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Geoscience Australia

Commonwealth Fisheries 2003

Product User Guide

National Mapping Division,
Geoscience Australia

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Technical support:
For up to date information on *the Commonwealth Fisheries 2003* refer to the Geoscience Australia website: www.ga.gov.au

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About this product user guide
This product user guide sets out the fundamental concepts and characteristics of the *Commonwealth Fisheries 2003*. The guide begins with general information and provides more details in later sections. The overview of data content and structure will allow you to make immediate use of the data.

The information in this product user guide was correct at the time of publication and is subject to change. Geoscience Australia assumes no liability resulting from any statements, errors or omissions in the publication or from the use of information contained in this product user guide.

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1 User information

1.1. User support/contact information

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1.2. Geoscience Australia - National Mapping Division

Geoscience Australia is the national agency for geoscience research and spatial information. It serves government and supports the community through its output areas of geoscience for urban centres, oceans and coasts, and regional and rural areas.

The National Mapping Division within Geoscience Australia undertakes national mapping, remote sensing maritime boundary and land information coordination activities in support of Australia's economic and social development.

1.3. The Australian Fisheries Management Authority (AFMA)

The Australian Fisheries Management Authority (AFMA) is the Commonwealth statutory authority responsible for the efficient management of Commonwealth fishery resources on behalf of the Australian community and key stakeholders. AFMA manages fisheries within the 200 nautical mile Australian fishing zone (AFZ) and, in some cases, by agreement with the Australian States, to the low water mark. In doing so, AFMA provides management, advisory, compliance and licensing services and implements appropriate fisheries management arrangements.

2 About Commonwealth Fisheries 2003

2.1 Commonwealth Fisheries 2003 components

Your *Commonwealth Fisheries 2003* data package has two components which combine to give you a complete data product. The components are:

- **Product user guide**
  This guide describes the structure and content of *Commonwealth Fisheries 2003*.
- **Data files**
  The number of files will vary with the application format of the data.

2.2 The Commonwealth Fisheries 2003 product

The *Commonwealth Fisheries 2003* is a digital representation of the boundary description of each of the Commonwealth Fisheries around Australia and its External Territories (except for the Australian Antarctic Territory) as set out in the Fisheries Management Regulations 1992 and/or relevant Management Plans administered by the Australian Fisheries Management Authority (AFMA).

In the event of an inconsistency between the *Commonwealth Fisheries 2003* and the description of the boundaries under the legislation, the latter prevails.

Further information about the fisheries can be found on the AFMA web site at www.afma.gov.au/fisheries.

2.3 Coordinate system

The Commonwealth Fisheries 2003 data is available in geographical coordinates (latitude and longitude) in decimal degrees using the Geocentric Datum of Australia 1994 (GDA94) coordinate system.

3 Data loading

3.1 Application formats

The *Commonwealth Fisheries 2003* data is supplied in three application formats:

- ArcInfo Export;
- ArcView Shapefile; and
- MapInfo.

The data was developed and is stored in ArcInfo v8.0.1. The ArcView Shapefiles and Mapinfo application formats are a translation of the ArcInfo data.

3.2 Description of files

The downloaded *Commonwealth Fisheries 2003* package contains the following files.

Table 1: *Commonwealth Fisheries 2003* files

Documentation files				
File name		**File content**		
61021_user_guide.pdf		This user guide		
Data files				
File name	**ArcInfo Export (*.e00) File size (KB)**	**ArcView Shapefile (*.dbf, *.shp, *.shx) File size (KB)**	**MapInfo mid/mif (*.mid, *.mif) File size (KB)**	**File content**
bsczsf	704	140	198	Bass Strait Central Zone Scallop Fishery
cif-ckf	260	126	177	Christmas Island and Cocos (Keeling) Islands Fishery
csf	164	114	147	Coral Sea Fishery
ecdwzf	137	57	73	East Coast Deepwater Zone Fishery
etbf	9 305	4 772	5 950	Eastern Tuna and Billfish Fishery
gabtf	826	212	304	Great Australian Bight Trawl Fishery
himi	148	92	116	Heard Island and McDonald Islands Fishery
jmf	6 339	1 106	1 567	Jack Mackerel Fishery
mif	170	53	75	Macquarie Island Fishery
nif	61	18	25	Norfolk Island Fishery
npf	5 673	2 437	3 123	Northern Prawn Fishery
nwstf	303	68	96	North West Slope Trawl Fishery
sbtf	30 990	18 432	23 552	Southern Bluefin Tuna Fishery
sentf	5 429	2 877	3 666	South East Non-Trawl Fishery
setf	5 636	2 458	3 185	South East Trawl Fishery
ssf	4 339	2 703	3 410	Southern Shark Fishery
ssjf	4 660	837	1 188	Southern Squid Jig Fishery
stbf	2 202	1 219	1 516	Southern Tuna and Billfish Fishery
str	19	4	5	South Tasman Rise Fishery
tspzf	2 605	1 690	2 253	Torres Strait Fisheries
wdtf	113	28	39	Western Deepwater Trawl Fishery
wtbf	16 803	8 100	10 076	Western Tuna and Billfish Fishery
Total	96 886 KB/ 94.6 MB	47 543 KB/ 46.4 MB	60 741 KB/ 59.3 MB	

4 Data characteristics and concepts

4.1 Commonwealth Fisheries 2003 data concepts

The *Commonwealth Fisheries 2003* is a feature based vector dataset.

Vector data
Vector data describes spatial data in which the location of a real world phenomenon is defined by points and straight lines (vectors) between these points. It also includes polygons which are areas bounded by straight lines. The vector data model used for the *Commonwealth Fisheries 2003* is based on polygons.

Feature-based data
The *Commonwealth Fisheries 2003* uses a feature-based data model described by the following definitions. These are used to describe data that represent phenomena in the real world:

- **Entity:** A real world phenomenon which cannot be divided into phenomena of the same type.
- **Feature instance:** A single occurrence of a feature which has a unique set of spatial and attribute object values.
- **Attribute:** A descriptive characteristic of a feature. Attributes can be spatial (or locational) and aspatial (or non-locational).
- **Attribute value:** A value assigned to an attribute, either for a feature instance or its attributes.
- **Feature class:** A group of feature instances defined by a set of rules and having common attributes and relationships that are the properties of the corresponding real world phenomena.
- **Entity class:** A group of entities of the same kind, matching the members of a feature class.

The structure of a feature instance in the feature based data model can be summarised as:
feature instance = [*spatial object* + *attribute object*]

Spatial object
Spatial objects are the locational attributes of the feature. They comprise the special cases of points, chains and polygons. Spatial objects have a spatial address which consists of one or more couplets (x, y) or triplets (x, y, z).

Point
A *point* is a geometric representation defined by a single (x, y) coordinate couplet or a (x, y, z) triplet. Three special points are used.

- **Entity point**
  An *entity point* is used to locate point entities, or area entities represented by a point because of the scale of the source material and/or scale of the final product.

- **Polygon label point**
  A *polygon label point*, contained within every polygon feature instance, locates information about that polygon. It is linked to the bounding chains of the polygon. In proprietary GIS software packages, this point type is sometimes known as a centroid.

- **Node**
  A *node* is a junction of two or more feature instances or an end point of a feature instance. Nodes may carry attribute information.

Chain
A *chain* is a spatial object composed of a sequence of non-intersecting line segments which is bounded by nodes at each end. Chains may carry topological information such as a reference to the polygons to the left and right (with respect to the direction of digitising) and reference the start and end nodes.

A line segment is a straight line between two consecutive vertices in a chain. Each vertex is defined by a single (x, y) coordinate couplet.

Figure 1: Chain spatial object

Polygon
A *polygon* is a bounded, continuous region consisting of an interior area, and an outer boundary defined by a set of chains. A polygon may also contain one or more non-nested inner boundaries also defined by sets of chains.

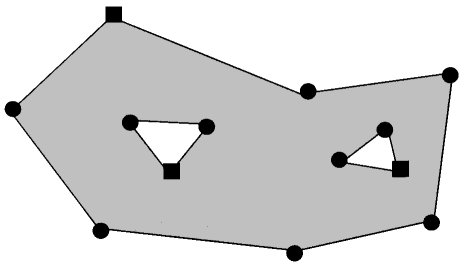

Figure 2: Polygon spatial object

5 Data structure and content

5.1 Data structure

The topological data model of the *Commonwealth Fisheries 2003* consists of lines, polygons and label points. The fisheries are represented by polygons which are themselves constructed from various line features. The label point of each fishery carries attributes to identify the fishery and important related information.

Where islands lie within the extent of a fishery, these are identified as separate polygons within the fishery. The label point of these polygons carry the attribute 'void' to identify that it is not part of the fishery.

The ArcInfo application format also includes the lines which form the boundary of each fishery in the dataset. These line features carry an attribute to identify its source. That is, a fishery may be bounded by a linear feature such as the coastline, the 3nm limit of Coastal Waters or the limit of the Australian Fishing Zone.

Theme
Each feature in the *Commonwealth Fisheries 2003* is defined by a spatial object and an attribute object. These features fit into the hierarchy of theme and layer. The Commonwealth Fisheries are grouped into a single theme. Each of the individual fisheries form a layer within this theme.

Layer
Each theme may consist of one or more layers. A layer is a grouping of features which have compatible spatial objects. The *Commonwealth Fisheries 2003* is made up of a set of polygon layers. That is, area features represented by polygons.

5.2 Data dictionary

Table 2: Attribute table of *Commonwealth Fisheries 2003*

Feature	Description	Object	Attribute	Attribute values
FISHERY (fishery)	The area of a Commonwealth fishery managed by the Australian Fisheries Management Authority (AFMA)	Polygon	NAME OF FISHERY (name)	Official name given to the fishery in AFMA legislation.
			NAME OFSUB AREA (name_sub_area)	The name of the sub area within a fishery. This is often a closed area or exclusion zone.
			FISHERY ABBREVIATION (abbrev)	The abbreviation of the fishery name used by AFMA.
			JURISDICTION (jurisdiction)	The jurisdiction of the fishery. This is always 'Commonwealth' for this dataset.
			CUSTODIAN (custodian)	The custodian of the spatial dataset. This is the 'National Mapping Division - Geoscience Australia'.
			SOURCE (source)	The source of the description of the area of water for the fishery. Generally a piece of Commonwealth legislation.
			EFFECTIVE START DATE (date_start)	The date the legislation describing the area of the fishery became effective.
			EFFECTIVE END DATE (date_end)	The date the legislation describing the area of the fishery became redundant.
			EFFECTIVE DATE DESCRIPTION (date_description)	Details of how the legislation describing the area of the fishery became effective.
			DATUM TYPE (datum_type)	The type of datum reference used in the legislation. Note that this is NOT necessarily the datum of the spatial data itself.
			MANAGING AUTHORITY (managing authority)	Australian Fisheries Management Authority (AFMA). AFMA is the Commonwealth statutory authority responsible for the efficient management of Commonwealth fishery resources.
			LAST UPDATED (last_updated)	The date that the spatial data was last updated.
			OCS ARRANGEMENTS (ocs_arrang)	In some cases, the management of Commonwealth fisheries involves agreements with Australian States. The State is listed where such agreements exist.

Feature	Description	Object	Attribute	Attribute values
VOID (void)	Voids are used in the spatial data to identify areas within the full extent of the fishery that are not part of the fishery. These are usually islands or an island and its coastal waters.	Polygon	nil	nil
FISHERY BOUNDARY LINE (fishery_ln) (ArcInfo application format only)	The line that bounds the area of the fishery. This line can be coincident with the coastline, the outer limit of coastal waters, the Australian fishing zone or a maritime Treaty line. Otherwise it consists of a line drawn from information (such as coordinates) given in the source document.	Chain	NAME OF FISHERY (name)	Official name given to the fishery in AFMA legislation.
			FISHERY ABBREVIATION (abbrev)	The abbreviation of the fishery name used by AFMA.
			FISHERY BOUNDARY LINE TYPE (fish_bdy)	coastline = *the coastline* 3nm = *the outer limit of coastal waters* 200nm = *the outer limit of the Australian Fishing Zone* maritime_ln = *a maritime Treaty line* 200m isobath = *the line of the 200m isobath* fishery_ln = *of a line drawn from information (such as coordinates) given in the source document.*
			SOURCE INFORMATION (q_info)	Provides information about the source of the line feature. It can be related to the *AMBIS* dataset.

6 Data quality information

Lineage
Descriptions of Commonwealth Fisheries boundaries, found in the Fisheries Management Regulations 1992 and/or relevant Management Plans, were interpreted and digitised into a Geographic Information System (GIS), and subsequently attributed. Where national maritime limits formed part of these boundaries, current *AMBIS 2001* data was directly extracted and appended into the coverages. Where fisheries included coastline or low water information, *GEODATA Coast 100K* coastline data was used as it provided a nationally consistent dataset; was of the right level of detail for the project (eg closed river mouths); and, resulted in a manageable file size for distribution. Any intersections between boundary lines were rigorously calculated using specialised geodetic software.

Positional accuracy
The positional accuracy of the spatial data is affected by three main issues:

The precision of the coordinates shown in legislation
Generally coordinates are only stated to the nearest minute of arc in the Regulations and/or Management Plans. This is equivalent to a precision of approximately one nautical mile (or approximately ± 900 metres). In some cases the boundary follows a Treaty line and the coordinates are stated to the same precision as recorded in the Treaty (usually to the nearest second of arc).

The positional accuracy of the coastline data
The positional accuracy of the *GEODATA Coast 100K* data is stated as "Not more than 10% of well-defined points are in error by more than 80 metres; and in the worst case, a well defined point is out of position by 150 metres." It should also be noted that this data depicts mean high water rather than the low water mark which is the true boundary for many of the fisheries.

Datum issues.
The coordinates stated in the Regulations and/or Management Plans are generally referred to the AGD66 datum. Where coordinates are stated only to the nearest minute, they are considered to be GDA94 compliant (because of the precision) and no further transformation was performed.

It should be noted that these comments relate to the accuracy of the spatial data contained in *Commonwealth Fisheries 2003* and does not infer that there is similar uncertainty in the fishery boundaries in a legal sense. In the event of an inconsistency between the *Commonwealth Fisheries 2003* and the description of the boundaries under the legislation, the latter prevails.

Attribute accuracy
Fishery line and polygon features were attributed with descriptive information relating to the fishery as recommended by AFMA, as well as with a Quality Information pointer, and a Unique Feature Identifier (UFI). Line source feature code was kept as a separate attribute item. Polygons representing voids within fisheries were only attributed with a feature code and a UFI.

Manual checks were used in ArcInfo to verify that 100% of all mandatory fields were filled and that there were no spelling errors.

Logical consistency
The GIS software ArcInfo was used to do a visual topological consistency checks to detect flaws in the spatial data structure and to flag them as errors. This check ensures that all classified polygons are closed, nodes are formed at the intersection of lines and that there is only one label within each polygon, etc. All coverages are built for polygons and free of artifacts.

Completeness
All current Commonwealth Fisheries have been represented in the GIS database. Internal fisheries and closure areas have not been included. It is expected that the data set will be maintained and updated as changes occur. The changing nature of Australia's coastline and hence the various national maritime boundaries may also influence changes to the fisheries data set.

Appendix A: Metadata

Note: This dataset description is metadata (data about data) which describes the actual dataset in accordance with the ANZLIC (Australia New Zealand Land Information Council) Core Metadata Guidelines Version 2.

Dataset citation

ANZLIC unique identifier: ANZCW0703005421

Title: Commonwealth Fisheries 2003

Custodian

Custodian: Geoscience Australia

Jurisdiction: Australia

Description

Abstract:

Commonwealth Fisheries 2003 is a digital representation of the limits of all Commonwealth Fisheries around Australia and its External Territories (except for the Australian Antarctic Territory), as set out in the *Fisheries Management Regulations 1992* and/or relevant Management Plans administered by the Australian Fisheries Management Authority (AFMA).

See http://www.ga.gov.au/nmd/mapping/marbound/index.htm and http://www.afma.gov.au/fisheries for further information.

ANZLIC search words:

- BOUNDARIES Administrative
- MARINE
- FISHERIES

Geographic extent name:

AUSTRALIA EXCLUDING EXTERNAL TERRITORIES - AUS - Australia - Australia
ASHMORE REEF AND CARTIER REEF- ACR-External Territories-Australia
CHRISTMAS ISLAND-CHI-External Territories-Australia
COCOS (KEELING) ISLAND-COI-External Territories-Australia
CORAL SEA ISLANDS TERRITORY-CSI-External Territories-Australia
TERRITORY OF HEARD AND MCDONALD ISLANDS-HMI-External Territories-Australia
NORFOLK ISLAND-NOI-External Territories-Australia

Geographic bounding box:

North bounding latitude: -9.00
South bounding latitude: -44.00
East bounding longitude: 168.00
West bounding longitude: 72.35

Data currency

Beginning date: 2001-06-01

Ending date: 2002-12-19

Dataset status

Progress: Complete

Maintenance and update frequency: As Required

Access

Stored data format:
Digital: ArcInfo

Available format type:
Digital: ArcInfo Export
Digital: ArcView Shapefile
Digital: Mapinfo mid/mif

Access constraints:
The data are subject to Copyright. Data files may be downloaded from Geoscience Australia's website at www.ga.gov.au/download/ . A licence agreement is required.

Data quality

Lineage:
Descriptions of Commonwealth Fisheries boundaries, found in the Fisheries Management Regulations 1992 and/or relevant Management Plans, were interpreted and digitised into a Geographic Information System (GIS), and subsequently attributed. Where national maritime limits formed part of these boundaries, current AMBIS 2001 data was directly extracted and appended into the coverages. Where fisheries included coastline or low water information, GEODATA Coast 100K coastline data was used as it provided a nationally consistent dataset; was of the right level of detail for the project (eg closed river mouths); and, resulted in a manageable file size for distribution. Any intersections between boundary lines were rigorously calculated using specialised geodetic software.

Positional Accuracy:
The positional accuracy of the data is affected by three main issues:

The precision of the coordinates shown in legislation
Generally coordinates are only stated to the nearest minute of arc in the Regulations and/or Management Plans. This is equivalent to a precision of approximately one nautical mile (or approximately ± 900 metres). In some cases the boundary follows a Treaty line and the coordinates are stated to the same precision as recorded in the Treaty (usually to the nearest second of arc).

The positional accuracy of the coastline data
The positional accuracy of the GEODATA Coast 100K data is stated as "Not more than 10% of well-defined points are in error by more than 80 metres; and in the worst case, a well defined point is out of position by 150 metres." It should also be noted that this data depicts mean high water rather than the low water mark which is the true boundary for many of the fisheries.

Datum issues
The coordinates stated in the Regulations and/or Management Plans are generally referred to the AGD66 datum. Where coordinates are stated only to the nearest minute, they are considered to be GDA94 compliant (because of the precision) and no further transformation was performed.

It should be noted that these comments relate to the accuracy of the spatial data contained in the Commonwealth Fisheries 2003 and does not infer that there is similar uncertainty in the fishery boundaries in a legal sense. In the event of an inconsistency between the Commonwealth Fisheries 2003 and the description of the boundaries under the legislation, the latter prevails.

Attribute Accuracy:

Fishery line and polygon features were attributed with descriptive information relating to the fishery as recommended by AFMA, as well as with a Quality Information pointer, and a Unique Feature Identifier (UFI). Line source feature code was kept as a separate attribute item. Polygons representing voids within fisheries were only attributed with a feature code and a UFI.

Manual checks were used in ArcInfo to verify that 100% of all mandatory fields were filled and that there were no spelling errors.

Logical Consistency:

The GIS software ArcInfo was used to do a visual topological consistency checks to detect flaws in the spatial data structure and to flag them as errors. This check ensures that all classified polygons are closed, nodes are formed at the intersection of lines and that there is only one label within each polygon, etc. All coverages are built for polygons and free of artifacts.

Completeness:

All current Commonwealth Fisheries have been represented in the GIS database. Internal fisheries and closure areas have not been included. It is expected that the dataset will be maintained and updated as changes occur.

The changing nature of Australia's coastline and hence the various national maritime boundaries may also influence changes to the fisheries data set.

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Metadata information

Metadata date: 2003-04-02

Additional metadata

Metadata reference XHTML: http://www.ga.gov.au/meta/ANZCW0703005421.html

Metadata reference XML: http://www.ga.gov.au/meta/ANZCW0703005421.xml

Size of dataset: 46.6 - 96.9 MB depending on the format.

Scale/resolution: Variable - source is generally larger than 1:150 000.

Projection/datum: Geographical coordinates using the Geocentric Datum of Australia 1994 (GDA94).

Glossary

Attribute
The descriptive characteristic of a feature. An attribute has a defined set of attribute values.

Attribute object
The attribute object holds the non-locational or semantic information about the feature instance.

Australian Geodetic Datum 1966 (AGD66)
This datum was adopted in 1966 and is defined by the parameters of the Australian National Spheroid and the coordinates of the Johnston Geodetic Station. This datum is used for the determination of coordinates for some Geoscience Australia products. Superseded by the Geocentric Datum of Australia (GDA94).

Chain
A line composed of a sequence of non-intersecting line segments bounded by nodes. Chains reference the polygon to the left and right of the chain.

Datum
A mathematical surface from which heights or positions are referenced.

Entity
A real world phenomenon which cannot be divided into phenomena of the same type.

Entity class
A group of entities of the same kind, matching the members of a feature class.

Entity point
An entity point is used to locate point entities represented by a point because of the scale of the source material.

Feature
A feature is the cartographic or digital representation of a class of entity.

Feature class
A feature class is a group of feature instances defined by a set of rules and having common attributes and relationships that are the properties of the corresponding real world phenomena.

Feature instance
A single occurrence of a feature which has a unique set of spatial and attribute object values.

Geocentric Datum of Australia 1994 (GDA94)
The set of geographic coordinates based on the Geocentric Datum of Australia. It is compatible with Global Positioning Systems (GPS). Adopted in 1994 and implemented in the year 2000. Used in production of new editions of 1:100 000 and 1:250 000 NATMAPs.

GEODATA
Geoscience Australia's brand of high quality digital data products for use in Geographic Information Systems (GIS).

Geodetic datum
A datum defines the basis of a coordinate system. A local or regional geodetic datum is normally referred to an origin whose coordinates are defined. The datum is associated with a specific reference ellipsoid which best fits the surface (geoid) of the area of interest. A global geodetic datum is now related to the centre of the earth's mass, and its associated spheroid is a best fit to the known size and shape of the whole earth. The position of a point common to two different surveys executed on different geodetic datums will be assigned two different sets of geographical coordinates.

Geographical coordinates
A position given in spherical coordinates commonly known as latitude and longitude.

Geographic Information System (GIS)
A spatial database which is manipulated via a set of spatial operators or commands.

Latitude
The latitude of a feature is its angular distance on a Meridian, measured northwards or southwards from the terrestrial Equator.

Layer
The features in a theme are subdivided into one or more layers on the basis of the spatial objects used to represent the features. Linear networks, polygons and point features are placed in separate layers.

Linear Network
A layer consisting of linear features which are connected and which form a pathway along which movement is possible.

Longitude
An angular distance measured east or west from a reference meridian (usually Greenwich) on the earth's surface.

NATMAP
Geoscience Australia's brand for its popular topographic map range.

Node
A point that is a junction of two or more chains or which is the end point of a chain. Connectivity of chains is indicated by the sharing of nodes at their intersections.

Point
A geometric representation defined by a single (x,y) coordinate pair or an (x,y,z) triplet.

Polygon
A continuous area defined by a set of bounding chains. There is only one external polygon and there may be one or more internal, non-nested inner boundaries.

Polygon label point
A point within a polygon feature instance used to locate labels or information about that polygon. This point is sometimes known as a centroid.

Positional accuracy
Statistical estimate of the degree to which planimetric coordinates and elevations of features agree with their real world values.

Projection
Any systematic way of representing the meridians and parallels of the earth upon a plane surface or map.

Segment
A direct line between a pair of points or a point and a node.

Spatial object
The spatial object holds the locational information of a feature instance. It is composed of either a point, chain or polygon.

Theme
The information contained in map production material can be divided into themes which contain logically related geographic information. Each theme is capable of being used as a dataset in its own right.

Unique Feature Identifier (UFI)

An attribute code which is unique to each feature entity and is attached to every feature instance. It is primarily used to facilitate 'change only' updates.

Vector data
Vector data uses points and straight lines (vectors) to describe features on, or characteristics of, the earth's surface. Vector data can also include polygons, which are areas enclosed by a number of vectors. To record additional information, data attributes can be attached to individual vector features.

Vertex
The connecting point of two line segments.