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1 Introduction


It provides a streamlined biodiversity assessment process for development, and is accompanied by a rigorous and credible offsetting scheme. This scheme means positive conservation action can be taken to generate maximum biodiversity gains in locations where it is most cost effective to do so.

Conservation of endangered animals, plants and ecosystems is one of the greatest environmental challenges facing Australia today. In NSW, 60% of native vegetation and habitats have been cleared for agriculture and urban areas. The NSW State Plan sets goals to improve the extent and condition of native vegetation, and to promote the recovery of threatened species. These goals have been adopted to arrest a trend in significant biodiversity decline caused by over 200 years of farming, mining, urban expansion and introduced exotic species.

Managing biodiversity across NSW requires a delicate balancing act between the needs of the environment and social and economic activities that require native vegetation to be cleared. This clearing impacts on the habitat of threatened species. However, the answer is not to simply reject these activities. Innovative approaches are needed to tackle the challenge of balancing the aims of providing the community with new housing, jobs and amenities while also conserving biodiversity for the future. BioBanking is one such innovation.

The BioBanking Scheme was established under Part 7A of the Threatened Species Conservation Act 1995 (TSC Act). This operational manual provides a guide for using the BioBanking Credit Calculator (the credit calculator). The credit calculator is the Microsoft Access™ program used to determine the number and type of credits needed to offset the impacts on biodiversity values at a development site, and the number and type of credits created at a biobank site.

This operational manual provides detailed guidelines on how to apply the BioBanking Assessment Methodology (the methodology) and use the credit calculator to determine the number of biodiversity credits required at a development site or to be created at a biobank site. Users should refer to the methodology for further information on how credits are calculated.

The Threatened Species Conservation (Biodiversity Banking) Regulation 2008 requires these assessments to be conducted by a person who is accredited (in accordance with s. 142B(1)(c) of the TSC Act) to use the methodology and the credit calculator to obtain a biobanking agreement or a biobanking statement. (Further information on the accreditation process can be found on the DECC website.)

Section 2 provides background information about the methodology, including the circumstances in which development is to be regarded as improving or maintaining biodiversity values; identification of red flag areas; and the databases referred to in the assessment methodology and incorporated into the credit calculator. This section also provides detailed information on when development on red flag areas will improve or maintain biodiversity values. It also provides information on the use of local data and judgment in the assessment process.

Section 3 gives a detailed description of components used to assess and measure the biodiversity values of a development site and a biobank site. This includes the assessment of vegetation type and condition, threatened species and the Landscape Values of the site. The information in this section is set out in the order in which an assessment of the site is normally done and includes the resources and data that an assessor needs to complete an assessment.
Sections 4 and 5 give detailed information on how to enter data from the field assessment into the credit calculator to determine the number and type of biodiversity credits required at a development site or created at a biobank site. The information in these sections is set out in the order in which information is entered into the credit calculator.
2  BioBanking Assessment Methodology

The methodology assesses biodiversity values as defined by the TSC Act. These values include the composition, structure and function of ecosystems. They also include (but are not limited to): threatened species, threatened populations and threatened ecological communities, and their habitats. This definition does not include fish or marine vegetation within the meaning of Part 7A of the *Fisheries Management Act 1994*, unless that fish or marine vegetation has been the subject of an order under s. 5A of the TSC Act.

The methodology tells users how to assess the biodiversity values at development sites and biobank sites. It also describes the process used to measure the loss of biodiversity values that results from removing native vegetation, threatened species habitat and threatened species on a development site as well as the gain in biodiversity values from taking management actions on a biobank site.

The methodology establishes two classes of biodiversity credits that may be created through undertaking management actions at a biobank site. The two classes of biodiversity credits are:

- **Ecosystem credits** – these are created or required for all impacts on biodiversity values (including threatened species that can be reliably predicted by habitat surrogates), except the threatened species or populations that require species credits.

- **Species credits** – these are created or required for impacts on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Threatened species that require species credits are identified in the Threatened Species Profile Database.

The methodology outlines the assessment process and the information required to assess the loss and gain of biodiversity values. This includes data that are collected in the field and data that are held by DECC in its biodiversity databases and contained in the credit calculator.

The credit calculator is the software version of the methodology. It is separated into two components. The first component is for the assessment of a development site. The second component is for the assessment of a biobank site. The data entered into the credit calculator are based on information collected at the site and from using geographic information systems (GIS) mapping software.

The credit calculator determines the number of ecosystem credits and species credits required at a development site and the number of ecosystem credits and species credits created at a biobank site. It does this on the basis of the equations and assessment process in the methodology. The number and type of credits required or created are set out in a report produced from the credit calculator.

Once the assessment process has been completed, the results of the assessment are submitted to DECC as part of an application for a biobanking statement or biobanking agreement. DECC then reviews the application and, where approved, the Director General will issue a biobanking statement or the Minister will approve an agreement.

A biobanking statement is an alternative to s. 5A (the current threatened species assessment of significance), a species impact statement and the concurrence requirements process under the *Environmental Planning and Assessment Act 1979* (EP&A Act). It does not provide an exemption from any other legislation (e.g. the *Water Management Act 2000*) or other requirements of environmental planning instruments (including SEPP and LEPs).

2.1 Circumstances that improve or maintain biodiversity values

Under the TSC Act, a biobanking statement can only be issued for a proposed development if the Director General makes a determination under the methodology that the development will improve or maintain biodiversity values. The methodology establishes the circumstances under which the development can be regarded as improving or maintaining biodiversity.
values. This includes circumstances where the impacts of clearing on biodiversity values at the development site are offset against the beneficial impacts of management actions that create biodiversity credits at the biobank site.

A development is regarded as improving or maintaining biodiversity values if:

1(a) The development does not directly impact on biodiversity values on a red flag area on the development site

or

1(b) The development does directly impact on biodiversity values on a red flag area on the development site but the Director General makes a determination that the development be regarded as improving or maintaining biodiversity values according to section 2.3 of the methodology

and

2. The direct impacts of the development on biodiversity values on the development site are offset by the retirement of biodiversity credits determined in accordance with the offset rules in the methodology

and

3. The Director General determines that any indirect impacts of the development on on-site and off-site biodiversity values that cannot be mitigated through on-site measures are offset by the retirement of biodiversity credits determined in accordance with the offset rules in the methodology.

If a development impacts on all or part of a red flag area on the development site but the Director General makes a determination that the development is to be regarded as improving or maintaining biodiversity values (according to section 2.3 of the methodology, the Director General must publish the reasons for that determination on the register of biobanking statements. A copy of the impact assessment will also be made publicly available on this register.

2.2 Red flag areas

A red flag area is an area of land that is identified by the methodology as having high biodiversity conservation values. An area of land is regarded as having high biodiversity conservation values if it contains one of more of the following:

- a vegetation type that been cleared by more than 70%, as listed in the Vegetation Types Database (i.e. has less than 30% of its estimated distribution remaining in the catchment management authority (CMA area) since the year 1750) and the vegetation is not in low condition (as defined in the box following)
- a critically endangered or endangered ecological community (EEC; as listed under the TSC Act or EPBC Act) and the vegetation is not in low condition (defined in the Box 1)
- one or more threatened species identified in the Threatened Species Profile Database that cannot withstand further loss in the CMA area because of one or more of the following:
  — the species is naturally very rare, is critically endangered, has few populations or a restricted distribution
  — the species or its habitat needs are poorly known
  — the species is an identified population (as defined in section 4.6 of the methodology and listed in the Identified Population Database).
Box 1 Definition of low-condition native vegetation

Vegetation in **low condition** means:

1. **woody native vegetation** with:
   - native over-storey percent foliage cover less than 25% of the lower value of the over-storey percent foliage cover benchmark for that vegetation type, and
     - less than 50% of groundcover vegetation is indigenous species, or
     - greater than 90% of groundcover vegetation is cleared.

2. **native grassland, wetland or herbfield** where:
   - less than 50% of groundcover vegetation is indigenous species, or
   - more than 90% of groundcover vegetation is cleared.

If native vegetation is not in low condition, it is in **moderate to good condition**.

The percentages for the groundcover calculations must be made in a season when the proportion of native groundcover vegetation compared to non-native groundcover vegetation in the area is likely to be at its maximum.

As they are woody vegetation, shrubland communities are assessed as woody native vegetation for the low condition definition. For shrubland vegetation types greater than 1 m in height (i.e. the over-storey benchmark is not zero), both the over-storey and groundcover assessment parts of the assessment are applied to determine whether the vegetation is in low condition. For shrubland vegetation types less than 1 m in height (i.e. the over-storey benchmark is zero), only the groundcover part of the woody native vegetation assessment is applied to determine whether the vegetation is in low condition.

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2.3 Determining that impact of development on red flag areas can be regarded as improving or maintaining biodiversity values

Where a proposed development or any part of a development is on land that is, or forms part of, a red flag area, a biobanking statement may still be issued where the Director General makes a determination that it is possible for the development to be regarded as improving or maintaining biodiversity values. The Director General can only make that determination if satisfied that the criteria set out in section 2.3 of the methodology have been met.

Information demonstrating how these criteria are met must be included as part of the impact assessment section in the BioBanking Assessment Report that accompanies an application for a biobanking statement if the proposed development or any part of it, is on land that is, or forms part of, a red flag area. Where the Director General determines that a development is to be regarded as improving or maintaining biodiversity values under section 2.3 of the methodology, then credits to offset the impacts of the development, including those on red flag areas, must be retired in accordance with section 2.1 of the methodology (see also section 2.1 of this operational manual). Furthermore, the Director General must publish the reasons for that determination on the register of biobanking statements.

The criteria, and the information that is required from the proponent to demonstrate how the criteria are met, are explained below. If the proposed development, or any part of it, is not on land that is, or forms part of, a red flag area, the impact assessment section in the BioBanking Assessment Report does not need to address these criteria (other than establishing that the land is not a red flag area).
1. Options to avoid impacts on red flag areas must be considered

The Director General must be satisfied that reasonable measures have been considered to:

(a) avoid adverse impacts on the red flag area; and

(b) improve or retain the viability of the red flag area through ongoing management.

A development impacts on a red flag area when the development footprint affects the biodiversity values of the red flag area. This includes direct impacts (such as from clearing) and indirect impacts on biodiversity values of red flag areas (such as from changes in water quality).

Under part (a) of this criterion, the application for a biobanking statement will need to demonstrate that the applicant has considered options to avoid adverse impacts on biodiversity values on the red flag area. This could include reconfiguring the development footprint to avoid the red flag area, or taking measures to minimise any impacts on biodiversity values on the red flag area, such as retention of a buffer zone to minimise impacts where the clearing occurs up to the boundary of a red flag area.

For part (b) of this criterion, the application could demonstrate that the applicant has considered measures to improve or retain the viability of the red flag area through ongoing management. Such measures could include designating patches comprising the red flag areas as an urban bushland park or a reserve within an urban precinct, or managing red flag areas by using conservation-based mechanisms such as a biobanking agreement or a planning agreement under s. 93F(2)(f) of the EP&A Act.

2. Highly cleared vegetation types have been considered

A highly cleared vegetation type is a vegetation type whose distribution in the CMA area is 10% or less than its estimated distribution in the CMA area before 1750 (i.e. 90% or more in the CMA area has been cleared, as defined by the Vegetation Types Database), and the vegetation is not in low condition (as defined in section 2.2 of the methodology).

Where a red flag area on the development site comprises a highly cleared vegetation type (see below) with an area greater than four hectares, the Director General cannot determine that the development will improve or maintain biodiversity values. This means that a biobanking statement cannot be obtained.

This operation of this criterion is illustrated by the following examples ('patch area' has the same meaning as adjacent remnant vegetation area, which is defined in section 3.7.2):

- If a highly cleared vegetation type covers an area greater than 4 ha, then the other criteria in section 2.3 of the methodology for varying red flags (e.g. contribution to regional biodiversity values and viability) cannot be considered. This means that the red flag area cannot be varied, as the development cannot pass the improve-or-maintain biodiversity values test.

- If a highly cleared vegetation type is the only vegetation in a patch of 4 ha or less, then the other criteria (points 3 and 4 below, i.e. contribution to regional biodiversity values and viability) can be considered and the red flag area can be varied where the other criteria can also be satisfied.

- If a highly cleared vegetation type is 4 ha or less in area and in a patch with a red-flagged vegetation type (e.g. more than 70% cleared), taking the total adjacent remnant vegetation area to over 4 ha, then the other criteria (contribution to regional biodiversity values and viability) can be considered and the red flag area can be varied if appropriate.

- If a highly cleared vegetation type larger than 4 ha in area is in a patch (i.e. together with the adjacent remnant area) with a vegetation type that is more than 70% cleared in the CMA area, and it is proposed to clear only the vegetation type which is more than 70%
cleared, then the other criteria (e.g. contribution to regional conservation significance and viability) can be considered and the red flag area can be varied if appropriate.

3. Contribution to regional biodiversity values must be low

The application for a biobanking statement needs to provide evidence that the contribution of the red flag area to regional biodiversity values is low. For this criterion, region is defined as both the CMA subregion where the red flag area is located and the adjoining CMA subregions. The purpose of this criterion is to consider the contribution of the biodiversity values of the red flag area to regional biodiversity values.

Under this criterion, each of the five following factors must be addressed in the impact assessment section of the application for a biobanking statement:

(a) **Relative abundance** – whether the vegetation type, or critically endangered or endangered ecological community, at the development site is relatively abundant in the region. The application could include evidence that the extant distribution of the affected vegetation type in the region is still relatively large in the region.

(b) **Percent remaining is high** – whether the percent remaining of the vegetation type, or critically endangered or endangered ecological community, at the development site is relatively high (greater than 50% remaining) in the region. The application could include evidence that more than 50% of the pre-1750 distribution of the vegetation type or endangered ecological community at the site remains in the region.

(c) **Percent native vegetation (by area) remaining is high** – whether the percent remaining of native vegetation cover in the region is relatively high (greater than 50% remaining). The application could include evidence that more than 50% of the native vegetation cover remains in the region.

(d) **Whether the vegetation type or critically endangered or endangered ecological community or native vegetation is generally in moderate to good condition in the region** – the application could include information from vegetation condition mapping of the region, and other relevant material on vegetation condition.

(e) **Relative abundance of individual threatened species or threatened species habitat on the site** – whether the habitat and/or numbers of the threatened species in the region would allow the species to bear temporary loss at the development site while gains are being achieved at biobank sites in the same region. Where the red flag area is for a threatened species that is considered unable to withstand a temporary loss (according to the Threatened Species Profile Database [TSPD]), then the application could include evidence that sufficient habitat is available in the region for that species and/or that the numbers of the species in the region are relatively abundant for the species to withstand a temporary loss within that region.

4. Viability must be low or not viable

The viability of biodiversity values on the red flag area must be low or not viable. Viability is defined in the methodology as the ability of biodiversity values at a site to persist for many generations or for long time periods. The viability of biodiversity values at a site depends on its condition, the area of the patch and its isolation, its current or proposed tenure, the surrounding land use, and whether mechanisms are available to manage low-viability sites such that their viability is improved over time.

In making an assessment that the biodiversity values on the red flag area are low or not viable, the Director General must be satisfied that options under criterion 1(b) above have been considered and either one or more of the following factors apply:

(a) The current or known future land uses surrounding the vegetation to be cleared (other than the land use proposed in the biobanking statement application) reduce its viability or make it unviable. Relatively small areas of native vegetation (e.g. patches of a few
hectares or less) surrounded, or largely surrounded, by intense land uses, such as urban
development, can be unviable or have low viability because of disturbances from
urbanisation, including edge effects.

(b) The size and connectedness (with other native vegetation) of the vegetation to be cleared
are insufficient to maintain its viability. Relatively small areas of isolated native vegetation
(e.g. patches of a few hectares or less that are more than several hundred metres from
another patch of native vegetation) can be unviable or have low viability.

(c) The condition of native vegetation to be cleared is substantially degraded, resulting in
loss of, or reduced, viability. Native vegetation in degraded condition can be unviable or
have low viability. Degraded condition means that the majority of vegetation condition
variables listed in table 3 of this operational manual are substantially outside benchmark,
but does not meet the definition of low condition in section 2.2 of this operational manual.
Vegetation that is substantially outside benchmark owing to a recent disturbance, such as
a fire, flood or prolonged drought, is not considered degraded.

5. Other matters that may be considered

An application to the Director General to determine whether the impacts on a red flag area
can improve or maintain biodiversity values may also include information that addresses the
factors listed below. This information can be considered only when the above criteria have
been addressed to the satisfaction of the Director General.

(a) Regional plans: whether the proposed development on the red flag area is in
accordance with an approved regional plan. For the purpose of these assessment
protocols, an approved regional plan can be a regional strategy, regional conservation
plan, environmental planning instrument or another regional plan that has been approved
by the relevant Minister.

(b) Consistency with plans: The application to the Director General should clearly define
how the development on the red flag area is consistent with the plan and how the
approved regional plan supports the determination that strict avoidance of the red flag
area is, in the particular case, unreasonable and unnecessary.

(c) Environmental contributions: whether an extra environmental contribution has been
made or extra credits are proposed to be retired in addition to the number of biodiversity
credits that must be retired in accordance with the improve-or-maintain test (section 2.1
of the methodology, see also section 2.1 of this operational manual) to offset the impacts
of the development on the red flag area (or the overall development). This may include
an environmental contribution, where relevant.

2.4 Assessing indirect impacts on biodiversity values

The impact assessment in the BioBanking Assessment Report that accompanies a
biobanking statement application must identify and assess any relevant negative indirect
impacts that the development is likely to have on biodiversity values off-site. The area that
is assessed for indirect impacts should extend as far as is necessary off-site to assess any
likely adverse impacts on biodiversity values from the development.

Indirect impacts on biodiversity values could include, for example:

- changes in water quality or quantity that affect downstream biodiversity values
- increased light or noise that may affect threatened species habitat
- roads or other linear developments that may restrict movement of threatened species or
  populations in areas surrounding the development.

Where the indirect impacts of the development occur on-site, these impacts should be
addressed by the BioBanking Assessor through the calculation of credits. This should then
be included as part of the application for a biobank statement.
Where the development has indirect impacts on biodiversity values that occur off-site, the process used to assess these indirect impacts is outlined in the two steps below.

**Step 1: Show that negative effects have been minimised**

The applicant for a biobanking statement must demonstrate that all cost-effective on-site measures to minimise any negative impacts of the development on biodiversity values are being, or will be, carried out (s. 127ZL(4)(d) of the TSC Act). This includes both on-site and off-site (indirect) impacts. Measures might include:

- implementing sediment and erosion controls at the development site
- use of noise and light barriers
- use of structures that allow movement of threatened species or populations.

Before issuing a biobanking statement, the Director General must be satisfied that the applicant has demonstrated that all cost-effective on-site measures to minimise any negative impacts of the development on on-site or off-site (indirect) biodiversity values are being, or will be, carried out.

These measures may be included as conditions on a biobanking statement issued in respect of the development.

**Step 2: Determine biodiversity credits to offset any remaining impact**

In circumstances where the use of cost-effective on-site measures are not sufficient to avoid negative indirect impacts on biodiversity values, the assessor is required to determine the number and type of biodiversity credits required to offset the remaining impact. To do this, the assessor must first identify any threatened species or population, or critically endangered or endangered ecological community that occurs offsite, which will continue to be impacted by the effects of the development.

The negative impact on these species, populations or communities is then assessed for biodiversity credits by using an expert report in accordance with the following:

- If the affected threatened species or population consists of species to which species credits apply, the expert report must indicate the area of habitat or number of individuals affected by the remaining indirect impact, after taking into account the effect the mitigation measures will have on ameliorating any impact. The expert report must include an estimate of the number of species credits required to offset the impact by using equation 13 in the methodology. Therefore the expert report should contain information on the area of habitat that is impacted on where the species is fauna, or the number of individuals that will be impacted on where the species is flora.

- If the threatened species affected are species to which ecosystem credits apply, the expert report must include an estimate of the number of additional ecosystem credits required to offset the impact. This estimate must be based on the probable area where the development will impact on the particular species, population or community and include an estimation of the change in Site Value score for the threatened species (using equation 9 of the methodology) that will result from the remaining indirect impact. The estimation of the number of additional ecosystem credits required to offset the indirect impact is then made using equation 10 of the methodology and the response to gain (the $T_G$ value) for that species.

- The expert report can also determine that the remaining indirect impacts cannot be assessed under sections 3, 4 or 5 of the methodology. If the remaining indirect impacts cannot be mitigated or offset, the development cannot improve or maintain biodiversity values and, therefore, a biobanking statement cannot be issued.
The Director General will consider the expert report and determine whether the indirect impacts can be offset by the retirement of credits and, if so, the number and class of credits to be retired in accordance with the offset rules in the methodology.

The Director General may develop information that provides guidance on assessing indirect impacts.

### 2.5 Credit profiles and offset rules for using credits

A credit profile is the set of attributes used to characterise a group of credits for ecosystem credits or species credits. The credit profile forms part of the offset rules for using credits to offset development. The credit profile is created by the credit calculator once an assessment has been completed; it is shown in the BioBanking Credit Report for developments and in the BioBanking Agreement Credit Report.

The offset rules ensure that a vegetation type is offset by vegetation types that have been cleared to an equal or greater extent and within the same vegetation formation, and that threatened species impacted at the development site are offset by suitable habitat for the suite of species within the geographic distribution of impacted species. The offset rules for ecosystem credits can vary, depending on whether or not the credit relates to a threatened species that can be reliably predicted by habitat.

The credit profile for a group of ecosystem credits that includes threatened species is made up of five attributes (see Table 1). These are used as primary filters to predict the presence of the threatened species. These attributes are assigned to each threatened species sub-zone created at a development site or biobank site.

#### 2.5.1 Credit profile at a development site – ecosystem credits

All ecosystem credits are attributed with a credit profile. The credit profile for ecosystem credits at a development site is used to find a matching profile from a group of credits from a biobank site. The attributes for the credit profile at a development site are identified in Table 1 and are derived from each threatened species sub-zone following the calculation of credits for that zone. Where the credit profiles from one or more threatened species sub-zones are consistent, the credits are combined to form groups of credits. These will be shown on the BioBanking Credit Report.

<p>| Table 1 | Attributes of the credit profile of an ecosystem credit (that includes threatened species) at the development site |</p>
<table>
<thead>
<tr>
<th>Credit profile attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CMA subregion</td>
<td>Specifies the CMA subregion(s) within which the required credit must be obtained and retired.</td>
</tr>
<tr>
<td>2. Vegetation type</td>
<td>Specifies the vegetation type(s) in which the required credit must be obtained and retired.</td>
</tr>
<tr>
<td>3. Vegetation formation</td>
<td>Identifies the vegetation formation in which the credit must be obtained and retired.</td>
</tr>
<tr>
<td>4. Surrounding vegetation cover</td>
<td>Specifies the surrounding vegetation cover class in a 1000-ha assessment circle in which the required credit must be obtained and retired. The classes are either 0–10%, 11–30%, 31–70% or &gt;70%.</td>
</tr>
<tr>
<td>5. Patch size, including low-condition</td>
<td>Specifies the patch size of vegetation including low-condition vegetation that is the minimum class in which the required credit must be obtained and retired. The classes are either &lt;5 ha, 5–25 ha, &gt;25–100 ha or &gt;100 ha.</td>
</tr>
</tbody>
</table>
These credit profile attributes are determined in accordance with the following subsections.

**Credit profile attribute 1: CMA subregion**

This attribute is used to specify the CMA subregions that have the same geographic distribution of the threatened species impacted by the development to which the credit profile applies.

For example, if all the threatened species that are predicted to be impacted by a development occur only within a single CMA subregion, then the ecosystem credits must be obtained from biobank sites within this single CMA subregion. Alternatively, if the threatened species (or endangered or critically endangered ecological communities) predicted to be impacted upon by a development occur in a number of CMA subregions (including in different CMA areas), then the group of credits can be obtained from biobank sites in any of these subregions.

If the ecosystem credits are not associated with a threatened species, the ecosystem credits can be obtained in any vegetation type in the same formation that is cleared to an equal or greater extent than the vegetation types being cleared within the CMA area where the development occurs.

**Credit profile attribute 2: Vegetation type**

This attribute is used to specify the vegetation types that:

(a) are identified in the TSPD (see section 2.8) as providing habitat for all the threatened species impacted by the development to which the credit profile applies, and

(b) have a percent cleared value of the vegetation type in the CMA area equal to or greater than the percent cleared of the vegetation type in the CMA area to which the group of credits applies.

For example, if all the threatened species predicted to be impacted by the development occur in a single vegetation type, then the group of credits must be obtained and retired within this single vegetation type. Alternatively, if the threatened species occur in a number of vegetation types, then the group of credits can be obtained and retired in one or more of these vegetation types (if the vegetation type is cleared to an equal or greater extent in the CMA than the vegetation type to which the group of credits applies).

If the ecosystem credits are not associated with a threatened species, the ecosystem credits can be obtained in any vegetation type in the same formation that is cleared to an equal or greater extent as the vegetation types being cleared within the CMA area where the development occurs.

**Credit profile attribute 3: Vegetation formation**

Vegetation formation is the vegetation formation under which the vegetation type is classified.

**Credit profile attribute 4: Surrounding vegetation cover**

Surrounding vegetation cover is the minimum surrounding vegetation cover class that all threatened species to which the group of credits applies can occupy, as determined by the TSPD. The surrounding vegetation cover classes are 0–10%, 11–30%, 31–70% and >70% cover.

**Credit profile attribute 5: Patch size, including low-condition**

Patch size, including low-condition is the minimum patch size of vegetation that can be occupied by all threatened species that are impacted on at the development site and to
which the group of credits applies, as determined by the TSPD. The minimum patch size including low-condition classes are <5 ha, 5–25 ha, >25–100 ha and >100 ha.

2.5.2 Credit profile at a biobank site – ecosystem credits

The credit profile for an ecosystem credit created at a biobank site is determined for each threatened species sub-zone that will be positively impacted by management actions. Credits with the same profile are grouped after the credit profile has been assigned.

The attributes in the credit profile of an ecosystem credit at the biobank site are identified in Table 2.

<table>
<thead>
<tr>
<th>Credit profile attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CMA subregion</td>
<td>Specifies the CMA subregion in which the credit is created.</td>
</tr>
<tr>
<td>2. Vegetation type</td>
<td>Specifies the vegetation type for which the credit is created.</td>
</tr>
<tr>
<td>3. Vegetation formation</td>
<td>Identifies the vegetation formation in which the credit is created.</td>
</tr>
<tr>
<td>4. Surrounding vegetation cover</td>
<td>Specifies the surrounding vegetation cover in which the credit is created, with classes 0–10%, 11–30%, 31–70% or &gt;70%.</td>
</tr>
<tr>
<td>5. Patch size, including low condition</td>
<td>Specifies the minimum patch size of vegetation, including vegetation in low-condition in which the credit is created, with classes &lt;5 ha, 5–25 ha, &gt;25–100 ha and &gt;100 ha.</td>
</tr>
</tbody>
</table>

The number of credits created at a biobank site, with their credit profiles, is listed in a public register held by DECC for use by anyone who wants to obtain and retire ecosystem credits.

2.5.3 Credit profile for species credits

The credit profile of a species credit relates only to the threatened species or population for which the credit is required or created.

2.5.4 Offset rules for using ecosystem credits

A biobanking statement can only be issued for a proposed development at a development site only if the Director General determines the proposed development will improve or maintain biodiversity values. The biobanking statement will specify the number and class of credits that must be retired in order to meet the ‘improve or maintain’ test. The number and class of credits obtained from a biobank site must be compatible with those required at a development site, as specified by the biobanking statement.

If it is predicted that threatened species requiring ecosystem credits are impacted on a development site, the ecosystem credits obtained from a biobank site are determined to be compatible with those required at the development site if all of the following conditions are met:

1. The number of ecosystem credits obtained and retired from the biobank site is equal to, or greater than, the number required at the development site, calculated by Equation 11 in the methodology.

2. The CMA subregion identified in attribute 1 of the credit profile at the biobank site (see Table 2) is the same as the subregion(s) identified in attribute 1 of the credit required at the development site.

3. The vegetation type identified in attribute 2 of the credit profile at the biobank site is the same as the vegetation type(s) identified in attribute 2 of the credit required at the development site.
4 The vegetation formation identified in attribute 3 of the credit profile at the biobank site is the same as the vegetation formation identified in attribute 3 of the credit required at the development site.

5 The surrounding vegetation cover class identified in attribute 4 of the credit profile at the biobank site is equal to, or greater than, the surrounding vegetation cover class in the landscape identified in attribute 4 of the credit required at the development site.

6 The patch size, including low condition class identified in attribute 5 of the credit profile at the biobank site is equal to, or greater than, the patch size, including low condition class identified in attribute 5 of the credit required at the development site.

If no threatened species requiring ecosystem credits are predicted to be impacted by the development, then the ecosystem credits retired from a biobank site are determined to be compatible with those required at the development site if the following conditions are met:

1 The number of ecosystem credits obtained and retired from the biobank site(s) is equal to or greater than, the number required at the development site, calculated by Equation 11 in the methodology.

2 The CMA subregion identified in attribute 1 of the credit profile at the biobank site is the same as the subregion(s) identified in attribute 1 of the credit required at the development site.

3 The vegetation type identified in attribute 2 of the credit profile at the biobank site is the same as the vegetation type(s) identified in attribute 2 of the credit required at the development site.

4 The vegetation formation identified in attribute 3 of the credit profile at the biobank site is the same as the vegetation formation identified in attribute 3 of the credit required at the development site.

2.5.5 Offset rules for using species credits

The credit profile of a species credit obtained from a biobank site(s) is determined to be compatible with a credit profile required at a development site if the credit profile at the development and biobank sites refers to the same threatened species.

2.6 Vegetation Types Database

Vegetation types for each CMA area are stored in the NSW Vegetation Types Database. The Vegetation Types Database is held by DECC and is publicly available from its website at www.environment.nsw.gov.au/biobanking/VegTypeDatabase.htm.

Vegetation types are used in the methodology as a surrogate for general biodiversity values. A vegetation type is classified within a vegetation class, which in turn is classified within a vegetation formation. There are approximately 1600 vegetation types, 99 vegetation classes, and 12 vegetation formations in NSW.

The Vegetation Types Database contains:

- a description of each vegetation type, its class and formation
- the CMA area within which the vegetation type occurs
- the percent cleared value of the vegetation type within each CMA area in which it occurs.

2.7 Vegetation Benchmarks Database

The Site Value score in the credit calculator is based on a comparative measurement of 10 site condition attributes between the vegetation at the proposal area and the benchmark for the attributes for that particular vegetation. Benchmarks are quantitative measures that describe the range of variability in condition of vegetation with relatively little evidence of
alteration, disturbance or modification by humans since the year 1750. Benchmarks are described for specified attributes by vegetation community at either the vegetation type or vegetation class level. Benchmarks are held in the Vegetation Benchmarks Database. Most benchmarks in the database are available only at vegetation class level. These are provided as default benchmarks in the credit calculator. Collection of local benchmarks from reference sites by accredited assessors for a vegetation type is encouraged (see section 3.4.3 of this operational manual). Published information can also be used to develop local benchmarks.

Further information on the Vegetation Benchmarks Database can be found at www.environment.nsw.gov.au/biobanking/vegbenchmarkdatabase.htm.

2.8 Threatened Species Profile Database

The Biobanking Threatened Species Profile Database (TSPD) contains information on threatened species, populations and communities listed under the TSC Act and the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). The TSPD includes information such as habitat, range, life history strategies, response to management actions, survey requirements and whether the species is able to withstand any further loss. This information is used in the methodology to determine the likely presence of threatened species at a site and to calculate ecosystem or species credits on the basis of the ability of the threatened species to respond to improvement in Site Value with management actions at the biobank site (the $T_G$ value).

The components of the TSPD that are used in the methodology for all threatened species are:

- a description of each threatened species and its habitat, ecology and threats
- CMA subregions in which the distribution of each species is associated (the distribution of a species is not associated with a CMA subregion if the species is identified by the database as being vagrant in that subregion)
- the vegetation types with which each species is associated
- the minimum surrounding vegetation cover class with which the species is associated (used as an initial filter to identify species for assessment)
- the minimum adjacent remnant area or patch size, including low-condition vegetation (hectares) with which the species is associated (used as an initial filter to identify species for assessment)
- the minimum vegetation condition with which the species is associated (being low-condition vegetation or moderate- to good-condition vegetation) (used as an initial filter to identify species for assessment)
- the management actions relevant for each species
- the ability of a species to respond to improvement in Site Value or other habitat improvement at a biobank site as a result of management actions (the $T_G$ value)
- the class of credit (ecosystem or species) required for the species.

The additional components of the TSPD that are used in the methodology for threatened species to which ecosystem credits apply are:

- the site attributes with which the habitat for the species is associated.

Additional components of the TSPD that are used in the methodology for threatened species to which species credits apply are:

- any geographic characteristics associated with the occurrence of the species
- any specific habitat features associated with the occurrence of the species
- threatened species that cannot withstand further loss
• the unit of measurement of impact to be applied for the species (either the number of individuals or the area of habitat)
• the months of the year in which the species is identifiable through survey.

The TSPD contains the following information:

• **Threatened Species by CMA Subregion**: identifies the distribution of threatened species by CMA subregion. This is available at http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_geo.aspx

• **Threatened Species by Vegetation Types**: identifies the vegetation types associated with each threatened species in each CMA area. This is available at http://www.threatenedspecies.environment.nsw.gov.au/tsprofile/browse_veg.aspx

• **Threatened Species Characteristics by CMA**: lists the information on each threatened species that is used to predict the likely presence of species and their association with the site attributes, and to determine response to improvement in Site Value with management actions. This is available at www.environment.nsw.gov.au/resources/biobanking/ThsppcharaCMA.xls.

Further details of the data in the Threatened Species Characteristics by CMA table are given in Appendix 1.

### 2.9 Accredited assessors

A person accredited to apply the methodology is known as a BioBanking Assessor. Only an accredited person may apply the methodology and use the credit calculator for the purpose of applying for a biobanking statement or biobanking agreement. The BioBanking Assessor applies the methodology to determine the number of credits required at a development site or to be created at a biobank site.

BioBanking Assessors are accredited in accordance with s. 142B(1)(c) of the TSC Act.

Refer to the BioBanking Assessor Accreditation Policy available from the BioBanking website for further information on the accreditation process.

### 2.10 Use of expert reports

Expert opinion may be used in a biobanking assessment to provide a professional judgement or opinion on a particular matter. There are two types of expert reports under the methodology:

• expert reports for the assessment of indirect impacts on biodiversity values. These come under section 2.4 of the methodology. An expert report may be used to provide expert opinion to assess the negative effects on threatened species or populations or critically endangered or endangered communities from indirect impacts of a development.

• where the use of an expert report is required instead of a survey for threatened species that require species credits. This comes under section 4.4 and 4.5 of the methodology.

An expert for the purpose of preparing either of these reports is a person who is accredited by the Director General under s. 142B(1)(b) of the TSC Act, or (if arrangements for accreditation under s. 142B(1)(b) are not in place), a person who has the relevant experience and/or qualifications to provide expert opinion about the specific biodiversity values to which an expert report relates.

Any targeted surveys for flora or fauna species that are required by the methodology must be carried out by a person who is accredited by the Director General under s. 142B(1)(b) of the TSC Act. If the arrangements for accreditation under s. 142B(1)(b) are not in place, the survey should be carried out by a person who has the relevant knowledge, experience and/or qualifications to carry out a survey for the particular species.
2.11 Use of judgment and local data

Use of judgment is required in the assessment process. The methodology permits the use of certified local data, and this gives the assessor some flexibility. Judgment is used by the assessor when applying the methodology to a development or biobank proposal. Certified local data can be used where the Director General certifies that it more accurately reflects local environmental conditions than the data in the database. The section numbers referred to below are in the methodology.

2.11.1 Use of judgment

Judgment requires knowledge, experience and (where required) risk assessment. In particular, BioBanking Assessors need to apply judgment when applying the following sections of the methodology:

- assigning vegetation types and delineating vegetation zones (methodology, section 3.2.1).
- placing plots and transects, and increasing the numbers of plots and transects where vegetation condition varies within a zone (but does not vary enough to form a separate zone; methodology, section 3.5.1; Appendix 2 of this operational manual). In these circumstances there is a balance between using more plots and transects and delineating another zone.
- removing multipliers for Site Value in the case of certain vegetation formations (methodology, section 3.5.2).
- arranging assessment circles to ensure that the minimum number is used (section 3.6).
- scoring percent native vegetation cover for measuring Landscape Value (methodology, section 4.6.1 and Table 6 of this operational manual). Percent vegetation cover in the 1000-ha and 100-ha assessment circles is assessed as a combination of extent and condition. For example, if 36% of the area in a circle is occupied by vegetation in benchmark condition then the percent vegetation in the circle is scored in the percentile range of 31–40%. If 18% of the area in this circle is occupied by vegetation that is 50% of benchmark, then the percent vegetation cover is 11–20%. If the condition of the vegetation in the circle is improved from 50% of benchmark condition to benchmark condition by management actions, then percent vegetation cover in the circle is scored as increasing from the percentile range of 11–20% to that of 31–40%.
- assessing average condition and determining width in the linkages for measuring connectivity (methodology, section 3.6.2). The assessment of connectivity also requires judgment when determining the scale that off-site vegetation is considered in the connectivity assessment.
- assessing patch size and adjacent remnant area, including assessing when separation is greater than 100 m (woody vegetation) and greater than 30 m (non-woody vegetation) from the next patch or remnant (methodology, section 4.2.1; Glossary of this operational manual).
- assessing the area of habitat for threatened species in order to map a species polygon (methodology, section 4.4).
- undertaking a threatened species survey (methodology, section 4.4).

2.11.2 Use of certified local data

Certified local data can be used where the Director General certifies that it more accurately reflects local environmental conditions than the data in the database. Use of the certified local data must be approved by the Director General before a biobanking statement or agreement is approved. The applicant must provide justification for the use of local data as part of the BioBanking Assessment Report for either a development or biobank proposal.
Local data can be used instead of the data in the Vegetation Types Database (including percent cleared values for vegetation types), Vegetation Benchmarks Database and TSPD (section 3.3) in the credit calculator. Benchmarks can be obtained from reference sites or published data. Published data on benchmarks can be obtained from texts such as *Australian Plant Communities* (Specht and Specht 1999; Oxford University Press, Melbourne), which provide lower and upper percent foliage covers for some structural vegetation categories. The types of data from the TSPD that are used by the credit calculator are listed under section 2.8 of this operational manual.

Local data that are more accurate or more relevant than the datasets in the credit calculator should be used in biobanking assessments. Local data can be certified by the Director General for use in a defined area, rather than on a case-by-case basis.

### 2.11.3 Varying red flag areas

The Director General may determine that development on red flag areas can be regarded as improving or maintaining biodiversity values (methodology, Operational Manual, section 2.3). This provision allows consideration of other factors that take account of local conditions, such as high regional abundance of a vegetation type compared with its abundance across the CMA area, or high relative abundance of a threatened species in the region, such that recovery is possible, or low viability of a patch of native vegetation and its biodiversity values.

### 2.11.4 Other related matters

Certain other matters in the methodology require assessment of the local situation. These matters are determined or approved by the Director General and include:

- assessing indirect impacts on biodiversity values (methodology, section 2.4)
- calculating the reduction in the number of credits from an environmental contribution (methodology, section 5.7)
- deferred credit retirements for development sites (methodology, section 7.1)
- discounting the number of credits (additionality) created on biobank sites where some of the management actions required for the biobanking agreement are already required under existing conservation obligations (methodology, section 7.2). Approval for additionality is given when a biobanking agreement is made.
- varying the extent of improvement in the site attribute scores (methodology section 3.5.4 and Appendix 4). Improvement in the site attributes scores can be increased if additional or tailored actions are being undertaken at a biobank site.

### 2.12 Application of the methodology to Part 3A projects

Where an applicant for a Part 3A project approval under the EP&A Act has not obtained a biobanking statement, the methodology can still be applied to assess the impacts of the project on biodiversity values. For example, the methodology may be used in the environmental assessment for the project. Application of the methodology to Part 3A projects would involve:

- at the preliminary assessment stage, considering options to avoid impacts on native vegetation and other areas likely to contain threatened species habitat
- for the environmental assessment, using the methodology, operational manual and credit calculator to assess the project (including the calculation of any offsets that may be required), and
- providing the BioBanking Assessment Report, along with a statement of commitments when the application is submitted to the Department of Planning. The statement of commitments should indicate cost-effective measures for minimising negative impacts
and the intended mechanism by which offsets are proposed to be provided (through retirement of biodiversity credits, reservation of land, or other mechanisms).

2.13 Updates to the credit calculator

The data from the biodiversity databases in the credit calculator are periodically updated as new information becomes available. For this reason, a new version of the credit calculator will be issued when a change is made to the data in the credit calculator.

DECC will notify BioBanking Assessors prior to a new version of the credit calculator being made available. All applications for biobanking statements and biobanking agreements made after the date on which the revised version of the credit calculator is available must be based on the latest available version of the credit calculator.
3  Undertaking the assessment

This section describes in detail the different components of assessment for development and biobank sites.

3.1  Resources required to complete an assessment

The following resources are required to complete an assessment under the methodology:

- hard copy of the BioBanking Operational Manual
- computer loaded with the credit calculator. Two formats of the credit calculator are available for download from the BioBanking website. Assessors who are using Microsoft Access 2003 software should use the BCCaccess version. Assessors who do not have Microsoft Access 2003 software should use the BCCruntime version. This version requires the installation of Microsoft Access Runtime 2003 software onto the computer. Both versions of the credit calculator can be downloaded from www.environment.nsw.gov.au/biobanking/calculator.htm
- satellite imagery or ortho-rectified digital imagery for the development or biobank site, extending a distance of at least 2 km from the development site (although a greater distance may need to be considered for connectivity assessment)
- digital layer of any vegetation mapping in the study area (desirable)
- field data survey sheets (templates are available at www.environment.nsw.gov.au/biobanking/index.htm The templates can be customised by an assessor as required.)
- printed copy of relevant vegetation types and definitions used in the credit calculator for each CMA area. These are available on the BioBanking website listed above. Set the printer to A3 to capture all the information on a single page.
- definitions and descriptions of potential Endangered Ecological Communities (i.e. critically endangered and endangered ecological communities – EECs) listed under the TSC Act that may occur on the site. Detailed descriptions of EECs can be accessed at www.threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx; search for Ecological Communities) and in the EPBC Act list at www.deh.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl
- threatened species profile information, to give more details on the habitat and geographic needs of species that require surveying
- relevant benchmarks for vegetation condition from www.environment.nsw.gov.au/biobanking/vegbenchmarkdatabase.htm or from local reference sites or published sources
- a Global Positioning System (GPS) receiver. A differential GPS receiver should be used where practical, or where the placement of a boundary of a property or a zone requires a greater level of accuracy.
- 2 x 50 m measuring tapes and tent pegs or surveyors pegs to secure tape ends
- small measuring tape/diameter tape
- clipboard and pencils
- digital camera (not essential)
plant identification books as required (native and exotic).
The assessor should also have access to the following datasets:

- CMA area boundaries (available at www.canri.nsw.gov.au/download)
- Mitchell Landscapes (available at www.maps.environment.nsw.gov.au/)
- Other data and information as considered necessary by the assessor. This may include information obtained from local councils, government agencies and other relevant sources.
- additional aerial photography that covers the site, if available.

3.2 Set up the development or biobank site assessment

The following information provides general guidance on the steps to complete an assessment.

Before entering data into the credit calculator, the assessor needs to undertake a number of tasks to set up the assessment. The assessor should have as much information about the site and layout of the proposed development as possible. This includes the locations of areas that are to be totally cleared and of any retained areas or particular management areas, such as buffer or asset protection zones (APZs). For biobank sites, the assessor should have information about the nature of the site and proposed management area layout of the site.

The assessor should do preliminary mapping of the site to define elements such as the area of different vegetation types, different management areas associated with the development or biobank site, and the landscape attributes used during the assessment process. Preliminary mapping of the site before a field visit can reduce the amount of time required on site. A GIS is required for initial delineation of vegetation zones, for determining the areas of vegetation zones and threatened species habitat, for the Landscape Value assessment, and to produce a map of the final proposal. The assessor can also use GIS to access available vegetation maps or threatened species records available for the site and surrounding area.

This information can be used to prepare desktop simulations of different proposals to obtain indicative credit requirements and offset needs in the credit calculator. However, the data entered into the credit calculator to determine the final credit requirements must be validated with field data before submission to the Director General for approval (biobanking agreements are issued by the Minister). Applications for a biobanking statement or agreement will not be approved if the site has not been surveyed in accordance with the methodology, or if inaccurate data have been used.

Suggested actions before the site inspection are as follows:

- Refer to the BioBanking website for the most recent versions of the credit calculator and any supporting documentation or data, at www.environment.nsw.gov.au/biobanking/calculator.htm.

- For a development site, obtain as much information about the development as possible (i.e. boundaries and areas of development; the proposed nature of the development and extent of clearing within the proposal, including any asset protection zones and retained areas or offsets if relevant; and environmental impact studies of the site, containing information on threatened species, vegetation types and the general condition of vegetation in the proposal areas). For a biobank site, discuss different conservation management objectives with the landowner and consider whether additionality may apply.

- Use any available vegetation maps, information from environmental studies and threatened species data as a guide to assess whether any part of the site where the proposal is situated is likely to contain an EEC or over-cleared vegetation type or threatened species that would constitute a red flag area. Vegetation maps are usually too
coarse and/or inaccurate for reliably showing vegetation types at the scale of the patch or paddock, so the actual vegetation types must be confirmed during a site visit. Vegetation maps may indicate vegetation types likely to be at the site, but these maps cannot be used for the actual assessment where a biobanking statement or agreement is sought.

- Do as much of the assessment as possible in the office by using the credit calculator and available data before the site inspection.
- If enough information is available to indicate the development site is likely to contain red flag areas, then before the site inspection consider discussing options that may avoid or mitigate impacts on the red flag area with the applicant/client.
- Print a hard copy of the satellite or ortho-rectified image, with property boundary, 100-ha and 1000-ha assessment circles (section 3.7.1 of this operational manual), and the boundary of the proposal area, as well as any vegetation maps or other natural resource data relevant to the site.
- Print hard copies of all the data sheets from the credit calculator for completion in the field.
- Print a copy of the relevant vegetation type definitions from the BioBanking website.

### 3.3 Map the vegetation zones

Vegetation zones are relatively homogenous areas of the same vegetation type and similar condition. Each vegetation zone should be a distinct vegetation type (according to the Vegetation Types Database) and similar broad condition state. Vegetation in low condition must always form a separate zone from vegetation that is in moderate to good condition. Vegetation zones are assessed by using transects and plots to collect site information, which is used to determine the Site Value (condition) of the vegetation zone.

For operational reasons, the minimum size of a vegetation zone is 0.25 ha. An area of vegetation that is less than 0.25 ha is included in the adjoining vegetation zone, i.e. the smallest area of a vegetation zone is 0.25 ha. Where more than one vegetation zone adjoins an area of vegetation of less than 0.25 ha, then the 0.25-ha area should be included with the vegetation zone with the closest condition and percent cleared value in the CMA. If the total are of native vegetation on the development site is an area of less than 0.25 ha, then the assessor should consider whether the methodology is a suitable option for assessing the biodiversity values of the site.

Vegetation zones must be digitised onto a recent aerial photograph or Spot 5 image and the information confirmed through a site visit. GPS should be used in the field to confirm the boundaries of the vegetation zones. Aerial photos may be required for greater detail or for non-woody vegetation types.

Where there are paddock trees on a development site, the area can be assessed according to the methods described in Appendix 3 using the BioBanking Paddock Tree Calculator. The BioBanking Paddock Tree Calculator can be used where:

- native vegetation has an over-storey percent foliage cover <25% of the lower projected foliage cover for the vegetation community and
  - there is no native mid-storey
  - the groundcover is in low condition (i.e. less than 50% of the groundcover is native vegetation or >90% of the groundcover is cleared).

If the groundcover vegetation is not in low condition, the BioBanking Paddock Tree Calculator can only be used to determine the percent over-storey foliage cover and the number of trees with hollows. Assessors should refer to [Info sheet 12: Suggested methods for assessing groundcover](http://www.environment.nsw.gov.au/vegetation/publications.htm) for further guidance on the groundcover assessment. The area covered by the paddock trees should still be assessed for species credits.
A vegetation zone is not required for assessing cleared land on a development site. If there is only cleared land, or paddock trees on a development site then the assessor should consider whether the methodology is a suitable option for assessing the biodiversity values of that site. If the development site contains cleared land as well as other land, then the cleared land should be assessed for species credits. Native grassland, wetland or herbfield (i.e. non-woody vegetation) that meets the definition of low condition may only need to be assessed for species credits.

**Box 2 Definition of cleared land**

Cleared land is land on which the native over-storey has been cleared, there is no native mid-storey, and less than 50% of the ground cover vegetation is indigenous species, or greater than 90% of the ground cover is cleared.

At a biobank site, a vegetation zone may include cleared land (including native groundcover where less than 50% of the ground cover vegetation is indigenous species) when this area is to be revegetated as part of a proposal for a biobank agreement. Cleared land is identified, in this case, as having vegetation of ‘low condition’, and the vegetation type should reflect the original vegetation community that the revegetation is attempting to establish. Cleared land that is being revegetated on a biobank site is assessed as having vegetation in low condition for the purposes of a credit profile. It is otherwise scored according to the condition of the site attributes as set out in section 3.3.2.

Changes to the extent of vegetation may have occurred since the date of the Spot 5 image or aerial photograph. A vegetation zone may be amended or deleted to account for any clearing of native vegetation that has been legally approved or permitted under NSW legislation since the date of the imagery. For example, clearing may have been permitted under the *Native Vegetation Act 2003* (NV Act) or the EP&A Act. Any amendment or deletion of vegetation

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**Figure 1** Example of mapping vegetation zones at a development site. The vegetation zones are based on vegetation type and condition.
zones from those shown on the imagery requires information identifying the relevant zones and the legal basis for the permitted clearing.

3.3.1 Define vegetation types

The vegetation types are described in the NSW Vegetation Types Database. Vegetation types are an expression of environmental continua and change continuously across a landscape. However, assigning vegetation to discrete types is required for assessment, management and calculation of credits. Some vegetation types observed in the field may not fit neatly into any of the vegetation types listed for a CMA area (e.g. where the vegetation lies in an ecotone between two types). In these cases, the professional judgment of the assessor is required when selecting the closest matching vegetation type.

Each vegetation type is defined by descriptions that help with field identification, on the basis of the following attributes, where relevant:

- dominant canopy species
- main associated species
- landscape position
- characteristic mid-storey species
- characteristic groundcover species
- other diagnostic features.

The definitions of vegetation types can be printed from the DECC website at www.environment.nsw.gov.au/biobanking/vegtypedatabase.htm to provide a field guide. This list can be filtered or formatted as required. Each vegetation type is assigned to a broader vegetation class and to a vegetation formation (Keith D, 2004) Ocean Shores to Desert Dunes: the Native Vegetation of New South Wales and the ACT, Department of Environment and Conservation NSW, Hurstville, NSW).

A percent cleared estimate (rounded to the nearest 5%) is provided for each vegetation type in the relevant CMA area. Information is provided to help assess derived vegetation. The credit calculator contains a link to definitions for each vegetation type within the chosen CMA area at Step 1b – Enter Threatened Species Sub-zones.

The vegetation type that has the closest resemblance to the vegetation at the site or the vegetation type that is likely to have originally occurred at the site (i.e. in 1750, or pre-clearing) must be selected from the drop-down list in Step 1b of the credit calculator. That is, the vegetation type should be the original vegetation type at the site, not the derived vegetation type. Derived vegetation types must only be selected where the original vegetation type cannot be determined. More information on assessing derived communities is included in section 3.4.2 of this operational manual.

3.3.2 Assess vegetation condition

If any vegetation on the proposal site meets the definition of low condition, then it is assessed under the methodology as being in low condition. All other vegetation in the proposal is assessed as being in moderate to good condition for threatened species assessment. Vegetation of the same type and in moderate to good condition can be stratified into distinct vegetation zones with a similar broad condition state for site (plots and transects) survey.

Vegetation that meets the definition of low condition does not trigger a red flag as it has a high likelihood of not being viable in the long term under its current management. An offset that improves the condition of more viable vegetation is likely to provide a better long-term biodiversity outcome than the original vegetation left in its current state.

Vegetation that has been recently disturbed (e.g. by fire or flood), or is regenerating after an event such as fire or flood, must be assessed on an equivalent site that is not disturbed in
these ways. The equivalent, undisturbed site must be approved by the Director General before issuing a biobanking statement. Sites that are deliberately degraded before an assessment may be subject to investigation by DECC.

The condition of the vegetation is an initial filter to identify the threatened species that require assessment at the site. If the development or biobank site comprises low-condition vegetation, only the species that can use vegetation in low condition require further assessment.

### 3.4 Assess the Site Value

The Site Value assessment is carried out by using transects and plots to collect the site attribute data. Plot and transect surveys of the development and biobank sites are used to provide quantitative measures of 10 site attributes (Table 3) for each vegetation zone. Assessors should note that regeneration is assessed for the whole zone.

Each site attribute is compared against the benchmark for the vegetation type or class to provide the Site Value score. This score represents the overall condition of the vegetation compared against the benchmark, and the score is used as the basis for determining the number of ecosystem credits that are required (at a development site) or created (at a biobank site). Each site condition attribute is allocated a score in the credit calculator from 0 to 3 (0 = low, 1 = moderate, 2 = high, 3 = very high) based on the difference between its measured value and its benchmark.
<table>
<thead>
<tr>
<th>Site attribute (field assessment method)</th>
<th>Site attribute score (see notes below)</th>
<th>Weighting for site attribute score</th>
</tr>
</thead>
<tbody>
<tr>
<td>### (a) Native plant species richness (plot)</td>
<td>0 &lt; 50% of benchmark</td>
<td>25</td>
</tr>
<tr>
<td>(b) Native over-storey cover (transect)</td>
<td>&gt;10–50% or &gt;150–200% of benchmark</td>
<td>within benchmark</td>
</tr>
<tr>
<td>(c) Native mid-storey cover (transect)</td>
<td>&gt;10–50% or &gt;150–200% of benchmark</td>
<td>within benchmark</td>
</tr>
<tr>
<td>(d) Native ground cover (grasses) (transect)</td>
<td>&gt;10–50% or &gt;150–200% of benchmark</td>
<td>within benchmark</td>
</tr>
<tr>
<td>(e) Native ground cover (shrubs) (transect)</td>
<td>&gt;10–50% or &gt;150–200% of benchmark</td>
<td>within benchmark</td>
</tr>
<tr>
<td>(f) Native ground cover (other) (transect)</td>
<td>&gt;10–50% or &gt;150–200% of benchmark</td>
<td>within benchmark</td>
</tr>
<tr>
<td>(g) Exotic plant cover (calculated as percentage of total ground and mid-storey cover) (transect)</td>
<td>&gt;66% &gt;33–66% &gt;5–33% 0–5%</td>
<td>5</td>
</tr>
<tr>
<td>(h) Number of trees with hollows (plot)</td>
<td>&gt;0–50% of benchmark</td>
<td>20</td>
</tr>
<tr>
<td>(i) Proportion of over-storey species occurring as regeneration (entire zone)</td>
<td>&gt;0–50%</td>
<td>12.5</td>
</tr>
<tr>
<td>(j) Total length of fallen logs (plot)</td>
<td>&gt;10–50% of benchmark</td>
<td>10</td>
</tr>
</tbody>
</table>

**Note**
The term ‘within benchmark’ means a measurement that is within (and including) the range of measurement identified as the benchmark for that vegetation type. The term ‘< benchmark’ means a measurement that is less than the minimum measurement in the benchmark range. The term ‘> benchmark’ means a measurement that is greater than the maximum measurement in the benchmark range.
3.4.1 Vegetation transects and plots

The Site Value assessment is done by using transects and plots. Transects and plots are established in each vegetation zone to collect the site attribute data used to measure Site Value according to the techniques set out in Appendix 2. Transects must be used to assess the site attributes that are measured by percent foliage cover. Other site attributes (except regeneration) are assessed by plots. Regeneration is assessed for the entire zone.

The transects/plots should be established randomly within the zone so that the assessment includes the range of variation in condition in the zone. Vegetation zones should be created as relatively homogeneous units within the proposal. Given there is always variation in native vegetation, transects and plots must be established in each zone in approximate proportion to areas of differing vegetation condition in that zone to achieve a representative sample.

Plots and transects can be placed randomly by:

- marking points randomly on the site imagery within each zone and establishing transects/plots at these points or
- pacing a predetermined and random distance into the zone, establishing a transect/plot at this point, and then repeating the process.

DECC has developed field data sheets that assessors may use to collect site attribute data. These field sheets are available for download from the BioBanking website.

The methodology sets a minimum number of transects/plots from which data must be collected (Table 4).

### Table 4  Minimum number of transects/plots required per zone area

<table>
<thead>
<tr>
<th>Vegetation zone area (ha)</th>
<th>Minimum number of transects/plots</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–4</td>
<td>1 transect/plot per 2 ha (or part thereof), or 1 transect plot if vegetation is in low condition</td>
</tr>
<tr>
<td>&gt;4–20</td>
<td>3 transects/plots or 2 transects/plots if vegetation is in low condition</td>
</tr>
<tr>
<td>&gt;20–50</td>
<td>4 transects/plots or 3 transects/plots if vegetation is in low condition</td>
</tr>
<tr>
<td>&gt;50–100</td>
<td>5 transects/plots or 3 transects/plots if vegetation is in low condition</td>
</tr>
<tr>
<td>&gt;100–250</td>
<td>6 transects/plots or 4 transects/plots if vegetation is in low condition</td>
</tr>
<tr>
<td>&gt;250–1000</td>
<td>7 transects/plots or 5 transects/plots if vegetation is in low condition. More transects/plots may be needed if the condition of the vegetation is variable across the zone.</td>
</tr>
<tr>
<td>&gt;1000</td>
<td>8 transects/plots or 5 transects/plots if vegetation is in low condition or in a homogenous landscape in the Western Division. More transects/plots may be needed if the condition of the vegetation is variable across the zone.</td>
</tr>
</tbody>
</table>

3.4.2 Assess the Site Value of derived vegetation communities

Some of the vegetation types in the NSW Vegetation Types Database are derived or secondary vegetation communities. Derived vegetation communities are communities that have changed to an alternative state as a consequence of management practices following European settlement. In practice, this often means that one or more structural components of the vegetation have been entirely removed or severely reduced (e.g. over-storey cover of a grassy woodland), or have developed where they were previously absent (e.g. shrubby mid-storey in an open woodland system). Derived vegetation communities do not include planted native vegetation.

In the assessment process, derived vegetation is assessed against the original vegetation type(s), not against the derived type(s). Therefore, derived vegetation types must be selected only when the assessor cannot determine the original vegetation type. This ensures that vegetation at the site is assessed against benchmarks for the original vegetation.
The credit calculator does not contain benchmarks for derived communities, nor does it provide a percent cleared value.

In the assessment of derived communities, the selection of vegetation type for the original community should be based on the informed judgment of the assessor, taking into consideration the remaining species composition, patterns of surrounding vegetation, landscape position, soil type, and historical land management practices of the area. The descriptions of derived vegetation types in the Vegetation Types Database indicate the original vegetation type(s) for derived vegetation types, where known. Some derived vegetation types can also occur in the same CMA area as an original community. Where available, such information is also included in the Vegetation Types Database.

3.4.3 Developing benchmarks from local reference sites or published sources

The methodology allows assessors to collect benchmark data from local reference sites where those data more accurately reflect the local environmental condition for a vegetation type. If local benchmark data are developed, they must be derived from reference site measurements of the same vegetation type in a relatively unmodified condition, or from published sources. The Director General must approve the use of benchmark data from local reference sites or published sources. This approval is made at the time that the application for a biobanking statement or agreement is submitted to DECC.

Locating reference sites
Reference sites must have little modification relative to other vegetation in the region, as indicated by: minimal timber harvesting (few stumps, coppicing, cut logs), minimal firewood collection, minimal exotic weed cover, minimal grazing and trampling by introduced or overabundant native herbivores, minimal soil disturbance, dieback not in excess of normal senescence, no evidence of very recent major perturbation such as fire or flood, not subject to high frequency burning, and evidence of recruitment of native species.

It may be difficult to find totally unmodified sites in a landscape, particularly in highly cleared regions or during periods of extended drought. Vegetation in relatively unmodified condition can be found in some travelling stock routes and reserves, national parks and nature reserves, state forests (especially Flora Reserves), cemeteries, roadsides and commons. Appropriate reference sites may sometimes exist on the development site or the biobank site. Reference sites can occur in small remnants, such as narrow roadsides and cemeteries. Different reference sites can be used to collect benchmark data on different condition attributes.

Numbers of reference plots
To encompass the variation in benchmark condition, a minimum of three reference transects/plots for each variable should be measured at reference sites for each vegetation type, with more transects/plots being desirable.

Field methods for measuring vegetation condition variables on reference sites
The methods for recording data from reference plots are identical to the methods for recording data for Site Value, as outlined in Appendix 2. Field data sheets for reference plots are available on the BioBanking website, or assessors may develop their own. An Excel spreadsheet (Local Benchmark Calculator.xls) for calculating local benchmarks can also be downloaded from this website.

Determining a benchmark from a local reference site
The data from all reference plots for a specific assessment are then used to develop the local benchmark for that vegetation type.
Local benchmarks are entered into the credit calculator by the assessor in Step 5. The information sources used to develop the local benchmark must be provided to DECC as part of the impact assessment. If the source is a local reference site, then the assessor should provide a copy of the site attribute data and a description of the site as part of the Biobanking Assessment Report.

Developing the benchmark

The data from all reference sites and transects/plots need to be entered into the Local Benchmark Calculator.xls for a specific development or biobank site (available for download from the BioBanking website). Once the data have been entered into the spreadsheet, the benchmark values are automatically calculated. These benchmarks then need to be copied into the credit calculator at Step 5b as part of data entry for the Site Value assessment. A copy of the data and other supporting information used to generate the benchmark should be submitted as part of the application for the biobanking agreement or statement.

3.5 Assess the change in Site Value at a development site

The change in Site Value from the impact of development or management is the basis for determining the number of biodiversity credits that are required at a development site or created at a biobank site. The assessor must determine this change for each vegetation zone at the development site.

The impacts of development on Site Value attributes will usually be negative, but the loss of Site Value can vary with the degree of the development impact. The direct and indirect impacts of the development on Site Value must be considered by the assessor before the future Site Value scores with development are entered into the credit calculator. This is because many scenarios are possible and the nature or configuration of the development may be changed in order to reduce the impact on biodiversity values.

This section provides the assessor with guidelines to help determine the extent of change in Site Value at a development site.

If the impacts of development on an area result in the vegetation zone being totally cleared, then the site attributes should be taken down to zero. This scenario will usually occur where there is a total change of land use, such as a mine site or an urban or industrial development. In these circumstances, the assessor is required to score each site attribute after development as zero.

Where there is only partial clearing of a vegetation zone or part of a vegetation zone, or the indirect impacts of development affect the condition of vegetation, the score for each attribute is reduced according to the degree of the impacts of development on the Site Value attributes. These impacts can be direct (i.e. partial clearing or thinning) or indirect.

For example, in an asset protection zone, the over-storey cover may be completely removed, whereas the ground cover is retained. In this situation, the attribute score for over-storey cover is reduced to zero while the attribute scores for ground cover may remain at their current values. Further guidance for assessing the change in Site Value for asset protection zones is in Appendix 4.

Where there are different levels of impact within a vegetation zone, the different scores for the site attributes are entered into management zones. A GPS must be used in the field to confirm the boundaries of the management zones whenever they differ from the vegetation zone.

3.6 Assess the change in Site Value at a biobank site

The predicted improvement in Site Value from implementing management actions is the basis for determining the improvement in Site Value at a biobank site.
The predicted increase in Site Value can vary on the basis of the current condition score for that attribute (Table 5). Calculation of the change in Site Value score at a biobank site is based on the difference between the current Site Value of the proposal and the future Site Value with the relevant management actions implemented. Because the gain is based on all standard management actions undertaken at a biobank site, the credit calculator will automatically calculate the predicted Site Value and the Site Value gain.

**Table 5** Predicted improvement in the site attribute score for each site attribute with management at the biobank site

<table>
<thead>
<tr>
<th>Site attribute</th>
<th>Increase in current site attribute score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>(a) Native plant species richness</td>
<td>+0.5</td>
</tr>
<tr>
<td>(b) Native over-storey cover</td>
<td>+1</td>
</tr>
<tr>
<td>(c) Native mid-storey cover</td>
<td>+1</td>
</tr>
<tr>
<td>(d) Native ground cover (grasses)</td>
<td>+1</td>
</tr>
<tr>
<td>(e) Native ground cover (shrubs)</td>
<td>+1</td>
</tr>
<tr>
<td>(f) Native ground cover (other)</td>
<td>+1</td>
</tr>
<tr>
<td>(g) Exotic plant cover</td>
<td>+0.5</td>
</tr>
<tr>
<td>(h) Number of trees with hollows</td>
<td>0</td>
</tr>
<tr>
<td>(i) Proportion of over-storey species occurring as regeneration</td>
<td>+0.5</td>
</tr>
<tr>
<td>(j) Total length of fallen logs</td>
<td>0</td>
</tr>
</tbody>
</table>

1 Calculated as a percentage of total ground-storey and mid-storey cover

The management actions that are required to be undertaken at a biobank site include those that are mandatory at each biobank site (as specified by section 2.6 of the methodology) and any others that are required following the assessment. Additional management actions are those that are required for particular threatened species where they are either recorded or are predicted to occur within a vegetation zone. The standard management actions required to be undertaken at each biobank site are:

- management of grazing for conservation
- weed control
- management of fire for conservation
- management of human disturbance
- retention of regrowth and remnant native vegetation
- replanting or supplementary planting where natural regeneration will not be sufficient
- retention of dead timber
- erosion control
- retention of rocks.

*Additional management actions that may be required for creating ecosystem credits*

Additional management actions may be required for particular vegetation zones at a biobank site to improve populations or habitats of particular threatened species that require
ecosystem credits. These management actions are additional to the standard management actions required to create ecosystem credits. Additional management actions will apply to a vegetation zone where it is indicated on the BioBanking Credit Report that an additional action is required.

Examples of additional actions that may be required for relevant species as identified in the TSPD are:

- control of feral and/or overabundant native herbivores
- vertebrate pest management – pigs
- vertebrate pest management – foxes and/or miscellaneous species
- nutrient control
- control of exotic fish species
- maintenance or reintroduction of natural flow regimes (where possible).

### 3.6.1 Vary the increase in Site Value with additional management actions

In some situations, the degree or extent of beneficial management actions undertaken at a biobank site exceeds the level of predicted gain, and further gains in Site Value are possible. There are also situations where the level of management may be limited and therefore the predicted gain in Site Value is unlikely to be achieved. In these situations, an assessor can increase or reduce the gain in Site Value to reflect the actual management regime. Assessors should note that increased gain in Site Value requires the approval of the Director General (as part of an application for a biobanking agreement).

In general, an increase in the site attribute score to greater than the default values shown in Table 3 may be used where either (i) additional and/or more tailored actions are applied on a biobank site which would increase site attribute values more than the default values or (ii) an increase in the extent and/or degree of management actions is likely to provide a greater increase in site attribute values than the default values. Any variation to increase the predicted site attribute value is limited and must be made according to the guidelines in Appendix 5.

A Site Value increase lower than the value predicted in Table 3 of the methodology (Table 5 of this operational manual) should be selected if the restorative or rehabilitation actions taken at a development site do not include all the management actions that contribute to the predicted improvement in condition for that site attribute. This may include circumstances where the proposal is part of a deferred credit retirement arrangement, or when the methodology is applied to situations where a biobanking statement is not being obtained.

### 3.6.2 Assess Site Value following rehabilitation/restoration of a development site

The methodology can be applied to a post-mining mine site or other similar development sites to calculate the number of credits that are created as a result of rehabilitation or restoration of the site proposed as part of a deferred retirement arrangement under the TSC Act. In the case of the mining industry, the NSW Government requires companies holding titles under the Mining Act 1992 to lodge security bonds to ensure that the cost of rehabilitation of mining will be met by the miner. This recognises that mining is a temporary land use and that rehabilitation of the site based on a Mining, Rehabilitation and Environmental Management Process (MREMP; available at www.dpi.nsw.gov.au/minerals/environment/mining/applying) or the equivalent can re-establish biodiversity values.
The extent to which biodiversity credits can be created on the site following the closure of the mine depends on factors such as the post-mining land use and future land management objectives. The number of credits created on a rehabilitated mine site may be used to reduce the up-front number of credits required for the initial clearing of the mine area.

The current Site Value for mine or other site rehabilitation is the Site Value taken immediately before the commencement of restorative actions. The gain in the Site Value score must be assessed against the benchmark values for the vegetation types that were originally affected by the development. This ensures that the credits created for rehabilitation are compared against the original vegetation at the site and are therefore compatible with the offset rules required by the methodology. All data required for a full assessment must be entered into the credit calculator for the rehabilitation site in accordance with the steps outlined in section 5 of this operational manual. The Landscape Value assessment should include any new vegetation associated with revegetation or regeneration on the rehabilitation area.

If an increase for a site attribute is considered higher than the default increase for that site attribute, the assessor must provide justification for this in a report that accompanies an application for a deferred credit retirement arrangement. This should include appropriate information from the MREMP showing the post-mining land use and the actions that are to be undertaken to achieve these outcomes. The Director General must approve any increases in site attribute values above the default values for those attributes before a biobanking statement can be issued.

### 3.7 Assess Landscape Value

Landscape Value is an assessment of the spatial configuration of vegetation, including percent native vegetation cover, adjacent remnant area and connectivity. For each measure (except total adjacent remnant area) there is one assessment of the current state of the landscape around the entire proposal and one assessment of the state of the landscape if the proposal were to proceed. The Landscape Value assessment is based on:

- percent native vegetation cover in the landscape at the 1000-ha and 100-ha scales
- adjacent remnant vegetation
- connectivity.

#### 3.7.1 Map assessment circles to determine percent native vegetation cover

An assessment circle with a radius of 1784 m (1000 ha) is used to assess the impact of the proposals on the percent native vegetation cover and as a filter to identify threatened species that may occur on the site. A 100-ha circle (564-m radius) is used to assess the impact of the proposal on the surrounding vegetation cover at a more local scale. The assessment circles are generally the largest area mapped, with all vegetation zones and threatened species sub-zones assigned within each 1000-ha assessment circle (Figure 2).

Cover estimates in woody vegetation are based on the percent cover of the over-storey relative to the approximate benchmark for a particular vegetation type. In non-woody vegetation such as native grasslands, the assessment is based on the amount of vegetation in the landscape that is unlikely to meet the definition of low condition. The estimates of percent native vegetation cover can be made from the aerial imagery and the assessor’s knowledge of the area. Any vegetation native to Australia can contribute to this measure (i.e. planted native species that are not indigenous to the area can contribute to this measure).
A new 1000-ha assessment circle must be used whenever:

(a) the development or biobank site exceeds a single 1000-ha assessment circle, or
(b) the configuration of the development or biobank site does not fit into a single 1000-ha assessment circle, or
(c) the development or biobank site extends from one CMA subregion into another CMA subregion.

Where more than one 1000-ha assessment circle is used, the circles may overlap. However, the associated values and scores for threatened species sub-zones, vegetation zones, the 100-ha circle within the area of overlap must be assigned to only one 1000-ha assessment circle. The assessment circles are arranged to ensure the minimum number is used. Appendix 6 provides guidance on how to correctly position assessment circles over a development or biobank site.

For each assessment circle created for a proposal, the assessor must visually estimate the percent native vegetation cover in the circle before and after the proposal, in increments of 10% (Table 6). Each circle must be centred on the area(s) proposed to be cleared as part of a development or established as a biobank site. Digitising tools in a GIS application can be used to provide a more accurate estimate of the percent native vegetation cover if it lies close to a threshold that cannot be accurately determined by eye, taking into account both condition and extent.

For the Landscape Value assessment, the loss or gain in percent cover of native vegetation as a result of the proposal is used to calculate ecosystem credits. For example, if 36% of the area in a circle is occupied by vegetation in benchmark condition, then the percent vegetation in the circle is scored in the percentile range of 31–40%. If 18% of the area in this circle is occupied by vegetation that is 50% of benchmark then the percent vegetation cover is 11–20%. If the condition of the vegetation in the circle is improved from 50% of benchmark condition to benchmark condition by management actions, then percent vegetation cover in the circle is scored as increasing from the percentile range of 11–20% to that of 31–40%.
Appendix 7 contains some diagrams that can assist with visual estimates of percent native vegetation cover in landscapes.

The score for each 10% increment increases at the 30% and 70% native vegetation cover threshold, as shown in Table 6. These percentages represent thresholds at which the fragmentation effects on biota can generally escalate.

<table>
<thead>
<tr>
<th>Native vegetation cover classes: 100-ha and 1000-ha assessment circles (%)</th>
<th>Score for % native vegetation cover: 100-ha circle</th>
<th>Score for % native vegetation cover: 1000-ha circle</th>
<th>Classes for threatened species filter (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0–10</td>
</tr>
<tr>
<td>≤10</td>
<td>1.5</td>
<td>2.4</td>
<td>11–30</td>
</tr>
<tr>
<td>11–20</td>
<td>3.0</td>
<td>4.8</td>
<td>31–70</td>
</tr>
<tr>
<td>21–30</td>
<td>4.5</td>
<td>7.2</td>
<td>&gt; 70%</td>
</tr>
<tr>
<td>31–40</td>
<td>5.5</td>
<td>8.8</td>
<td></td>
</tr>
<tr>
<td>41–50</td>
<td>6.5</td>
<td>10.4</td>
<td></td>
</tr>
<tr>
<td>51–60</td>
<td>7.5</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>61–70</td>
<td>8.5</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>71–80</td>
<td>9.0</td>
<td>14.4</td>
<td></td>
</tr>
<tr>
<td>81–90</td>
<td>9.5</td>
<td>15.2</td>
<td></td>
</tr>
<tr>
<td>91–100</td>
<td>10.0</td>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

The percent native vegetation cover value that is entered into the credit calculator is also used to filter for the threatened species that require assessment at the site. This attribute is one of the five initial filters that are applied to generate the list of threatened species for assessment, as outlined in section 3.8 below.

To map a 1000-ha assessment circle, create a point theme in the GIS, buffer the point by 1784 m, and save as a new spatial file. To create the 100-ha circle, create a point theme, buffer it by 564 m, and save as a new spatial file. Assessors should be aware that they may need to adapt this buffer distance, depending on the GIS software they use, actual map projection and topography to meet the required 1000-ha area.

### 3.7.2 Map the adjacent remnant vegetation

The area of adjacent remnant vegetation is the area of moderate- to good-condition (i.e. not low condition) native vegetation of which the biobank site or development site is a part. The adjacent remnant vegetation area may extend off site to include adjoining areas of native vegetation in moderate to good condition that are ≤100 m (≤30 m for non-woody) from the biobank site or development site, as shown in Figure 3. If all the adjacent remnant vegetation (including that on the development or biobank site) is in low condition, then the size of the adjacent remnant area is zero. Where both woody and non-woody vegetation occurs in different areas then the adjacent remnant vegetation area includes adjoining native vegetation in moderate to good condition where the separation is less than ≤30 m.

The adjacent remnant area has two purposes in the assessment. First, it is used as part of the Landscape Value score. The aim of this measure is to encourage biobank sites to be established adjacent to, or as part of, larger remnants and to discourage reduction or fragmentation of larger remnant patches from development.
Figure 3  Example of an adjacent remnant area

The adjacent remnant area is scored as being either very large, large, medium or small according to the Mitchell Landscape in which all or most of the proposal occurs (Table 7). This is because the relative value of remnant area for biodiversity values varies with how much native vegetation is cleared across a landscape.

Mitchell Landscapes were mapped at a broad scale (1:250 000), so the actual Mitchell Landscape in which a proposal occurs may not always be the landscape shown on the map. The Mitchell Landscape chosen from the drop-down list in the credit calculator can be different from the Mitchell Landscape indicated by the map in the assessor’s GIS. Where the description of an adjacent Mitchell Landscape more accurately reflects the landscape in which the proposal mostly occurs, the adjacent Mitchell Landscape should be chosen. Where a development or biobank site lies across the boundary of a Mitchell Landscape, the assessor should choose the Mitchell Landscape in which most of the development or biobank site occurs.

Table 7  Criteria for assessing adjacent remnant vegetation area for Landscape Value

<table>
<thead>
<tr>
<th>Level for adjacent remnant area</th>
<th>% native vegetation cleared in the Mitchell Landscape in which most of the proposal occurs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;30%</td>
</tr>
<tr>
<td>Very large</td>
<td>&gt;500 ha</td>
</tr>
<tr>
<td>Large</td>
<td>&gt;200 ha &amp; &lt;500 ha</td>
</tr>
<tr>
<td>Medium</td>
<td>&gt;100 ha &amp; &lt;200 ha</td>
</tr>
<tr>
<td>Small</td>
<td>&gt; 0 ha &amp; &lt;100 ha</td>
</tr>
</tbody>
</table>
Second, the adjacent remnant area value is used to identify threatened species that may occur on the site and therefore require further assessment. For this purpose, adjacent remnant area is recorded in size classes of <5 ha, 5–25 ha (including 25 ha), >25–100 ha (including 100 ha) or >100 ha. The Mitchell Landscape is not relevant when the adjacent remnant area is used to identify threatened species. The largest adjacent remnant area class used in the credit calculator is an area of >500 ha. Once this size is surpassed, the assessor can stop mapping the adjacent remnant area and enter the figure ‘501’. Because adjacent remnant vegetation area does not include vegetation in low condition, the assessor should enter the figure 0 into the credit calculator when vegetation for the threatened species sub zone is in low condition.

The size for the adjacent remnant area is entered into the credit calculator in Step 1b – Enter Threatened Species Sub Zones. The credit calculator will use this value for both parts of the assessment.

### 3.7.3 Connectivity assessment

The connectivity assesses the impact of the proposal on the connectivity of the development or biobank site with the surrounding vegetation on the basis of changes in the width and overall vegetation condition of the linkages. The scale at which connectivity is assessed will vary with each site. This variation depends on two criteria: the magnitude of the proposal in relation to the area and length of the connecting link and the extent to which the development impacts on connectivity. This means the assessor must use their judgment and knowledge of the local area when assessing the impact of development on connectivity of the site.

Connectivity is one of the attributes used to determine the Landscape Value score for the proposal. An assessment is made for each connecting link that connects the site with adjoining vegetation, as defined below. The link with the highest Connectivity Value is the primary connecting link and is used to calculate the number of credits that are required or created.

The site is linked to adjoining vegetation where the adjoining vegetation:

- is in moderate to good condition, and
- has a patch size >1 ha, and
- is separated by a distance of ≤100 m for woody vegetation and ≤30 m for non-woody vegetation from the next area of native vegetation (i.e. the site is 100 m (or 30 m) or closer to the adjoining vegetation), and
- is not separated by a hostile gap such as a dual carriageway or wider highway, railway line or large water body.

Where more than one 1000-ha assessment circle is required for a development site or biobank site, and the circles touch or overlap, one connectivity assessment is made for these circles, rather than a different connectivity assessment within each individual circle. This means the assessor must enter the same linkage width and condition value for connectivity in each circle, on the basis of the overall impact of the proposal on connectivity.

Where more than one 1000-ha assessment circle is required for the development or biobank site, and the circles do not touch, connectivity is assessed separately for each circle.

To determine the connectivity value in the credit calculator, the assessor must assess the linkage width and overall condition of the vegetation across the entire link by using a three-step process. Some examples of assessing connectivity are shown in Figures 4 to 6 below.

**Step 1: Determine the number of linkage width classes that are crossed**

To determine the number of linkage width classes that are crossed, the assessor must first establish the current linkage width class. This is determined by identifying the area of the connected vegetation with the most limiting width of the connected vegetation. The area of
connected vegetation can include vegetation on and off the development or biobank site. Where adjoining vegetation occurs in patches that are 100 m or closer to each other (i.e. the vegetation patches occur as a series of stepping stones), the linkage width class is based on the width of the narrowest patch.

The assessor must then determine the change in linkage width class as a result of the development. To determine the change in the linkage width, the assessor accounts for any loss of vegetation from the link, as well as for any hostile environments that are created as a result of the development and that may limit the ability of species to cross into other patches of vegetation. Hostile environments include dual carriageway roads, wider highways, railway lines or large water bodies.

The assessor should also judge whether the development could reduce the usable width of the connecting vegetation. For example, the width of the link that is able to be used by species may be lower than the actual cover if the link is adjacent to the rim of an open-cut mine operation or borders a large industrial development.

On a biobank site, the assessor should consider whether the increase in extent of native vegetation will increase the width of the connecting vegetation.

In the credit calculator, the linkage width classes contained in the Before Development and After Development drop-down menu are:

<table>
<thead>
<tr>
<th>Linkage width classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–5 m</td>
</tr>
<tr>
<td>&gt;5–30 m</td>
</tr>
<tr>
<td>&gt;30–100 m</td>
</tr>
<tr>
<td>&gt;100–500 m</td>
</tr>
<tr>
<td>&gt;500 m</td>
</tr>
</tbody>
</table>

The number of linkage width thresholds that are crossed as a result of the proposal is used in step 3 to determine the connectivity value score.

An example of the assessment of linkage width is shown in Figure 4 and Figure 5.

**Step 2: Determine the number of linkage condition thresholds that are crossed**

The average condition class of the vegetation that forms the connecting linkage, including vegetation on and off the development and biobank site, is assessed across the entire link. For woody vegetation types, the linkage condition assessment is based on the over-storey cover and either the mid-storey cover or ground cover, depending on which stratum is most relevant to the vegetation. For non-woody vegetation types, only the ground cover is assessed. The connectivity condition value is first determined by assessing the current average condition for the relevant strata of the vegetation that forms the connecting link. The assessor then considers the impact of the proposal on the average condition of that stratum to determine how many condition class thresholds have been crossed.

The average condition class of the vegetation that forms the connecting linkage, including vegetation on and off the development and biobank site, is assessed across the entire link (Figure 5). The assessor is required to judge the average condition state and the area of vegetation over which the connecting link is assessed. The linkage condition classes for woody vegetation types are determined by assessing over-storey cover and mid-storey cover or ground cover according to Table 8. Either the mid-storey or groundcover strata is used, depending on which stratum is the most appropriate for assessing connectivity for the vegetation types that form the link. The linkage condition classes for non-woody vegetation types are determined according to Table 9.
### Example of connectivity assessment

#### Description of assessment

The primary link is to the north-east of the development area.

**Step 1:** The clearing for development reduces the linkage width class from >100–500 m down to >5–30 m. Therefore, two linkage width classes have been crossed.

**Step 2:** The linkage condition class before the development was within benchmark percent foliage cover for the over-storey and mid-storey stratum. Using Table 8, the current condition class is 3. There is no loss in overall condition as a result of development. No condition classes are crossed, so the condition class remains at 3. (Some judgment could be used by the assessor to evaluate whether the changed land use will indirectly impact on the condition of the remaining corridor.)

**Step 3:** Using Table 10, no linkage condition thresholds have been crossed and two linkage width thresholds have been crossed. Therefore, the Connectivity Value for this site is 4.

---

The primary link is to the north-east of the development site. The black lines indicate a change in the broad condition of the link.

**Step 1:** Before development, the overall linkage width class was >30–100 m. Following clearing, the overall linkage width class is 0–5 m. Two linkage width classes are crossed.

**Step 2:** The current connectivity condition class is >25% foliage cover of lower benchmark for over-storey and percent foliage cover within benchmark for groundcover. From Table 8, the current linkage condition class is 2.5. The development will reduce the overall condition of the corridor to no native over-storey or groundcover. From Table 3, the future linkage condition class is 0.

**Step 3:** Using Table 10, two width thresholds have been crossed and 2.5 condition thresholds have been crossed. Therefore the Connectivity Value for the site is 9.

---

There is no primary link and the site is equally connected on all sides.

**Step 1:** There is no loss or gain in linkage width, as the site remains connected on all sides. Therefore, no linkage widths have been crossed. Width value is 0.

**Step 2:** There is no loss or gain in overall connectivity condition. Therefore, no condition classes have been crossed. Condition value is 0.

**Step 3:** The final Connectivity Value score is 0.
### Table 8  Linkage condition classes (woody vegetation)

<table>
<thead>
<tr>
<th>Mid-storey or ground cover condition</th>
<th>Over-storey condition</th>
<th>% foliage cover &gt;25% of lower benchmark</th>
<th>% foliage cover &gt;25% of lower benchmark</th>
<th>% foliage cover &gt;25% of lower benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>No mid-storey or ground cover or exotic vegetation with similar structure to the proposal</td>
<td>No native over-storey or exotic vegetation with similar structure to the proposal</td>
<td>0</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>% foliage cover of mid-storey or ground cover &lt;25% of lower benchmark or exotic vegetation with similar structure to the proposal</td>
<td>0.5</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
</tr>
<tr>
<td>% foliage cover of mid-storey or ground cover &gt;25% of lower benchmark</td>
<td>1</td>
<td>1.5</td>
<td>2</td>
<td>2.5</td>
</tr>
<tr>
<td>% foliage cover of mid-storey or ground cover within benchmark</td>
<td>1.5</td>
<td>2</td>
<td>2.5</td>
<td>3</td>
</tr>
</tbody>
</table>

### Table 9  Linkage condition classes (non-woody vegetation)

<table>
<thead>
<tr>
<th>Linkage condition class</th>
<th>Vegetation condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>% foliage cover is within benchmark in native grassland, herbfield or wetland (herbaceous vegetation)</td>
</tr>
<tr>
<td>2</td>
<td>% foliage cover &gt;25% of lower benchmark to lower benchmark in native grassland, herbfield or wetland (herbaceous vegetation)</td>
</tr>
<tr>
<td>1</td>
<td>% foliage cover &lt;25% lower benchmark in native grassland, herbfield or wetland (herbaceous vegetation) OR exotic vegetation with similar structure to the proposal</td>
</tr>
<tr>
<td>0</td>
<td>Meets none of the above definitions</td>
</tr>
</tbody>
</table>

The numbers of linkage condition class thresholds that are crossed as a result of the proposal are scored as:

0 = no change, or change is within the same linkage condition class

1 = crosses one linkage condition threshold, i.e. changes from one connectivity condition class to the next one across one threshold

2 = crosses two linkage condition thresholds, i.e. changes from one class to another class across two thresholds

3 = crosses three linkage condition thresholds, i.e. changes from one class to another class across three thresholds.
For woody vegetation types, the number of linkage condition thresholds can include half points for where the connectivity condition class crosses to another threshold for only one stratum, as shown in Table 8 and in the example in Figure 5.

At the development site, the linkage condition class is measured by assessing the average condition of the vegetation across the entire link before and after the development. The assessor must consider the impact the development will have on the overall condition of the link. They should use their judgment to evaluate whether the land use of the development site will lead to a change in condition. The number of linkage condition class thresholds crossed as a result of the loss of vegetation is scored.

At the biobank site, the linkage condition class is measured by assessing the average condition of the vegetation across the entire link before and after the biobank proposal. The assessor should consider whether the improved condition that will result from undertaking the management actions at a biobank site will improve the overall condition of the link. The number of condition class thresholds crossed as a result of improving vegetation at the biobank site is scored.

Once the future connectivity condition has been determined for the vegetation strata, the assessor can determine the connectivity condition class by using the matrix in Table 10. The difference between the before and after connectivity condition scores represents the number of connectivity condition class thresholds that have been crossed; this score is then used in Step 3.

**Step 3: Determine the Connectivity Value score**

The final Connectivity Value score is calculated by using the matrix in Table 10, along with the number of linkage width thresholds crossed from step 1 and the number of linkage condition thresholds crossed from step 2. Where these two values meet on the matrix determines the final Connectivity Value score. For example, where two linkage width thresholds are crossed and one linkage condition threshold has been crossed, the Connectivity Value score for the site is 6.

**Table 10: Final Connectivity Value scores**

<table>
<thead>
<tr>
<th>Number of linkage condition thresholds crossed</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3 or 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>0.5</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>1.5</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>2.5</td>
<td>5</td>
<td>7</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
</tbody>
</table>
Connectivity assessment case study

In this case study, three main linkages are identified for assessment. Each link is assessed for the impact of the development on the width and condition of the link. The assessor should use judgment to consider the impact of the existing and future development on the linkage width as well as the role the surrounding vegetation plays on the overall connectivity condition of the site.

**Step1: determine the number of linkage width classes that are crossed**

**Figure 5** Assessing the linkage width at a development site

- **Green**: The most limiting width occurs through this section (>100–500 m class). Judgment should be used to consider the impacts from the existing development. With the new development, the linkage width is assessed as being in the 30–100 m class. Therefore, one linkage width threshold has been crossed.

- **Orange**: The most limiting width occurs through this section (>30–100 m class). Only the vegetation in moderate to good condition is included. The impact and edge effects of the existing and future development is considered. There is one linkage width threshold crossed, taking the link into the >5–30 m class.

- **Yellow**: The most limiting width occurs offsite (>5–30 m class). The linkage width is not impacted by the development.
Step 2: determine the number of linkage condition classes that have been crossed

**Figure 6**  Example of assessing linkage condition

**Green:** There is a loss of over-story vegetation at benchmark condition on the development site, whereas the condition of vegetation below the site is in poorer condition. However, using judgment to consider the current impacts of development and the large area of vegetation in benchmark condition (blue line) to the east that retains a north–south connection, there is no overall loss of linkage condition class.

**Yellow:** The current linkage condition class is below benchmark in two areas, both of which are off the development site. Therefore, there is no loss of connectivity condition because connectivity is retained to the east (dark blue line).

**Orange:** The current linkage condition class is assessed at >25% of lower benchmark, with groundcover condition at <25% of lower benchmark (score from Table 8 = 1.5). The new development (including edge effects) reduces condition of over-storey cover to <25% of lower benchmark. However, there is no further impact on groundcover strata (score from table 8 = 1). Therefore, half (0.5) of a condition class threshold has been crossed.

**Example of determining the connectivity value score using Figures 5 and 6**

Using the example shown in Figures 5 and 6, the orange connecting link scores the greatest loss and is therefore the primary connecting link for the development. This is because there is no significant loss in linkage condition along the green link, when the condition and extent of vegetation to the east of the site is taken into account. The details for the orange link are then entered into the credit calculator at step 1a.

<table>
<thead>
<tr>
<th>Link</th>
<th>Linkage width class (before/after)</th>
<th>Condition class (use Table 8)</th>
<th>Final Connectivity Value (use Table 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow</td>
<td>5–30 m to 5–30 m</td>
<td>Before = 2, after = 2. Crossed no threshold</td>
<td>0</td>
</tr>
<tr>
<td>Orange</td>
<td>30–100 m to 5–30 m</td>
<td>Before = 1.5, after = 1. Crossed 0.5 thresholds</td>
<td>3</td>
</tr>
<tr>
<td>Green</td>
<td>&gt;100–500 m to &gt;30–100 m</td>
<td>Before = 3, after = 3. Crossed no thresholds</td>
<td>2</td>
</tr>
</tbody>
</table>
3.8 Identify threatened species for assessment

Threatened species are assessed for either ecosystem credits or species credits by using a series of filters based on information contained in the TSPD. The assessment is initially based on five criteria that filter all listed threatened species to identify those species that require assessment at the site. The filters are initially applied to a threatened species sub-zone, which is derived from the vegetation zones set up in section 3.3 of this operational manual. The threatened species assessment process is applied to each threatened species sub-zone on the development site and biobank site (see section 3.9 below).

A threatened species requires further assessment if all five criteria listed below are met. The credit calculator will generate the list of species that are assessed for ecosystem credits and those that require survey for species credits. Species that are identified in the TSPD as being predictable by habitat surrogates are assessed according to the methodology for ecosystem credits. Species that are identified in the TSPD as not being predictable by habitat surrogates are assessed according to the methodology for species credits.

Initial filtering

The five criteria used to filter for threatened species in each threatened species sub-zone are:

1. The distribution of the species includes the CMA subregion in which the development or biobank site is located.
2. The species is associated with one or more of the vegetation types occurring within the development or biobank site.
3. The surrounding vegetation cover class within the 1000-ha assessment circle is equal to or greater than the minimum class specified in the TSPD as being required for that species. The surrounding vegetation cover class is determined from one of four classes, being either intact (>70% natural habitat retained), variegated (between 31% and 70% habitat retained), fragmented (between 11% and 30% habitat retained) or relictual (10% or less habitat retained).
4. The condition of any vegetation within the development or biobank site is equal to or greater than the minimum condition required for that species. The minimum condition required for a species is either low condition or moderate to good condition vegetation.
5. The minimum adjacent remnant area or patch size, including low-condition (for species that can use low condition vegetation) at the development or biobank site is equal to or greater than the minimum specified for that species. For adjacent remnant areas or patch size, including low-condition, the minimum area required for a species is <5 ha, >5–25 ha, >25–100 ha or >100 ha.

Assessors should note that the percent native vegetation cover class and adjacent remnant area are also used to determine the Landscape Value of the site, as described in section 3.7 above. The surrounding vegetation cover class has the same meaning as the percent native vegetation cover.

Secondary filtering

Threatened species require assessment within a vegetation zone at a development or biobank site if they meet the secondary filtering criteria:

- the development or biobank site contains specified geographic attributes associated with the species that requires species credits in the TSPD
- the vegetation zone contains habitat features associated with the species as identified in the TSPD.
This information is used to generate a final list of species likely to occur at a development or biobank site and for which a targeted survey or an expert report is required.

Species profiles of all threatened species are available from the DECC website at www.threatenedspecies.environment.nsw.gov.au/tsprofile/index.aspx. These profiles contain useful information about the geographical location, habitat needs and ecology of a species which may assist assessors when undertaking the assessment process.

3.9 Map threatened species sub-zones

A threatened species sub-zone is derived from the vegetation zones established in section 3.3 for applying the initial five filters to predict which threatened species require assessment at the site. To apply the filters in the credit calculator, the following information is entered for each threatened species sub-zone at a development site or biobank:

- CMA subregion area in which the site occurs
- vegetation type and vegetation condition (according to, section 3.3)
- percent native vegetation cover in a 1000-ha circle, also referred to as surrounding vegetation cover for the threatened species filter (according to section 3.7.1)
- adjacent remnant area (according to section 3.7.2)
- patch size including low-condition (according to section 3.9.1).

The area of a threatened species sub-zone is generally the same as the vegetation zone, except where the assessor has stratified vegetation of the same type and in moderate to good condition into smaller zones for survey. A new threatened species sub-zone will also be required where the area of a vegetation zone is non-contiguous and different landscape characteristics are associated with different areas of the vegetation zone. For example, in Figure 7, two threatened species sub-zones are required for vegetation zone 1 (as shown in Figure 1). This is because the size of the adjacent remnant area for TS sub-zone 2 is different from that for TS sub-zone 1. This is because a different list of threatened species may be predicted for TS sub-zone 1 than for TS sub-zone 2.

A new threatened species sub-zone must be mapped whenever the area of the proposal:

- crosses into a new CMA subregion
- is in a different vegetation type or condition
- crosses a 1000-ha circle, or
- has a different-sized patch including low-condition-class vegetation. These attributes are also used to credit the credit profile for ecosystem credits required at a development site or created at a biobank site.

For any of these situations, a threatened species sub-zone may include more than one vegetation zone (Figure 7).
3.9.1 Map patch size including low-condition

The patch size, including low condition attribute is assigned to each threatened species sub-zone for the credit profile. It comprises all adjoining vegetation which is less than or equal to 100 m (≤30 m for non-woody) from the next patch of native vegetation, including low-condition vegetation, regardless of whether the vegetation is in low condition or moderate to good condition. The area of the patch size including low-condition vegetation includes vegetation on and off the site. Patch size including low condition vegetation is recorded for all threatened species sub-zones, regardless of condition, as shown in Figure 8.

This attribute is assigned to the credit profile for ecosystem credits created for that zone. This attribute is recorded in size classes of <5 ha, 5–25 ha (including 25 ha), >25–100 ha (including 100 ha) and >100 ha.

The largest class of patch including low-condition vegetation used in the credit calculator is an area of >500 ha, so once this size is surpassed, the assessor can stop mapping contiguous vegetation and can enter the figure ‘501’ into the credit calculator.
Figure 8 Example of estimation of patch size including low-condition vegetation (red indicates assessment site boundary)
Box 3: Examples of the difference in assessing Adjacent Remnant Area and Patch Size, including low condition (vegetation in low condition is hatched)

**Polygon A**
- TS Sub Zone Area = 4 ha
- Adjacent Remnant Area = 0 ha
- Patch Size, including Low Condition = 14 ha

**Polygon B**
- TS Sub Zone Area = 6 ha
- Adjacent Remnant Area = 0 ha
- Patch Size, including Low Condition = 20 ha

**Polygon C**
- TS Sub Zone Area = 3 ha
- Adjacent Remnant Area = 10 ha
- Patch Size, including Low Condition = 13 ha
3.10 Identify threatened species for survey

Only species that are assessed for species credits require a targeted survey. This is because the habitat needs of these species are not reliably predicted by the vegetation type or location. The list of threatened species that require a targeted survey at a development or biobank site is generated by assessing whether the site contains particular habitat features associated with the occurrence of a species or whether the site has any specific geographic attributes associated with a species (i.e. secondary filters). If the habitat features relate to a stream or waterway (including the presence of riparian vegetation), the assessment is based on the presence of the feature (including unmapped drainage lines) and not the Strahler stream ordering system.

An example of the information on habitat features and geographic location for a species is shown in Table 11.

The habitat and geographic information is held in the credit calculator from data in the TSPD. The list of habitat and geographic features is created at Step 2 – Identify geographic and habitat features. The development or biobank is then assessed for the habitat and geographic features listed at this step.

<table>
<thead>
<tr>
<th>Species</th>
<th>Habitat feature</th>
<th>Geographic location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broad-headed snake</td>
<td>Land within 50 m of sandstone escarpments with hollow-bearing trees, rock crevices or flat sandstone rocks on exposed cliff edges</td>
<td>n/a</td>
</tr>
<tr>
<td>Brush-tailed rock wallaby</td>
<td>Land within 1 km of rock outcrops or cliff lines</td>
<td>n/a</td>
</tr>
<tr>
<td>Little tern</td>
<td>Land within 40 m of inshore coastal waters or shallow waters of estuaries, coastal lagoons and/or lakes</td>
<td>n/a</td>
</tr>
<tr>
<td>Grevillea caleyi</td>
<td>Open forest on laterite soils located on ridgetops</td>
<td>Land within 8-km grid around Terrey Hills in Pittwater CMA subregion</td>
</tr>
<tr>
<td>Pultenaea sp. Genowlan Point</td>
<td>Sandstone cliffs and terraces</td>
<td>Land above 600 m altitude in Wollemi CMA subregion</td>
</tr>
<tr>
<td>Pultenaea aristata</td>
<td>n/a</td>
<td>Land within the Woronora Plateau, a small area between Helensburgh, south of Sydney, and Mt Keira above Wollongong in Sydney Cataract CMA subregion</td>
</tr>
<tr>
<td>Dillwynia tenuifolia – endangered population, Baulkham Hills</td>
<td>n/a</td>
<td>Land within Baulkham Hills LGA in Yengo CMA subregion</td>
</tr>
</tbody>
</table>

After the secondary filters have been applied, the threatened species that require a targeted survey are identified in Step 4 – Undertake Site Survey and are listed in a report, ‘Threatened species requiring survey’. An example of the report is shown in Figure 9. On a biobank site, targeted surveying for species identified in step 4 is optional. A targeted survey (or an expert report in exceptional circumstances) is required if a biobank site owner wishes to create species credits for a particular species. Therefore, before any surveys are done, it
is recommended landholders obtain ecological advice about the likelihood of any species identified for survey occurring on their sites.

Where a threatened species that requires species credits is not predicted to occur through the filtering process, but is then found on a development or biobank site, that species must be included in the calculation of biodiversity credits for the site. Additional species can be added to the assessment process in the calculator at Step 5e – Threatened Species – Survey Results. Assessors should note that only species that require species credits can be added at this step.

Figure 9 Example of a report that identifies the threatened species requiring survey at a development site

---

**Threatened Species Requiring Survey**

**Proposed ID:** 1478/2008/D034  
**Assessor Name:** John Citizen  
**Assessor Accreditation Number:** 1478  
**Tool Version:** 1.0  
**Report Created:** 25-Jul-2003 10:46

**List of species requiring survey**

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trailing Woodruff</td>
<td>Asperula ashenes</td>
</tr>
<tr>
<td>Netted Bottle Brush</td>
<td>Callistemon lineanfilius</td>
</tr>
<tr>
<td>Leafless Tongue Orchid</td>
<td>Cryptostylis humerianna</td>
</tr>
<tr>
<td>Sand Doubletale</td>
<td>Diuris arenaria</td>
</tr>
<tr>
<td>Rough Double Tail</td>
<td>Diuris praecox</td>
</tr>
<tr>
<td>Campbell’s Stringybark</td>
<td>Eucalyptus campbellii</td>
</tr>
<tr>
<td>Narrow-leaved Red Gum population, Greater Tare</td>
<td>Eucalyptus seeana - endangered population</td>
</tr>
<tr>
<td>Small-flower Grevillea</td>
<td>Grevillea parviflora subsp. parviflora</td>
</tr>
<tr>
<td>Groves Paperbark</td>
<td>Melaleuca groveana</td>
</tr>
<tr>
<td>Large-leaved Myotis (Breeding Habitat)</td>
<td>Myotis adversus (Breeding Habitat)</td>
</tr>
<tr>
<td>Tall Knotweed</td>
<td>Persicaria elatior</td>
</tr>
<tr>
<td>Koala population. Hawks Nelse and Tea Gardens</td>
<td>Phascolarctos cinereus - endangered population Hawk</td>
</tr>
</tbody>
</table>
3.10.1 Threatened species survey guidelines

Threatened species surveys are undertaken in accordance with the sections 5.2 and 5.3 of the guideline entitled *Threatened Species Survey and Assessment: Guidelines for Developments and Activities (Working Draft)*. It can be accessed from the DECC website at www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf.

Only sections 5.2 (Plants) and section 5.3 (Animals) of these survey guidelines apply to biobanking assessments. These survey guidelines need to be used with care and with considerable judgment for biobanking assessments, as the guidelines were developed for developments, activities or actions pursuant to Parts 4 and 5 of the EP&A Act, and Part 6 of the TSC Act, rather than for biobanking assessments.

A threatened species survey does not need to be carried out by a consultant accredited to use the methodology. Assessors should note that accreditation to perform assessments under the BioBanking scheme does not provide accreditation to assessors to survey for species for which they do not have specialist skills and knowledge. Threatened species surveys have to be carried out by an accredited expert; that is, a person accredited by the Director General under s.142B(1)(b) of the TSC Act, or, if arrangements for accreditation under s.142B(1)(b) are not in place, a person who has the relevant experience and/or the specialist skills and qualifications to carry out a survey for a particular species. Assessors should be aware that threatened species records need to be submitted to the Wildlife Atlas if the survey method used for the biobanking assessment requires a licence under the *National Parks and Wildlife Act 1974* (e.g. if it involves trapping).

The purpose of the survey is to determine whether the species is present at the development or biobank site and, where present, to calculate either:

- the area of habitat likely to be impacted by development or management actions (for fauna species), or
- the number of individuals likely to be impacted by development or management actions (for flora species).

Where a species is recorded on site, its area of habitat for fauna, or distribution based on a count of individuals for flora, must be mapped as a species polygon in accordance with section 4.4.1 of the methodology. Further information on species polygons is also given in section 3.11 of the operational manual, below. The number of credits required at a development site is based on the area of habitat or number or individuals likely to be impacted by the development. Similarly, the number of credits that can be created on a biobank site is based on the area of habitat or individuals on the biobank site.
The survey for each species listed on the Threatened Species Survey Report must be done during the time of year suitable for identifying the species, as identified in the TSPD.

Survey for threatened species is not required on a biobank site unless species credits are proposed to be created.

3.10.2 Use expert reports instead of undertaking survey

An expert report may be prepared under section 4.4 of the methodology instead of undertaking a threatened species survey at a development site. An expert report may also be used in certain circumstances on a biobank site to determine that a species is present. An expert survey may be used only for those threatened species and populations to which species credits apply, not for any threatened species to which ecosystem credits apply.

Expert reports are prepared by a person who is accredited by the Director General under s. 142B(1)(b) of the TSC Act, or, if arrangements for accreditation under s. 142B(1)(b) are not in place, a person who has the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values to which an expert report relates.

Use of an expert report rather than a targeted survey may be beneficial where it is highly likely or highly unlikely that a species may occur on site, and/or the reliability of recording a species through survey is particularly low.

The purposes of using an expert report instead of a survey are to determine whether:

- the species is unlikely to be present at the development site; in this case no further assessment of the species is required. An expert report cannot determine that a species is unlikely to be present if the land is within an identified population for that species, unless the expert report is approved by the Director General.

- the species is likely to be present at the development site; in this case the expert report must provide an estimate of the number of individuals or area of habitat to be impacted by the development (depending on whether the species is flora or fauna). The area of the species polygon is determined in accordance with section 4.4.1 of the methodology. If an estimate of the number of individuals is required, then the estimate is based on the density of individuals in nearby populations. The number of species credits required for the species at the development site is calculated on the basis of this estimate.

- the species is likely to be present at the biobank site; in this case the expert report must provide an estimate of the number of individuals or area of habitat on the biobank site (depending on whether the species is flora or fauna). The area of the species polygon is determined in accordance with section 4.4.1 of the methodology. If an estimate of the number of individuals is required, then the estimate is based on the density of individuals in nearby populations. The number of species credits that can be created for the species at the biobank site is calculated on the basis of this estimate. Expert reports for presence of species credit species on biobank sites can only be accepted if they provide documented information from survey records carried out within (say) the last 5 years on the site (polygon). Such records would have to be from surveys that meet the guidelines for TS surveys under Step 3, Section 4.4. of the methodology.

Preparation of an expert report under section 4.4 of the methodology – assessment of threatened species for species credits.

The person who prepares an expert report must be accredited under 142B(1)(b) of the methodology or have the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values (in this case, threatened species) to which the expert report relates.
3.10.3 Assumed presence of a fauna species

Where a development site contains any of the specified geographic attributes and habitat features associated with a fauna species under the secondary filtering step, the species may be assumed to be present on site. It is therefore possible to prepare a species polygon to map the area of habitat or number of individuals instead of undertaking a threatened species survey or obtaining an expert report. Species can only be assumed to be present on development sites.

If a species is assumed to be present, a species polygon must be used to map the area of habitat or individuals that is likely to occur on the site. The number of species credits required for the fauna species at the development site is calculated on the basis of this estimate. Where the area may be uncertain, an expert report should be used to determine the habitat area.

3.11 Map species polygons to record threatened species on site

A species polygon is used for threatened species that require species credits in order to identify an area of land:

- where development impacts on a threatened species or population at a development site, or
- where specified management actions are required for a species or population at a biobank site, and
- to calculate the number of credits at the development site and biobank site for any such species or population.

The species polygon is also used to identify and map the location and habitat area where an expert report has been used to determine that a species is likely to occur on a biobank site or a development site.

At the development site, a species polygon must be mapped if a threatened species or population is determined to be present by either:

- assuming that the species or population is present
- an assessment of any identified population
- a threatened species survey
- an expert report in accordance with section 4.5 of the methodology.

At a biobank site, a species polygon must be mapped if a threatened species is determined to be present by either:

- an assessment of any identified population
- an expert report in accordance with section 4.5 of the methodology
- a threatened species survey.

At a biobank site, a species polygon is used to identify the area where particular management actions are required for that species to continue to protect and enhance the species habitation of the site.

For fauna species, the species polygon boundary surrounds the area of land where the species is located and is subject to the impact of the development. Within the boundary of the species polygon are the geographical characteristics and/or specific habitat features used by that species on the site. The area of the species polygon is entered into the credit calculator at Step 5 – Enter threatened species survey information and is used to determine the number of species credits that are required at a development site or created at the biobank site.
Flora species are recorded as the number of individuals on the site. For small sites this can be calculated by simply counting the number of individuals. For large sites or for species with many individuals, a count can be conducted within representative sample area(s) and then extrapolated over the entire site to count the overall number of individuals. The area over which the threatened flora species occurs is then mapped onto the aerial image of the site as a species polygon. Where this technique has been used to count the number of flora species, a description of the method must be included in the impact assessment section of the BioBanking Assessment Report.

A species polygon can usually be mapped only at a later stage of the assessment process, as mapping depends on completion of any targeted flora and fauna surveys of species identified for further assessment, or preparation of an expert report. A GPS must be used in the field to confirm the boundaries of the species polygon, and this information is digitised onto an ortho-rectified air photo or SPOT-5 image. The area of a species polygon for all affected species must be submitted to DECC as part of the impact assessment section in the BioBanking Assessment Report that accompanies an application for a biobanking statement or agreement.

### 3.12 Notional assessment to calculate species credits

A notional assessment can be used to calculate the number of species credits required for a development site, or the number that is created at a potential offset site if a biobank statement or agreement is not required. This type of assessment for calculating species credits can be made without strictly applying the methodology. It can also be used where a species is known to occur on a site and application of the initial and secondary filters is therefore not necessary.

In the case of a development site, the credit requirements can be calculated by using equation 13 from the methodology (number of species credits required = area habitat loss or number of individuals lost/T\textsubscript{G} value for the species × 10). The assessor must first establish a species polygon to determine either the area of habitat (usually) for a fauna species, or the number of individuals (usually) for a flora species. This area/number is then divided by the T\textsubscript{G} value for the species and multiplied by a scaling factor of 10. The final number is the number of credits required for the development. The T\textsubscript{G} value for a species can be accessed from the Species characteristics by CMA spreadsheet available on the BioBanking website.

In the case of a biobank or other offset site, the number of credits created can be calculated by using equation 14 from the methodology (number of species credits created = area habitat gain or number of individuals gain × 0.6 (being the default gain in Site Value) × 10. The assessor must first establish a species polygon for the species to determine either the area of habitat (usually) for a fauna species, or the number of individuals (usually) for a flora species. This area/number is multiplied by 0.6 (being the default gain in Site Value) and then multiplied by a scaling factor of 10. The final number is the number of species credits that are created at the offset site.

Where the default gain in Site Value is used, assessors should be aware that the actual gain in Site Value could be higher or lower on a site where the methodology has been strictly applied. This is because the gain in Site Value of 0.6 assumes an improvement in the Site Value score from 1 to 2 (see Table 2 in the methodology). This gain may be higher (e.g. 85% gain in Site Value) or lower (e.g. 40% gain in Site Value) than the default value, depending on the starting values of the attributes in the Site Value score (see Table 2 in the methodology).
3.13 Assess identified populations

The Director General may develop an Identified Populations Database that identifies population(s) of threatened species present in an area of land as identified population(s).

As part of the assessment process, the assessor is required to check whether the Identified Populations Database contains an identified population that is listed for the CMA subregion(s) in which the development or biobank site is located. The Identified Population Database contains geographic and other information that describes the species and location of the identified population. If there is a listing of a species in the Identified Populations Database, further assessment is required to determine whether any part of the biobank or development site is within the area identified as containing an identified population.

Any information on identified populations in the Identified Population Database will be publicly available on the DECC website at www.environment.nsw.gov.au/biobanking/index.htm. DECC will also notify accredited assessors of any new listings of identified populations as they are made.
4 Assessors’ guide to operating the credit calculator: development sites

The computer on which the credit calculator is running will require Microsoft Access or Microsoft Access Runtime software. Where the computer has Microsoft Access installed, the credit calculator requires no installation and it can be simply saved to a local drive or a network drive. Where the computer requires Microsoft Access Runtime, the software can be downloaded from the BioBanking website. It will require installation on the computer before the credit calculator can be used.

4.1 Open the credit calculator

To open the credit calculator simply double click on the icon from Windows Explorer. Several messages may appear while the credit calculator is opening, depending on which version of Microsoft Access or Microsoft Access Runtime is installed on the machine. It is unlikely all of the following messages will appear, but they may include:

1. Open File – Security Warning. Do you want to open this file? (Click Open).
2. Convert/Open Database (Select Open and press OK).
3. Do you want to block unsafe expressions (Select No).
4. Security Warning (Select Open).

Once all messages have been answered the credit calculator will open. Click Next to proceed through the first page, read the disclaimer and accept the conditions. Then select Development Sites to begin the assessment of a development site.

To start a new case for assessment, click on the button containing the forward arrow and asterisk at the base of the page.

4.2 Enter proposal details and location information

The details of the proposal are entered into the Assessment of a Development Site page. This information is needed to track information relating to the applicant, the BioBanking Assessor and where the development site is located (Figure 10).

This includes details of the development site: details of the Lot and Deposited Plan (DP), details of the applicant and details of the assessor, including their biobanking accreditation number. The Lot/DP number is added by clicking on the Enter Lot Details button, which opens up a new screen. Where more than one Lot/DP number is required, additional space will appear once the numbers are entered into the space above.

This page also contains the assessment steps that the credit calculator follows to complete an assessment. Clicking on any of the buttons will lead to that part of the assessment as shown in Figure 10.

The proposal ID is assigned according to the following protocol:
Assessor’s four digit accreditation no/year (yyyy)/Development case number (D000)

e.g. 1478/2009/D034

Next, enter the name of the CMA area and the Mitchell Landscape in which the development site is located from the drop-down menus in the Location Details box. The CMA area that is chosen will filter the selection of CMA subregions available in Step 1. The credit calculator will allow only one CMA area to be entered. If the development site extends over two CMA areas then the site must be assessed as separate proposals.
The Mitchell Landscape is used to determine the significance of the size of adjacent remnant vegetation. If a development site lies across the boundary of a Mitchell Landscape, then choose the Mitchell landscape in which most of the development occurs (see section 3.7.2 of this operational manual).

**Figure 10** Opening screen for assessment of a development site

### 4.3 Step 1 – Enter Landscape Value assessment circles and threatened species sub-zone data

The information required for the threatened species sub-zones and the Landscape Value assessment circles can be mapped initially onto the SPOT-5 image or ortho-rectified air photo by using GIS. This will allow you to identify and record distinct vegetation patches, determine the broad condition state, and possibly distinguish the likely vegetation types. To complete this step, make a preliminary site visit to confirm the vegetation type, condition and area of the vegetation on the site. These data can then be entered into a GIS to confirm the areas of the different vegetation zones. Other information that may be validated during the preliminary site visit includes the condition of surrounding vegetation that is either connected to the site, or is adjacent to the site.

#### 4.3.1 Step 1a – Enter assessment circles

*Step 1a – Enter assessment circles* is used to enter information about Landscape Value of the site and to predict which threatened species require further assessment. This information is used to determine the change in Landscape Value score by assessing the impact of the development on native vegetation cover and connectivity as well as the size of adjacent remnant area.

The information entered into the credit calculator at this stage is predominately sourced from mapping the site using GIS software. First record the assessment *Circle Number/Name* and the *CMA Subregion* in the space provided. The CMA subregion is chosen from a drop-down list that is limited by the CMA chosen from the site details screen.

Then record the scores for the % Native Vegetation Cover in 1000 ha Circle and the % Native Vegetation Cover in 100 ha Circle. The % native vegetation cover assesses the change in the overall percentage of native vegetation within the 1000-ha and 100-ha assessment circles in which the development occurs. The *Before Development* score is the current % native vegetation cover before development and is visually estimated in classes of 10% by using the drop-down menus for the 1000-ha circle and the 100-ha circle (Figure 11).
The *After Development* score is the % native vegetation cover remaining in each circle following the development. This is estimated in classes of 10% by using the drop-down menu for each circle.

A development site may require more than one 1000-ha assessment circle. A new 1000-ha assessment circle must be used whenever:
(a) the development site exceeds a single 1000-ha assessment circle, or
(b) the configuration of the development area does not fit into a single 1000-ha assessment circle, or
(c) the development site extends from one CMA subregion into another CMA subregion.

Add further assessment circles by clicking on the *Add Assessment Circle* button at the bottom of the screen. Data are then entered for each new assessment circle. An assessment circle can also be deleted from the proposal by clicking on the *Delete this Assessment Circle* button on the right of the screen. Be aware that this will also delete any threatened species sub-zone information that relates to that assessment circle. For guidance on how to position an assessment circle, see section 3.7.1 and Appendix 6 of this operational manual.

**Figure 11** Landscape value data are entered in Step 1

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### 4.3.2 Step 1a – Connectivity value

The score for Connectivity Value is determined from the three-step process described in section 3.7.3 above. The change in the linkage width is entered by choosing the appropriate linkage width class from the drop-down menu (Figure 9). A linkage width must be chosen for the *Before Development* box and for the *After Development* box. The credit calculator will automatically calculate the number of thresholds that are crossed on the basis of the impact of the development.

To enter the connectivity condition value into the credit calculator, first choose which type of vegetation is being assessed by selecting the radial button for either *Woody vegetation types* or *Non-woody vegetation types*, according to whether the vegetation is naturally woody or non-woody.

For woody vegetation types, first select the average condition class from the drop-down menu for both the *Over-storey condition* and *Mid-storey condition* strata. This information must be entered for both *Before Development* and *After Development* using the drop-down
menu for each field. The condition class for After Development is selected by taking into account the impact of development on the overall remaining condition of each stratum.

The credit calculator will then automatically calculate the number of connectivity condition class and linkage width classes that have been crossed as a result of the development to determine the final Connectivity Value score.

4.3.3 Step 1b – Enter threatened species sub-zones

Threatened species sub-zones are used to filter for the threatened species that are to be assessed at the site.

A new threatened species sub-zone must be added for each new vegetation type, or where the same vegetation type occurs in both low condition and moderate to good condition. A new threatened species sub-zone should also be used where the same vegetation type has been stratified into vegetation zones in the same broad condition state which are identified using the Ancillary Code, or where vegetation zones are not contiguous. The vegetation zones should be digitised onto the aerial photograph or SPOT-5 image to allow the accurate recording of the Vegetation Zone Area.

Each threatened species sub-zone must be identified with a name or number; this allows it to be tracked through later steps in the assessment (Figure 12). If more than one threatened species sub-zone is required within the assessment circle, then select the Add New Sub Zone button at the bottom of the screen. To delete the sub-zone, select the Delete this Sub Zone button at the right of the screen.

The first data to be entered in this screen are the threatened species sub-zone name/number, and the vegetation zone area (in hectares). The Adjacent Remnant Vegetation Area and Patch Size, Including Low Condition Veg are recorded for each new threatened species sub-zone. Patch Size, Including Low Condition Veg is the area of native vegetation that includes the development site, plus any adjoining native vegetation that is not separated by more than 100 m (for woody vegetation) or more than 30 m (for non-woody vegetation).

Veg Formation, Veg Type and Condition class are then added using the drop-down menus. The Veg Type Name, located below the vegetation type pull-down list, will be filled automatically. In particular, the vegetation type should be selected using the drop-down menu rather than by typing the name of the vegetation type. This is because each vegetation type is preceded by a unique code. The final field is the ancillary code, which is an optional field. The ancillary code allows the assessor to split areas of the same vegetation type in moderate to good condition into smaller and more homogenous condition states (e.g. poor, good, very good etc) for the purpose of determining a more precise Site Value score for the same vegetation type where it occurs in a different condition state on different parts of the site. Using the same Ancillary Code in a different threatened species sub-zones of the same vegetation type will create the one vegetation zone.

An assessor can also export all of the data entered for each threatened species sub-zone using the Export TS sub-zone button at the bottom of the screen. This makes it easy to review the data entered into the calculator. It also can be exported to an excel spreadsheet to easily calculate the area of clearing for each vegetation type and the overall development.
4.4 Step 2 – Identify geographic and habitat features

Once all the data for Step 1 have been entered, the credit calculator will automatically query the TSPD to identify those species requiring further assessment at the development site. For those species requiring species credits, further information is needed relating to whether particular geographic and habitat features occur on the site (see operational manual, section 3.10). This information needs to be entered into the credit calculator in Step 2 – Identify Geographic and Habitat Features.

In this step, you are asked to identify whether particular habitat or geographic features occur on the site as the basis for the association of particular species with these features (Figure 13). The habitat and geographic features listed on the screen complete the question, Does any part of the development impact on … The feature may be used to filter for one or more different threatened species. Select Yes if in doubt about whether the feature occurs on site. This allows the potential presence of the species to be discounted through a targeted survey.

To help identify these features, print this form and take it into the field to determine whether or not the feature occurs on site. After the site has been field-checked for the habitat features, allocate an answer of Yes or No to each question. The response to whether these features occur on site or not will enable the credit calculator to further filter the list of threatened species that require survey. If a question cannot be answered with confidence, the default answer should be Yes. This will maintain the species within the list that require survey. Once completed, select the Done button.
Figure 13 The development site is checked for the list of geographic and habitat features developed at Step 2

<table>
<thead>
<tr>
<th>Step 2 - Identify Geographic and Habitat Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does any part of the development impact and:</td>
</tr>
<tr>
<td>deep, low-nutrient sands</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Hollow-bearing trees, bridges, caves or artificial structures within 200 m of riparian zone</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>land below 1000 m in altitude and within 40 m of rainforest or eucalypt forest with deep leaf litter</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>land containing caves or similar structures</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>land containing escarpments, cliffs, caves, deep crevices, old mine shafts or tunnels</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>land within 1 km of rock outcrops or cliffs</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>land within 100 m of emergent aquatic or riparian vegetation</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>land within 100 m of semi-permanent or ephemeral ponds or depressions containing leaf litter</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>land within 100 m of fresh/brackish/saline waters of larger rivers or creeks; estuaries, coastal lagoons, lakes and/or inshore marine waters</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>land within 100 m of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation or emergent aquatic vegetation</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>land within 40 m of freshwater or saline wetlands (e.g., saltmarsh, mangroves, mudflats, awens, billabongs, floodplains, watercourses pools, wet heathland and/or farm dams)</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>land within 40 m of permanent wetlands with a good surface cover of floating vegetation</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

4.5 Step 3 – Assess for identified populations

Next, enter Step 3 – Assess for identified populations by clicking on the button on the home screen. The credit calculator will search for information on any identified populations in the CMA subregion(s) relevant to the development site. If the credit calculator indicates that a species is listed as an identified population, obtain further details for the listing from the Identified Populations Database on the DECC website.

The information in the Identified Populations Database will enable you to verify whether all or any part of the development site is within any area identified as containing an identified population.

Then, from the pull-down menu, record whether all, part or none of the development covers an identified population for each identified species, by choosing either Yes – entire development, Yes – part of the development or No.

Information in the Identified Populations Database will also indicate whether any loss of the population can be allowed. Next select either Population can be offset or Population cannot be offset from the pull-down menu. Where the identified population cannot be offset, that part of the development area will be red flagged.

Finally, a summary sheet will be presented showing all identified populations, whether they can be offset, and whether a survey is required for the species. Select Done to complete Step 3.

If there are no identified populations listed for that CMA subregion, the credit calculator will notify you of this via a dialogue box, and you will be advised to proceed directly to Step 4.

4.6 Step 4 – Undertake the site survey

The site survey requirements for the site are obtained by selecting the 4. Undertake Site Survey button on the initial development details screen. The opening screen in Step 4 contains the Survey Time Matrix and a link to print the site survey details for the vegetation zones and for the threatened species.

The Survey Time Matrix lists all the species that require a targeted survey, as well as the appropriate time of year when the survey can take place for that species. To identify the months in which they can surveyed, click on the box under the Proposed Survey Times...
Because it may not be possible to meet this requirement for all species, the alternatives are to provide an expert report for the species or assume that the species is present.

Species that cannot be surveyed at the selected times of year are listed in the Threatened Species Requiring an Expert Report or are to be assumed to be present box (Figure 14). These species, if not surveyed for or checked by an expert, will be assumed to be on the site and therefore included in the final credit calculations.

**Figure 14** Threatened species survey matrix, showing the species that require an expert report or are assumed to be present

Once the intended survey times have been entered into the credit calculator, a report can be produced showing all the species that require survey. To do this, select the Print list of threatened species requiring field survey button. The species are organized into groups (e.g. amphibians, shrubs) and contains the following information for each species (Figure 15):

- the vegetation types, condition and patch size the species is likely to occur in on the site
- the appropriate time, specific habitat and any geographic requirements of the species
- whether the species has an identified population within the area to be surveyed (as identified in Step 3)
- where a survey time has not been indicated for a species, the report will indicate that an expert report is required to be prepared for this species
It is also possible to produce and print a report, *Threatened species predicted on site*. This report provides a list of the threatened species that are predicted to occur on the site and that are assessed for ecosystem credits. There is no requirement to survey for these species, as they are assessed for ecosystem credits. The report is generated by clicking on the *Print list of threatened species predicted on site* button on the right of the screen.

The third report relating to the site survey provides information on the vegetation zones that require a site assessment using transects and plots. To get a list of the vegetation zones requiring survey, click on the *Print list of vegetation zones requiring field survey* button and print the report produced. The information provided will include:

- vegetation zone name
- total area of the zone
- condition of the vegetation within the zone
- ancillary code (if entered)
- possible EECs within the zone
- minimum number of transect/plots required to survey the vegetation zone.

After selecting the time of year to carry out the survey for each threatened species and printed any of the reports, return to the opening screen by clicking on the *Done* button.
4.7 Step 5 – Enter survey results and vegetation red flag status

Once the field surveys have been completed, the results can be entered into the credit calculator by selecting the 5. Enter Survey Results and Vegetation Red Flag Status button from the development details screen. The data that need to be entered in this step include indicating whether the vegetation type is an EEC; site attribute information collected from the transects/plots; and the outcomes from the targeted survey for individual threatened species.

The results are entered in two sections, one being for Site Value and the other for threatened species. To enter information on the vegetation transects/plots and EEC status of each vegetation type, select the Enter Vegetation Plot Information and Red Flag Status button. To enter data on each threatened species requiring survey, or with an identified population, click on the Enter Threatened Species Survey Information button.

4.7.1 Step 5a – Vegetation zone: EEC and red flag status

To enter data on each vegetation zone, including the plot data, select Enter Vegetation Plot Information and Red Flag Status. The opening screen in Step 5a lists information for each vegetation zone, including the vegetation type, its percent cleared according to the NSW Vegetation Types Database, the area of the zone and the minimum number of transects/plots required for the zone (Figure 16).

For each vegetation zone, assess whether or not it is an EEC (i.e. critically endangered or endangered ecological community) or part of an EEC. Where a vegetation type may be an EEC or part of an EEC, use the pull-down menu of the potential EECs for that vegetation type, that are listed under the heading EEC? If the vegetation type is considered to be an EEC or part of an EEC that is listed, then choose the appropriate community. If the vegetation type is not considered to be an EEC, then select Not an EEC from the pull-down menu.

Once this information has been entered, the credit calculator will indicate whether a red flag is triggered for the vegetation zone. If a red flag has been triggered for a vegetation zone, the assessment can still continue and the red flag will be listed in the final report. You will be asked in Step 6 if you wish to apply for a determination from the Director General that the development can still be regarded as improving or maintaining biodiversity values. If so, you will need to provide information that addresses section 2.3 of the methodology (also refer to section 2.3 of the operational manual for further information). If not, a biobanking statement will not be issued as the development does not meet the improve or maintain test.

It is also possible to export transect/plot data for the whole proposal by selecting the Export all transect/plot information buttons at the bottom of the screen. The data for the export function is in .xml file format.

Figure 16 Identification of EEC or red flags for vegetation zones

<table>
<thead>
<tr>
<th>Name</th>
<th>% Cleared</th>
<th>EEC?</th>
<th>RedFlag?</th>
<th>Number of Transects/Plots</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HU591 Moderately Good</td>
<td>29</td>
<td>Not an EEC</td>
<td>No</td>
<td>15.00</td>
<td></td>
</tr>
<tr>
<td>Blackbutt - Narrow-leaved White Mahogany, shrubby tall open forest of coastal ranges, northern Sydney Basin</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HU832 Moderately Good</td>
<td>69</td>
<td>Swamp sclerophyll forest on coastal lowlands of the North Coast and northern Sydney Basin</td>
<td>Yes</td>
<td>6.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Swamp Mahogany</td>
<td>In Complete</td>
<td>6.00</td>
<td></td>
</tr>
</tbody>
</table>

Enter Transect/Plot Scores
Enter Management Scores

Export All Transect/Plot Information
4.7.2 Step 5b – Enter vegetation transect/plot information

Next, enter the site attribute data collected from transects and plots by selecting the Edit Transects/Plots button for each vegetation zone. This screen displays the Vegetation Zone Name and benchmark data for the vegetation type. The benchmark data shown in the screen are taken from the NSW Benchmark Database. Benchmark data can be accessed from the NSW Benchmarks Database, from local reference sites, or from published information. If using local benchmark data from a local reference site, these data can be entered into the credit calculator by selecting the Edit Benchmarks button (Figure 17). The credit calculator will indicate that local benchmark data have been used, and this will appear in the final credit report for the site.

Where the vegetation type is a derived grassland or shrubland, enter the benchmark data that most closely resemble the original vegetation type. Where the value entered for over-storey regeneration is not the same for each transect/plot, an error message will pop up to say this value must be the same for the entire zone, as regeneration is assessed for the whole zone. Additional transects/plots can be added by selecting Add Transect/Plot at the bottom of the screen. Also enter the easting and northing of each transect/plot taken for the vegetation zone. Select Done when all the site survey data have been entered.

Figure 17 Enter vegetation transect/plot information

Transect/plot data can also be imported for each individual vegetation zone by clicking on the Import Transect/Plot button at the bottom of the screen. This may help to minimise the amount of data entry required if data have already been entered into a spreadsheet. Note that this will add to any existing data already entered into the tool, rather than overwrite the existing data. Transect/plot data can only be imported with the data set out in a specific layout and saved in a file that is in CSV format.

Steps to import transect/plot data in CSV format for each vegetation zone:

1. Download a copy of the ‘plotstemplate.csv’ file from the BioBanking website, and rename it ‘vegetation zone name.csv’ (any name can be used). When saving the file, you should use a name that will easily link it to the vegetation zone, particularly where the site involves many vegetation zones.

2. Open the empty ‘vegetation zone name.csv’ file with Microsoft Excel.

3. Enter all the transect and plot data into the ‘vegetation zone name.csv’ file

   (a) Columns labelled ‘PlotName’, ‘Easting (Longitude)’, ‘Northing (Latitude)’ and ‘Zone’: allow free text entry, but the fields must not be left empty.

   (b) Columns labelled ‘NPS’, ‘NOS’, ‘NGCG’, ‘NGCS’, ‘NGCO’, ‘EPC’, ‘NTH’, ‘OR’, ‘FL’: each field must contain a number (e.g. 18, 8, 4, 2).
4. After you have entered data into the file, perform a quick validation of your data (note that these data can still be adjusted once they have been exported into the credit calculator).

5. Saving CSV files in Excel can be tricky. The easiest way is to just close Excel, allow Excel to request the user to save the file, and then just overwrite the existing file.

6. Open Step 5b of the credit calculator and delete any existing transect/plots, including any that contain zero values. Then click on the Import Transect/Plot button and select the location/file of the vegetation zone name.csv. This will import all transect/plot data for this vegetation zone. This process should be repeated for each vegetation zone.

7. The data import is now completed and the plot data is displayed on the screen in the credit calculator.

Any plot/transect data that have already been entered into the tool can be exported from one version of the tool into another through selecting the Export this Proposal button at Step 6 or the Export all Transect/Plot Data button at Step 5a.

4.7.3 Step 5c – Management zones

To access Step 5c, first select the Enter Management Zones button. This step allows the assessor to stratify a vegetation zone into different management units by assigning a different area or extent of impact for each management zone. This allows efficient simulation of different development proposals based on the extent of impact from the development on biodiversity values. For example, Figure 18 shows a vegetation zone with three management outcomes, being total clearing, an inner APZ and an outer APZ.

Each management zone must be given a name and assigned to a threatened species sub-zone by selecting a zone from the drop-down menu. The combined area of all management zones must equal the overall area of the vegetation zone. Additional management zones can be added by selecting the Add Management Zone button from the bottom of the screen.

Once the data entry is complete for this screen, the status will change to complete.

A GPS must be used in the field to confirm the boundaries of the management zones whenever they differ from those of the vegetation zone.

Figure 18 Example of management zones

4.7.4 Step 5d – Enter site attribute score with development

Carrying out Step 5d requires predicting the impact of development on each site attribute for each management zone. To enter the score for vegetation after development, select the Scores button. The Current Site Value score will have already been calculated from the data that have been previously entered for the vegetation zone (Figure 19).
Next, enter a score for each site attribute based on the condition of the vegetation after development. If the site is to be completely cleared, then all scores should be reduced to zero but if the management zone is only going to be thinned (such as for an APZ), the score for each site attribute should be reduced appropriately. Guidelines for reducing the score for an APZ are in Appendix 4.

**Figure 19** Determine Site Value score with development

The final loss of Site Value is then shown under the heading, *Decrease in Site Value Score*. This score represents the loss of Site Value for that management zone. Once the *Future Site Value* score has been determined, select the *Done* button to return to Step 5 – Enter Survey Results.

### 4.7.5 Step 5e – Threatened species – survey results

The results from targeted surveys for threatened species can now be entered into the credit calculator by selecting the button, *Enter Threatened Species Survey Information*. For each species, answer Yes or No for the question, *Is the species impacted by the development?* Then record the *Identification Method* from the drop-down menu by selecting either Survey, Assumed Presence or Expert Report (Figure 20).

If the species has been found on site, indicate the number of individuals (for flora), or the area of habitat in hectares (for fauna) under the *Loss* column. Where a threatened population and a species (which comprises the threatened population) are both listed and are both found on site, enter any loss for the threatened population, rather than the individual species. The credit calculator will also indicate the number of individuals or area of habitat that is considered to be a negligible loss for that species. If the impact of development exceeds the negligible loss, the credit calculator will indicate a red flag has been triggered. This is because the species is identified in the TSPD as one that is not capable of withstanding further loss in the CMA area.

Where an expert report has been used to identify that a species is not present on the site, the expert report will need to be approved by DECC before a biobanking statement is issued. The report should be provided as part of the BioBanking Assessment Report for the site.
BioBanking Credit Report will indicate that the expert report will need to be included as part of the application.

If a threatened species is recorded on the site but it was not predicted to occur there, the species must be added to the list at Step 5e by selecting the species from the drop-down menu for the field at the bottom of the screen, Additional threatened species found on site. Only species that require species credits can be added into the assessment.

Once all of the information has been completed, the Threatened Species – Loss Summary screen can be accessed by selecting Next.

**Figure 20** Recording results from threatened species surveys

<table>
<thead>
<tr>
<th>Species Name</th>
<th>Is the species impacted by the development?</th>
<th>Identification Method</th>
<th>Loss</th>
<th>Units</th>
<th>No. considered a negligible loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maleleucos grieveana</td>
<td>No</td>
<td>Survey</td>
<td>0</td>
<td>individuals</td>
<td>N/A</td>
</tr>
<tr>
<td>Pseudomyx granuliflora</td>
<td>No</td>
<td>Survey</td>
<td>0</td>
<td>ha</td>
<td>N/A</td>
</tr>
<tr>
<td>Tetrathela jucunda</td>
<td>No</td>
<td>Survey</td>
<td>0</td>
<td>individuals</td>
<td>N/A</td>
</tr>
<tr>
<td>Archaeophyta adamsi</td>
<td>No</td>
<td>Survey</td>
<td>0</td>
<td>ha</td>
<td>0</td>
</tr>
<tr>
<td>Belostom lonqued</td>
<td>No</td>
<td>Survey</td>
<td>0</td>
<td>individuals</td>
<td>0</td>
</tr>
<tr>
<td>Cryptostylis hunteri</td>
<td>Yes</td>
<td>Survey</td>
<td>0</td>
<td>individuals</td>
<td>2</td>
</tr>
<tr>
<td>Cynanchum elegans</td>
<td>No</td>
<td>Assumed, Expert Report</td>
<td>0</td>
<td>individuals</td>
<td>2</td>
</tr>
<tr>
<td>Diursa spicata</td>
<td>No</td>
<td>Survey</td>
<td>0</td>
<td>individuals</td>
<td>0</td>
</tr>
</tbody>
</table>

**4.7.6 Step 5e – Threatened species – loss summary**

A final Threatened Species – Loss Summary is then displayed, allowing you to check that the data have been entered correctly. For each species, the Threatened Species – Loss Summary indicates whether the species is an identified population and shows the Total Loss and Units of loss, and whether the loss triggers a red flag (Figure 21).

If the species loss has triggered a red flag because the species is identified in the TSPD as one that is not capable of withstanding further loss in the CMA, this will appear on the BioBanking Credit Report. You will be asked in Step 6 if you wish to apply for a determination from the Director General that the development can still be regarded as improving or maintaining biodiversity values. If so, you will need to provide information that addresses section 2.3 of the methodology (refer to section 3.5 of the operational manual for further information). If not, a biobanking statement will not be issued for that part of the development.

After confirming all data are correct, select Done twice to return to the proposals page.
4.8 Step 6 – Report on credit requirements

The final step in the assessment process performs all the calculations for ecosystem credits and species credits. It can also produce queries that summarise the data entered into the credit calculator.

Where a red flag has been triggered during the assessment, indicate whether a determination from the Director General is requested for that part of the development. If the applicant for the development wishes to apply for a determination, select Yes from the drop-down menu. This selection must be made before calculating the final credit requirements (Figure 22).

4.8.1 Calculate credit requirements

The BioBanking Credit Report will outline the credit requirements for the proposed development, provide the credit profile for each group of credits, and indicate whether any additional information is required for use of local benchmark data or whether an expert report is needed. The BioBanking Credit Report will also indicate whether a red flag or flags have been triggered and list the species or vegetation types that are red flagged.
To produce the BioBanking Credit Report, select the Calculate Credit Requirements button. Please note that the calculator may take a few moments to work through the data. Once the calculations have been completed, the final report and all queries can be produced. Be aware that this step must be re-run to include any changes made to the data after the credit requirements have been calculated.

4.8.2 BioBanking Credit Report

To generate the BioBanking Credit Report for the development, select the Report on Credit Requirements button in the Final Reports box at the bottom of the screen. The BioBanking Credit Report contains details relating to the proponent of the development and the name and accreditation number of the assessor. A copy of the BioBanking Credit Report should be submitted as part of the application for a biobanking statement.

The BioBanking Credit Report shows:

- the number and type of biodiversity credits required to offset the proposed development
- whether any red flags have been triggered at the development site, and the name of the vegetation type and/or threatened species that has triggered the red flag
- the credit profile for each group of ecosystem credits, showing the number of credits required and the CMA subregion(s), vegetation formation, vegetation types, minimum surrounding vegetation and minimum patch size including low-condition vegetation
- the credit profile for species credits, showing the number of species required for each affected species.

The final report will also show what additional reports are required to be submitted to DECC as part of the application for a biobanking statement. These reports may include:

- approval for use of benchmark data collected from local reference sites
- use of an expert report to confirm the presence or absence of a species
- application for a red flag determination.

4.8.3 Queries

Once the calculations have been completed, the data in the credit calculator can be queried to produce summary information for each vegetation zone, detailed information for each threatened species sub-zone and other threatened species information. It is advisable to check these queries before the final report is produced to ensure that the data are accurate for the site.

The queries contain the following information:

(a) Export detailed vegetation zone data. This query allows information about the assessment and credit requirements to be exported. The export contains the threatened species sub-zone name, assessment circle name, zone name, zone area, red flag status, current Site Value, future Site Value, loss in Site Value, landscape value score (percent native vegetation cover, adjacent remnant area), identify the threatened species requiring the greatest number of credits (their $T_G$ and site attribute loss) and the credit requirement for each particular vegetation zone.

(b) Export species predicted within ecosystem credits. This query provides a list of threatened species that have been predicted to occur with each vegetation type assessed for the development.

(c) Export threatened species survey data. This query contains the scientific name, common name, identified population, whether the species was found during the survey, total loss, units of loss, number considered a negligible loss, red flag status and total credits required for the species.
To generate this information, select each of the buttons under the *Queries* title. Each button will produce a spreadsheet of the data. These data can be copied and saved into an Excel spreadsheet.

4.8.4 Export development proposal

Once the proposal has been finalised, an .xml file can be generated that contains all the data for the case by selecting the button *Export this proposal*. A dialogue box will appear; it allows you to name the file and the location where it is to be saved. A copy of the .xml file is required to be submitted to DECC as part of the BioBanking Assessment Report when applying for a statement.

The *Export this proposal* button can be activated at any time during the assessment process. This allows the case to be transferred into a new version of the credit calculator if one has been issued, or to efficiently transfer information about a case between different office locations.

4.9 Reset Steps 2 to 6

If a mistake in data entry was made but not realised until after data continued to be entered, then *Steps 2 to 6* need to be reset. As each step of the credit calculator builds on the previous step, all data entered from *Steps 2 to 6* need to be re-entered to ensure the credit calculator is working with the correct information. The case can be reset by clicking on the *Reset steps 2–6* button on the *Development site details* page.

If any data needs to be changed that has been entered into the calculator after completing the data entry, a dialogue box will pop up. It states that if proceeding, all data from future steps will be deleted. To continue with the change, it is advisable to either save a copy of the calculator or export and save an .xml file of the case before proceeding. This will provide a safeguard against the loss of any work previously performed in the calculator.

4.10 Calculate credits for environmental contributions

If an environmental contribution is required for a development, the number of biodiversity credits required to offset the development is reduced (including to nil) to take account of that environmental contribution.

An *environmental contribution* is a contribution that is required under subdivision 2 (Planning Agreements), subdivision 3 (Local Infrastructure Contributions) or subdivision 4 (Special Infrastructure Contributions) of Division 6 of Part 4 of the EP&A Act. For biobanking, the contribution must be used or applied for the conservation or enhancement of the natural environment. A contribution may be in the form of the dedication of land, levy or other material benefit.

In issuing a biobanking statement, the Director General may take into account an environmental contribution for the contribution or enhancement of the natural environment. The biobanking statement will set out the credits required to be retired without the contribution, and also the reduced number of credits required to be retired if the environmental contribution is made. In applying for a biobanking statement, applicants should provide information in the BioBanking Assessment Report about the environmental contribution, including:

- the type of environmental contribution, and
- how the contribution will be used or applied for conservation or enhancement of the natural environment.

If there is a change to the environmental contribution after the biobanking statement is issued, a revised biobanking statement will need to be obtained.
The number of credits required for a development to which an environmental contribution applies is reduced in accordance with the following four steps.

**Step 1: Identify the parts of the contribution that are relevant**

A contribution required under the EP&A Act may be used for, or applied to, many different purposes. Only those parts of a contribution that are used for, or applied to, the conservation or enhancement of the natural environment can reduce the number of credits required at a development site.

**Step 2: Calculate the number of biodiversity credits that are equivalent to the environmental contribution**

The biodiversity credits attributable to the environmental contribution that involves the dedication of lands managed for the conservation or enhancement of the natural environment or the provision of funding for managing specific land for improved biodiversity values are assessed as follows:

- Refer to section 5 of this operational manual to determine the number and type of credits that would be created on the land if the land were to be established and managed as a biobank site.
- If any management actions required by the methodology are not undertaken on the land, the number of credits must be reduced according to the guidelines in Appendix 9.

**Step 3: Calculate the total number of credits required as a result of development impacts**

The methodology is applied to the development site to determine the number and type of credits required as a result of the development impacts; it is assumed that the environmental contribution is not required.

**Step 4: Calculate the revised number of credits required to offset development, taking the environmental contribution into account**

The revised number of credits required to offset the development (if any) is calculated by subtracting the number of credits that are equivalent to the relevant actions in step 2 from the number of credits required as a result of the development impacts in step 3. A credit or credits described in step 2 may only be subtracted from the credits required in step 3 if the credits are of a type and profile that are compatible with the credits required in step 3. See section 2.5 of this operational manual for further information regarding the credit profile.

If an applicant is applying for an environmental contribution, the application for a biobanking statement must also include the BioBanking Agreement Credit Report and other information to support the use of the environmental contribution. The use of an environmental contribution as part of a biobanking statement requires approval from the Director General.

4.11 Submit results to DECC

The applicant must submit the following information as part of their application for a biobanking statement:

- biobanking statement application form
- BioBanking Assessment Report, which includes an impact assessment section. This is to identify the direct and indirect impacts of the development on biodiversity values, including impacts on red flag areas. It may also include an application for a determination on red flag areas; the expert report (where required); use of local benchmark data (where appropriate); and request for use of local data.
- copy of the Biobanking Credit Report
• copy of the .xml file for the proposal from the credit calculator
• a digital map (either satellite image or ortho-rectified aerial image) identifying the
development site, boundary, vegetation zones and species polygons (showing location
of any threatened species for which species credits are required)
• any other information required by the biobanking statement application form.

Once completed, send the application to:
BioBanking Team
Department of Environment and Climate Change
PO Box A290
Sydney South
NSW 1232
5 Assessors’ guide to operating the credit calculator – biobank sites

The computer on which the credit calculator is running will require Microsoft Access or Microsoft Access Runtime software. Where the computer has Microsoft Access installed, the credit calculator requires no installation and it can be simply saved to the local drive or a network drive. Where the computer requires Microsoft Access Runtime, the software can be downloaded from the BioBanking website. It will require installation on the computer before the credit calculator can be used.

5.1 Open the credit calculator

To open the credit calculator, simply double click on the icon from Windows Explorer. Several messages may appear while the credit calculator is opening, depending on which version of Microsoft Access or Microsoft Access Runtime is installed on the computer. It is unlikely all of these messages will be received, but they may include:

1. Open File – Security Warning. Do you want to open this file? (Click Open).
2. Convert/Open Database (Select Open and press OK).
3. Do you want to block unsafe expressions (Select No).
4. Security Warning (Select Open).

Once all messages have been answered the credit calculator will open. Click Next to proceed through the first page, read the disclaimer and accept the conditions. Select Biobank Sites to begin the assessment of a biobank site.

To start a new case for assessment, click on the button containing the forward arrow and asterisk at the base of the page.

5.2 Enter proposal details and location information

Enter the details of the proposal into the Assessment of a Biobank Site page. This information is used to track the landholder of the proposed biobank site, details of the accredited assessor and location of the biobank site.

This includes details of the biobank site, including details of the Lot and Deposited Plan (DP), details of the proponent and details of the assessor, including their biobanking accreditation number (Figure 23). The Lot/DP details are added by clicking on the Enter Lot Details button, which opens up a new screen. Where more than one Lot/DP number is required, additional space will appear once the number is entered into the space above.

The proposal ID is assigned according to the following protocol:
year (yyyy)/assessor’s four-digit accreditation no/biobank case number (B000)

e.g. 1478/2009/B017

This information is needed to track the landholder of the proposed biobank site, the BioBanking Assessor and where the biobank site is located.

This page also contains the assessment steps that the credit calculator follows to complete an assessment. Clicking on any of the buttons will go to that part of the assessment.

You are also required to provide the name of the CMA and the Mitchell Landscape in which the biobank site is located. Do this from the drop-down menus in the Location Details box. The name of the CMA is used to filter which CMA subregions are used in the assessment. A proposal must occur only within one CMA region. If the biobank site extends over two CMA regions the site must be assessed as separate proposals.
The Mitchell Landscape is used to determine the significance of the size of adjacent remnant vegetation. If a biobank site lies across the boundary of a Mitchell Landscape, choose the Mitchell Landscape in which most of the biobank site occurs.

**Figure 23** Opening screen for biobank proposals

5.2.1 Assessing a biobank proposal for any existing conservation obligations

Next, state whether management actions under an existing conservation obligation under the heading *Covenant/Agreement* are required to be carried out on the biobank site or any part of it. The credit allocation for these areas is subject to additionality and the credit allocation for these areas is discounted in accordance with section 7.2 of the methodology.

Additionality refers the creation of additional biodiversity credits on land that is subject to management actions that are carried out under existing conservation obligations.

Under the Regulation, biodiversity credits can only be created only on land where the management actions are additional to any biodiversity conservation measures or to other actions that are already being carried out on the land or that are required to be carried out.

This includes management actions under the following kinds of existing obligations:

1. a restriction on use or public positive covenant under Part 4A of the *Crown Lands Act 1989*
2. a conservation agreement entered into under the *National Parks and Wildlife Act 1974*
3. a trust agreement entered into under the *Nature Conservation Trust Act 2001*
4. any agreement entered into with a public authority under which the owner of the land receives funding for biodiversity conservation purposes (other than biobanking agreements)

5. in the case of publicly owned land, any legislative requirements to manage the land for biodiversity conservation purposes.

If a biobanking agreement is entered into on land that is subject to one or more of these existing obligations, the allocation of credits for the biobank site is discounted according to the number and type of conservation measures and/or management actions required to be carried out in relation to the existing obligation. Further information on the percentage discount for biodiversity credits is provided in Appendix 9. For example, if the existing obligation specifies weed control must be undertaken and that regrowth native vegetation and remnant native vegetation (where retention of remnant is not required by the *Native Vegetation Act 2003*) must be retained, then the credit allocation for the biobank site is discounted by 15% for those management actions, that is, 7.5% plus 7.5%.

If a proposed biobank site is subject to existing obligations, answer Yes from the pull-down menu in response to the question: *Is any part of this proposal subject to an existing conversation obligation?* If the answer is yes, enter the type of obligation from the drop-down menu date indicating when the obligation was entered into. The date is important, because this rule does not apply to agreements or covenants that landholders entered into before 1 March 2009. No date is required to be entered for publicly owned land.

### 5.3 Step 1 – Enter Landscape Value assessment circles and threatened species sub-zone data

The information required for the threatened species sub-zones and the Landscape Value assessment circles should be mapped initially onto a SPOT-5 image or ortho-rectified air photo by using a GIS. This allows identification and recording of distinct vegetation patches, stratifying the vegetation on the site into a broad condition state, and possibly distinguish the likely vegetation types.

To complete this step, do a preliminary site visit to confirm the vegetation type and condition and the area of the vegetation on the site. These data can then be entered into a GIS to confirm the area of the different vegetation zones. Other information that should be validated during the preliminary site visit includes the condition of surrounding vegetation that is connected to the site and/or adjacent to the site.

#### 5.3.1 Step 1a – Enter assessment circles

*Step 1a – Enter Assessment Circles* is used to enter information about Landscape Values of the site. This information is used to determine the change in Landscape Value score by assessing the impact of the biobank proposal on native vegetation cover and connectivity, as well as the size of the adjacent remnant areas.

The information entered into the credit calculator at *Step 1a* is predominately sourced from mapping the site by using GIS software and any preliminary site assessment information. First, record the *Assessment Circle Number/Name* and the *CMA Subregion* in the space provided. The *CMA Subregion* is chosen from a drop-down list that is limited by the CMA chosen from the initial biobank site details screen.

Then record the scores for the % *Native Vegetation Cover in 1000-ha Circle* and the % *Native Vegetation Cover in 100-ha Circle*. The % *Native Vegetation Cover* assesses the change in the overall percentage of native vegetation within 1000-ha and 100-ha assessment circles in which the biobank site occurs. The *Before Biobank* score is the current % *Native Vegetation Cover* before the time of the biobank site proposal, and this is visually estimated in increments of 10% by using the drop-down menus for the 1000-ha circle and the 100-ha circle (Figure 24).
The After Biobank score is the % Native Vegetation Cover remaining in each circle following the biobank proposal; it includes any proposed increases in cover of vegetation in the circles. This is estimated in classes of 10% by using the drop-down menu for each circle. The score for each 10% class increases at the 30% and 70% native vegetation cover thresholds, as shown in Table 6. These percentages represent thresholds at which the fragmentation effects on biota can generally escalate.

A biobank site may require more than one 1000-ha assessment circle. A new 1000-ha assessment circle must be used whenever:

(a) the biobank site exceeds a single 1000-ha assessment circle, or
(b) the configuration of the biobank area does not fit into a single assessment circle, or
(c) the biobank site extends from one CMA subregion into another CMA subregion.

To add further assessment circles, click on the Add assessment Circle button at the bottom of the screen. Then add the data for each new assessment circle. An assessment circle can also be deleted from the proposal by clicking on the Delete this Assessment Circle button on the right of the screen. Be aware that this will also delete any Threatened Species Sub-zone information for that assessment circle. For guidance on how to correctly position an assessment circle, please refer to Appendix 6.

**Figure 24. Landscape Value assessment data**

### 5.3.2 Step 1a – Connectivity value

The score for Connectivity Value is determined from the three-step process described in section 3.7.3. A linkage width for connectivity of the biobank site must be chosen for the Before Biobank box and the After Biobank box by selecting one of the linkage width classes from the drop-down menu (Figure 24). The credit calculator will automatically calculate the number of thresholds that are crossed on the basis of the impact of the biobank proposal.

To enter the Connectivity Condition value into the credit calculator, first choose whether the vegetation is predominantly woody or non-woody by selecting the radial button for either Canopy and under-storey or Grasslands.

For woody vegetation types, first select the average condition class from the drop-down menu for both the Canopy/over-storey condition and Under-storey condition strata. This information is then entered into the boxes for Before Biobank and After Biobank by selecting one of the condition classes from the drop-down menu. The class for After Biobank is
selected after taking into account the impact of the biobank proposal on the overall condition of the strata most relevant to the vegetation type.

The credit calculator will then automatically calculate the number of connectivity condition class thresholds and linkage width thresholds that have been crossed as a result of the biobank proposal and will thus determine the final Connectivity Value score.

5.3.3 Step 1b – Enter threatened species sub-zones

Threatened species sub-zones are created to filter for the threatened species that are assessed at the site and to set up the vegetation zones for the Site Value assessment. They are the area(s) on the biobank site where the condition of vegetation will be improved by implementing all of the standard management actions.

A new threatened species sub-zone must be added for each vegetation type, or where the same vegetation type occurs in both low condition and moderate to good condition. Digitise the threatened species sub-zone onto the aerial photograph or SPOT5 image to allow accurate recording of the Threatened Species Sub-Zone Area.

Identify each threatened species sub-zone with a name or number that allows it to be tracked through later steps of the assessment (Figure 25). If more than one threatened species sub-zone is required within the assessment circle, then select the Add New Sub Zone button at the bottom of the screen. If you wish to delete the sub-zone, select the Delete this Sub Zone button at the right of the screen.

The first data to be entered in this screen are the Threatened Species Sub Zone Name/Number and the Vegetation Zone Area (hectares). The Adjacent Remnant Vegetation Area and Patch Size, Including Low Condition Veg are recorded. Patch Size, Including Low Condition Veg is the area of native vegetation that includes the biobank site, plus any adjoining native vegetation that is no more than 100 m away from other woody vegetation or no more than 30 m away from other non-woody vegetation (i.e. that is, less than or equal to 100-m [30-m] from the proposal site)

Vegetation Formation, Vegetation Type and Condition Class are then entered by using the drop-down menus. The vegetation type should be selected using the drop-down menu, rather than by typing the name of the vegetation type. This is because each vegetation type is preceded by a unique code. The final field is the Ancillary Code, which allows you to split or join threatened species sub-zones of the same vegetation type and broad condition state (i.e. low condition or moderate to good). Using the same Ancillary Code in a threatened species sub-zone will create the one vegetation zone, while a different ancillary code will create separate vegetation zones.

An assessor can also export all the data entered for each threatened species sub-zone using the Export TS sub-zone button at the bottom of the screen. This will allow the assessor to easily review the data entered into the calculator and to export it to an excel spreadsheet to calculate the overall area for each vegetation type on the biobank site.
5.4 Step 2 – Identify geographic and habitat features

Once all the data from Step 1 have been entered, the credit calculator will automatically query the TSPD to identify those species that could be assessed for species credits on the biobank site. For those species that may create species credits, further information is required in relation to whether particular geographic and habitat features occur on the site (refer to section 3.10). This information is entered into the credit calculator in Step 2 – Identify Geographic and Habitat Features.

In this step, you are asked to identify whether particular habitat or geographic features occur on the biobank site, on the basis of the association of particular species with these features (Figure 26). The habitat and geographic features listed on the screen complete the question, *This species is likely to occur on …* The feature may be for one or more threatened species.

To help identify these features, it is recommended this form be printed to take into the field to validate whether the particular feature occurs on site or not. After the site has been field-checked for the habitat features, allocate an answer of *Yes* or *No* to each question. The response to whether these features occur on site or not will enable the credit calculator to further filter the list of threatened species that require survey. If a question cannot be answered with confidence, the default answer should be *Yes*. This will maintain the species within the list that require survey. Once you are finished, select the *Done* button.
5.5 Step 3 – Assess for identified populations

The assessment for identified populations is required only if it is proposed to create species credits for the biobank site. Enter Step 3 – Assess for identified populations by clicking on the button on the biobank proposal details screen. The credit calculator will search for information on identified populations within the CMA subregions in which the biobank site is located. If the credit calculator indicates that a species is listed as an identified population, you must then obtain details for the listing from the Identified Populations Database. This can be accessed from the DECC website.

Record whether all, part or none of the biobank site covers an identified population for each identified species from the pull-down menu, by choosing either Yes – entire development, Yes – part of the development or No.

The information from the Identified Populations Database will enable you to verify whether all or any part of the biobank site is within any area identified as containing an identified population.

Then record whether all, part or none of the biobank site covers an identified population for each identified species. The responses available through the pull-down menu are Yes – entire biobank site, Yes – part of the biobank or No. Once data entry is complete, click Next.

Where there are no identified populations listed for that CMA subregion, the credit calculator gives notification via a dialogue box. It then advises to proceed to Step 4.

5.6 Step 4 – Undertake the site survey

The site survey requirements for the biobank site proposal are now obtained by selecting the 4. Undertake Site Survey button on the site details page. The opening screen in Step 4 provides a list of all the threatened species that can be surveyed for on the biobank site (Figure 27). The requirement to undertake targeted surveys for threatened species at a biobank site is optional, unless the landholder specifically wishes to create species credits for a particular species. Therefore, before any surveys are undertaken, landholders should obtain ecological advice about whether any of the species identified for survey are likely to actually occur on their site.

The Survey Time Matrix provides a list of all the species that could be surveyed for on the biobank site, as well as the appropriate time of year when the survey can take place for that species. By clicking on the box under the Proposed Survey Times section you can then identify the months in which a particular species can be surveyed.

Because it may not be possible to meet this requirement for all species, or because there may be reliable records that relate a species to the biobank site, the alternative is to provide an expert report for the species. Expert reports for presence of species credit species on biobank sites can only be accepted if they provide documented information from survey records carried out within (say) the last 5 years on the site (polygon). Such records would
have to be from surveys that meet the guidelines for TS surveys under Step 3, Section 4.4. of the methodology.

Species that are not surveyed on the biobank site are listed in the *Threatened Species that won’t be surveyed* box.

**Figure 27** Threatened species survey matrix for a biobank site

Once the intended survey times for any or all species are entered into the credit calculator, select the *Print list of threatened species requiring field survey* button. This report contains information on the species that are intended to be surveyed for, including:

- the vegetation types, condition and patch size where the species is likely to occur at the site
- the appropriate time, specific habitat and any geographic requirements of the species
- whether the species has an identified population within the area to be surveyed (as identified in Step 3).

The assessor can also print a list of the threatened species that are predicted to occur on the biobank site. There is no requirement to survey for these species, as they are assessed for ecosystem credits. The report is generated by clicking on the *Print list of threatened species predicted on site* button on the right of the screen.

The third report relating to the site survey provides information on the vegetation zones that require a site assessment using transects and plots. To get a list of the vegetation zones requiring survey, click on the *Print list of vegetation zones requiring field survey* button and print the report produced. The information provided will include:

- vegetation zone name
- total area of the zone
- condition of the vegetation within the zone
- ancillary code (if entered)
- possible EECs within the zone
- minimum number of transects/plots required for the Site Value survey.

Once you have selected the time of year you wish to survey and printed any of the reports, you can then return to the opening screen by clicking on the *Done* button.
5.7 Step 5 – Enter survey results for vegetation and threatened species

Once the field surveys have been completed, enter the results into the credit calculator by selecting the 5. Enter survey results for vegetation and threatened species button on the proposal details screen. The data that are required to be entered in this step include indicating whether the vegetation type is an EEC (i.e. critically endangered or endangered ecological community under NSW TSCA 1995 or EPBC Act 1999); site attribute information collected from the transect / plot surveys; and the outcomes of any targeted surveys that were carried out for individual threatened species.

The results are entered in two sections, one for Site Value and the other for threatened species. To enter data from the vegetation transects/plots surveys and the EEC status of each vegetation type, select the Enter Vegetation Plot Information and EEC Status button. To enter data on the threatened species that require survey or have an identified population, click on the Enter Threatened Species Survey Information button.

5.7.1 Step 5a – Vegetation zone: transect/plot and EEC status

To enter transect/plot data for each vegetation zone, select Enter Vegetation Plot Information and EEC Status. The opening screen in Step 5a lists information for each vegetation zone, including the vegetation type, its percent cleared according to the NSW Vegetation Types Database, the area of the zone, and whether the minimum number of transects/plots has been entered for the zone (Figure 28).

For each vegetation zone, indicate whether the vegetation type is an EEC or part of an EEC. The pull-down menu which, under the heading EEC? will contain all possible EECs that relate to this vegetation type. If the vegetation type is considered to be one of these EECs, choose the appropriate community. If the vegetation type is not considered to be an EEC, then select Not an EEC from the pull-down menu. Once this step has been completed, select the Enter Transects/Plots button to enter site data into the credit calculator.

It is also possible to export transect/plot data for the whole proposal by selecting either the Export all Transect/Plot Information button at the bottom of the screen. The data are in .xml file format.

Figure 28 Identification of EEC and vegetation zone information

5.7.2 Step 5b – Enter vegetation transect/plot information

Enter the site attribute data collected from transects and plots at the biobank site by selecting the Edit Plots button for the vegetation zone in question. This screen displays the vegetation zone name and benchmark data for the vegetation type. The benchmark data displayed in the credit calculator are sourced from the NSW Benchmark Database. If data was collected
from local reference sites or from published sources, select the Edit Benchmarks button, then enter the revised benchmark data for that case. The credit calculator will indicate that local benchmark data have been used, and this will appear in the BioBanking Agreement Credit Report.

Where the vegetation type chosen for the zone is a derived grassland or shrubland, select the Edit Benchmarks button and then enter the benchmark data that most closely resemble the original vegetation type or class for that likely vegetation type. These data can be accessed from the NSW Benchmarks database. If more plots are required, select Add Transect/Plot at the bottom of the screen. Select Done when all transects/plots are entered.

To enter the vegetation plot data, select Enter Transects/Plots for the vegetation zone in question. A screen will be presented that has the benchmark data shown for the vegetation type (Figure 29). Enter the transect/plot name and then add the vegetation transect/plot data into the appropriate cells. The same value for each transect/plot should be entered for Overstorey Regeneration as regeneration is assessed for the whole zone. An error message will give an alert if different values are entered within a zone. Finally the assessor should enter the location where the transect/plot data was collected by entering the northing and easting into the calculator.

**Figure 29** Enter vegetation transect/plot information

Vegetation transect/plot data can also be imported for each individual vegetation zone by clicking on the Import Transect/Plot button at the bottom of the screen. This may help minimise the amount of data entry required if data have already been entered into a spreadsheet. Note that this will add to any existing data already entered into the tool, rather than overwrite the existing data.

**Steps to import transect/plot data in a CSV format for each vegetation zone:**

1. Download a copy of the ‘plotstemplate.csv’ file from the BioBanking website, and rename it ‘vegetation zone name.csv’ (note that any name can be used). When saving the file, use a name that will easily link it to the vegetation zone, particularly where the site involves many vegetation zones.
2. Open the empty ‘vegetation zone name.csv’ with Microsoft Excel
3. Enter all the transect and plot data into the ‘vegetation zone name.csv’ file
   (a) Columns labelled ‘PlotName’, ‘Easting (Longitude)’, ‘Northing (Latitude)’, ‘Zone’: allow free text but the fields must not be left empty.
   (b) Columns labelled ‘NPS’, ‘NOS’, ‘NGCG’, ‘NGCS’, ‘NGCO’, ‘EPC’, ‘NTH’, ‘OR’, ‘FL’: each field must contain a number (i.e. 18, 8, 4, 2).
4 After entering data into the file, perform a quick validation of these data (note that they can still be adjusted once they have been exported into the credit calculator).

5 Saving CSV files in Excel can be tricky. The easiest way is to just close Excel and allow Excel to request the user to save the file, and then just overwrite the existing file.

6 Open Step 5b of the credit calculator and delete all existing transects/plots, including any transects/plots with zero values. Then click on the Import Transect/Plot button and select the location/file of the ‘vegetation zone name.csv’. This will import all transect/plot data for this vegetation zone. This process should be repeated for each vegetation zone.

7 The data import is now completed and the plot data are displayed on the screen in the credit calculator.

Any plot/transect data that has already been entered into the tool can be exported from one version of the tool into another by selecting the Export this Proposal button at Step 6 or the Export all Transect/Plot Information button at Step 5a.

5.7.3 Step 5c – Management zones

To access Step 5c, first select the Enter Management Zones button. This step allows the user to stratify a vegetation zone into different management units; the management outcome may vary for particular parts of the vegetation zone. This allows simulation of different outcomes where additional management actions may be applied to parts of the biobank site. For example, Figure 30 shows a vegetation zone with two management outcomes, one of which includes revegetation. A new management zone should also be created where an easement cuts through a proposal area. Map the management areas where the standard and/or additional management actions apply.

Information on the management zones is entered at Step 5c. Each management zone must be given a name and assigned to a threatened species sub-zone. The combined area of all management zones must equal the overall area of the vegetation zone. Additional management zones can be added by selecting the Add management zone button at the bottom of the screen.

A GPS must be used in the field to confirm the boundaries of the management zones whenever they differ from the vegetation zone.

Figure 30 Examples of management zones

5.7.4 Step 5d – Enter site attribute score with biobank

The increase in Site Value score at a biobank site is automatically calculated on the basis of the management actions that are required for the site. The current Site Value score and the predicted future Site Value score are shown by selecting the Site Value Score button. The Increase in Site Value shown at the bottom of the screen (Figure 31) is the score that is used...
to determine the number of credits created for that zone on the basis of the improvement in condition of the site through management actions.

**Figure 31** Increase in Site Value

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**5.7.5 Step 5d – Enter site attribute score with additional management**

In certain circumstances, the Site Value score may be increased where additional or tailored management actions are being applied to a site. In these circumstances, the score for a particular site attribute may be increased to a level greater than the Default Increased Score, as shown in Figure 31. To increase the default Site Value score, first select the Request additional gain in site value button to open up the new screen. The gain in Site Value may also be reduced if restrictions such as an easement for powerlines prevent the predicted gain in Site Value being realised. In this case, select the Reduce gain in site value lower than the default button to open the new screen.

The score for any or all site attributes can be increased (or decreased) by choosing the revised score from the drop-down menu. The extent of the increase for any site attribute is limited on the basis of the current condition of the attribute. Any increase (or decrease) in the extent of improvement above the default values is limited to the guidelines in Appendix 5 and must be approved by the Director General before the Minister will enter into a biobanking agreement for the site. Indicate a brief reason for the change, as shown in Figure 32. If the Site Value score has been increased, provide full justification in the Biobanking Assessment Report, demonstrating how the additional management will improve the condition of the vegetation beyond that predicted by the methodology.

It is also possible to lower the expected increase in the site attribute score by selecting a lower level of increase from the drop-down menu. A lower level of increase should be chosen where the level of management applied to a site does not meet the standard required for a biobanking agreement. For example, this may be where a notional calculation of credits is being made under a deferred retirement arrangement or for an environmental contribution. A smaller gain in site value may be necessary where other management objectives apply such as fuel reduction for an APZ, or maintenance of a powerline easement.
5.7.6 Step 5e – Existing management actions for ecosystem credits

If a biobank site is subject to additionality (section 5.2.1), indicate the management actions that are already required to be performed at a site through another obligation. To enter the required management actions into the calculator, first select the Pre-existing Management Actions button at Step 5a. This button is not highlighted where the assessor did not indicate on the Biobank Proposal Details page that an existing conservation obligation applies to the land. In order to continue, you are asked to confirm that existing obligations apply.

Next, place a tick in the box against each management action that is required to be at the site according to the existing conservation obligation (Figure 33). The amount of credits that can be created for that zone will then be discounted by the credit calculator according to the number and type of management actions chosen. Where applicable for the site, choose between Manage grazing for conservation and No grazing of domestic stock. If the existing conservation obligation specifies that stock be excluded from grazing, choose No grazing of domestic stock. Manage grazing for conservation should be chosen if the existing conservation obligation permits grazing of a strategic or low-impact nature. Also choose between Manage fire for conservation and Total fire exclusion. Choose the total fire exclusion option where the existing obligation is to exclude fire from the site.

Further guidance on applying additionality to ecosystem credits, and the level of discounting that applies to each management action, can be found in Appendix 9.
Information obtained from any threatened species surveys can now be entered into the credit calculator by selecting the button *Enter threatened species survey information.* For each species that was surveyed, answer *Yes* or *No* to the question *Is the species present and to be managed on the biobank site?* If the species is found, enter the method (i.e. by survey or expert report), *size of species polygon* (being either hectares or number of individuals) and the name of the management zone that most closely covers the area of the species polygon (Figure 34). If the gain in Site Value has not been determined, or the location of the species does not relate to a management zone, select the *Default gain in Site Value* box. The default gain in Site Value is 60% (see section 3.12 of this operational manual for more information).

Additional species may be added to the list if the species was recorded on site but was not originally predicted to occur on site; this is done by selecting the species from the drop-down menu at the bottom of the screen. This step is optional on a biobank site, except where the landowner wishes to create species credits for that species. Only species that require species credits may be added to the survey results.

If an expert report has been used to identify that a species is present on the biobank site, this report will need to be approved by DECC before a biobanking agreement is approved. The expert report should be provided as part of the BioBanking Assessment Report for the site. The BioBanking Credit Report will indicate that the expert report will need to be included with the application.

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**Figure 34** Threatened species survey results

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Identification Method</th>
<th>size of polygon</th>
<th>Management zone</th>
<th>Default gain in Site Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus aethiopicus</td>
<td>Yes</td>
<td>Survey</td>
<td>0</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Callicebon linearfolius</td>
<td>Yes</td>
<td>Survey</td>
<td>7</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Cryptostylus hutenriana</td>
<td>No</td>
<td></td>
<td>0</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Diuris arenaria</td>
<td>No</td>
<td></td>
<td>0</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Diuris priceoce</td>
<td>No</td>
<td></td>
<td>0</td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td>Eucalyptus camfieldi</td>
<td>No</td>
<td></td>
<td>0</td>
<td></td>
<td>60%</td>
</tr>
</tbody>
</table>

---

**Figure 33** Accounting for existing management actions at a biobank site
If no threatened species surveys were undertaken on the biobank site, simply click Next to move to the threatened species summary screen.

5.7.8 Step 5g – Threatened species – Summary

A final Threatened Species – Summary is then displayed; it allows checking the data are entered correctly. For each species, the Threatened Species – Summary indicates whether the species is an identified population and shows the Total Size of the area where the species is found on site (Figure 35). This information is presented as a review for an assessor to confirm that the correct information has been entered into the calculator.

5.7.9 Step 5h – Existing management actions for species credits

If the area of the species polygon is subject to existing conservation management obligations, the Pre-existing Management Actions button will be highlighted. Clicking on this button leads to Step 5h – management actions for species credits. Indicate here which management actions apply to the land by placing a tick against the required action, as done in Step 5e.

It is recommended not selecting any management actions until the additional actions that may apply to species credits at the site have been identified. To do so may unnecessarily reduce the number of species credits created at the site.

To identify whether any additional actions apply at the site, the assessor will need to complete the assessment in the credit calculator and click on the Calculate the credits to be created button at step 6. The BioBanking Agreement Credit Report will indicate which additional management action/s (if any) is required for the site and the threatened species for which the additional action/s apply. This information is contained in the section Additional Management Actions which appears at the back of the report.

If an additional management action is required and that action is subject to an existing conservation obligation, re-enter step 5h and select the additional management action. After completing this step, return to step 6 and re-calculate the number of credits created for the site.

After confirming all data are correct, select Done twice to return to the proposals page.

Figure 35 Threatened species summary

<table>
<thead>
<tr>
<th>Step 5g- Threatened Species- Summary</th>
<th>Is an Identified Population?</th>
<th>Total Size</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pteropus poliocephalus (Beeding Habitat)</td>
<td>Grey-headed Flying-fox (Beeding Habitat)</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Rhizanthella stapala</td>
<td>Eastern Australian Underground Orchid</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Senna acclinis</td>
<td>Rainforest Cassia</td>
<td>N/A</td>
<td>0</td>
</tr>
<tr>
<td>Tetraethya junosa</td>
<td>Black-eyed Susan</td>
<td>N/A</td>
<td>25</td>
</tr>
</tbody>
</table>

5.8 Step 6 – Report on credits created

The final step in the assessment process performs all the calculations for ecosystem credits and species credits. It also produces queries summarising the data entered into the calculator. To calculate the credits created at the site, select the Calculate credits to be created button. The credit calculator will then perform all the necessary calculations for the site.
5.8.1 Biobanking Agreement Credit Report

The BioBanking Agreement Credit Report will list the ecosystem and species credits created for the proposal, provide the credit profile for each group of credits, and indicate whether any additional information is required for the use of local benchmark data or an expert report.

To produce the BioBanking Agreement Credit Report, select the *Report on credits to be created* button.

The BioBanking Agreement Credit Report contains the biobank site and owner details and the name and accreditation number of the assessor. Submit a copy of the BioBanking Agreement Credit Report as part of the BioBanking Assessment Report in the application for a biobanking agreement.

The Credit Report will indicate:

- the credit profile for each group of credits, showing the number of ecosystem credits created for each vegetation type, the CMA subregion, the vegetation formation, and the values for minimum surrounding vegetation and minimum patch size, including low condition vegetation
- the credit profile for species credits, showing the number of species credits created for each affected species
- the additional management actions required at the site in respect of ecosystem credits or species credits.

The final report will also indicate what additional reports are required to be submitted to DECC as part of the application for a biobanking agreement. These reports may include:

- extent of discounting where all or part of the biobank site is covered by a covenant, has received government funding or is crown land
- approval for use of benchmark data collected from local reference sites or from published sources
- use of an expert report to confirm the presence of a species
- request for an increase in Site Value for additional management.

5.8.2 Export development proposal

Once the proposal has been finalised you can generate an .xml file that contains all the data for the case by selecting the button, *Export this proposal*. A dialogue box will appear to name the file and the location where it is to be saved. A copy of the .xml file must be submitted to DECC as part an application for a biobanking agreement.

The *Export this proposal* button can be activated at any time during the assessment process. This allows the case to be transferred into a new version of the credit calculator if one has been issued, or to efficiently transfer information about a case between different office locations.

5.8.3 Queries

Once the calculations have been completed, the data in the credit calculator can be queried to produce summary information for each vegetation zone, detailed information for each threatened species sub-zone and other threatened species information. Check these queries before the final report is produced to ensure that the data are accurate for the site.

The queries contain the following information:

(a) **Export summary vegetation zone data.** This query allows the export and review of detailed information for each vegetation zone, including Landscape Value score, threatened species sub-zone name, assessment circle name, level of discounting for
additionality, current Site Value, future Site Value, gain in Site Value, and the total credits created for each management zone.

(b) Export Threatened Species Data. This query contains the scientific name and common name, and indicates whether it is an identified population, whether the species was found during survey, the area of the species polygon and the total credits created for that species.

To generate and view this information, select each of the buttons under the Queries title. Each button will produce a spreadsheet of the data. Then export these data into an Excel spreadsheet.

5.9 Reset Steps 2–6

Should you make a mistake in data entry and continue to enter data before you realize the mistake, you will need to reset Steps 2–6. As each step of the credit calculator builds on the previous step, all data entered in Steps 2–6 will need to be re-entered to ensure the credit calculator is working with the correct information. The case can be reset by clicking on the Reset steps 2–6 button on the Biobank Proposals Details page.

If any data entered into the calculator needs to be changed after completing the data entry, a dialogue box will pop up. This states that by proceeding, all data from future steps will be deleted. To continue with the change, it is advisable to either save a copy of the calculator or perform an export of the case before proceeding. This will safeguard against the loss of any work previously performed in the calculator.

5.10 Submit results to DECC

The applicant must submit the following information as part of their application for a biobanking agreement:

- biobanking agreement application form
- BioBanking Assessment Report, including additional information required to support the application: expert report (as required), use of local benchmark data (as required), request for increase in gain of Site Value (as required) and use of local data (as required)
- copy of the BioBanking Agreement Credit Report
- copy of the .xml file for the proposal from the credit calculator
- a digital map (either satellite image or ortho-rectified aerial image) identifying the development site, boundary, vegetation zones, species polygons (showing locations of any threatened species for which species credits are created) and any management areas where an increase in gain in Site Value is requested
- copy of draft management plan (prepared in accordance with the biobanking agreement template
- proof of ownership of the property
- any other information required by the biobanking agreement application form.

Once completed, the information should be sent to:

BioBanking Team
Department of Environment and Climate Change
PO Box A290
Sydney South
NSW 1232
References

The preparation of the BioBanking Assessment Methodology and Operational Manual has drawn on:


Glossary

**accredited assessor** see **BioBanking Assessor**.

**adjacent remnant area** The area of moderate to good condition native vegetation of which the biobank site or development site is a part which is linked (≤100 m for woody vegetation and ≤30 m for non-woody vegetation) to the next area of native vegetation. Adjacent remnant area provides landscape context to the biobank or development site and may extend onto adjoining land.

**assessment circle** Circles of 100 ha and 1,000 ha in which percent native vegetation cover in the landscape is assessed, taking into account both cover and condition of vegetation, for credit profiles and for Landscape Value score.

**benchmarks** (vegetation benchmarks) Quantitative measures of the range of variability in vegetation condition where there is relatively little evidence of modification by humans since European (post-1750) settlement. Benchmarks are defined for specified variables for vegetation communities. Vegetation with relatively little evidence of modification generally has minimal timber harvesting (few stumps, coppicing, cut logs), minimal firewood collection, minimal exotic weed cover, minimal grazing and trampling by introduced or overabundant native herbivores, minimal soil disturbance, minimal canopy dieback, no evidence of recent fire or flood, not subject to high-frequency burning, and evidence of recruitment of native species. Benchmarks are available by vegetation class (*sensu* Keith 2004) at: www.environment.nsw.gov.au/projects/BiometricTool.htm and can also be obtained from reference sites or published sources.

**biobank site** Land designated by a biobanking agreement to be a biobank site. This term is also used in this Operational Manual for land that is being assessed as a biobank site.

**biobanking agreement** An agreement between the landowner and the Minister for Climate Change and the Environment (under Part 7A of the TSC Act) for the purpose of establishing a biobank site. The agreement states the management actions to be carried out to improve biodiversity values on the site and thereby create biodiversity credits under the scheme (s.127D of the TSC Act).

**BioBanking Assessment Methodology** (the methodology) The rules established under s.127B of the TSC Act. The BioBanking Assessment Methodology determines:

- the number and class of credits required to offset the loss in biodiversity values caused by development

- the number and class of credits that may be created by management actions that improve biodiversity values at a biobank site

- the circumstances that improve or maintain biodiversity values.

**BioBanking Assessment Methodology and Credit Calculator Operational Manual** (the operational manual) An operational manual that provides instructions on how to apply the methodology and the calculator, including the collection of data and field survey methods.

**BioBanking Assessor** A person who has been accredited in accordance with s.142B(1)(c) of the TSC Act to use the methodology and calculator.

**BioBanking Credit Calculator** (the calculator) A computer program that applies the methodology and calculates the number and classes of credits required at a development site or created at a biobank site.
biobanking statement A statement issued under s.127ZL of the TSC Act, specifying the number and class of credits to be retired for a particular development in accordance with the methodology. The statement may include other conditions to minimise the impact of the development on biodiversity values. If provided to a consent or determining authority under the EP&A Act, the statement must be included as a condition of development consent or approval.

biodiversity credits Ecosystem or species credits required to offset the loss of biodiversity values on development sites or created on biobank sites from management actions that improve biodiversity values.

biodiversity values These include the composition, structure and function of ecosystems, and (but not limited to) threatened species, populations and ecological communities, and their habitats. This does not include fish or marine vegetation within the meaning of Part 7A of the Fisheries Management Act 1994 unless that fish or marine vegetation has been the subject of an order under s.5A of the TSC Act.

certified local data see more appropriate local data

cleared land Where the native over-storey has been cleared, there is no native mid-storey (or the native mid-storey has been cleared), and less than 50% of the ground cover vegetation is indigenous species or greater than 90% of the ground cover (dead or alive) is cleared.

CMA area The area of operation of a catchment management authority, as described in Schedule 2 of the Catchment Management Authorities Act 2003.

CMA subregion Subregions of catchment management authority areas as set out in the Environmental Outcomes Assessment Methodology, Native Vegetation Regulation 2005.

connectivity A measure of the degree to which an area (or areas) of native vegetation is linked with other areas of vegetation.

Credit Calculator see BioBanking Credit Calculator.

credit profile A description of the credit created or required in a vegetation zone or group of zones, according to the attributes of CMA subregion, vegetation type, vegetation formation, surrounding vegetation cover, and patch size including low-condition vegetation.

critically endangered ecological community see threatened ecological community.

crown cover Area covered by the crowns of trees, when the area of each crown is treated as a solid object. Expressed as percent. In Biobanking assessments, crown cover is only used in the assessment of paddock trees.

defered retirement arrangement An arrangement under s.127ZT of the TSC Act that enables the Minister for Climate Change and the Environment to hold biodiversity credits until restorative actions have been completed at a development site.

derived vegetation communities Native vegetation communities where one or more structural components of the vegetation have been entirely removed, severely reduced or developed where they were previously absent, as a consequence of management practices (sometimes in association with environmental conditions) since European settlement.

development Includes development within the meaning of the EP&A Act and includes an activity within the meaning of Part 5 of that Act and may also include projects under Part 3A of that Act.

development site An area of land that is subject to a proposed development for which a biobanking statement is sought or obtained.

ecosystem credit The class of biodiversity credits created or required for the impact on general biodiversity values and some threatened species; that is, for biodiversity values except threatened species or populations that require species credits. Species that require ecosystem credits are listed in the Threatened Species Profile Database.
endangered ecological community see threatened ecological community.

environmental contribution A contribution for the conservation or enhancement of the natural environment, as defined in s.127B(10) of the TSC Act.

EPBC Act Environmental Protection and Biodiversity Conservation Act 1999

expert A person accredited by the Director General of DECC under s.142B(1)(b) of the TSC Act, or, if arrangements for accreditation under s.142B(1)(b) are not in place, a person who has the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values to which an expert report relates.

general biodiversity values Biodiversity values assessed in the methodology, excluding assessment of threatened species and populations.

GPS Global positioning system receiver. A differential GPS receiver should be used where it is practical and available.

grassland Native vegetation classified in the vegetation formation grasslands in Ocean Shores to Desert Dunes: the Native Vegetation of New South Wales and the ACT (Keith D 2004, Department of Environment and Conservation NSW, Hurstville, NSW). Grasslands are generally dominated by large perennial tussock grasses, a lack of woody plants, the presence of broad-leaved herbs in inter-tussock spaces, and their ecological association with fertile, heavy clay soils on flat topography in regions with low to moderate rainfall.

group of credits Credits from a development or biobank site that have an identical credit profile.

habitat An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic component.

habitat surrogates Measures of habitat for threatened species, populations and communities; in the methodology they are CMA subregion, vegetation type, percent vegetation cover, vegetation condition and patch area including low-condition vegetation.

herbfield Native vegetation that predominantly does not contain an over-storey or mid-storey and where the ground cover is dominated by non-grass species.

highly cleared vegetation type A vegetation type which has 10% or less of its estimated pre-1750 distribution in the CMA remaining (as shown by the Vegetation Types Database).

identified population A population present within an area of land if identified as habitat for a particular species and listed in the Identified Population Database.

Identified Population Database A database that may be published by DECC and made publicly available on the web, which contains information such as a map or criteria that describe the location of an identified population.

impact assessment The impact assessment that is referred to in s.127ZK(3)(c) of the TSC Act, which must be prepared in accordance with the methodology. The methodology requires the impact assessment to address the criteria used to justify an impact on a red flag area under section 2.3 of the methodology, the assessment of indirect impacts of the development under section 2.4, and the assessment of the direct impacts of the development under sections 3 and 4 of the methodology.

impacts on biodiversity values Refers to the loss in biodiversity values on or off the development site and the gain in biodiversity values at the biobank site.

individual A single, mature organism.
**Landscape Value** A measure of fragmentation, connectivity and adjacency of native vegetation at a site. Landscape Value comprises:
- percent native vegetation cover in the 100-ha and 1000-ha assessment circles in which the development or biobank sites are located
- connectivity with surrounding vegetation

**Total adjacent remnant area.**

**Low-condition vegetation** Woody native vegetation where:
- the native over-storey percentage of foliage cover is less than 25% of the lower value of the over-storey percentage of foliage cover benchmark for that vegetation type
  and
  - less than 50% of ground cover vegetation is indigenous species, or
  - more than 90% of ground cover vegetation is cleared.

Native grassland, wetland or herbfield where:
- less than 50% of ground cover vegetation is indigenous species, or
- more than 90% of ground cover vegetation is cleared.

If native vegetation is not in low condition, it is in moderate to good condition.

**Management zone** Where the extent of development impact or improvement through management varies over a vegetation zone, a management zone is used for the purpose of calculating the change in Site Value for that vegetation zone.

**Methodology** see **BioBanking Assessment Methodology**.

**Minister** Minister for Climate Change and the Environment.

**Mitchell Landscape** Landscape with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

**Moderate to good condition vegetation** Native vegetation that is not in low condition, as defined in section 2.1.1 of the methodology.

**More appropriate local data** Data that more accurately reflects local environmental conditions, as certified by the Director General of DECC in relation to the Vegetation Benchmarks Database, the Vegetation Types Database and the Threatened Species Profile Database.

**Native vegetation** As defined by the *Native Vegetation Act 2003*; means any native vegetation that has regrown since the earlier of the following dates:

(a) 1 January 1983 in the case of land in the Western Division and 1 January 1990 in the case of other land

(b) the date specified in a property vegetation plan for the purposes of this definition (in exceptional circumstances being a date based on existing rotational farming practices).

**Notional assessment and notional information** Undertaking an assessment by using information on vegetation type, vegetation condition or presence/absence of threatened species obtained from remote imagery rather than from site surveys; or assessment of threatened species from surveys or Expert Reports without using the initial or secondary filtering criteria.

**Offset rules** Circumstances in which credits can be used (retired) for a development to improve or maintain biodiversity values.
patch size, including low-condition vegetation The area of moderate- to good- and low-condition native vegetation of which the biobank site or development site is a part that is linked to (≤100 m from for woody vegetation and ≤30 m for non-woody vegetation) the next area of native vegetation. Patch size, including low-condition vegetation provides landscape context to the biobank or development site and may extend onto adjoining land.

percent cleared The percentage of a vegetation type that has been cleared within a CMA area as a proportion of its pre-1750 extent as identified in the Vegetation Types Database.

percent foliage cover The percentage of ground that would be covered by a vertical projection of the foliage, and branches and trunk of a plant or plants.

percent vegetation cover The percentage of native vegetation cover in the 100-ha and 1,000-ha assessment circles in which the vegetation zone is located. The percent native vegetation cover within the assessment circles is visually estimated from aerial or satellite imagery, taking into account both cover and condition of vegetation.

plot An area in which some of the 10 site attributes that make up the value score are assessed in a vegetation zone.

red flag area An area of land (part of a development site) with high biodiversity conservation values. The impact of the development on the biodiversity values of a red flag area cannot be offset by the retirement of biodiversity credits unless the Director General of DECC determines that strict avoidance of the red flag area is unnecessary in the circumstances.

reference sites Relatively unmodified sites used to obtain local benchmark information when benchmarks in the Vegetation Benchmark Database are too broad or otherwise incorrect for the vegetation type and/or local situation. Benchmarks can also be obtained from published sources.

retirement of biodiversity credits A change in the status of a credit such that the credit can no longer be bought or sold. Retirement of credits may be required to comply with a biobanking statement or a direction issued by the Minister for Climate Change and the Environment, or they may be retired voluntarily.

site attributes Attributes used to assess Site Value and threatened species habitat. The 10 site attributes are native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.

Site Value A quantitative measure of structural, compositional and functional condition of native vegetation, measured by site attributes.

species credit The class of biodiversity credit created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Species Profile Database.

species polygon The actual area of habitat, or number of individuals of a threatened species, impacted by development at the development site or by management actions at the biobank site.

species that cannot withstand any loss In general, a species is identified as not being able to withstand any loss within a CMA if the species is known to occur in less than three populations within that CMA area (also see section 2.3 of the methodology).

surrounding percent vegetation cover see percent vegetation cover

surrounding vegetation cover see percent vegetation cover
**Tₚ value** The ability of a species to respond to improvement in Site Value or other habitat improvement at a biobank site with management actions. Tₚ is based on the lowest value of the following: effectiveness of management actions, life history characteristics, naturally very rare species and very poorly known species.

**threatened ecological community** As defined in s. 4(1) of the TSC Act and any additional critically endangered ecological communities listed under Part 13 of the EPBC Act.

**threatened population** An endangered population as defined in s.4(1) of the TSC Act.

**threatened species** Critically endangered, endangered or vulnerable threatened species and populations as defined in s. 4(1) of the TSC Act; or any additional threatened species listed under Part 13 of the EPBC Act as critically endangered, endangered or vulnerable.

**Threatened Species Profile Database** The database containing information on habitat characteristics, range, response to management actions, survey requirements, and the class of biodiversity credits required for the species. It is used for calculation of ecosystem or species credits, filtering to determine the likely presence of threatened species, information on threatened species’ ability to withstand loss, and threatened species’ response to management.

**threatened species sub-zone** The area of vegetation that is assessed initially to determine which threatened species are assessed for biodiversity credits at a development site and a biobank site.

**threatened species survey** A targeted survey for a threatened species, undertaken in accordance with DECC guidelines to determine if the species is present.

**transect** A line or narrow belt along which environmental data is collected.

**TSC Act** Threatened Species Conservation Act 1995.

**Vegetation Benchmarks Database** A database of benchmarks for vegetation classes and some vegetation types. Vegetation benchmarks can also be collected from reference sites.

**vegetation class** A level of classification of vegetation communities defined in *Ocean Shores to Desert Dunes: the Native Vegetation of New South Wales and the ACT* (Keith D 2004, Department of Environment and Conservation NSW, Hurstville, NSW). There are 99 vegetation classes in NSW.

**vegetation formation** A broad level of vegetation classification, as defined in *Ocean Shores to Desert Dunes: the Native Vegetation of New South Wales and the ACT* (Keith D 2004, Department of Environment and Conservation NSW, Hurstville, NSW). There are 12 vegetation formations in NSW.

**vegetation type** The finest level of classification of native vegetation used in the methodology. Vegetation types are assigned to vegetation classes, which in turn are assigned to vegetation formations. There are approximately 1600 vegetation types within NSW.

**Vegetation Types Database** A database which contains the information on each vegetation type used in the methodology and comprises a description of each vegetation type, its class and formation, the CMA area within which the vegetation type occurs, the percent cleared value of the vegetation type, and the source of the information.

**vegetation zone** (zone) A relatively homogenous area in a proposal area (development or biobank site) that is of the same vegetation type and broad condition. A single zone must not contain a mix of vegetation in low condition and not in low condition. Zones with the same vegetation type and in moderate to good condition (that is, not in low condition) can be combined within one ecosystem credit profile (as a sub-zone). A zone may comprise one or more discontinuous areas.

**viability** The ability of biodiversity values in an area to persist for many generations or over long periods of time.
**wetland** Native vegetation classified in the vegetation formation defined as freshwater wetland in *Ocean Shores to Desert Dunes: the Native Vegetation of New South Wales and the ACT* (Keith D 2004, Department of Environment and Conservation NSW, Hurstville, NSW). Freshwater wetlands are areas of land affected by permanent or semi-permanent inundation by either standing or running water. The vegetation is typically dominated by shrubs, sedges or herbs.

**woody native vegetation** Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs.

**zone** *see vegetation zone.*
## Appendix 1  Description and use of data from the Threatened Species Profile Database (TSPD)

Table A1 Detailed description of the species characteristics data from the Threatened Species Profile Database (TPSD). This information is used in the credit calculator to identify and assess threatened species. For further information on how these data are used, refer to section 4 of the BioBanking Assessment Methodology.

<table>
<thead>
<tr>
<th>TSPD Data</th>
<th>Description and use of data</th>
</tr>
</thead>
</table>
| Surrounding vegetation cover threshold (applies to Ecosystem credits – fauna and Species credits) | An entry in this field is used only to assess for fauna species. Expert(s) for the species have identified the minimum ‘surrounding vegetation cover’ class that the species regularly uses as habitat. The term ‘surrounding vegetation cover’ is as defined in the BioBanking Assessment Methodology. Surrounding vegetation cover is the percentage of native vegetation cover currently within a 1000-ha circle in which the site is located. Surrounding vegetation cover is identified as one of four classes:  
  1. Intact (>70% natural habitat retained)  
  2. Variegated (between 31% and 70% habitat retained)  
  3. Fragmented (between 11% and 30% habitat retained)  
  4. Relictual (10% or less habitat retained). In the methodology, the information in this field is used to:  
    • initially filter threatened species at a development or biobank site  
    • determine the credit profile required at a development site or created at a biobank site. |
| Adjacent remnant area or patch size including low-condition thresholds (applies to Ecosystem credits – fauna and Species credits) | An entry in this field is used only to assess for fauna species. Expert(s) for the species have identified the minimum ‘adjacent remnant area’ and ‘minimum patch size, including low condition vegetation’ that the species regularly uses as habitat. Both thresholds include vegetation on and off the site.  
‘Adjacent remnant area’ is the area of vegetation in moderate to good condition in which the site is located and that is no more than 100 m from the next area of vegetation in moderate to good condition. Adjacent remnant area does not include vegetation in low condition and is used to filter for species that cannot occupy or use vegetation in low condition.  
‘Patch size, including low condition’ is the area of land with native vegetation in moderate to good condition and vegetation in low condition in which the site is located and that is no more than 100 m from the next area of vegetation in moderate to good and in low condition. Patch size including low-condition is used to filter for the species that can occupy or use vegetation in low condition. Both thresholds are identified as one of four classes:  
  1. < 5 ha  
  2. 5–25 ha  
  3. >25–100 ha  
  4. >100 ha  
In the methodology, the information in this field is used to:  
• initially filter threatened species at a development or biobank site  
• determine the credit profile required at a development site or created at a biobank site. |
### Able to occupy low condition vegetation?
*(applies to Ecosystem credits – fauna and Species credits)*

An entry in this field is used only to assess for fauna species. Expert(s) for the species have identified whether the species regularly occupies or uses vegetation in low condition.

The term ‘vegetation in low condition’ is as defined in the Biobanking Assessment Methodology.

An entry of ‘YES’ in this field indicates that the species regularly occupies or uses vegetation in low condition. The species is therefore considered regularly to occupy or use vegetation in moderate to good condition.

An entry of ‘NO’ in this field indicates that the species does not regularly use vegetation in low condition. The species is therefore considered regularly to occupy or use vegetation in moderate to good condition.

In the methodology, the information in this field is used to:
- initially filter threatened species at a development or biobank site
- determine the credit profile required at a development site or created at a biobank site.

### Able to withstand loss?
*(applies to Ecosystem credits – fauna, Species credits – fauna and Species credits)*

An entry of ‘YES’ in this field means that the species is able to withstand the loss of individuals or habitat within the CMA area. This means that this CMA area is NOT a red flag area for the species. All species that are assessed for ecosystem credits are able to withstand loss.

An entry of ‘RED FLAG’ in this field means that the species is not able to withstand the loss of individuals or habitat within the CMA area.

A species was identified as not being able to withstand any loss within a CMA area if the species was known to occur in fewer than three populations in that CMA area. Some additional species that are rare or highly threatened or poorly known were also red flagged in the CMA areas where they occurred.

### Number considered a negligible loss
*(applies to Species credits – flora)*

An entry of ‘0’ in this field means that expert(s) have determined that the species cannot withstand the loss of any individuals in the CMA area and are red flagged.

The entry of a number >0 means that the species is a plant and that it is able to withstand the loss of a number of individuals up to and including the number indicated. A loss up and including this number of individuals does not trigger a red flag area. This rule applies only to flora species.

### Class of credit applying to the species
*(applies to Ecosystem credits – fauna, Species credits – fauna and Species credits)*

Indicates whether the species is assessed for ecosystem credits or species credits.

Some species have been split, with species credits applying to some components of their habitat requirements and ecosystem credits applying to the remaining components. For example, cave-roosting bats may have species credits applying to breeding habitat and ecosystem credits applying to foraging and shelter habitat.

### Habitat requirements

The field describes habitat features associated with the occurrence of the species. The phrase entered in this field completes the sentence ‘This species is most likely to occur on …’.

The information in this field is used for:
- the secondary filtering of threatened species
- describing the survey requirements for threatened species to which species credits apply
- determining the number of species credits required at a development site or created at a biobank site.
| **Association of species with site attribute** | The following eight fields are used only for fauna species to which ecosystem credits apply.  

The site attribute fields identify whether the occurrence of the species is associated with a particular vegetation site attribute.  

The information in this field is used to calculate the number of ecosystem credits required from the development site (refer to equation 9 and equation 10 of the BioBanking Assessment Methodology). The site attributes include:  

- association of species richness  
- association of species with site attribute: over-storey cover  
- association of species with site attribute: mid-storey cover  
- association of species with site attribute: ground cover (grasses)  
- association of species with site attribute: ground cover (shrubs)  
- association of species with site attribute: ground cover (other)  
- association of species with site attribute: hollows  
- association of species with site attribute: fallen logs. |
| **T<sub>0</sub> Value** | The T<sub>0</sub> value is the species’ ability to respond to management actions on the biobank site. It is based on the lowest value of effectiveness of management actions, life history characteristics, naturally very rare species, and very poorly known species as this value indicates the component that most limits the ability of the species to respond to management actions. The lower the T<sub>0</sub> value, the greater the number of credits required.  

Some species have been ‘split’, with species credits applying to some components of their habitat requirements and ecosystem credits applying to the remaining components (e.g. species credits apply to the breeding habitat of the Large-footed Myotis, whereas ecosystem credits apply to its foraging habitat). |
| **Month of survey** | The data in the 12 months of the survey columns relate to whether the presence of the species can be adequately determined by surveying during the identified month. |
| **Survey technique code** | Each species is linked to a survey technique code that is identified in DECC’s threatened species survey guidelines. The code identifies the survey technique(s) and level of survey effort required to determine presence or absence of the species. This information is used for the ‘threatened species survey requirements report’ that is generated by the BioBanking Credit Calculator.  

An entry in this field is required only for species to which species credits apply (i.e. species identified by an A in the column titled ‘Class of credit applying to the species’). |
| **Ancillary survey information** | This column identifies additional information that may be of use in undertaking a survey for a species. This information is recorded on the ‘threatened species survey requirements’ report that is generated by the BioBanking Credit Calculator.  

An entry in this field is made only for species to which species credits apply (i.e. species identified by an A in the column titled ‘Class of credit applying to the species’). |
Appendix 2  Field methodology for measuring condition attributes in Site Value

Suggested transect plot layout

Plot marker and GPS
point where relevant

<table>
<thead>
<tr>
<th>20 m</th>
<th>20 × 20 m plot</th>
<th>50-m line transect</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Layout of nested 20 × 50 m and 20 × 20 m plots used for the assessment of vegetation condition attributes (taken from BioMetric Manual, p. 40)

Field methodology

Table A2  Field methods for measuring vegetation condition variables in the Site Value

<table>
<thead>
<tr>
<th>Variable</th>
<th>Plot or transect type</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indigenous plant species richness</td>
<td>20 × 20 m plot</td>
<td>‘Indigenous plant species’ refers to vascular species that are local to the area and, if planted, come from a local seed source. Systematically walk the plot, counting the number of indigenous plant species for all vascular plants (i.e. the species do not have to be identified).</td>
</tr>
<tr>
<td>Native over-storey cover</td>
<td>At 10 points along a 50-m transect</td>
<td>Native over-storey is the tallest woody stratum present (including emergents) above 1 m and includes all species native to New South Wales (i.e. native species not local to the area can contribute to over-storey structure). In a woodland community the over-storey stratum is the tree layer, and in a shrubland community the over-storey stratum is the tallest shrub layer. Some vegetation types (e.g. grasslands) may not have an over-storey stratum. Over-storey cover is estimated as percent foliage cover, which is equivalent to the amount of shadow that would be cast on the ground if there were a light source directly overhead; it is estimated as follows: At 10 points along the 50-m transect (i.e. every 5 m) estimate percent foliage cover directly overhead by using the images provided in Appendix 8. Divide the total by the number of points (i.e. 10) measured along the transect (e.g. 50%, 0%, 0%, 40%, 0%, 45%, 50%, 55%, 0%, 0% = 240/10 =24% foliage cover).</td>
</tr>
<tr>
<td>Variable</td>
<td>Plot or transect type</td>
<td>Method</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Native mid-storey cover        | At 10 points along a 50-m transect | Native mid-storey contains all vegetation between the over-storey stratum and a height of 1 m (typically tall shrubs, under-storey trees and tree regeneration) and includes all species native to New South Wales (i.e. native species not local to the area can contribute to mid-storey structure). Percent foliage cover of the mid-storey is estimated as follows:  
At 10 points along the 50-m transect (i.e. every 5 m) estimate percent foliage cover in the mid-storey. Divide the total by the number of points (i.e. 10) measured along the transect (e.g. 50%, 0%, 0%, 40%, 0%, 45%, 50%, 55%, 0%, 0% = 240/10 = 24% foliage cover). |
| Native ground cover (grasses)  | At 50 points along a 50-m transect | Native ground cover contains all native vegetation below 1 m in height and includes all species native to New South Wales (i.e. it is not confined to species indigenous to the area). Native ground cover (grasses) refers to native grasses (i.e. plants belonging to the family Poaceae). Percent foliage cover of the ground stratum (grasses) is estimated as follows:  
At 50 points along the 50-m transect (i.e. every 1 m) record whether native grass intersects that point. Divide the total of ‘hits’ by the number of points measured along the transect (i.e. 50). |
| Native ground cover (shrubs)   | At 50 points along a 50-m transect | Native ground cover contains all native vegetation below 1 m in height and includes all species native to New South Wales (i.e. it is not confined to species indigenous to the area). Native ground cover (shrubs) refers to native woody vegetation <1 m. It is measured in the same way as for native ground cover (grasses) (see above). |
| Native ground cover (other)    | At 50 points along a 50-m transect | Native ground cover contains all native vegetation below 1 m in height and includes all species native to New South Wales (i.e. it is not confined to species indigenous to the area). Native ground cover (other) refers to non-woody native vegetation (vascular plants only) <1 m that is not grass (e.g. herbs, ferns). It is measured in the same way as for native ground cover (grasses) (see above). |
| Exotic plant cover             | At 50 points along a 50-m transect | Exotic plants are vascular plants not native to Australia. Exotic plant cover is measured as total percent foliage cover of all exotics in all strata. If the exotics are in the over-storey, then measure by using the same method as for native over-storey cover (see above). If exotics are in the mid-storey, then measure by using the same method as for native mid-storey cover (see above). If exotics are in the ground stratum, then measure by using the same method as for native ground cover (grasses) (see above). |
| Number of trees with hollows   | 50 × 20 m plot         | This is a count of the number of living and dead trees within a 50 × 20 m plot that have at least one hollow (note that the hollow does not have to be within the plot). A hollow is recorded only if:  
(a) the entrance can be seen;  
(b) the minimum entrance width is at least 5 cm across;  
(c) the hollow appears to have depth (i.e. cannot see solid wood beyond the entrance);  
(d) the hollow is at least 1 m above the ground (this omits hollows in cut stumps or at the bases of trees);  
(e) the centre of the tree is within the plot. Trees should be examined from all angles. |
<table>
<thead>
<tr>
<th>Variable</th>
<th>Plot or transect type</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regeneration</td>
<td>Entire zone</td>
<td>Regeneration is measured as the proportion of over-storey species present in the zone that are regenerating (i.e. with diameter at breast height ≤ 5 cm). For example, if there are three tree species present in the zone but only one of these species is regenerating, then the value is 0.33. The maximum value for this measure is 1.</td>
</tr>
<tr>
<td>Total length of fallen logs</td>
<td>50 × 20 m plot</td>
<td>This is the total length of logs at least 10 cm in diameter and at least 0.5 m long. The diameter is estimated with a measuring tape (or callipers if available) held horizontally immediately above the log, and the length is estimated to the nearest metre by measuring with a tape, or pacing, along the part of the log that is at least 10 cm in diameter. If estimating length by pacing, then the actual lengths of a sample of logs should be measured regularly with a tape so that the assessor can calibrate the estimate derived from pacing. Only those parts of logs lying within the plot are measured.</td>
</tr>
</tbody>
</table>
Appendix 3  Method to assess paddock trees on a development site

The following method provides guidance on how to assess paddock trees on a development site using the BioBanking Paddock Tree Calculator, which can be downloaded from www.environment.nsw.gov.au/biobanking/operationalmanual.htm

The paddock tree calculator can be used where:

- native vegetation has an over-storey percent foliage cover <25% of the lower projected foliage cover for the vegetation type and
- there is no native mid-storey
- the groundcover is in low condition (i.e. less than 50% of the groundcover is native vegetation or >90% of the groundcover is cleared)


If the development site contains only scattered paddock trees and the groundcover is not native (indigenous) vegetation or the groundcover is in low condition, the assessor should consider whether the biobanking methodology is a suitable option to assess the biodiversity values of the site, especially where the area is small. Assessment for biobanking is not recommended in these circumstances.

Where the methodology is being used to assess paddock trees on a development site that also contains other vegetation in moderate to good condition, the paddock tree calculator can be used for assessing:

- percent foliage cover of the over-storey
- whether the over-storey vegetation is in low condition
- number of trees with hollows
- the effective clearing area (this is the total area of percent foliage cover over the vegetation zone for all the paddock trees). The effective clearing area must only be used where the groundcover is in low condition (i.e. less than 50% of the groundcover is native vegetation or >90% of the groundcover is cleared).

This assessment can be made using rectified imagery in a GIS combined with some simple field measurements rather than by measuring percent foliage cover (and trees with hollows) using transects/plots.

An assessor requires the following data to use the paddock tree calculator:

- average crown diameter of paddock trees – this can be determined using measuring tools in a GIS using all of the trees in a zone or a representative sample from the zone
- average percent foliage cover of the over-storey – based on a field sample
- number of paddock trees in the zone – determined from a GIS or by sampling
- lower benchmark for over-story cover for that vegetation type
- area of the vegetation zone in hectares – see below for method
- number of trees with hollows – based on field sample.

To establish the area of the paddock trees using GIS, draw one or more concave polygons around the trees that comprise a vegetation type. Outlying small clumps of trees (usually a tree or a clump of trees that is/are more than three times as far from the nearest trees as the majority of the trees in a clump are from each other) should be assessed in a separate
polygon. The aggregation of these polygons is then combined to form one zone. Outlier trees can be included in the zone by drawing an area around them similar to the distance between the trees in the clump.

If there is more than one vegetation type, a new zone should be created for that vegetation type, as shown in Figure A1.

**Figure A1** Establishing the area of paddock trees

Once the input data have been entered, the paddock tree calculator will automatically determine if the over-storey vegetation is in low condition. If the vegetation is in low condition, the area that forms the effective clearing area (i.e. the total “percent foliage cover” over-storey of all the paddock trees) for that vegetation zone will appear. If the groundcover does not meet the definition of low condition, then transects and plots must be used to collect the other site attribute data required by the methodology.

The effective clearing area is the area within the vegetation zone (or the polygon) covered by the total percent foliage cover when it is proportioned across the area at 25% of lower benchmark percent foliage cover. The effective clearing area is the area entered into the credit calculator as the actual area for that zone area for the total percent foliage cover over-storey calculation for paddock trees. The ‘effective clearing area’ must only be used in the calculator when the groundcover is in low condition (i.e. less than 50% of the groundcover is native vegetation or >90% of the groundcover is cleared).
Example of low condition assessment using the formula in the paddock tree calculator

**Sample data:**
- average crown diameter (crown diameter) = 22 m
- average percent foliage cover (pfc) = 45%
- number of trees (# trees) = 46
- lower benchmark over-story (LBO) = 15%
- vegetation zone area in hectares (area) = 40 ha

**Is the vegetation in low condition?**
1. Calculate the average crown radius:
   - crown radius = average crown diameter ÷ 2
   - crown radius = 22 m ÷ 2 = 11 m
2. Calculate ‘percent foliage cover for zone’:
   - \((\pi \times \text{radius}^2 \times \# \text{ trees} \times \text{pfc}) \div \text{area} \text{ (in m}^2\text{)})
   - \(3.14 \times 11^2 \times 46 \times 45\% \div 40 \text{ ha} = 2.00\%
3. Determine low condition:
   - is 2.00% < 0.25 \times 15% = yes

Example of effective clearing area calculation using the formula in the paddock tree calculator

**Sample data:**
- average crown diameter (crown diameter) = 22 m
- average percent foliage cover (pfc) = 45%
- number of trees (# trees) = 46
- lower benchmark over-story (lbo) = 15%
- polygon area in hectares (area) = 40 ha

Calculation of effective clearing area:
1. effective clearing area (ha) = \((\pi \times (r^2 \div 10000) \times \# \text{ trees} \times \text{pfc}) \div 0.25 \times \text{lbo}
   - effective clearing area (ha) = \(3.14159265 \times (11^2 \div 10000) \times 46 \times 45\% \div 0.25 \times 15 = 20.98333\)
2. round up the result to 1 decimal place
   - round up 20.98333 to 1 decimal = 21.0

Example of average number of trees with hollows calculation using formula in the paddock tree calculator

**Sample data:**
Effective clearing area = 21.0 ha
Number of trees with hollows = 22

1. hollow per plot = number of hollow-bearing trees in effective clearing area ÷ effective clearing area ÷ 10
   - hollows per plot = \(22 \div 21.0 \div 10 = 0.1048\)
2. round to 1 decimal place
   - hollows per plot = 0.1
Appendix 4  Guideline to assessing change in Site Value for asset protection zones

Asset Protection Zone

Often referred to as a fire protection zone, the Asset Protection Zone (APZ) aims to protect human life, property and highly valued public assets and values. An APZ is an area surrounding a development where the vegetation based fuel load is managed to reduce the bush fire hazard to an acceptable level. The width of the APZ varies with slope, vegetation and construction level. The APZ consists of an area maintained to minimal fuel loads and, for subdivision purposes, comprises a combination of perimeter road, fire trail, rear yard or reserve, so that a fire path is not created between the hazard and the building. Creation of an APZ normally results in partial clearing in order to reduce fuel loads in vegetation that adjoins urban areas.

Outer Protection Area

The Outer Protection Area (OPA) of an asset protection zone is where fuel loads are maintained at a level (usually less than 8 t/ha) such that the intensity of an approaching bushfire would be significantly reduced. The reduced fuel substantially decreases the intensity of an approaching fire and restricts pathways to crown fuels, thus reducing the levels of direct flame, radiant heat and ember attack on the Inner Protection Area (IPA).

The assessor should consult the document, Planning for Bush Fire Protection 2006 (available under publications at www.rfs.nsw.gov.au) or the relevant bushfire management plan or LEP to confirm the requirements for maximum fuel loads in OPAs. Clearing within the OPA should occur so that any trees and shrubs are retained in such a manner that the vegetation is not continuous.

Table A3 provides the minimum decrease for the site attribute scores in an OPZ. The site attributes that are reduced to 1 are likely to be more heavily cleared to achieve the required fuel load. Hollow-bearing trees should always remain, where possible. The value that is retained for a site attribute must be consistent with the condition of that attribute in relation to the benchmark according to Table 1 of the methodology.

Table A3  Change in site attributes – Outer Protection Area

<table>
<thead>
<tr>
<th>Site attribute</th>
<th>Current site attribute score =</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Maximum score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species richness</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>2</td>
</tr>
<tr>
<td>Over-storey cover</td>
<td></td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>−2</td>
<td>1</td>
</tr>
<tr>
<td>Mid-storey cover</td>
<td></td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>−2</td>
<td>1</td>
</tr>
<tr>
<td>Native ground cover (grasses)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>2</td>
</tr>
<tr>
<td>Native ground cover (shrubs)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>−2</td>
<td>1</td>
</tr>
<tr>
<td>Native ground cover (other)</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>2</td>
</tr>
<tr>
<td>Exotic plant cover</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>2</td>
</tr>
<tr>
<td>Number of trees with hollows*</td>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Over-story regeneration</td>
<td></td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>−2</td>
<td>1</td>
</tr>
<tr>
<td>Total length of fallen logs</td>
<td></td>
<td>0</td>
<td>0</td>
<td>−1</td>
<td>−2</td>
<td>1</td>
</tr>
</tbody>
</table>

* Trees with hollows should be maintained inside OPAs where possible. These trees provide valuable habitat. If they are removed, then the reduction in Site Value should reflect this.


**Inner Protection Area**

The Inner Protection Area (IPA) of an APZ extends from the edge of the OPA to the actual buildings of the development and is normally maintained to contain minimal fuel loads. This area can contain a combination of perimeter road, fire trail, rear yard or reserve, so that a fire path is not created between the hazard and the building. Therefore, clearing within an IPA is usually more aggressive, as the IPA is next to dwellings etc, and vegetation may not even be present (e.g. on roads). However, where some vegetation has been retained, the assessor should use Table A4 to determine the minimum decrease that must occur for a site attribute in an IPA. If any hollow-bearing trees that occur in an IPA cannot be retained, the reduction in Site Value should reflect this. The value that is retained for a site attribute must be consistent with the condition of that attribute in relation to the benchmark according to Table 1 of the methodology.

**Table A4  Change in site attributes – Inner Protection Area**

<table>
<thead>
<tr>
<th>Site attribute</th>
<th>Minimum decrease from the current site attribute score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Species richness</td>
<td>0</td>
</tr>
<tr>
<td>Over-storey cover</td>
<td>0</td>
</tr>
<tr>
<td>Mid-storey cover</td>
<td>0</td>
</tr>
<tr>
<td>Native ground cover (grasses)</td>
<td>0</td>
</tr>
<tr>
<td>Native ground cover (shrubs)</td>
<td>0</td>
</tr>
<tr>
<td>Native ground cover (other)</td>
<td>0</td>
</tr>
<tr>
<td>Exotic plant cover</td>
<td>0</td>
</tr>
<tr>
<td>Number of trees with hollows*</td>
<td>0</td>
</tr>
<tr>
<td>Over-story regeneration</td>
<td>0</td>
</tr>
<tr>
<td>Total length of fallen logs</td>
<td>0</td>
</tr>
</tbody>
</table>

* Trees with hollows should be maintained inside OPAs where possible. These trees provide valuable habitat. If they are removed, then the reduction in Site Value should reflect this.
Appendix 5  Guidelines for varying the increase in Site Value with additional management actions

The increase in the site attribute score from the current condition shown in Table 1 of the methodology may be used where either additional actions are being undertaken at a biobank site or the extent to which the management actions are being undertaken is likely to provide a greater increase in Site Value than that predicted in Table 2 of the methodology.

Any increase in Site Value greater than that predicted in Table 2 of the methodology must be approved by the Director General before the Minister enters into a biobanking agreement. Any increase in Site Value greater than predicted by Table 2 of the methodology is limited to the increases shown in Table A5 below. Detailed information on the management action related to the extra gain for that site attribute score must be provided as part of the application for a biobanking agreement.

A Site Value increase lower than the value predicted in Table 2 of the methodology can be selected where the restorative or rehabilitation actions taken at a development site as part of a deferred credit retirement arrangement do not include the management actions that contribute to the predicted improvement in condition for that site attribute.

Table A5  Allowable increases for varying the increase in site attribute scores under certain circumstances

<table>
<thead>
<tr>
<th>Site attribute</th>
<th>Increase in site attribute score from current condition</th>
<th>Example of management actions required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Species richness</td>
<td>Increase by 1 rather than 0.5</td>
<td>Increase by 1 rather than 0.5</td>
</tr>
<tr>
<td>Over-storey cover</td>
<td>Increase by 1.5 rather than by 1</td>
<td>Increase by 1.5 rather than by 1</td>
</tr>
<tr>
<td>Site attribute</td>
<td>Increase in site attribute score from current condition</td>
<td>Example of management actions required</td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Mid-storey cover</td>
<td>Increase by 1.5 rather than by 1</td>
<td>Increase by 1.5 rather than by 1</td>
</tr>
<tr>
<td>Native ground cover (grasses)</td>
<td>Increase by 1.5 rather than by 1</td>
<td>Increase by 2 rather than by 1</td>
</tr>
<tr>
<td>Native ground cover (shrubs)</td>
<td>No extra increase</td>
<td>Increase by 1.5 rather than by 1</td>
</tr>
<tr>
<td>Native ground cover (other)</td>
<td>No extra increase (i.e. increase by 1)</td>
<td>No extra increase (i.e. increase by 1)</td>
</tr>
<tr>
<td>Exotic plant cover</td>
<td>No extra increase (i.e. increase by 0.5)</td>
<td>Increase by 1 rather than 0.5</td>
</tr>
<tr>
<td>Site attribute</td>
<td>Increase in site attribute score from current condition</td>
<td>Example of management actions required</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------------------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Number of trees with hollows</td>
<td>No extra increase (i.e. 0 increase)</td>
<td>No extra increase (i.e. increase by 0.5)</td>
</tr>
<tr>
<td>Over-story regeneration</td>
<td>Increase by 1 rather than 0.5</td>
<td>No extra increase (i.e. increase by 1)</td>
</tr>
<tr>
<td>Total length of fallen logs</td>
<td>Increase by 0.5 rather than 0 increase</td>
<td>Increase by 1 rather than by 0.5</td>
</tr>
</tbody>
</table>
Appendix 6  Guide to the positioning of assessment circles for a development or biobank site

The circles centred equally over the development or biobank site.

Assessment circles centred over the development or biobank sites.

Assessment circles centred over assessment sites where the development or biobank sites are not adjoining.

The configurations of the development or biobank sites do not fit into a single 1000 ha circle. Two circles are required and are then centred over the site.

Linear development for road or rail may require more than one circle. The additional circles are placed end to end. A separate assessment of connectivity is required for each circle.

The development or biobank site is split by CMA subregion boundary. The vegetation zone (and threatened species sub-zone) is split and separate 1000 ha and 100 ha assessment circles are required for the assessment are in each CMA sub region.
Appendix 7  Guide to assessing percent vegetation cover at the landscape scale

<10% cover

10%–30% cover

30%–70% cover

>70% cover
Appendix 8  Guide to assessing percent foliage cover

Photos to assist with estimates of percent foliage cover (Walker and Hopkins 1988, Vegetation, pp. 58–86 in *Australian soil and land survey field handbook*, 2nd edition). Rows show similar crown types for different leaf sizes (large to small, left to right). *Acacia phylodes* is in the right-hand row. Most Australian woody plants are in the range 40–70%.
Appendix 9  Additionality in credit allocations

If a biobanking agreement is entered into on land that is subject to existing conservation obligations (as outlined in section 2.7 of the methodology), the allocation of credits for the biobank site is discounted according to the number and type of conservation measures or actions required to be carried out in relation to the existing obligation. The discount for each management action required for each ecosystem credit is shown in Table A6 and Table A7 below and for each species credit is shown in Table A8 below.

The current and predicted values of the Site Value score with management are calculated to determine the credit allocation for the site. Additionality is then included by scaling back the number of credits allocated according to which management actions the landholder is already obliged to perform under the existing obligation. For example, if the existing obligation specifies that weed control must be undertaken and that native vegetation regrowth and remnant native vegetation must be retained, then the credit allocation for the biobank site is discounted by 15% for those management actions—that is, 7.5% plus 7.5%.

Where an existing obligation only partly aligns with a biobanking management action (e.g. ‘exclusion of domestic stock’ rather than ‘management of grazing for biodiversity enhancement’), the credit allocation is discounted by 5% rather than by 7.5%.

Applying additionality to ecosystem credits

In the credit calculator, additionality is applied at Step 5e for ecosystem credits and at Step 5h for species credits. In step 5e – Management actions for ecosystem credits – the assessor should first select each of the standard management actions that are already required for the site. The additional management actions that are shown in Table A7 should only be selected if they are required as part of the biobanking agreement to enhance the habitat of threatened species likely to use the biobank site.

To identify whether any additional actions apply at the site, the assessor will need to complete the assessment in the credit calculator and click on the Calculate the credits to be created button at step 6. The Biobanking Agreement Credit Report will indicate which additional management action/s (if any) is required for the site and the vegetation zones to which the additional action/s apply. This information is contained in the section Additional management actions, which appears at the back of the report.

If an additional management action is required and that management action is subject to an existing conservation obligation, step 5e needs to be re-entered, then select the additional management action. Once this step has been completed, return to step 6 and re-calculate the number of credits that are created for the site. Review the level of discounting that applies to each zone through the export summary vegetation zone data function in Step 6 of the credit calculator.
### Table A6  Percentage discounts for ecosystem credits – standard management actions

<table>
<thead>
<tr>
<th>Conservation measure or action</th>
<th>Percentage discount in ecosystem credit allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manage grazing for conservation</td>
<td>7.5% (5% if obligation is only for domestic stock exclusion)</td>
</tr>
<tr>
<td>Weed control</td>
<td>7.5%</td>
</tr>
<tr>
<td>Manage fire for conservation</td>
<td>7.5% (5% if obligation is only for fire exclusion)</td>
</tr>
<tr>
<td>Manage human disturbance</td>
<td>7.5%</td>
</tr>
<tr>
<td>Retain regrowth and remnant native vegetation</td>
<td>7.5%</td>
</tr>
<tr>
<td>Replant/supplementary planting</td>
<td>7.5%</td>
</tr>
<tr>
<td>Retain dead timber</td>
<td>7.5% (0% if obligation excludes only commercial use (e.g. commercial firewood collecting), as this is required under the Native Vegetation Act 2003)</td>
</tr>
<tr>
<td>Nutrient control</td>
<td>5%</td>
</tr>
<tr>
<td>Erosion control</td>
<td>5%</td>
</tr>
<tr>
<td>Retention of rocks</td>
<td>5%</td>
</tr>
</tbody>
</table>

### Table A7  Percentage discounts for ecosystem credits – additional management actions

<table>
<thead>
<tr>
<th>Management action</th>
<th>Percentage discount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control feral herbivores (plus overabundant natives)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Vertebrate pest control (pigs)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Vertebrate pest control (foxes and/or miscellaneous species)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Control exotic fish species</td>
<td>5%</td>
</tr>
<tr>
<td>Maintain natural flow regimes</td>
<td>5%</td>
</tr>
<tr>
<td>Any other management action for species credits</td>
<td>7.5% (for each additional action)</td>
</tr>
</tbody>
</table>

### Applying additionality to species credits

To apply additionality to species credits, the assessor should follow a similar process to that for ecosystem credits (described above). However, at *Step 5h – management actions for species credits* – the assessor should not select any management actions until they have identified which additional actions may apply at the site. To do so may unnecessarily reduce the number of species credits created at the site.

To identify whether any additional actions apply at the site, the assessor needs to complete the assessment in the credit calculator and click on the *Calculate the credits to be created* button at *step 6*. The BioBanking Agreement Credit Report will indicate which additional management action/s (if any) is required for the site and the threatened species for which the additional action/s apply. This information is contained in the section *Additional management actions*, which appears at the back of the report.

If an additional management action is required, and that action is subject to an existing conservation obligation, re-enter *step 5h* and select the additional management action. After completing this step, return to *step 6* and re-calculate the number of credits created for the site.
Table A8  Percentage discounts for species credits

<table>
<thead>
<tr>
<th>Conservation measure or action</th>
<th>Percentage discount in ecosystem credit allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control feral herbivores (plus overabundant natives)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Vertebrate pest control (pigs)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Vertebrate pest control (foxes and/or miscellaneous species)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Control exotic fish species</td>
<td>5%</td>
</tr>
<tr>
<td>Maintain natural flow regimes</td>
<td>5%</td>
</tr>
<tr>
<td>Any other management action for species credits</td>
<td>7.5% (for each additional action)</td>
</tr>
</tbody>
</table>

This rule does not apply to:

- a restriction on use or public positive covenant under Part 4A CL Act that is imposed in connection with an application to purchase land that is duly made by a lease holder in respect that land before 9 March 2009

- a conservation agreement entered into under the NP&W Act as a result of a proposal made by the landholder to the Minister administering that Act before 9 March 2009

- a trust agreement entered into under the NCT Act as a result of a proposal made by the landholder to the Nature Conservation Trust before 9 March 2009.