Environmental Pollution Control GIS

Scenario
To effectively improve the pollution control and management in Yilan, the Department of Environmental Protection Yilan, Taiwan planned to establish a platform named Yilan Pollution Control GIS with SuperGIS Server. SuperGIS Server allows organizations to distribute GIS data and web services easily via the Internet. The project is established step by step and comprises GIS data collection, prototype system development, system expansion, and platform development and operation to meet the governor’s expectation.

The Environmental Pollution Control GIS platform currently focuses on an integrating all kinds of pollution modeling analyses such as marine and air pollution which enable decision-makers to combine the data with existing pollution layer for further application use.

Goals
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Results
The overall functionality of Environmental Pollution Control GIS includes positioning, layer management, marine and air pollution modeling, and data management.

- Positioning: The positioning function contains coordinate positioning, road positioning, address positioning, landmark positioning, layer positioning, and cadastral positioning. Users can use the layer positioning tool to zoom to the location they would like to query, and receive cross-layer information through keyword search.

- Layer Management and Attribute Query: Besides getting the real-time traffic information on mobile phones through the application, the system also provides web page for the public to query online.

- Marine Pollution Simulation: The marine pollution simulation software, GNOME, developed by National Oceanic and Atmospheric Administration U.S. is able to simulate and demonstrate the general situation of oil spills off the coast of Yilan. The emergency reaction team can utilize the useful layer information combined with demonstrations to make crucial decisions.

- Air Pollution Modeling & Integration: A disaster may cause significant damage or loss of life. In this case, how to prevent and minimize the effects of disasters becomes more and more important to the emergency reaction team. In 2011, the staff of Department of Environmental Protection Yilan uses the air pollution modeling & analysis software, ALOHA, developed by National Oceanic and Atmospheric Administration to generate some analytic results. These results have greatly assisted decision-makers in understanding the possible extent, area, and disaster-affected population of hazards and establish possible prevention programs in advance.

Solutions
Environmental Planning
- Web GIS: The system is developed with SuperGIS Server to establish the map server and provide real-time spatial data to users.
- Database Management: The system adopts Microsoft SQL Server 2008 as the database management software to manage spatial data and optimize query efficiency.

Data Integration
The data source contains the information about cadastre, images, pollution surveys, water and other basic maps. Most importantly, the system allows each unit to collect and analyze the data from other units to display the analytic results on the system.

Platform Planning
The platform includes public query system, emergency system, and back-end data management system. The public query system allows the public to query the pollution data and related map navigation tools, such as reachable positioning and map measuring. The internet system offers comprehensive map information and related simulation tools. The back-end data management system allows to add new layers, update data, and manage authorization.

By using the improved marine and air pollution data, modeling, and analytic analysis provided by Pollution Control GIS, users can make smarter and more effective decisions for better disaster prevention and management. The project has successfully brought benefits to the Department of Environmental Protection Yilan.

Case Study

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