Green Star – Public Building
Change in Ecological Value Calculator Guide

Date Issued: May 2013

CHANGELOG

Version	Release Date	Description of Changes
A	April 2013	Release

Table of Contents

green building council australia

greenstar

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:

- Whether the site contains endangered, threatened or vulnerable species;
- 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.

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.

There are several state and federal threatened species databases available. The Department of the Environment and Water Resource's Species Profile and Threats database can be searched by latitude and longitude for nationally listed threatened species and ecological communities.

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.

Ecological Land Type	Relative Ecological Weighting
Building	0
Impermeable/concreted area	0
Bare ground	0
Weed infestations	5
Exotic garden	5
Lawns	5
Native garden	15
Indigenous native garden*	25

green building council australia

green**star**

Date issued: 7 May 2013 / Version A

Green roof	35
Exotic grassland	5
Indigenous native grassland*	25
Crop farming	5
Constructed Wetland / riparian buffer strip	60
Existing wetland / riparian habitat*	75
Native plantation forest	15
Non-native plantation forest	5
Regenerated native habitat <5 years old*	35
Regenerated native habitat 5 to 10 years old*	50
Indigenous native habitat >10 years old*	75
Indigenous native habitat >20 years old*	100
* Indicates land types which are modified by the Bioregion Reservation Importance Factor.	

Table 1 Relative ecological weightings for different land types

4. Ecological Land Type Descriptions

Bare ground: An area with less than 40% ground cover is generally considered to be inadequate for preventing significant soil erosion and should be classified as bare ground. The percentage ground cover is usually described as the opposite of per cent bare soil surface. Ground cover is any material found on or near the soil surface that protects the soil from the erosive action of wind and water (rain drop impact and overland flow). Materials such as loose surface stones and dung can provide an effective ground cover, but plant material (herbage ground cover), either alive or dead, is the most common and most important. Gravel is considered bare ground for the purposes on this credit.

Weed infestations: An area predominantly covered in a plant species found on a National Weeds List. A weed is any plant that requires some form of action to reduce its effect on the economy, the environment, human health and amenity. Weeds are also known as invasive plants. Many plants introduced into Australia in the last 200 years are now weeds. Weeds typically produce large numbers of seeds, assisting their spread. They are often excellent at surviving and reproducing in disturbed environments and are commonly the first species to colonise and dominate in these conditions. A weed can be an exotic species or a native species that colonises and persists in an ecosystem in which it did not previously exist. Some weeds are of particular concern and, as a result, can be found listed for priority management or in legislation.

Exotic garden: An area of landscaping cultivated with non-Australian species that are not found on a National Weeds List.

Native garden: An area landscaped using Australian native species that are not found on a National Weeds List.

Indigenous native garden: Area landscaped using species and seed stock native to the bioregion.

Green roof: A roof of a building that is partially or completely covered with vegetation and a growing medium, usually planted over a waterproofing membrane. Green roof systems may be modular, with drainage layers, filter cloth, growing media and plants already prepared in movable, interlocking grids, or, each component of the system may be

green building council australia   greenstar

installed separately. Green roof development involves the creation of a contained green space on top of a human-made structure. This green space could be below, at or above grade, but in all cases the plants are not planted in the "ground".

Exotic grassland: An area containing exotic (non-native) pasture grasses. Must not contain species listed on a National Weeds List.

Indigenous native grassland: An area dominated by native grasses indigenous to the bioregion. Created native grasslands must be landscaped using species and seed stock native to the bioregion.

Crop farming: An area dominated by commercial crops or other intensive agricultural uses.

Constructed wetland / riparian buffer strip: Water sensitive urban design (WSUD) treatments including wetlands, rain gardens, planted detention basins and planted bioswales that introduce riparian flora and fauna and increase biological diversity on the site.

Existing wetland / riparian habitat: This definition covers both man-made and natural areas. Wetlands are areas of permanent or periodic/intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed 6 metres. To be classified as a wetland, the area must have one or more of the following attributes:

1. at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or

2.   the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or

3.   the substratum is not soil and is saturated with water, or covered by water at some time.

NB. This definition does not include wetlands of high ecological value. If a wetland of high ecological value (as defined by the Green Star Eco –Conditional Requirement) needs to be entered into the calculator, a CIR must be submitted to the GBCA. Note however that this would be highly unusual as wetlands of high ecological value cannot be constructed, and in almost all cases their removal would not be permitted under legislation or under the Green Star Eco-Conditional Requirement.

Regenerated native habitat <5 years old: An area that has been rehabilitated or regenerated using species native to the bioregion, up to 5 years ago.

Regenerated native habitat 5 to 10 years old: An area that has been rehabilitated or regenerated using species native to the bioregion, between 5 and 10 years ago. NB. Regenerated native habitat that is older than 10 years is 'indigenous native habitat' (see below).

Indigenous native habitat >10 years old: An area that contains vegetation native to the site and to the bioregion that is ten years old or more, but less than twenty years old.

Indigenous native habitat >20 years old: An area that contains vegetation native to the site and to the bioregion that is twenty years old or more.

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:

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

Table 2. Bioregion importance factors

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.

City	Bioregion Name

Date issued: 7 May 2013 / Version A

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

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

green building council australia

greenstar