

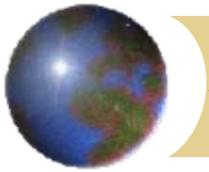
Geospatial Data Stewards Meeting

National Coal Mining Geospatial Committee

June 27th – 28th, 2006

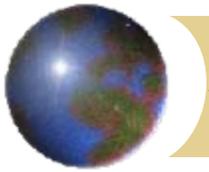
SMCRA Geospatial Technology Questionnaire Results

Rick Koehler, New Mexico Mining & Minerals Div.



Outline of this talk ...

- About the Questionnaire
- Overall Response Summary
- Use GIS?
- Infrastructure Summary
- Web Presence / Distribution
- Got Plan?
- Development Needs
- Accomplishments
- Goals, and Requests for Assistance
- Something To Share ?
- Comments
- Interesting Things That Turned Up / Points to Ponder



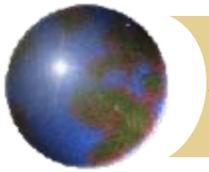
About the Questionnaire

In September 2005, the NCMGC decided it would be useful to gather all the various SMCRA geospatial workers together: hence, this “Geospatial Data Stewards Meeting” that you are attending today.

Having some good background information from the potential meeting attendees was also deemed “a good idea”; hence, the Questionnaire was developed and sent out to all the SMCRA organizations via TIPS Service Managers.

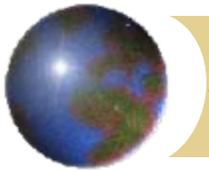
We were looking for input on the infrastructure already in place, needs, goals, accomplishments, folks who could share expertise – we wanted a **baseline**.

The results will be summarized here;
the actual full compilation is over 100 pages long.



About the Questionnaire #2

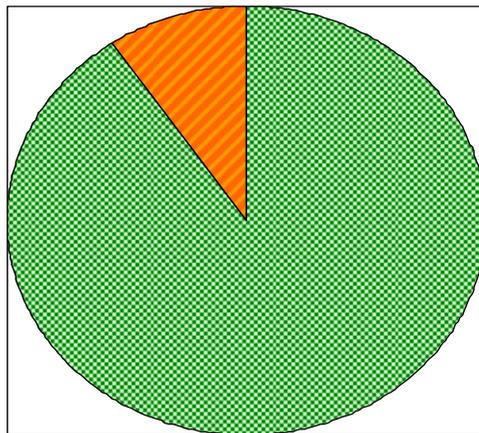
- Objective of Questionnaire
 - Obtain preliminary information to help NCMGC work with each organization in the most efficient manner [establish baseline status]
- Questions Posed:
 - Responding Organization Name (RA/AML, etc.)
 - Geospatial Data Steward (name, contact info)
 - GIS Status (do you use GIS to support SMCRA?)
 - Infrastructure Details
 - GIS Development Plan
 - GIS Development Needs (list important needs)
 - Geospatial Accomplishments
 - Geospatial Goals (name three for next year)
 - Sharing Geospatial Technology
 - Comments
 - Respondent Information

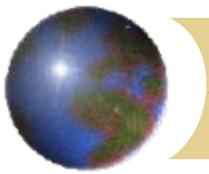


Do You Use GIS?

To the question "Does your organization use GIS to support SMCRA?":

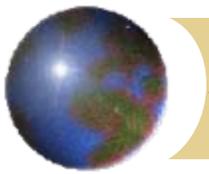
Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	26	87	3	100	9	100	38
No	4	13	0	0	0	0	4
Total	30	100	3	100	9	100	42





Infrastructure Summary #1: Descriptions

Response	Examples
Software - workstation	ArcGIS Desktop (13), AutoCAD Map (5), SurvCADD (2), ArcObjects (1), Erdas Imagine (1), MS Excel (1)
Software - server	Blade server with multiple Linux Oracle blades (1), Citrix farm (1), ArcSDE server (1)
Hardware - workstations	Windows XP workstations and laptops (1)
Hardware - servers	Windows 2003 server (1), Network Attached Storage (1)
Data storage - current	File-based server (3), shapefiles (1), AutoCAD DWG files (2), Personal geodatabase (5), ArcSDE geodatabase (2), ArcSDE geodatabase with MS SQL Server (1), MS Access (2), Storage Area Network (1)
Data storage - planned	ArcSDE geodatabase (1), ArcSDE geodatabase on MS SQL Server (2), WWW server to be integrated into Blade Server and ArcSDE (1), Distributed computing model with Citrix thin clients access Citrix Farm via WAN (1)
Internet data distribution - current	ArcIMS (1), MapGuide (1)
Internet data distribution - planned	ArcIMS (2)
Mobile GIS/ Mobile Computing	ArcPad on laptops (1), Trimble ProXRS with Asset Surveyor (1), Trimble GeoXT with ArcPad (1), Leica RTK (1)

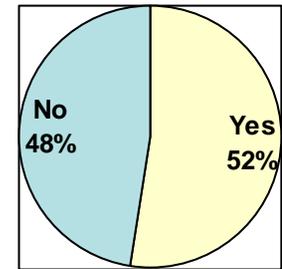


Infrastructure Summary #2: Database Systems

Use Of Relational Database Management Systems: MS SQL Server & Oracle

MS SQL Server

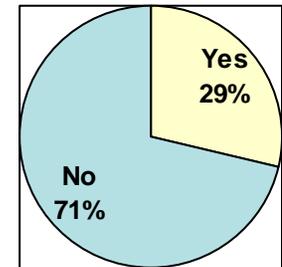
Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	15	50	2	67	5	56	22
No	15	50	1	33	4	44	20
Total	30	100	3	100	9	100	42



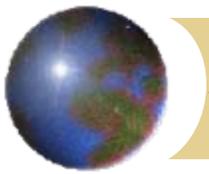
17% mandated

Oracle

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	12	40	0	0	0	0	12
No	18	60	3	100	9	100	30
Total	30	100	3	100	9	100	42



7% mandated

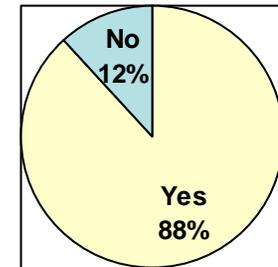


Infrastructure Summary #3: Database Systems

Use Of Relational Database Management Systems: MS Access & Other

MS Access

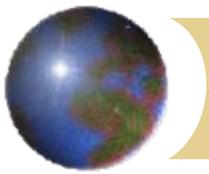
Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	26	87	3	100	8	89	37
No	4	13	0	0	1	11	5
Total	30	100	3	100	9	100	42



Other

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
FoxPro	0	0	0	0	4	67	4
Sybase	1	33	0	0	0	0	1
Paradox	1	33	0	0	0	0	1
Unidentified	1	33	0	0	2	33	3
Total	3	100	0	0	6	100	9

Remember that the use of one RDBMS doesn't have to preclude the use of another also ...

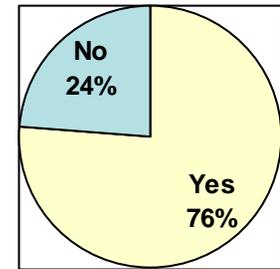


Infrastructure Summary #4: Spatial File Formats

Does Your Organization Primarily Use Shapefiles / Primarily Use Coverages?

Primarily Shapefiles

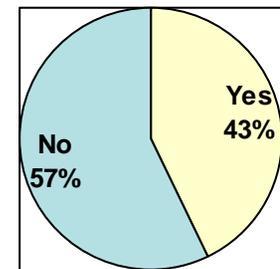
Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	23	77	2	67	7	78	32
No	7	23	1	33	2	22	10
Total	30	100	3	100	9	100	42

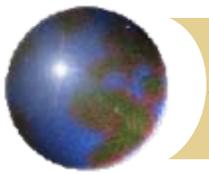


Hmmmmm ... ?

Primarily Coverages

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	12	40	3	100	3	33	18
No	18	60	0	0	6	67	24
Total	30	100	3	100	9	100	42



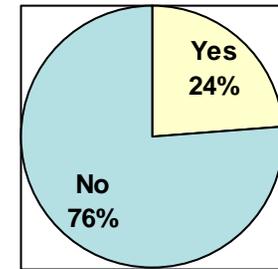


Infrastructure Summary #5: ESRI ArcView & ArcGIS

Does Your Organization Primarily Use ArcView 3.x / Primarily Use ArcGIS?

Primarily ArcView 3.x

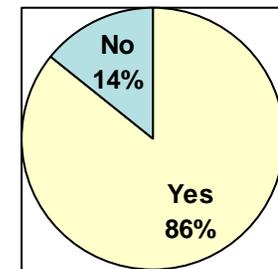
Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	7	24	0	0	3	33	10
No	22	76	3	100	6	67	31
Total	29	100	3	100	9	100	41

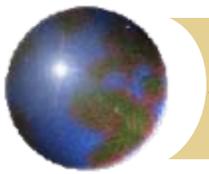


Primarily ArcGIS Desktop

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	26	87	3	100	7	78	36
No	4	13	0	0	2	22	6
Total	30	100	3	100	9	100	42

Hmmmmm ... ?



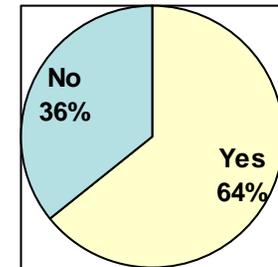


Infrastructure Summary #6: AutoCAD Map & ArcSDE

Does Your Organization Primarily Use AutoCAD Map / Use ESRI ArcSDE?

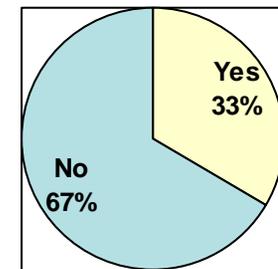
Primarily AutoCAD Map

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	19	63	2	67	6	67	27
No	11	37	1	33	3	33	15
Total	30	100	3	100	9	100	42



Uses ESRI ArcSDE

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	9	30	1	33	4	44	14
No	21	70	2	67	5	56	28
Total	30	100	3	100	9	100	42

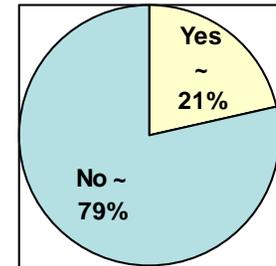




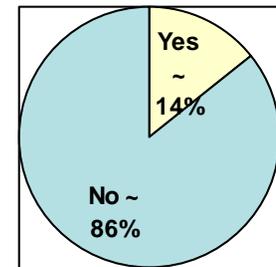
Web Presence / Distribution Summary #1

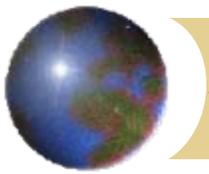
Does Your Organization Use ESRI ArcIMS and/or Autodesk MapGuide?

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	7	23	0	0	2	22	9
No	23	77	3	100	7	78	33
Total	30	100	3	100	9	100	42



Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	4	13	0	0	2	22	6
No	26	87	3	100	7	78	36
Total	30	100	3	100	9	100	42

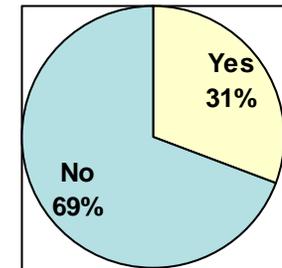




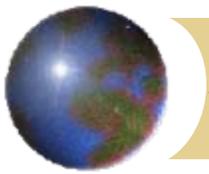
Web Presence / Distribution Summary #2

Distribute Spatial Data To The Public Via Internet?

Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	13	43	0	0	0	0	13
No	17	57	3	100	9	100	29
Total	30	100	3	100	9	100	42



Data includes permit boundaries, water monitoring sites, AML sites, underground mines, areas of environmental concern; in many formats, using many methodologies, including FTP sites, one-of-a-kind systems, ArcIMS, MapGuide and even MapServer!

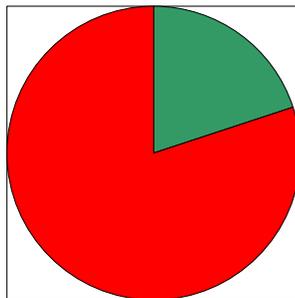


GIS Development Plan Summary

Does Your Organization Have A Written GIS Development Plan?

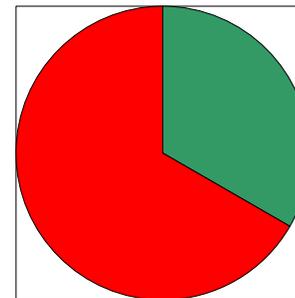
Response	States	% of States	Tribes	% of Tribes	OSM Offices	% of OSM Offices	Totals
Yes	6	20	0	0	3	33	9
No	24	80	3	100	6	67	33
Total	30	100	3	100	9	100	42

States Having GIS Plan

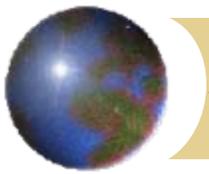


■ Yes ~ 20%
■ No ~ 80%

OSM Offices Having GIS Plan

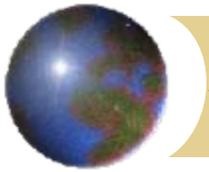


■ Yes ~ 33%
■ No ~ 67%



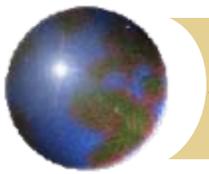
Development Needs Summary

Infrastructure	Three (3) each for centralized management of coal mining spatial data, consistent coal mining spatial data standards, & current aerial imagery. Two (2) each for effectively share geospatial data with field offices, integrate GIS into workflow. One (1) each for use geospatial data in ArcSDE for mobile GIS and Internet mapping, migrate from shapefiles to geodatabase, serve large raster data, develop high quality location data for permitted facilities, implement geodatabase spatial data structures, serve coal mining data to the public, scan, georeference, and digitize underground mine maps, watershed mining data, general mapping, uniform data collection with other departments.
Personnel	Two (2) for implement SDE. One (1) each for Spatial data entry; maintenance of geodatabases for mining permits and geology; managing geospatial information with more than CAD drawings; migrate from MapGuide to different web-mapping technology; compile legacy maps and data; develop SQL-based databases for AML.
Business processes	Integrate GIS into mine permitting work processes (1), National Mine Map Repository (1), collect, exchange, organize and archive spatial data supporting SMCRA regulatory duties (1), need GIS to track AML projects and emergencies (1), generate reports (1)
Training	Spatial analysis, 3-dimensional analysis, raster analysis, imagery analysis (1), using spatial data (1), geodatabase (1), Erdas (1), unspecified training (4)
Software	ArcSDE (1), ArcGIS Server (2), Image Server (1), ArcIMS (1), ArcGIS Engine (1)
Hardware	Equipment to archive underground coal and hard rock maps (1), aperture card scanner (1), mobile GIS (1), unspecified equipment upgrades (1), equipment capable of running Erdas software (1)
Nothing	2 organizations responded nothing is required
No response	2 organizations did not respond to this question



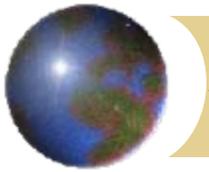
Accomplishments Summary #1: Using Data

- Mobile GIS for inspection, AML projects, or project management (6 similar responses);
- Establishing ArcSDE geodatabase and migrating data (2 similar responses);
- Demonstrating imagery to document pre-mining conditions;
- Demonstrating GeoFluv for AML and regulatory projects;
- Using GIS to buy aerial services and solicit bids for archaeological work;
- Locating abandoned mine shafts and sinkholes;
- Preserving original underground mine maps;
- Making coal mining data available on the Internet;
- Establishing coal mine reclamation history in geodatabase;
- Spatial analysis of wildfires and coal seams to support investigations;
- Using GIS to resolve mining issues;
- Using GIS for individual projects;
- Analysis of coal mining permit applications and support field investigations



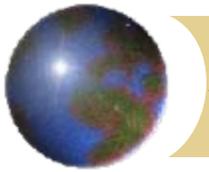
Accomplishments Summary #2: Getting Data

- Continuing cataloging, scanning, & geo-referencing abandoned underground mine maps (3)
- Acquiring 2003, 2004, 2005 NAIP aerial photos (2)
- Completing base maps
- Integrating CAD mine maps with GIS data
- Inventorying valley fills, federal lands permits, and slurry dams in a GIS format
- Obtaining high quality location data for permitted facilities
- Developing dataset of final permit boundaries
- Continuing development of "regulatory" GIS datasets
- Completing permit boundaries of all active mine sites
- Adding shadow areas and 2004 NAIP infrared photography to the Coal Mine Viewer
- Setting up GIS data in a Networked Attached Storage (NAS)
- Making geospatial data more useful to our specialists
- Developing more data for subsidence control
- Maintaining geospatial data served on Internet
- Scanning, geo-referencing archaeologist's maps, and creating shapefiles
- Developing a statewide AML hazard & reclamation inventory database & serving it live to the public



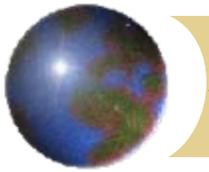
Accomplishments Summary #3: Projects, & Others

- Project Successes:
 - Implementing a remote sensing plan
 - Participating in business process mapping & evaluation workshop for Dept. IT initiative
 - Supporting staff using GIS & GPS technology in regulatory duties
 - Representing at State Geographic Information Council
 - Acquiring geospatial data in CAD format to help in electronic permitting
 - Transforming undocumented local survey coordinate systems into standard coordinate systems
 - Mobile GIS
- Personnel:
 - Hiring a GIS Specialist
 - Hiring a Geoscientist to assist with GIS
- Training:
 - Training inspectors to use electronic permitting & GIS applications
 - Training new permit reviewers & inspectors to use GIS & custom tools
 - Migrating staff to use ArcGIS (2)
- Other:
 - Developing geospatial strategy
 - Creating an Annual Report application
 - Using GIS database with ArcGIS
 - Buying a server



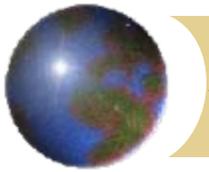
Goals Summary #1: Using Data

- Making coal mining GIS data available to the Internet (5 responses);
- Using mobile GIS (4 responses);
- Migrating to SDE geodatabase to improve organization, information retrieval, and analysis (2);
- Using geospatial technology in business processes (2);
- Making more geospatial data useable to specialists;
- Evaluating replacement of Paradox with SQL compatible RDBMS for better integration with ArcGIS
- Organizing and maintaining GIS data on network;
- Conducting statewide analysis of relationship between wildfires and coal seam outcrops;
- Using GIS to expand use of National Mine Map Repository;
- Using GIS in mine inspection reports, technical reviews, and report findings;
- Using Erdas and aerial photos for approximate original contour study;
- Provide GIS capabilities to programs not currently using GIS;
- Developing more GIS-enabled web-mapping applications for public use;
- Continuing development of GIS capabilities for coal mining program;
- Matching seeding requirements with phased bond release



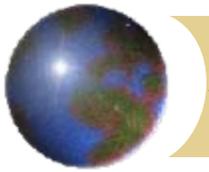
Goals Summary #2: Getting Data

- Adding coal mining GIS data (3 responses);
- Begin developing datasets of mining features for permitted facilities (2 responses);
- Implementing water quality database with sample locations (2 responses);
- Adding NPDES locations;
- Continuing entry into geodatabase of individual mine tract reclamation history;
- Acquiring 2005 DOQQ's; Acquiring more remote sensing data; (← 2 similar)
- Scanning mine maps; Completing scanning of underground mine maps; (← 2 similar)
- Digital conversion of underground mine extents;
- Reducing data entry backlog of coal mining spatial data;
- Completing high quality location data for mining facilities;
- Dataset of all AML projects;
- Linking permit documents in Coal Mine Viewer;
- Updating coal mining permit boundaries;
- Completing bond release verification and tracking geodatabase;
- Incorporate public facility data into GIS database;
- Migrating data to ArcSDE geodatabase;
- Developing spatial databases;
- Expanding acquisition of GPS data



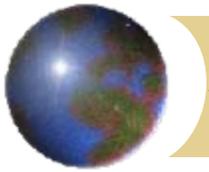
Goals Summary #3: Personnel / Training / Software / Other

- Personnel:
 - ▣ Hiring spatial data entry personnel (2);
 - ▣ Replacement for retiring GIS specialist;
- Training:
 - ▣ Providing OJT to new hires;
 - ▣ Retrain all inspectors in mandatory use of GPS to capture discharge locations and pond/fill footprints;
 - ▣ Unspecified training;
- Software:
 - ▣ Acquiring ArcSDE, ArcGIS Server, Image Server, and ArcIMS;
- Other:
 - ▣ Developing GIS tools to automate repetitive functions;
 - ▣ Using XML in electronic permitting;
 - ▣ Taking leadership role in statewide effort to create geospatial resources center;
 - ▣ Promoting success to NCMGC efforts;
 - ▣ Continue development of department-wide enterprise GIS;
 - ▣ Better coordination with other departments using GIS;
- No Goals (4 responses); Did Not Respond (4 Organizations)



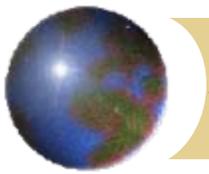
Requests for Assistance Summary #1: Technical Assistance

- Develop/share geospatial data models and/or logical formats for coal mining geospatial data (5);
- Technology transfer of ideas, methods, & plans used by other SMCRA organizations to conduct business (2);
- Create broad national geospatial standards for coal mining data to coordinate sharing of regulatory information & ideas among SMCRA programs (2);
- Develop geospatial database schema;
- Sponsor workshops and conferences;
- Develop a generic data model for AML reclamation projects that can be customized by state programs;
- Provide a clearinghouse for raster data;
- Provide plug-ins and modules for spatial analysis;
- Facilitate sharing of national projects and case studies;
- Standardizing electronic data requirements;
- In-house training on database development;
- Sharing hardware, software, training, and other technology-related resources;
- Help evaluate migration to ArcSDE geodatabase;
- Create mobile GIS custom applications;
- Investigate XML (for spatial data) in electronic permitting



Requests for Assistance Summary #2: Funding, Training & Other

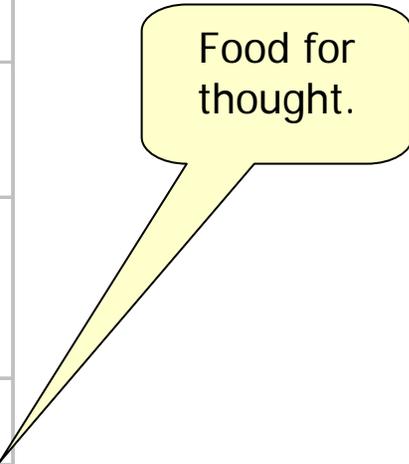
- **Funding:**
 - Funding in general (2 responses);
 - Funding a full-time GIS specialist in each district mining office of our state program;
 - Funding for redesign of of database programs for integration with ArcGIS;
 - Funding to offset equipment purchasing freeze;
 - Funding to offset limited spending authority for travel or training;
 - Funding for scanning mine maps;
 - Continued or increased funding for geospatial technology hardware and software for state programs;
- **Training:**
 - Unspecified Training (3 responses);
 - Geospatial Technology Training;
 - ArcSDE training;
- **Hardware:**
 - FLIR infrared equipment to locate coal seam fires from air;
- **Software:**
 - Provide core software & training in development of enterprise GIS;
 - ESRI ArcSDE;
- **Other:**
 - Encourage OSM to continue to provide GIS/CAD software & training;
- **None:** 1 organization responded "no assistance required"
- **No Response:** 13 organizations had no response to this question



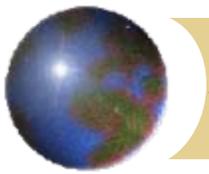
Something to Share? Summary

How can your organization contribute to sharing SMCRA-related geospatial technology?

Category	Examples
Expertise	Two (2) can share technical assistance in geospatial technology, and one (1) each in: Training; training and technical assistance in mobile GIS; expertise in GPS equipment; instruction in TIPS SurvCADD software; unspecified expertise
Experience	Three (3) for: Sharing successes and failures, and one (1) each in: demonstrating data serving to remote office locations; sharing experiences; demonstrate statewide inventory database; experience with serving underground mine maps
Service	One (1) each in: Participate in mobile GIS workshop; hosting a node to National Map; serve on workgroups; participate in workshops, conferences
Share resources	Six (6) for: Existing digital geospatial data based on public records, two (2) for: future geospatial data when available, and one (1) each for: underground mine maps; web-based access; data dictionary; research information
Nothing	9 organizations had nothing to share, were uncertain, did not know, or provided comments about sharing,
No response	7 organizations had no response to this question



Food for thought.

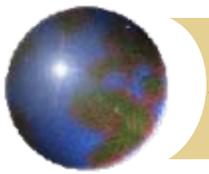


Comments Summary

Responses received in the "Comments" section:

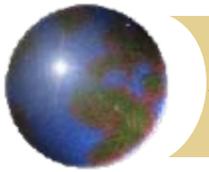
Category	Examples
Needs	Assistance in acquiring current, high resolution datasets from multiple sources for SMCRA work on small mine sites (2), assistance in acquiring high resolution imagery (1), expanded geospatial capability in AMLIS (1), lack of integration in AutoCAD for enterprise GIS (1), geospatial technology to support long range planning of electronic permitting (1), customization tools for ArcGIS and ArcPad (1), long term support for GIS software and hardware (1)
Recommendations	Consistent geospatial data standards for GPRA and bond release annual reporting (1), investigate spatial data delivery methods meeting security requirements (1), integrate geospatial technology into business processes (1), SMCRA business processes should govern use of geospatial technology in SMCRA organizations instead of IT consolidation issues (1), investigate methods to support digital exchange of coal mining geospatial data for electronic permitting such as a generic template using XML, XHTML, SXML, or Xlink to provide the data to an XML-enabled RDBMS (1)
General	Delivering coal mining spatial information through the Internet in a user-friendly ArcIMS application has greatly increased ability of managers and staff to communicate effectively with others inside and outside the organization during telephone conferences (1)
No response	26 organizations had no comment.

"No Comment"
from 26
organizations?
Come on!
Say something.



Highlights of Questionnaire Results

Category	Rank		
	1	2	3
Needs	Infrastructure (12)	Personnel (6)	Training (5)
Accomplishments	Using Data (14)	Getting Data (12)	None (6)
Goals	Using Data (12)	Getting Data (10)	None (8)
Help from NCMGC	No Response (13)	Tech. Assist. (11)	Funding (9)
Contribute/share	None (17)	Tech. Assist. (10)	Data (8)
Comments	None (27)	Using Data (9)	Tech. Assist. (5)



Thank you.

Next Presentation:

Coal Mining Datasets of National Significance –
Keynote Address by Benny R. Wampler