



Green Star

Change in Ecology Calculator Guide

Date Issued: May 2014

CHANGELOG

Version	Release Date	Description of Changes
1.0	August 2010	Release
2.0	June 2012	Updated for Green Star - Communities
3.0	May 2013	Updated for Green Star - Communities PILOT v0.1 - Updated 'Ecological Land Type Descriptions'

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1. Introduction

The Change of Ecological Value Calculator compares the relative ecological value of land at the time of site purchase and after development. Points are achieved where the ecological value of the site is either maintained, or increased.

The following information is required to use the Calculator:

- The bioregion in which the site is located;
- The area of each different ecological land type on the site before development**; and
- The area of each different ecological land type on the site after development**.

** Areas of vegetation can be provided to the nearest 10sqm, and must not be more than 100sqm units.

2. How the Calculator Works

The Change of Ecological Value Calculator is used to assess the different types of vegetative and non-vegetative cover on a proposed development site using the following:

- The different ecological land types have been assigned relative Ecological Weightings by qualified ecologists for comparative purposes only (refer to information following for further advice);
- The area of each land type is multiplied by the Ecological Weighting, for the site both before and after development, to give an Ecological Score for each;
- For existing native land types, wetlands and waterways the Ecological Score is multiplied by a Bioregion Reservation Importance Factor;
- A Total Ecological Score for the site both before and after development is determined by then adding the Ecological Scores for each land type;
- A comparative Ecological Diversity Index for the site before and after development is calculated by dividing the Total Ecological Score by the site area;
- The Change in Ecological Value is calculated by subtracting the Ecological Diversity Index (before) from the Ecological Diversity Index (after); and
- Credits are then awarded based on the Change in Ecological Value achieved.

3. Ecological Weightings

The ecological weightings are based on using the Draft National Framework for Assessing Native Vegetation Condition (EA, 2001) Decision Making Process. The following weightings, based on an average bioregion in Australia (refer below), were assigned.

Table 1 Relative ecological weightings for different land types

Ecological Land Type	Relative Ecological Weighting
Hard surface	0
Exotic vegetation	5
Non-improved pastures	35
Planted native vegetation	50
Regenerating native habitat (regrowth) < 5 years old	50
Regenerating native habitat (regrowth) 5 - 10 years old	75
Regenerating native habitat (regrowth) > 10 years old	90
Remnant native vegetation	100
Natural water-bodies	100
Artificial water-bodies	50

4. Ecological Land Type Descriptions

Ecological Land Type	Description
Hard surface	Concrete, paving, paths or roads. No vegetation present.
Exotic vegetation	Gardens, amenity plantings or landscaping consisting of exotic species. May also include highly degraded greenfield sites that consist predominantly of invasive exotic species (< 5% native vegetation cover).
Non-improved pastures	Former paddocks that have not been subjected to frequent ploughing, cropping or fertiliser applications. Should include at least 5 % native vegetation cover (otherwise 'Exotic vegetation' – see definition above) and less than 25% native vegetation cover (otherwise 'Remnant native vegetation - see definition below). Native vegetation will consist mostly of disturbance-tolerant species. Does not include sites that have a homogenous structure or species composition (i.e. monoculture).
Planted native vegetation	Gardens, amenity plantings, landscaping or revegetation consisting predominantly of native species.
Regenerating native habitat (regrowth) < 5 years old	An area supporting immature native vegetation that is regenerating following a disturbance event (e.g. clearing, ploughing, or fire) within the last 5 years.
Regenerating native habitat (regrowth) 5 - 10 years old	An area supporting immature native vegetation that is regenerating following a disturbance event (e.g. clearing, ploughing, or fire) within the last 5-10 years.
Regenerating native habitat (regrowth) > 10 years old	An area supporting immature native vegetation that is regenerating following a disturbance event (e.g. clearing, ploughing, or fire) more than 10 years ago.
Remnant native vegetation	An area supporting at least 25% cover of native vegetation that is remnant to the area, i.e. vegetation that naturally occurs in the local area and has not been planted. Also includes the canopy of any remnant native scattered trees that may exist in other ecological land types.
Natural water-bodies	A river, creek, stream, tributary, lake, billabong, drain, which largely retain their pre-European structure and physical characteristics. May include ephemeral water bodies that only periodically contain water, and water-bodies that have poor water quality and altered biotic assemblages or vegetation structure.
Artificial water-bodies	Any dam, weir, channel, pond or lake that has been constructed post European settlement.

5. Bioregion Reservation Importance Factor for Native Vegetation in Different Bioregions

To acknowledge that biodiversity importance varies across different regions of Australia, a Bioregion Reservation Importance Factor has been included in the Change in Ecological Value Credit Calculator. Using a Bioregion Reservation Importance Factor results in an increased Ecological Score being given to the native vegetation, wetlands and waterways in areas where the vegetation is less abundant and ecosystems are threatened.

The factors were developed following a review of:

- National Strategy for the Conservation of Biological Diversity (DEST, 1996);
- State of the Environment Reports (Williams, 2001; ASEC 1996 and 2001);
- National Land and Water Resource Audit reports including the Australian Terrestrial Biodiversity Assessment 2002 and Australian Native Vegetation Assessment 2001;
- Revision of Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1;
- Human Settlements Environmental Indicators for National State of the Environment Reporting (Newton et al., 1998); and
- National Framework for the Management and Monitoring of Australia's Native Vegetation (NRMMC, 2000).

To apply a Bioregion Reservation Importance Factor a consistent national set of information about the reservation priority for each of the bioregions was used. This assessment method is the Comprehensive, Adequate, Representative (CAR) System. This System has evaluated how comprehensive, adequate and representative the reserve system is across Australia. Commonwealth and State government officers have indicated that in the absence of other relevant data, the CAR System is the most appropriate for assigning conservation priorities.

The most recent assessment using the CAR System is in the National Land and Water Resources Audit Biodiversity Assessment Report. This report is available from the National Land and Water Resources Audit website, www.nlwra.gov.au. Further details about the CAR system are provided on the Department of Environment and Water Resources website www.environment.gov.au.

Each of the Bioregions has been assessed using the CAR system and a reservation priority rating assigned. There are five reservation priority categories, which are lowest, second lowest, medium, second highest and highest. For the purposes of creating the Bioregion Reservation Importance Factor, these categories have been assigned a numerical rating between 0.5 and 1.5 as follows:

Table 2. Bioregion importance factors

Category	Bioregion Reservation Importance Factor
Lowest	0.5
Second lowest	0.75
Medium	1.0
Second highest	1.25
Highest	1.5

The general location of the bioregions is shown on the map of Interim Biogeographic Regionalisation of Australia, Version 5.1. To determine which bioregion the development is in users should refer to the website of the relevant state government department.

Table 3. Bioregions for Australian capital cities (source: Department of the Environment and Water Resources)

City	Bioregion Name
Adelaide (East)	East Kanmantoo
Adelaide (West)	Flinders Lofty Block
Brisbane	South Eastern Queensland
Canberra	South Eastern Highlands
Darwin	Darwin Coastal
Hobart	Tasmanian South East
Melbourne (East)	South East Coastal Plain
Melbourne (West)	Victorian Volcanic Plain
Perth	Swan Coastal Plain
Sydney	Sydney Basin