



**ACT**  
Government  
Environment and Planning

**ACT Environmental Offsets Calculator**  
**Assessment Methodology**  
**18 May 2015**

## **Acknowledgement**

This Assessment Methodology and the ACT Environmental Offsets Calculator are based on the former NSW Department of Environment, Climate Change and Water's BioBanking Assessment Methodology and Credit Calculator Operational Manual and the BioBanking Credit Calculator (BBCC) version 1.1. The provision of the calculator, assessment methodology, manual and programming behind the BBCC is gratefully acknowledged.

Information from PlantNET was gratefully used for some plant descriptions incorporated into the calculator.

The Royal Botanic Gardens and Domain Trust (31 May 2011) PlantNET - Visit the [Plant Information Network System of The Royal Botanic Gardens and Domain Trust, Sydney, Australia](#).

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## 1. Introduction

The ACT Environmental Offsets Assessment Methodology (the methodology) provides a streamlined process for calculating environmental offsets for matters that are covered under the Environmental Offsets Policy. This approach means positive conservation action can be taken to generate offset gains in locations where it is most cost effective to do so. The methodology is applied using the ACT Environmental Offsets Calculator (EOC).

The EOC provides a simple user friendly tool which maintains scientific rigour. The calculator provides a balance between complexity of environmental offset values at a site and user friendliness for the assessment of environmental offsets. Because of this, it is most appropriately used to assess offsets at individual sites, rather than for strategic level assessments.

The ACT EOC includes data on lowland species and vegetation communities of conservation importance. Lowlands are generally those below 750m. For proposals that may impact on upland species (above 750m), aquatic or riparian ecosystems or vegetation within Namadgi National Park or Tidbinbilla Nature Reserve, the Commonwealth Offsets Assessment Guide should be used.

The methodology assesses the environmental values for protected matters at development sites and offset sites, and describes the process for measuring the loss of these values that result from removing significant native vegetation, significant species<sup>1</sup> habitat and significant species on a development site, and the gain in environmental values for protected matters from management actions on an offset site.

**Chapter 2** outlines the broad approach to assessing offsets to maintain or improve conservation values for protected matters. For an offset to form part of the conditions of approval for a development the Conservator of Flora and Fauna (the Conservator) must provide advice that they are satisfied that the offset for a proposed development maintains or improves the values of the protected matter. The Chapter introduces the concepts of: 'Tg' values which is a measure of the ability of a species to respond to an improvement in site value; and about special offset requirements for some species.

The methodology establishes two classes of credits that may be impacted at the development site or created in respect of management actions at an offset site. The two classes of credits are:

1. Ecological community credits – these are created or required for all impacts on environmental values for protected matters that can be reliably predicted by vegetation, except the protected matters that require species credits (**Chapter 3**).
2. Species credits – these are created or required for impacts on protected matters that cannot be reliably predicted to use an area of land based on vegetation alone (**Chapter 4**).

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<sup>1</sup> Significant species are those species that are covered under the ACT Environmental Offsets Policy. This includes threatened species listed under the EPBC Act and listed as a protected matter under the Planning and Development Act 2007. Significant species are a subset of those protected matters which cannot reliably be predicted to be associated with listed ecological communities.

**Chapter 3** of the methodology sets out how to measure and assess site and landscape values to help determine the number of ecological community credits that are required for a development site or can be created at an offset site.

In **Chapter 4**, the methodology sets out how to measure and assess biodiversity values for significant species on a development site and an offset site. This chapter determines the species that require further assessment for species credits.

**Chapter 5** of the methodology establishes the rules for calculating the number and type of ecological community credits and species credits that are required in relation to loss of biodiversity values at a development site, or created in relation to improving biodiversity values at an offset site.

**Chapter 6** contains offset rules for the use of credits to offset the impacts of development on significant species at a development site by management actions at an offset site.

**Chapter 7**, provides rules regarding certainty scores for management of offsets sites in accordance with the offsets policy.

**Chapter 8** contains information on additional matters.

The **glossary** provides an explanation of the terms used in the methodology. Key **References** are also provided.

## 2. Maintaining or improving conservation values for protected matters

### 2.1 Protected matters included in the ACT Environmental Offsets Calculator

For an offset to form part of the conditions of approval for a development the Conservator of Flora and Fauna (the Conservator) must provide advice that they are satisfied that the offset for a proposed development maintains or improves the values of the protected matter.

The aim of the offset methodology is to establish the circumstances in which an offset for development is regarded as maintaining or improving protected matter values, for example the impacts of clearing of offset values at a development site are offset by the beneficial impacts of management actions which create offset credits at an offset site.

The *Planning and Development Act 2007* (Planning Act), s111 A, provides that a protected matter for the consideration of environmental offsets is a matter protected by the Commonwealth or a declared protected matter. This declaration declares that ACT listed threatened species are protected matters for consideration of environmental offsets.

Protected matters that are able to be assessed using the ACT EOC are either ecological communities or species. Within the calculator the protected matters that relate to species are termed **significant species**. The [Significant Species Database](#) contains information on habitat characteristics, range, response to management actions, survey requirements, and the class of credits required for the species (either ecosystem or species). It is used for calculation of ecological or species credits, filtering to determine the likely presence of significant species, and provides information on significant species' ability to withstand loss.

The ACT EOC only considers a range of protected matters. The ACT EOC is used to calculate the value of an offset in the following circumstances:

- Protected matters that are being assessed through an Environmental Impact Statement under the Planning and Development Act 2007 for species and ecological communities, other than wetland and aquatic species ecological communities, that occur below 750 metres altitude.
- Protected matters that are subject to an s 211 exemption under the Planning and Development Act 2007 for species and ecological communities, excepting aquatic species and aquatic ecological communities, that occur below 750 metres altitude.

The Australian Government Offset Assessment Guide is to be used to calculate the value of an offset in the following circumstances:

- Protected matters that are being assessed through an Environmental Impact Statement under the Planning and Development Act 2007:
  - i. for species and ecological communities that occur above 750 metres altitude.
  - ii. for all wetland and aquatic species and ecological communities
  - iii. listed migratory species, as defined under the Nature Conservation Act 2014.
  - iv. Listed national heritage sites.
  - v. Wetlands of international importance listed under the RAMSAR convention.

- Protected matters that are subject to a s 211 exemption under the Planning and Development Act 2007 (offsets will become conditions of approval for DAs in the Impact Track):
  - i. for species and ecological communities that occur above 750 metres altitude.
  - ii. for any listed wetland and aquatic species and ecological communities.
  - iii. listed migratory species, as defined under the Nature Conservation Act 2014.
  - iv. listed national heritage sites.
  - v. Wetlands of international importance listed under the RAMSAR convention.
- in any other circumstances.

## 2.2 Assessment of protected matter values – key matters

### 2.2.1 Types of credit

Protected matter values are assessed and measured according to the type of offset credits that may be created. There are two types of credits: ecological community credits and species credits.

1. Ecological community credits are created or required for all impacts on protected matter values (including those species that can be reliably predicted by vegetation), except the protected matters that require species credits.
2. Species credits are created or required for impacts on protected matters that cannot be reliably predicted to use an area of land based on vegetation alone. Protected matters that require species credits are identified in the [Significant Species Database](#) (available on the [Environment and Planning Directorate's \(EPD\) website](#)).

### 2.2.2 Ability of species to respond to improvement in site value (Tg value)

The assessment uses a value called the 'Tg' value which relates to the ability of a species to respond to improvement in Site Value or other habitat improvements at an offset site due to management actions. These values are identified in the [Significant Species Database](#). The lower the Tg value the less able the species is to respond to improvements and the greater the number of credits required.

### 2.2.3 Special offset requirements

Certain species have a special offset requirement which must be met before an offset can be provided. These are species which have special habitat requirements, the loss of which could impact strongly on the persistence of the species. Where the development is inconsistent with the special requirement a flag is raised. Developments that are flagged are dealt with in Chapter 8.

**Table 1 Special Offset Requirements**

Species	Special Offset Requirements
Brown Treecreeper	No clearance of vegetation that is part of a woodland patch >100ha of at least partially or moderately modified condition that is historically known to have supported Brown Treecreeper. The woodland patch can extend beyond the development site and consist of several vegetation types in which the Brown Treecreeper can be found.
Golden Sun Moth	<p>No loss of habitat patches &gt;50ha AND supporting populations of more than 50 moths (population must be counted at a time when large populations are observed at nearby known sites).</p> <p>Given this special offset requirement, a survey is required for this species for both the number of individuals as well as the extent of habitat in hectares. Data is required to be entered into the calculator for both of these units. The calculator will supply two rows for the Golden Sun Moth when associated vegetation types have been entered at Step 1. Please complete both rows.</p>
Hooded Robin	No clearance of vegetation that is part of a woodland patch >100ha of at least partially or moderately modified condition that is historically known to have supported Hooded Robin. The woodland patch can extend beyond the development site and consist of several vegetation types in which the Hooded Robin can be found.
Grey-headed Flying Fox (Roosting)	No clearing of roosting trees, unless expert advice has been obtained and tree removal is justified on safety grounds.
Little Eagle (Nesting)	No loss of nest and vegetation within 300m of a nest tree or if clearance will occur during breeding event (September to December) then no loss of vegetation within 800m of nest (survey may consider on site vegetation only if access to adjacent sites is not possible).
Pink-tailed Worm-lizard	Up to 10% of a habitat patch may be cleared if habitat patch is greater than 5ha and clearance does not result in increase in the number of patches.
Striped Legless Lizard	No loss of known habitat within Priority 1 and Priority 2 grasslands as specified in Action Plan 28 (see the <a href="#">EPD website</a> ).
Superb Parrot	No loss of known habitat tree and trees within surrounding 50m, or within 100m during a breeding event (breeding season September to January) (survey may consider on site vegetation only when access to adjacent sites is not possible).

### 3. Assessment and measurement of protected matter values for ecological community credits

This chapter sets out how to measure and assess environmental offset values to calculate ecological community credits. These are referred to as general protected matter values. **Chapter 4** details species credits and **Chapter 5** details final credit calculations for both ecological community credits and species credits.

#### 3.1 Vegetation type and condition

Vegetation types are used as surrogates for protected species habitat values. The vegetation communities include the endangered ecological communities of native temperate grassland and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

A vegetation type is classified within a vegetation class, which in turn is classified within a vegetation formation.

A study was undertaken in 2007 to classify the vegetation communities of the ACT. A full description of these communities and their conservation status can be found in Sharp *et al* (2007). The ACT [Vegetation Types Database](#) provides a list of vegetation types together with descriptive information and relationship to the *Environment Protection and Biodiversity Conservation Act 1999* listed communities.

The [Vegetation Benchmarks Database](#) identifies the range of quantitative measures that represent the benchmark condition for each vegetation type.

Benchmarks are quantitative measures that describe the range of variability in condition in vegetation with relatively little evidence of alteration, disturbance or modification by humans since European settlement (post 1750). Benchmarks are described for specified attributes by vegetation type. 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, is not subject to high frequency burning, and shows evidence of recruitment of native species. The benchmarks used as part of this methodology have been developed using local data.

Vegetation that is substantially outside benchmark condition due to a recent disturbance, such as fire, flood or prolonged drought, is not considered degraded. Vegetation that has been recently disturbed, or is regenerating after an event such as fire or flood, must be assessed by reference to an equivalent site that is not disturbed in these ways. EPD can provide guidance on appropriate benchmark sites.

### 3.2 Vegetation zones

Prior to assessment, the development site and offset site must be divided into vegetation zones, using a satellite or ortho-rectified aerial image of the site. Vegetation zones are delineated by vegetation type and broad condition for the purpose of assessing the average site condition of the vegetation and to survey for protected matters.

The *Nature Conservation Act 2014* s 233 provides a definition of a native vegetation area (**Box 1**). This definition is used to determine when an area is considered to be native vegetation. Native vegetation can, at certain times, be dominated by annual weeds, or by bare ground, and still be determined as native vegetation.

#### **Box 1 Definition of Native Vegetation Area**

##### **Native Vegetation Area – refer to *Nature Conservation Act 2014* s 233**

A *native vegetation area*, means an area where—

(a) either—

- (i) 10% or more of the area is covered with vegetation (whether dead or alive); and
- (ii) no more than 60% of the ground layer vegetation cover is exotic annual (at any time of year); and
- (iii) more than 50% of the perennial ground layer vegetation cover is native vegetation; or

(b) trees or shrubs indigenous to the area have a canopy cover of 10% or more in any stratum over the area.

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, including within the same vegetation type. Vegetation zones are assessed using transects and plots to collect site information, which is used to determine the *Site Value* (condition) of the vegetation zone.

Where the extent of native vegetation at a development or offset site has changed since the satellite or ortho-rectified aerial image was made, vegetation zones must be amended to reflect the current situation, based on an up to date field survey. Any changes must be documented.

### 3.3 Minimum numbers of transects and plots

Transects and plots are established in each vegetation zone. Vegetation zones are relatively homogeneous units within the subject site. Given there is always variation in native vegetation, transects and plots should be established in each zone in approximate proportion to any different habitat types that occur in that zone to achieve a representative sample.

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.

**Table 2** sets out the minimum number of plots/transects that are required in each vegetation zone. If the condition of the vegetation is more variable across the zone, more transects and plots may be needed than the number in **Table 2**, particularly where the area of the vegetation zone is large.

**Table 2: Minimum number of transects/plots required per zone area**

Vegetation zone area (ha)	Minimum number of transects/plots
0 – 4	1 transect/plot per 2 ha (or part thereof) or 1 transect/plot if vegetation is in low condition.
> 4 – 20	3 transects/plots or 2 transects/plots if vegetation is in low condition.
> 20 – 50	4 transects/plots or 3 transects/plots if vegetation is in low condition.
> 50 – 100	5 transects/plots or 3 transects/plots if vegetation is in low condition.
> 100 – 250	6 transects/plots or 4 transects/plots if vegetation is in low condition.
> 250 – 1000	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.
> 1000	8 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.

### 3.4 Assessment of Site Value

*Site Value* is the quantitative measure of the condition of native vegetation assessed for each vegetation zone. The *Site Value* assessment is also used to determine the condition of certain habitat attributes used by the protected species on the site.

#### 3.4.1 Plot and transect surveys

Plot and transect surveys of the development and offset sites are used to provide quantitative measures of site attributes in each vegetation zone. The site attributes, listed in Table 2, are assessed to calculate the number of ecological community credits that can be created at an offset site or are required at a development site.

Line transects must be used to assess the site attributes that are measured by percent foliage cover. Other site attributes are assessed by plots. The plot and transect surveys are conducted in each vegetation zone to sample vegetation condition across the zone. Regeneration is assessed for the entire zone.

The minimum number of plots and transects required for each vegetation zone on a development or offset site must be in accordance with **Section 3.3**. Survey data sheets are available on the website and in the [EOC Operational Manual](#) with further instructions.

#### 3.4.2 Calculating the current Site Value score

The current *Site Value* score is determined from the plot/transect surveys in each vegetation zone. Ten site attributes are assessed against benchmark values to determine vegetation condition and the *Site Value* score.

The benchmark range for each attribute relating to vegetation types or classes can be found in the [Vegetation Benchmarks Database](#). It is a quantitative measure of the range of variability in site attributes under local conditions for the vegetation type where there is relatively little evidence of modification by humans since 1750. Benchmark ranges reflect the range of variability of the vegetation type with little modification since European settlement. The site attribute score is either [0], [1], [2] or [3] as shown in **Table 3**.

**Table 3 Scoring and weighting of the site attributes**

Site attribute		Site attribute score <sup>2</sup>				Weighting for site attribute score
		0	1	2	3	
a)	Native plant species	0	>0 – <50% of benchmark	50 – <100% of benchmark	≥ benchmark	25
b)	Native over-storey cover	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	10
c)	Native mid-storey cover	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	10
d)	Native ground cover (grasses)	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	2.5
e)	Native ground cover (shrubs)	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	2.5
f)	Native ground cover (other)	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	2.5
g)	Exotic plant cover (calculated as percentage of total ground cover)	>66%	>33 – 66%	>5 – 33%	0–5%	5
h)	Number of trees with hollows	0 (unless benchmark includes 0)	>0 – <50% of benchmark	50 – <100% of benchmark	≥ benchmark	20
i)	Proportion of over-storey species occurring as regeneration	0	>0 – <50%	50 – <100%	100%	12.5
j)	Total length of fallen logs	0–10% of benchmark	>10 – <50% of benchmark	50 – <100% of benchmark	≥ benchmark	10

<sup>2</sup> 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.

As shown in **Equation 1**, the site attribute scores are calculated, then converted to a current *Site Value* score out of 100. The same equation is used to determine the current *Site Value* score at both the development and offset sites.

If the lower benchmark value for any site attribute is zero, and the measure of that attribute on the site is zero, then the attribute is not included in Equation 1. If the only benchmark value for any site attribute is [zero], then the attribute is not included in **Equation 1** and [c] is scaled accordingly.

**Equation 1: Determining the current *Site Value* score for a vegetation zone at the development and offset site**

$$S_c = \left( \frac{\left( \sum_{v=a}^j (a_v w_v) \right) + 5((a_a a_g) + (a_b a_i) + (a_h a_j) + (a_c a_k))}{c} \right) \times 100$$

where  $S_c$  is the current *Site Value* score of the vegetation zone  
 $a_v$  is the attribute score for the  $v$ th *site attribute* (a–j) as defined in Table 1  
 $a_k$  is equal to  $(a_d + a_e + a_f)/3$ , the average score for attributes d, e and f  
 $w_v$  is the weighting for the  $v$ th *site attribute* (a–j) as defined in Table 1  
 $c$  is the maximum score that can be obtained given the attributes a–j that occur in the vegetation type (the maximum score varies depending on which attributes occur in the vegetation type under assessment).

The multipliers for ‘native over-storey cover [x] proportion of over-storey species occurring as regeneration’ and ‘number of trees with hollows [x] total length of fallen logs’ may be omitted from Equation 1 (and [c] recalculated accordingly) for determining *Site Value* at a development or offset site if the vegetation type is from one of the following vegetation formations: grasslands or heathlands.

### 3.4.3 Calculating change in *Site Value* at the development site

The loss in *Site Value* at a development site is calculated as the difference between the current *Site Value* score and the *Site Value* score following development using **Equation 2**.

**Equation 2: Change in *Site Value* score at the development site**

$$\Delta S_{Loss} = S_{current} - S_{future}$$

where  $\Delta S_{Loss}$  is the change (loss) in the *Site Value* score of a vegetation zone at the development site

$S_{current}$  is the current *Site Value* score, as determined by **Equation 1**

$S_{future}$  is the future (after development) *Site Value* score, as determined by **Equation 1**.

The future *Site Value* is determined by decreasing the current site attribute scores by the loss in site attributes after development, according to **Equation 1**.

#### 3.4.4 Calculating change in *Site Value* score at the offset site

The gain in *Site Value* score at an offset site is calculated as the difference between the current *Site Value* score and the predicted future *Site Value* score following management actions at the offset site using **Equation 3**.

#### Equation 3: Change in *Site Value* score at the offset site

$$\Delta S_{\text{Gain}} = S_{\text{future}} - S_{\text{current}}$$

where  $\Delta S_{\text{Gain}}$  is the change (gain) in the *Site Value* score of a vegetation zone at the offset site  
 $S_{\text{future}}$  is the future *Site Value* score (with management actions as described below), as determined by **Equation 1**  
 $S_{\text{current}}$  is the current *Site Value* score, as determined by **Equation 1**.

The management actions are undertaken by the landholder or land manager to improve site attributes at the offset site. The landholder or land manager must undertake all standard management actions identified in **Section 6.1**.

Given the gain is based on all standard management actions undertaken at an offset site, the calculator will automatically calculate the predicted *Site Value* and the *Site Value* gain.

The future *Site Value* score is determined by increasing the current site attribute scores by the predicted gains shown in **Table 4**. The assessor may increase the predicted incremental improvement where the improvement may be higher or lower than the increase shown in **Table 4** (refer **Section 3.4.5**). The assessor may decrease the predicted incremental improvement where the expected improvement is lower than the increase shown in **Table 4** (refer **Section 3.4.6**).

Any variation to the extent of improvement shown in **Table 4** must be documented, and must be consistent with any statutory guidelines established under the *Planning and Development Act 2007*.

**Table 4 Predicted improvement in the site attribute score for each site attribute with management at the offset site**

Site attribute		Increase in current site attribute score			
		0	1	2	3
a.	Native plant species	+0.5	+0.5	+ 1	No change
b.	Native over storey cover	+1	+1	+1	No change
c.	Native mid-storey cover	+1	+1	+1	No change
d.	Native ground cover (grasses)	+1	+1	+1	No change
e.	Native ground cover (shrubs)	+1	+1	+1	No change
f.	Native ground cover (other)	+1	+1	+1	No change
g.	Exotic plant cover <sup>3</sup>	+0.5	+0.5	+1	No change
h.	Number of trees with hollows	0	+0.5	+0.5	No change
i.	Proportion of over-storey species occurring as regeneration	+0.5	+1	+1	No change
j.	Total length of fallen logs	0	+ 0.5	+1	No change

### **3.4.5 Varying the increase in Site Value with Additional Management Actions**

In some situations, the degree or extent of beneficial management actions undertaken at an offset site exceeds the level of predicted gain, and further gains in *Site Value* are possible.

In general, an increase in the site attribute score to greater than the default values may be used where either (i) additional and/or more tailored actions are applied on an offset 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 value. An additional gain in site value must be documented.

### **3.4.6 Varying the increase in Site Value to recognise actions not undertaken**

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 may include an additional gain in site value or a reduction in site value lower than the default.

A Site Value increase lower than the value predicted in Table 4 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.

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<sup>3</sup> Calculated as a percentage of total ground-storey and mid-storey cover.

### 3.4.7 Assessment of Landscape Value

Landscape Value assesses the change in native vegetation cover and connectivity as a result of clearing or other actions on a development site or management actions on an offset site, based on the following attributes:

- habitat context (nearest neighbour) - assesses how a patch of vegetation sits in relation to other vegetation patches; and
- link value - assesses connectivity of the site with surrounding vegetation to determine how important a patch of vegetation is to linking large patches together.

Geographic Information System (GIS) data layers are provided on [ACTMAPi](#) to support calculation of habitat context and link value. The GIS layers display habitat context values and link values. These values combined provide a landscape assessment. The values in the connectivity layers take into account regional connectivity which is an important site characteristic.

### 3.4.8 Calculating Landscape Value score

The Landscape Value score is calculated using **Equation 4**.

#### Equation 4: Ecological community credits – determine Landscape Value score

$$LV = (a \times b) + (c \times d)$$

where LV is the Landscape Value score of the development site or offset sites  
a is the % development within a habitat context zone  
b is the habitat context zone score for the relevant zone type (Table 5**Error! eference source not found.**)  
c is the % development within a link value zone  
d is the link value zone score for the relevant zone type (Table 5).

There are two inputs to this equation:

1. The habitat context score using a scale between very low connectivity [3] and very high connectivity [38] (**Table 5**).
2. Link value is scored as either low linkage [3] or high linkage [12] (**Table 5**).

The landscape attributes are combined to provide a Landscape Value score out of [50] which is entered into the calculator.

**Table 5 Habitat Context (Nearest Neighbour) Value**

Zone type	Zone Score
Very Low Connectivity	3
Low connectivity	10
Moderate Connectivity	15
High Connectivity	28
Very High Connectivity	38

Calculation of the Habitat Context score needs to assess the area (has) of the development or offset site within each context value zone as a percentage of the total site from data on ACTMAPi. For sites with multiple context values, these scores are added to calculate the percentage of the development site impacting on each habitat context zone using the count field in the attribute table. The percentages are then entered into the calculator in the habitat context table.

### 3.4.9 Link Value

Calculation of the Link Value score needs to assess the area (in hectares) of the development or offset site within each link value from the data layer on ACTMAPi as a percentage of the total site. There are two options: a low linkage score [3] or a high linkage score [12] (Table 6).<sup>4</sup> The percentage values are entered into the calculator in the link value table.

**Table 6 Link Value**

Zone type	Zone Score
Low linkage	3
High linkage	12

#### Box 2 - Example of landscape value calculation

If a site has 80% of area in an area of low connectivity and 20% in an area of moderate connectivity, the score for the site would be:

[habitat context score] = (% area [times] low connectivity score) [plus] ( % area [times] moderate connectivity score)

$$11 = (0.8 \times 10) + (0.2 \times 15)$$

If 80% of the site is in an area of low linkage value and 20% in a high linkage value site the score for the site would be:

[link value score LV] = (% area [times] low linkage score) plus( % area [times] high linkage score)

$$6 = (0.8 \times 3 + 0.2 \times 12)$$

**Example:** In the case above the total landscape value score would be calculated as follows:

$$[HCLV] 17 = (0.8 \times 10 + 0.2 \times 15) + (0.8 \times 3 + 0.2 \times 12)$$

Total Landscape Value score would be 17.

A worked example is given in **Appendix 12** of the EOC Operational Manual.

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<sup>4</sup> Note The GIS layer provides only high link value areas, and all other areas are allocated to the low link value zone.

## 4. Assessment and measurement of protected matters (for species credits)

This section outlines the process for assessing impacts on protected matters for which species credits are created or required.

### 4.1 Significant Species Database

Species are assessed in the methodology using data in the [Significant Species Database](#). This database is held by the Environment and Planning Directorate and is publicly available from the [EPD website](#). The database is updated periodically as new species are listed. New releases will be announced on the [EPD website](#).

The components of the [Significant Species Database](#) that are used for all significant species are:

1. a description of each significant species, its habitat and ecology;
2. ACT regions and subregions within which the distribution of each species is associated;
3. vegetation types with which each species is associated;
4. minimum required landscape size with which the species is associated;
5. the vegetation condition with which the species is associated (being native pasture, paddock trees or moderate to good condition vegetation);
6. the ability of a species to respond to improvement in *Site Value* or other habitat
7. improvement at an offset site due to management actions (the Tg value); and
8. the class of credit (ecological community or species) required for the species.

The additional components of the [Significant Species Database](#) that are used in the methodology for significant species to which **species credits** apply are:

1. any geographic characteristics associated with the occurrence of the species;
2. any specific habitat features associated with the occurrence of the species;
3. significant species which cannot withstand further loss;
4. the unit of measurement of impact to be applied for the species (e.g. the number of individuals, area of habitat); and
5. the months of the year that the species is identifiable through survey.

## 4.2 Identifying significant species that require assessment

The significant species requiring assessment at a site are identified through initial filtering of all significant species using four criteria. A significant species is identified as requiring further assessment if all four of the following criteria are met:

1. The distribution of the species includes the ACT region and/or subregion in which the development or offset site is located (maps of the regions and subregions are available in the EOC Operational Manual or on the [EPD website](#)).
2. The species is associated with one or more of the vegetation types occurring within the development or offset site.
3. The condition of any vegetation within the development or offset 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 (native pasture and/or paddock trees) or moderate to good condition vegetation.
4. The minimum patch size at the development or offset site is equal to or greater than the minimum specified for that species. The minimum patch size required for a species is considered with the following categories [<5 ha], [>5–25 ha], [>25–100 ha] or [>100 ha].

The filters are applied to one or more vegetation zones at both the development and offset sites.

Significant species that meet the above four criteria require further assessment and these species are then sorted into species that require either ecological community credits or species credits:

- species that are identified in the Significant Species Database as being predicted by vegetation are assessed according to the methodology for ecological community credits (**Section 4.3**); and
- species that are identified in the Significant Species Database as not being predicted by vegetation are assessed according to the methodology for species credits (**Section 4.4**).

## 4.3 Assessment of significant species for ecological community credits

Significant species that require ecological community credits are assessed in conjunction with general biodiversity values, based on the vegetation type present on the site. The likely impacts on these species from clearing or other actions at the development site and from management actions undertaken at the offset site are measured by the predicted change in site attributes that result from these actions and by the area of land that is impacted.

Because species requiring ecological community credits have a high likelihood of occurrence based on the attributes assigned to a vegetation zone, a species survey is not required.

#### 4.4 Assessment of significant species for species credits

Significant species for which species credits are created or required are identified in the Significant Species Database. Species credits apply to significant species that cannot be reliably predicted to occur based on a vegetation type. Species credits can also apply to species that require protection of particular habitat elements, such as breeding habitat for a bird.

Species that require species credits are assessed within a species polygon. A species polygon is an area of land comprising habitat for a significant species. A species polygon may be for a whole vegetation zone, or for a subsection of a vegetation zone, or for more than one vegetation zone, depending on the site configuration of specific habitat attributes used by the species.

Some significant species require assessment at a development or offset site if they meet one or both of the following filtering criteria:

1. The development or offset site contains specified geographic attributes associated with the species.
2. The vegetation zone contains habitat features associated with the species as identified in the Significant Species Database.

This information is used to generate a final list of species likely to occur at a site and for which a targeted survey or expert report is required.

#### 4.5 Mapping and attributing a species polygon

A species polygon is used to identify any area of land where development will have impacts on a particular species and where specified management actions are required at an offset site, to calculate the number of credits at the development site and the offset site.

The boundary of the species polygon is the boundary of the area of land subject to the impact of development or management actions, which surrounds the location(s) of the species and contains the geographic characteristics and/or specific habitat features associated with that species on the development and offset sites.

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

- an expert report (in accordance with **Section 4.6** and **Section 8.3**);
- assuming that the species is present (in accordance with **Section 4.7**); or
- a significant species survey;

At an offset site, a species polygon is mapped if a significant species is determined to be present by either:

- an expert report (in accordance with **Section 4.6** and **Section 8.3**); or
- a significant species survey.

Surveys for species credit species on an offset site are optional. They must, however, be undertaken if the offset provider wishes to generate credits for a particular species.

A species polygon is attributed with a unit of measurement for the impacts resulting from the development or the management actions.

1. the unit of measurement is generally either the number of individuals of the species within the species polygon; or
2. the area of habitat for the species (being the area of the species polygon). Other units include hollow-bearing trees, habitat trees and campsites.

The Significant Species Database identifies which unit of measurement is applicable to a species.

1. The unit of measurement for significant flora species is generally the number of individuals.
2. The unit of measurement for fauna species is usually the area of habitat impacted, but it can be hollow-bearing trees, habitat trees or campsites. The assessment process differs depending on which unit of measurement applies.

A species polygon is mapped on a satellite (SPOT5) or ortho-rectified aerial image, using GPS during field surveys to confirm boundaries

#### 4.6 The use of expert reports instead of undertaking site surveys

An expert report may be obtained instead of undertaking a significant species survey at a development or offset site. An expert report can only be used for species to which species credits apply and not for any species to which ecological community credits apply.

The purpose of an expert report is to determine that:

1. The species is unlikely to be present at the development site – in this case no further assessment of the species is required.
2. The species is likely to be present at a development site – in this case the expert report must provide an estimate of the size of the impact (e.g. the number of individuals or area of habitat). The area of the species polygon is to be determined in accordance with **Section 4.5**. 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 based on this estimate.
3. The species is likely to be present at an offset site – in this case the expert report must provide an estimate of the size of the impact (e.g. the number of individuals or area of habitat). The area of the species polygon is determined in accordance with **Section 4.5**. 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 offset site is calculated based on this estimate.

#### 4.7 Assumed presence of fauna species

Where the development site contains any of the specified geographic attributes and habitat features associated with a fauna species (under the filtering in **Section 4.2**), 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 significant species survey or obtaining an expert report. Species can only be assumed to be present on development sites.

Where a species is assumed to be present, a species polygon must be used to map the area of impact likely to occur on 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.

#### 4.8 Inclusion of additional species for species credits

Where a significant species that requires species credits was not predicted to occur through the filtering process but is found on a development site, that species must be included in the calculation of offset credits for the site.

### 5. Calculating credits

This section provides rules and the equations for calculating the number and type of credits required at a development site or created at an offset site.

#### 5.1 Ecological community credits

Ecological community credits represent general protected matter values. The number of credits required at a development site or created at an offset site is determined by summing the credits for each vegetation zone in the site. Credit profiles are created for individual zones, except where there is more than one zone of the same vegetation type in moderate to good condition.

Ecological community credits are determined by **Equation 5** for a development site.

#### Equation 5: Ecological community credits required at a development site for general protected matter values

Number of ecological community credits required for a vegetation zone at a development site	$= (\Delta S_{loss} \times A) + (LV \times A)$
---	--

where  $\Delta S_{loss}$  is the change (loss) in the *Site Value* score of a vegetation zone at the development site, as defined by **Equation 2**.

A is the area in hectares of the vegetation zone at the development site.

LV is the Landscape Value score for the development site as determined by **Equation 4**.

Ecological community credits are determined by **Equation 6** for an offset site.

**Equation 6: Ecological community credits created at an offset site for general protected matter values**

Number of ecological community credits created for a vegetation zone at an offset site	$= \left[ \left\{ \left( \frac{S_{current}}{10} \right) + \Delta S_{gain} \right\} \times A \right] + \Delta LV_{gain} \times A$
--	--

Where  $S_{current}$  is the current *Site Value* score of the vegetation zone as defined by **Equation 1**.  
 $\Delta S_{gain}$  is the change (gain) in the *Site Value* score of the vegetation zone at the offset site, as defined by **Equation 3**.  
 $A$  is the area in hectares of the vegetation zone at the offset site.  
 $\% \Delta LV_{gain}$  is the proportion of the total Landscape Value gain score for the offset site, as determined by **Equation 4**, apportioned to the vegetation zone.

**5.2 Calculating ecological community credits for significant species**

A calculation of ecological community credits for significant species must be undertaken if a significant species that requires ecological community credits is likely to use land within a vegetation zone at the development site. A significant species is determined to be likely to use land within a vegetation zone if it meets the criteria used in filtering for the species in **Section 4.2**

Ecological community credits for significant species calculations are based on the site attributes associated with the habitat of the species, as identified in the Significant Species Database. Losses in site attributes are averaged across all attributes reduced by the development as shown in **Equation 7**.

**Equation 7: Ecological community credits – determining the change (loss) in *Site Value* score for a significant species at a development site**

$\Delta S_{L_{spp1}} = \frac{a_{vc} - a_{vf}}{3} \times 100$
--

where  $\Delta S_{L_{spp1}}$  is the change (loss) in the score for site attributes that are relevant to Species 1, which is the species that is predicted to use land within the vegetation zone and which requires the greatest number of credits.

$a_{vc}$  is the average of all current attribute scores (maximum value for each attribute is 3) for the  $v$ th site attributes (a–j) as defined in Table 1, where the  $v$ th attributes are identified in the Significant Species Database as being attributes that are associated with the habitat of Species 1.

$a_{vf}$  is the average of the future attribute scores (maximum value for each attribute is 3) for the  $v$ th site attributes (a–j) as defined in Table 1, where the  $v$ th attributes are identified in the Significant Species Database as being attributes that are associated with the habitat of Species 1.

Note: The maximum site loss score is 100, which is proportionally reduced if the relevant site attributes do not start in the highest condition.

The number of ecological community credits for a significant species is then calculated separately for each significant species that is likely to use land within the vegetation zone using **Equation 8** below.

Once the credit requirements for each significant species that is likely to use land within a vegetation zone have been calculated, the number of ecological community credits for significant species required at a development site is based on the species with the highest credit requirements.

The number of credits required for the significant species is weighted by the ability of the species to respond to improvement in *Site Value* with management actions on the offset site ( $T_G$ ).

#### Equation 8: Ecological community credits at the development site by zone

$$\text{Number of ecological community credits required for a vegetation zone at the development site} = \left[ \frac{\Delta S_{L \text{ spp1}} \times A}{T_{G \text{ spp1}}} + (LV \times A) \right]$$

where,

$\Delta S_{L \text{ spp1}}$  is the change (loss) in the score of the particular site attributes that are relevant to the habitat requirements of Species 1, as determined by **Equation 7**. Species 1 is the species that is predicted to use land within the vegetation zone and which requires the greatest number of credits.

LV the Landscape Value score for the development site as determined by **Equation 4**.

$T_{G \text{ spp1}}$  is the ability of a species to respond to improvement in *Site Value* with management actions at an offset site.  $T_{G \text{ spp1}}$  is identified for each species in the Significant Species Database and has values between 0.1 and 1.

A is the area in hectares of the vegetation zone.

### 5.3 Final calculation of ecological community credits at a development site

The final calculation of ecological community credits for a vegetation zone required at a development site is undertaken by comparing the number of ecological community credits required for general protected matter values with the number required for significant species. The final number of ecological community credits is the highest number of credits required for that zone using **Equation 9**.

The number of ecological community credits at both the development and offset sites is scaled by a factor of 0.25. The number of credits is then rounded to the nearest whole number using conventional rounding rules, except if the number is less than one, in which case the number of credits is one.

The total number of ecological community credits required for the entire site is determined by summing the number required for all vegetation zones on the site as shown in **Equation 9**.

### Equation 9: Ecological community credits – final credit calculations at the development site

$$\text{Total ecological community credits required at the development site} = \sum_{i=1}^n \left[ \text{Ecological community credits required for vegetation zone } i \text{ at the development site} \right]$$

a) If  $(\Delta S_{\text{loss}} + LV) \geq \left[ \frac{\Delta S_{L \text{ spp1}}}{T_{G \text{ spp1}}} \right] + LV$  for vegetation zone  $i$ , then

$$\left[ \text{Ecological community credits required for vegetation zone } i \text{ at the development site} \right] = \left[ (\Delta S_{\text{loss}} \times A) + (LV \times A) \right] \times 0.25$$

b) If  $(\Delta S_{\text{loss}} + LV) < \left[ \frac{\Delta S_{L \text{ spp1}}}{T_{G \text{ spp1}}} \right] + LV$  for vegetation zone  $i$ , then

$$\left[ \text{Ecological community credits required for vegetation zone } i \text{ at the development site} \right] = \left\{ \left[ \frac{\Delta S_{\text{loss}}}{T_{G \text{ spp1}}} \times A \right] + (LV \times A) \right\} \times 0.25$$

Where,

$i$  is the  $i$ th vegetation zone to be impacted at the development site.

$\Delta S_{\text{loss}}$  is the change (loss) in the *Site Value* score of a vegetation zone at the development site.

$LV$  is the Landscape Value score for the development site as determined by **Equation 4**.

$\Delta S_{L \text{ spp1}}$  is the change (loss) in *Site Value* score that is relevant for Species 1, as determined by **Equation 8**. Species 1 is the species that is predicted to use land within the vegetation zone and which requires the greatest number of credits.

$T_{G \text{ spp1}}$  is the ability of a species to respond to improvement in *Site Value* with management actions at an offset site.  $T_{G \text{ spp1}}$  is identified for each species in the Significant Species Profile Database and has values between 0.1 and 1.

$A$  is the area in hectares of the  $i$ th vegetation zone.

#### 5.4 Final calculation of ecological community credits at an offset site

At the offset site, the number of ecological community credits required is determined by summing the credits created for each vegetation zone from the predicted improvement in protected matter values from the management actions on the offset site using **Equation 10**.

The number of ecological community credits at the offset site is scaled by a factor of 0.25. The number of credits is rounded to the nearest whole number using conventional rounding rules, except if the number is less than one, in which case the number of credits is one.

**Equation 10: Ecological community credits –credit calculations for an offset site**

Number of ecological community credits created at an offset site	$= \sum_{i=1}^n$	$\left\{ \left( \frac{S_{\text{current}}}{10} + \Delta S_{\text{gain}} \right) \times A \right\} + (\% \Delta LV_{\text{gain}} \times A) \times 0.25$
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Where,

$i$  is the  $i$ th vegetation zone to be managed at the offset site.

$S_{\text{current}}$  is the current *Site Value* score of a vegetation zone at the offset site, as defined by **Equation 1**.

$\Delta S_{\text{gain}}$  is the change (gain) in the *Site Value* score of a vegetation zone at the offset site, as defined by **Equation 3**.

$\% \Delta LV_{\text{gain}}$  is the proportion of the total Landscape Value gain score for the offset site, as determined by **Equation 6**, apportioned to the vegetation zone.

$A$  is the area in hectares of the  $i$ th vegetation zone.

Where an offset site is to be transferred to a publically managed conservation reserve, final credits are then calculated using **Equation 11**. Where an offset site is to be transferred to a publically managed special purpose reserve or catchment area, final credits are then calculated using **Equation 12**. Where an offset site is to be managed as urban open space or hills ridges buffers, final credits are then calculated using **Equation 13**. Where an offset site is to be transferred to a privately managed reserve or as public unleased land, final credits are then calculated using **Equation 14**.

**Equation 11: Ecological community credits – final credit calculations for an offset site that is being transferred to the publically managed conservation reserve network**

Number of ecological community credits created at an offset site which is being transferred to the public reserve system	=	Number of ecological community credits created at an offset site	X 1.4
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**Equation 12: Ecological community credits – final credit calculations for an offset site that is being transferred to the publically managed special purpose reserve network/Catchment area**

$$\boxed{\text{Number of ecological community credits created at an offset site which is a new Special Purpose Reserve}} = \boxed{\text{Number of ecological community credits created at an offset site}} \times 1.3$$

**Equation 13: Ecological community credits – final credit calculations for an offset site that is being transferred to the publically managed open space/Hills Ridges Buffers**

$$\boxed{\text{Number of ecological community credits created at an offset site which is a Open Space/Hills Ridges Buffers}} = \boxed{\text{Number of ecological community credits created at an offset site}} \times 1.2$$

**Equation 14: Ecological community credits – final credit calculations for an offset site that is being transferred to a privately managed reserve**

$$\boxed{\text{Number of ecological community credits created at an offset site which is a private reserve}} = \boxed{\text{Number of ecological community credits created at an offset site}} \times 1.1$$

### 5.5 Calculation of species credits at a development site

The species to which the calculation of species credits applies are identified through the assessment process in **Section 4.2**.

The number of species credits required at the development site is calculated for individual species based on the area of habitat, number of individuals, number of hollow-bearing trees, number of habitat trees or campsites likely to be impacted by development using **Equation 15**.

The number of species credits at both the development and offset site are scaled by a factor of 10. The number of credits is rounded to the nearest whole number using conventional rounding rules, except if the number being rounded is less than one, in which case the number of credits is rounded to one.

### Equation 15: Species credits – number of credits required at the development site

$$\text{Number of species credits required for a significant species at the development site} = \frac{H_{\text{loss}}}{T_{G \text{ spp1}}} \times 10$$

Where the Significant Species Database indicates that the unit of measurement of impact for a species is the area of habitat (mostly fauna), then:

- $H_{\text{loss}}$  is the area of habitat in hectares to be lost at the development site, as determined in accordance with **Section 4.5**.
- $T_{G \text{ spp1}}$  is the ability of the species to respond to improvement in *Site Value* with management actions at the offset site.  $T_{G \text{ spp1}}$  is a value identified for each species in the Significant Species Database and has values between 0.1 and 1.

Where the Significant Species Database indicates that the unit of measurement of impact for a species is the number of individuals (mostly flora), then:

- $H_{\text{loss}}$  is the number of individuals to be lost at the development site, as determined in accordance with **Section 4.5**.
- $T_{G \text{ spp1}}$  is the ability of the species to respond to improvement in *Site Value* with management actions at the offset site.  $T_{G \text{ spp1}}$  is a value identified for each species in the Significant Species Database and has values between 0.1 and 1.

Where the Significant Species Database indicates that the unit of measurement of impact for a species is the number of hollow bearing trees, number of habitat trees or number of campsites, then:

- $H_{\text{loss}}$  is the number of trees or campsites to be lost at the development site, as determined in accordance with **Section 4.5**.
- $T_{G \text{ spp1}}$  is the ability of the species to respond to improvement in *Site Value* with management actions at the offset site.  $T_{G \text{ spp1}}$  is a value identified for each species in the Significant Species Database and has values between 0.1 and 1.

The scaling factor of 10 applies on both development and offset sites.

### 5.6 Calculation of species credits at an offset site

The number of species credits created at the offset site is calculated for individual species based on the area of habitat, number of individuals, number of hollow-bearing trees, number of habitat trees or number of campsites of a significant species predicted to be impacted positively by management actions within a species polygon using **Equation 16**.

#### Equation 16: Species credits – number of credits created at the offset site

$$\begin{array}{l} \text{Number of species credits} \\ \text{created for a species at} \\ \text{the offset site} \end{array} = H_{\text{current}} \times \% \Delta S_{\text{gain}} \times 10$$

Where the Significant Species Database indicates that the unit of measurement of impact for a species is the area of habitat (mostly fauna), then:

- $H_{\text{current}}$  is the current area of habitat in hectares for the species that will be improved by the management actions at the offset site, as determined in accordance with **Section 4.5**.
- $\% \Delta S_{\text{gain}}$  is the proportional gain in habitat for the species from the management actions, usually measured as proportional gain in *Site Value* score (as defined by Equation 3) for the vegetation zone that contains the species polygon. A value of 0.60 (60%) is used as the default value for  $\% \Delta S_{\text{gain}}$  where improvement in *Site Value* cannot be measured directly.
- $H_{\text{current}} \times \% \Delta S_{\text{gain}}$  measures the gain in habitat in hectares at the offset site from the management actions.

Where the Significant Species Database indicates that the unit of measurement of impact for a species is the number of individuals (mostly flora), then:

- $H_{\text{current}}$  is the current number of individuals of the species that will be increased by the management actions at the offset site, as determined in accordance with **Section 4.5**.
- $\% \Delta S_{\text{gain}}$  is the proportional gain in number of the species from the management actions, usually measured as proportional gain in *Site Value* score (as defined by Equation 3) for the vegetation zone that contains the species polygon. A value of 0.60 (60%) is used as the default value for  $\% \Delta S_{\text{gain}}$  where improvement in *Site Value* cannot be measured directly.
- $H_{\text{current}} \times \% \Delta S_{\text{gain}}$  measures the gain in number of individuals of the species at the offset site from the management actions.

Where the Significant Species Database indicates that the unit of measurement of impact for a species is the number of hollow-bearing trees, number of habitat trees or number of campsites, then:

- $H_{\text{current}}$  is the current number of trees or campsites of the species that will be increased by the management actions at the offset site, as determined in accordance with **Section 4.5**.
- $\% \Delta S_{\text{gain}}$  is the proportional gain in number of units from management actions, usually measured as proportional gain in *Site Value* score (as defined by Equation 3) for the vegetation zone that contains the species polygon. A value of 0.60 (60%) is used as the default value for  $\% \Delta S_{\text{gain}}$  where improvement in *Site Value* cannot be measured directly.
- $H_{\text{current}} \times \% \Delta S_{\text{gain}}$  measures the gain in number of trees or campsites of the species at the offset site from the management actions.

The scaling factor of 10 applies on both the development and offset sites.

#### 5.7 Final calculation of species credits at an offset site

Where an offset site is to be transferred to a publically managed conservation reserve, final credits are then calculated using **Equation 17**. Where an offset site is to be transferred to a publically managed special purpose reserve or catchment area, final credits are then calculated using **Equation 18**. Where an offset site is to be managed as urban open space or hills ridges buffers, final

credits are then calculated using **Equation 19**. Where an offset site is to be transferred to a privately managed reserve or as public unleased land, final credits are then calculated using **Equation 20**.

**Equation 17: Ecological community credits – final credit calculations for an offset site that is being transferred to the publically managed conservation reserve network**

$$\begin{array}{|c|} \hline \text{Number of ecological} \\ \text{community credits} \\ \text{created at an offset site} \\ \text{which is being transferred} \\ \text{to the public reserve} \\ \text{system} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Number of} \\ \text{ecological} \\ \text{community credits} \\ \text{created at an offset} \\ \text{site} \\ \hline \end{array} \times 1.4$$

**Equation 18: Ecological community credits – final credit calculations for an offset site that is being transferred to the publically managed special purpose reserve network/Catchment area**

$$\begin{array}{|c|} \hline \text{Number of ecological} \\ \text{community credits} \\ \text{created at an offset} \\ \text{site which is a new} \\ \text{Special Purpose} \\ \text{Reserve} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Number of} \\ \text{ecological} \\ \text{community credits} \\ \text{created at an offset} \\ \text{site} \\ \hline \end{array} \times 1.3$$

**Equation 19: Ecological community credits – final credit calculations for an offset site that is being transferred to the publically managed open space/Hills Ridges Buffers**

$$\begin{array}{|c|} \hline \text{Number of ecological} \\ \text{community credits} \\ \text{created at an offset} \\ \text{site which is a Open} \\ \text{Space/Hills Ridges} \\ \text{Buffers} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Number of} \\ \text{ecological} \\ \text{community credits} \\ \text{created at an offset} \\ \text{site} \\ \hline \end{array} \times 1.2$$

**Equation 20: Ecological community credits – final credit calculations for an offset site that is being transferred to a privately managed reserve**

$$\begin{array}{|c|} \hline \text{Number of ecological} \\ \text{community credits} \\ \text{created at an offset} \\ \text{site which is a private} \\ \text{reserve} \\ \hline \end{array} = \begin{array}{|c|} \hline \text{Number of} \\ \text{ecological} \\ \text{community credits} \\ \text{created at an offset} \\ \text{site} \\ \hline \end{array} \times 1.1$$

## 6. Existing conservation management obligations

### 6.1 Existing conservation management obligations – leasehold land

Additionality requires offset credits to only be created for management actions that are not already required to be carried out pursuant to existing conservation obligations.

If an offset is proposed for land that is subject to one or more of these existing obligations, the allocation of credits for the offset 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.

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 existing arrangements. For example, if the existing agreement specifies that weed control must be undertaken, then the credit allocation for the offset site is discounted by 7.5%.

While there is an existing duty of care for private leasehold land as established through land management agreements, the discounts apply to offset management plans, voluntary conservation agreements or biobanking agreements or stewardship programs where Commonwealth funding has been provided for the direct management of the site. This is to provide equity across the ACT and NSW border to ensure that ACT landholders are not disadvantaged by having a higher duty of care than landholders in NSW.

**Table 7 Percentage discount in ecological community credit allocation for existing conservation measures secured through offset management plans, voluntary conservation agreements, biobanking agreements and Commonwealth funded stewardship programs**

Conservation measures or actions	Percentage discount in ecological community credit allocation
Manage grazing for conservation	7.5%
No grazing of domestic stock	5%
Manage fire for conservation	7.5%
Weed control	7.5%
Manage human disturbance	7.5%
Retain regrowth	7.5%
Replant/supplementary planting	7.5%
Retain dead timber	7.5%
No collection of fallen timber for commercial purposes	1%
Nutrient control	5%
Retention of rocks	5%
Control feral herbivores (plus overabundant natives)	7.5%
Vertebrate pest management (foxes, pigs and/or miscellaneous species)	7.5%
Control exotic fish species	1%
Maintain natural flow regimes	1%

**Table 8 Percentage discount for species credits - Conservation measures or actions - Percentage discount in species credit allocation for existing conservation measures secured through offset management plans, voluntary conservation agreements, biobanking agreements and Commonwealth funded stewardship programs**

Conservation measures or actions	Percentage discount in species credit allocation
Control feral herbivores rabbits, deer and/or miscellaneous species	7.5%
Vertebrate pest management (foxes, pigs and/or miscellaneous species)	7.5%
Manage overabundant native species	7.5%
Control exotic fish species	1%
Maintain natural flow regimes	1%
Nutrient control	1%
Any other management action for species credits	7.5% (for each additional action)

## 6.2 Existing conservation obligations – public land

Offsets on public land can be secured through a range of mechanisms. Public land offsets have a range of governance mechanisms that ensure they are permanent, secure, subject to transparent management arrangements (through Plans of Management) and are subject to scrutiny. The Environmental Offsets Policy provides additional guidance on how to adjust existing conservation obligations for each type of public land offset.

**Table 9 Percentage discount in ecological community credit allocation for existing conservation measures or actions on public land**

Type of land	ACT EOC discounts
Unleased Territory land	Exclusion of fire 5%
Urban Open Space/ Hills Ridges Buffers/River corridors	Exclusion of fire 5% Weed control 7.5% Erosion control 5% Control feral herbivores (rabbits/deer etc.) 7.5%
Special Purpose Reserve	Exclusion of fire 5% No grazing of domestic stock 5% Weed control 7.5% Erosion control 5% Control feral herbivores (rabbits/deer etc.) 7.5%
Existing conservation reserves (wilderness areas/national parks/nature reserves)	Exclusion of fire 5% Weed control 7.5% Manage human disturbance 7.5% No collection of fallen timber for commercial purposes 1% Erosion control 5% Retention of rocks 5% Control feral herbivores (rabbits/deer etc.) 7.5% Vertebrate pest management (foxes, pigs etc.) 7.5% Control exotic fish species 1%

While there is an existing duty of care for weed and pest animal management on unleased territory land the duty of care for this land is lower than other types of public land. This type of land may be identified as future urban land. Weed and pest animal management would be negligible, or related to the development of the land.

**Table 10 Percentage discount for species credits – Public Land**

Conservation measures or actions	Percentage discount in species credit allocation
Control feral herbivores rabbits, deer and/or miscellaneous species	7.5%
Vertebrate pest management (foxes, pigs and/or miscellaneous species)	7.5%
Manage overabundant native species	7.5%
Control exotic fish species	1%
Maintain natural flow regimes	1%
Nutrient control	1%
Any other management action for species credits	7.5% (for each additional action)

## 7. Certainty credits – offset sites

The consequences for not achieving the conservation outcomes is an important consideration. The premise of applying a certainty score is that reservation adds security and provides additional ecosystem services through incorporating the area into a protected area network.

Suitable offsets must effectively account for and manage the risks of the offset not succeeding. This risk relates to whether individual offsets are likely to be successful in compensating for the residual impacts of a particular action over a period of time.

This risk is considered in determining a suitable offset and has direct bearing on the scale of the offset required. The magnitude of a suitable offset will increase proportionately to the risk posed to the protected matter by the proposed action. The ACT EOC includes a score to recognise the long-term certainty of outcomes. The score applies to reservation of conservation reserves only from unleased public land. **Table 11** indicates the appropriate increase in the offset site score to recognise both a higher duty of care and increased certainty about the long-term maintenance of the offset site values.

**Table 11 - Certainty scores**

Certainty attribute	Certainty multiplier	Justification
Conservation reserve (wilderness/national park/nature reserve)	40%	<ul style="list-style-type: none"> <li>○ primary purpose nature conservation</li> <li>○ highest level of security</li> <li>○ managed under the Nature Conservation Act</li> <li>○ significant penalties apply to clearing and damaging land</li> <li>○ use can be restricted using Resource Protection areas</li> <li>○ higher duty of care applies</li> </ul>
Special Purpose Reserve/catchment areas	30%	<ul style="list-style-type: none"> <li>○ purpose of reservation includes conservation as well as other purposes</li> <li>○ management plan applies</li> <li>○ managed under the Nature Conservation Act</li> <li>○ significant penalties apply to clearing and damaging reserves</li> <li>○ use can be restricted using Resource Protection areas</li> <li>○ permits for use</li> <li>○ higher duty of care applies</li> <li>○ requires Territory Plan variation for change</li> </ul>
Urban Open Space/other reserves/Hills Ridges/Buffers/River Corridor	20%	<ul style="list-style-type: none"> <li>○ areas managed for multiple values, such as landscape</li> <li>○ managed under Planning and Development Act</li> <li>○ Reserve Management provisions do not apply</li> <li>○ lower duty of care/requires more management</li> </ul>
Biobanking agreements/lease agreements	10%	<ul style="list-style-type: none"> <li>○ Lease agreements once agreed require approval for sale</li> <li>○ lease can include withdrawal clauses</li> <li>○ ongoing management through Offset Management Plan</li> <li>○ less public oversight</li> <li>○ lower duty of care</li> <li>○ areas smaller, less connected, subject to higher edge ratios</li> </ul>
Public unleased land	0%	<ul style="list-style-type: none"> <li>○ public unleased land can include roadsides, land banked for future urban uses etc.</li> </ul>

## 8. Additional matters and further information

### 8.1 Offset rules for using credits

Offsets for a proposed development will need to demonstrate that the arrangements improve or maintain protected matter values.

The conditions of approval for a development application may 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 an offset site must be compatible with those required at a development site.

Offset credits that are over what is needed for a particular development may be able to be used against additional developments in the future. Contact the Directorate for further guidance.

### 8.2 Flagged developments

An Environmental Offset Assessment may result in a development being 'flagged'. A flag identifies an area of land (part of a development site) with significant protected matter values. When an impact on a species or ecological community is flagged in the ACT EOC, the impact of the development on the protected values requires additional consideration by the Conservator as to whether offsets are appropriate.

An area of land is flagged if the vegetation is not in low condition and it contains one or more of the following:

1. One or more significant species identified in the significant species database that cannot withstand further loss in the ACT because the species' current occurrence in the ACT is such that it cannot suffer any further loss, without a strong possibility of extinction within the ACT.
2. The woodland/forest present is in an "old growth" condition. Old growth forest/woodland is ecologically mature forest/woodland where the effects of disturbance are now negligible. Old growth must have the following attributes:
  - an old growth forest patch must be at least 5ha;
  - the overstorey is in late to over-mature growth stage with the presence of large old trees (many containing hollows and often with the presence of dieback or dead branches in the crown); and
  - the age (growth) structure of the stand measured as relative crown cover consists of less than 10% of regeneration and advance growth, and more than 10% of late to over mature (senescent) growth – "advance growth" comprises any tree regrowth that has become established in advance of regeneration.

3. Category 1 or Category 2 grassland as described and mapped in Action Plan No. 28. *ACT Lowland Native Grassland Conservation Strategy (2005)* Environment ACT, unless it can be demonstrated that the area of clearance is a peripheral component (i.e. on the edge) of a grassland remnant; AND is not habitat of significant grassland fauna (or habitat of the Golden Sun Moth); AND has only five or less native herbs in the most diverse 20x20m of the area of investigation; AND is devoid of any significant or regionally rare plants<sup>5</sup>.

Please note: If a development site contains an area of native grassland that includes an area of significant or regionally rare plants, the entire area of native grassland should be flagged.

4. Partially modified or moderately modified lowland woodland of high connectivity as described below:
  - a. Partially modified lowland woodland as mapped within Action Plan 27. *ACT Lowland Woodland Conservation Strategy (2004)* Environment ACT, or if unmapped the woodland needs to contain large hollow-bearing trees and an understorey in which two or more of the following species are present:

- |   |   |
|---|---|
| ○ <i>Amphibromus nervosus</i>                       | ○ <i>Leucochrysum albicans</i> var. <i>tricolor</i> |
| ○ <i>Arthropodium minus</i>                         | ○ <i>Limosella australis</i>                        |
| ○ <i>Bossiaea prostrata</i>                         | ○ <i>Lotus australis</i>                            |
| ○ <i>Brachyscome heterodonta</i>                    | ○ <i>Microseris lanceolata</i>                      |
| ○ <i>Burchardia umbellata</i>                       | ○ <i>Opercularia hispida</i>                        |
| ○ <i>Caesia calliantha</i>                          | ○ <i>Ophioglossum lusitanicum</i>                   |
| ○ <i>Calocephalus citreus</i>                       | ○ <i>Pentapogon quadrifidus</i>                     |
| ○ <i>Calotis lappulacea</i>                         | ○ <i>Pimelea linifolia</i>                          |
| ○ <i>Carex bichenoviana</i>                         | ○ <i>Polygala japonica</i>                          |
| ○ <i>Craspedia variabilis</i>                       | ○ <i>Sorghum leiocladum</i>                         |
| ○ <i>Cullen microcephalum</i>                       | ○ <i>Stuartina muelleri</i>                         |
| ○ <i>Cullen tenax</i>                               | ○ <i>Swainsona monticola</i>                        |
| ○ <i>Dianella longifolia</i> var. <i>longifolia</i> | ○ <i>Swainsona recta</i>                            |
| ○ <i>Dichanthium sericeum</i>                       | ○ <i>Swainsona sericea</i>                          |
| ○ <i>Desmodium brachypodum</i>                      | ○ <i>Rutidosia leptorrhynchoides</i>                |
| ○ <i>Dichopogon fimbriatus</i>                      | ○ <i>Thesium australe</i>                           |
| ○ <i>Diuris pedunculata</i>                         | ○ <i>Thysanotus tuberosus</i>                       |
| ○ <i>Leptorhynchos elongates</i>                    | ○ <i>Zornia dyctiocarpa</i> var. <i>dyctiocarpa</i> |

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<sup>5</sup> *The Nature Conservation Act 2014* provides for the listing of protected species and includes a category for rare species. Once species are listed in this category, the list will be included in the Manual, as well as on the Legislation Register. A draft list can be provided on request.

- b. Moderately modified lowland woodland as mapped within Action Plan 27. ACT Lowland Woodland Conservation Strategy (2004) Environment ACT, or which has both an overstorey of large hollow-bearing trees and a predominately native understorey present, in which one or more of the species are present:

- |  |  |
|--|--|
| ○ <i>Amphibromus nervosus</i>                | ○ <i>Limosella australis</i>                 |
| ○ <i>Arthropodium minus</i>                  | ○ <i>Lotus australis</i>                     |
| ○ <i>Bossiaea prostrata</i>                  | ○ <i>Microseris lanceolata</i>               |
| ○ <i>Brachyscome heterodonta</i>             | ○ <i>Opercularia hispida</i>                 |
| ○ <i>Burchardia umbellata</i>                | ○ <i>Ophioglossum lusitanicum</i>            |
| ○ <i>Caesia calliantha</i>                   | ○ <i>Pentapogon quadrifidus</i>              |
| ○ <i>Calocephalus citreus</i>                | ○ <i>Pimelea linifolia</i>                   |
| ○ <i>Calotis lappulacea</i>                  | ○ <i>Polygala japonica</i>                   |
| ○ <i>Carex bichenoviana</i>                  | ○ <i>Sorghum leiocladum</i>                  |
| ○ <i>Craspedia variabilis</i>                | ○ <i>Stuartina muelleri</i>                  |
| ○ <i>Cullen microcephalum</i>                | ○ <i>Swainsona monticola</i>                 |
| ○ <i>Cullen tenax</i>                        | ○ <i>Swainsona recta</i>                     |
| ○ <i>Dianella longifolia var longifolia</i>  | ○ <i>Swainsona sericea</i>                   |
| ○ <i>Dichanthium sericeum</i>                | ○ <i>Rutidosia leptorrhynchoides</i>         |
| ○ <i>Desmodium brachypodum</i>               | ○ <i>Thesium australe</i>                    |
| ○ <i>Dichopogon fimbriatus</i>               | ○ <i>Thysanotus tuberosus</i>                |
| ○ <i>Diuris pedunculata</i>                  | ○ <i>Zornia dyctiocarpa var. dyctiocarpa</i> |
| ○ <i>Leptorhynchos elongatus</i>             |  |
| ○ <i>Leucochrysum albicans var. tricolor</i> |  |

If a development is flagged then the proponent should refer the proposal to the Conservator of Flora and Fauna. In some circumstances, it may be possible to provide an offset for an impact on a protected matter in a flagged area. Before providing advice on a development that includes a 'flagged' element the Conservator would need to be satisfied that all reasonable measures have been considered to:

- avoid and minimise the adverse impacts of development on the flag area(s); or
- improve the viability of the protected matters in the flagged area. This includes consideration of whether appropriate conservation management arrangements can be established over the flagged area given its current ownership, and the likely costs of future management.

However, approval of the offset arrangements would need to be consistent with the [ACT Environmental Offsets Policy](#).

The Conservator of Flora and Fauna can be contacted via email at [environment@act.gov.au](mailto:environment@act.gov.au)

### **8.3 Expert Reports**

The ACT EOC can substitute use of an expert report rather than undertaking a survey. The Conservator can identify appropriate experts, which may be from within Conservation Planning and Research or outside of the ACT Government. Costs of securing expert advice are the responsibility of the proponent. An expert is considered to be a person who has the relevant experience and/or qualifications to provide expert opinion in relation to the protected matter values to which an expert report relates. The Conservator of Flora and Fauna can be contacted on this matter via email at [environment@act.gov.au](mailto:environment@act.gov.au).

### **8.4 Indirect offsets**

The ACT EOC only calculates direct offset credit requirements. The Policy allows for the use of indirect offsets in certain circumstances. The [ACT Environmental Offsets Policy](#) identifies those circumstances. Generally, the development is only required to meet 90% of offset requirements through direct offsets which are calculated using the ACT EOC.

### **8.5 Documenting the outcomes of the environmental offset assessment**

The proponent must submit the required documents outlined in the Scoping Document for an Environmental Impact Statement.

For further information on the methodology or about environmental offsets please contact:

Natural Environment Policy Team  
Email: [envoffsets@act.gov.au](mailto:envoffsets@act.gov.au)  
Environment and Planning Directorate  
GPO Box 158  
CANBERRA ACT 2601

## 9. Glossary

**ACT Environmental Offsets 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 an offset site.

**ACT Environmental Offsets Calculator Operational Manual** (the [operational manual](#)) Provides instructions on how to apply the Assessment Methodology and using the Environmental Offsets Calculator, including the collection of data and field survey methods.

**ACT region** One of three geographic areas used to filter significant species. These are: North of Molonglo River, River Corridor and South of Molonglo River.

**ACT Subregion** One of nine geographic areas within the three ACT regions which have a particular suite of significant species associated with them.

**Biodiversity values** These include the composition, structure and function of ecosystems, and (but not limited to) significant species and ecological communities, and their habitats. For the purposes of the Environmental Offsets Calculator this does not include aquatic ecosystems or species.

**Calculator** *see* **Environmental Offsets Calculator**.

**Connectivity** A measure of the degree to which an area (or areas) of native vegetation are linked with other areas of vegetation.

**Credits** Ecological community or species credits required to offset the loss of biodiversity values on development sites or created on offset sites from management actions that improve biodiversity values.

**Credit Calculator** *see* **Environmental Offsets Calculator**.

**Environmental offsets** One or more appropriate actions put in place in an appropriate location to compensate an impact on biodiversity values.

**Development site** An area of land that is subject to a proposed development.

**Ecological community credit** The class of credits created or required for impacts on general biodiversity values and some significant species (species which can be reliably predicted by vegetation). Species that require ecological community credits are listed in the [Significant Species Database](#).

**EPBC Act** means *Environment Protection and Biodiversity Conservation Act 1999*.

**Expert** 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.

**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 flag area cannot be offset by the retirement of biodiversity credits unless the Conservator of Flora and Fauna determines that strict avoidance of the flag area is unnecessary in the circumstances.

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

**Habitat Context (nearest neighbour)** Assesses how a patch of vegetation sits in relation to other vegetation patches

**Individual** A single organism.

**Landscape Value** A measure of fragmentation, connectivity and adjacency of native vegetation at a site. Landscape Value comprises:

- habitat context (nearest neighbour) – a measure of how a patch of vegetation sits in relation to other vegetation patches; and
- link value – a measure of how important a patch of vegetation is to linking large patches of vegetation.

**Large old trees** Trees with a diameter at breast height of 70cm or greater.

**Late to over-mature growth stage** (senescent or partly dying) growth stage with the presence of large old trees, many containing hollows and often with the presence of dieback or dead branches in the crown.

**Link Value** A measure of how important a patch of vegetation is to linking large patches of vegetation.

**Low condition vegetation** is:

- paddock trees - native over-storey percent foliage cover is less than 25% of the lower value of the overstorey percent foliage cover benchmark for that vegetation type and less than 50% of ground cover perennial vegetation is indigenous species; and
- native pasture - trees are absent or form less than 1% cover. The understorey is predominately comprised of native grasses, and there are five or less native herbs within the most diverse 20x20m of the area of investigation.

**Management actions** An action carried out at an offset site in order to improve or maintain biodiversity values.

**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.

**Moderate to good condition vegetation** Native vegetation that is not in low condition.

**Native Pasture** Trees are absent or form less than 1% cover. The understorey is predominately comprised of native grasses, and there are five or less native herbs within the most diverse 20 x20m of the area of investigation.

**Nearest Neighbour Value** see **Habitat context**

**Offset site** Land designated by conditions of approval to be managed to offset the impacts on a development site.

**Operational manual** see **Environmental Offsets Calculator Operational Manual**

**Paddock Trees** Where the native over-storey percent foliage cover is less than 25% of the lower value of the overstorey percent foliage cover benchmark for that vegetation type and less than 50% of ground cover perennial vegetation is indigenous species. For example Yellow Box- Blakely's Red Gum woodland has a benchmark overstorey cover of between 11 -32%. Where tree cover is less than 2.75% and the understorey is predominately exotic these trees would be regarded as paddock trees.

**Patch size** The area of native vegetation that includes the development or offset site significant species sub zone area, plus any adjoining native vegetation of a similar vegetation structure in the same or better condition on and off the site that is not separated by more than 100m (for woody vegetation) or more than 30m (for non-woody vegetation).

**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.

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

**Region** see **ACT region**

**Site attributes** Attributes used to assess *Site Value* and significant 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 significant species that cannot be reliably predicted to use an area of land based on vegetation. Species that require species credits are listed in the Significant Species Database.

**Species polygon** The actual area of habitat, or number of individuals of a significant species, impacted by development at the development site or by management actions at the offset site.

**Subregion** see **ACT subregion**

**Significant Species Database** The [Significant Species Database](#) contains 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 ecological or species credits, filtering to determine the likely presence of significant species, and provides information on significant species' ability to withstand loss.

**Tg value** the ability of a species to respond to improvement in *Site Value* or other habitat improvements at an offset site due to management actions. The lower the Tg value the less able the species is to respond to improvements and the greater the number of credits required.

**Vegetation zone** The area of vegetation that is initially assessed to determine which significant species are assessed for biodiversity credits at a development site and an offset site.

**Significant species survey** A targeted survey for a significant species, undertaken in accordance with ACT government guidelines to determine if the species is present.

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

**Vegetation Benchmarks** Vegetation Benchmarks are 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. See [Vegetation Benchmarks Database](#).

**Vegetation Benchmarks Database** The [Vegetation Benchmarks Database](#) provides benchmarks for vegetation classes and some vegetation types.

**Vegetation formation** A broad level of vegetation classification, as in the [Vegetation Types Database](#).

**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.

**Vegetation Types Database** The [Vegetation Types Database](#) which contains information on each vegetation type used in the methodology and comprises a description of each vegetation type, its class and formation, the region within which the vegetation type occurs, the percent cleared value of the vegetation type, and the source of the information.

**Vegetation zone** A relatively homogenous area in a development or offset 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 (as a sub zone). A zone may comprise one or more discontinuous areas.

**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**.

## 10. References

- ACT Government (2004) *Woodlands for Wildlife: ACT Lowland Woodland Conservation Strategy. Action Plan No. 27*, Environment ACT, Canberra.
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