# INTEGRATED BIODIVERSITY ASSESSMENT TOOL

# IBAT MAP LAYERS

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# 1 Introduction

This document provides details about each of the geospatial datasets used within the mapping interface of IBAT - the "Integrated Biodiversity Assessment Tool".

Through the top menu item "Downloads", you can download complete data sets by country/territory, in either shape file format (for use with, for example, ESRI's suite of GIS applications) or kml format (for use with, for example, Google Earth). These compressed files, include spatial information for the following:

- Internationally recognised Protected Areas (including Ramsar Wetlands, UNESCO MAB, World Heritage and Natura 2000)
- National designated sites (including IUCN categories I-VI)
- Key Biodiversity Areas (including Alliance for Zero Extinction Sites and BirdLife's Important Bird Areas)

In addition to the country/territory downloads, you can also download a number of global data sets. These broad-scale data sets provide a useful indication, at a landscape level, of the biodiversity value of a particular area, but are not a substitute for the more detailed country/territory site-based data sets of protected areas and key biodiversity areas.

The following broad-scale data sets are available through the download page:

- Biodiversity Hotspots
- HBWAs
- Endemic Bird Areas

## 2 Data layers - overview

The following data layers are available through the mapping interface:

- Completeness
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- Legally protected areas:
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  - IUCN Category III- IV
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  - Internationally Recognised Sites (including World Heritage, Ramsar Wetlands, UNESCO MAB and Natura 2000 sites)

- Priority sites for Biodiversity
  - Key Biodiversity Areas
  - Alliance for Zero Extinction sites (AZEs)

- Regions of conservation importance
  - Biodiversity Hotspots
  - High Biodiversity Wilderness Areas (HBWAs)
  - Endemic Bird Areas

# 3 Completeness

## 3.1 KBA completeness

This layer gives an indication of the current state of the KBA directories within a country/territory. The layer is split into 7 categories as described below:

1. Full coverage for all birds and other major taxa
2. Full coverage for all birds, partial coverage for other major taxa
3. Full coverage for all birds, in preparation for other major taxa
4. Full coverage for all birds
5. Partial coverage for birds and other major taxa
6. In preparation
7. No sites identified

An additional comments field is available when an individual country/territory is queried which gives further details on the status of the KBA identification and boundary delineation.

Derived from ESRI Data and Maps 2005 CDROM. ESRI, California USA.

More information...

| **Layer name: CompletenessKBA** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| POLITICNAM | char (254) | Country/Territory Name |
| CtyRecID | integer | Unique Country ID |
| ISO3 | char (3) | Three-letter country codes as defined in ISO 3166-1 |
| Comment | char (254) | Description of KBA identification process |
| Complete | char (100) | Description of category |

## 3.2 WDPA completeness

This layer describes, by country/territory, the quality of protected areas data held within the WDPA. Quality is calculated by scoring each country/territory based on the presence of polygons versus points, completeness of attribute information and currency of dataset.

- *Restricted*: a country/territory which has placed a restriction on the data that prevents UNEP-WCMC from displaying the dataset or otherwise making it available;
- *Poor*: a dataset that does not have polygons in addition to incomplete attributes and has not been updated in the past 3-5 years;
- *Deficient*: a dataset that has fewer polygons than points and is also lacking in currency and attributes;
- *Good*: a data set that has received a good score in two out of three of the criteria;
- *Very Good*: a country/territory data set which has mostly or all polygons, complete attributes and has been updated recently.

Derived from ESRI Data and Maps 2005 CDROM. ESRI, California USA.

More information...

| **Layer name: CompletenessWDPA** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| ISO3 | char (3) | three-letter country codes defined in ISO 3166-1, |
| COUNTRY | char (50) | Country Name |
| DATA_ASSES | char (30) | Description of category |
| FUT_ASSESS | char (30) | Data to be provided |
| POLY_PRO | real (19.11) | Percentage of polygons |

# 4 Legally protected areas

All internationally recognised and nationally designated sites are provided in two files – one for polygon data and one for point data (where no polygon exists).

| **Layer names: CountryName_WDPA** | | |
|---|---|---|
| Geometry: Point and Polygon (two separate layers) | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| WDPAID | integer | Unique identification number specific to each site |
| WDPA_PID | Integer | This ID only applies where zones exist within a protected area. Each zone will have its own WDPA ID which will be linked to an overarching or "parent" protected area through a Parent ID. The WDPA ID of the parent site will become a WDPA Parent ID. |
| NAME | char (254) | Name of protected area in English. |
| ORIG_NAME | char (254) | Name of protected area as known in local area (local language) |
| COUNTRY | char (3) | The country, territory or other administrative unit of geographical interest that a protected area jurisdictionally resides within, as given by its ISO 3166-1 alpha-3 code. |
| SUB_LOC | char (100) | State / Province in which protected area is designated/located |
| DESIG | char (254) | Type of protected area in local language e.g. Parques Nacionales, Monumentos Naturales |
| DESIG_ENG | char (254) | Type of protected area in English e.g. national park, natural monument, Wetland of International Importance (Ramsar) etc |
| DESIG_TYPE | char (20) | Three values: National, International or ABNJ (Area Beyond national Jurisdiction) |
| IUCN_CAT | char (20) | IUCN Category (Ia, Ib, II, III, IV, V or VI) adopted for national protected areas. For reporting on international protected areas the option of listing "Not Applicable" is used. |
| INT_CRIT | char (100) | Criteria assigned to protected area under the international convention/agreement |
| MARINE | char (20) | Does the site contain a 'marine' element? |
| REP_M_AREA | double | Total marine protected area extent (in hectares) |
| GIS_M_AREA | double | Total marine protected area extent (in square kilometres) as calculated from spatial boundary (GIS) data. |
| REP_AREA | double | Total protected area extent, marine and terrestrial, (hectares) as defined in governmental declarations or decrees or management plans |
| GIS_AREA | double | Total protected area extent, marine and terrestrial (square kilometres) as calculated from spatial boundary (GIS) data. |
| STATUS | char (100) | Current legal standing of the site e.g. proposed, legally declared (Designated), Degazetted |
| STATUS_YR | integer | Date of establishment that current status |

| | | |
|---|---|---|
| | | came into force e.g. proposed, legally declared (Designated). |
| GOV_TYPE | char (100) | Outline of the decision-making structure of the protected area and is closely linked to the ownership. |
| MANG_AUTH | char (200) | Name of managing authority/agency responsible for governance of the site |
| MANG_PLAN | char (254) | A reference to an official management plan for the protected area. This could represent a hyperlink to the document(s) on-line or a legal reference to where the documents can be found including the Title and Identifiable Numbering or Cataloguing system. |
| METADATAID | integer | Unique identification number specific to each data source. |

What follows is an explanation of the main designation types and of to select each subset of data.

## 4.1 World Heritage

This designation, administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO) covers sites, protected and unprotected, which are recognized as having outstanding natural and/or man-made features which are considered of international importance to all people. The aim of such recognition is in promoting international cooperation in protecting such sites. This is based on the Convention Concerning the Protection of the World Cultural and Natural Heritage, adopted in 1972. Sites are nominated by the countries in which they occur and evaluated by a World Heritage Committee. Such sites do not necessarily recognize areas of high biodiversity value or nationally designated protected areas.

To select this subset within a GIS, use the following values:
DESIG_ENG = "World Heritage Site"
DESIG_TYPE = "International"

More information...

## 4.2 Ramsar Wetlands

An international designation recognizing important wetland sites, protected and unprotected. It is based on the Convention on Wetlands of International Importance especially as Waterfowl Habitat, which was adopted in 1971 in the town of Ramsar. Originally focused on promoting the protection of wetlands for birds, the convention has since broadened its scope to include any all aspects of wetland conservation and wise use.

To select this subset within a GIS, use the following values:
DESIG_ENG = "Wetlands of International Importance (Ramsar)"
DESIG_TYPE = "International"

More information...

### 4.3 UNESCO MAB

A designation assigned to existing protected areas by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Theses reserves are not covered by any one international convention and instead form part of the UNESCO Man and the Biosphere (MAB) Programme. The protected areas selected to receive this designation do not necessarily protect unique or important areas, and can exhibit a variety of objectives including research, monitoring, training and demonstration, as well as conservation.

To select this subset use the following values:
DESIG_ENG = "UNESCO-MAB Biosphere Reserve"
DESIG_TYPE = "International"

More information...

### 4.4 Natura 2000

Natura 2000 is the centrepiece of EU nature & biodiversity policy. It is an EU-wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive. Together, SPAs and SACs make up the Natura 2000 series. All EU Member States contribute to the network of sites in a Europe-wide partnership from the Canaries to Crete and from Sicily to Finnish Lapland.

- Special Protection Areas (SPAs) are classified under the Birds Directive to help protect and manage areas which are important for rare and vulnerable birds because they use them for breeding, feeding, wintering or migration.

- Special Areas of Conservation (SACs) are classified under the Habitats Directive and provide rare and vulnerable animals, plants and habitats with increased protection and management. These sites have been identified under the European Birds and Habitats directives as Special Areas for Conservation and Special Protection Areas:

To select these subsets within a GIS, use the following values:
DESIG_ENG = "Site of Community Interest (Habitats Directive)"
DESIG_TYPE = "International"

DESIG_ENG = "Special Protection Areas (Birds Directive)"
DESIG_TYPE = "International"

## 4.5 Other International protected areas

A number of other conventions with a global or regional remit are also included:

- Barcelona Convention – 21 sites
- ASEAN Heritage – 26 sites
- OSPAR MPA (Area Beyond National Jurisdiction) – 6 sites

To select these subsets within a GIS, use the following values:

DESIG_ENG = "ASEAN Heritage"
DESIG_TYPE = "International"

DESIG_ENG = "Barcelona Convention"
DESIG_TYPE = "International"

DESIG_ENG = "Marine Protected Area"
DESIG_TYPE = "International"
INT_CRIT = "OSPAR MPA"

More information...

## 4.6 IUCN Category I – II

The World Conservation Union's (IUCN) global set of standard categories to classify protected areas, both terrestrial and marine, based on management objectives. These allow comparison between countries; unlike national naming designations (e.g. national park or forest reserve) which are not standardized internationally and do not necessarily convey information on management targets.

| Category | Main management target | Definition |
|---|---|---|
| Ia | Science | Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring. |
| Ib | Wilderness protection | Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition. |
| II | Ecosystem protection and recreation | Natural area of land and/or sea, designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be |

| | | |
|---|---|---|
| | | environmentally and culturally compatible. |

To select this subset within a GIS, use the following values:
DESIG_ENG = ""
DESIG_TYPE = "National"
IUCN_CAT = "Ia", "Ib" or "II"

More information...

## 4.7 IUCN Category III- IV

The World Conservation Union's (IUCN) global set of standard categories to classify protected areas, both terrestrial and marine, based on management objectives. These allow comparison between countries; unlike national naming designations (e.g. national park or forest reserve) which are not standardized internationally and do not necessarily convey information on management targets.

| **Category** | **Main management target** | **Definition** |
|---|---|---|
| III | Conservation of specific natural features | Area containing one or more, specific natural or natural/cultural feature which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance. |
| IV | Conservation through management intervention | Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species. |

To select this subset within a GIS, use the following values:
DESIG_ENG = ""
DESIG_TYPE = "National"
IUCN_CAT = "III","IV"

More information...

## 4.8 IUCN Category V- VI

The World Conservation Union's (IUCN) global set of standard categories to classify protected areas, both terrestrial and marine, based on management objectives. These allow comparison between countries; unlike national naming designations (e.g. national park or forest reserve) which are not standardized internationally and do not necessarily convey information on management targets.

| **Category** | **Main management target** | **Definition** |
|---|---|---|
| V | Landscape/seascape conservation and recreation | Area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the |

| | | |
|---|---|---|
| | | protection, maintenance and evolution of such an area. |
| VI | Sustainable use of natural ecosystems | Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs. |

To select this subset within a GIS, use the following values:
DESIG_ENG = ""
DESIG_TYPE = "National"
IUCN_CAT = "V", "VI"

More information...

### 4.9 IUCN Category Unknown

The World Conservation Union's (IUCN) global set of standard categories to classify protected areas, both terrestrial and marine, based on management objectives. These allow comparison between countries; unlike national naming designations (e.g. national park or forest reserve) which are not standardized internationally and do not necessarily convey information on management targets.

These sites have either been degazetted or proposed protected areas that currently have no national recognition.

To select this subset within a GIS, use the following values:
DESIG_ENG = ""
DESIG_TYPE = "National"
IUCN_CAT = "Not Reported"

More information...

# 5 Priority sites for Biodiversity

## 5.1 Key Biodiversity Areas (KBAs)

A site identified as a conservation priority for a variety of species (not only birds) based on quantitative criteria used for BirdLife's Important Bird Areas (IBAs) - see below for further details on IBAs. These sites are ideally based on manageable land units defined by local experts using global standards. The identification of these sites is an ongoing process and aims to provide defined manageable units for conservation management.

The KBAs presented in IBAT are made up of a combination of Important Bird Areas, Alliance for Zero Extinction sites and Key Biodiversity Areas (as defined by Conservation International through the hotspot conservation prioritisation process).

More information...

**Important Bird Area (IBA):** A site identified as a conservation priority for bird species based on four criteria: presence of globally threatened species; significant populations of restricted range species; a representative sample of biome-restricted species; important congregations of species. This model of site prioritization was pioneered by BirdLife International and has been used by other organizations to define similarly important sites for other groups of species, culminating in the development of the Key Biodiversity Area concept.

More information...

| **Layer name: KBAsGlobal** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| SitRecID | integer | Unique Site ID |
| REGION | char (50) | Region of globe |
| COUNTRY | char (100) | Country/territory name |
| ISO3 | char (3) | ISO 3166-1 three letter country code |
| NATNAME | char (254) | Name for Site used nationally |
| INTNAME | char (254) | Name for Site used internationally |
| FINCODE | char (8) | Final code for site |
| SITLAT | Double | Latitude centroid coordinate |
| SITLONG | Double | Longitude centroid coordinate |
| KBASTATUS | char (50) | Is site confirmed KBA |
| IBASTATUS | char (50) | Is site confirmed IBA |
| AZESTATUS | char (50) | Is site confirmed AZE |
| SITAREA | double | Recorded area of site in hectares |
| PROTECT | char (1) | Documented protection status of the site |
| NO_PA | integer | Interaction of protected areas |
| SOURCE | char (254) | Origin of data |
| DELTXT | char (254) | Digitising notes |
| DELGEOM | char (20) | Geometry delineation type (Polygon, Provisional Polygon, Refined Polygon or Point) |
| ADDEDBY | char (254) | Who added the site polygon |

| | | |
|---|---|---|
| ADDEDDATE | date | Date polygon added |
| CHANGEBY | char (254) | Who edited the polygon |
| CHANGEDATE | date | When polygon edited |

## 5.2 AZEs (Alliance for Zero Extinction sites)

A site occupied by the majority of the remaining population of the highest class of threatened species (Critically Endangered or Endangered). If this site is lost, the species it has been selected for will become extinct. These sites are effectively the subset of Key Biodiversity Areas and Important Bird Areas which are the most immediate priority for conservation action.

More information...

| **Layer name: AZEs** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| SitRecID | integer | Unique Site ID |
| REGION | char (50) | Region of globe |
| COUNTRY | char (100) | Country/territory name |
| ISO3 | char (3) | ISO 3166-1 three letter country code |
| NATNAME | char (254) | Name for Site used nationally |
| INTNAME | char (254) | Name for Site used internationally |
| FINCODE | char (8) | Final code for site |
| SITLAT | Double | Latitude centroid coordinate |
| SITLONG | Double | Longitude centroid coordinate |
| KBASTATUS | char (50) | Is site confirmed KBA |
| IBASTATUS | char (50) | Is site confirmed IBA |
| AZESTATUS | char (50) | Is site confirmed AZE |
| SITAREA | double | Recorded area of site in hectares |
| PROTECT | char (1) | Documented protection status of the site |
| NO_PA | integer | Interaction of protected areas |
| SOURCE | char (254) | Origin of data |
| DELTXT | char (254) | Digitising notes |
| DELGEOM | char (20) | Geometry delineation type (Polygon, Provisional Polygon, Refined Polygon or Point) |
| ADDEDBY | char (254) | Who added the site polygon |
| ADDEDDATE | date | Date polygon added |
| CHANGEBY | char (254) | Who edited the polygon |
| CHANGEDATE | date | When polygon edited |

# 6 Regions of conservation importance

## 6.1 Endemic Bird Areas

Endemic Bird Areas are regions of global conservation importance, identified by BirdLife International, where the distributions of two or more restricted-range bird species overlap. About 25% of all bird species have a 'restricted' range, i.e. they are restricted (endemic) to a very small area in global terms (defined as 50,000 km² or smaller). Half of all restricted-range species are already globally threatened or Near Threatened, while the other half remain forever vulnerable to the loss or degradation of habitat owing to the smallness of their ranges. The unique landscapes where these species occur, amounting to just 4.5% of the earth's land surface, are thus BirdLife International's priorities for broad-scale ecosystem conservation. The EBAs also support many of the world's more widespread bird species, are also important for the conservation of restricted-range species from other animal and plant groups, and are often particularly rich in human cultures and languages.

More information...

| **Layer name: ebamapglobal** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| EBARECID | integer | Unique ID |
| EBANAME | char (50) | Name of EBA |
| EBALON | real (19.11) | Approximate longitude of area in decimal degrees |
| EBALAT | real (19.11) | Approximate latitude of area in decimal degrees |
| EBAAREA | real (19.11) | Recorded area in hectares |
| EBAALTMIN | real (19.11) | Recorded minimum altitude in metres |
| EBAALTMAX | real (19.11) | Recorded maximum altitude in metres |

## 6.2 Biodiversity Hotspots

Hotspots are regions of global conservation importance defined by the presence of high levels of threat (at least 70% habitat loss) in areas with high levels of species endemism (at least 1,500 endemic plant species). One hotspot can include multiple ecoregions. These hotspots represent the set of broad-scale priority regions for work by Conservation International. These are currently terrestrially focused but the process of identifying marine hotspots is under way.

More information...

| **Layer name: hotspots_revisited_2004_polygons** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| NAME | char (45) | Hotspot name |

| | | |
|---|---|---|
| LongDD | real (19.11) | Approximate longitude of site in decimal degrees |
| LatDD | real (19.11) | Approximate latitude of site in decimal degrees |

## 6.3 HBWAs

High Biodiversity Wilderness Areas (HBWAs) are large areas (at least 10,000 $km^2$) consisting of regions defined by their relatively undisturbed nature (at least 70% intact) and high level of species endemism (at least 1,500 endemic plant species). These form a supplementary broad-scale priority to biodiversity hotspots for Conservation International.

More information...

| **Layer name: wilderness_0803** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| ID | Integer (8.0) | Unique ID |
| WA_NAME | String (50.0) | Name of Wilderness Area |
| AREA | Real (16.3) | Area in hectares |
| LonDD | Real (19.11) | Approximate longitude of area in decimal degrees |
| LatDD | Real (19.11) | Approximate latitude of area in decimal degrees |

# 7 Species Data

## 7.1 Species Density

The species density layer is a hexagonal gridded layer that contains the summary count of species ranges intersecting each grid cell

| **Layer name: density** | | |
|---|---|---|
| Geometry: Polygon | | |
| PROJECTION: GEOGRAPHIC WGS84 | | |
| **Field name** | **Field type** | **Description** |
| FID | Integer | Unique feature ID |
| ISEA9_ID | Integer | Unique grid cell ID |
| Count_ | Integer | Number of species in grid cell |

In future versions of IBAT we may expand the level of information available.

# 8 Download Data

IBAT offers download files in two format: shape file and kml. Explanation of each is given below.

## 8.1 Shapefile definition

The ESRI shapefile, more commonly referred to simply as "shapefile", is a popular geospatial vector data format for geographic information systems software, developed by ESRI (www.esri.com). It is probably the most widely used GIS vector format.

A Shapefile is a digital vector (non-topological) storage format for storing geometric location and associated attribute information. The Shapefile format is used not only by ESRI's family of GIS products – ArcView, ARC/INFO, ArcGIS – but also a range of other widely used GIS software such as MapInfo.

A Shapefile stores map (geographic) features and attribute data as a collection of files. Three of these make up a "required" set, with a number of optional files. Each is described below:

Required
- .shp - the file that stores the feature geometry
- .shx - the file that stores the index of the feature geometry
- .dbf - the dBASE file that stores the attribute information of features

Optional
- .sbn and .sbx - the files that store the spatial index of the features. These two files can be created in ArcView (see ArcView's on-line help for more information)
- .fbn and .fbx - the files that store the spatial index of the features for shapefiles that are read-only. These two files can be created in ArcView (see ArcView's on-line help for more information)
- .ain and .aih - the files that store the attribute index of the active fields in a table or a theme's attribute table. These two files can be created in ArcView (see ArcView's on-line help for more information)
- .prj - the file that stores the coordinate system information. This file can be created with and is used by the ArcView Projection Utility. It is not used by ArcView GIS Version 3.x or older versions, or by ARC/INFO versions previous to version 8.0.
- .xml - metadata for ArcGIS, for using shapefiles on the Internet

Since a Shapefile is non-topological it does not maintain spatial relationship information such as connectivity, adjacency, and area definition. This makes the format simpler but less capable when performing complex spatial analysis.

*NOTE: An individual Shapefile is actually a collection of files as described above that must be moved or distributed as a group otherwise the shapefile can be rendered unusable.*

## 8.2 KML definition

Keyhole Markup Language (KML) is an XML notation for expressing geographic annotation and visualization within Internet-based, two-dimensional maps and three-dimensional Earth browsers. KML was developed for use with Google Earth, which was originally named Keyhole Earth Viewer. It was created by Keyhole Inc, which was acquired by Google in 2004. KML is an international standard of the Open Geospatial Consortium. Google Earth was the first program able to view and graphically edit KML files.

**KML Structure:**
The KML file specifies a set of features (place marks, images, polygons, 3D models, textual descriptions, etc.) for display in Google Earth, Maps and Mobile, or any other geospatial software implementing the KML encoding. Each place always has a longitude and a latitude. Other data can make the view more specific, such as tilt, heading, altitude, which together define a "camera view".

KML files are very often distributed in KMZ files, which are zipped files with a .kmz extension.

An example KML document is:

```
<?xml version="1.0" encoding="UTF-8"?>
<kml xmlns="http://www.opengis.net/kml/2.2">
<Document>
<Placemark>
  <name>New York City</name>
  <description>New York City</description>
  <Point>
    <coordinates>-74.006393,40.714172,0</coordinates>
  </Point>
</Placemark>
</Document>
</kml>
```

A full reference of the KML format can be found here:
https://developers.google.com/kml/documentation/kmlreference

## 8.3 Summary

To summarise, both shapefiles and kml files are used to display geographic features. Notable differences are that KML files have been designed to show information over the internet via Google Earth or Google Maps. Shapefiles, on the other hand, were designed to be used within a GIS such as ArcView.

KML files contain the ability to style the geographic features (e.g. define the colours of the fill and outlines), a shapefile on the other hand, does not provide this functionality (e.g. it only provides the geographic features but with no styling, this has to be done within the GIS).

Conversion between the two formats can be performed by using ArcGIS or certain open source tools such as OGR. Converting a shapefile to KML can often result in the KML file size increasing by up to 2.5x the size of a shapefile (e.g. a 50mb shapefile can become 125mb as a KML file).

## IMPORTANT LIMITATIONS

*Once a KML file exceeds 40mb, the file is simply too large for Google Earth, and the application becomes rather unresponsive. In contrast, the maximum size for KML within Google Maps is 10mb.*

*Single Shapefiles cannot exceed 2Gb in size. However, if there is a requirement to use larger files then an ESRI File Geodatabase is an option, which has a limit of 1 terabyte.*