

GIS Database of Sensitive Coastal Area in Taiwan

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Abstract

Coastal areas have been recognized as environmentally sensitive area and are under increasing pressure from rapid expanse of human activities in Taiwan such as industrial development, aquaculture, tourism and so on. Environmental stress on coastal zones is getting severe. However, environmental management in coastal areas has been emphasized in recent years. A good understanding of environmental resources in coastal areas is crucial to the proper management of coastal areas. The Environmental Protection Agency (EPA) of Taiwan has launched a project to establish a database for coastal areas since 1994. It is undertaken by a research team from National Taiwan University, Academia Sinica and other universities. This paper presents the work and achievements of this project.

The resources in coastal areas are diversify and complex. Data involved in those resources are manifold and complicated. A sophisticated data management tool therefore becomes critical. Geographic information system (GIS) was employed by this study to compile, integrate, and organize these environmental resource data in coastal areas. Data were collected by different experts coming from different disciplines such as geography, zoology, botany, biology geology, geomorphology, archaeology, sociology, climatology, and so on. Those data came from different sources such as existing maps, aerial photos, satellite imagery, documents, and field survey. They were compiled and integrated by GIS technology. One to five thousand scale orthomaps were used as base maps. Everything was relocated to these base maps either by GIS method or by manual allocation. Field survey was aided by Global positioning system (GPS). The database contains physical themes such as, geology, soil, coastline, water level, endangered animals, vegetation; human themes such as population, landuse historical relic, existing recreational spots, and environmentally sensitive themes such as wetlands, lagoons, sandbar, sand dune.

Outline

1. Study Area

--western coast, Yi-lan coast (north-east), Pen-hu islands, Jen-Men & Mar-Ju islands

2. Database Themes:

--Physical Themes:

Geology, Soil, Coastline, Watertable, Geomorphology, Climatology, Hydrology

--Human Themes:

Land Use, Historical Relic, Demography, Industry, Hazards, Environmental Issues, Recreational Sites

--Environmental Sensitive Themes:

Wetland, Lagoon, Sand Dune, Sand Bar

--Biological Themes:

Endangered Animals, Rare Vegetation Species

3. Methods

--Collaborative Works:

geographers, zoologists, demographers, botanists, sociologists, geologists, geomorphologists, biologists, archaeologists, climatologists, geographic information scientists

--Use GIS technology to integrate data

Domain experts → Maps, documents, aeriphotots, satellite imagery, field survey → GIS method → GIS database

4. Data Sources

--Maps (digitization)

--Satellite imagery (image rectification & registration, Image classification, vectorization)

--Aeriphotosts (image rectification & registration, image interpretation, digitization)

--Documents, Figures (relocate to base maps, field verification, digitization)

--Field survey (integration of GPS with GIS technologies)