

**EXTENDING THE BOUNDARIES:
A WORKSHOP ON MANAGING AND PRESERVING
GEOSPATIAL ELECTRONIC RECORDS**

Report of the Workshop

May 13, 2004

Center for International Earth Science Information Network (CIESIN)
The Earth Institute
Columbia University
Palisades, New York

Report prepared by:

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with support from

The National Historical Publications and Records Commission (NHPRC)
National Archives and Records Administration (NARA)

under NHPRC Grant 2003-038

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1. Introduction

This report summarizes the discussions and recommendations from “Extending the Boundaries: A Workshop on Managing and Preserving Geospatial Electronic Records”. The workshop was convened on May 13, 2004 and hosted by CIESIN, the Center for International Earth Science Information Network, at the university’s Lamont campus in Palisades, NY. CIESIN is an interdisciplinary research and data center within the Earth Institute of Columbia University. The workshop was organized as part of the project “Managing and Preserving Geospatial Electronic Records,” conducted by CIESIN and funded by the National Historical Publications and Records Commission (NHPRC) of the National Archives and Records Administration (NARA).

The workshop was designed to engage practitioners and managers from both the geospatial and data archiving communities in collaborative discussions regarding the challenges faced by state and local government personnel in managing and preserving geospatial data and related electronic records, such as those created using Geographic Information Systems (GIS). It brought together a diverse group of professionals from various government agencies and other organizations from New York, New Jersey, Connecticut, and Rhode Island involved in various aspects of using and managing geospatial data.

The project’s Advisory Board (Appendix A) served as the Program Committee for the workshop. The full list of participants is given in Appendix B. Fifty-seven individuals from five states were invited to the workshop and twenty-five participated. Table I presents the distribution of workshop participants by state.

Table I. Workshop Invitees and Participants by State

State	Invitees	Participants
NY	30	18
NJ	18	5
CT	4	1
RI	4	1
MA	1	0

The workshop participants represented various government agencies and organizations that use geospatial data and share a common interest in the policies and practices for government agencies to manage and preserve geospatial data. Participants’ organizational affiliations included educational institutions and international, national, state, and municipal levels of government from the region. Table II indicates workshop participation by government level and organizational type.

The workshop also included a diversity of expertise. Represented areas of expertise included geospatial project management and coordination, geographical product analysis and development, planning and policy, archives, and geographical data coordination and libraries. Table III highlights the diversity of professionals who were invited to attend the workshop and those who participated.

Table II. Workshop Invitees and Participants by Government Level and Organizational Type

Government Level or Organizational Type	Invitees	Participants
International Government	4	2
Federal Government	2	1
State Government	11	7
County Government	12	4
Municipal Government	7	3
Educational Institution	19	8
Non-Profit Organization	2	0

Table III. Workshop Invitees and Participants by Expertise

Expertise	Invitees	Participants
Geospatial Project Management & Coordination	16	8
Geographical Product Analysis & Development	14	6
Planning & Policy	7	5
Archives	15	5
Geographical Data Coordination & Libraries	4	1
Information Systems and Technology	1	0

2. Workshop Organization and Process

This workshop was specifically designed as a one-day event to minimize the burden on workshop participants, many of whom have operational responsibilities in their organization. To facilitate discussion and interaction, the workshop utilized a number of facilitation techniques to promote rapid elicitation of issues and identification of common concerns. The plenary presentations were therefore planned carefully within a limited time frame. Several Advisory Board members played key roles in this session.

Dr. Robert S. Chen, Principal Investigator (PI) for the project and Deputy Director of CIESIN, opened the workshop with a brief overview of CIESIN, the Earth Institute of Columbia University, and the project. He described the project’s goals, activities, staff, and the progress achieved to date. Dr. Chen then summarized the workshop objectives and the scheduled activities for the day. His presentation is available on the project website (<http://www.ciesin.columbia.edu/ger>). He also invited the workshop participants to introduce themselves briefly.

Ms. Cheryl Benjamin, Coordinator for Standards and Data at the New York State Office of Cybersecurity and Critical Infrastructure Coordination, introduced the panel of plenary speakers.

Mr. Lawrence Thornton, Manager of the Bureau of GIS at the New Jersey Department of Environmental Protection, gave the plenary presentation on the “GIS Perspective.” He discussed the use of GIS in environmental planning and regulation and highlighted key needs for improving practices of managing and preserving these data from his perspective as a user within state government.

Mr. Geoffrey Huth, Manager of Records Service Development for the New York State Archives, addressed the Archiving perspective. He noted the long tradition of archiving of important records within state government and emphasized the emerging challenge of preserving artifacts that exist only in electronic form.

Dr. Robert R. Downs, Co-PI of the project and Senior Digital Archivist at CIESIN, presented preliminary results of the needs assessment on managing and preserving GERS. He summarized the interview methodology and the questionnaire and presented observations of needs reported by those who had been interviewed to date. His presentation is available on the project website (<http://www.ciesin.columbia.edu/ger>).

After the presentations, Ms. Benjamin invited the workshop participants to ask questions of the speakers and moderated the discussion by the panel of speakers and the workshop participants.

Dr. Theresa Pardo, Deputy Director of the Center for Technology in Government at the University of Albany, described the goals for the breakout sessions and provided instructions for the workshop participants to organize into four groups and meet in breakout rooms to discuss geospatial data management topics that had been prepared in advance and assigned to each group.

The groups were organized to ensure diverse representation within each group, taking into account organizational responsibilities and roles, types of organizations, levels of government, and levels of authority. Appendix C lists the workshop participants assigned to each group. A facilitator was also assigned to each group to coordinate activities and lead discussions. Members of the Advisory Board served as facilitators for the breakout groups, and each facilitator and other members of the Advisory Board participated in a pre-workshop briefing led by Dr. Pardo. Table IV lists the Advisory Board members who served as group facilitators along with the topic assigned to each group.

Table IV. Workshop Breakout Groups

Group #	Facilitator	Geospatial Data Management Topic
1	Terry Spies	Coordination and Infrastructure for Sharing
2	Cheryl Benjamin	Security, Confidentiality, and Freedom of Information
3	Robert Sandev	Preservation for Future Access and Use
4	Geoffrey Huth	Quality Assurance, Documentation, and Reusability

During the breakout sessions, the facilitators led each group through exercises designed to engage all group members in a process of identifying and organizing pertinent issues related to each topic. Initially, each group brainstormed to identify issues related to policy, techniques, standards, organizational, managerial and practical issues, including key legal and ethical requirements, current practices, or gaps between practice and requirements. Each group prioritized the issues and identified the barriers and enablers for each of the prioritized issues. The groups then recorded the ideas that emerged from their discussions and reported them to all workshop participants in a plenary session moderated by Dr. Pardo.

After the plenary group reporting and open discussion session, each group reconvened to discuss each of the prioritized issues in light of comments and questions raised during the open discussion. During the afternoon set of breakout sessions, each group went through an exercise to identify possible approaches to solving or avoiding the prioritized issues identified previously, any existing resources that might be employed, and any ideal resources for addressing the prioritized issues. Based on these discussions, each group then prepared recommendations in prioritized order to present to the workshop participants in a second moderated plenary session.

In this plenary, Dr. Pardo first asked each group to present the recommendation that it considered most important. Each group's highest recommendation was discussed among all workshop participants and placed on the wall in proximity to previous recommendations. Additional recommendations offered by each group in successive order of priority were discussed and placed on the wall in the same manner. After all recommendations were presented, workshop participants offered additional suggestions to further group and organize recommendations, reassigning particular recommendations within the emergent categories and assigning and refining labels for the categories.

In the final plenary session, Dr. Chen thanked the participants for their efforts, described the next steps for reporting and building on the recommendations of the workshop, and invited all of the participants to attend a reception after the workshop, where they might engage in less formal discussions on any of the issues raised during the workshop. Dr. Chen also asked the participants to complete a Workshop Evaluation Survey to report on their experience and to offer any comments on the workshop.

3. Workshop Recommendations

The recommendations developed during the workshop were categorized into six main themes. The themes represent a broad spectrum of concerns for managing and preserving geospatial data and related electronic records that were discussed by the participants during the breakout sessions and the plenary sessions of the workshop. Table V lists each theme along with a brief description. The following sections describe the themes in more detail and the recommended actions for each.

Table V. Themes of Workshop Recommendations

Theme	Description
Policy and Implementation	Policies to provide direction and guidance for agencies to initiate and implement change.
Climate for Change	The organizational culture needs to value change and promote opportunities for improvement.
Outreach Coordination	Sharing of resources to improve practices and facilitate learning among staff within several agencies.
Communication among Archives/GIS	Sharing of knowledge and promotion of learning between work groups, disciplines, and organizations.
Justification Examples	Demonstration of the benefits and costs of managing geospatial data to justify the allocation of needed resources.

Technical Standards and Interoperability	Proven practices, tools, and techniques for managing and preserving geospatial data.
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Policy and Implementation

Clear directives and continuing support from top management are both necessary to initiate and implement improvements within agencies and departments. Policies need to be clear to enable personnel to understand what activities are mandated and to obtain the resources and cooperation needed to complete necessary improvements. Understanding the policies and current strategies helps individuals to set priorities and gain support from others in the organization. The need to develop clear policies is especially critical when considering issues of security and confidentiality for sharing data. Similarly, when policies change, changes must be communicated and explained so that the new policies are adopted and practices are modified accordingly.

Managing records during their lifecycle requires the employment of limited organizational resources that could be employed to attain other organizational objectives. Records should be selected for preservation with consideration for the costs to manage them. Selecting records to be managed requires a decision to commit the organizational resources necessary to effectively manage these records. Similarly, the lifetime of these records also should be determined since that term will reflect the duration of the commitment required for managing these records. Given the potential long-term commitment of resources for managing and preserving selected records, organizations need to identify criteria for identifying archival records in GIS so that only those records that have potential for long-term enduring value are selected for preservation.

Workshop participants identified seven specific recommendations concerning Policy and Implementation:

1. Develop criteria for identifying archival records in GIS.
2. Create a good standard and emergency data/record distribution policy.
3. Identify secure and confidential data/record based on Freedom of Information.
4. Create data sharing agreements with all parties (sooner, not later).
5. Protection of sensitive/confidential records by destruction is not an option; Cannot destroy records as a way to protect them.
6. Create secure and confidential data distribution mechanism with secure access controls.
7. Continuously monitor changes to security/privacy of records throughout the lifecycle of the records (Communication between records creators and preservationists).

These recommendations highlight the importance of organizational efforts to develop and implement policies that can guide and improve practices for managing and preserving geospatial data and related electronic records.

Climate for Change

When initiating change, managers and their staff need support from others in the organization. Initiating change can involve risk. If such risk-taking is not encouraged and rewarded, individuals will be reluctant to take risks needed to initiate change.

The workshop participants identified six recommendations regarding the “climate” for change:

1. New state laws to fund and define mission for archives and records management of GIS – for those states without.
2. Need to think outside the GIS/Archiving box (Legal, HR, IT, Project Management, PR, Legislative, Users).
3. Integrate activities into existing initiatives so they do not seem to be new work.
4. Create an enforcement mechanism for each distribution policy.
5. Involve archivists/records professional in the creation of secure/confidential data distribution mechanisms that produce preservable records (including access logs).
6. Create an organization with joint mission: grab turf.

Outreach Coordination

Sharing information can enable the reuse of knowledge and resources by more than one agency or department. It also can assist agencies in building on the work of others and cooperating to achieve common objectives. For example, cost savings can be realized by sharing tools, procedures, and case studies among agencies. Sharing best practices and lessons learned creates new opportunities for those trying to achieve similar objectives in other workgroups and agencies. Providing opportunities to share such information fosters inter-organizational learning and provides new opportunities for those who may have valuable experience to contribute. Accessing such information can help staff in other agencies to avoid costly mistakes.

The workshop participants identified four recommendations for outreach coordination:

1. Continue the work of this MAPGER project.
2. Establish web portals for outreach, education, and curricula.
3. Establish website of case studies on how to integrate GIS and archives.
4. Establish grant program to develop a GIS/archival consortium.

Justification Examples

As in any organization, departments in government agencies often compete for needed resources. Agency leaders and other stakeholders who decide on budget allocations need to recognize the potential value to be gained before committing resources to new initiatives. Demonstrating efficiencies attained from geospatial data management can assist those

allocating resources to understand how the resources will be used and the benefits to be achieved.

The five recommendations regarding justification examples identified by the workshop participants are:

1. Share case studies with cost savings and public benefit.
2. Centralize and pool interagency cooperation vertically.
3. Develop fundable project plans (include return on investment for groups).
4. Put money and resources into distribution.
5. Manager allocate resources to preserve GIS records.

Communication among Archives and GIS

Agencies often face similar challenges for managing geospatial data and much can be accomplished by working together. Combining knowledge, perspectives, and resources can help those attempting to learn and develop new techniques for managing geospatial data. Often, problems that are being encountered in one organization can be addressed by employing techniques that have been developed or tried in another organization. Likewise, when more than one agency is developing a new procedure, inter-agency cooperation can enable agencies to share the work, where each partner focuses on those aspects in which they have competence or resources.

The workshop participants identified five specific recommendations for communication among archives and GIS:

1. Joint workshops among professional groups.
2. Provide training and certification program for metadata and archives.
3. Cross-training of archivists and the GIS field is necessary: archivists to preserve GIS, GIS to produce preservable records; create archivist-type position within GIS organization.
4. GIS and archivists participate in committee to select GIS records for preservation.
5. Training on standards for archiving GIS records and techniques for using technology.

Technical Standards and Interoperability

Technical standards document the use of techniques and technologies that communities of interest have identified and developed to serve their common needs. Interoperability refers to capabilities that enable the transfer of information between information systems and networks that have been developed by various vendors for different purposes. Various communities contribute to the development of technical standards that can be employed by agencies engaged in managing and preserving geospatial data. The work of these communities can be leveraged by agencies to identify technologies that others have found valuable.

The workshop participants identified three recommendations for Technical Standards and Interoperability:

1. Promulgate open GIS standards and Internet map coordination.
2. Open source development of standards for archival and GIS records community.
3. Develop an open non-proprietary GIS format.

Other Recommendations

A number of lower priority recommendations suggested by different groups were not categorized during the workshop:

1. Enhance legal requirements for open GIS and addressing archival issues.
2. Crosswalk between standards for GIS and archives.
3. Joint glossary of terms for GIS and archive.
4. Educational curriculum development (all levels).
5. Develop model program on how to fit archives into metadata.
6. Metadata interface and use graphical user interface improvements.

Workshop Evaluation

The Workshop Evaluation Survey was administered to the workshop participants to obtain their anonymous responses. The survey specifically requested respondents to “not include your name on the survey.” The survey had been previously approved by the Columbia University Institutional Review Board as part of a protocol designed for the protection of human research subjects. The instrument contained four items to measure self-reported perceptions of how useful the participants found the workshop. It also included a section that requested respondents to provide comments about the workshop or suggestions for future workshops. For each of the four items regarding perceived usefulness of the workshop, respondents were asked to indicate their level of agreement on a five-point scale that ranged from “Strongly Disagree” to “Strongly Agree.” The Workshop Evaluation Survey is included in Appendix D.

Excluding the investigators, twenty-three workshop participants were surveyed. The investigators received fifteen completed surveys. The response rate was 65%, reflecting the administration of the survey at the end of the workshop when some participants had to leave quickly to return home. All respondents answered all four of the items. Ten of the respondents provided responses in the section of the survey eliciting comments or suggestions.

All respondents either strongly agreed (60%) or agreed (40%) that the workshop provided useful information for managing and preserving geospatial records and data. Similarly, all respondents either strongly agreed (66.6%) or agreed (33.3%) that the workshop fostered learning about the issues discussed. On whether the workshop schedule and moderators enabled discussions among participants about relevant issues, respondents indicated that they strongly agreed (53.3%), agreed (40%), and were neutral (6.6%). Finally, on whether the

workshop provided participants with a unique forum for discussion and learning about managing and preserving geospatial records and data, respondents strongly agreed (73.3%), agreed (20%), and disagreed (6.6%). The responses on the four measures indicate that almost all of the respondents found the workshop useful.

These results are consistent with the comments and suggestions received on the survey. All of the comments and suggestions provided by respondents were quite favorable and are given in Appendix E. Three respondents offered comments expressing approval and appreciation, but did not include suggestions. Two respondents offered constructive suggestions without commenting on the workshop. The remaining five responders combined comments and suggestions.

Acknowledgements

The organizers are grateful to the Advisory Board for their active assistance in planning and conducting the workshop. In particular, we thank Theresa Pardo for her role as lead facilitator and her willingness to train the rest of us on how to work efficiently in both small and large groups. We also thank Jennifer Mulvey of CIESIN for her help with workshop logistics.

This workshop was supported by the National Historical Publications and Records Commission under NHPRC Grant 2003-038. We are grateful to Mark Conrad, our original project officer, and to Michael Meier, our current project officer, for their advice and assistance regarding the project. The recommendations described in this report are those of the authors and workshop participants and do not necessarily reflect those of CIESIN, the Earth Institute, Columbia University, or the NHPRC.

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Appendix A: Project Advisory Board Membership

Cheryl Benjamin, Standards/Data Coordination New York State Cyber Security & Critical Infrastructure Coordination

Kevin Glick, Electronic Records Archivist, Yale University Sterling Memorial Library

Bill Guthe, Educational Tech Center GIS Analyst, Princeton University

Geoffrey Huth, Mgr, Records Services Development New York State Education Dept, Archives

Sally Johnson, Policy Analyst for Statewide Planning Program, State of Rhode Island

Patrick McGlamery, Library Liaison to Geography, University of Connecticut

Jennifer O'Neill, E-Government & GIS Specialist, New York State Education Dept, Archives

Theresa Pardo, Deputy Director, Center for Technology in Government, University of Albany

Robert Sandev, GIS Officer, Division for Ocean Affairs and the Law of the Sea, Office of Legal Affairs, United Nations

Doug Schuetz, GIS Director, Rockland County Planning

Bridget Sisk, Chief, Archives & Records Management Section, United Nations Secretariat

Terri Spies, GIS Specialist, New York City Dept of Environmental Protection

Larry Thornton, Bureau Chief, Geographic Information and Analysis, New Jersey Department of Environmental Protection

Sam Wear, GIS Director, Westchester County

Appendix B: Workshop Participants

Mark Becker

GIS Manager, CIESIN
Columbia University

Cheryl Benjamin

NYS Office of Cyber Security & Critical
Infrastructure Coordination

Hélène Bray

Geographical Information Officer
United Nations Headquarters
DPKO/Situation Center
Cartographic Section

Robert S. Chen, PI

Deputy Director, CIESIN
Columbia University

Kelly M. Dobbins

Planner
Orange County Department of Planning

Patricia N. Dohrenwend

Director
Westchester County Archives & Records
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Robert R. Downs, co-PI

Senior Digital Archivist, CIESIN
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Merv Frankel

GIS Coordinator/Facilitator
LAN/WAN Internetworking Architect
NYC DEP, OIT

Kevin Glick

Electronic Records Archivist
Sterling Memorial Library
Yale University

Frederic Grevin

Director, Records & Archives Management
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Geof Huth

Manager, Records Service Development
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Ronald C. Jantz

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Sally Johnson

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Kate McGuire

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New York City Department of Environmental
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New Jersey DEP/OIRM
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Lyna Wiggins

Associate Professor
Urban Plan & Pol Dev
Rutgers University

Appendix C: Small Group Assignments

Coordination & Infrastructure for Sharing – Group 1

Terry Spies (Facilitator)
Patricia N. Dohrenwend
Lyna Wiggins
Sally Johnson
Kate McGuire
Mark Becker

Security, Confidentiality, and Freedom of Information – Group 2

Cheryl Benjamin (Facilitator)
Frederic Grevin
Edith Konopka
Hélène Bray
Sam Wear
Kevin Glick
Harvey Simon
Robert S. Chen

Preservation for Future Access and Use – Group 3

Robert Sandev (Facilitator)
Jennifer O'Neill
Merv Frankel
Ronald C. Jantz
Robert R. Downs

Quality Assurance, Documentation, & Reusability – Group 4

Geoffrey Huth (Facilitator)
Lawrence L. Thornton, MS
Doug Schuetz
Kok Meng Png
Kelly M. Dobbins
John Mickelson

Appendix D: Workshop Evaluation Survey

Please help us to evaluate the workshop and plan for future workshops by volunteering 5 minutes to answer the questions in the anonymous survey, below. We cannot offer incentives for completing the survey and there are no foreseeable risks. **Please do not include your name on the survey** to ensure the confidentiality of all responses received.

If you have any questions about the survey, call Robert Downs at 845-365-8985. The Columbia University Institutional Review Board may be contacted at 212-854-1324 with any concerns about participating in the survey.

Workshop Evaluation Survey Questionnaire

Please complete the questionnaire, below to help us plan future workshops.

After each statement, circle the term to indicate your level of agreement.

The workshop provided useful information for managing and preserving geospatial records and data.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The workshop organization and participation fostered learning about the issues discussed.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The workshop schedule and moderators enabled discussions among participants about relevant issues.

Strongly Disagree Disagree Neutral Agree Strongly Agree

The workshop provided me with a unique forum for discussion and learning about managing and preserving geospatial records and data.

Strongly Disagree Disagree Neutral Agree Strongly Agree

Please provide comments, below, about the workshop or suggestions for topics to be covered during future workshops.

Appendix E: Workshop Evaluation Survey Responses: Written Comments and Suggestions

“Great job!”

“Very useful workshop – thank you.”

“Thank you for providing lunch, snacks, reception refreshments, and mileage reimbursement.”

“It might be useful instead of the standard brainstorming to use the method that allows individuals to fill out cards in writing for ideas and discuss them after. This helps ideas from introverts (which I am not) to be incorporated and a variety of wording choices.”

“Training how to implement the recommendation”

“Suggest more panel discussion time

Tried to address too many topics within a group for exercise #1 (group was just beginning to gel)

Need caffeine at lunch!

Good facilities and materials

Reception afterwards is a good way to continue discussion”

“More!!”

“Good use of our time, but I yearned to address some issues in greater detail.”

“Very Productive! I was surprised at how relevant and interesting the results were!”

“This was a good way of collecting this data – it was a long, but fruitful day – although we could have used some more time at some points. In our group, it seems that not everyone was able to participate equitably as some dominated the conversation – but such is often the case with such meetings.”