Developing GIS Applications to Manage and Disseminate Emissions Activity Data

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Overview

- Introduction
- Data collection
- Development of GIS application
- Summary
Introduction (1 of 3)

• The California Regional PM$_{10}$/PM$_{2.5}$ Air Quality Study (CRPAQS)

  – Multi-year program involved meteorological and air quality monitoring, emission inventory development, data analysis, and air quality simulation modeling.
• Emission inventory development phase included collection of emissions activity data during 1999-2001 period to improve the California Air Resources Board’s (CARB) emissions activity databases.

• Emissions activity data includes geographic information.
• Data must be available to analysts for the data analysis phase of CRPAQS beginning in the fall of 2002.

• An Internet-based GIS application was developed to manage, display, and disseminate data via the web.

• CRPAQS On-line Atlas with Regional and Site-specific Events (COARSE)
What is GIS?

- GIS software tools map and analyze things that exist and events that happen on earth.
- GIS integrates database operations with the geographic analysis benefits offered by maps.
- Internet-based GIS applications provide a way to display and disseminate data to a broad audience.

ESRI, 2000
Why Use GIS?

- GIS adds spatial context to data.
- Software is becoming more affordable and easier to use.
- GIS provides a framework for managing, displaying, and disseminating data.
Data Collection Objectives

- Data collection phase entailed gathering and processing

  (1) short-duration emission events data that may impact CRPAQS air quality measurements; and

  (2) highly resolved activity data in the immediate surroundings of 24 selected CRPAQS monitoring sites.
Data Sources

- observers stationed in the field
- automated digital camera equipment
- publicly available records and/or news reports
Data Products

Atlas/database containing ground-truth maps, tabular data, and observation diaries

Archive of digital photographs

Database containing news stories of emissions events

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Application Development (1 of 2)

- ArcIMS - Environmental Systems Research Institute (ESRI) Internet mapping software
- Framework for implementing GIS services via the Internet
- Customizable and scaleable at all levels
  - User interface
  - Application features and functions
  - Server
Application Architecture

Web Server/ColdFusion
ArcIMS Application Server
ArcIMS Spatial Server

Data Sources
Map Layers
Database(s)

Figure adapted from ESRI, 2000.
COARSE Interface

Map Layer tools allow users to toggle map features on and off.

Active Layer tool allows users to identify map features and obtain attribute information about features.

Tabular Data Reports allow users to view source reports, emissions events, digital photographs, and site logs.
Summary

• GIS applications are cost-effective and useful for managing, displaying, analyzing, and sharing environmental data with broad audiences.

• ArcIMS-based applications are highly scaleable, customizable, and can incorporate many types of data from different sources (databases).
Acknowledgements

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  - Karen Magliano
  - Richard Bradley
  - Beth Schwehr
  - Robert Effa

- COARSE available in fall 2002:
  - http://www.sonomatech.com/coarse