecosystems, their number and distribution can be measured. Even using a relatively simplified measure, any given area contributes to biodiversity in at least two different ways: through its richness in numbers of species and through the endemism (geographical uniqueness) of these species. The relative importance of these two factors changes at different geographical scales (*EPA Position Statement No.3*).

Priority flora and other **significant flora** such as uncommon or range-restricted species are another measure of biodiversity values and should be considered under this principle. Similarly, **priority ecological communities** provide a measure of biodiversity for ecological communities . The presence of significant flora or priority ecological communities is indicative of **environmental values** worthy of protection and a higher level of biological diversity than might typically be expected in an area.

Examples

Under this principle, clearing of 'degraded' condition vegetation with low comparable diversity where there are significant areas of that vegetation in 'good' condition elsewhere in the **bioregion** and **local area**, is unlikely to be at variance with this principle.

However the following is likely to be at variance:

- clearing of native vegetation that is representative of an area of high biodiversity, such as the northern sandplains in the vicinity of Mount Lesueur;
- clearing of native vegetation that has a higher diversity than other examples of an ecological community in a bioregion; and
- clearing of native vegetation that is in 'degraded' condition yet is in better condition than other vegetation of the same ecological community in the local area (for example, a largely degraded rangelands ecological community).

Tools

Adequate assessment of this principle as part of an initial assessment will rely on existing site and regional studies for comparative purposes. The assessor will need to have skills in assessing vegetation **condition**, and determining floral species diversity and plant ecological community diversity generically to enable such comparisons to be made.

Where more information is needed the scope of the assessment will be determined on a case-by-case basis, but would be consistent with *EPA Position Statement No. 3*. Position Statement No. 3 outlines the EPA's principles for environmental impact assessment of biodiversity. The EPA sees proper understanding of the requirements of adequate surveys as central to achieving a sound assessment of biodiversity.

EPA Guidance Statement No 10, Level of assessment for proposals affecting natural areas within the System 6 region and Swan Coastal Plain portion of the System 1 region, *EPA Guidance Statement No 51, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* and *EPA Guidance Statement No. 56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* also provide guidance as to survey requirements.

Some key factors in using surveys to assess biodiversity include:

- The methodology used should be consistent with the approaches recommended in the EPA Guidance Statement. The methodology used, and any limitations of the surveys, should be outlined in the resulting report;
- The timing and time allocated should be determined by the natural cycles of the region (such as growth and flowering);
- The intensity of the sampling (number of sites; their spacing; and their area) should be based on the complexity of the flora, vegetation and faunal assemblages of the permit application area; and
- The level of effort should correspond with the existing data for that area, i.e. where less existing information is available, a greater survey effort would be required.

In undertaking an assessment specific measures of diversity include:

Plant species

- total vascular plant taxa (species, subspecies and varieties) diversity: and
- vascular plant taxa diversity for each ecological community.

Fauna species:

- total vertebrate and invertebrate fauna taxa (genera, species and subspecies) diversity

Ecosystem diversity:

- number of ecological communities (plant communities);
- number of ecological communities (fauna communities (assemblages));
- macrohabitat diversity;
- microhabitat diversity in each macrohabitat;
- a variety of soil types or geological formations; and
- micro-topographical diversity and edaphic variation.

Useful information for assessing principle (a)

- Interim Biogeographic Regionalisation for Australia
- Mapped pre-European Vegetation / Mattiske Vegetation / Heddle Vegetation Complexes
- Conservation estate and DEC-managed lands and waters
- Systems 1-12 boundaries
- Significant wetlands and watercourses (eg Ramsar sites)
- *EPA Position Statement No.2 Agriculture Region*
- Bush Forever sites
- Significant and priority flora
- Priority ecological communities
- Areas identified as significant in local government biodiversity inventories

Principle (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.

Guidelines

This principle aims to maintain indigenous fauna species and assemblages of species in their local natural habitat. This principle protects habitat for threatened fauna and **significant habitat** for **meta-populations** of fauna.

Fauna plays an important role in maintaining ecosystems and the life-supporting services provided by ecosystems by:

- cycling of material, through the browsing of flora, predation, digging, the consumption of organic matter generally, excretion, death and decay;
- the pollination, fertilisation and germination of plants; and
- maintaining the dynamic balance in ecosystems. The balance between assemblages of plants, animals and diseases, and environmental elements such as fire, soil structure and chemistry, can be destabilised by changes to any of the ecosystem components.

The ecological relationships between fauna, vegetation and their physical environment are affected by habitat decline and a consequent loss of ecological functions and processes. These may include:

- increasing edge to area ratios of native vegetation, which reduce the width of a remnant and increase its perimeter;
- loss of corridors, stepping stones (**ecological linkages**) and **buffering** vegetation;
- loss of large intact areas of native vegetation capable of supporting breeding populations of species with limited dispersal;
- loss of vegetation areas that support meta-populations;

- the loss of key habitat requirements, e.g. loss of tree hollows and fallen trees and branches that may be used for breeding or sheltering sites; the loss of proximity of the required combination of habitat types (for example Carnaby's Black Cockatoo is threatened because it requires a combination of woodland for breeding and heath habitat for feeding, and both habitat types have been extensively cleared);
- increased probability of weed invasion due to external influences such as nutrient enrichment, drainage water or wind-blown material;
- increased risk of disease entry and subsequent reduction in habitat values; and
- adjacent land uses which may impact adversely on habitat values.

In extensively cleared **landscapes** fauna specialist species have declined as a result of habitat loss and in many cases are declining further as a result of natural attrition and an inability to recruit. For example, specialist bird species of heathlands and specialist bird species of woodlands in the wheatbelt and Swan Coastal Plain have declined at least in proportion to the loss of those habitats.

It may be necessary to identify, from the total pool of faunal species present, the species that would become (more) vulnerable if a habitat was lost. For example, in the fragmented habitats of the WA wheatbelt, Lambeck (1997) found that birds were useful indicators of habitats.

To identify which species or communities may be vulnerable to local extinction, consideration should include whether:

- the breeding, sheltering and feeding sites within the subject land would be lost or reduced;
- the subject land provides an important linkage; or
- the habitat area would be reduced so that a breeding pair or functioning social group could not survive.

Examples

The following is likely to be at variance with this principle:

- clearing of native vegetation that is habitat for specially protected or threatened fauna; and
- clearing of native vegetation that is habitat for meta-populations of fauna.

Under this principle, a clearing proposal where only widespread fauna species are present, which are supported by the surrounding extensive, intact vegetation would not be at variance with this principle. An example could be common, widespread species of the Pilbara within extensive and intact Pilbara habitat.

Tools

To determine the likelihood of species or populations of **fauna that is otherwise significant**, ecological communities or their habitat within the site or its vicinity, an assessment should include the following considerations.

1. Consult fauna references and/or key agencies (Species and Communities Branch at DEC; WA Museum) to determine whether any specially protected or threatened fauna, **priority fauna** or fauna otherwise of significance occurs within the geographic range of the land. Compile a field list of each of these species, and their habitat requirements.

2. Note the presence or absence of each of the specific habitat elements required by field list species. Identify relevant areas on the application area map.

3. Determine if any of the following habitats are present in the area where populations of fauna that is otherwise significant may exist:
   - foraging areas (food sources) – studies also need to record species that may only be present on a seasonal basis and rely on the vegetation in that season, e.g. nest hollows or an autumn food source;

- trees with hollows;
- abundance of ground cover and/or fallen trees;
- caves, rock outcrops, overhangs or crevices;
- permanent or intermittent waterways or water bodies; and
- other (with a description).

4. Determine whether the habitat is part of either an ecological linkage or forms a large area of intact vegetation that may support meta-populations of fauna.

5. Note any signs of fauna presence, including distinctive scratches, nests, diggings, scats, pellets, calls, burrows, bones, etc. Record any sightings of fauna, including the habitat in which they were seen.

If the results of the assessment show the potential for significant fauna values, a survey of fauna habitats and values may need to be undertaken. The scope of the survey will be determined on a case-by-case basis, but would be consistent with *EPA Guidance Statement No.56*. In marine environments, *EPA Guidance Statement No.29* provides a set of principles to be applied when considering proposals that may result in removal or destruction of, or damage to, marine benthic primary producer communities or the habitats which support them.

Useful information for assessing principle (b)

- Interim Biogeographic Regionalisation for Australia
- Mapped pre-European Vegetation / Mattiske Vegetation / Heddle Vegetation Complexes
- Significant wetlands and watercourses (eg Ramsar sites)
- *EPA Position Statement No.2 Agriculture Region*
- Specially protected, threatened and priority fauna

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

Guidelines

Rare flora refers to flora that is declared as rare under section 23F of the *Wildlife Conservation Act* 1950 and gazetted from time to time in the *Wildlife Conservation (Rare Flora) Notice*.

This principle aims to provide for the continuing in situ existence of rare flora and protects habitat necessary for its maintenance. This principle also considers the buffer necessary to protect the rare flora from deleterious impacts by maintaining ecological processes and functions within the habitat of the surrounding vegetation.

Rare flora are protected under the *Wildlife Conservation Act 1950* and may not be taken except with the written consent of the Minister for Environment. The term "to take" includes "to gather, pluck, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means" and includes activities such as burning and grazing.

Areas within the buffer necessary to maintain ecological processes and functions for rare flora should not be cleared under this principle. The value of the subject land for the ongoing maintenance of rare flora should be determined. Buffer areas are measured from location of the flora, or in the case of more than one individual, from the outermost individual(s). The determination of a buffer as an ongoing and viable area to protect the rare flora and ecological processes and functions, should be made on a case by case basis, and is related to the characteristics of the species being protected and the surrounding land uses.

All studies must be undertaken by a suitably qualified person of a timing, duration and extent necessary for the adequate identification of rare flora.

Examples

The following is likely to be at variance with this principle:

- clearing of flora declared as rare or listed as threatened; and/or
- clearing of buffers or other areas necessary to maintain ecological processes and functions for rare flora.

Tools

To determine the likelihood of rare flora or habitat suitable for rare flora within the site or its vicinity, an assessment should be carried out which would ideally use the following approach:

1. Consult flora references and/or key agencies (Species and Communities Branch at DEC; WA Herbarium) for advice on the presence of known populations of rare flora, and site-specific studies for the presence of rare flora. This advice may attract a fee.

2. Refer to DEC FloraBase and any appropriate regional or area-specific studies to determine whether habitats likely to support rare flora are present.

3. Compile a field list of each of the taxa that may occur within the geographic area and its habitat requirements. The appropriate geographic area for this should be determined on a case-by-case basis in consultation with DEC's Species and Communities Branch.

4. Note the presence or absence of each of the specific habitats recorded in the field list. Identify relevant areas on the property map.

Adequate assessment of this principle may not be possible as part of an assessment unless comprehensive and adequate site surveys to identify rare flora have been undertaken unless no habitat likely to be suitable for such species occurs.

The scope of a survey (if required) would be determined on a case-by-case basis, and should be consistent with *EPA Guidance Statement No.51*. Appropriate buffers would also need to be determined as part of this.

Useful information for assessing principle (c)

- Declared rare and priority flora database
- Commonwealth database for threatened flora
- Herbarium Specimen Collection Database (FloraBase)
- Soils, State wide
- Interim Biogeographic Regionalisation of Australia
- Mapped pre-European Vegetation / Mattiske Vegetation / Heddle Vegetation Complexes

Principle (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.

Guidelines

The aim of this principle is to provide for the continuing *in situ* existence of threatened ecological communities declared under section 51B of the EP Act to be environmentally sensitive areas and those listed under the *Environment Protection and Biodiversity Conservation Act 1999*. This principle also protects habitat necessary for the maintenance of these threatened ecological communities.

Vegetation that has a **bioregional conservation status** of **depleted** or worse (less than 50 per cent representation) is more likely to contain threatened or other significant ecological communities.

The principle also considers the buffer necessary to protect the ecological communities from deleterious impacts by maintaining ecological processes and functions within these habitats. Buffer areas are measured from outermost edge of the ecological community. To ensure an ongoing and viable area remains to protect the ecological communities and their ecological processes and functions, a buffer is recommended This should be determined on a case by case basis and is related to the characteristics of the ecological communities being protected, and the surrounding land uses.

Examples

The following is likely to be at variance with this principle:

- clearing of native vegetation in which threatened ecological communities are present;
- clearing of native vegetation if habitat necessary for the maintenance of threatened ecological communities is present.

Tools

To determine the likelihood of occurrence of threatened ecological communities or their habitat within the site or its vicinity, an assessment should use the following approach:

1. Consult references and/or key agencies (Species and Communities Branch at DEC and Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) database) for advice regarding known sites of threatened ecological communities declared by the Minister for Environment under section 51B or listed in the *Environment Protection and Biodiversity Conservation Act 1999*. This advice may attract a fee.

2. Refer to any appropriate regional or area-specific studies to determine whether areas are likely to support threatened ecological communities. These can be determined on a case-by-case basis in consultation with DEC's Species and Communities Branch.

3. Based on a site visit, determine whether habitats are present that may contain threatened ecological communities.

Adequate assessment of this principle may not be possible as part of an assessment unless comprehensive and adequate site surveys to identify threatened ecological communities have been undertaken or the habitat is unsuitable for such communities.

The scope of a survey (if required) would be determined on a case-by-case basis, and should be consistent with *EPA Guidance Statement No.51*. Appropriate buffers would also need to be determined as part of this survey.

Useful information for assessing principle (d)

- DEC Threatened ecological communities database
- DEWHA database of threatened ecological communities
- Environmentally sensitive areas declared under section 51B of the EP Act

Principle (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.

Guidelines

This principle aims to maintain sufficient native vegetation in the landscape for the maintenance of ecological values. It also recognises the need to protect ecological communities that have been extensively cleared and to retain a representation of each ecological community in local areas throughout its pre-European range. It is in this principle that the cumulative impacts of clearing within a particular area should be considered.

The *National Objectives and Targets for Biodiversity Conservation 2001-2005* (Commonwealth of Australia 2001a) recognise that the retention of 30 per cent or more of the pre-clearing extent of each ecological community is necessary if Australia's biological diversity is to be protected. This is the threshold level, below which species loss appears to accelerate exponentially and loss below this level should not be permitted. This level of recognition is in keeping with the targets recommended in the review of the *National Strategy for the Conservation of Australia's Biological Diversity* (ANZECC 2000) and in *EPA Position Statement No.2* on environmental protection of native vegetation in Western Australia (EPA 2000).

Ecological communities that are naturally rare or restricted may require substantially greater than 30 per cent of their pre-European extent to be retained for effective representation and ecological viability.

The level of 30 per cent representation within a bioregion does not consider the effect of habitat fragmentation and isolation. Studies have shown that larger areas of native vegetation generally support a greater number and diversity of species than smaller areas (e.g. Kitchener et al., 1980a, 1980b, 1982), and that smaller areas are more vulnerable to edge effects and other disturbances. Habitat fragmentation acts to reduce the area of available habitat. Representation levels may need to be increased considerably above 30 per cent in already fragmented landscapes in order to maintain biodiversity.

A typical pattern of vegetation clearing in highly fragmented landscapes (e.g. from analysis of vegetation in the Greater Bunbury Regional Scheme study area) shows that relatively few large remnants remain, and the vast majority of remnant areas are small, mostly less than five hectares. In these fragmented landscapes, larger remnants should be retained as a priority as they provide core habitat areas necessary to support populations of species that are unable to survive in smaller areas of native vegetation. Note that these areas should also be significant when assessed against Principle (a) and Principle (b).

In extensively cleared landscapes the task of mapping and classifying the extent of woody vegetation remaining becomes increasingly more complex as areas of native vegetation become smaller and more fragmented, and the quality of the vegetation more variable. Thus in fragmented landscapes the estimates of remaining native vegetation are less reliable. In these areas mapping is likely to incorporate aggregations of trees and degraded native vegetation with limited understorey component, as well as intact native bushland. There is also likely to have been some further reduction in vegetated areas since the information was captured. Therefore the current area of intact native vegetation is likely to be significantly less than the indicated figure.

To perform some ecosystem services, retention of more than 30 per cent of some ecological communities may be necessary; for example, retention of riverine vegetation is necessary to assist in maintaining healthy river systems or to maintain hydrological balance in areas at risk of salinity.

In some areas there may be less than 30 per cent of pre-European extent of native vegetation in good condition if the systems are degraded for example in the rangelands. These areas may be significant despite an overall level of greater than 30 per cent of pre-European extent remaining. *EPA Position Statement No. 5 Environmental Protection and Ecological Sustainability of the Rangelands in Western Australia* provides some guidance for pastoral areas.

EPA Guidance Statement No.10 includes criteria for the identification of regionally significant natural areas in the System 6 / part System 1 region (outside the Bush Forever study area). The criteria include representation of ecological communities, diversity, rarity, maintaining ecological processes or natural systems, scientific or evolutionary importance and general criteria for protection of wetland, streamline, and estuarine **fringing vegetation** and coastal vegetation. In applying the criteria, individual area attributes are considered including size and shape, vegetation condition and uplands and wetlands.

EPA Guidance Statement No. 33 provides information and advice on a range of environmental issues and their protection and management in the context of planning and development. It is of particular use in relation to **constrained areas.**

Examples

The following is likely to be at variance with this principle:

- clearing in landscapes where the existing vegetation is required to maintain ecosystem services (e.g. hydrological processes), or to compensate for a high degree of fragmentation.

Under this principle, clearing in areas with greater than 30 per cent native vegetation is not likely to be at variance if there is greater than 30 per cent of the total vegetation in the local area and within the bioregion in 'good' condition. A Jarrah-Marri forest that is in an area with significant forests on public land may be an example.

EPA Position Statement No.9 identifies **vegetation complexes** with 30 per cent or less or their pre-clearing extent remaining in a bioregion, or 10 per cent or less of their pre-clearing extent remaining in constrained areas on the Swan Coastal Plain, to be **critical assets**. Clearing of critical assets would generally be either at variance or seriously at variance to this principle.

It is important to consider the context and condition of vegetation in assessing this principle.

Tools

Remnant vegetation data exist for the whole State, but reliable statistics may be difficult to obtain. To determine whether there is significant remnant vegetation present, an assessment should be carried out using the following approach.

1. Determine the ecological communities on the subject land.
   The best available knowledge should be used in determining the ecological communities in an area.

   Vegetation complexes, which are mapped for the entire extent of the Swan Coastal Plain in the System 6 and System 1 Region (Heddle *et al.* 1980; Mattiske and Havel 1998) and the area covered by the Regional Forest Agreement, which includes the Jarrah Forest bioregion within System 6 (Mattiske and Havel 1998; Havel 2000), are used as the base mapping of ecological communities. On the Swan Coastal Plain, this should be supplemented by information on floristic community types (Gibson *et al.*,

1994, Department of Environmental Protection, 1996). Outside of these areas, **vegetation types** as defined by Beard (1990) are used as the base mapping of ecological communities.

2. Determine the percentage remaining of these types within the bioregion, subregion and local area. This can be determined using the **vegetation type** / vegetation complex and floristic community type at Interim Biogeographic Regionalisation for Australia (IBRA) region and subregion scale and the local area of that type.

3. Determine if the application area is a constrained area (including urban, urban deferred or industrial) within the constrained area of urban development.

   In recognition of past land use planning decisions, constrained areas have been identified on the Swan Coastal Plain of the Greater Bunbury Region Scheme, Peel Region Scheme and within the Bush Forever Study. Within these constrained areas, retention objectives may be varied to "at least 10%". However, other principles do apply within these constrained areas, subject to exemptions for assessed schemes and deemed works of subdivisions. This includes the need to recognise locally significant bushland.

   Outside of these defined constrained areas of the Perth Metropolitan, Peel and Greater Bunbury Region Schemes, the target (noting that in many regions clearing has proceeded well beyond this point) to achieve at least 30 per cent representation applies.

4. Determine the degree of fragmentation of the local area, and consider that highly fragmented landscapes and naturally rare or restricted ecological species require a high level of representation to maintain a full suite of values for the long term.

Useful information for assessing principle (e)

- Interim Biogeographic Regionalisation of Australia (bioregions)
- Mapped pre-European Vegetation / Mattiske Vegetation / Heddle Vegetation Complexes
- Region Schemes (e.g. Metropolitan Region Scheme, Greater Bunbury Region Scheme, Peel Regional Scheme)
- Bush Forever
- *EPA Position Statement No.2 Agriculture Region*

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

Guidelines

This principle aims to conserve vegetated watercourses and wetlands and their buffers. In this principle, the word "association" refers to the buffer area. The criteria consider both the area identified as watercourse or wetland and an appropriate buffer required to maintain the hydrological and ecological values of the watercourse or wetland. The watercourse or wetland buffer is the area outside of vegetation dependent on waterlogged soil. Under this principle, vegetation dependent on waterlogged soils would be protected e.g. damplands and floodplains.

Watercourses and wetlands are an integral part of our heritage, have diverse ecological functions and support a wide range of activities including agriculture and tourism. Watercourses provide important linkages between landforms in our predominantly dry landscape. Wetlands are widely recognised as important wildlife habitats and as being among the most biologically productive and diverse habitats on the planet. They directly and indirectly supply food to a broad range of animals and also serve important water purification functions. Both watercourses and wetlands support specialist plant assemblages and restricted

plant species. However, as a result of human land use and inappropriate management, many have been degraded.

Buffers are designed to protect watercourse and wetland vegetation from potentially deleterious impacts caused by surrounding land uses. Buffers aid in safeguarding and maintaining the ecological processes and functions occurring directly within or adjacent to watercourses or wetlands and, wherever possible, promote these processes within the buffer itself. For wetland and watercourse ecosystems, the buffers are measured from the edge of the boundary, which encompasses both waterlogged and inundated areas and the wetland-dependant vegetation, to the outside edge of any proposed development or activity.

For watercourses the process for determining appropriate buffer areas should be based on biological and physical criteria. These criteria are summarised as, but not limited to vegetation, hydrology, soil type, erosion, geology, climate, topography, function/uses, habitat, land use and heritage.

For wetlands the Water and Rivers Commission's *Position Statement: Wetlands (2001)* provides recommended buffer widths for certain land uses. *EPA Position Statement No.4* has as a goal of "no net loss of wetland values and functions" and recognises the need for appropriate buffers to ensure adequate protection of these values.

Biological communities associated with groundwater-dependent ecosystems, such as wetlands, groundwater-dependent terrestrial vegetation, cave streams and springs, have adapted to existing water regimes. Clearing can alter these regimes and cause degradation of existing biological communities. Degradation could result in local extinction of vegetation species, loss of diversity of fauna or loss of habitat diversity.

Where groundwater-dependent ecosystems are likely to be affected by changes in water table caused as a result of clearing, assessment of the ecological water requirements of groundwater-dependent ecosystems (generally by qualified ecologists) may be required. Hydrogeologic modelling can then be employed to ensure that the proposed clearing of native vegetation does not breach the water level criteria.

On the Swan Coastal Plain, groundwater-dependent ecosystems most likely to be affected by a rising water table are those in areas with a depth to groundwater of zero to six metres.

Examples

Under this principle, clearing of native vegetation that is watercourse or wetland dependent is likely to be at variance (e.g. damplands and floodplains).

Tools

To determine whether vegetation is associated with a wetland or watercourse an assessment should be carried out to include the following.

1. Identify watercourses and wetlands including their associated riparian zones, wetland-dependent vegetation and appropriate buffers.

   Determine whether the watercourse or wetland is listed as significant. These include those listed as:
   - Environmental Protection Authority (1992). *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*. Western Australian Government Gazette, 24 December , 1992, pp 6287-93
   - Environmental Protection Authority (1998). *Environmental Protection (South West Wetlands) Policy 1998*
   - Environmental Protection Authority (1992). *Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992*
   - Conservation category wetlands in the geomorphic wetland maps held by, and available from, DEC

- Significant wetlands of the South Coast Region
- Wetlands listed under the Ramsar Convention
- Wetlands in the *Directory of Important Wetlands in Australia* available from the Commonwealth Department of the Environment, Water, Heritage and the Arts
- Other wetlands and watercourses declared under section 51B of the EP Act as environmentally sensitive areas
- Wild rivers identified by the Department of Water
- Watercourses and wetlands listed in EPA Systems 1-12

Sources of information that will aid in the identification of significant watercourses and wetlands are listed below. This is not a definitive list of work completed to date. DEC (wetlands) and DoW (watercourses) offices should be contacted to ensure the most up to date information for the area is used. Information is limited for areas outside the southwest of Western Australia.

- Swan Coastal Plain wetland mapping north of Bunbury is available through the Geomorphic Wetlands Database.
- Swan Coastal Plain wetland mapping south of Bunbury is available in Hill *et al.*, (1996) Wetlands of the Swan Coastal Plain Volume 2B: Wetland Mapping, Classification and Evaluation. Wetland Atlas.
- Additional wetland mapping around the state is provided in the following reports.
  - V & C Semeniuk Research Group (2000) *Wetlands of the northwestern Great Sandy Desert in the LaGrange hydrological sub-basin.* Unpublished report for the Water and Rivers Commission.
  - V & C Semeniuk Research Group (2000) *Wetlands of the Pilbara Region: description, consanguineous suites, significance.* Unpublished report for the Water and Rivers Commission.
  - V & C Semeniuk Research Group (1994) *Ecological Assessment and Evaluation of Wetlands in the System 5 Region.* Report to the Australian Heritage Commission.
  - V & C Semeniuk Research Group (1998) *Evaluation of Wetlands on the Southern Swan Coastal Plain.* Unpublished report for the Water and Rivers Commission.
  - Pen, L. (1997) *A Systematic Overview of Environmental Values of the Wetlands, Rivers and Estuaries of the Busselton-Walpole Region.* WRC Report # WRAP 7.
  - V & C Semeniuk Research Group (1997) *Mapping and Classification of Wetlands from Augusta to Walpole in the South West of Western Australia.* WRC Report # WRT12.
  - V & C Semeniuk Research Group (1998) *Preliminary Delineation of Consanguineous Wetland Suites Between Walpole and Fitzgerald Inlet, Southern Western Australia.* Unpublished report for the Water and Rivers Commission.
  - V & C Semeniuk Research Group (1999) *Preliminary Delineation of Consanguineous Wetland Suites in the Pallinup-North Stirling Region, South Western Australia.* Unpublished report for the Water and Rivers Commission.
  - ecologia Environmental Consultants (2000) *A Preliminary Evaluation of Wetlands in the Esperance Water Resource Region.* Unpublished report for the Water and Rivers Commission.

2. Determine appropriate buffers (where necessary) for watercourses and wetlands.
   Additional information that may aid in the application of buffers to watercourses and wetlands:
   - Water and Rivers Commission Restoration Report No.16 *Determining Foreshore Reserves*
   - Water and Rivers Commission Position Statement: *Wetlands, 2001*
   - Guide to Water and Rivers Commission Foreshore Policy 1: *Identifying the Foreshore Area*
   - DEC (2008) Soil and Water Conservation Guideline (DRAFT for public consultation)

Watercourse and wetland buffers

In order to protect a watercourse or wetland and its associated riparian area, the DEC's policy is that a **foreshore area** or buffer is determined based on an assessment of the biological and physical features associated with the watercourse or wetland, and its values and pressures. The features to be used in the assessment are known as 'biophysical criteria'.

These criteria can be summarised as, but are not limited to, the following:

- *Vegetation* – fringing vegetation and native vegetation associated with or influencing the watercourse or wetland, and its condition or value;
- *Hydrology* – processes and changes in water levels and flow regimes; water quality; flood-prone land and areas subject to changes in channel location over time;
- *Soil Type* – soil types that influence the extent of fringing vegetation, active channel processes or wetland processes, and/or the fate of potential contaminants;
- *Erosion* – soil types prone to erosion;
- *Geology* – geological features which influence the watercourse or wetland;
- *Climate* – Climatic variations and resultant changes in flow regimes, vegetation etc
- *Topography* – landscape features including slope, shape, relief and diversity that influence, or are influenced by, the watercourse or wetland;
- *Function/uses* – the function of the watercourse or wetland and foreshore area or buffer area – flood protection, recreation or habitat conservation - and relative values;
- *Habitat* – habitats such as river pools, woody debris, riffles and fringing vegetation and their condition and values;
- *Land Use* – land uses, activities and/or associated contaminants that influence, or are influenced by, the riparian area or fringing vegetation (i.e. how the pressure / contaminant may affect the buffer / watercourse / wetland and how the buffer / watercourse / wetland may affect the pressure / contaminant); management response to contamination; and
- *Heritage* – archaeological and ethnographic sites.

Foreshore Policy 1 does not specify compatible land or water activities for foreshore areas or buffers. However, within a buffer area there is a presumption against supporting any activity likely to degrade its protective function, including activities that are likely to require, cause, or result in the following: clearing, filling, mining, drainage into or out of, effluent discharge into, pollution of, or environmental harm.

Details of how to use biophysical criteria to determine the size or width of a foreshore area or watercourse buffer, including the underlying rationale, can be found in the Water and Rivers Commission Water Note *Determining Foreshore Reserves* (WN23 October 2001).

Wetland buffers are determined using a similar, biophysical assessment process. For a guide to wetland buffer requirements for a range of land uses on the Swan Coastal Plain refer to the table in the Water and Rivers Commission *Position Statement: Wetlands* (06/06/01).

Useful information for assessing principle (f)

- Rivers / lakes / linear hydrography
- Wild Rivers
- Geomorphic Wetlands (Mgt Categories), Swan Coastal Plain
- Ramsar wetlands
- Register of Important Wetland (Commonwealth Department of the Environment, Water, Heritage and the Arts)
- Swan Coastal Plain EPP Lakes
- South West Agricultural Zone Wetlands
- Hydrographic Catchments
- Other wetlands and adjacent areas declared under section 51B of the EP Act as environmentally sensitive areas

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

Guidelines

This principle aims to maintain sufficient native vegetation in the landscape to prevent land degradation. Native vegetation should not be cleared if it is likely to cause land degradation. This includes soil erosion, salinity, nutrient export, acidification, waterlogging and flooding that affect the present or future use of land.

The assessment of land degradation risk takes into consideration a number of often interacting factors including soil type, landform and slopes, rainfall zone and intended land use.

Land Capability

Generally land of low or very low capability for its intended use should not be cleared. Such land has severe physical limitations not usually overcome by standard development techniques and/or have a high risk of land degradation. For example, the clearing of sand dunes or areas of deep pale sands for crops and pasture production may result in increased ground water recharge, surface water runoff, soil erosion or nutrient export.

Soil Erosion

Soil erosion generally occurs where there is insufficient vegetative cover to protect soils from high intensity winds and rainfall. In the south west land division, the vulnerability of land to water erosion is dependent upon a combination of factors including rainfall intensity, soil properties (soil type, organic matter, structure and permeability) slope length and gradient, land use and soil conservation practices. In general, land with slopes greater than nine per cent should not be cleared.

In the arid tropics, high intensity rainfall is commonly experienced and severe soil erosion can occur on land with as little as one to two per cent slopes if it is cleared and/or cultivated. Land use systems that maintain greater than 2.5 tonnes/ha of standing dry matter are usually required to achieve soil stability on such land.

The rangelands comprise a diverse range of soils and land forms, including some that are particularly prone to wind and water erosion. Many potentially erodible soils are protected by stony mantles. Accelerated erosion usually occurs where the protective vegetation or stony mantles are removed or natural flow regime (often sheet flow) is altered. Once gullies have established, vegetation communities down gradient that are dependent upon receiving sheet flows can be seriously compromised.

Wind erosion risk is determined by a combination of soil strength, structure, particle size and landform. Thus fine loose sands on a dune or exposed flat plain are particularly prone to erode. Similarly fine textured kopi soils in and around salt lake systems are particularly prone to erode if cleared and can be difficult to stabilise and rehabilitate.

In the rangelands, loss of nutrient rich top soil and leaf litter through wind and water erosion greatly reduces productivity and when severe can cause scalding. Scalds tend to become permanent landscape features. Alluvial plains adjacent to rivers are particularly prone to erosion.

Soil Acidity

Soil acidification results in a lack of crop performance and can occur after clearing certain soil types. In the northern and central agricultural regions, yellow sand plain soils supporting wodgil vegetation should be tested for pH and risk of aluminium toxicity. Generally soils that show pH<4.0 in 1:5 0.5M KCl and >20 µM Al are unsuitable for crop and pasture production. Such land is a wind erosion risk as well as increased groundwater recharge causing salinity down gradient.

Localised soil acidity may also occur where pyritic material is exposed to air and rainfall. The resulting acid run off or drainage water will kill most vegetation and may have severe impacts on wetlands systems.

Salinity

Dryland salinity occurs where the hydrological balance has been altered by clearing and the subsequent land use. It is an intractable problem of the medium and low rainfall zones of the wheatbelt on soils developed over crystalline rock. Irrigation salinity is dependent upon soil type, water quality and water management practice.

Risk assessment is site-specific and takes into account average annual rainfall, catchment information such as; soil types, landform, underlying geology and hydrology and the intended use of the land after clearing.

Examples

Under this principle, the following types of clearing are likely to be 'at variance':

- clearing of land that is likely to increase salinity either on-site or off-site;
- clearing of land that is likely to increase waterlogging either on-site or off-site;
- clearing of land that is likely to result in nutrient export;
- clearing of land that is likely to increase water and wind erosion on-site or off-site; and
- clearing of land that is likely to increase in soil acidity.

Tools

Advice on land degradation is available from the Commissioner of Soil and Land Conservation (at DAFWA).

DAFWA Ag Map CD-ROMs can provide an indication of land use capability for the Swan Coastal Plain, Mortlock Catchment, and areas in the South West and Great Southern. The DAFWA *Technical Report 298: Land evaluation standards for land resource mapping: assessing land qualities and determining land capability in South-Western Australia* provides further detail on land use capability assessment.

GIS databases can highlight potential dry land salinity, groundwater salinity, and erosion risk using topographic contours to determine slope gradient.

Useful information for assessing principle (g)

- Salinity risk / mapping / monitoring
- Groundwater salinity, confined / superficial aquifers
- Soils, statewide
- Land System Mapping (Kimberley / Rangelands)
- *Country Area Water Supply Act 1947* Clearing Control Catchments
- Topographic contours
- Rainfall, Mean Annual
- Hydrology / hydrogeology
- Ag Maps Horticulture Land Capability Swan Coastal Plain Lancelin to Augusta CD-ROM (DAFWA)
- Ag Maps Land Profiler Capel, Busselton and Augusta-Margaret River CD-ROM (DAFWA)
- Ag Maps Land Manager Serpentine-Jarrahdale, Kwinana, Rockingham, Mandurah, Murray, Boddington, Waroona and Harvey CD-ROM (DAFWA)
- Ag Maps Land Manager Albany Eastern Hinterland CD-ROM (DAFWA)
- Ag Maps Land Manager Mortlock Catchment, encompassing parts of the shires of Dalwallinu, Wongan-Ballidu, Moora, Victoria Plains, Toodyay, Northam, Goomalling, Cunderdin, Dowerin, Koorda, Wyalkatchem, Tammin, Kellerberrin, Trayning & Mount Marshall CD-ROM (DAFWA)

Principle (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.

Guidelines

This principle aims to ensure that the conservation values of **conservation areas** are not reduced as a result of native vegetation clearing.

Habitat fragmentation poses one of the greatest threats to biodiversity. When core habitat reserves are isolated from one another by human land uses, the diversity of native species generally declines and the probability of species extinction increases. This process of ecosystem decay has been well-documented in fragmented landscapes throughout the world.

Ecological linkages and buffers in the context of this principle contribute to the functioning and viability of existing conservation estate by:

- establishing connectivity between conservation areas and other areas of native vegetation;
- contributing to the maintenance or restorability of one or more key ecological processes required to sustain the conservation areas; and
- expanding the functional size of an existing conservation area or partially compensating for less than ideal shape.

The basic ecological functions of smaller, remnant natural areas can only be maintained through connectivity with the broader natural landscape.

Native vegetation adjacent to or near conservation reserves improves the viability and conservation values of the reserve by providing larger core areas, buffering the reserve from edge effects, consolidating boundaries or adding plant communities and habitats not represented or under-represented in the reserve. The size of a buffer to be effective will depend on the vegetation types present and their resilience.

Ecological linkages of vegetation between larger areas of conservation value are important for enabling fauna to continue to move through the landscape and between reserves. This is vital both for species that are nomadic and for maintaining populations of less mobile species that may otherwise become locally extinct in individual reserves.

Remnant patches within the vicinity of large contiguous areas of native vegetation (outliers) are more likely to support wildlife than more isolated patches – with greater the separation distances fewer species will have the mobility necessary to maintain access.

Tools

To determine whether native vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area an assessment should be carried out to include the following:

1. Determine if land held or managed for conservation is present. Assessors will need to:
   - refer to land status maps for existing reserves and CALM/DEC region plans / EPA System 1-12 reports and Bush Forever for proposed reserves and **protected areas**;
   - refer to DLI data for reserves that have a dual purpose (e.g. recreation and conservation) and are not vested with the Conservation Commission (managed by DEC);
   - check with LGA for Shire reserves that may have a dual purpose;
   - check with DEC for CALM/DEC covenants, Land for Wildlife sites, World Heritage areas, biosphere reserves;

- check with National Trust of Australia (WA) (NTWA) for covenants and Bush Bank sites;
- check with Worldwide Fund for Nature (WWF) for Woodland Watch sites;
- consider areas on the Register of the National Estate for natural values;
- consider significant wetlands identified under principle (f)
- Perth Biodiversity Project Local Biodiversity Guidelines and subsequent Local Biodiversity Plans for regional and local ecological linkages and Local Biodiversity Areas with high priority for retention and protection (i.e. Local Conservation Areas).

2. Determine whether the land provides a buffer, ecological linkage or outlier to a conservation area. These may include areas that provide large, regional connections to conservation areas and buffer the conservation area from adverse impacts. Alternatively, a narrow, disjunct, impacted, or otherwise tenuous habitat linkage connecting to conservation areas may exist. These are essential to maintain landscape-level connectivity, but are particularly in danger of losing connectivity function. An example is a narrow peninsula of habitat, surrounded by a human-dominated land uses, that connects larger habitat blocks, such as the South Coast Region Macro-corridor project.

3. Factors to consider in determining whether an area has a function as an ecological linkage or buffer, or contributes significantly to the environmental values of a conservation area include:
   - distance to the conservation area and between other possible ecological linkages;
   - size and shape of the ecological linkage or buffer;
   - types of habitats (riparian, coastal, woodland, etc.) present within the linkage or buffer and key focal species and ecological processes that may be present that would indicate connectivity;
   - types of land cover (eg. natural vegetation, pastoral/grazing, cropland/irrigated agricultural, low density residential, etc.) within and immediately adjacent to the linkage;
   - primary barriers that are impediments to faunal movement, gene flow and ecological processes (dirt road, agriculture, urban areas); and features that facilitate these within a linkage (watercourses, riparian habitat, continual habitat coverage, underpasses,); and
   - any studies that exist to demonstrate the use and functions of the linkage or buffer, including any anecdotal evidence or field studies conducted on this particular linkage or buffer.

4. Determine if the land provides habitats not well represented on the conservation land. Less than 15 per cent representation in conservation reserves is a benchmark.

Useful information for assessing principle (h)

- DEC-managed Lands and Waters
- DOW-managed Estate
- System 1-12 boundaries
- Bush Forever
- Local government areas of biodiversity significance
- Register of National Estate
- Conservation covenants and agreements to reserve under the *Soil and Land Conservation Act 1945* (registered as a memorial on the Certificate of Title)
- CALM / DEC nature conservation covenants
- National Trust of Australia (WA) nature conservation covenants
- Cadastre

Principle (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.

Guidelines

This principle considers biological, chemical and physical parameters, and water quantity as far as these affect overall environmental quality. This principle aims to ensure that the quality of water supplies are not reduced, that salinity, pH or levels of nutrients in water bodies and discharge water, are not significantly altered by clearing, and that water regimes and environmental water provisions are not adversely affected.

The assessment should consider both on-site and off-site impacts, so that problems are not transferred from the cleared site to another part of the catchment or aquifer.

Within Public Drinking Water Supply Catchments, the impacts of clearing must be compatible with the Public Drinking Water Supply Catchments guidelines and Water Source Protection Plans.

In certain controlled catchments reserves under the *Country Areas Water Supply Act 1947* (CAWS), clearing controls are in place to prevent salinity. In these areas, the CAWS Clearing Guidelines should be consulted to identify additional water quality considerations. Clearing may be restricted through compensation payments or due to location in the catchment and salinity risk.

Consideration should be given to clearing that may be likely to significantly alter the salinity or pH of water tables. Consideration should also be given to the possibility that sedimentation, erosion, turbidity or **eutrophication** of water bodies on or off site is likely to be caused or increased.

It need to be noted that clearing of relatively substantial areas of vegetation can alter existing water regimes and cause degradation of groundwater-dependent ecosystems (discussed under Principle (f)). Degradation could result in local extinction of vegetation species, loss of diversity of fauna or loss of habitat diversity.

Examples

Under this principle, the following types of clearing are likely to be at variance:

- clearing of native vegetation where the clearing is likely to lead to adverse environmental impacts through sedimentation entering water bodies;
- clearing of native vegetation where the impacts of the clearing are likely to contribute to increased nutrient levels in the catchment;
- clearing of native vegetation where there is potential for low pH waters and/or acid sulphate soils to form as a result of clearing;
- clearing of native vegetation where the impacts of the clearing are likely to contribute to increased salinity in catchments already affected by or likely to be affected by salinity; and
- clearing of native vegetation where the clearing is likely to lead to changes in water regimes of, or result in breaches of environmental water provisions for, Groundwater Dependent Ecosystems (GDEs) on or off site and subsequent degradation of the biological communities associated with these systems.

Tools

An assessment should include consideration of the following factors.

General

- Geological Series Maps (Department of Mines and Petroleum) - identifies soil types and geomorphology.

Groundwater

1. Estimate depth to water table and identify existing water quality readings from Water Information Network (WIN) sites and drilling project reports, obtained from DoW.

2. Consult salinity risk mapping series to identify if salinity (electrical conductivity) is rising in the area (south west only). If it is, then obtain all water quality monitoring parameters from WIN and look at the long-term trend, focusing on pH and electrical conductivity.

3. Where clearing is likely to have a high impact on ground water advice should be sought from DoW. Hydrogeological modelling may be necessary to determine the likely spatial and temporal extent and magnitude of impact on the water table of clearing, particularly where large areas of vegetation are proposed to be cleared.

   Where GDEs are likely to be affected by water table rises, assessment of the Ecological Water Requirements of groundwater-dependent ecosystems (generally by qualified ecologists) may be required. Hydrogeologic modelling can then be employed to ensure that the proposed clearing of native vegetation does not breach the water level criteria.

Surface water

1. Identify the nearest Water Information Network (WIN) DoW database surface water site and view historical pH, electrical conductivity and nitrogen and phosphorus readings. The Phosphorus Retention Index (PRI) may be useful to determine the nutrient capacity of the soils (DAFWA, Land Resources Series No. 1). If there is a trend, then obtain all WIN readings for the area and consider long term trends.

2. Determine nutrient trends for wetlands in the catchment where data exist. Determine soils in the catchment and their risk of erosion and nutrient holding capacity.

3. Determine soil types in the catchment and the risk of erosion of nutrient-rich soil particles and/or leaching. No increase in nutrient levels is acceptable in systems with a trend towards elevated nutrient levels.

4. In other areas, determine whether soil types have the potential to generate acid sulfate soils. Consult the Acid Sulfate Soils Guideline Series for information on this. Consider any previous studies carried out in the area.

   Within the north-west of the State, mangrove areas and tidal flats provide the main indicator of conditions that may potentially result in acid sulfate soils and low pH waters.

   In the southwest, the situation is more complex. The following geomorphic or site description criteria should be used to determine if acid sulfate soils are likely to be present within the south west:
   - land with elevation less than five metres AHD;
   - soil and sediment of recent geological age (Holocene);
   - marine or estuarine sediments and tidal lakes;
   - low-lying coastal wetlands or back swamp areas, waterlogged or scalded areas, stranded beach ridges and adjacent swales, interdune swales or coastal sand dunes;
   - coastal alluvial valleys;
   - areas where the dominant vegetation is tolerant of salt, acid and/or waterlogging conditions e.g. mangroves, saltcouch, swamp-tolerant reeds, rushes, paperbarks (*Melaleuca* sp.) and swamp oak (*Casuarina* sp.); and
   - areas identified in geological descriptions or in maps as:
     - bearing sulfide minerals;
     - coal deposits or marine shales/sediments (geological maps and accompanying descriptions may need to be checked); and

- deep older estuarine sediments below ground surface of either Holocene or pre-Holocene age.

The Acid Sulfate Soils Guideline Series available from DEC provides further information on this issue.

Useful information for assessing principle (i)

- Salinity risk / mapping / monitoring
- Public Drinking Water Source Areas (PDWSA)
- Acid sulfate soil risk mapping
- Soils, statewide
- WIN groundwater sites (monitoring / Water Corporation / other)
- WIN surface water sites (stream gauging, other)
- WIN telemetry sites and uncatalogued sites
- Evaporation isopleths
- Isohyets
- Topographic contours
- Groundwater salinity, confined / superficial aquifers
- Hydrography, linear, catchments, sub-catchments
- Rainfall, Mean Annual
- Potential Groundwater Dependent Ecosystem Areas
- Environmental Protection Policy areas, lakes
- Geodata, Lakes
- Surface water / groundwater areas, irrigation districts, rivers under the *Rights in Water and Irrigation Act 1914*

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

Guidelines

This principle aims to ensure that there is no increase in the frequency or intensity flooding resulting from native vegetation clearing.

Consideration of this principle may require extensive modelling of the whole catchment and should only be considered for large clearing proposals.

For smaller proposals, clearing should not cause water logging (localised flooding). This is already considered under principle (g) (land degradation). Flooding and/or water logging may also exacerbate criteria under principle (i) such as salinity, sedimentation, low pH waters or **eutrophication** or result in unacceptable changes in water regimes or environmental water provisions, both on and offsite.

Tools

To determine if clearing the vegetation is likely to cause, or exacerbate the incidence of flooding an assessment should consider the following factors:

1. Determine possible water logging problems using the following indicators:
   - soil compaction and infiltration
   - soil profile depth
   - soil drainage/recharge rates
   - perched water tables – groundwater contours and monitoring well water levels could be considered
   - water logging observed on adjacent properties

2. Floodplain mapping for major towns (1 in 100 year flood levels).

To further determine the risk of flooding, hydrological modelling or hydrological advice maybe required as part of a secondary assessment.

Useful information for assessing principle (j)

- Perth Basin Hydrogeology,
- DWAID (Divertible Water Allocation Inventory Database) Aquifers
- Evaporation Isopleths
- Isohyets
- Hydrography
- Topographic Contours, Statewide
- Rainfall, Mean Annual

3. Determine possible water logging problems using the following indicators:
   - soil compaction and infiltration
   - soil profile depth
   - soil drainage/recharge rates
   - perched water tables – groundwater contours and monitoring well water levels could be considered
   - water logging observed on adjacent properties

4. Floodplain mapping for major towns (1 in 100 year flood levels).

To further determine the risk of flooding, hydrological modelling or hydrological advice maybe required.

Planning instruments and other relevant matters

Planning instruments

In considering a clearing matter, the CEO shall have regard to any planning instrument and other relevant matters when making decisions as to clearing permits.

Local and regional level planning strategies, by-laws and policies should be considered as part of the recommendations to the CEO and decision-making. Examples of these include Local Biodiversity Guidelines and related Local Biodiversity Plans prepared by Local Government, or regional planning strategies related dealing with public infrastructure.

EPA's Guidance Statement No. 33 *Environmental Guidance for Planning and Development* is a useful resource in considering planning and development issues in the context of environmental impact.

Other relevant matters

In considering a permit application the CEO shall also have regard for any other relevant matter. 'Other matters' are not defined in the EP Act, and consequently are any matters the CEO considers relevant. Other matters are generally environmental issues not directly within the scope of the clearing principles, but within the object and principles of the Act.

Other matters typically include consideration of land use impacts, previous decisions related to the area, other legislative requirements related to the proposal and the necessity of the clearing.

Land use impacts

Environmental, economic and social impacts arising from land use is an 'other matter' the CEO would consider when making a decision regarding the clearing application.

Previous decisions

Any previous decisions related to the area should be considered in undertaking an assessment. These decisions could include whether the EPA has formally assessed the proposal and any advice given. It could also include any decisions under the previous Notice of Intent to Clear system under the *Soil and Land Conservation Act 1945*.

Legislative requirements

Legislative requirements under other written laws may be a consideration in assessing the clearing of native vegetation. These include whether the proposal requires a prescribed premise works approval or licence under the EP Act, a groundwater or surface water licence under the *Rights in Water and Irrigation Act 1914* and Native Title requirements under *Native Title Act 1993*, Aboriginal Sites of Significance under the *Aboriginal Heritage Act 1972* and local government requirements such as extractive industry licences.

Necessity

Native vegetation clearing should only be considered after all other reasonable attempts to mitigate adverse impacts have been exhausted. Potential environmental impacts should be addressed using the impact mitigation sequence:

- avoid – avoid impact altogether;
- minimise – limit the severity of the impact;
- rectify – restore the impacted site as soon as possible;
- reduce – eliminate the impact over time; and
- offset – offset significant residual impacts.

In determining the necessity of the clearing higher priority will be given to clearing for public use than private benefit or commercial gain.

Environmental protection policies (EPPs)

The CEO shall refuse to grant a clearing permit if the CEO considers that the associated effect on the environment would be inconsistent with any approved policy. An approved policy is an environmental protection policy approved by the Minister for Environment under section 31(d) of the EP Act. Further information on these is available by contacting the Native Vegetation Conservation Branch.

Approved policies for which clearing may be inconsistent include:

- *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*;
- *Environmental Protection (Peel Inlet - Harvey Estuary) Policy 1992*;
- *Environmental Protection (Swan Coastal Plain Lakes) Policy 1992*;
- *Environmental Protection (South West Agriculture Zone Wetlands) Policy 1998*;
- *Environmental Protection (Western Swamp Tortoise Habitat) Policy Approval Order 2002*.

Agreements to reserve, conservation covenants and soil conservation notices under the Soil and Land Conservation Act 1945

The CEO is prevented from making a decision to grant a clearing permit on land which is subject to an agreement to reserve under the *Soil and Land Conservation Act 1945* without the written approval of the Commissioner of Soil and Land Conservation. DEC will contact the Commissioner to seek his written advice if the land under application is subject to an agreement to reserve.

The CEO is also prevented from making a decision to grant a clearing permit:

- on land which is the subject of a conservation covenant under section 30B(2) of the *Soil and Land Conservation Act 1945*; or
- in contravention of a soil conservation notice imposed under Part V of the *Soil and Land Conservation Act 1945*.

DEC will advise any applicant affected by these instruments or requirements in writing.

Tools

Consideration of planning instruments and other relevant matters typically includes the following.

1. Determine whether the clearing is consistent with a region or local planning scheme, any relevant planning approvals, approved policy or local planning strategy.

2. Consider whether any previous decisions have been made related to the proposal or other legislative requirements need to be fulfilled for the proposal to proceed. These could include:
   - Prescribed premise works approval or licence;
   - Groundwater or surface water licence;
   - Extractive industry licences;
   - Native Title requirements;
   - Aboriginal Sites of Significance; or
   - local government requirements.

Useful information for assessment

- Region Schemes
- Town Planning Schemes
- Environmental impact Assessments decisions
- Environmental Protection Policies
- Native Title Claims
- Aboriginal Sites of Significance
- Acid Sulfate Soil risk map
- Ag Maps Horticulture Land Capability Swan Coastal Plain Lancelin to Augusta

Glossary

Biodiversity describes the variety of life forms: the different plants, animals and microorganisms, the genes they contain, and the ecosystems they form. It is usually considered at three levels: **genetic diversity**, **species diversity** and **ecosystem diversity** (NSCABD 1996). Also referred to as **biological diversity**.

Bioregion means a bioregion of Western Australia as defined in *Revision of the Interim Biogeographic Regionalisation of Australia (IBRA) and the Development of Version 5.1 – Summary Report* (2000) published by the Commonwealth Department of the Environment and Heritage, Canberra. A bioregion represents an area with common ecological characteristics, including climate, geomorphology, landforms, lithology and characteristic flora and fauna. The IBRA regions represent a **landscape**-based approach to classifying the land surface. Specialist ecological knowledge combined with regional and continental scale data on ecological characteristics were interpreted to describe these patterns. The resulting integrated regions were ascribed the term biogeographic regions. The IBRA was developed in 1993-94 under the coordination of Environment Australia by the States and Territories as a basis for developing priorities for the Commonwealth in funding additions to the reserve system under the National Reserve System Cooperative Program. It has been subsequently revised in the light of new knowledge.

Bioregional conservation status of ecological vegetation classes

Presumed extinct:	probably no longer present in the **bioregion**
Endangered*:	Less than 10 per centof pre-European extent remains
Vulnerable*:	10-30 per cent of pre-European extent exists
Depleted*:	More than 30 per cent and up to 50 per cent of pre-European extent exists
Least concern:	More than 50 per cent pre-European extent exists and subject to little or no degradation over a majority of this area

*or a combination of depletion, loss of quality, current threats and rarity gives a comparable status (Department of Natural Resources and Environment 2002).

Buffer means an area designed to protect significant **environmental values**, including **significant flora**, significant **ecological communities**, and wetlands and watercourses, from deleterious impacts by maintaining ecological processes and functions in the habitat. Refer also **watercourse or wetland buffer**.

Clearing means (a) the killing or destruction of; (b) the removal of; (c) the severing or ringbarking of trunks or stems of; or (d) the doing of any other substantial damage to, some or all of the native vegetation in an area, and includes the draining or flooding of land, the burning of vegetation, the grazing of stock, or any other act or activity that causes (e) the killing or destruction of; (f) the severing of trunks or stems of; or (g) any other substantial damage to, some or all of the native vegetation in the area.

Condition, in an environmental context, is a rating given to vegetation to categorise disturbance related to human activities. This rating refers to the degree of change in the structure, density and species present in vegetation in relation to undisturbed vegetation of the same type. The most widely used condition system is that defined by Keighery (1994):

1. Pristine: no obvious signs of disturbance.
2. Excellent: vegetation structure intact; disturbance affecting individual species and weeds are non-aggressive.
3. Very Good: vegetation structure altered; obvious signs of disturbance.
4. Good: Vegetation structure significantly altered by obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it.
5. Degraded: Basic vegetation structure severely impacted by disturbance. Scope for regeneration of vegetation structure, but not to a state approaching 'good' **condition** without intensive management.
6. Completely Degraded: The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

Other condition ratings commonly used are described in Bush Forever (Government of WA 2000).

Conservation area is a term used in the *Environmental Protection Act 1986* to describe a conservation park, national park, nature reserve, marine nature reserve, marine park or marine management area within the meaning of the *Conservation and Land Management Act 1984* or any other land or waters reserved or managed for the purpose of, or purposes including, nature conservation.

Constrained areas, for the purpose of this document, are those defined within the:

- Perth Metropolitan Regional Scheme (and Bush Forever Study Area);
- Greater Bunbury Regional Scheme; and
- Peel Regional Scheme,

where there is a reasonable expectation that development will be able to proceed. This may include areas zoned urban, urban deferred or industrial zoned land. Regional schemes, town planning schemes and local planning strategies can be viewed on the Western Australian Planning Commission's website at http://www.wapc.wa.gov.au/Region+schemes.

Critical assets represent the most important environmental assets in the State that must be fully protected and conserved for the State to meet its statutory requirements and to remain sustainable in the longer term.

Declared rare flora refer to **rare flora**.

Depleted refer to **bioregional conservation status**.

Ecological community describes a naturally occurring biological assemblage that occurs in a particular type of habitat. Note: the scale at which ecological communities are defined will often depend on the level of detail in the information source, therefore no particular scale is specified (English and Blyth 1999).

Ecological linkage describes a network of native vegetation that maintain some ecological functions of natural areas and counter the effects of habitat fragmentation.

Ecological system diversity is the variety of habitats, biotic communities and ecological processes in a given area.

Ecological processes are the interactions, changes or evolutionary development processes of the ecosystem over time.

Ecosystem describes a dynamic complex of plant, animal, fungal, and microorganism communities and the associated non-living environment interacting as an ecological unit (NSCABD 1996), including abiotic components, being partly determined by soil, parent material and climate.

Ecosystem diversity is the diversity of all living organisms and non-living components within a given area and their relationships.

Ecosystem services describes the processes by which the environment produces resources that provide benefits to humans e.g. flood and disease control, clean air.

Eutrophication is a natural process of accumulation of nutrients leading to increased or abnormal aquatic plant growth in lentic wetlands, rivers, harbours and estuaries. Human activities contributing fertilisers and other high nutrient wastes can speed up the process, leading to algal blooms and deterioration in water quality.

Environmental values are the particular values or uses of the environment that are important for a healthy ecosystem or for public benefit, welfare, safety or health and which requires protection from the effects of pollution and harm (ANZECC and ARMCANZ, 2000; see *Environmental Protection Act 1986*).
A **beneficial use**, in an environmental context, means the use of the environment which is:
(a) conducive to public health or aesthetic enjoyment and which requires the protection from the effects of emissions or environmental harm; or
(b) identified and declared within the *Environmental Protection Act 1986* to be a beneficial use to be protected under an approved policy.
An **ecosystem health condition** means a condition of the ecosystem that is:
(a) relevant to the maintenance of ecological structure, ecological function or ecological process and which requires the protection from the effects of emissions or of environmental harm; or
(b) identified and declared to be a beneficial use to be protected under an approved policy.

Fauna that is otherwise significant are defined as:
- Threatened / **specially protected fauna** as endorsed by the Minister;
- fauna species that are habitat specialists;
- wide-ranging fauna species with reduced populations in the **bioregion**;
- short-range endemic species;
- fauna species that have few populations in the **bioregion**;
- fauna species which have reduced ranges or few recent records in the **bioregion**; and/or
- internationally-listed migratory species.

Foreshore reserve means the foreshore area or watercourse **buffer** set aside as a reserve under planning legislation.

Fringing vegetation refers to the **riparian vegetation** adjacent to a water body and directly dependent on the proximity of a watercourse or wetland. **Riparian vegetation** may include both wetland and dryland vegetation. Wetland vegetation can tolerate some period of inundation and is typically found below the high water mark or within the floodway, for example flooded gums and paperbarks, and submerged and emergent species like rushes. Dryland vegetation is not tolerant of permanently or seasonally waterlogged conditions. **Riparian vegetation** provides many important functions including habitat for many aquatic and terrestrial species, stabilisation of the banks, energy dissipation, **ecological linkages**, and sediment and nutrient retention; it assists in maintaining the integrity of the watercourse or wetland in a number of ways.

Genetic diversity represents the heritable variation within and between populations of organisms. Variation of genes / genetic information contained in all individual plants, animals and micro-organisms both within and between populations of organisms that comprise individual species as well as between species. There are so many genes and different possible combinations of genes that for most types of organism every individual, population and species is genetically distinct.

High value asset/s represents those environmental assets that are in 'good' or better condition (refer to Appendix 1 for condition rating), are considered valuable by the community and/or government, but are not identified as 'critical'.

Landscape describes the physical environment made up of basic elements – climate, geology, topography, vegetation, fauna and humans – biophysical characteristics that can be used to identify differences between different **landscapes.**

Local area summarises the surrounding environment within a radius that varies with region and indicates the distance across which there is little change in a vegetation community. For example, in the mallee region of the south-west, a local area is typically a radius of 15 kilometres from the subject land. For **ecological communities** where there is rapid change over distance, such as the Lesueur and Fitzgerald River areas, a distance of five kilometres is more appropriate. In the Eremaean Province, a distance of 50 kilometres is recommended. This will need to be determined on a region and vegetation specific basis.

Meta-population describes a population of populations. A defined set of geographically separate populations with at least some exchange of individuals between the separate populations – in other words, systems of local populations connected by dispersing individuals.

Native vegetation means indigenous aquatic or terrestrial vegetation but does not include vegetation that was intentionally sown, planted or propagated unless (a) that vegetation was sown, planted or propagated as required under this Act or another written law; or (b) that vegetation is of a class declared by regulation to be included in this definition, and includes dead vegetation unless that dead vegetation is of a class declared by regulation to be excluded. Note that this definition includes non-vascular plants (e.g. mosses, fungi, algae) and marine plants (seagrass, macroalgae / seaweed).

Planning instrument means:

(a) a scheme or a strategy, policy or plan made or adopted under a scheme;
(b) a State planning policy approved under section 29 of the *Planning and Development Act 2005* and published in the *Gazette*;, or
(c) a local planning strategy made under the *Planning and Development Act 2005*.

Plant association is a vegetation unit that considers plant associations that have a similar physiognomy (a combination of vegetation structure and growth-form) independent of specific floristic composition, and is the component species with particular dominants of a given area. If the vegetation of another area has the same dominants it is in the same association.

Plant formation is the basic unit of vegetation as determined by the component species with particular dominants of a given area to define the **vegetation association** that considers plant associations that have a similar physiognomy (a combination of vegetation structure and growth-form), independent of specific floristic composition.

Priority ecological community means an ecological community that does not meet survey criteria for 'threatened' status or that are not adequately defined. They are listed by DEC under one of five categories ranked in order of priority for survey and/or definition of the community, and evaluation of conservation status, so that consideration can be given to their declaration as threatened ecological communities.

Priority fauna refers to conservation significant animal species listed by DEC's Threatened Species Consultative Committee, but which are not currently listed under Section 14(2)(ba) of the *Wildlife Conservation Act 1950* as **specially protected fauna**.

Priority flora refers to plant taxa that are either under consideration by DEC as **rare flora** but are in need of further survey to adequately determine their status, are adequately known but require ongoing monitoring to ensure their security does not decline, or are conservation dependent and require active management to maintain their status.

Protected area/s describes an area of land especially dedicated to the protection and maintenance of biological diversity and managed through legal and other effective means. (ICUN 1994).

Rare flora refers to flora that is declared rare in the current *Wildlife Conservation (Rare Flora) Notice* under section 23F of the *Wildlife Conservation Act 1950*.

Representativeness describes the extent to which areas selected for inclusion in the national reserves system are capable of reflecting the known biological diversity and ecological patterns and processes of the **ecological community** or ecosystem concerned (Commonwealth of Australia 1996).

Riparian vegetation means the distinctive vegetation associated with a wetland or watercourse. This vegetation is influenced by the passage and storage of water.

Significant flora are defined as:

- species that are confined to a specific area (ie endemic to the **bioregion**) or otherwise geographically restricted;
- distinctive local forms that have not been recognised taxonomically (not a species, subspecies or variety);
- populations that are outside the main geographic range (ie disjunct populations);
- populations at the end of the plant's geographic range;
- populations that represent a significant number of the known individuals of the taxon in the **bioregion**; or
- **priority flora** of priority 1 to 4 as listed by DEC – taxa that are under consideration as **rare flora** but are in need of further survey or continued monitoring.

Significant habitat/s refers to habitat that provides resources (breeding, resting and feeding), connectivity or habitat area for a species or community that is critical for its survival.

Specially protected fauna refers to fauna that is declared in the current gazetted *Wildlife Conservation (Specially Protected Fauna) Notice* under the *Wildlife Conservation Act 1950.*

Species diversity can be considered as the variety of individual species within a given area, such as a region. While such diversity can be measured in many ways, the number of species (species richness) is most often used. A more precise measurement of taxonomic diversity also considers the relationship of species to each other. The greater the difference between one species and another species, the greater its contribution to any overall measure of biological diversity. The ecological importance of a species can have a direct effect on community structure and thus on overall **biodiversity**. The variety of species increases with genetic change and evolutionary processes.

Suitably qualified person means a person with specific training and/or experience in a field of interest relating to Western Australian ecosystems and/or landscapes, e.g. flora and/or fauna identification, ecology, threatening processes, hydrology and land degradation.

Threatened ecological community means an ecological community listed, designated or declared under a written law or a law of the Commonwealth as threatened, endangered or vulnerable. In practice, these are those declared under section 51B of the EP Act as an environmentally sensitive area, and those under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999.* Categories relating to the status of the threat to a particular community are determined following assessment, and are 'presumed totally destroyed', 'critically endangered', 'endangered' or 'vulnerable'.

Vegetation association / complex / type

Associations as defined by Beard (1980) are based on three principal characteristics of vegetation:

1. Floristic Composition: the species of plants, which comprise vegetation.
2. Vegetation Structure: the height of plants in layers, their shape and their spacing
3. Growth Form: the morphological characteristics of the component plants, such as woody or herbaceous, annual or perennial, thorny or succulent, evergreen or deciduous, and leaves of a certain texture, size and shape.

Complexes as defined by Heddle *et al* (1980) and Mattiske and Havel (1998) are based on the pattern of vegetation at a regional scale as it reflects the underlying key determining factors of landforms, soils and climate.

Types as defined by Beard (1980) are mapped principally at the level of **plant formation** and most often at the 1:250,000 scale with minor attention to **plant associations** where they could be readily distinguished.

Watercourse means:
(a) any river, creek, stream or brook in which water flows;
(b) any collection of water (including a reservoir) into, through or out of which any thing coming within paragraph (a) flows;
(c) any place where water flows that is prescribed by local by-laws to be a watercourse;
and includes the bed and banks of any thing referred to in paragraph (a), (b) or (c).
For the purposes of this definition:
(a) a 'flow' or 'collection' of water includes those that are intermittent or occasional;
(b) a river, creek, stream or brook includes a conduit that wholly or partially diverts it from its natural course and forms part of the river, creek, stream or brook; and
(c) it is immaterial that a river, creek, stream or brook or a natural collection of water may have been artificially improved or altered.

Watercourse or wetland buffer means land adjoining, or directly influencing a watercourse or wetland that is managed to protect watercourse and wetland values, including any riparian areas. It is basically an area outside a watercourse or wetland where clearing and certain activities are inappropriate. The size of the buffer area should take into account watercourse or wetland values, condition, pressures and responses to pressures.

Wetland means an area of seasonally, intermittently or permanently waterlogged or inundated land, whether natural or otherwise, and includes a lake, swamp, marsh, spring, dampland, tidal flat or estuary.

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APPENDIX 1

Determining vegetation condition

Bush Forever Volume 11 defines vegetation condition:

> *"Condition is a rating given to bushland to categorise disturbance related to human activities. This rating refers to the degree of change in the structure, density and species present in the bushland in relation to undisturbed bushland of the same type. Different people have used a series of scales of disturbance. Condition ratings used commonly in the Perth Metropolitan Region are described in Volume 2 (Connell 1995, Government of WA 1995, Keighery 1994)."*

Condition Scale **(Extract from Table 12 on page 48 of Bush Forever Volume 2 from Keighery B.J. (1994)2)**	
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

1 *Bush Forever Final Report* (December 2000), Western Australian Planning Commission.
2 Keighery, B.J. (1994) *Bushland Plant Survey. A Guide to Plant Community Survey for the Community.* Wildflower Society of WA (Inc), Nedlands, Western Australia.

APPENDIX 2

Critical assets

As defined in the EPA's Position Statement No.9 *Environmental Offsets* and Guidance Statement No.19 *Guidance for the Assessment of Environmental Factors (Environmental Offsets)*.

1. **Public conservation reserve system**
   - Nature reserves, national parks, conservations parks, regional parks, marine parks, marine nature reserves and marine management areas.
2. **Native vegetation**
   - Where adverse impacts are considered to be 'seriously at variance' with any of the ten clearing principles in Schedule 5 of the EP Act.
   - Where proposed clearing would result in the pre-European extent of a vegetation complex to fall below 30% in a bioregion (vulnerable).
   - Where proposed clearing would result in the pre-European extent of a vegetation complex to fall below 10% in constrained areas on the Swan Coastal Plain (endangered).
   - Bush Forever reserves, excluding those subject to negotiated planning solutions, having regards to WAPC's SPP No.2.8 *Bushland Policy for the Perth Metropolitan Region* (draft).
3. **Biodiversity**
   - Declared Rare Flora and Declared Threatened Fauna where proposed clearing would significantly impact local populations.
   - Having regard for threatened ecological communities which are considered to be 'presumed totally destroyed', 'critically endangered', 'endangered', 'vulnerable' or 'data deficient'.
   - Having regard for the Priority Species List (flora and fauna).
4. **Wetlands**
   - Ramsar wetlands.
   - A wetland listed in *A Directory of Important Wetlands in Australia* and Australian Wetlands Database.
   - Environmental Protection Policy (EPP) wetlands.
   - Conservation category wetlands (CCWs).
5. **Rivers**
   - Wild and Scenic Rivers.
6. **Landscape**
   - Where proposed clearing will result in irreversible damage to or destruction of an important landscape, natural feature or environmental icon.
7. **Environments sensitive to emissions/discharges**
   - In areas where new or an addition to existing emissions present a significant risk to human health or the environment, or exceed a prescribed environmental or health standard, or contribute to a global environmental problem such as ozone depletion.
8. **Ecosystems vulnerable to threats**
   - Where proposed clearing threatens or has the potential to threaten the survival, abundance or evolutionary development of an indigenous species or ecological community as identified above for rare flora, specially protected or threatened fauna, threatened ecological communities and priority species.
9. **Heritage**
   - Where proposed clearing could compromise identified values of places of State, National or World Heritage significance (including places of indigenous heritage of high importance) within the scope of the EP Act.

APPENDIX 3

Surveys and gathering additional information

During the preliminary assessment of a clearing application it may become apparent that insufficient information exists to make a confident determination of variance against one or more of the clearing principles. In this instance it will be necessary to obtain the additional information required by undertaking a survey and gathering additional information.

Where a survey and gathering additional information is needed the scope of this will be determined on a case-by-case basis, but would be consistent with *EPA Position Statement No.3*. This document outlines the EPA's principles for environmental impact assessment of biodiversity. The EPA sees proper understanding of the requirements of adequate surveys as central to achieving a sound assessment of biodiversity.

EPA Guidance Statement No.10, *EPA Guidance Statement No.51*, and *EPA Guidance Statement No.56* also provide guidance as to survey requirements.

Some key factors in using surveys to assess biodiversity include:

- the methodology used should be consistent with the approaches recommended in the EPA Guidance Statements No's 10, 51 and 56 – the methodology used, and any limitations of the surveys, should be outlined in the resulting report;
- the timing and time allocated should be determined by the natural cycles of the region (such as growth and flowering);
- the intensity of the sampling (number of sites; their spacing; and their area) should be based on the complexity of the flora, vegetation and faunal assemblages of the permit application area; and
- the level of effort should correspond with the existing data for that area, i.e. where less existing information is available, a greater survey effort would be required.

In undertaking a survey and gathering additional information, specific measures of diversity include the following.

Plant species

- total vascular plant taxa (species, subspecies and varieties) diversity: and
- vascular plant taxa diversity for each ecological community.

Fauna species

- total vertebrate and invertebrate fauna taxa (genera, species and subspecies) diversity

Ecosystem diversity

- number of ecological communities (plant communities);
- number of ecological communities (fauna communities (assemblages));
- macrohabitat diversity;
- microhabitat diversity in each macrohabitat;
- a variety of soil types or geological formations; and
- micro-topographical diversity and edaphic variation.

Other aspects

It may be necessary to gather more detailed information on the physical aspects of an application, such as the extent of land degradation and possible hydrological changes as a result of an incidence clearing.

ANNEXURE 2

A Guide to Preparing Revegetation Plans for Clearing Permits

Government of **Western Australia**
Department of **Water and Environmental Regulation**

A Guide to Preparing Revegetation Plans for Clearing Permits

under Part V of the *Environmental Protection Act 1986*

Department of Water and Environmental Regulation
March 2018

Department of Water and Environmental Regulation
168 St Georges Terrace
Perth Western Australia 6000
Telephone +61 8 6364 7000
Facsimile +61 8 6364 7001
National Relay Service 13 36 77
www.dwer.wa.gov.au

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Contents

Tables

Definitions[1]

CEO means the Chief Executive Officer of the Department of Water and Environmental Regulation

density means the number of individual plants of a defined group that are present in a given area at a particular time, for example stems per unit area.

dieback survey means an onsite survey undertaken by an environmental specialist to: (a) verify desktop study information; (b) identify indicator species; and (c) carry out soil sampling in areas significantly affected by dieback.

direct seeding means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.

disease means organisms (pathogens) that cause adverse outcomes (symptoms) in another organism (host). Dieback of native plants caused by *Phytophthora* species is an example of a serious plant disease that is a major problem in Western Australia (Environmental Protection Authority 2006).

dominant species means the tallest and/or most common plant in the overstorey or each layer.

environmental specialist means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide, or is approved by the CEO as a suitable environmental specialist.

local provenance means native vegetation, seeds and propagating material from natural sources geographically similar and within as close proximity as practicably possible. Local provenance in higher diversity bioregions, such as the Swan Coastal Plain, can be within less than 50 kilometres, while in areas with homogenous diversity, such as the Central Kimberley, it may be within 200 kilometres.

mulching means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.

[1] The definitions of terms in individual clearing permits, where inconsistent with this Guide, take precedence for the time that the permit is valid.

optimal time means the specified period for the activity in a particular area of the State as follows:

Area	Optimal time for direct seeding	Optimal time to undertake planting
Gascoyne	May in south or November–December in north	no planting without irrigation
Goldfields Esperance	April–May	no planting without irrigation
Great Southern	April–May	May–June
Kimberley	October–December	no planting without irrigation
Metropolitan	April–June	May–July
Midwest	April–May or November–December in extreme north	May–June
Pilbara	November–December	no planting without irrigation
South West	April–June	May–June
Wheatbelt northern	May–June	June–July
Wheatbelt southern	April–June	May–June

permit holder means the holder of a clearing permit granted and in force under Part V Division 2 of the *Environmental Protection Act 1986*.

planting means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.

quadrat means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density and condition.

qualified disease interpreter means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of two years' work experience in plant disease identification and remediation techniques.

reference site means a site used to provide baseline data for planning a revegetation project. Measurements from fixed reference points or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects.

regenerate/ion means the re-establishment of vegetation from in-situ seed banks and propagating material (such as lignotubers, bulbs, rhizomes) contained either within the topsoil or seed-bearing mulch.

rehabilitation means actively managing an area containing native vegetation in order to improve the ecological function of that area.

remedial action means any activity that is required to ensure successful re-establishment of vegetation to its pre-clearing composition, structure and density, and may include a combination of soil treatments and revegetation.

revegetate/ion means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.

revegetation plan means a plan prepared by the permit holder, or an appropriate environmental specialist delegated by the permit holder, for the revegetation and rehabilitation of a site in accordance with a permit condition.

site preparation means management of existing site topsoil and preparation of the finished soil surface, for example by ripping or tilling the soil surface and re-spreading site topsoil and chipped native vegetation.

species richness means the number of species that are present in a habitat or ecosystem.

vegetation condition means the rating given to native vegetation which refers to the impact of disturbance on each of the layers and the ability of the community to regenerate (Keighery 1994). The Keighery scale (1994) is used for the South West and Interzone Botanical Province, and Trudgen (1991) is used for the Eremaean and Northern Botanical Provinces (see Appendices C and D).

vegetation unit means any group of plants or a plant community, regardless of vegetation category or level.

1 Purpose

This guide sets out the Department of Water and Environmental Regulation's (DWER) recommended approach to preparing a revegetation plan, where land revegetation is proposed as an offset or required, as a condition of a clearing permit granted under the *Environmental Protection Act 1986* (EP Act). It provides general guidance to key stakeholders including landowners, consultants, local government authorities and state government agencies, regarding the information that should be provided to DWER to ensure that an assessment of the adequacy of a revegetation plan can be made.

2 Introduction

Revegetation is the intentional establishment and management of native vegetation to recreate or improve the environmental values of a site to achieve a species composition, structure and diversity similar to that which existed prior to disturbance.

Depending on the purpose of the revegetation, it may be necessary to revegetate land within the clearing impact area (onsite) or at a separate location (environmental offset). Revegetation will generally be in accordance with an approved revegetation plan as a condition to a clearing permit.

Onsite revegetation (onsite mitigation) may be conducted when some or all of the land cleared is no longer required for the purpose for which it was cleared. Restoring the clearing footprint to a self-sustaining state, or as close to its pre-clearing state as possible, aims to reduce long-term environmental impacts of the clearing.

Offsite revegetation (environmental offset) may be required when clearing results in a significant residual environmental impact. DWER's Chief Executive Officer (CEO) may require a permit holder to offset the loss of native vegetation by undertaking offsite revegetation, whether on the same or another property.

Successful revegetation requires appropriate planning and preparation to establish objectives and completion criteria, and identify tasks and resources to ensure the success of the revegetation. It is important for revegetation projects to be guided by a revegetation plan appropriate to the specific conditions and requirements of the revegetation site.

The revegetation plan should be prepared by, or in consultation with, an environmental specialist with appropriate expertise in revegetation techniques, and demonstrated revegetation experience specific to Western Australian native vegetation and environmental conditions.

To facilitate the consideration and approval of revegetation plans, checklists of the recommended contents of a revegetation plan and monitoring report are provided in Appendices A and B of this guide.

This guide provides a recommended approach for preparing a revegetation plan and is not intended to detail revegetation techniques. Sections 7 and 8 references some other publications that provide detailed guidance on revegetation techniques.

3 Legislation

The clearing of native vegetation in Western Australia is regulated under Part V Division 2 of the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations). Clearing of native vegetation is an offence unless a clearing permit has been granted, or an exemption applies.

A clearing permit may be granted subject to conditions that the CEO considers necessary or convenient for mitigating environmental harm or offsetting the loss of cleared vegetation (section 51H). Such conditions may include requirements relating to the revegetation of an area (whether onsite or offsite). This includes the preparation of a revegetation plan for the establishment and maintenance of vegetation on land (other than land cleared under the permit to offset the loss of the cleared vegetation).

The CEO has delegated the clearing provisions of the EP Act to the Department of Mines, Industry Regulation and Safety for clearing regulated under the *Mining Act 1978*, various petroleum legislation and under state agreements administered by the Department of Jobs, Tourism, Science and Innovation.

4 Reporting Requirements

Under section 51I(2)(d) of the EP Act, a permit holder may be required to monitor operations and environmental harm, conduct analysis of monitoring data, and provide reports of monitoring data and analysis to the CEO.

The completion criteria for revegetation must be measurable so that the effectiveness of the revegetation can be monitored, reported and assessed. Monitoring reports and the evaluation of monitoring data must be provided to the CEO before the date specified on the clearing permit.

Reporting must continue until the expiry of the clearing permit or until the CEO or delegate agrees that the conditions of the clearing permit and the revegetation completion criteria are met (provided that this is prior to the expiry of the permit).

5 Revegetation Plan

The revegetation plan must include an outline of the permit holder’s revegetation commitments; background information about the impact site prior to clearing and, if offsite revegetation is proposed, the revegetation site; relevant information collected from reference sites; and completion criteria. The revegetation plan should also outline a monitoring and management program.

Appendix A contains a checklist of the recommended content of a revegetation plan. The revegetation plan checklist must be completed and attached to the revegetation plan upon submission to DWER. If revegetation is required as a condition of a clearing permit, typically an applicant will be requested to provide a revegetation plan to DWER for review, prior to the granting of the permit. DWER may require the permit holder to amend the revegetation plan where it is insufficient. This checklist can be modified to meet specific circumstances as required.

5.1 Revegetation Commitments

The permit holder's overall objectives for the revegetation project should be outlined in the revegetation plan.

The Environmental Protection Authority's (EPA) *Guidance Statement No. 6 – Rehabilitation of Terrestrial Ecosystems* (2006) provides information on setting effective objectives for rehabilitation and revegetation. The vision and objectives of a revegetation plan should be consistent with the SMART (specific, measurable, achievable, relevant, time-bound) principles.

Examples of a revegetation project objective are to ensure the:

- ecosystem has the capacity to become self-sustaining or become sustainable with minimal management; and
- revegetation is representative of the original vegetation unit.

5.2 Background Information

The revegetation plan should include the following information about the impact site prior to clearing and, if offsite revegetation is proposed, the revegetation site:

- ownership, vesting and zoning of the land;
- description of the site's physical and biological features (such as soil type, landform, topography, hydrology/drainage, vegetation type and fauna);
- description of the site's history, including historical disturbance such as grazing and logging;
- description of disturbances and threats potentially exacerbated by clearing such as erosion and weeds;
- existing site conditions that require remediation such as soil compaction, erosion, surface water diversion, weeds, feral animals and plant pathogens;
- evidence of any agreements necessary to access the site for the purpose of undertaking revegetation; and
- maps, photographs and spatial datasets relating to the site.

Maps and shapefiles

Maps, spatial datasets and other information referred to in the revegetation plan are to be provided to DWER electronically. Spatial datasets provided should be as Environmental Systems Research Institute (ESRI) shapefiles with the following properties:

- geometry type: polygon shape;
- coordinate system: GDA 1994 (Geographic latitude/longitude); and
- datum: GDA 1994 (Geocentric Datum of Australia 1994).

Aerial photographs or maps should be used to show features of a site, for example, the boundaries of the clearing footprint, the revegetation site/s, the reference site/s and vegetation unit boundaries.

5.3 Reference Sites

Reference sites enable the collection of baseline data that assist in determining the completion criteria to be developed in sufficient detail.

Selecting reference sites

Reference sites are an important source of information on the type of vegetation, for example species composition and structure, that is proposed to be revegetated. Baseline floristic data can be collected from the following types of reference sites:

- floristic surveys of the pre-disturbance vegetation that is in 'excellent condition' (Keighery, 1994) or 'very good condition' (Trudgen 1991) or better;
- in consultation with DWER, adjacent vegetation of the same vegetation unit/s and is in 'excellent condition' (Keighery 1994) or 'very good condition' (Trudgen, 1991) or better, and occurs on the same soil type; or
- in consultation with DWER, vegetation located in close proximity that has the same vegetation unit/s and is in 'excellent condition' (Keighery 1994) or 'very good condition' (Trudgen 1991) or better, and occurs on the same soil type.

Where it can be demonstrated that a suitable reference site meeting the above criteria is not available, DWER may consider and approve an alternative reference site (e.g. occurring on a different soil type).

Existing datasets can be used to supplement reference site data.

Data to collect

Collecting baseline data using quadrats for the overall site is necessary to develop the completion criteria. Other information such as existing datasets may be used in some circumstances. Baseline data should be collected for each relevant component, for example, each vegetation type impacted or proposed to be revegetated, and the completion criteria developed for each of these. Compilation of baseline floristic and associated data from reference site surveys also assists in the development of species lists for revegetation.

Table 1 outlines example data and methods of collection that may be used to develop the completion criteria (see Section 5.4) and monitoring reports (see Section 6). The methods of collection outlined should be based on site characteristics and justification provided.

Table 1: Example data and methods of collection

Scale	Data	Method
Quadrat-level	Species richness	Number of species within quadrats.
	Species list (includes weeds)	List in order of dominance and grouped by structural component (for example trees and shrubs). Dominance is determined by ranking species based on density. Density is described below.
	Density of trees and large shrubs using stems/ha (includes weeds) Density of small shrubs and herbs using plants/quadrat (includes weeds)	For trees and large shrubs use stems/ha as quadrat based counts may be inaccurate where trees and large shrubs are not numerous. For small shrubs such as herbs, conversion between stems/ha and count/quadrat is possible, as long as the quadrat size is known.
	Vegetation structure	ESCAVI (2003), Muir (1977) or similar.
	Vegetation condition	Use Keighery (1994) or Trudgen (1991) depending on botanical province (Appendices C and D respectively).
	% Bare ground	Visual estimate for quadrats or site (if small). Bare ground includes soil and/or rock.
	Photos (photo monitoring points)	Taken at each quadrat for future reference.
Site level	Species richness	The number of species found at the site.
	Species list (includes weeds)	List in order of dominance and grouped by structural component (for example trees and shrubs. Dominance is determined by ranking species based on their density. Use density as described above.
	Vegetation condition site mapping	Use Keighery (1994) or Trudgen (1991) depending on botanical province (Appendices C and D respectively).
	Weed mapping	Use polygons and % cover classes.
	Disease mapping	To be completed by a qualified disease interpreter.

When to survey

Floristic surveys should be conducted close to the peak flowering period for the majority of species in the vegetation unit. Site type, latitude and conditions specific to the season, such as late or early rains, should be considered (Department of Biodiversity, Conservation and Attractions 2017). www.dpaw.wa.gov.au/images/documents/plants-animals/monitoring/forms/threatened-priority-flora-field-manual.pdf).

Where Threatened or Priority flora species are present, or are likely to be present, specific consideration should be given to the peak flowering period for these species. (www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities).

Further information on optimal survey times can be found in the EPA's Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (2016). Province and bioregion maps can be viewed on the FloraBase website, https://florabase.dpaw.wa.gov.au/help/ibra.

Quadrat quantity, placement and size

The number of quadrats required will vary depending on the size of the site being surveyed. Sufficient replication is required to ensure that physical and biological variation within the site is adequately sampled (Harding and Williams 2010). The revegetation plan should demonstrate that appropriate sampling techniques were used to determine the optimum number of quadrats.

Appropriate quadrat placement is important in the establishment of suitable and realistic completion criteria:

- quadrats must be placed in vegetation that is in 'excellent condition' (Keighery, 1994) or 'very good condition' (Trudgen 1991) to ensure that completion criteria reflect the vegetation type that is compositionally and structurally intact (for example, placed 50–100 metres from the edge of a site to avoid edge effects). If this is not possible, contact DWER for advice;
- the placement of quadrats should avoid ecotones (transitional vegetation areas) to ensure data is representative of a unique vegetation unit; and
- quadrats must include common or dominant species, and species representative of and endemic to the ecosystem (Department of Environment and Conservation 2009).

Quadrat locations must be reported to DWER at the time of the clearing permit application assessment.

The selection of quadrat size is dependent on the spatial scale of ecological and floristic variation within the bioregion. Bioregions of higher diversity, such as the Geraldton Sandplains and Swan Coastal Plain, may require smaller quadrats than those located within the more homogenous Central Kimberley bioregions.

Further information on sampling design and intensity can be found in the EPA's Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (2016).

Vegetation condition

The condition of vegetation at a reference site is to be determined by assessing the impact of disturbance on the vegetation structure and its capacity to regenerate. Appendices C and D list vegetation condition scales for different Western Australian botanical provinces.

Vegetation condition maps are to be included in the revegetation plan.

Weeds and diseases

Recording the species, extent and density of weeds or diseases present in a reference site assists in determining the appropriate techniques to manage weeds and diseases within the revegetation site.

Use of existing datasets

A substantial volume of 'grey' literature (that is, academic literature that has not been formally published) exists, which may be useful in the development or refinement of completion criteria.

Existing floristic datasets can be used to supplement data collected from reference sites. If a reference site is missing key structural components due to disturbance, previously collected relevant data (especially from regional baseline surveys) may provide relevant information on the site's likely vegetation prior to disturbance.

The revegetation plan should clearly differentiate between data obtained through surveys undertaken by (or on behalf of) the permit holder, and data obtained from existing datasets. If existing floristic datasets are used, the currency of species names should be checked. Existing floristic datasets must be referenced.

5.4 Completion Criteria

Revegetation plans should include quantitative completion criteria. Each completion criterion must be defined by a measurable outcome so that the effectiveness of the revegetation action(s) can be assessed over time. The measurable outcomes of a revegetation project that are to be regularly monitored and reported, should be included in the revegetation plan. DWER may assist permit holders with the development of appropriate completion criteria.

Completion criteria must be designed to allow effective reporting and auditing for the duration of the clearing permit. Floristic data from reference sites are useful in setting the completion criteria for the revegetation site. Revegetation is generally considered complete once the completion criteria have been met. DWER will ensure that an approved revegetation plan and the clearing permit conditions are consistent. If approved completion criteria have not been met towards the end of the permit, the permit holder or DWER may seek an extension of the permit.

Developing completion criteria

Completion criteria are developed based on data collected from a reference site (where possible) and must be consistent with the SMART principles (see Section 5.1). Completion criteria will depend on the revegetation purpose and objectives.

Table 2 outlines a typical framework for the completion criteria of a revegetation project to increase biodiversity. Other criteria may be proposed, provided there is sufficient evidence to justify use. DWER may discuss specific criteria with the permit holder during the assessment.

Table 2: Example framework for the completion criteria of a revegetation project aimed at improving biodiversity

Criterion		Measure	Units
A	**Species richness**	i. Total species richness (site)	species count
		ii. Quadrat species richness (average across quadrats)	species count
		iii. Tree species richness	species count
		iv. Shrub species richness	species count
B	**Species density**	i. Tree density (for each dominant species)	stems/ha
		ii. Shrub density	stems/ha (large shrubs) or count/quadrat (small shrubs)
C	**Herbs, sedges, grasses**		count and/or percentage cover per quadrat
D	**Weed cover**	i. Minor, non-competitive species	percentage cover or count
		ii. Major competitive weeds	percentage cover or count
		iii. Declared weeds	percentage cover or count
E	**Bare ground**		percentage
F	**Vegetation structure**		refer Table 1
G	**Other measures as required**		

Table 3 outlines an example of completion criteria developed, based on baseline data collected from a fictional reference site, *Banksia woodland X*,which is to be cleared, and the completion targets. In this example, the completion criteria include 'duplicate criteria' for the number of stems per hectare to be achieved at the revegetation site (see criteria B and F), for example, criteria B is attained by achieving criteria F. DWER will accept 'duplicate criteria' that are complementary, but will not accept criteria that are in conflict with other completion criteria, for example targeted outcomes which contradict each other.

Table 3: Example completion targets and criteria developed for Banksia woodland X
(Note: Criterion C - Herbs, sedges and grasses is not a significant measure for this revegetation.*)*

The vegetation unit to be revegetated is identified as *Banksia woodland X.* As it is to be cleared, *Banksia woodland X* is used as the reference site, upon which completion criteria will be developed.

Criterion	Baseline floristic data	Completion targets	Completion criteria
A(i)	Site species richness is 55 (native sp. only).	Minimum of 60% of native species returned, based on reference sites.	The revegetation site needs to achieve a minimum species richness of 33 native species, as recorded at the reference sites.
A(ii)	Species richness of the 10m x 10m quadrats were 30, 35, 32, 25 and 36. Therefore, the average number of species/quadrat is 32.	Minimum of 60% of native species returned, based on reference sites.	The revegetation site needs a minimum of 19 native species per quadrat, as recorded at the reference sites.
A(iii)	There are four dominant tree species.	Return dominant tree species present at reference sites.	The revegetation site needs to have the four dominant tree species (*Banksia attenuata*, *B. menziesii*, *B. ilicifolia* and *Eucalyptus marginata*) recorded at the reference sites.

A(iv)	Shrub species richness is 20.	Minimum of 60% of native species returned, based on reference sites.	The revegetation site needs a minimum of 12 shrub species, as recorded at the reference site.
B(i)	Common tree species by dominance are *Banksia attenuata* 200 stems/ha; *B. menziesii* 150 stems/ha; *B. ilicifolia* 50 stems/ha; *Eucalyptus marginata* 25 stems/ha	Minimum of 60% of stems/ha for dominant tree species returned, based on reference sites.	The revegetation site needs a minimum of stems/ha for: *Banksia attenuata* 120 stems/ha; *B. menziesii 90* stems/ha; *B. ilicifolia* 30 stems/ha; *Eucalyptus marginata* 15 stems/ha, as recorded at the reference site.
B(ii)	Shrub species by dominance are *Bossiaea eriocarpa* 500 stems/ha; *Acacia pulchella* 50 stems/ha; *Adenanthos cygnorum* 20 stems/ha; *Leucopogon conostephioides* 300 stems/ha; *Scholtzia involucrata* 400 stems/ha	Minimum of 60% of stems/ha for dominant shrub species returned, based on reference sites.	The revegetation site needs a minimum of stems/ha for: *Bossiaea eriocarpa* 300 stems/ha; *Acacia pulchella* 30 stems/ha; *Adenanthos cygnorum* 12 stems/ha; *Scholtzia involucrata* 240 stems/ha; as recorded at the reference site.
D(i)	Weed cover at the site is 15% (minor non-competitive species).	Weed cover is no greater than in the reference sites.	The revegetation site should have a maximum of 15% weed cover, as recorded at the reference site.
D(ii)	5% cover of major competitive weeds.	Absent from the revegetation site.	The revegetation site needs to have major competitive weeds absent from the site.
D(iii)	No declared weeds are present.	Managed as required by the *Biosecurity and Agriculture Management Regulations 2013*.	Absent.
E	Bare ground is 15%.	No more than 5% greater than in the reference sites.	The revegetation site average for bare ground is to be no more than 15%, as recorded at the reference site.
F(i)	Clearing will result in loss of Carnaby's habitat.	The site must be fully revegetated to at least 75% cover or density of the reference sites using native food plants for Black Cockatoos, and high to medium priority food species.	The revegetation site needs to have a minimum of stems/ha for: *Banksia attenuata* 150 stems/ha; *B. menziesii* 110 stems/ha; *B. ilicifolia* 35 stems/ha.
F(ii)	Survival rate to be achieved.	If after 5 years of planting a survival rate of at least 80% is not achieved, all planted trees that have not survived must be replanted within 12 months and monitored for a further 2 years.	The revegetation site needs to ensure a survival rate for trees of at least 80% is achieved after five years, and replant any trees within 12 months of dying.

5.5 Methodology

The revegetation plan should include the revegetation methodology. Some common methods of site preparation and revegetation establishment are discussed below. Information on revegetation techniques in this guide are of a general nature only and must be considered on a site-by-site basis. Other techniques may be considered, depending on the site's characteristics. Permit holders undertaking revegetation activities are advised to consult an environmental specialist.

Advice on correct site preparation should be sought from an environmental specialist to minimise maintenance after vegetation establishment, and enhance progress towards completion criteria.

Species for revegetation should be selected to replicate dominant species at the reference site. Reasonable attempts should be made to obtain diverse relevant species for revegetation. Where it is not possible to obtain a particular species, consultation with an environmental specialist is required to determine if there are any suitable substitute species.

Revegetation techniques

Effective revegetation techniques differ across local soil and climatic conditions. In arid regions, topsoil management with some direct seeding may be the most effective method of vegetation establishment. In higher rainfall regions of the south-west, planting and seeding may be the most effective.

Seeds and seedlings should be obtained from disease-free sources to ensure that plant pathogens are not introduced to the revegetation site.

Dieback mapping and site hygiene

Phytophthora sp. dieback is a soil-borne plant pathogen that is spread through wet soil, water and root-to-root contact between plants in areas that receive 400 millimetres of rainfall per year or more (e.g. the south-west of Western Australia).

If *Phytophthora* sp. dieback is suspected at a site, a dieback survey undertaken by an environmental specialist will be required prior to the commencement of site works to prevent accidental spread. The mapping can be used as a baseline for ongoing dieback monitoring, management and reporting to DWER. Sites may require a site hygiene protocol to reduce the spread of dieback at already infected sites and prevent the spread of dieback to uninfected sites.

Ripping

Some revegetation sites may need to be ripped prior to establishment to promote the best chance of survival for seeds and plantings in the first year. Ripping has a number of advantages, including breaking up soil compaction to allow root and water penetration, promoting better root development, and lifting roots and rocks that may interfere with vegetation establishment.

Pre-vegetation establishment weed control

Pre-vegetation establishment weed control is important to ensure that competition for resources between weeds and the native plants or seeds is minimised. Where necessary, weed control should commence at least 12 months prior to vegetation establishment. An environmental specialist should be consulted to develop a site-specific weed management plan. Alternatively, the revegetation plan may refer to an existing weed management plan if appropriate for the revegetation site, a copy of which must be provided to DWER.

Fencing

Consideration should be given to fencing as part of site preparation ahead of revegetation, where sheep and other livestock may otherwise have access to the site. Temporary fencing may be required to deter kangaroos and rabbits from grazing establishing plants. Fencing also assists in reducing unauthorised access by people to the site, either by foot or in off-road vehicles.

Tubestock and direct seeding

A program of works should avoid weather that is detrimental to vegetation establishment. This may include strong winds, heavy rain, very dry conditions or temperature extremes. Vegetation establishment should occur at the optimal time of year for that bioregion, or as otherwise specified in the clearing permit. Local or seasonal conditions that could influence the optimal timing for seeding or planting should be detailed in the revegetation plan.

Tubestock will need to be sourced in advance of any planned revegetation activities to ensure required species are available for planting and direct seeding. Seed obtained for revegetation must comply with any definition of local provenance in the clearing permit. Collection of seed from Crown land requires a 'Scientific or Other Prescribed Purposes' licence under the *Wildlife Conservation Act 1950*. On private property, the landowner's permission is required.

Depending on species and to allow for seasonal variation, it is suggested that seed collection commences at least two years prior to revegetation. Seed stocks may be supplemented by purchase through a seed supplier from local provenance sources.

Topsoil

Where a site to be cleared has relatively intact and weed-free vegetation, topsoil (the upper layer within a soil profile, which normally contains organic matter) may contain valuable native plant seeds, organic matter and other nutrients. Topsoil is best used immediately after clearing, however where this is not possible, topsoil can be stockpiled. Stockpiled topsoil must be managed as there is an exponential decrease in seed viability and soil nutrients over time.

Mulch

Where a site to be cleared contains relatively intact and weed-free vegetation, mulching can provide a good source of seed (especially canopy stored seeds) to be spread over the site. The mulched material can be spread over the top of re-spread topsoil and help to suppress weeds.

5.6 Maintenance and Contingency Measures

The revegetation plan should outline maintenance activities that will be undertaken over the life of the revegetation project (for example, weed control and nuisance animal control). Contingency measures should also be included in case monitoring identifies deficiencies in the revegetation, for example if a significant number of plants die during a drought.

5.7 Schedule and budget

A schedule of actions, including dates for the start of activities, an estimated budget and funding sources, should be included in a revegetation plan. An example of an indicative schedule is provided in Table 4. Appendix E provides two examples of budgets for revegetation in Western Australian bioregions. Permit holders must take into consideration the requirements of the clearing permit where applicable.

Table 4: Example of a schedule of actions

Stage	Actions	Timing	Responsibility	Year 1	Year 2	Year 3	Year 4 and beyond	Cost and funding source
COMPLETION CRITERIA	Reference site surveys and development of completion criteria	Spring	WA Revegetation Consultants are the lead consultancy and will engage and coordinate specific sub-contractors as required.	X				***Insert cost estimate and source of funding for each action***
SITE PREPARATION	Dieback mapping and development of hygiene plan	Spring	XYZ dieback interpretive services	X				
	Onsite clearing	February	LMN contractors		X			
	Fencing and ripping	Autumn	LMN contractors		X			
	Weed control	Autumn	EFG weed control contractors	X	X			
VEGETATION ESTABLISHMENT	Seed collection and seed management	Spring	WA Revegetation Consultants	X	X if required			
	Place tubestock orders with nursery	Summer	WA Revegetation Consultants ordering from ABC Native Nursery.	X	Until completion criteria have been met and maintained for two years (within the timeframe of the clearing permit).			
	Plant tubestock and undertake direct seeding	May–July	WA Revegetation Consultants		X	Until completion criteria have been met and maintained for two years (within the timeframe of the clearing permit).		
MONITORING	Vegetation monitoring against completion criteria	Spring	WA Revegetation Consultants		X	Until completion criteria have been met and maintained for two years (within the timeframe of the clearing permit).		

Stage	Actions	Timing	Responsibility	Year 1	Year 2	Year 3	Year 4 and beyond	Cost and funding source
	Weed monitoring	Spring	WA Revegetation Consultants		X	Ongoing annually until completion criteria met and maintained for two years (and as required in the clearing permit)		
	Dieback monitoring	Spring	XYZ dieback interpretive services		X	Ongoing annually		
MAINTENANCE & CONTINGENCY	Weed control	After winter rains	EFG weed control contractors		X	Ongoing annually until completion criteria met and maintained for two years (and as required in the clearing permit)		
	Remedial planting	May to July	WA Revegetation Consultants			X	Ongoing as indicated by monitoring	
	Dieback treatment	Summer	XYZ dieback interpretive services		As required and indicated by monitoring			
REPORTING	Revegetation plan		WA Revegetation Consultants Includes datasets in their entirety (electronically), data analysis, results, discussion. Includes all from Appendix A checklist including completed checklist. Mapping and GIS shapefiles included	X				
	Annual progress report	June 30 each year	WA Revegetation Consultants Includes all datasets in their entirety (electronically), data analysis, results, discussion. Includes all from Appendix B checklist including completed checklist. Mapping and GIS shapefiles included		X	Ongoing annually until completion criteria met and maintained for two years (and as required in the clearing permit)		

6 Revegetation Monitoring Reports

Clearing permit conditions may include a requirement to monitor revegetation and measure the progress of revegetation activities undertaken to determine if maintenance and contingency actions are required. This section provides guidance on monitoring requirements, including information to be included in annual reporting. Appendix B provides a checklist of the recommended content of monitoring reports for submission to DWER.

6.1 Monitoring methods

Data to collect

The types of data and methods of collection at a reference site apply to data collection for monitoring purposes (refer to Section 5.3).

Quadrats

The aim of quadrat-level monitoring is to collect data in a consistent way for use in detecting changes in revegetation over time, in order to determine if revegetation is progressing towards meeting the completion criteria. By using the same data collection methods, the data can be analysed year to year to compare the progress of the revegetation.

Determining the appropriate time to undertake a floristic survey, and the appropriate number, placement and size of quadrats for monitoring revegetation, follows the same principles as those outlined for reference sites (refer to Section 5.3):

- floristic surveys should be conducted close to the peak flowering period for the majority of species in the vegetation unit revegetated, taking into consideration seasonal variations; and
- sufficient replication of quadrats is required to encompass variability in the monitoring area, and quadrat location must be random to ensure this variation is taken into account.

The monitoring report must demonstrate that appropriate sampling techniques were used to determine the optimum number of quadrats for replication, and describe the method for quadrat location randomisation.

If permanent monitoring quadrats are used, these should be established in accordance with the Standard Operating Procedure Establishing Vegetation Quadrats (Department of Environment and Conservation 2009), the EPA's Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (2016) and the requirements specified in the clearing permit.

Photopoint monitoring

Photopoint monitoring provides a visual comparison of changes to vegetation over time. This requires photographs to be taken from the same location at set intervals

(for example, in January, April, July and October each year for three years), and using the same method (such as camera settings). Images must be provided to DWER in accordance with records and reporting conditions on the clearing permit.

Weeds and disease

Monitoring can be useful to identify whether weed control methods have been effective. This includes whether the composition and density of native species are responding positively to weed control, and whether modification to the control methods is required, for example, planting trees closer together to shade out weeds.

If disease is present within a revegetation site, hygiene management must be implemented to prevent the spread of the disease within or outside the affected area. Ongoing investigation by an environmental specialist is also recommended to ensure that disease is not being inadvertently spread through the revegetation site and to evaluate the effectiveness of hygiene protocols.

6.2 Monitoring Schedule

The frequency and duration of monitoring and documentation of changes in revegetation over time are outlined in Table 5.

Table 5: Example monitoring requirements

Scale	Monitoring type	Output	Frequency	Duration
Quadrat-level	Quadrat floristics	Floristic survey data, analysis (ordinations), discussion, list of coordinates and site map with quadrats.	Annual	Until completion criteria have been met (within the timeframe of the clearing permit).
	Vegetation structure	Data, analysis and discussion.	Annual	
	Photopoint monitoring	Images, list of coordinates, map of photopoints.	Annual	
Site-level	Vegetation condition	Data and map.	Annual	
	Weed monitoring and mapping	Data and map.	Annual	
	Disease monitoring and mapping	Data, map, name and qualifications of dieback interpreter.	Annually or as required	

6.3 Detecting Change through Data Analysis

Both multivariate (multiple variable) and univariate (single variable) analysis are used to monitor change in vegetation over time. Multivariate analysis identifies changes in the vegetation unit as a whole (that is, change in multiple species from year to year in a single test), whereas univariate analysis identifies change in one feature (for example, the change in *Banksia attenuata* stems/ha from year to year). Analysis by an experienced statistical analyst who is familiar with botanical data is recommended.

Multivariate analysis can assist in providing an indication of how revegetation is progressing towards the completion criteria. As a minimum, analyses should be completed to compare the species' richness (presence/absence) and species density (plants/ha or stems/ha) between the revegetation site and reference sites.

For transparency, an outline and justification of data treatment and analysis must be included in the monitoring report. Data pre-treatment may be required and logarithmic, square root or other transformations should also be considered.

6.4 Maintenance and Contingency Measures

Results from the monitoring data may trigger corrective or contingency measures where revegetation is compromised by weeds, feral or stock animals, human activities, fire and drought. Maintenance and contingency measures should include:

- post-planting weed control, for example spot-spraying, hand weeding and mulch;
- remedial planting or seeding requirements (dependent on establishment and ongoing success);
- disease treatment (if required);
- inspection and maintenance of fencing (if required);
- erosion (causes and remedial actions); and
- other maintenance actions.

Timing and methods of these measures should be documented.

7 Useful Resources

7.1 General

Australian and New Zealand Minerals and Energy Council and Minerals Council of Australia 2000, *Strategic framework for mine closure*, ANZMEC and MCA, Canberra.

Department of the Environment and Energy n.d., *Australia's bioregions – maps*, Australian Government. www.environment.gov.au/land/nrs/science/ibra/australias-bioregions-maps.

Casson, N, Downes, S and Harris, A 2009, *Native vegetation condition assessment and monitoring manual for Western Australia*, Department of Environment and Conservation, Western Australia. www.dbca.wa.gov.au.

Environmental Protection Authority 2006, *Guidance for the assessment of environmental factors: rehabilitation of terrestrial ecosystems*, guidance no. 6, EPA, Western Australia. www.epa.wa.gov.au

Hussey, BMJ and Wallace, KJ 1993, *Managing your bushland,* Department of Conservation and Land Management, Western Australia.

7.2 Photo monitoring

Hussey, BMJ 2001, 'Photographic monitoring of vegetation', *Wildlife Notes*, no. 9, Department of Conservation and Land Management, Western Australia. www.dbca.wa.gov.au.

7.3 Plants and seeds

Apace WA n.d., *Revegetation catalogues*. http://apacewa.org.au/revegetation-catalogues/.

Bradby, K and Morris, V 1997. 'Seed collection from native plants', *Wildlife Notes*, no. 4, Department of Conservation and Land Management, Western Australia. www.dbca.wa.gov.au.

Department of Biodiversity, Conservation and Attractions n.d., *FloraBase*, Government of Western Australia. https://florabase.dpaw.wa.gov.au/.

Department of Biodiversity, Conservation and Attractions 2014, *Plants for Carnaby's search application*, Government of Western Australia. www.dpaw.wa.gov.au/apps/plantsforcarnabys/index.html.

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Department of Biodiversity, Conservation and Attractions 2013, *Seed notes for Western Australia*, Government of Western Australia. www.dpaw.wa.gov.au/about-us/science-and-research/publications-resources/114-seed-notes-for-western-australia.

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Kings Park and Botanic Gardens 1999, *Smoke to sow and grow*, Kings Park and Botanic Gardens, Western Australia. Email: scienceadmin@bgpa.wa.gov.au

Ralph, M 2003, *Growing native trees from seed*, CSIRO Publishing.

7.4 Vertebrate pests, weeds and disease

Brown, K and Brooks, K 2002, *Bushland weeds: a practical guide to their management with case studies from the Swan Coastal Plain and beyond*, Environmental Weeds Action Network, Greenwood.

Brown, KL and Bettink, KA (2009-), *Swan weeds: management notes,* FloraBase — The Western Australian Flora, Department of Biodiversity, Conservation and Attractions. https://florabase.dpaw.wa.gov.au/weeds/swanweeds/.

Department of Biodiversity, Conservation and Attractions. Forest Ecosystem Management Division. Email: enquiries@dbca.wa.gov.au Phone: (08) 9219 9000.

Department of Biodiversity, Conservation and Attractions 2014, *Rabbits,* Government of Western Australia. www.dpaw.wa.gov.au/management/pests-diseases/181-rabbits

Department Primary Industries and Regional Development n.d., *Rabbit control in urban and semi-urban areas,* Government of Western Australia. www.agric.wa.gov.au/

Dieback Working Group n.d., *Expert directory*. www.dwg.org.au/expert-directory.

Dieback Working Group n.d., *Publications*. www.dwg.org.au/publications.

Hussey, BMJ, Keighery, GJ, Dodd, J, Lloyd, SG and Cousens, RD 2007, *Western weeds: a guide to the weeds of Western Australia,* 2nd Edition, The Plant Protection Society of Western Australia, Victoria Park.

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Appendices

Appendix A: Recommended Content for a Revegetation Plan

PERMIT HOLDER MUST COMPLETE THIS CHECKLIST AND SUBMIT TO DEPARTMENT OF WATER AND ENVIRONMENTAL REGULATION (DWER) TOGETHER WITH THE REVEGETATION PLAN.

Relevant boxes should be ticked to demonstrate that the information has been provided within the submitted revegetation plan.

☐ Title which clearly outlines the name of the revegetation project and its location.

☐ Table of contents. Suggested headings include:

- Introduction
- Reporting requirements
- Background of revegetation site
- Current disturbances and threats
- Reference site floristic data collection
- Revegetation commitments and completion criteria
- Site preparation
- Vegetation establishment
- Proposed monitoring plan
- Maintenance and contingency measures
- Schedule and budget
- References and appendices

Introduction

This section should contain the following information on the background of the site and include, but is not limited to:

☐ Purpose of the plan.

☐ Section explaining how the proposed revegetation addresses the impacts of the clearing.

☐ Clearing permit number (CPS xxx/x) that the revegetation plan relates to.

☐ Key contacts and details of person who developed the plan.

☐ Level of qualification and experience of person who developed the plan.

☐ Location of clearing, property details, clearing size and purpose.

☐ Location of revegetation site, property details and size of revegetation site.

☐ Map outlining the boundary of the clearing area, the revegetation site, aerial photography, cadastral boundaries, roads and other relevant factors. Include area in hectares.

☐ Associated spatial data for the clearing area is provided in approved format (for example, shapefile).

☐ Name and qualifications of company providing expertise on completion criteria development and onsite revegetation techniques.

Background of revegetation site

This section should contain information on the existing environment and land details of the revegetation site and include:

☐ Details of ownership, vesting and zoning of the land (current and/or proposed).

- ☐ Details of agreement with landowner to access and carry out revegetation (if not the owner of the revegetation site).
- ☐ Details on how the long-term security of the revegetation site will be ensured, including any existing or proposed management arrangements (for example, a conservation covenant).
- ☐ Map outlining the existing vegetation unit/s, summary structure and condition. When mapping each vegetation unit and vegetation condition across the site, include area in hectares.
- ☐ Map outlining the existing soil types, landforms and topography. Include area in hectares.
- ☐ Associated spatial data for the revegetation site (vegetation units, soil types, landforms and topography) is provided in Geographic Information Systems (GIS) format (for example shapefile).
- ☐ Existing hydrology and drainage.
- ☐ Existing evidence of fauna.
- ☐ Photos of the existing environment should be provided.

Current disturbance and threats

This section should contain the current disturbances and threats to the revegetation site:

- ☐ Site history (for example, grazing or logging).
- ☐ Existing land use disturbances that need to be addressed such as grazing, rubbish dumping, four wheel drive access and fire.
- ☐ Existing physical site factors that need to be addressed or repaired such as soil compaction, erosion and surface water diversion.
- ☐ Existing biological site conditions that need to be repaired such as weed invasion, disease, lack of fauna habitat, feral animals and low floristic diversity.

Revegetation commitments

This section should contain the overall vision of the plan as well as objectives for the revegetation project.

- ☐ Vision: an overarching statement of the intent of the plan and its ultimate goal.
- ☐ Objectives: set the main goals of the revegetation (for example, safe and stable landforms and soils, establishment of natural hydrology, resilient and self-sustaining vegetation, reaching agreed numeric targets for revegetation recovery and to provide fauna habitat).

Reference site floristic data collection

If more than one vegetation unit is being revegetated, reference site data for each vegetation unit is required. Species lists from different vegetation units are not to be combined.

- ☐ Identify each unique vegetation unit to be revegetated (if there are many vegetation units, contact DWER to discuss).
- ☐ Describe and justify chosen reference site/s in the context of developing completion criteria.
- ☐ Provide map showing reference site location, tenure and size; boundaries of vegetation units; aerial photograph; and quadrat locations, size and number. Also include site vegetation condition mapping, site weed mapping and site disease mapping (include area in hectares).
- ☐ Associated spatial data for the reference site/s is provided in GIS format (for example shapefile).
- ☐ Provide all reference site data sets as outlined in Section 5.3 in this guide. This includes entire floristics for each quadrat as outlined (electronically). If more than one vegetation unit is being revegetated, separate reference site data is required.

Targets and completion criteria

If more than one vegetation unit is being revegetated, each will require a set of unique completion criteria. Do not combine different vegetation units into one, unless through prior discussion with DWER.

- ☐ Outline targets and completion criteria.
- ☐ Describe clearly how each target and completion criterion was developed and how they meet the SMART principles. If existing data sets were used, describe and justify their inclusion.

Species list compilation and revegetation techniques

This section should include details on how and when vegetation establishment is to occur.

- ☐ Species list and amounts from completion criteria. Describe and confirm where these species can be acquired, in the required amounts and at the correct time of year.
- ☐ Seed collection (for either direct seeding or seedling propagation). Details on the timing of seed collection and the source and methods used to collect seeds are required. Include provenance.
- ☐ Direct seeding. A species list, timing and details on the methods used to direct seed are required as well as the target species composition and sowing rate (kilogram per hectare). Justify species composition and sowing rate (if undertaken).
- ☐ Topsoil. A list of expected species and species composition from the topsoil is required, along with the methods and timing of collecting, stockpiling and spreading the topsoil on the revegetation site (if undertaken).
- ☐ Mulching. Details on timing and methods are required.
- ☐ Confirm that seedlings are obtained from dieback-free sources to prevent introduction or spread of disease.

Site preparation

This section should contain details on the site preparation required prior to vegetation establishment.

- ☐ Describe techniques, timing and methods to be used to undertake site preparation actions. For example, actions may include ripping; grading and contouring; stockpiling of topsoil; mulching or matting; and pre-planting weed control.
- ☐ Describe revegetation site protection actions to be undertaken including methods and timing. For example:
  - Protecting the site through fencing and providing protection from grazing. Provide map of current and proposed fencing boundaries.
  - Signage and schedule for installation.
  - Provide dieback mapping and site hygiene plan showing hygiene boundaries to prevent spread of dieback and other plant diseases. Please provide map in report and associated spatial data in GIS format (for example shapefile).
  - Provide weed mapping and hygiene boundaries to prevent spread of dieback and other plant diseases. Please provide map in report and associated spatial data in GIS format (for example shapefile).

Maintenance and contingency measures

This section should outline the maintenance and contingency measures that will be put in place to ensure revegetation is successful.

- ☐ Post-planting weed control (for example, spot-spraying, hand weeding and mulching). Timing and methods used should be documented.
- ☐ Remedial planting or seeding requirements (dependent on establishment and ongoing success). Timing and methods used should be documented.

- ☐ Dieback treatment if required. Contractor name, timing and methods used should be documented.
- ☐ Inspection of fencing. Timing and methods used should be documented.
- ☐ Erosion. Cause and remedial action to be used should be documented.
- ☐ Other maintenance actions. Timing and methods used should be documented.

Schedule and budget

This section should include a detailed work plan that outlines the timing for each action per year including monitoring and maintenance. It should also outline the costings and source of funding for each revegetation action.

- ☐ Schedule of actions (timeline) in table format (see Table 4) showing actions to be undertaken per month/season and per year of the project. This includes specialist environmental consultancy services, materials, site preparation, on ground works, maintenance, monitoring and overheads/administration. A date for the commencement of revegetation should be identified.
- ☐ The entity or person responsible to implement each action outlined in the schedule of actions.
- ☐ Budget and costings (see examples in Appendix E).
- ☐ Source of funding.

Monitoring and analysis

This section should include details on the proposed methods for monitoring and data analysis. Describe monitoring methods to be used:

- ☐ Describe monitoring frequency and timing (month / year).
- ☐ Outline the statistical analysis to use and the features of the revegetation to analyse.

References and appendices

This section should include references used to create the plan and any appendices.

- ☐ References used to create the revegetation plan.
- ☐ Aerial photographs.
- ☐ Onsite photographs (photopoints) of both reference site/s and revegetation site.
- ☐ Required datasets in entirety. Both reference site/s and revegetation site (site floristics, quadrat vegetation structure, quadrat vegetation condition, quadrat per cent bare ground and vegetation. Datasets are to be clearly named with a basic description of each required.
- ☐ Maps of fence boundary, dieback mapping, vegetation condition mapping, photopoint locations and monitoring quadrat locations.
- ☐ Associated spatial data of the revegetation site features is provided in GIS format (for example shapefile). Shapefiles are to be clearly named to reflect content.
- ☐ Copy of written agreement with landowner (if not the owner of the revegetation site).

Appendix B: Recommended Content for Monitoring

PERMIT HOLDER MUST COMPLETE THIS CHECKLIST AND SUBMIT TO DEPARTMENT OF WATER AND ENVIRONMENTAL REGULATION (DWER TOGETHER WITH THE MONITORING REPORT.

Relevant boxes should be ticked to demonstrate that the information has been provided within the submitted revegetation annual report.

- ☐ Title which clearly outlines the name of the revegetation project and its location
- ☐ Table of contents. Suggested headings include:
  - Introduction
  - Summary of revegetation site:
    - background of revegetation site;
    - current disturbances and threats;
    - site preparation; and
    - initial vegetation establishment.
  - Monitoring outcomes
  - Progress against completion criteria:
    - data analysis;
    - results; and
    - discussion.
  - Maintenance and contingency measures
  - Updated schedule and budget
  - References and appendices

Introduction

The following should be included, but not limited to:

- ☐ Purpose of the report.
- ☐ Section explaining how the proposed revegetation addresses the impacts of the clearing.
- ☐ Clearing permit number (CPS xxx/x) that the revegetation plan relates to.
- ☐ Key contacts and details of person who wrote the report.
- ☐ Level of qualification and experience of person who wrote the report.
- ☐ Location of clearing, property details, clearing size and purpose.
- ☐ Location of revegetation site, property details and size of revegetation site.
- ☐ Map outlining the boundary of the clearing area, the revegetation site, aerial photography, cadastral boundaries, roads and other relevant factors (include areas in hectares).
- ☐ Associated spatial data for the clearing area is provided in GIS format (for example shapefile).

Summary of revegetation site

This section should include the components below which are from the original revegetation plan:

- ☐ The background of the revegetation site.
- ☐ Current disturbances and threats.
- ☐ Summary of initial site preparation.
- ☐ Summary of initial vegetation establishment.
- ☐ Revegetation sites and/or activities that have occurred should be illustrated on a detailed site plan and provided in GIS format (for example shapefile).

Monitoring outcomes

This section should state the monitoring outcomes and include:

- ☐ A description of monitoring methods to be used (particularly if changed from what was suggested in the revegetation plan).
- ☐ A description of the monitoring frequency and timing (month/year).
- ☐ The monitoring data sets (electronically), monitoring summaries, analysis and interpretation of findings for data outlined in table below.
- ☐ Records of the weed density or cover. Provide weed map in report and GIS format (for example shapefile).
- ☐ A vegetation condition map in the report and in GIS format (for example shapefile).
- ☐ Disease mapping (if relevant) in the report and in GIS format (for example shapefile).
- ☐ The success of additional actions, for example weed control, fencing and rabbit control.

Progress against completion criteria

This section should comprise data analysis, results and discussion on changes in the revegetation over time. This includes:

- ☐ Who completed the analysis?
- ☐ The data analysis methods used and justification for their use.
- ☐ Why/why not data pretreatment was/was not undertaken.
- ☐ The type of pretreatment used.
- ☐ Results and discussion.

Maintenance and contingency measures

This section should outline the maintenance and contingency measures that are required based on monitoring results and progress against completion criteria, including:

Maintenance measures

- ☐ A list of the maintenance measures.
- ☐ The trigger for maintenance measures.
- ☐ Timing.
- ☐ How often these measures will be undertaken.

Contingency measures

- ☐ A list of the contingency measures
- ☐ The trigger for contingency measures.
- ☐ Timing.
- ☐ How often these measures will be undertaken.

Updated schedule and budget

This section should include any modifications to the original detailed work plan.

- ☐ Schedule of actions (timeline) in table format (see Table 4) showing actions to be undertaken per month/season and per year of the project. Highlight any changes from the original revegetation management plan and provide explanation.
- ☐ The entity or person responsible to implement each action outlined in the schedule of actions.
- ☐ Budget and costing of actions (see examples in Appendix E).
- ☐ Source of funding.

References and appendices

This section should include references used to create the plan and any appendices.

- ☐ References used to create the revegetation plan.
- ☐ Aerial photographs.
- ☐ Onsite photographs (photopoints).
- ☐ Required monitoring datasets in entirety.
- ☐ Maps of fence boundary, dieback mapping, vegetation condition mapping, photopoint locations and monitoring quadrat locations.
- ☐ Associated spatial data of the revegetation site features is provided in GIS format (for example shapefile). Shapefiles are to be clearly named to reflect content.
- ☐ Copy of written agreement with landowner (if not the owner of the revegetation site).

Appendix C: Measuring Vegetation Condition for the South West and Interzone Botanical Province (Keighery scale)

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Score	Condition	Description	General Management Response
1	Pristine	Pristine or nearly so, with no obvious signs of disturbance.	Monitoring
2	Excellent	Vegetation structure intact, with disturbance affecting individual	Weed control plus above
3	Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, and/or grazing, dieback and logging.	Remedial planting plus above
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.	Rehabilitation including above
5	Degraded	Basic vegetation structure severely impacted by regeneration but not to a state approaching good condition without disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.	Revegetation with scope for rehabilitation but will require intensive, ongoing management.
6	Completely degraded	The structure of the vegetation is no longer intact and the area is completely, or almost completely, without native species. These areas are often described as "parkland cleared" with the flora comprising weed or crop species with isolated native trees or shrubs.	Complete revegetation

Source: Keighery 1994

Appendix D: Measuring Vegetation Condition for the Eremaean and Northern Botanical Provinces (Trudgen scale)

Condition	Description
E Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
VG Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
G Good	More obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
P Poor	Still retains basic vegetation structure or ability to regenerate after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
VP Very Poor	Severely impacted by grazing, very frequent fires, clearing or a combination of these activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
D Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation, such as areas that are cleared or 'parkland cleared' with flora comprising weed or crop species with isolated native trees or shrubs.

Source: Trudgen 1991

Appendix E: Examples of Budgets for Revegetation in Two Different Western Australian Landscapes

Note: The costs used in these examples are for illustrative purposes only and should not be considered as recommended costs for these or similar activities.

Example 1

Swan Coastal Plain

Impact: Clearing 1.9 hectares of native vegetation (which included Black Cockatoo foraging habitat).

Revegetation: 4.1 hectares of offsite revegetation.

Background: Most of the revegetation site has been heavily modified or degraded, with numerous weed species dominating most of the area. In addition, the revegetation site is threatened by the dumping of rubbish, edge effects from residential gardens, grazing by kangaroos, and uncontrolled access to remnant vegetation, feral animals and, potentially, dieback.

Stage	Actions	Timing	Commitments / Completion criteria	Estimated unit cost	Total estimated cost (where possible)	Comments
INITIAL DATA COLLECTION AND SURVEY	Control/baseline site selection and data collection to inform target setting.	Year 1		$14,000	$14,000	
	Surveys of flora species to be used in revegetation.	Years 1–3		$500	$500	

SITE PREPARATION	Secure land tenure.	Immediately		-	-	The site is vested as Crown Land managed by a local government authority.
	Weed control.	1. 18 months prior to planting 2. Autumn 2015 3. Winter 2015 4. Year 1		1. $1,800/ha 2. $1,800/ha 3. $1,800/ha 4. $1,800/ha	1. $6,408 2. $6,408 3. $6,408 4. $6,408 Total: $25,632	
	Review existing tracks and determine placement of new access tracks.	Year 1		$5,000	$5,000	
	Fencing and gates.	Year 1	To be established prior to planting/seeding.	$2,500/km $850/gate	-	
	Signage.	Year 1		$2,000	$2,000	
	Fire prevention (management plan and installation of fire break).	Year 1	To be established prior to planting/seeding.	$5,000	$5,000	
	Rubbish removal.	Year 1		$1,000	$1,000	
	Grading, scalping, ripping and other protection actions.	Year 1		$85/ha	$300	
	Apply fertiliser and water crystals.	Year 1–2		$2,100/ha	-	

VEGETATION ESTABLISHMENT	Seed collection.	Year 1		$250/kg	-	
	Treatment to break dormancy and mulching for direct seeding.	Years 1–3		$275/ha	-	
	Purchase and plant seedlings.	Years 1–3		$2.80/seedling	-	
	Purchase and plant mature shade trees around the perimeter of the revegetation site with 10m spacing.	Years 1–3	Target of 300 trees/ha of native plant species preferred by Black Cockatoos for foraging within 10 years of planting/seeding	$25/plant	-	
	Replacement planting and seeding, if necessary	Years 2–3	• No reduction in areas considered to be in Good or Very Good condition from baseline surveys. • Target density of revegetation within 5 years of 40% of control site coverage/ha of native plant species. • Target density of revegetation within 10 years of 75% of control site coverage/ha of native plant species. • Target species diversity of revegetation within 5 years of 40% of native species diversity at control site. • Target species diversity of revegetation within 10 years of 75% of native species diversity at control site. • Target overstorey, midstorey and understorey ratios of revegetation within 5 years of 40% of ratios at control site. • Target overstorey, midstorey and understorey ratios of revegetation within 10 years of 75% of ratios at control site.	$2.80/seedling	-	

MONITORING	Monitoring to be undertaken for a period of 10 years.	Year 1 and ongoing		$100,000	$100,000	Examples: vegetation quadrats, photopoint monitoring, fauna habitat assessment, weed monitoring, fences and firebreaks, and threatening processes.
MAINTENANCE	Implement and maintain fire management plan.	Year 1 and ongoing		$5,000	$5,000	
	Remove litter/rubbish on a regular basis as required.	Year 1 and ongoing		$3,000	$3,000	
	Maintenance of fencing, gates and signage.	Year 2 and ongoing		$5,000	$5,000	
	Weed control.	Year 2 and ongoing	Target of less than 20% weed cover of grassy weeds and less than 10% weed cover of herbaceous weeds (consistently) for the first 10 years after planting/seeding.	$1,800/ha	-	
REPORTING	Annual reporting to DWER.	Annually, ongoing		$5,000	$5,000	

Example 2

South West

Impact: Clearing of 6.7 hectares of native vegetation with environmental values Priority 4 conservation significant flora, Carnaby's Cockatoo, Forest Red-tailed Black-Cockatoo, Baudin's Black-Cockatoo, Western Ringtail Possum and Rainbow Bee-eater. The site is also in an area of vegetation identified as part of an ecological link.

Revegetation: 4.9 hectares; 3 hectares of offsite revegetation; and 1.9 hectares of onsite revegetation.

Stage	Actions	Timing	Commitments / Completion criteria	Estimated unit costs	Total estimated cost	Comments
INITIAL DATA COLLECTION AND SURVEY	Reference site surveys and development of completion criteria.	Autumn		-	-	
	Dieback survey.	Prior to seed collection		$1,500	$1,500	
SITE PREPARATION	Fencing of Management Zone 1.			-	-	
	Weed control.	May	Reduce existing weeds in degraded areas.	$750–$1,000	$750–$1,000	
	Mulch spreading.	May		-	-	
	Ripping and mounding.	March–May from 2015 onwards		$3,000	$3,000	
	Fencing and signage.		Fence the boundary, restrict access and install signage to revegetation sites.	-	-	
	Apply fertiliser and water crystals.			-	-	

VEGETATION ESTABLISHMENT	Seed collection, sorting and treatment.	Spring 2014 and continuing for a minimum of 3 years		$2,000/year	Minimum of $6,000	
	Purchase seedlings.			-	-	
	Plant propagation.	June–July	• 20% overstorey, 50% midstorey and 30% understory. • Revegetate with endemic native species identified in the reference site surveys. Plant density should average 500 plants/ha. • Use local provenance seed if available. • No introduction of dieback to the site. • Retain large trees where possible. 1 year (2 years; 3 years; 5 years) after planting: • 95% (90%; 90%; 75%) survival of planted seedlings. • 5% (10%; 25%; 50%) native plant cover. • 30% (40%; 40%; 70%) plant diversity.	$3,000	$3,000	
	Direct seeding.	June–July		-	-	

MONITORING	Vegetation monitoring and overall site inspection.	Autumn and spring of each calendar year for a period of three years after planting. If completion criteria have not been met, monitoring will continue for another 2 years.	If completion criteria have not been met after 5 years, contingency actions and further monitoring will be discussed with the Department of Environment Regulation.	-	-	
MAINTENANCE AND CONTINGENCY	Weed control.	Annually in late spring with a follow-up in Autumn as required, for a minimum of 3 years following cessation of planting (including replacement or infill planting).	No introduction of new weed species or spread of existing species.	$750–$1,000 for Year 2	$750–$1,000 for Year 2	
	Application of plant guards.	If required.		-	-	
	Remove rubbish.	If required.	Remove all rubbish and debris from the site.	-	-	
	Infill planting.	If required.		-	-	
REPORTING	Monitoring report.	Submit to DWER by 30 June each year.		-	-	

ADVICE

1. **Monitoring by the CEO**
   The *CEO* may monitor the implementation of clearing and other activities done under this Permit in order to determine whether the Permit Holder is complying with the conditions of this Permit. In the event that the CEO determines that the Permit Holder is not complying with one or more conditions of this Permit, the *CEO* may amend, suspend or revoke this Permit as the *CEO* considers necessary.

2. **Reports**
   Reports provided by the Permit Holder to the *CEO* under Part V of this Permit may be made publicly available.

3. **Clearing likely to have a significant impact on the environment**
   The Permit Holder must ensure that it complies with any obligation under section 38(5) of the *EP Act* to refer to the *EPA* a proposal that appears to the Permit Holder to be likely, if implemented, to have a significant effect on the environment.

4. **Cumulative impacts of clearing**
   In accordance with the intent of the clearing principles in Schedule 5 of the *EP Act*, the Permit Holder must consider the cumulative *impacts* of clearing of native vegetation done under this Permit and other clearing done in that bioregion. The cumulative *impacts* of clearing done under this Permit will be considered by the *CEO* annually upon receipt of the Permit Holder's reports pursuant to Part V of this Permit, and this Permit may be amended as necessary.

5. **Temporary clearing**
   The Permit Holder must ensure that, wherever possible, new *temporary works* and *rest areas* are located in areas that have already been cleared of native vegetation.

6. **External Audit**
   When conducting an *external environmental audit* under condition 17 of this Permit, the *lead environmental auditor* will determine which conditions of this Permit in respect of which he or she will conduct the audit.

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 818/15
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Commissioner of Main Roads Western Australia
Application received date: 14 April 2020

1.3. Property details

Property: The State of Western Australia
Localities: Statewide

1.4. Application

Clearing Area (ha)	Method of Clearing	Purpose category:
See regional clearing limits in Table 1.	Mechanical Removal	Road construction or upgrades

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 25 June 2020

Reasons for Decision:

Clearing Permit CPS 818/1 was granted to the Commissioner of Main Roads Western Australia (MRWA) on 11 November 2005 by the then Department of Environment. The clearing permit authorises the clearing of native vegetation for a range of defined activities across Western Australia necessary for the upgrade and maintenance of the State's main road network. The permit has since been amended thirteen times with CPS 818/15 being the latest amendment.

The Department of Water and Environmental Regulation (DWER) has conducted a review of the operation of CPS 818 to ensure that it meets community expectations with respect to transparency and protection of the environment, whilst also providing an efficient approvals pathway for important road safety initiatives. Issues raised by previous public submissions on 818 have also been incorporated within this review. As a result of this review, numerous changes to the conditions of 818 have been made. These changes include:

- A requirement for MRWA to publish details of proposed clearing projects that are at variance or may be at variance with the clearing principles on their website from the 1 January 2021 for public submissions for 21 days on their website;
- A requirement for MRWA to publish details of all clearing activities undertaken under CPS 818 on their website;
- A requirement for MRWA to publish all submissions received and a statement addressing each of those submissions on their website;
- MRWA to publish the lead environmental auditor's summary of findings of external audits for CPS 818 on their website on their website;
- Increased requirements for MRWA to demonstrate that alternatives to clearing have been undertaken prior to clearing under the permit;
- Improved efficiencies with the assessment against the clearing permit procedure outlined under Part II of the permit; and
- Improved efficiencies with the management of clearing impacts, including revegetation and dieback management, outlined under Part III of the permit.

With consideration of the above, and having regard to the relevant clearing principles, planning and other relevant matters, the Delegated Officer decided to grant the amendment to the clearing permit. The Delegated Officer determined that environmental impacts associated with clearing activities undertaken through the permit can be appropriately managed through the conditions conditions imposed on the permit.

2. Site Information

Clearing Description

Clearing of native vegetation for a range of project activities throughout the State of Western Australia as defined in Condition 1 of the permit. Regional clearing limits apply (see Table 1 and Figure 1).

Table 1: MRWA Regional Clearing Limits

Region	Maximum Annual Limits of Clearing (hectares)
Metropolitan	100
South West	75
Wheatbelt	120
Great Southern	75
Goldfields-Esperance	200
Midwest - Gascoyne	300
Pilbara	150
Kimberley	500
Total	**1,520 ha**

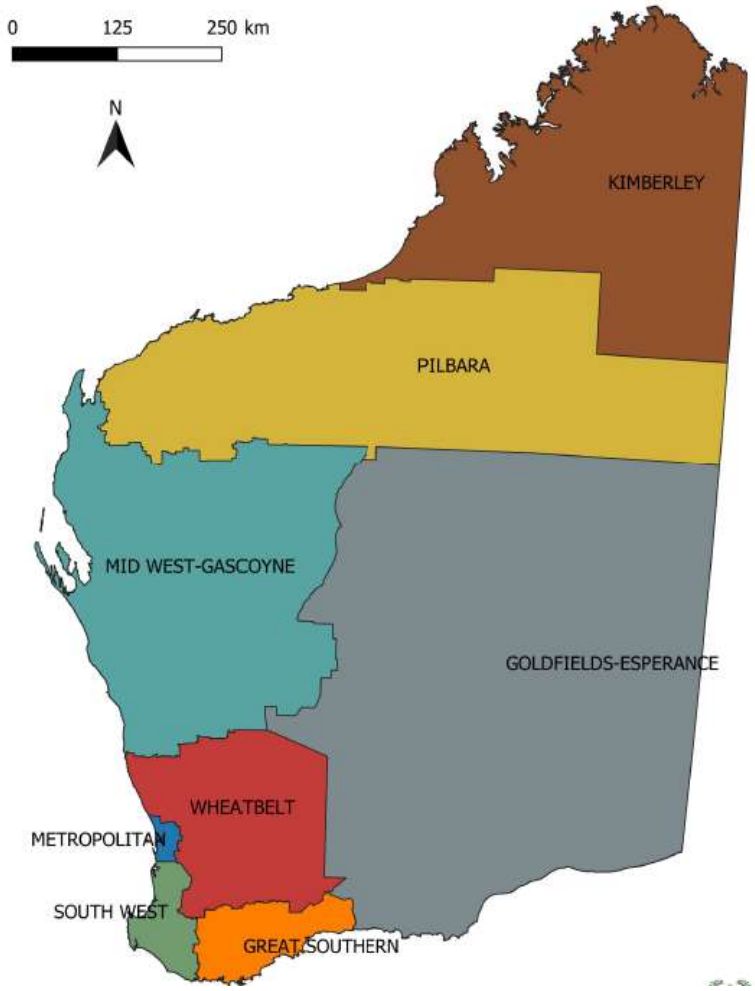

Figure 1: Map of MRWA regions.

Vegetation Condition

As clearing is to occur state-wide, the condition of native vegetation to be cleared under this permit is likely to range from Completely Degraded to Excellent condition, described as (Keighery, 1994):

- Completely degraded: The structure of the vegetation is no longer intact and the area is completely or almost without native species.
- Degraded: Basic vegetation structure severely impacted but disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
- Good: Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retain basic vegetation structure or ability to regenerate to it.
- Very Good: Vegetation structure altered, obvious signs of disturbance.
- Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive.

3. Assessment of application against clearing principles

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

Proposed clearing is likely to be at variance with this Principle

Clearing for project activities will occur statewide. It is likely that some areas proposed to be cleared for these activities will comprise a high level of biodiversity.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit, being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b), if clearing is still required, it is likely that some areas proposed to be cleared will comprise a high level of biodiversity. That being, areas that contain or may contain habitat for conservation significant flora, fauna and communities and constitute an ecological linkage or important water resource. Where areas proposed to be cleared are identified by MRWA's environmental assessment as comprising a high level of biodiversity then the assessment process set out in Part II of the clearing permit will apply and require MRWA to:

- undertake clearing impact assessment, including any necessary biological surveys, if required;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

Under condition 9 and 10, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared and undertake weed and dieback management measures when undertaking the proposed clearing to reduce impacts.

If the proposed clearing is at variance with this principle, MRWA is required to offset the area cleared in accordance with Part IV of the clearing permit.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

(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.

Proposed clearing is likely to be at variance with this Principle

Clearing for project activities will occur statewide. It is likely that some areas proposed to be cleared for these activities will comprise the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b), if clearing is still required, it is likely that some areas proposed to be cleared will comprise the whole or part of, or be necessary for the maintenance of, a significant habitat for fauna. In particular, road reserves are often likely to constitute an ecological linkage necessary for the maintenance of significant habitat for fauna. Significant habitat contains or may contain areas that are known to support foraging, breeding, roosting or facilitate landscape connectivity for fauna. Where areas proposed to be cleared are identified by MRWA's environmental assessment as comprising the whole or part of, or are necessary for the maintenance of, a significant habitat for fauna, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment, including any necessary fauna surveys, if required;
- seek submissions from relevant stakeholder, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

Under condition 9 and 10, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared and undertake weed and dieback management measures when undertaking the proposed clearing.

If the proposed clearing is at variance with this principle, MRWA is required to offset the area cleared in accordance with Part IV of the clearing permit.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

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

Proposed clearing is likely to be at variance with this Principle
Clearing for project activities will occur statewide. It is likely that some areas proposed to be cleared for these activities will include or is necessary for the continued existence of, threatened flora.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b), if clearing is still required, it is likely that some areas proposed to be cleared will include, or be necessary for the continued existence of, threatened flora. Where areas proposed to be cleared are identified by MRWA's environmental assessment as containing, or as necessary for the continuing existence of, threatened flora, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment, including any necessary flora surveys;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

Under condition 9 and 10, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared and undertake weed and dieback management measures when undertaking the proposed clearing.

If the proposed clearing is at variance with this principle, MRWA is required to offset the area cleared in accordance with Part IV of the clearing permit.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

(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.

Proposed clearing is likely to be at variance to this Principle
Clearing for project activities will occur statewide. It is likely that some areas proposed to be cleared for these activities will comprise the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b) if clearing is still required, it is likely that some areas proposed to be cleared will comprise the whole or part of, or be necessary for the maintenance of, a state listed threatened ecological community. Where areas proposed to be cleared are identified by MRWA's environmental assessment as comprising the whole or part of, or as necessary for the maintenance of, a state listed threatened ecological community, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment, including any necessary flora and vegetation surveys;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

Under condition 9 and 10, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared and undertake weed and dieback management measures when undertaking the proposed clearing.

If the proposed clearing is at variance with this principle, MRWA is required to offset the area cleared in accordance with Part IV of the clearing permit.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

(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.

Proposed clearing is likely to be at variance with this Principle
Clearing for project activities will occur statewide. It is likely that some areas proposed to be cleared for these activities will comprise of a significant remnant of native vegetation in an area that has been extensively cleared.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b) if clearing is still required, it is likely that some areas proposed to be cleared will contain native vegetation that is significant as a remnant of native vegetation in an area that has been extensively cleared. Where areas proposed to be cleared are identified by MRWA's environmental assessment as comprising or including native vegetation that

is significant as a remnant of native vegetation in an area that has been extensively cleared, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment, including any necessary biological surveys;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

Under conditions 9 and 10, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared and undertake weed and dieback management measures when undertaking the proposed clearing.

If the proposed clearing is at variance with this principle, MRWA is required to offset the area cleared in accordance with Part IV of the clearing permit.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

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

Proposed clearing is likely to be at variance with this Principle

Clearing for project activities will occur statewide. It is likely that some areas proposed to be cleared for these activities will be growing in, or in association with, an environment associated with a watercourse or wetland.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b) if clearing is still required, it is likely that some areas proposed to be cleared will comprise native vegetation that is growing in, or in association with, an environment associated with a watercourse or wetland.

Where areas proposed to be cleared are identified by MRWA's environmental assessment as comprising native vegetation that is growing in, or in association with, an environment associated with a watercourse or wetland, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment, including any necessary flora surveys;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

Under conditions 9 and 10, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared and undertake weed and dieback management measures when undertaking the proposed clearing.

If the proposed clearing comprises native vegetation that is growing in, or in association with, an environment associated with a watercourse or wetland that is greater than 0.5 hectares and the impacts relate to major watercourse(s); a wetland classed as a conservation or resource enhancement management category wetland or a wetland that is a defined wetland, defined under clause 3 of the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, then MRWA is required to offset the area cleared in accordance with Part IV of the clearing permit.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

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

Proposed clearing is likely to be at variance with this Principle

Clearing for project activities will occur statewide. It is likely that clearing some of the areas proposed to be cleared for these activities will cause appreciable land degradation.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b), if clearing is still required, it is likely that the proposed clearing will likely or may cause appreciable land degradation. Where the proposed clearing in an area is identified by MRWA's environmental assessment as likely to result in appreciable land degradation, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

If the proposed clearing is at variance with this principle, MRWA is required to implement a vegetation management plan, developed in consultation with the Commissioner of Soil and Land Conservation, to address the impacts of clearing.

Under conditions 9, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

(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.

Proposed clearing is likely to be at variance with this Principle
Clearing for project activities will occur statewide. It is likely that clearing of some of the areas proposed to be cleared for these activities will impact on the environmental value of adjacent or nearby conservation areas.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b), if clearing is still required, the proposed clearing of native vegetation in some areas is likely to have an impact on the environmental values of an adjacent or nearby conservation area. Where the clearing of native vegetation in an area is identified by MRWA's environmental assessment as likely to impact on the environmental values of an adjacent or nearby conservation area, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment, including a biological survey;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

Under conditions 9 and 10, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared and undertake weed and dieback management measures when undertaking the proposed clearing.

If the proposed clearing is at variance with this principle, MRWA is required to offset the area cleared in accordance with Part IV of the clearing permit.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

(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.

Proposed clearing is likely to be at variance with this Principle
Clearing for project activities will occur statewide. It is likely that clearing some of the areas proposed to be cleared for these activities will cause deterioration in the quality of surface or underground water.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b) if clearing is still required, the proposed clearing of native vegetation in some areas will likely or may cause deterioration in the quality of surface or underground water. Where the proposed clearing in an area is identified by MRWA's environmental assessment as likely to result in deterioration in the quality of surface or underground water, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake a clearing impact assessment,
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

If the proposed clearing is at variance with this principle, MRWA is required to implement a vegetation management plan, developed in consultation with the Commissioner of Soil and Land Conservation, to address the impacts of the clearing.

Under conditions 9, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

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

Proposed clearing is likely to be at variance to this Principle
Clearing for project activities will occur statewide. It is likely that clearing some of the areas proposed to be cleared for these activities will cause or exacerbate the incidence or intensity of flooding.

Prior to clearing native vegetation for project activities, MRWA is required, under condition 5(a) of the permit, to consider alternatives to clearing. If clearing is determined to be necessary after considering alternatives, MRWA is required to have regard to three principles as outlined under Condition 5(b) of the permit. They being, avoid the clearing of native vegetation, minimise the amount of native vegetation to be cleared and reduce the impact of clearing on any environmental value.

After adhering to conditions 5(a) and 5(b), if clearing is still required, the proposed clearing in some areas proposed to be cleared for these activities will likely or may cause, or exacerbate, the incidence or intensity of flooding. Where the proposed clearing in

an area is identified by MRWA's environmental assessment as likely to result in, or exacerbate, the incidence or intensity of flooding, then the assessment process set out in Part II of the clearing permit will apply to require MRWA to:

- undertake clearing impact assessment, including relevant surveys or field assessments;
- seek submissions from relevant stakeholders, the public and government organisations; and
- implement a vegetation management plan to address the impacts of the clearing.

If the proposed clearing is at variance with this principle, MRWA is required to implement a vegetation management plan, developed in consultation with the Commissioner of Soil and Land Conservation, to address the impacts of clearing.

Under conditions 9, MRWA will also be required to revegetate and rehabilitate areas that have been temporarily cleared.

The permit does not authorise any clearing which is likely to be seriously at variance with this clearing principle.

Planning instruments and other relevant matters.

Clearing Permit CPS 818/1 was granted to MRWA on 11 November 2005 by the then Department of Environment. The clearing permit authorises the clearing of native vegetation for a range of defined activities across Western Australia necessary for the upgrade and maintenance of the State's main road network. The permit has since been amended thirteen times with CPS 818/15 being the latest amendment.

CPS 818/14 was due to expire on 30 June 2020. This amendment was made by the applicant to extend the permit duration until 30 June 2023.

The clearing permit application was advertised on the DWER website on 29 April 2020 with a 21 day submission period. One public submission was received, in relation to this application. The public submission raised the following concerns in regards to conditions on the permit (Submission, 2020):

Avoid and minimise:

- The avoid and minimise condition on the permit is currently not effective. The applicant should be required to provide justification for the clearing, what non-clearing options have been considered and why the preferred design option was selected.
- The applicant should provide evidence that they have an appropriate plan in place for the management and retention of native vegetation in road reserves.
- There should be an assessment and compliance regime built into the permit that allows DWER to assess the quality of avoidance and minimisation efforts by the applicant and to take enforcement action where these efforts are found to be inadequate.

Regional clearing limits:

- Regional clearing limits proposed in the permit need to be reduced, especially within the metropolitan, southwest, great southern and wheat belt regions. Clearing out side these reduced limits should be submitted as a separate clearing permit applications.

Revegetation

- Revegetation should be required on back slopes and the front slopes of constructed roads.
- Where vegetation has been cleared the roadside needs to be widened by a width of 5 times the clearing and revegetated with indigenous flora.
- Where a 30 metre wide strip of good quality vegetation does not exist in a roadside, it needs to be acquired through land acquisition and revegetation with indigenous flora if necessary.

Translocation

- There is no mention of translocation or recovery of biological resources such as plants, seeds or topsoil cleared as part of roadworks.
- Translocation of threatened, priority and significant species that are impacted by clearing under this permit should be required.

Community consultation

- The applicant has not contacted or consulted with the submitter about proposed roadworks and the proposed permit conditions do not require the applicant to consult with a variety of different stakeholders.

Auditing

- This condition should be updated to require external auditing every two years and auditing reports should be made publically available.

In regards to the concerns surrounding regional clearing limits, clearing limits have not been amended during this review of CPS 818 due to uncertainty around ongoing clearing requirments. DWER have been advised by MRWA that they have not come close to reaching there regional limits within the metropolitan, southwest, great southern and wheat belt regions in previous iterations of the permits. However, it is anticipated that clearing limits may be reached within some regions due to the increase focus of Commonwealth and State Government funding on infrustracture projects over the next three years.

In regards to translocation of plants, seeds and topsoil cleared under this permit, MRWA is required to use topsoil and vegetative material for revegetation of temporarily cleared areas and may propose to use it during revegetation for offset purposes under condition 11 of the permit.

In regards to land acquisition and revegetation adjacent to road reserves to address the impacts of clearing within roadsides, this suggestion is outside the scope of the type of conditions that can be placed on clearing permits due to planning and other approval requirements. It will be up to the determination of MRWA as to when land aquistion is required to facilitate the project activities.

In regards to the other concerns raised in the submission, DWER has conducted a review of the operation of CPS 818 to ensure that it meets community expectations with respect to transparency and protection of the environment, whilst also providing an efficient approvals pathway for important road safety initiatives. As a result of this review numerous changes to the conditions of 818 have been made. These changes include:

- A requirement for MRWA to publish details of proposed clearing projects that are at variance or may be at variance with the clearing principles on their website from the 1 January 2021 for public submissions for 21 days on their website;
- A requirement for MRWA to publish details of all cleaing activities undertaken under CPS 818 on their website;
- A requirement for MRWA to publish all submissions received and a statement addressing each of those submissions on their website;
- MRWA to publish the lead environmtnal auditor's summary of findings of external audits for CPS 818 on their website;
- Increased requirements for MRWA to demonstrate that alternatives to clearing have been undertaken prior to clearing under the permit;
- Improved efficiencies with the assessment against the clearing permit procedure outlined under Part II of the permit; and
- Improved efficiencies with the management of clearing impacts procedure, including revegetation and dieback management, outlined under Part III of the permit.

4. References

Keighery, BJ (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Submission (2020) Public submission for clearing permit application to amend CPS 818/14 – MRWA. DWER ref A1895041