



Grand Challenges in GIScience

A Perspective from EPA

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Overview

- EPA Overview and Mission Areas (including shared mission areas)
- EPA Priorities
- EPA Geospatial Technology Implementation
- Some Grand Challenges from the EPA Perspective



Overview

- About EPA
 - Established in 1970
 - Mission: Protect Human Health and the Environment
 - ~17,000 employees
 - 10 Regional Offices, multiple regulatory programs
 - Substantial research footprint (distributed Office of Research and Development presence across the country)
- What We Do
 - Develop and Enforce Regulations
 - Give Grants
 - Study Environmental Issues
 - Sponsor Partnerships
 - Teach People About the Environment
 - Publish Information



Mission Areas

- Major Mission Areas
 - Waste Management (Superfund, Leaking Underground Storage Tanks, etc.)
 - Water Quality (Clean Water Act, Safe Drinking Water Act)
 - Air Quality (Clean Air Act, Climate Change / Carbon)
 - Pesticides and Toxic Substances Regulation (FIFRA, TSCA)
 - Enforcement
 - Research



Priorities

- EPA Priorities
 - Taking action on climate change
 - Improving air quality
 - Assuring the safety of chemicals
 - Cleaning up our communities
 - Protecting America's waters
 - Expanding the conversation on environmentalism and working for environmental justice
 - Building strong state and tribal partnerships



Current State of Geospatial Technology Implementation

- Strengths
 - Agency-wide GIS Workgroup
 - Central funding mechanism for major acquisition
 - Enterprise geospatial software and data
 - Partnerships (FGDC and beyond)
- Opportunities
 - Mobile Devices, Location Based Services & Apps
 - Volunteered Geographic Information
 - Interest in Mashups (new user base)
 - Publishing of Geospatial Analytics
 - Virtual Globes
 - Geo-enablement of the National Environmental Information Exchange Network



Grand Challenges

- Radically Improved User Interfaces and Participatory GIS
 - Beyond mapping...
 - Geography and geospatial technology as a platform for story telling
 - Make geographic analysis more accessible to facilitate transparent, participatory government
 - Are we limiting our audience and their potential by making our applications look like desktop GIS systems? Or like Google Maps / Bing?



Grand Challenges

- Digital Earth / Citizens As Sensors
 - Towards participatory government
 - Citizens taking on more active roles in data production and creation
 - *Potential for citizen networks of environmental observation is high: Air Quality Monitoring, Water Quality Monitoring*
 - *But... is there a widespread public interest in contributing?*
 - How do we store, represent and exploit this data in concert with other data available in Digital Earth construct (e.g., GEOSS)
 - Authoritative source, representation of uncertainty, data models and ontologies



Grand Challenges

- The Geospatial Semantic Web
 - Berners-Lee “Open Linked Data” and “Web of Data” taking hold
 - Opportunities with Data.gov
 - Need for authoritative, domain specific geo-ontologies
 - Real time spatial inferencing
 - Are those drums near that stream on that facility property likely to indicate a violation of environmental law?
 - *Need for compelling examples of implementation*



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