



DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT

# Guidance to assist a decision-maker to determine a serious and irreversible impact



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# Serious and irreversible impacts guidance, criteria and lists: explanatory information

The concept of serious and irreversible impacts (SAIL) is a central component of the NSW biodiversity offsets scheme. It is fundamentally about protecting threatened species<sup>1</sup> and threatened ecological communities that are most at risk of extinction from potential development impacts or activities.

The *Biodiversity Conservation Act 2016* (BC Act) and the *Local Land Services Act 2013* (LLS Act) imposes various obligations on decision-makers in relation to impacts on biodiversity values that are at risk of a serious and irreversible impact. These obligations generally require a decision-maker to determine whether or not any of the residual impacts of a proposed development, activity, biodiversity certification or vegetation clearing on biodiversity values (that is, the impacts that would remain after any proposed avoid or mitigate measures have been taken) are serious and irreversible.

To assist a decision-maker with this task, the BC Act (and the Biodiversity Regulation 2017 (BC Regulation)) provides a framework to make this determination. The framework consists of a series of principles defined in the BC Regulation and supporting guidance, provided for under section 6.5 of the BC Act, to interpret these principles.

The principles broadly align with the criteria prepared by the International Union for the Conservation of Nature (IUCN) (IUCN 2017; Keith et al. 2013) to assess the extinction risk of species and ecological communities. These criteria were derived by the IUCN from a wide review aimed at detecting extinction risk factors across a broad range of organisms and ecosystems. The consistency of the principles with the IUCN criteria provides a transparent and robust approach to identifying entities most at risk of extinction if impacted by development, clearing or certification.

The guidance, developed by the Coordinator-General, Environment, Energy and Science Group within the NSW Department of Planning, Industry and Environment (DPIE), provides supporting information to assist with the application of these principles. Decision-makers can use this document to help them form an opinion on whether a proposed impact will be serious and irreversible.

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<sup>1</sup> References to threatened species in this document include threatened populations listed in schedules under the BC Act.

# 1. Purpose and scope of the guidance

This guidance is intended to assist decision-makers<sup>2</sup> in determining whether a proposed impact on biodiversity values is likely to be serious and irreversible.

Section 6.5 of the *Biodiversity Conservation Act 2016* (the BC Act) allows the Environment Agency Head to provide guidance to aid decision-makers in making this determination. The BC Act states that the guidance can include criteria that assist in the application of the principles and lists of entities at risk of a serious and irreversible impact (SAII).

The guidance provided in this document:

- describes the regulatory context of SAII
- describes the criteria used to apply the principles to identify entities at risk of a SAII
- provides the decision-maker with a step-by-step approach to form an opinion on whether an impact is serious and irreversible.

The guidance is relevant for decisions under Parts 7 and 8 of the BC Act, Part 5A of the *Local Land Services Act 2013* (LLS Act) and Part 4 of the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017.

The document will be updated as required to reflect new information or changes to policy settings or legislation.

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<sup>2</sup> The term 'decision-maker' includes: consent authorities for development applications under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act); the Minister for Planning and Public Spaces for activities under Part 5.1 of the EP&A Act; determining authorities for activities under Part 5 of the EP&A Act; the Native Vegetation Panel for approvals for clearing native vegetation under s.60ZF of the LLS Act 2013 and clause 14 of the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017; the Minister for Environment and Energy in relation to biodiversity certification under Part 8 of the BC Act.

## **2. Regulatory context of serious and irreversible impacts**

### **2.1 Principles for determining serious and irreversible impacts**

Under the BC Act, a determination of whether an impact is serious and irreversible must be made in accordance with the principles prescribed in section 6.7 of the BC Regulation.

The principles have been designed to capture those impacts which are likely to contribute significantly to the risk of extinction of a threatened species or ecological community in New South Wales. These are impacts that:

- will cause a further decline of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline
- will further reduce the population size of the species that is currently observed, estimated, inferred or reasonably suspected to have a very small population size, or will further degrade or disrupt an ecological community that is already observed, inferred or reasonably suspected to be severely degraded or disturbed
- impact on the habitat of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution
- impact on a species or ecological community that is unlikely to respond to measures to improve habitat and vegetation integrity and is therefore irreplaceable.

The first three principles broadly align with the IUCN (2017) (see also Bland et al. (2016)) criteria used to identify entities at the greatest risk of extinction (i.e. critically endangered entities) and the fourth principle captures impacts on entities that cannot be offset.

### **2.2 Criteria to interpret the principles**

Criteria have been developed to assist consent authorities in the application of the principles (see Appendix A). The criteria provide definitions, descriptions and/or quantifiable measures to enable the identification of threatened species and ecological communities that:

- are in a rapid rate of decline
- have a very small population size
- are severely degraded or disrupted
- have a very limited geographic distribution
- are unlikely to respond to measures to improve habitat.

These criteria enable identification of threatened species and ecological communities most at risk of serious and irreversible impacts.

### **2.3 Entities at risk of serious and irreversible impacts**

The Department has applied the criteria to all threatened species and threatened ecological communities listed under the BC Act. Entities that meet the criteria under one or more principle are identified as entities at risk of a SAIL in the [Threatened Biodiversity Data Collection](#) housed in BioNet and displayed on the Department website.

As an example, Megalong Valley bottlebrush (*Callistemon megalongensis*) is considered to be a species at risk of a SAI as it meets Principle 3. This is because after applying the principles according to the criteria, the species is determined to have a very limited geographic distribution; the only known location of the species globally is in an area of 8 km<sup>2</sup> in the eastern portion of Megalong Valley.

Species and ecological communities may be listed under more than one principle. Any impact on these entities could be serious and irreversible and therefore the decision-maker should give consideration to the additional information provided in the Biodiversity Assessment Report (BAR) (see Appendix B of this document) before making a determination.

### 3. Guidance for decision-makers on determining SAI impacts

#### 3.1 Framework for decision-making

This section provides a framework for decision-makers to take into account the scale of an impact and the potential for avoidance and mitigation within the context of the SAI principles and the supporting criteria. These factors are weighed against the status and vulnerabilities of the entity at risk of the SAI to ultimately determine if a proposal will indeed have a serious and irreversible impact.

Figure 1 outlines the decision-making hierarchy for arriving at a determination of whether an impact is serious and irreversible.

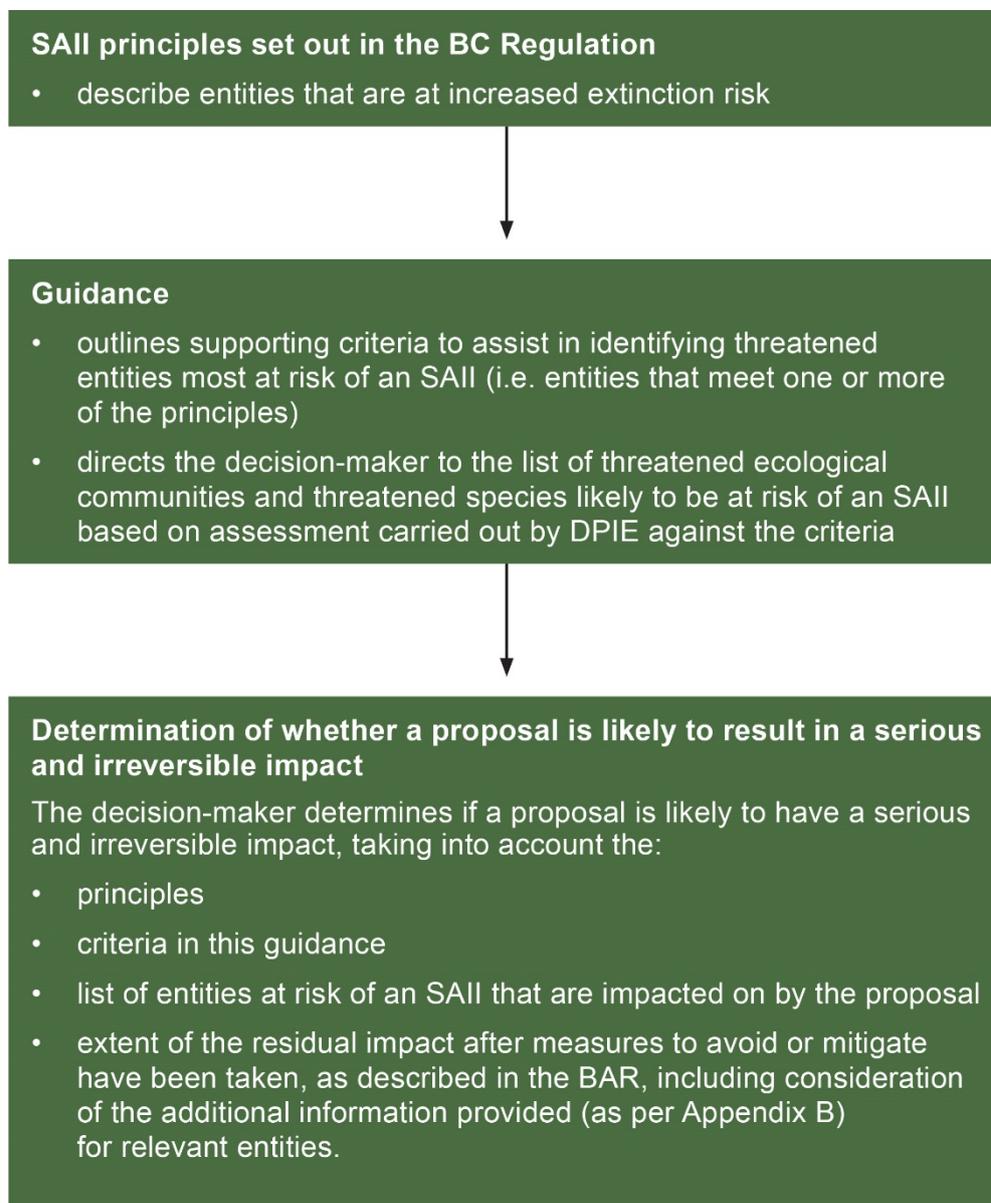


Figure 1 Decision-making hierarchy for determining if an impact is serious and irreversible

## 3.2 Determining whether impacts are serious and irreversible

In determining whether impacts on relevant entities will be serious and irreversible, the decision-maker should undertake the following steps.

### 3.2.1 Step 1: Identify relevant entities at risk of a SAI

The Biodiversity Assessment Report (BAR) will identify species or ecological communities at risk of a SAI that are likely to be affected by the proposal<sup>3</sup>. These entities are identified in the BAM Calculator (BAM-C). The front page of the credit report provided by the BAM-C will also identify all the entities that are considered to be at risk of a SAI and are impacted on by the proposal.

The accredited assessor (the assessor; who must be accredited in accordance with section 6.10 of the BC Act and the scheme made under that section to apply the BAM), must identify whether the entity, or habitat for the entity, is present. If present, the area of habitat and/or location of individual flora species must be mapped in accordance with Section 6 of the Biodiversity Assessment Method (BAM) and reported in the BAR.

The assessment data should be used by the proponent to avoid any impact on these entities (in accordance with Section 8 of the BAM).

Additional information on all entities can be found in the [Threatened Biodiversity Data Collection](#) (TBDC).

It is possible for the decision-maker to consider entities that are not identified in the TBDC as being at risk of a SAI, but only where they meet one or more of the principles in the BC Regulation.

### 3.2.2 Step 2: Evaluate the extinction risk of the entity to be impacted

The assessor is required to report on the factors influencing the extinction risk of the entity.

For species this is evidence of:

- rapid decline (Principle 1)
- small population size (Principle 2)
- limited geographic distribution (Principle 3)
- the species being unlikely to respond to management (Principle 4).

For TECs this is evidence of:

- reduction in geographic extent (Principle 1)
- environmental degradation or disruption of biotic processes (Principle 2)
- restricted geographic distribution (Principle 3).

In forming an opinion on the proposed impact, the decision-maker should remember the context of listing a species at risk of a SAI. The principles in the BC Regulation broadly align with the IUCN (IUCN 2017; Keith et al. 2013) requirements to list a species or ecological community as critically endangered (Appendix A). For example, under Principle 2, species that have fewer than 50 mature individuals, independent of whether there are any threats

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<sup>3</sup> Proposal is taken to mean development, activity, major project, biodiversity certification application or clearing proposal to which the Biodiversity Offsets Scheme applies.

operating on the population, would meet the threshold for critically endangered. Similarly, under Principle 3, species that have an area of occupancy of less than 10 km<sup>2</sup> would be critically endangered. In applying the criteria, the Department has made the assessment at the state scale.

### **3.2.3 Step 3: Detail measures taken to avoid, minimise and mitigate impacts on the entity**

In accordance with Section 8 of the BAM and Paragraph 10.2.2.1 for TECs and 10.2.3.1 for species, the BAR must set out the measures that the proponent of the proposal intends to take to avoid or mitigate any impacts. These measures must be considered by the decision-maker in determining whether an impact is acceptable.

The decision-maker can assess any residual impacts on entities at risk of a SAI using the remaining steps.

### **3.2.4 Step 4: Evaluate a serious and irreversible impact**

Where a proposed impact has been identified as potentially serious and irreversible, based on the application of Steps 1–3, the decision-maker must review the additional information provided for all entities at risk of a SAI by the assessor in the BAR.

The assessment criteria in the BAM under Subsection 10.2.2 for TECs and 10.2.3 for species, are designed to estimate the impact the proposal will have on the viability of the entity at the local, Interim Biogeographic Regionalisation of Australia (IBRA) subregional/regional and state scales (see Appendix B).

The decision-maker can use the impact assessment information to decide if the proposal is likely to increase the extinction risk of any of the relevant entities and whether impacts/losses/declines are likely to be serious and irreversible.

The decision-maker can contact the Department if, based on the principles and criteria, they suspect an entity is at risk of a SAI but is not currently listed as such in the TBDC.

### **3.2.5 Step 5: Decision-making**

Where the decision-maker is of the opinion that a proposal is likely to have a serious and irreversible impact on biodiversity values, the BC Act and the LLS Act set out the following requirements in relation to any approval or consent of the proposal (Table 1).

For proposals that are state significant development/state significant infrastructure, Part 5 activities or biodiversity certification applications that are approved and considered likely to result in a serious and irreversible impact, the consent authority can include conditions in the approval that further minimise the impact. The consent authority should use information in the BAR that addresses section 10.2 or section 10.3 of the BAM to identify additional measures that will minimise impacts.

**Table 1 Role of the decision-maker for different types of development proposals**

Type of proposal	Role of the decision-maker
<p>Application for development consent under Part 4 of the <i>Environmental Planning &amp; Assessment Act 1979</i> (EP&amp;A Act) (other than an application for state significant development or an application for a complying development certificate) See section 7.16(2) of the BC Act</p>	<p>Required to refuse to grant development consent</p>
<p>Application for development consent for state significant development or for approval for state significant infrastructure under the EP&amp;A Act See section 7.16(3) of the BC Act</p>	<p>Required to:</p> <ul style="list-style-type: none"> <li>• take likely SAI into consideration, and</li> <li>• determine if there are any additional and appropriate measures that will minimise the impact if consent or approval is granted</li> </ul>
<p>Part 5 activity (where the proponent has elected to obtain a biodiversity assessment report under Division 2 of the BC Act) See section 7.16(4) of the BC Act</p>	<p>Required to:</p> <ul style="list-style-type: none"> <li>• take likely SAI into consideration, and</li> <li>• determine if there are any additional and appropriate measures that will minimise the impact if the activity is to be carried out or approved</li> </ul>
<p>Biodiversity certification of land See section 8.8(2) of the BC Act</p>	<p>Required to:</p> <ul style="list-style-type: none"> <li>• take likely SAI into consideration in determining the application, and</li> <li>• determine if there are any additional and appropriate measures that will minimise the impacts</li> </ul>
<p>Approval for clearing native vegetation under section 60ZF of the LLS Act</p>	<p>Required to refuse to grant approval</p>
<p>Approval for clearing native vegetation under clause 14 of the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017</p>	<p>Required to refuse to grant approval</p>

## 4. References

Keith DA, Rodríguez JP, Rodríguez-Clark KM, Nicholson E, Aapala K, Alonso A, et al. 2013, Scientific Foundations for an IUCN Red List of Ecosystems, *PLoS ONE* 8(5): e62111. <https://doi.org/10.1371/journal.pone.0062111>

Bland LM, Keith DA, Miller RM, Murray NJ and Rodriguez JP (eds) 2016, *Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria* Version 1.0, International Union for Conservation of Nature Gland, Switzerland.

IUCN Standards and Petitions Subcommittee 2017, *Guidelines for Using the IUCN Red List Categories and Criteria*, Version 13, prepared by the Standards and Petitions Subcommittee, IUCN Species Survival Commission, Gland, Switzerland, [www.iucnredlist.org/documents/RedListGuidelines.pdf](http://www.iucnredlist.org/documents/RedListGuidelines.pdf)

NSW Threatened Species Scientific Committee 2018, *Guidelines for interpreting listing criteria for species, populations and ecological communities under the NSW Biodiversity Conservation Act 2016*, Version 2, NSW Threatened Species Scientific Committee, Sydney.

## Appendix A Criteria for identifying potential entities

This section sets out criteria that assist in identifying and assessing threatened species and threatened ecological communities which are entities at risk of a SAI in accordance with the principles in the BC Regulation; that is, threatened species or ecological communities which are:

- observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline
- observed, estimated, inferred or reasonably suspected to have a very small population size
- observed, inferred or estimated to have very limited geographic distribution
- unlikely to respond to management and are therefore irreplaceable.

The principles in the BC Regulation broadly align with the criteria prepared by the IUCN (2017) and Bland et al. (2016) to assess the extinction risk of species and ecological communities.

All threatened entities have been evaluated against the principles and the criteria in this appendix. Those that meet one or more principles can be located in the [Threatened Biodiversity Data Collection](#); they are also displayed on the [Serious and irreversible impacts](#) webpage. The lists on the webpage also identify the relevant principles that entities at risk of a SAI meet.

### Principle 1 – species or ecological community currently in a rapid rate of decline

Species and ecological communities that have undergone large reductions or are likely to undergo large reductions in the future are considered to be at greater risk of extinction than those that have undergone or are likely to undergo smaller reductions (NSW Threatened Species Scientific Committee 2018).

Entities listed under this principle have already undergone, currently are in, or are projected to undergo, a rapid rate of decline. Criteria used to identify these entities include the following:

#### Entities listed as critically endangered under the BC Act

The principle would generally capture entities listed as critically endangered under the BC Act where the reason for that listing is a very large reduction in population size.

#### Rapid rate of decline for species considered to be critically endangered by IUCN

The species has an observed, estimated, inferred, suspected or projected population reduction of  $\geq 80\%$  in 10 years or three generations (whichever is longer).

‘Generation’ means the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation therefore reflects the turnover rate of breeding individuals in a population (IUCN 2017).

The period of decline can be assessed as recent decline, current decline or projected future decline that is liable to continue.

Different measures may be used to assess reduction in population size, including: direct observation; an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effects of introduced species, hybridisation, pathogens, pollutants, competitors or parasites.

### **Rapid rate of decline for an ecological community considered to be critically endangered by IUCN**

To be considered under this principle, the ecological community should have been observed, estimated, inferred, or reasonably suspected to have undergone, or be projected to undergo, a very large reduction in distribution, being:

- ≥90% reduction where the reduction is measured since 1750 (historical decline), or
- ≥80% reduction where the reduction is over a 50-year period, either in the past, future, or any part of the past, present and future.

The period of decline for an ecological community can be assessed as recent decline, current decline or projected future decline that is liable to continue unless remedial measures are taken, or alternatively, as historical decline.

## **Principle 2 – species or ecological communities with a very small population size**

Species with very small populations are highly vulnerable to any event that impacts on their population size. Impacts from development or biodiversity certification proposals that further reduce the population size of species that meet this principle makes them highly vulnerable to extinction during the time-lag between the impacts from development and the realisation of ecological benefits from improvements in habitat condition at a stewardship site.

Very small population size for ecological communities means communities have very high levels of either environmental degradation or disruption of biotic processes, and interactions have an increased risk of failure to sustain their characteristic native species assemblages (Keith et al. 2013).

### **Entities listed as critically endangered under the BC Act**

The principle would generally capture species or ecological communities listed as critically endangered under the BC Act where the reason for that listing is a very small size or very high environmental degradation and/or a very large disruption of biotic processes or interactions, respectively.

### **Very small population size for species considered to be critically endangered by IUCN**

Species that have a very small population size are species with a known population size that is either:

- fewer than 50 mature individuals independent of whether there are any threats, or
- fewer than 250 mature individuals and the species has an observed, estimated or projected continuing decline:
  - of at least 25% in three years or one generation (whichever is longer) OR
  - where the number of mature individuals in each subpopulation is <50 OR
  - the percentage of mature individuals in one subpopulation is 90–100% OR
  - the population is subject to extreme fluctuations<sup>4</sup> in the number of individuals (IUCN 2017).

‘Population’ means the total number of mature individuals in New South Wales (IUCN 2017). For functional reasons, primarily owing to differences between life forms, population size is measured as the number of mature individuals only. The number of mature individuals is the number of individuals known, estimated or inferred to be capable of reproduction.

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<sup>4</sup> Extreme fluctuations are: where population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (IUCN 2017).

'Subpopulations' are geographically or otherwise distinct groups in the total population between which there is little demographic or genetic exchange (IUCN 2017).

### **Very high environmental degradation or disruption of biotic processes or interactions for an ecological community considered to be critically endangered by IUCN**

Ecological communities that are considered to have a very large degree of environmental degradation or disruption of biotic processes or interactions are those with:

- $\geq 90\%$  extent and severity where the disruption or impacts are measured since 1970
- $\geq 80\%$  extent and severity where the disruption or impacts are over a 50-year period, either in the past, future, or any part of the past, present and future (as per Bland et al. 2016).

## **Principle 3 – species or area of ecological community with very limited geographic distribution**

This principle is particularly important to consider given stewardship sites do not necessarily seek to establish species populations in new locations but enhance or restore the habitat of existing ones. Further, there are very limited opportunities to manage the community that already is at a greater risk of a single event that adversely affects the entire distribution.

Any impacts on the entities that meet this principle will likely lead to, or greatly increase the risk of, extinction should one or more of the known remaining locations be impacted.

### **Entities listed as critically endangered under the BC Act**

The principle would generally capture entities that are listed as critically endangered under the BC Act where the reason for that listing is their very highly restricted geographic distribution.

### **Very limited geographic distribution for species considered to be critically endangered by IUCN**

Species that have a very limited geographic distribution are generally known to:

- have an area of occupancy (sensu IUCN 2017) of  $\leq 10 \text{ km}^2$
- have an extent of occurrence (sensu IUCN 2017) of  $\leq 100 \text{ km}^2$
- have at least two of the following three conditions:
  - are severely fragmented<sup>5</sup> or only known from one location
  - continuing decline<sup>6</sup>
  - extreme fluctuations<sup>7</sup>
- inhabit less than or equal to three locations in New South Wales.

'Location' means a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat (IUCN 2017).

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<sup>5</sup> Severe fragmentation occurs where there are increased extinction risks when most of the individuals of a species are found in relatively small and isolated populations.

<sup>6</sup> Decline can be observed, estimated, inferred or projected in any of the following: extent of occurrence; area of occupancy; area, extent and/or quality of habitat; number of locations or subpopulations; number of mature individuals.

<sup>7</sup> Fluctuations can be in any of the following: extent of occurrence; area of occupancy; number of locations or subpopulations; number of mature individuals.

### **Very limited geographic distribution for an ecological community considered to be critically endangered by IUCN**

The geographical distribution of ecological communities is defined by the area of occupancy (sensu Bland et al. 2016). Ecological communities with a very limited geographic distribution have an area of occupancy of less than or equal to two 10 x 10 km grid cells or an extent of occurrence of  $\leq 1000$  km<sup>2</sup> (sensu Bland et al. 2016) and one of the following:

- an observed or inferred continuing decline in:
  - a measure of spatial extent appropriate to the ecological community
  - a measure of environmental quality appropriate to characteristic biota of the ecological community
  - a measure of disruption to biotic interactions appropriate to the characteristic biota of the ecological community
- observed or inferred threatening processes that are likely to cause continuing declines in geographic distribution, environmental quality or biotic interactions within the next 20 years
- an ecological community exists at one location.

## **Principle 4 – species or ecological community that is unlikely to respond to management and is therefore irreplaceable**

The consideration of whether an entity is unlikely to respond to management encompasses two key elements.

The first is based on the best current ecological knowledge of the life history traits and characteristics of a species. There are some threatened species that are known to display particular life history traits that severely limit the species' ability to increase in abundance.

The second element considers whether there are any key threatening processes affecting the species or ecological community that cannot be effectively managed.

### **Species or ecological community that cannot be offset because the entity is unlikely to respond to management**

These are species or ecological communities with:

1. Life history traits and/or ecology which is known, but the ability to control key threats at the site scale is negligible. In general, these are species significantly threatened by uncontrollable disease (e.g. frogs highly threatened by chytrid fungus).
2. Known reproductive characteristics that severely limit their ability to increase the existing population on, or occupy new habitat at, a stewardship site. In general, these are plants that are sterile or largely clonal with no or very limited capacity to increase in number through seed production and recruitment.

### **Irreplaceable**

Whether an impact on an entity is considered irreplaceable takes into account two factors. The first factor is the likely success in achieving gain in condition, abundance or habitat area. For potential species that are identified in criteria 1 and 2 above, the likelihood of achieving an offset gain is extremely low or highly uncertain.

The second factor takes into account consideration of impacts on habitat components that cannot readily be re-created. In general, these are impacts on essential habitat such as caves or cliff lines that are used by threatened species.

## Appendix B: Additional information in the Biodiversity Assessment Report to support decision-makers

The following information must be provided by the accredited assessor in the Biodiversity Assessment Report (BAR) for any candidate SAI entity to be impacted by development. The provisions below are a replication of Subsections 10.2.2 and 10.2.3 of the BAM.

### Additional impact assessment provisions for ecological communities

The assessor is required to provide the following further information in the Biodiversity Development Assessment Report (BDAR) or Biodiversity Certification Assessment Report (BCAR) about potential ecological communities:

- a. the action and measures taken to avoid the direct and indirect impact on the potential entity for a SAI
- b. the area (ha) and condition of the threatened ecological community (TEC) to be impacted directly and indirectly by the proposed development. The condition of the TEC is to be represented by the vegetation integrity score for each vegetation zone
- c. a description of the extent to which the impact exceeds the threshold for the potential entity
- d. the extent and overall condition of the potential TEC within an area of 1000 ha, and then 10,000 ha, surrounding the proposed development footprint
- e. an estimate of the extant area and overall condition of the potential TEC remaining in the IBRA subregion before and after the impact of the proposed development has been taken into consideration
- f. an estimate of the area of the candidate TEC that is in the reserve system within the IBRA region and the IBRA subregion
- g. the development, clearing or biodiversity certification proposal's impact on:
  - i. abiotic factors critical to the long-term survival of the potential TEC; for example, how much the impact will lead to a reduction of groundwater levels or the substantial alteration of surface water patterns
  - ii. characteristic and functionally important species through impacts such as, *but not limited to*, inappropriate fire/flooding regimes, removal of understorey species or harvesting of plants
  - iii. the quality and integrity of an occurrence of the potential TEC through threats and indirect impacts including, *but not limited to*, assisting invasive flora and fauna species to become established or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants which may harm or inhibit growth of species in the potential TEC
- h. direct or indirect fragmentation and isolation of an important area of the potential TEC
- i. the measures proposed to contribute to the recovery of the potential TEC in the IBRA subregion.

### Additional impact assessment provisions for threatened species or populations

The assessor is required to provide the following further information in the BDAR:

- a. The action and measures taken to avoid the direct and indirect impact on the potential entity for a SAI.

- b. The size of the local population directly and indirectly impacted by the development, clearing or biodiversity certification.
- c. The extent to which the impact exceeds any threshold for the potential entity.
- d. The likely impact (including direct and indirect impacts) that the development, clearing or biodiversity certification will have on the habitat of the local population, including but not limited to:
  - i. an estimate of the change in habitat available to the local population as a result of the proposed development
  - ii. the proposed loss, modification, destruction or isolation of the available habitat used by the local population
  - iii. modification of habitat required for the maintenance of processes important to the species' life cycle (such as in the case of a plant – pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development.

BioNet Atlas records or other documented, quantifiable means must be used by the assessor to estimate what percentage of the species' population and habitat is likely to be lost in the long term within the IBRA subregion due to the direct and indirect impacts of the development.

- e. The likely impact on the ecology of the local population. At a minimum, address the following:
  - i. for fauna:
    - breeding
    - foraging
    - roosting, and
    - dispersal or movement pathways
  - ii. for flora, address how the proposal is likely to affect the ecology and biology of any residual plant population that will remain post development including where information is available:
    - pollination cycle
    - seedbanks
    - recruitment, and
    - interactions with other species (e.g. pollinators, host species, mycorrhizal associations).
- f. A description of the extent to which the local population will become fragmented or isolated as a result of the proposed development.
- g. The relationship of the local population to other population/populations of the species. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range.
- h. The extent to which the proposed development will lead to an increase in threats and indirect impacts, including impacts from invasive flora and fauna, that may in turn lead to a decrease in the viability of the local population.
- i. An estimate of the area, or number of populations and size of populations that is in the reserve system in NSW, the IBRA region and the IBRA subregion.
- j. The measure/s proposed to contribute to the recovery of the species in the IBRA subregion.