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## **LESSONS FROM PRACTICE: ORGANIZATIONAL ASPECTS OF DATA SHARING**

**Abstract:** Data sharing, area integration, and collaboration to achieve these objectives have been recognized by the geodata community for some time as topics of great interest. Data sharing does not happen unless it is underpinned by a common business need. Further, collaboration to achieve sustained data sharing does not happen unless champions engage to provide leadership via a trusted forum to work through differences in policy and procedures. When organizations in the geodata community reach this understanding, many begin to search out models to avoid “reinventing the wheel.” These organizations were the target audience for a September 2001 publication entitled *Lessons From Practice: A Guidebook to Organizing and Sustaining Geodata Collaboratives*, a collaborative effort of the presenters.

The presenters will summarize six common characteristics fundamental to the success of the geodata collaboratives identified in the “Lessons from Practice” guide, share their varied experience with successful geodata collaboration initiatives, and offer practical organizational tips for successfully sustaining data sharing.

The presenters’ hope is that this effort to document the stories of successful multi-participant GIS efforts via the Lessons From Practice Guide, and similar efforts that follow, will foster the collaboration needed to achieve the vision of National Spatial Data Infrastructure (NSDI). Achieving this vision is essential to enhance our collective abilities to implement smart growth policies and measurably improve our effectiveness as institutions and, in turn, effectively improve our quality of life, emergency responsiveness, and economic competitiveness.

## INTRODUCTION

In September 2001, *Lessons From Practice: A Guidebook to Organizing and Sustaining Geodata Collaboratives*<sup>1</sup> was completed. It was a collaborative endeavor by the authors and the emerging National GeoData Alliance. Six organizational keys to successful geodata collaboration are identified in this “guide” and are the focus of this paper.

The project that resulted in the writing of the “Lessons from Practice” guide was conceived in March 2001 by Randall Johnson, Staff Coordinator of MetroGIS<sup>2</sup>, and developed with the assistance of Zorica Nedovic-Budic, Professor of Urban and Regional Planning at the University of Illinois at Urbana-Champaign. During the proceeding two years, Randall Johnson had been asked on several occasions to share MetroGIS’s story with individuals and organizations interested in establishing a similar collaborative initiative in their respective areas. The “Lessons from Practice” guide was envisioned in part to more efficiently share the MetroGIS story but also to document a suite of successful approaches to pick and choose from depending on local needs.

A second objective of the “Lessons from Practice” guide project was to compare and contrast the keys to success identified for each participating geodata collaborative to determine if there was any commonality, not only among those collaboratives participating, but also with the conclusions of research that has been underway for several years by Professor Nedovic-Budic and her colleagues.

The participating collaboratives identified six common keys to success. A strong similarity was also found between these six keys to success and the results of the independent research conducted by Prof. Nedovic-Budic with her research colleague Jeffery Pinto, Penn State University-Eerie. The geodata collaboratives that participated in the “Lessons from Practice” guide project were as follows:

- MetroGIS
- National Cooperative Soils Survey (NCSS)
- New York GIS Data Sharing Cooperative
- Pacific Salmon Information Network (PSIN)
- PaMAGIC (Pennsylvania)
- Ramsey County GIS Users Group (Minnesota)

The reader is advised that the goal of the “Lessons from Practice” guide project was to encourage several successful collaboratives to self-identify themselves and tell their stories in their own words to share with others aspiring to create or enhance a geodata collaborative. This project was not intended to be an exhaustive study of successful geodata collaboratives. Nor was it intended to be a scholarly paper drawing from thoroughly researched case studies. Rather, the academic community is encouraged to undertake a more rigorous evaluation of the similarities and differences among the six geodata collaboratives that participated.

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<sup>1</sup> The document may be viewed and downloaded from [http://www.geoall.net/what\\_we\\_do.html](http://www.geoall.net/what_we_do.html)

<sup>2</sup> <http://www.metrogis.org>.

## **WHY COLLABORATE ON COMMON GEODATA NEEDS?**

GIS technology benefits organizations who incorporate it into their daily business functions. According to the experiences of the six collaboratives that participated in the “Lessons from Practice” guide project, the most notable of these benefits include:

- Improved efficiency
- Improved data management
- Improved decision support
- Improved customer/constituent satisfaction

More importantly, the participants in these collaborative initiatives have recognized that organizations which elect to collaborate with others on common geospatial needs and opportunities can benefit substantially more than when they utilize GIS technology on their own. Additional benefits that can accrue to those who collaborate on common geospatial needs and opportunities include, as noted in the “Lessons from Practice” guide:

- Reduced data costs
- Improved data quality
- Minimized data conflicts
- Improved participant operations
- Leveraged technology investments
- More widely understood benefits of data sharing
- Reduced project costs through collective bidding
- Strengthened rationale and commitment to standards
- Improved support for cross-jurisdictional decision making
- Strengthened working relationships fostering broader cooperation

Further, in a 1999 study<sup>3</sup>, funded by a NSDI Benefits Grant, Dr. William Craig, University of Minnesota Center for Urban and Regional Affairs, and David Bittner, a graduate associate, evaluated the effectiveness of MetroGIS by investigating benefits realized from geodata collaboration. Both geospatial data and non-data related measures and characteristics were investigated. They found that since the inception of MetroGIS, more data sharing was occurring, there was more communication, and there was a better attitude about sharing. The study also clearly demonstrated that non-data related collaboration benefits were perceived by the participants as at least equal to the benefits received from improved access to geospatial data.

Providing an incentive for gathering people together in discussions about sharing data had, in fact, led to increased awareness of each other’s situation, friendship, and trust. Other findings of the study included: nearly 70 percent of the respondents thought participation in MetroGIS was worth their time, 50 percent or more felt that MetroGIS had improved their work life by sharing communication about GIS and improving the attitude about sharing across the region and, although MetroGIS was at that time still in its formative stages, 50 percent of those who had sought data had found it.

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<sup>3</sup> The abstract for Dr. Craig’s study is provided in the Minnesota section of the document at <http://www.fgdc.gov/publications/documents/geninfo/funding98.pdf>. A summary of the study conclusions in the form of a slide presentation is available at <http://www.metrogis.org/benefits/studies/index.shtml>.

Collaboratives of this type across the country, some in existence and many others yet to be formed, will be needed (no doubt in a variety of manners) to achieve the vision of the National Spatial Data Infrastructure (NSDI)<sup>4</sup> -- collaboratives of disparate interests capable of achieving and sustaining effective and efficient solutions to common geodata needs that are larger than any single interest.

Unfortunately, data sharing does not happen unless it is underpinned by a business need. Further, sustained collaboration also can not be expected unless it is likewise underpinned by a business need. When organizations in the geodata community reach this understanding, many begin to search out models so they do not have to “reinvent the wheel”. These organizations are the target audience for the “Lessons from Practice” guide, which offers of practical organizational tips for success.

### **FINDINGS - CHARACTERISTICS OF PARTICIPATING COLLABORATIVES**

Challenges faced by each of the participating geodata collaboratives are wide-ranging. However, each of them has in common a continuing need to demonstrate the benefits of the collaborative to their stakeholders and maintain momentum through achievement of tangible short and longer-term objectives. Put another way, unless the work of the collaborative is perceived by the stakeholders as helping them more effectively achieve their day-to-day business functions, participation will diminish and the likelihood of garnering needed resources will wane.

The type of organizational structure appears to have little or no relevance with the number, type, or complexity of functions supported. It is also clear from the information provided by the participating collaboratives that neither the form of the organizational structure, legally reorganized or informal, nor the existence or complexity of operating rules is essential, regardless of the purpose or function supported. Dedicated staff are associated with the more ambitious collaboratives, which was expected, and these staff are generally provided by the lead or champion organization, as opposed to working directly for the collaborative.

Significant sector diversity was common among the participating collaboratives for all but one. Even the exception has significant diversity among its local government and neighborhood participants. All have diverse government sector participants. Five of the six have non-profit participants. And, four of the six have for-profit participation.

And finally, all acknowledge that luck or otherwise unexplained good fortune has played a role in each of their successes. To quote Bruce Oswald, with the New York State GIS Cooperative, “Hard work, clearly defined issues/goals, great planning, commitment, expertise, and good business arguments are essential for the success of this kind of initiative, but luck is also an important factor. There is no substitute for being in the right place at the right time with the right folks.”

### **FINDINGS - KEY PRACTICES FOR SUCCESS**

The six participating geodata collaboratives were created for several different purposes: forum to share information, forum to share exiting geospatial data, perform area

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<sup>4</sup> <http://www.fgdc.gov/nsdi/nsdi.html>.

integration functions for like-data from multiple sources, and combinations of these and others. They collectively identified seventeen key practices fundamental to their abilities to achieve their respective visions (Appendix A.) Six of these key practices are shared by all of the participating collaboratives (no order of significance is intended):

- Broad Support For Vision & Expectations
- Champion Individuals / Community Support
- Knowledgeable, Respected Participants
- Maintain Contact With National (Higher Order) Organizations
- Proactive, Open And Inclusive Process / Procedures To Enable Maximum Participation / Diverse Perspectives
- Promote Understanding/Outreach

Moreover, five additional key practices to success were cited by four of the six participants. They are as follows (no order of significance is intended):

- Champion Organization(s)
- Document Stakeholder Benefits / Business Argument
- Maintain Focus on Common Business Information Needs
- Maintain an Institutional Memory
- Supported Business Plan/Well Defined Issues

### **CORROBERATION VIA PRIOR RESEARCH**

Technological developments and solutions are increasingly enabling data sharing. They are important but still the non-technical coordination process, issues and concerns are the keys to success. The key practices for success, collectively identified by the collaboratives in the “Lessons from Practice” guide, are generally stated in less specific terms than the findings reported from the academic case studies. Notwithstanding these differences, there is a strong correlation between the findings from the two approaches. Leadership, broad support for collective vision, equity, trust, and openness are concepts embedded and fundamental to the findings of both initiatives.

The waste caused by duplication of effort, due largely to lack of information exchange among local, state, and federal government and private sector organizations, remains a significant impediment to building of Spatial Data Infrastructures (SDIs) at the national, state, regional, and local levels and prevents more effective and efficient use of GIS throughout the society. To facilitate SDI development, research<sup>5</sup> by Nedovic-Budic & Pinto and other authors provide insights into the mechanisms and behavioral aspects of interorganizational GIS activities. Following are the lessons derived from their recent case studies and a national survey:

- **Keep It Simple.**
  - The extent of the interaction between organizations usually goes beyond data-related activities (e.g., data purchase; data exchange; project-driven joint data efforts; joint data acquisition; joint database development and/or maintenance) to include joint system development, personnel (often in the role of coordinators and technical support), space, and applications. The latter group is more often practiced in intraorganizational settings.

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<sup>5</sup> See the bibliography presented in Appendix 3, *Lessons from Practice: A Guidebook to Organizing and Sustaining Geodata Collaboratives*, for over 60 citations.

- Moving from data toward applications, the interactions increase in their sophistication and complexity, but also in difficulty in making them functional.
- Shared or jointly supported application developments are the most challenging.
- Think big but start small and build gradually around data-centered approaches.
- **Formalize & Structure.**
  - Mutual trust is the key for successful cooperation (as noted by Harvey), but supporting interaction with formal documentation, such as inter-governmental agreements, memoranda of understanding, data licenses, contracts, etc. is wise to do. They are more practiced (and probably more needed) in relationships with other organizations than internally within an organization.
  - These documents may enable a continued data exchange even in cases where the other forms of interaction are discontinued.
  - The nature of sharing structures also needs to be established early in the process. Simply allowing the GIS and database interactions to evolve over time without set rules and procedures often attract increasingly suspicious partners and may lead to problems down the road. The key, therefore, is to establish a stable and simple relationship structure.
- **Contributions -- Fairness, Equity, & Continuity.**
  - First, determine the contributions in advance and in specific terms. Data are the major contribution to coordinated activities. Financial and staff contributions are also substantial, the latter being more evident in intraorganizational settings.
  - Take into account the concerns most organizations would have about how commensurate their contributions would be relative to their size, resources, and utilization of data or other joint products.
  - Apply the principle of *equity* in accepting contributions and distributing the common resources.
  - Extensive negotiations may be necessary to decide on contributions and returns.
  - Loss of full independence and investment of energy and resources are deliberate and tangible contributions toward developing and maintaining relationships with other organizations.
  - Some level of contribution from each participant tends to increase the commitment to the joint goals and raises the stakes in success.
  - Finally, secure long-term commitment for contributions. Their variations on annual basis may jeopardize the project and prevent implementation of strategic or more elaborate multi-year developments
- **Control & Ownership.**
  - As with any multi-party venture, participants needed to feel empowered to plan, make decisions, and bring them to realization.
  - Participants in interorganizational activities expect a fair decision-making process to ensure their adequate control over the joint activities and resources.
  - Voting rights and decision authority have to be carefully determined and clearly defined.
  - Extensive negotiations may be necessary here as well.
  - Expect that depending on their resources, power, and role in the partnership, organizations differ in their views about what fairness and equity in decision-making represents.
  - Perceptions about data ownership contributes to dominant control.
  - Openness with regard to data access, minimal proprietary interest in data, and no major financial gains expected from data distribution, are all conducive to less conflict and tension regarding the ownership of data.

- Finally, all parties have to perceive the coordinating unit or coordinator and their location as neutral (i.e., having no vested interest or commitment to any one agency or organization).
- **The What's In It For Me (WIIFM) Syndrome.**
  - It is only natural and should be taken seriously.
  - Understanding and respecting the reasons that motivate organizational participation is part of the success.
  - Saving of resources and common mission and goals are the most frequently declared reasons for interorganizational interaction.
- **Process, Process, & Process.**
  - Ongoing communication and negotiation is inherent part of coordination efforts.
  - Identifying semantical differences and commonalties among concepts held by participants and creating a common working language is a prerequisite for effective communication.
  - Communication happens both formally and informally.
  - Persistence and willingness to compromise are the keys to success, particularly through difficult times (which are experienced even by most successful collaboratives).
  - Coalition building and bargaining may be exercised as well.
  - Differential commitment levels are possible. The true commitment, however, helps overcome many of the obstacles in the process of joint database or system activities, and also maintains the focus on the matters that are pertinent to the joint activities. Participants who are committed “for the wrong reasons” are usually disruptive to the joint effort.
  - Process takes time and patience.
  - Finally, the spirit of cooperation is crucial for keeping participants active and interested. It is based on teamwork, shared understanding, trust, and mutual credibility.
- **Project Leadership.**
  - The key success factor.
  - Provides vision, support, and backing with resources.
  - Exercises the authority to promptly act on common plans and decentralizes it to allow for implementation of the agency-specific parts.
  - Stability characterizes effective project leadership structures.
  - Ensures “enforcement” of common standards and commitments (e.g., database or other contributions).
- **Roles And Responsibilities.**
  - Roles and responsibilities of each participant have to be well defined – another key success factor.
  - Database development and maintenance responsibility is the life cord of inteorganizational activities.
  - It is necessary to identify and secure support of the original data providers early in the coordination initiative, so that data provision and update will be kept close to the source and/or in organizations with compatible functions.
  - Additional resources and support infrastructure needs to be provided to the units, with accepted new roles and responsibilities (e.g., charged with maintaining the data), which incur additional workloads and expenses.
  - The units perceiving inequities in data maintenance commitments are prone to downgrade their own support of the system. In absence of staffing, funding, equipment, or training provisions, the agencies assigned database maintenance

responsibilities are likely to fall behind in timing and quality of database update. They also tend to depart from prescribed standards and procedures as another consequence of the inadequate support for database maintenance duties.

- Assignment of roles and responsibilities is highly susceptible to fairness issues and concerns.
- **Managing Change.**
  - In a highly technical field, as GIS is, it is necessary to adapt local solutions to take advantage of technological change and innovations.
  - The problems of mismatch between new database tasks and procedures and existing organizational structures are common in the newly initiated interorganizational efforts.
  - Technological change requires change in administrative and organizational structure and processes. Integrated and distributed data processing tend to generate leaner, more flexible, and responsive organizations with fewer management levels and more direct information exchange between the top and bottom layers.
  - The sense of upcoming change and the uncertainty brought with it tends to be unsettling to many agencies and their personnel. It is crucial to confront the concerns about the implications of the technological change and joint database activities for subsequent organizational and staff realignment.
  - The status of the joint project needs to be frequently demonstrated and communicated to all the participants and leaders. Project expectations should be managed at administrative, management, and operational level.
  - Finally, the culture of both sharing and change has to be nurtured.

## **CONCLUSION**

The “Lessons from Practice” guide project was undertaken to contribute to fostering and nurturing of inter-organizational relationships needed to move the concepts of the NSDI toward a common reality in all parts of the country. The authors found that a substantive progress has been made to achieve the cooperation needed to attain this vision. Transfer of knowledge of organizational “keys to success”, from these and other successful geodata collaborative efforts, is in the best interests of the community to minimize duplication and effort and to avoid the alternative need to “reinvent the wheel”. Transfer of these valuable organizational lessons learned is as important to the achieving the vision of the NSDI as is transferring best practices and standards regarding the data structures and related systems architectures themselves.

The hope was that “Lessons from Practice” guide project, and similar efforts expected to follow, will foster the collaboration needed to achieve the visions of the NSDI. The stakes are high and relevant to our daily lives. If the vision of the NSDI is attained, our collective abilities to implement smart growth policies and to measurably improve our effectiveness as institutions will be significantly enhanced and, in turn, enhance our collective abilities to more effectively achieve livable communities goals, improve quality of life, and improve economic competitiveness.

Among the challenges to achieve these outcomes is not only the need to maintain up-to-date documentation on our collective organizational “keys to success”, as well as best practices and other relevant geodata knowledge, but, as importantly, to implement an effective method to connect prospective users with the “lessons” documentation when

they need it. These challenges, if not currently, ought to be priorities of geodata research initiatives, I-Teams, the Geodata Alliance, and others to collectively address.

## APPENDIX A

### CHARACTERISTICS OF SUCCESSFUL GEODATA COLLABORATIVES

Key Practices to Success	MetroGIS	NCSS	PaMAGIC	PSIN	Ramsey County	New York
Broad Support for Vision & Expectations	X	X	X	X	X	X
Champion Individuals / Community Support	X	X	X	X	X	X
Knowledgeable, respected participants	X	X	X	X	X	X
Maintain contact with national (higher order) organizations	X	X	X	X	X	X
Proactive, Open and Inclusive Process / Procedures to Enable Maximum Participation / Diverse Perspectives	X	X	X	X	X	X
Promote Understanding/Outreach	X	X	X	X	X	X
Champion Organization(s)	X	X		X		X
Document Stakeholder Benefits / Business Argument	X	X		X		X
Maintain an Institutional Memory	X	X	X	X		
Maintain Focus on Common Business Information Needs	X	X		X	X	
Supported Business Plan/Well Defined Issues	X	X	X			X
Seek Consensus on Policy Decisions	X	X		X		
Timely and Important Issue		X	X	X		
Active Involvement of Policy Makers ( <i>elected officials</i> )	X	X				
Align with Internal Business Needs ( <i>functions for collaborative</i> )	X	X				
Incentives	X				X	
Short Interesting Meetings			X	X		

**Abstract Originally Submitted – Per Proceedings Instructions**  
(*exceeded 250 words*)

Data sharing, area integration, and collaboration to achieve these objectives have been recognized by the geodata community for some time as topics of great interest. Data sharing does not happen unless it is underpinned by a common business need. Further, collaboration to achieve data sharing does not happen unless champions engage to provide leadership via a trusted forum to work through differences in policy and procedures. When organizations in the geodata community reach this understanding, many begin to search out models to avoid “reinventing the wheel.” These organizations were the target audience for a September 2001 publication entitled *Lessons From Practice: A Guidebook to Organizing and Sustaining Geodata Collaboratives*, a collaborative effort of the presenters.

In consecutive presentations, the presenters will summarize findings of their varied experience with successful geodata collaboration initiatives and offer practical organizational tips for successfully sustaining data sharing.

Randall Johnson, Staff Coordinator for the MetroGIS geodata collaborative serving the seven-county, Minneapolis-St. Paul Metropolitan Area, will talk about six common characteristics fundamental to the success of the organizations featured in the lessons from practice “guide”.

Zorica Nedovic-Budic, Associate Professor of Urban and Regional Planning, University of Illinois, Champaign-Urbana, will summarize how her independent research with a colleague Jeffery Pinto, Penn State University Eerie, compare and contrast with the six common characteristics of successful collaboratives identified in “guide”.

Bruce Oswald, Director, New York State Center for Geographic Information will talk about factors that have contributed to the success of the New York State Data Sharing Cooperative.

The hope is this effort to document stories of successful multi-participant GIS efforts, and similar efforts that follow, will foster the collaboration needed to achieve the vision of National Spatial Data Infrastructure (NSDI). Achieving this vision will significantly enhance our collective abilities to implement smart growth policies and measurably improve our effectiveness as institutions. These outcomes will, in turn, improve our quality of life, emergency responsiveness, and economic competitiveness.