BIDCARBON™

BidCarbon Carbon Farming (BCF) Mapping Guidelines

Note: The BCF mapping guidelines as the guidelines as published on the BidCarbon Standard's website, to be used for mapping project areas and CEAs, as in force from time to time. As at October 2024, this document is the latest version of the BCF mapping guidelines in force.

The BCF mapping guidelines are based on the Carbon Farming Initiative (CFI) Mapping Guidelines in Australia.

Table of Contents

Glossary of Terms

Term	Definition and explanation
Attributes	The properties of a Carbon Estimation Area (CEA), for example, when mapping forested land, attributes might be the project name, tree species present and the planting date of the forest.
Carbon Estimation Area (CEA)	A stratum of the Project Area; land which is homogenous for the purpose of abatement calculations, has consistent biophysical characteristics and is established and managed in a consistent way. CEAs may be defined by a single CEA Polygon or, where a specific methodology allows, more than one CEA Polygon (see Split CEA). The CEA is the area defined by the CEA Polygon(s) less the area defined by any Exclusion Area Polygon(s) within the CEA Polygon(s).
Sequestration Area	Sequestration areas within the project area are the basic unit within which management actions are carried out and for which sequestration are estimated under this methodology. A sequestration area may consist of a single area of land with an unbroken perimeter or of several adjacent or non-adjacent, discrete areas of land of differing sizes and shapes.
Carbon Estimation Area (CEA) Polygon	A polygon defining the external boundary of a CEA or, for Split CEAs, the external boundary of a CEA Part. Note: The CEA Polygon(s) are distinct from any Exclusion Area Polygon(s) that contribute to defining CEAs.
Sequestration Area Polygon	A polygon defining the external boundary of a Sequestration Area or, for Split Sequestration Areas, the external boundary of a Sequestration Area Part. Note: The Sequestration Area Polygon(s) are distinct from any Exclusion Area Polygon(s) that contribute to defining Sequestration Areas.
CEA Part	For a Split CEA, a single CEA Polygon exclusive of any Exclusion Areas within the CEA Polygon defines a CEA Part.
Sequestration Area Part	For a Split Sequestration Area, a single Sequestration Area Polygon exclusive of any Exclusion Areas within the Sequestration Area Polygon defines a Sequestration Area Part.
Carbon Maintenance Obligation	A Carbon Maintenance Obligation requires landowners (including subsequent owners of the same land) to maintain carbon stocks. The Technical Governance Committee may impose a Carbon Maintenance Obligation in relation to an area or areas of land for which a relinquishment requirement has not been complied with as required under the *BidCarbon (Carbon Farming) Standard*.
Exclusion Area	Areas of land within the Project Area that do not contribute to abatement. Examples of Exclusion Areas are given in the section below on *Defining and mapping Exclusion Areas*.

Term	Definition and explanation
Exclusion Area Polygon	A polygon defining an Exclusion Area. Each CEA or Sequestration Area can contain zero, one or more than one Exclusion Area(s). An Exclusion Area Polygon may occur wholly within a CEA Polygon or Sequestration Area Polygon, for example, representing a dam or road)or fall partly outside a CEA Polygon or CEA Polygon or Sequestration Area Polygon.
Geographic Information System (GIS)	An electronic system used to manage geographic data which may include creating and storing maps; overlaying and analysing different types of spatial information; and displaying, editing, formatting and printing new maps resulting from spatial analysis.
Interchangeable digital GIS formats (data file)	Used to encode map data as an electronic file. A set of sub-files lists the types of geometric features in the data (polygons in the case of Emissions Reduction Fund projects), the data that defines the polygon locations, the attributes of each polygon, and the map projection in which the polygon locations are given.
Line Segment	A straight line bounded by two end points, with each end point having distinct map coordinates.
Metadata	Descriptive data that provides information about another set of data. Metadata can include, but is not limited to, data title, data source, and accuracy.
Model Point	A static location defined by latitude and longitude coordinates for each CEA for the purpose of estimating carbon stocks using either the Carbon Farming Accounting Model (CFAM).
Orthorectify	Removal of distortions in an image so the new image has a consistent scale.
Polygon	A closed shape bounded by a single connected polyline that does not cross, such that the map coordinates of the end point of the polyline are the same as the map coordinates of the start of the polyline. Polygons can define the boundaries of a Project Area, CEA, CEA Partor Exclusion Area.
Polyline	A continuous line composed of one or more connected line segments.
Project	An eligible offsets project which is registered with the Technical Governance Committee. A project can be a sequestration project or an emissions avoidance project.
Project Area	An area of land on partor all, of which the project has been, is beingor is to be, carried out.
Project Area Polygon	A polygon defining the external boundary of a Project Area. Project Areas which are located in more than one place will require a set of Project Area polygons to define their external boundaries.
Project Proponent	The person who is responsible for carrying out the project, and has the legal right to carry out the project.

Term	Definition and explanation
Split CEA	A CEA consisting of two or more non-contiguous CEA Parts. In some methodology Split CEAs are referred to as a CEA comprised of a set of polygons.
Split Sequestration Area	A Sequestration Area consisting of two or more non-contiguous Sequestration Area Parts. In some methodology Split Sequestration Areas are referred to as a Sequestration Area comprised of a set of polygons.
Stratification	The subdivision of the land within a Project Area according to biophysical characteristics and management regimesor by other characteristics as allowed or required within a specific methodology.

1. Introduction

These mapping guidelines are designed to complement provisions contained within the BidCarbon (Carbon Farming) Standard (the Standard), the BidCarbon (Carbon Farming) Specifications (the Specifications), any amendments to the Standard, or Specifications and the associated methodology. Project proponents should use these guidelines to prepare geospatial mapping for the purposes of:

- meeting project compliance obligations under the BidCarbon Standard Scheme
- providing information to the Technical Governance Committee (the Working Body), and
- estimating abatement.

These mapping guidelines may be reviewed and updated as necessary.

Further information regarding mapping requirements, including the evidence required to support mapped boundaries, for project proponents can be found in the Standard, Specifications and specific methodology (all available on the bidcarbon website: http://www.bidcarbon.org/).

2. When is mapping required?

Geospatial information is relevant for most land sector projects; the amount of information required varies according to the activity type and methodology in use. Each methodology describes the specific mapping requirements. In circumstances where carbon emissions and removals are independent of the land area, a single point location may be adequate information. When abatement is influenced by the location and area of the land where the project mechanism occurs, more detailed and precise delineation of the Project Area is necessary.

Project proponents may be required to provide geospatial mapping information about their Project Area to the Working Body when:

- applying for a declaration as an eligible offsets project.
- the Working Body declares a project to be an eligible offsets project.
- reporting estimated abatement.
- applying for BRUs.
- providing information to the BidCarbon Standard Scheme project register .
- a project proponent applies for a voluntary variation of declaration of eligible offsets project, including to amend the Project Area or to restructure an eligible offsets project.
- the Working Body informs the relevant local administration about a sequestration project, responding to a request for information from the Working Body.

The Working Body requires this information to establish compliance with the relevant legislative requirements, including:

- whether Project Areas overlap.
- that a land area is not registered twice for an offsets project under the same methodology.
- if the project proponent has the legal right to carry out the project on the designated Project Area – whether the land is Torrens title (comparable system) or Crown land, whether there is native title over the land and who has a registered interest in the Project Area. Project proponents are advised to consult the Working Body if the Project Area is classed as land rights land or may be subject to native title.
- whether a Project Area is subject to a Carbon Maintenance Obligation.

3. Mapping requirements

3.1. General description of mapping for land sector projects

Please note: further detail on mapping concepts is in Appendix 1.

Most land sector projects require collection and reporting of some geographic information. The specific requirements for a project are detailed in the applicable methodology, but broadly include a single point location, and/or detailed geographic boundaries.

When defining boundaries, key points and corners should be established using the tools, data sources and standards defined in this document. Boundaries of a Project Area may be simple or complex in shape (see Figure 1).

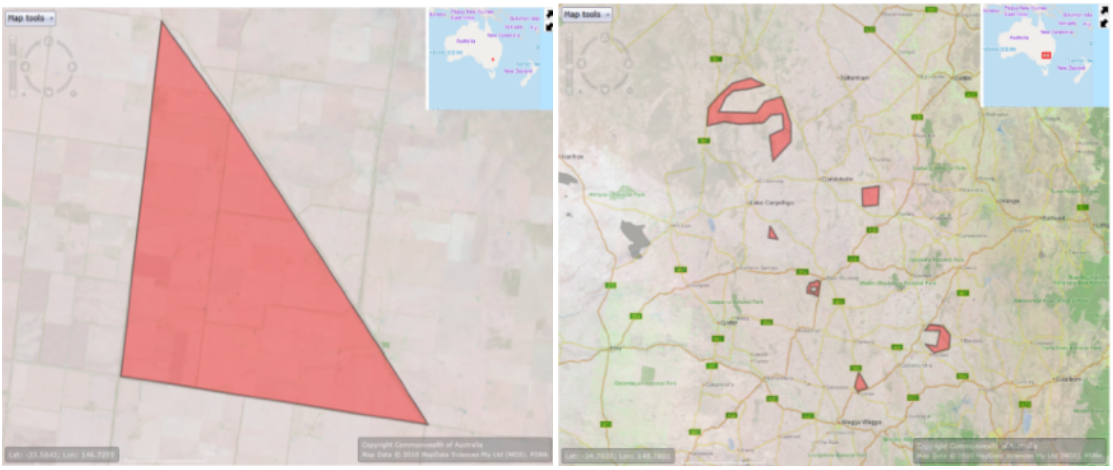

Figure 1: Examples of project areas that are simple (left) and complex (right) in shape.

3.2. Procedure for mapping

3.2.1. Identifying the Project Area

The Project Area includes the land on which the project has been, is being or is to be, carried out. A Project Area is subject to requirements. Where the Project is defined by a point location, such as a landfill facility, the Project Area may be defined as a single reference point (latitude and longitude). For projects where it is necessary to determine the size of the area(s) on which the project mechanism is being applied to estimate the abatement, a geographic map is required. For carbon capture and sequestration projects, an estimate of the size of the area(s) for estimate the abatement is not required, but a geographic map is required.

A Project Area can consist of land covered by multiple land titles. Subject to the requirements of the Standard and a particular methodology, a Project Area can consist of land areas that are separated by any distance provided they are still within the geographic bounds of a country and external territories (see left panels in Figures 1 and 2).

For methodology where estimating the abatement requires determining the size of the area(s) on which the project mechanism is being applied , project proponents may wish to include the whole land title as their Project Area, even if the project mechanism is only being applied on a part of the land. In this case the project will be required to create a geographic map identifying, within the Project Area Polygon, the Carbon Estimation Ares (CEAs) where the project mechanism is being applied (Figure 2, left panel). Alternatively, project proponents may wish to define their Project Area narrowly, to include only the areas where the project mechanism is being applied (Figure 2, right panel).

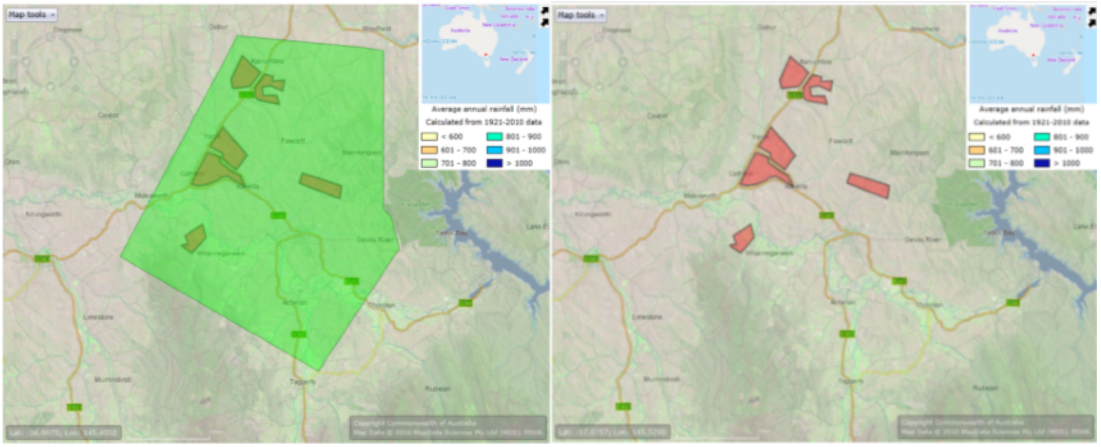

Figure 2: A project proponent may opt to define the Project Area according to the land on which they have the legal right to carry out the project (green-coloured area on left) and report only on the abatement achieved in CEAs (salmon-coloured areas) within this project area. Alternatively a Project Area may include only the areas on which the project mechanism is currently being applied (right).

Under the Standard, variations to the declared Project Area require the project proponent to apply to the Working Body. By having declared a Project Area that includes all land where the proponent has the legal right to carry out a project, the proponent has the flexibility to increase the area to which they apply the project mechanism, for example, more CEAs without the requirement to vary the project area.

3.2.2. Defining and mapping Exclusion Areas

Some methodology require Exclusion Areas to be identified and delineated. An Exclusion Area may be an area of land where it is not possible to apply the project, for example a large rock outcrop or an access roador an area of land that doesn't meet eligibility requirements. Alternatively, an Exclusion Area may be an area of land which the project proponent does not wish to include in the project, for example a paddock used for grazing. Exclusion Areas can be a substantial size if entire land titles are identified as project areas.

If a methodology details that certain areas of land—for example areas of land without forest cover—must be identified as Exclusion Areas, then these provisions apply to:

- features greater than five metres in width; and
- areas less than five metres in width that total more than five per cent of the Project Area, for example, a Project Area that is one hectare in area should exclude any and all areas where the project mechanism is not applied if the total of these areas exceeds 500 m^2.

For reforestation and afforestation methodology, unless otherwise specified in a methodology, the default boundary of an Exclusion Area is defined by a polyline not more than 2 metres from the stems of any trees planted in the area.

3.2.3. Stratifying Carbon Estimation Areas

Some methodology, including many for sequestration projects, require project proponents to stratify the land within a Project Area into more homogenous units. These units are generally referred to as CEAs. Stratification intends to improve the accuracy of abatement calculations; appropriate stratification will ensure the key variables affecting emissions abatement are controlled.

Methodology will set out the Specifications and basis for stratification. Stratification is usually based on spatially variable attributes that may affect abatement calculations, such as species composition, physical characteristics, common management regimesor site history.

The project proponent may need to re-stratify a CEA or create new CEAs over time, for example, where disturbance events occur or growth is not uniform, to ensure accurate estimation of project abatement.

3.2.4. Model Point Location

Many methodology require each CEA in the Project Area to have a Model Point location at the approximate centre of the CEA (see Figure 3).

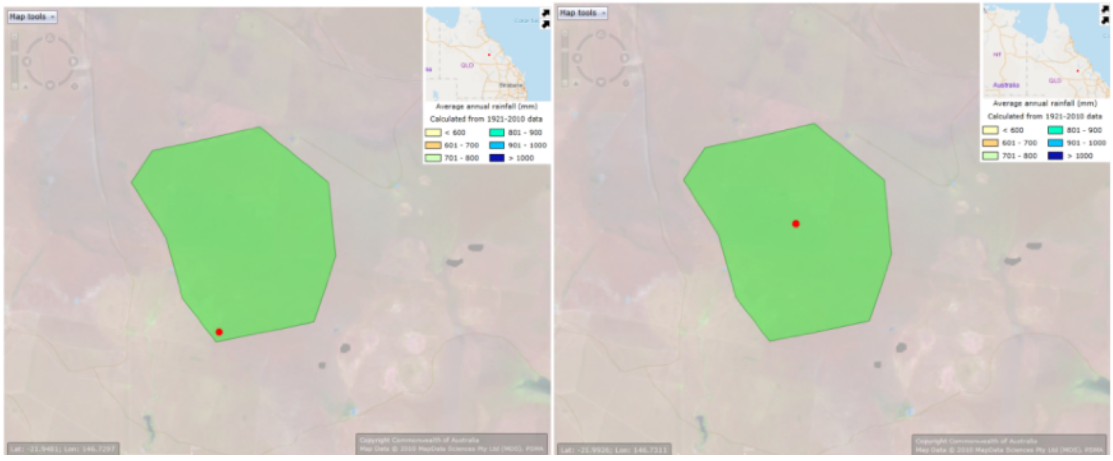

Figure 3: This project has one CEA, shown in green. The Working Body may reject the CEA Model Point location (shown as the red dot) in the left panel, as it is not in the approximate centre as per the right panel example.

3.2.5. Split Carbon Estimation Areas

If permitted under a specific methodology a CEA may be a Split CEA (see Figure 4). Some methodology refer to Split CEAs as a CEA comprised of a set of polygons. For Split CEAs:

- The Model Point for the CEA must be located approximately in the centre of the area encompassed by all of the CEA Parts. The Model Point does not need to be contained within a CEA, the location can be in an Exclusion Area or outside of the Project Area.
- Where an applicable radius is specified in a methodology, it defines a radius from the model point within which the entire area of each CEA Part in a Split CEA must fall.
- All CEAs and CEArts must comply with any stratification requirements specified in the methodology.

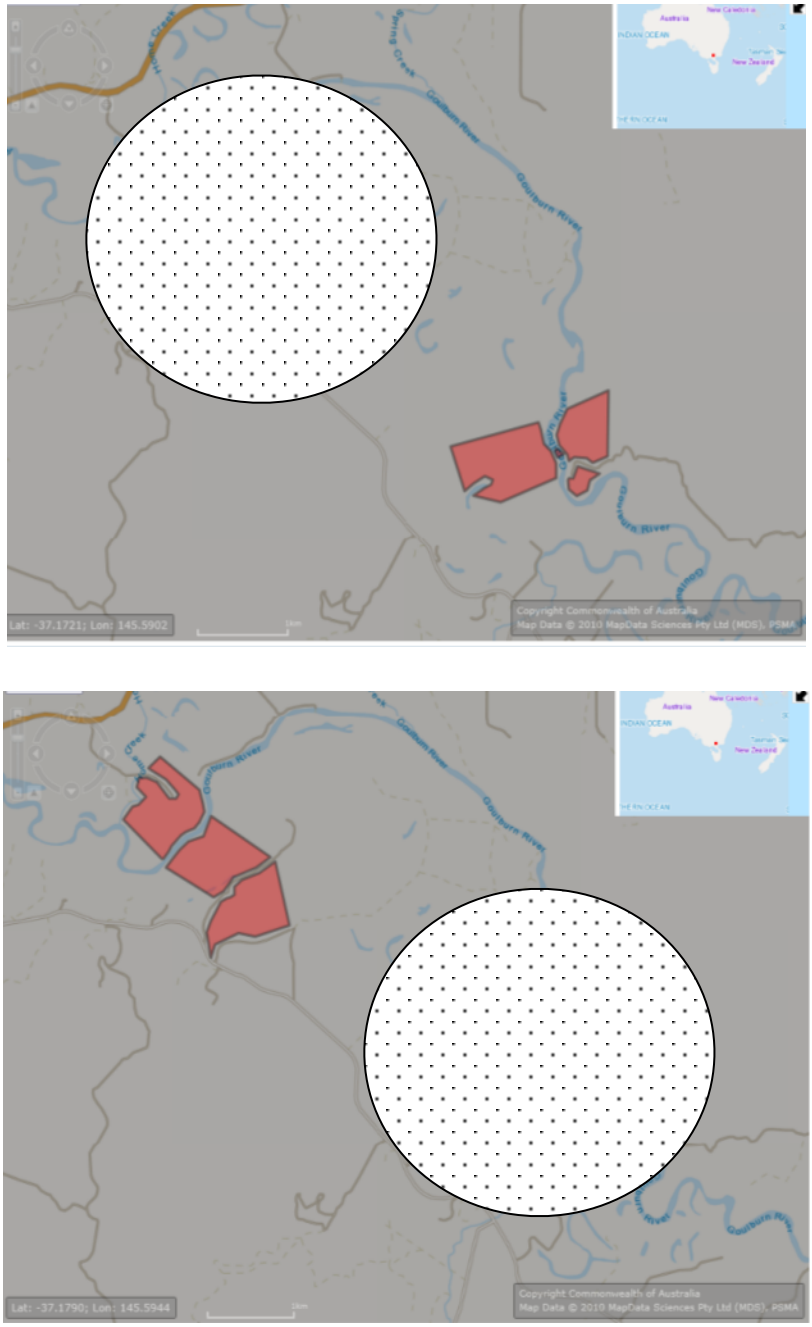

Figure 4: The methodology for this project allows for Split CEAs and has an applicable radius of 1.5 km. This project has two split CEAs which each have three CEA Parts. In the top image, the Model Point location falls within a CEA

part. In the lower image, the Model Point location is in the approximate centre of the area encompassed by the CEA Parts. For each CEA, all three CEA parts fall entirely within the maximum applicable radius of 1.5 km from their respective Model Points.

4. Geospatial information requirements

4.1. Geospatial capture

A project proponent may use any of the following sources of data to delineate the boundaries of Project Areas, Exclusion Areas and CEAs as required by the BidCarbon Standard Scheme:

- Global Positioning Systems (GPS) / Global Navigation Satellite System (GNSS)
- field surveys and sampling
- orthorectified aerial photographs
- orthorectified satellite imagery
- cadastral database
- publicly available vegetation datasets

A methodology may also specify different methodology or approaches or accuracy or resolution requirements that must be complied with. Such records need to be made and maintained as evidence.

4.2. Fitness for purpose

Prior to using a dataset, project proponents should assess the appropriateness of the dataset for the intended use, any other evidence required to support itor its fitness for purpose against criteria that include:

- age
- scale
- resolution
- accuracy
- classification, aggregation, generalisation systems (for example, smoothing)
- integrity of the dataset
- relevance to the proposed BidCarbon Standard Scheme activity.

4.3. Accuracy

All sequestration offsets projects under the BidCarbon Standard Scheme must meet the minimum spatial data requirement of a horizontal accuracy of at least 10 metres at the 95 per cent threshold in accordance with the BidCarbon Map and Spatial Data Accuracy Standard (http://www.bidcarbon.org/spatial-data). This data accuracy must be included within accompanying metadata.

4.4. Data description and attribute information

When methodology require project proponents to submit a map to the Working Body that is created in accordance with these mapping guidelines, they must report minimum attributes for each CEA. These required attributes are specified in Table 1. Additional attributes may also need to be described depending on the requirements of the particular methodology.

Table 1: Minimum attributes to be submitted for each CEA.

Attribute	Attribute Name	Format
Project name	NAME	Text String
Project number	NUMBER	Integer
Applicable methodology	Methodology	Text String
CEA name	CEA_ID	Text String
CEA number	CEA_NUM	Integer
Year of inclusion in Project	YEAR_REG	Integer: 4 characters
Year of variation to the CEA	YEAR_VAR	Integer: 4 characters

Project proponents who must report a Model Point for each CEA must report the latitude and longitude.

4.5. Data exchange and formats

Project proponents must supply spatial data in an interchangeable digital Geographic Information System (GIS) format which is consistent with the instructions outlined in these mapping guidelines.

4.6. Data ownership and usage

Project proponents must ensure that they have the necessary rights, for example, a data licence for primary mapping products, to use spatial data for the project. Proponents must also be able to grant the Regulator or its representative's permission to use projects' spatial data for the purpose of administering the BidCarbon Standard Scheme.

4.7. General instructions

Geospatial mapping information must meet all of the following requirements:

- include the number or name of each stratum/CEA
- include, where applicable, the Model Point that applies to each CEA
- describe the coordinate system and map projections used, noting that:
  - the datum of all geospatial data must be Geocentric Datum of BidCarbon Standard Scheme
  - all geospatial data must be either projected to Map Grid of BidCarbon Standard Scheme or use a geographic coordinate system
- be submitted electronically and use one of the commonly used interchangeable digital GIS file formats
- contain file information on:
  - the feature geometry (that is, the map coordinates of the line segments that make up the Project Area polygons).
  - a positional index of the feature geometry (that is, the location within the file of the start of the data for each CEA).
  - the projection format.
  - attribute information.
  - the coordinate system and map projection used.

A methodology typically contains further information and instructions for determining and identifying CEAs in addition to the conditions in this section.

Appendix 1: Further explanation of mapping concepts

Project proponents should familiarise themselves with the following mapping concepts:

Base imagery (orthophotographyor orthorectified satellite imagery)

Mapping tools use processed remote-sensing data such as aerial photographs or satellite images as a backdrop, over which polygons that define the land area of interest may be drawn. Data is orthorectified – that is, corrected for distortions due to topography, camera angle and lens imperfections – resulting in an image that is orthographically-correct or like a map; that is, it has a defined orientation and the area, shape, direction and distance can be determined according to a single scale across the entire area. Orthographically-corrected imagery, including digital photography, is often referred to as orthoimagery. The terms orthophotography and orthorectified satellite imagery are also used, depending on the source of the image data.

Datum and coordinate system

A datum is a set of parameters and control points used to accurately define the three-dimensional shape of the Earth. A coordinate system provides a reference for measuring horizontal and vertical distances on a map. Coordinate systems are usually defined by a map projection, a spheroid reference, a datum and a number of other parameters, for example, standard parallels, a central meridian and possible shifts in the x and y directions.

The two most commonly used coordinate systems in the BidCarbon Standard Scheme are geographical (latitude and longitude) and the Map Grid (MG). Regional or local datum, projections and coordinate systems may also be used.

Map projection

Mapping is the process of 'projecting' the three-dimensional surface of the Earth onto a two-dimensional surface, whether that be a sheet of paper or an electronic equivalent. A map projection is a mathematical model or set of mathematical equations that describes the relationship between the same points on the three-dimensional and two-dimensional surfaces. It transforms the spatial relationships of features on the Earth's three-dimensional surface onto a two-dimensional surface. This is done to minimise distortions in area, shape, direction and distance. A flat map does not accurately reflect the shape of the Earth, so many different map projections have been developed and used in spatial analysis and map-making. Some projections preserve shape, while others preserve accuracy of area, distance or direction.

Mapping tool

A mapping tool is a computer software package that allows users to create, store, edit and display maps of physical features visible on base imagery. These features include forests, roads and lakes, and the software enables users to define the boundaries of these features using polygons and their attributes. The process of creating an electronic representation of such features by drawing directly over base imagery displayed on a computer screen is called 'on-screen digitising'.

Metadata and attributes

Metadata are structured descriptive data that provide information about another set of data. They can be accessed using database and internet technologies that automate search and retrieval capabilities. Metadata are maintained and kept up to date in the same way as spatial data. Metadata must be kept up

to date to retain their utility and value. Metadata must be maintained in accordance with the relevant country, state or territory government requirements and any appropriate data policies.