Development of Environmental Management System using Marine Geographic Information System

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Abstract: Environmental management system has been constructed using by marine GIS, which is applied latest scientific algorithm, and fisheries related data for the citizens of the Jinhae Bay and executive officers. Through this system, we will get more easily marine environmental data, and production features of aquaculture farming areas.

Keywords: Marine GIS, environmental management system

1. Introduction

For the farming areas management and increase of the fisheries production, it is need to manage the deliberate development in coastal regions and control with the scientific environmental management system. It is also to construct marine GIS applied latest scientific methods and need the scientific system which can offer fast and accurate ecological information (Kapetsky et al., 1998). Through this system, we can get environmental information in aquaculture farming areas and understand scientifically growth characteristics in aquaculture fishery and production. Those results are some highlights of our current progress on environmental management system in Jinhae Bay (Park et al., 2004).

2. Data and Methods

We connect vector data of numerical maps in Jinhae Bay and raster information, and construct the marine GIS. And, we construct raster information which could be presented in graphic system with Data Base Management System (DBMS) to visualize the environmental variation in aquaculture field areas, amounts of fisheries facilities, cultured production. We use the database which is acquired with the nutrients amounts in Jinhae Bay, and water qualities, make it visible with an electrical methods (NFRDI, 2004).

3. Results

1) system construction

There are several programming languages in environmental management system, Jinhae Bay. Program language "Delphi" is primarily used for the ecological management system, Visual C++ is used for 3-D visual system construction in marine GIS, and Interactive Data Language (IDL) is used for 3-D visualization system in physical –biological ecosystem modeling output (Fig. 1.). Utilized GIS is GeoMania™ which is developed by domestic company, Data Base Management System (DBMS) is the Oracle product which are famous for stable and popular program. Fig. 2. represents the main screen for environmental management system. The square represents marine farming areas in Jinhae Bay (Fig. 2.). The comprehensive composition of system is achieved by setting of location, licensed fisheries farming areas data, ecological data, and physical-biological modeling output data. All of the information is presented through easy-to-read charts, interactive mapping enlarged with mouse-click jobs (Fig. 3.).

2) graphic user interface

The presentation method of farming areas data is defined by "Layer Nesting Method" which is used by general method and sets the each information unit of each object, respectively. According to necessity, all of users can use the function of enlarging each region, each kind of fisheries farming areas, and each period licensed fisheries. If user select the aquaculture field areas with a mouse in window program of personal computer where is accessible to search, they can precisely print out the basic information such as license agency, license number, etc.

4. Conclusion

In this research, we develop and construct the environmental management system which is being used graphic user interface. This is mainly adopted by marine GIS. These results suggest that we consider the environmental management system necessary to achieve the sound farming areas use and evaluate and assess the condition of the Jinhae Bay.

Acknowledgement

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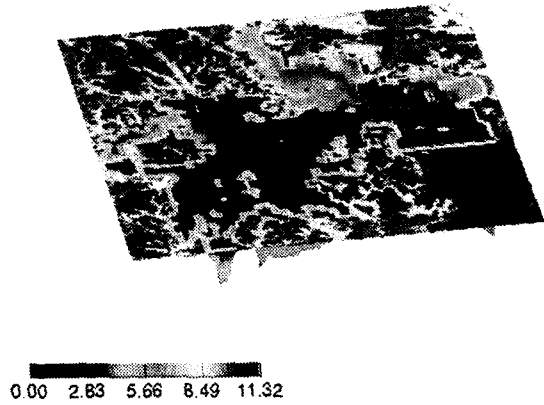
Fig. 1. The three-dimension visualization system in physical-biological ecosystem modeling COD output in Aug, 2003.
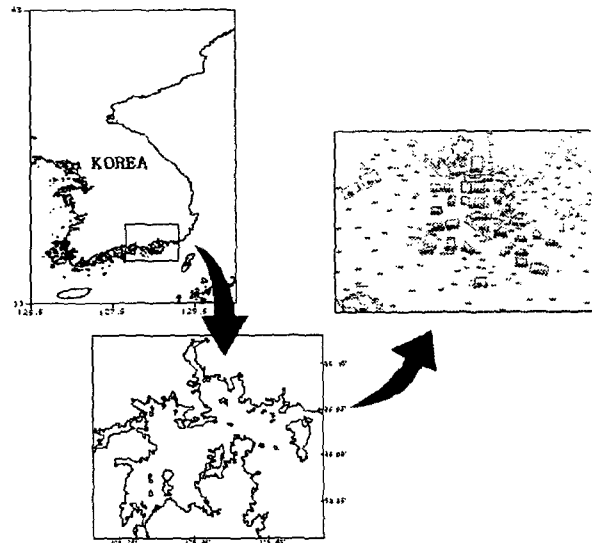

Fig. 3. The visualization system of location and licensed number for each fisheries farming areas in Jinhae Bay.
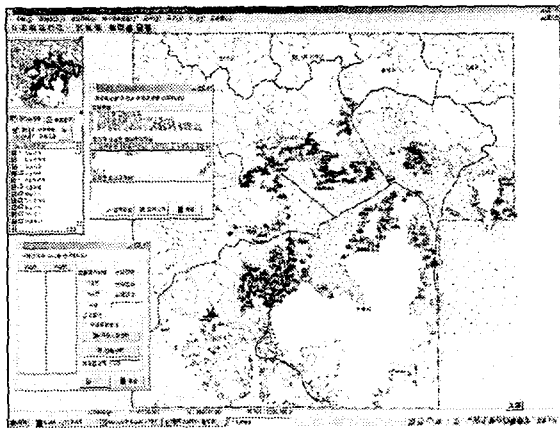

Fig. 2. The main screen image of the environmental system in Jinhae Bay.