Introduction to Coastal and Marine GIS
GeoData in partnership with ABPmer

COURSE OUTLINE

Delivering sustainable development in the marine environment requires a balance to be achieved between resource use and protection of our seas. Spatial data is increasingly important in such decision making being used for marine planning, conflict management and environmental management.

GeoData’s experienced GIS trainers have teamed up with ABPmer GIS Consultants, who specialise in the coastal and marine sector, to create a course that will provide you with the background and skills necessary to utilise these powerful tools and techniques.

The course introduces GIS concepts and techniques using ArcGIS 10. In addition, it describes available Coastal and Marine GIS datasets, which also form the basis for the course exercises.

A project showcase, drawn from ABPmer’s portfolio, illustrates how these datasets have been used within GIS to support coastal and marine decision making. The course also considers common problems faced when mapping the coastal and offshore zones (including projections, vertical datums, etc.) and offers a GIS Clinic, where delegates have the opportunity to discuss their own specific issues with the experts.

ANTICIPATED COURSE OUTCOMES / ACHIEVEMENTS

Aims and objectives

• Provide introductory level GIS knowledge
• Focus in on commonly used coastal and marine datasets
• Show the many potential applications of GIS within the coastal and marine sectors (through our partners at ABPmer)
• Discuss some of the unique challenges / pitfalls when mapping the coastal and marine zones (e.g. coordinate systems, vertical datums, integration of model outputs)

Learning outcomes - by the end of the course, delegates will have a knowledge and understanding of:

• What a GIS is; what spatial data is; raster and vector data models
• The core tasks involved in GIS analysis e.g. data acquisition/input; data storage and management; data manipulation/analysis; and data presentation and output.
• The core functionality of ArcMap, ArcCatalog and the embedded ArcToolbox.
• Importing data from GPS outputs and scanned paper maps.
• Handling tables including selections and queries.
• Georeferencing raster images, such as hydrographic charts.
• Creating and editing spatial data.
• Greater appreciation of coastal and marine GIS data and applications.
• The steps required to produce paper maps from base data.
• Basic geoprocessing tasks e.g. buffering and clipping.
• Introduction to ModelBuilder
# Introduction to Coastal and Marine GIS

## Day 1

1. **Introduction to Coastal and Marine GIS**
   - What is GIS?
   - GIS Tasks
   - GIS Data Types
   - Mapping in Layers
   - Co-ordinate Systems
   - Coastal & Marine GIS Applications

2. **Manipulating Coordinate Systems**
   - Some History
   - ArcGIS Family
   - What is ArcView?
   - ArcCatalog
   - ArcMap
   - ArcToolbox
   - GeoDatabases
   - Map Documents
   - Help!

   *Exercise 2: Getting Started*

3. **Using ArcMap**
   - Navigating around ArcMap
   - Spatial Bookmarks
   - Data Frames and Layers
   - Feature Types
   - Sources of Data
   - Layer Properties
   - Map Documents

   *Exercise 3a: ArcMap Basics; 3b: Handling Spatial Data*

4. **Data and Metadata Management using ArcCatalog**
   - Overview
   - Metadata (and Finding Data)
   - Data Management
   - Marine data model

   *Exercise 4: ArcCatalog Basics*

5. **Handling Tabular Data**
   - Table Types, Creating Tables
   - Adding Fields and Records
   - Editing a Table, Selections, Sorting a Table, Generating Field Statistics and Table Summaries

   *Exercise 5: Using Tables*

## Day 2

6. **Selections and Queries**
   - Identifying Features
   - Map Tips
   - Hyperlinks
   - Select Features Interactively
   - Selection by Criteria
   - Sorting Data
   - Theme on Theme Selections

   *Exercise 6: Generating statistics for the coastline*

7. **Georeferencing**
   - What is Georeferencing?
   - Data Types Requiring Georeferencing
   - The Georeferencing Toolbar
   - Aligning Rasters using GCPs
   - Aligning Rasters using X,Y Co-ordinates
   - Transforming the Image
   - Rectifying the Image
   - Georeferencing oblique images

   *Exercise 7: Georeferencing a Bathymetry Chart*

8. **Creating and Editing Layers**
   - Creating New Data
   - Shapefiles
   - GeoDatabases
   - Adding Attributes
   - Editing Shapefiles
   - Snapping

   *Exercise 8: Creating and Editing Layers*

## Day 3

9. **Producing Maps**
   - What is a Map Layout?
   - Creating a Map Layout
   - Map Elements
   - Graphic Elements
   - Modify Map Elements
   - Grouping Map Elements
   - Using Templates
   - Printing the Map

   *Exercise 9: Creating a Layout*

10. **GeoProcessing, Analysis and ModelBuilder**
    - Toolbars
    - GeoProcessing
    - Buffer, Clip, Union, Spatial Join
    - ModelBuilder
    - Extensions and Customisation
    - 3D visualisation / Modelling

   *Exercise 10: Geoprocessing and Analysis*

11. **Issues when Mapping the Coastal and Marine Zones**
    - Vertical Datums
    - Handling Temporal Data
    - Integration with other systems (live data feeds, modelling)
    - Archiving GIS Data

   *Exercise 11: Horizontal and Vertical Projections; Archiving ArcGIS*

## ABPmer Coastal and Marine GIS Data & Project Showcase

Highlighting the importance of GIS in the context of Marine Spatial Planning. Trainees will explore and interact with important data sources used for Coastal GIS projects (including Ordnance Survey, OceanWise and remotely sensed data).

## ABPmer Coastal / Marine GIS Consultancy Exercises

A more wide-ranging exercise where delegates work with data to solve a typical problem such as planning a new cable route for an offshore windfarm or locating a Salmon protection area.

## GIS Advice

We encourage delegates to bring their own data and discuss issues with experienced coastal GIS consultants.