

Reconfiguring Administrative Geographies In The United States

Francis Harvey¹

Department of Geography, University of Minnesota, Minneapolis, MN 55455

Phone: +1 612.625.2586 (o), +1 612.624.1044 (f)

Email: fharvey@umn.edu

Abstract

Some of the most significant social, political, ethical, and economic implications of GIS-based technologies show themselves in changing modes of governance. Administrative geographies in the United States, with some peculiarities resulting from their historical development, are analyzed in this paper as boundary objects that loosely organize local practices. Boundary objects bring together technologies, people, institutions, programs, and policies in an infrastructure that simultaneously enables and constrains governance. The introduction of geo-spatial technologies destabilizes the existing local infrastructure, but only temporally. A process of re-stabilization usually follows that involves the modification and creation of boundary objects to fit the changed social and political relationships. This paper looks in particular at the impacts arising from the implementation of geo-spatial technologies in US local governments and conflicts between neighboring governmental bodies. This research suggests that the stability of administrative boundaries helps veil sweeping changes to governance. This paper examines how geo-spatial technologies are intrinsic to these changes in several United States' local governments. The

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struggles surrounding the reconfiguration of administrative geographies reflect the growing significance of neo-liberal governance strategies and their use of technologies in the United States.

Introduction

The practices of government have been under the sway of neo-liberal governance for a number of years (Giddens, 1998). This applies to all levels of government. Local governments rely increasingly on GIS-based technologies to introduce cost-saving management strategies and implement regulatory frameworks with explicit and implicit invocations of neo-liberal philosophies. GIS-based technologies take up a key role in introducing neo-liberal concepts of governance and take up a key role in changing meanings of administrative geographies. For example, numerous studies of communication technologies have highlighted the roles of technologies in changing administrative activities and government practices around the globe (Castells, 1985, 2000; Wheeler, Aoyama, and Warf, 2000). The consequences of neo-liberal inspired government reform for urban geographies are wide-ranging and profound (Graham and Marvin, 2001). This research focuses on these issues in US local governments, which have generally embraced the philosophy of neo-liberal governance in an embrace of Foucauldian self-regulation that characterizes governmentality (Foucault, 1991).

The locally contingent roles of GIS-based technologies offer opportunities for examining how administrative geographies are changing. Drawing on insights that technology is a quintessential component of neo-liberal governance and resulting changes to administrative geographies (Scott, 1998; Mitchell, 2002), this study of the development of local GIS-based technologies illustrates the non-linear processes that change meanings of administrative geographies. In particular, conflicts surrounding the use of GI technologies in coordinating government activities across administrative boundaries offer critical geographers with an ideal spatial, cultural, and political setting to examine the adoption of neo-liberal governance strategies and non-linear processes of destabilization and stabilization.

Considerable complexity characterizes the practices of neo-liberal governance. Internal struggles and external pressures result in a complex play of forces that are inexorably woven into relationships of place and people. Messy stories and the work practices of administrative bounding lie behind the creation and maintenance of crisp, linear boundaries that define the United States' administrative geography—boundaries which are rarely changing geographically, but are undergoing considerable change in their meanings. The introduction of GI-technologies in the cases studies discussed in this article is accompanied by destabilization and stabilization of the administrative infrastructure. The administrative boundaries remain largely unchanged throughout this process, but

they continue to occupy key positions for administrative coordination activities. Drawing on boundary objects and Actor Network Theory (ANT) , this article examines how this process demonstrates the importance of administrative boundaries and the contribution of GI-technologies to neo-liberal governance. Boundary objects gird the theoretical framework for examining how the technologies, people, institutions, programs, and policies of a local government interact in an infrastructure that simultaneously stabilizes and destabilizes governance. Administrative boundaries delineate the geographical extents of governance and places of government interaction, taking on new meanings as interactions change. The contradictory and simultaneously conciliatory roles boundary objects take up for different actors provides key theoretical traction for examining how information technologies take on key roles in neo-liberal attempts to reorganize state institutions. In local governments GIS-based technologies are in this sense the bringers of fundamental change, while retaining existing administrative geographies in processes of destabilization and re-stabilization.



Figure 1 Administrative boundary markers

jurisdictions, and on the other hand they also mark connections for governance: the road continues into the next county, people cross, water districts and sewer districts may overlap, and taxes may be different. Every administrative boundary indicates an administrative relationship at the same time that it indicates the boundaries of a jurisdiction.

Deciphering administrative boundaries

The cryptic markings of most US administrative boundary markers (Figure 1) are almost meaningless to most passerbys. To a San Diego County department of transportation employee, conservation official or police officer the same markings have great significance – these are all people involved in the creation and maintenance of administrative boundaries. As boundary objects they simultaneously point out the limits of one government and the interactions with at least one other government. On one hand, these signs mark the limits of their administrative

Many administrative boundaries in most of the United States appear to be dictated by pure geometric rationality (e.g., the 49th parallel, Western state boundaries, the public land survey), exemplars of Cartesianism and Euclidean ideals in a country founded in the Enlightenment. This is the spatial organization

preferred by a society that idealizes the *tabula rasa* origin mythology beckoning the unfolding of American manifest destiny. The American preoccupation with gerrymandering belies the significance of administrative boundaries in political life (Thompson, 1987; de Tocqueville, 1988; Monmonier, 1995). Administrative boundaries often seem to be arbitrary, dictated solely by geometrical abstractions. The US Public Land Survey (PLS) (Thrower, 1966), the prime example, created a one mile by one mile (1.6 km) grid across most of the US. Many administrative boundaries in this area, however, are still influenced by nature: the boundaries for infrastructures that usually rely on gravity to ensure that their fluid matter flows in the proper direction are significant, e.g., water or sewage districts. Regardless, the role and meaning of administrative boundaries varies according to their variable roles in coordinating governance.

Administrative Boundaries Made for Contestation

Administrative boundaries in the US generally delineate functional areas: conservation districts, water districts, planning areas, traffic management zones, garbage collection areas, fire protection zones, and many more, apparently without regard for historical events or natural features. The PLS grid, stretching to the horizon divided every quarter-mile, mile, and six miles in most parts of the US, is the most common example, although some administrative boundaries in this area follow natural features, e.g., watersheds. Administrative boundaries in the US may also follow roads, property lines, natural features, power lines, degrees of latitude and longitude, drainage ditches, etc.

Over 39,000 administrative boundaries divide and subdivide the United States, geographic and political divisions resulting from the invisible work of humans and nonhumans in government administrations. This plethora of administrative boundaries is the ideal grounds for Foucauldian self-regulating governmentality; the normalization and entrenchment of private sector principles espoused by corporate management techniques to create a web of surveillance and control that is internalized in the institutions of public administration. In any American city one finds thousands of administrative boundaries administered by various public, private, and semi-private entities following their own mandate-specific rationalizations. Reflecting the values of a pragmatic culture and a minimalist functional approach to governance, the markers of administrative boundaries (see Figure 1 above) follow a functional aesthetic that cloaks the messy business of governance.

The precepts of neo-liberal governance find a well-established political cultural and spatial organization in the US that the functionalist trappings suggest. Although other English-speaking countries have recently been marked by a penchant for government devolution, from its foundation in 1776, the devolved

organization of public administration in the US forms an ideal basis for the unfolding of a Foucauldian regime of self-regulating governance. Since inception, the US has not only steadfastly preserved a devolution of administrative power, but also a concentration of governmental power². As de Tocqueville, one of the first of many European political and cultural commentators and definitely among the best known, noted in the early 19th century (1988), the US is characterized by administrative decentralization³. In contrast to centralized governments and strong administrative and bureaucratic hierarchies in European countries⁴, in the US “there is scarcely a trace of hierarchy” (de Tocqueville, 1988, p. 89).

The lack of hierarchy and decentralization means several things for U.S. local administrations. First, the disorganized character of American urban areas reflects the mandate specific administrative geographies. In the Chicago area (approximately 13,400 km² and 7.5 million inhabitants⁵) there are over 1,200⁶ bodies responsible for administering various services (Post, 2002); in the Minneapolis-St. Paul area (approximately 7,700 km² and around 1 million inhabitants) over 293 units of government are active (see figure 2). Coordination of government activities among that many administrative bodies is simply impossible. Any US county, even in metropolitan areas, remains the primary administrative body for many state functions executed elsewhere by local offices of the provincial or central government. In contrast, a US county must constantly coordinate its administrative activities with other government bodies that carry responsibilities for some government functions in portions of the same area.

² De Tocqueville makes a distinction between administration (functions of the state) and government (politics of the state) that is helpful in unraveling American local government politics. Government is generically used in the US for both. Additionally the term has recently begun to take on new meanings, drawing on Foucault’s work on governmentality. I will use the term administration and administrative, reflecting the focus of this analysis on functions.

³ The urbanization of the United States has led to considerable tensions and attempts to re-establish a theoretical basis for federalism that considers the complex interactions. Local government fragmentation is a recognized issue for political scientists.

⁴ Switzerland is the notable exception for de Tocqueville.

⁵ These values were determined from the 1990 U.S. Census Bureau data. The Chicago area consists of the following nine counties: Cook, Du Page, Grundy, Kane, Kankakee, Kendall, Lake, McHenry, and Will. These counties make up the majority of the Chicago Primary Metropolitan Statistical Area defined by the U.S. Census Bureau. A portion of Kenosha County, Wisconsin has been left out in calculating both area and population.

⁶ Illinois is the state with the highest number (6,810) of local government administrations. 2,995 are special purpose, or single function administrations (Source: <http://www.cookcountyassessor.com/lwvc/chgomaze05.html>).

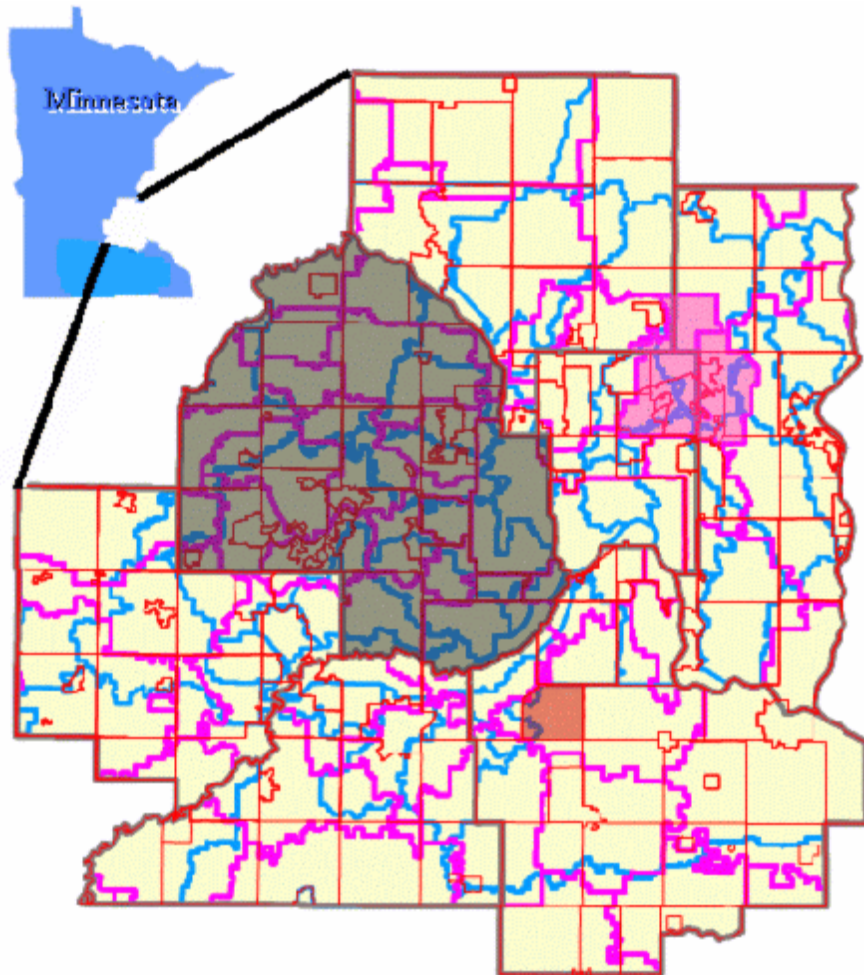


Figure 2 Administrative boundaries in the Twin Cities Metropolitan Area (Courtesy of Randy Johnson/MetroGIS)

Because of their overwhelming, near anarchic, complexity, administrative boundaries are rarely contested publicly. They are usually mundane affairs of administrations, often barely noticed by people outside the administration and rarely making affected people irate. Even then, the ability to pursue administrative objectives is often contingent on political support through a council, executive board, city manager, or mayor. In some situations, minor administrative boundary changes, however, can become politically contentious because of complementary changes in administrations (Judd, 1979). The interactions between neighboring governmental bodies resulting from the deployment of information technologies to enhance administrative coordination may constitute the biggest conflicts for neo-liberal governance strategies.

Destabilizing and Re-stabilizing Administrative Boundaries with Information Technology

An important element in the interactions between administrative bodies in the US and the reconfiguration of administrative boundaries is information technology. In a country that relies heavily on technology for economic development and cultural identity, 'improvements' to administrative information infrastructures signify commitments to progress and form a key part of neo-liberal reform strategies. Following Habermas' arguments for the discourse of rationality (Habermas, 1984), development and provision of beneficial services or savings for the government are fundamental ways to assure political support for administration activities. Much as going from the chalked lines of a marketplace to a map displayed at an information kiosk can change market dynamics, changing from paper forms to wireless computers for recording water meter readings can change administrative boundaries. Exemplary narrative becomes part of popular discourse and underscores the promise of information technology for local administrations. In Lexington, Kentucky, a GIS analysis of garbage pick-up, aimed to improve routing of garbage trucks, led to the discovery that through substantial routing improvements, the city actually had an extra garbage truck and would not have to purchase a new garbage truck (costing \$100,000). As a result the sanitation department acquired a GIS and has trained some of their staff in its use (Harvey, 2000). The garbage pick-up areas were changed and the saved money was a windfall for the politicians who had been challenged on the appropriateness of spending \$10,000 for the GIS analysis. This sort of 'bon mot' has been important in introducing GI technologies to reconfigure administrative boundaries.

The use of GI technologies in the reconfiguration of administrative boundaries involves numerous changes to the multiple networks that utilize the administration and reference administrative boundaries. The introduction of any information technology in local administrations has diverse and unforeseeable impacts. In a Foucauldian regulation of neo-liberal governance strategies in US local government, GI technology is intrinsic to the destabilization and re-stabilization of the relationships and coordination of administration activities and their demarcation through administrative boundaries.

Geographic Information Technology Infrastructure

The neo-liberal reconfiguration of administrative boundaries occurs in the context of Federal government policies promoting the use of various technologies and through the creation of GI infrastructures. These activities focus on the development of a nation-wide infrastructure for geographic information. Although direct impacts of Federal activities are limited due to decentralization, federal policies and activities have had and continue to have substantial indirect impacts.

In an over-arching Foucauldian regulatory framework these policies are clearly part of neo-liberal attempts to re-organize government administration.

Behind all geographic information infrastructures at any level of administration in the US lies the national infrastructure for geographic information (GI) known as the National Spatial Data Infrastructure (NSDI). The NSDI includes a framework of data and standards, a concept for guiding GI policies, and federal government activities. Considering the administrative decentralization of the United States, the direct measurable impact of the NSDI on local administrations is minimal. Basic awareness of the NSDI in local administrations hovers around 50%, but actual use of the data framework, standards, and concept is considerably less (Harvey, 2000; Harvey and Tulloch, 2003). The NSDI influences policy-setting activities in local administrations through its influence on local, regional, state, tribal, and federal policies. Demonstration projections and funding of metadata collection, dissemination and training have had some impacts. Federal regulations and funding priorities offer tangible, but small rewards (financial or otherwise) for local administrations to embrace NSDI concepts.

While the NSDI has only had minimal success defining the architecture for a national geographic information infrastructure among local governments, it has become an essential policy backdrop for local administration information technology (IT) activities. Explicitly or implicitly, the NSDI defines an important part of the context for developing IT in local governments. IT introduced in local administrations is often argued for as necessary to assure the municipality or county stays in 'touch' with national developments. The Foucauldian regulatory role for the NSDI supplements traditional mandates and funding programs helps to implement neo-liberal administrative organizations (Barry, Osbourne, and Rose, 1996). While rarely changing established jurisdictional boundaries, the NSDI frequently changes the meaning of functional administrative boundaries and their co-constituted administrative interactions.

Boundaries and Boundary Objects

Local administrative activities involve the coordination of activities in relationship to boundaries and boundary objects. The complex devolution of American public administration, especially in urban areas, and the centrality of information technology to the ongoing reconfiguration of American local administrations constitutes key characteristics of American instances of "splintering urbanism" (Graham and Marvin, 2001). Information technologies occupy a key role in neo-liberal attempts to organize state institutions to better support capitalist accumulation strategies (Harvey, 1989). Administrative boundaries become critical markers for the re-creation of jurisdictions as part of neo-liberal networked economy and society. Administrative boundaries impact

processes that constitute geographic interactions: relationships are a key part of administrative boundaries roles (Massey, 1994). The boundary objects developed and maintained in administrations to delineate functional activity areas constitute administrative boundaries and become integral to the infrastructure of neo-liberal governance. Administrative boundaries provide an ideal spatial, cultural and political exemplar for studying governance; boundary objects provide the key theoretical resource for studying the messy practices of local administration coordination activities.

Like other geographic boundaries, administrative boundaries are evidence of complex and ever-present processes of differentiating territory and groups (Massey, 1994). Massey's remark holds validity even for a country that seems largely divided up its territory without regard for the different groups—past and present. The boundaries are part of complex processes that must distinguish different territories and groups. Conceptualized as boundary objects, the study of administrative activities involving coordination across administrative boundaries points to the messy processes of American political geography and sheds insight on the significant role of administrative technologies in the process of Foucauldian regulation of US neo-liberal governance.

What are boundary objects?

Boundary objects are intermediaries that stabilize network relationships and make them durable; they also frame relationships. A common-place example is a beer glass in a pub. For the customer, it serves to hold the beer they have looked for; to the people working behind the bar the beer glass holds one serving of the beer that they will need to clean after the customer is finished drinking and replace if it breaks. The roads stored in a local government GIS may facilitate the assessment of consequences of proposed activities for planners; for the roads' department they may only be a nice element to add to their maps of maintenance needs and activities. Loosely structured for common practice, they can be made specific through refinements that do not alter the underlying boundary object (Clarke and Star, 2003). Roads are roads, no matter how much data are added by any department to support their needs. They perform dual functions connecting different meanings while retaining differences. Boundary objects are thus an important part of theoretical frameworks for considering interactions between different groups (Star and Griesemer, 1989), or social worlds to use the terminology associated with Grounded Theory, an interpretive method grounded in phenomenology (Strauss 1990; Glaser and Strauss, 1967). With origins as well in symbolic interactionism (Blumer, 1969; Reynolds and Herman-Kinney, 2003) boundary objects share with early versions of actor network theory (ANT) an emphasis on considering human and nonhuman elements (Latour, 1988). Boundary objects hold similarity to Grounded Theory (Strauss, 1990; Glaser and Strauss,

1967) in its orientation towards empirical actions of actors ‘speaking for themselves’, but can be distinguished by its emphasis on considering nonhumans equally as capable of significant action as humans. This point holds perhaps at first glance as a complement to ANT, but ANT, especially the derivative developed by Latour, Callon, and Law (Law, 1991; Callon, Law, and Rip, 1986; Law and Hassard, 1999; Latour and Woolgar, 1979; Latour, 1993, 1988, 1999) focuses mainly on particular actors (e.g., Pasteur, versus symbolic interactionism’s focus on micro-scale interactions and empirical studies of various modes of communication). Further, in distinction to ANT, symbolic interactionist approaches emphasizes how people interact and collaborate in spite of trenchant semantic differences.

Methodologically, this research deploys a hybrid of ANT and grounded theory lacking the micro-scale analysis of symbolic interactionism. Boundary objects in this hybrid offer a productive analytic framework for examining the key elements of a situation (Garrety, 1997). The grounded theory aspects of the theoretical framework deployed for this research focus on underlying issues of the various actors who interact for administrative coordination. At the scale of actor-network analysis, boundary objects become nodes in what Latour describes as relational assemblies linking technological networks, spaces and places, humans, and nonhumans (Latour, 1993). Feminist critiques of the early version of actor-network theory have pointed out the pragmatic orientation of actor-network theory leads to a construction of a structure (network) that constrains interactions between nodes that the researcher has chosen (Clarke, 1990). Critical issues of inclusion and exclusion are implicitly decided by the researcher’s selection of a point-of-view, e.g., Latour’s depiction of Pasteur (Latour, 1988). Later versions of ANT have adopted a theoretical framework that makes multiplicity a key element of the theoretical framework and veers away from analyzing obligatory points of passage as defining markers of a structure (Law and Hassard, 1999). The theoretical framework for this research supports an articulation of the multiple passage points. Lacking the micro-scale study of activities, it fails to engage the detailed specificity of the human and technological interactions in great detail.

At the meso-scale of this research, the analysis of administrative boundaries as boundary objects refers first to accepted common meanings of the boundary objects and, second, from the framework of symbolic interaction (Strauss 1993), to actors (human and nonhuman) that are part of contentious, often intractable, differences. Two neighboring counties face similar challenges, but administrative approaches will vary greatly based on a number of additional issues including political support, economic conditions, personal relationships, etc. Boundary objects are co-constitutive elements in a social world (Clarke and Star, 2003) that accounts for these issues in social coordination. Examination of contentious issues

facing local administrations⁷ helps comprehend the consequences of interactions in terms of materialities and multiple meanings. In spite of significant and persistent political, cultural, and economic differences between local administrations, boundary objects offer a theoretical framework for unraveling the complex interactions related to administrative boundaries.

Administrative Boundaries and Boundary Objects in Action

Drawing on research conducted for a study of local government practices in relationship to the NSDI (Harvey and Tulloch, 2003), two case studies presented here examine the processes of changing administrative boundaries through the introduction of information technologies⁸.

The methodology deployed here involves the analysis of cases examined as part of a project exploring local government GI sharing and coordination activities. The analysis relies on material collected by the author for this project, which pursued a strong ethnographic data collection along the lines of symbolic interactionism, but also influenced by Grounded Theory.

Overcoming Obstacles in San Diego

Geographic Information Systems (GIS) have been used by governments since the 1960s (Tomlinson, 1968). This case study of the city and county of San Diego, California (4,300 square miles with a population of 800,000), highlights the role of GIS-based technologies in altering regional government collaboration, de-formalizing relationships and turning interactions between government agencies into a part of disciplinary activities. The development has been at times highly contentious, which, in time, lead to local administrations finding a need to enhance coordination among them. Power companies there also invested early in GIS data collection and maintenance to support their operations. Municipalities, counties, state agencies, and federal agencies could get the San Diego Gas and Electric data for free, but had to pay royalties for the use. Due to increasing use of geographic information, in 1984 the city and county started the Regional Urban Information

⁷ Symbolic interaction has played a significant role in science, technology, and medicine studies. Clarke and Star (2003) offer a succinct overview of this research corpus.

⁸ The data for these case studies was collected as part of a project supported by the Federal Geographic Data Committee. Investigators were Francis Harvey and David Tulloch. The report is available at <http://www.tc.umn.edu/~fharvey/research/BestPrac4-03.pdf>.

System (RUIS), which was used for ten years. During these ten years more and more municipalities and consulting engineers in the area began to use GIS-based technologies. The city and county reviewed the situation and decided in 1994 to pursue a new strategic plan with a focus on data preparation, distribution, and sales. First and foremost, the new system (called SanGIS) would focus on maintenance of land base data (geographic information combining land use and land cover information), providing public access, and marketing of geographic information. Through subscriptions to the land use data and minimal charges for public access, SanGIS, legally organized in 1997, hoped to achieve financial solvency.

Financial solvency is important because even though SanGIS is managed by the city and county of San Diego, it is a public-private entity organized under a Joint Power's Agreement under California Government Code section 6500. The City Manager and County CAO are the sole two members of the board of directors. There is no advisory board, nor other forms of oversight. For most intents and purposes, SanGIS functions as a private company, which offers it flexibility in negotiating contracts and in negotiations with public agencies and private companies. SanGIS has seven staff, four of whom are county employees and three being temporary agency employees.

Financial solvency was sought mainly through subscriptions. For a \$10,000 yearly subscription a municipality could acquire all SanGIS data for their portion of the county. Even though the fees for public access were small in comparison (minimum of \$10), little data were sold and few map making service contracts realized. Marketing went somewhat better, but with few successes. With few subscriptions and limited sales, operating costs continued to be far higher than revenues. In 2002, SanGIS changed their subscription model, reducing the yearly charge to \$6000 for a north and south zone in the developed coastal areas and offering public administrations the data for \$1000 less. Updated data from SanGIS comes quarterly and were very accurate.

What was the reason for the limited number of subscriptions and sales of accurate data? Ultimately, the lack of subscriptions and sales led SanGIS to change their pricing scheme, but for municipalities and other public agencies this would have meant abrogating too much power and control over local data collection. The \$10,000 year subscription fee was simply out of the question for most municipalities and agencies. The costs of collecting and preparing the data for most municipalities were likewise too great, but another avenue opened that addressed local administrations' issues. San Diego's regional planning agency, SANDAG (San Diego Association of Governments), responsible for transportation planning in the region, was acquiring data for its planning purposes and made the data available for free. Included in the free data was a data set with rasterized land-use for the San Diego County area. SANDAG's land use data were not as accurate as the SanGIS land base and lacked much of the detailed information provided by SanGIS, but it was useful enough for most planning purposes.

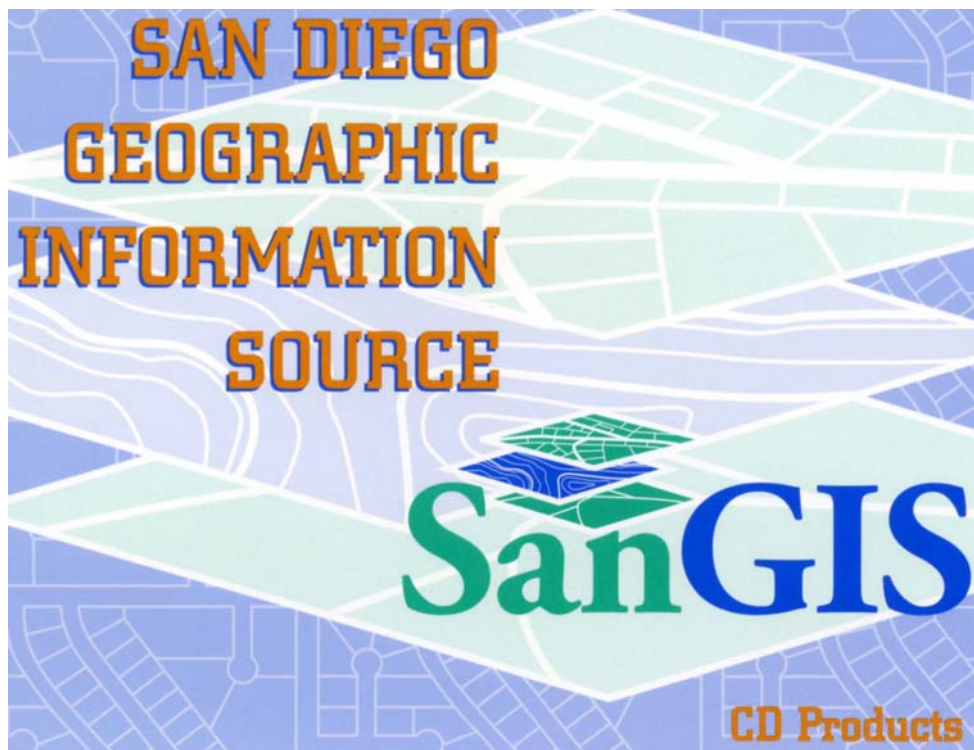


Figure 3 SanGIS envelope for CD products with logo

This support for coordinated activities became a key factor in reconfiguring local administrative relationships. SANDAG emphasizes participation in administrative interactions among administrations, federal, and state bodies active in San Diego. It, and its predecessor the San Diego County Comprehensive Planning Organization, have used GIS since 1970 and has actively supported a GIS coordinator group that meets regularly to discuss GIS development and exchange approaches for meeting changing regulatory mandates. Also organized under a joint powers agreement, SANDAG's board of directors is made up of nineteen cities and county government with SANDAG defining its role as "The Forum for regional decision-making"(SANDAG, 2002). Each local administration has a formal agreement with SANDAG. Further, representatives of important federal agencies and the governments of the City of Tijuana and the state of Baja California, Mexico, are advisory representatives.

In interviews with staff from San Diego County municipalities and regional state agency offices, the expense of SanGIS data had very early been seen as an insurmountable hurdle. The fees and loss of control over data exemplified the loss of local control and the loss of administrative boundaries. The administrations, in this regard, would lose a portion of their administrative functions to the SanGIS and the boundaries between municipalities and county would erode. The detailed information SanGIS collected and maintained also failed to meet individual local



Figure 4 Working with administrative boundaries (Photo by author).

administration requirements. The availability of free, or low cost, geographic information, even if limited to considerations of data accuracy, and the creation of a participatory ‘forum’ that retained local administration control and reinforced autonomy led many administrations to find new relationships between municipalities. Administrative staff interviewed spoke of the importance of the regular GIS coordinator group meeting and other semi-formal and informal groups that had sprung up. Administrative boundaries delimited administrative units, but became important geographical references for enhancing interactions and resolving common problems. The boundary objects created helped facilitate new levels of interaction and cooperation that fundamentally altered the meanings of administrative boundaries. New functions that local administrations took on were discussed in these interactions and resolved cooperatively. The combination of formal, semi-formal, and informal activities led most people interviewed to proudly point to the strong cooperation and regional interaction as a new era of local administration. Although individual administrations followed different GIS strategies, all staff interviewed spoke of the benefits of sharing and the abilities they now had to contact colleagues in neighboring municipalities to obtain data and help. Whereas the expense of SanGIS data had once been an obstacle, cooperation between administrations aided by SANDAG had facilitated a great deal of sharing

among administrations and changed the meaning of many administrative boundaries in San Diego County.

Struggling for Data in Dane County

In Dane County, Wisconsin, the use of GI technology offers some parallels to the example from San Diego, but shows that the introduction of GI technologies can create boundary objects that polarize administrative boundaries. The introduction of a new cost-sharing regime to generate funds to cover the costs of producing new geographic information may destabilize existing relationships and threaten other forms of collaboration. The contentions in Dane County are different from San Diego County because Wisconsin is one of the few states in the United States that has a funded County level position in each county whose sole purpose is the integration of land information in that county. The struggle in Dane County, emanating from the person in this position seeking to establish funding for a data collection project, illustrates the limitations of NSDI concepts and problems facing local administrative autonomy.

The image is a screenshot of the 'AccessDane' website. At the top, the logo reads 'AccessDane' in blue and red, with 'geographic and land information' below it. A dark blue navigation bar contains a 'Welcome' button and links for 'Public Access', 'Public Agency Access', and 'Subscription Access'. Below this, a date stamp shows 'Wednesday, March 23, 2005'. A central message reads: 'Welcome to Dane County's access point for geographic and land information! This site provides data and services to Dane County citizens, government and public agencies, and business professionals.' Below this is a section titled 'Enter a Portal below...' with three circular buttons: 'Public Access', 'Public Agency Access', and 'Subscription Access'. At the bottom, a footer bar contains links for 'Dane County Home', 'LIO Home', 'AccessDane Home', 'Privacy Statement', 'Disclaimer', and 'Contact Us'. Below the footer, copyright information is provided: 'Copyright 2001 Dane County Land Information Office, 210 Martin Luther King Jr. Blvd, City-County Bldg, Room 520, Madison, WI 53703, Email - accessdane@co.dane.wi.us'.

Figure 5 Three types of access to Dane County's geographic information (<http://accessdane.co.dane.wi.us/>)

The Wisconsin version of the NSDI strategy centers on county land information offices in each of the 72 counties. Each office has statutory responsibility for coordinating geographic information activities in that county and receives funds through a surcharge placed on property transfers. Each county has a Land Information Officer (LIO) and Land Records Modernization Plan (Tulloch and Niemann, 1996). In rural Wisconsin, the Land Information Officer readily integrates into an underfunded, overworked county administration. Tensions with other administrative agencies arise, but can be mostly dealt with informally. The case is quite different in the main urbanized areas of the state. The City of Milwaukee has had long and tenuous relationships with surrounding counties in the state's largest metropolitan area. Dane County, the location of the state capital, Madison, has also experienced many tenuous administrative relationships with local and regional governments.

In Dane County many administrative agencies clash as the suburban population grows and expands into farmland. Since large areas of Dane County are still farmland, strong agriculture interests clash with urban and suburban interests regularly. The state and federal governments have local administrative offices who carry out state and federal laws and regulations including soil conservation, natural resource protection, farmland preservation, etc. These laws and programs often follow existing administrative boundaries, but often follow boundaries defined solely for the purpose. The boundaries of a watershed will always coincide with a hill ridge, which may, or may not, also coincide with an administrative boundary. In either case, administrative boundaries serve as important boundary objects for administrative interactions.

The county land information officer plays a key role in boundary object maintenance. S/he coordinates county data and partners with many state agencies (Tulloch et al., 1997). However, in the devolved organization of US governance, the cities and federal agencies are independent. Coordination with municipal and federal administrations is established through negotiations. In this rapidly growing area, coordination between bureaucratic administrative agencies becomes more difficult with increasing conflicts between administrative agendas. Farmland preservation, the responsibility of federally and state funded agencies, often conflicts with economic development. Administrative boundaries between a soil protection district and municipalities can become key boundary objects in farmland preservation. Overlaps between administrative boundaries lead to struggles to establish boundary objects that are valid for different administrations. The development of unique locally situated GIS-based technologies becomes a key component of strategies to find ways to cooperate and introduce changes to government agencies.

In this environment, relationships between administrations are already tense and the county land information officer already has her/his hands full balancing

competing interests and activities. Boundary objects are fought over as different administrations seek to fulfill their mandates and establish their power. Perhaps seeking a pragmatic way to collect aerial photographs of the county for clarifying these disputes led the county land information officer to develop a partnership with a limited number of municipalities to collect aerial photographs and photogrammetric data for the county. However, the aerial photographs were made available only to those municipalities and the county. If other agencies or municipalities wanted aerial photographs, they had to purchase a license. This condition was necessary because the county's 'partners' on this project wanted to assure that costs were shared among all users and that other agencies could not free-load.

An attempt to re-stabilize the new meaning of administrative boundaries resulting from this project was accompanied by new tensions and exacerbated prior disputes. The reactions, however, were both positive and negative. Some interviewed administrative staff justified the exclusionary licensing arrangement as necessary to assure that the data were collected by the agencies needing the data in a timely fashion. The complexity of negotiating a cost-sharing arrangement with all administrative agencies in the county was seen to be overwhelming. Other staff accused the county and 'partners' of creating geographic information 'haves' and 'have-nots' and destroying the principle of equitable opportunities for all parts of the county. Regardless of position, administrative staff agreed that the result reduced the willingness to share data. Administrative boundaries took on additional meanings that delineated different access to aerial photos and data. The new meanings also reflected new tensions on inter-administration interactions.

Administrative boundaries had taken on new meanings as a result. The county and 'partners' may have acquired the data they sought, but by limiting participation to those administrations with available financial means contributed to dividing municipalities and creating an environment where concepts of the NSDI became harder to realize. Whereas in San Diego County the obstacle of a newly created administrative agency was countered by a more pluralistic-orientated administrative agency that helped municipalities develop alternatives, in Dane County the struggle for data had led to the undermining of administrative relationships and the stabilization of administrative boundaries as boundary objects that divide.

Conclusion

GIS-based technologies play a key role in changing administrative geographies through processes of destabilizing certain meanings arising in governance activities and re-stabilizing meanings in a new configurations. Administrative boundaries rarely change; their meanings change frequently as

administrations adopt neo-liberal regulatory regimes (evident in both San Diego and Dane Counties). The administrative boundaries continue to play crucial roles as both obstacles and relationships. As boundary objects they continue to connect and differentiate, creating opportunities and frictions for neo-liberal strategies relying on the use of information technologies to alter activities of governance and bring them closer to a Foucauldian regulatory framework.

In San Diego County obstacles in administrative relationships resulting from restrictive access to geographic information were overcome by developing other types of geographic information and help craft new relationships. In Dane County, relationships between administrations were turned into obstacles by selectively developing geographic information technology that excluded some administrations. In both cases, administrative boundaries take on multiple meanings as boundary objects for administrative relationships.

Boundary objects aid the comprehension of these relationships. Administrative boundaries take on dual characteristics as both obstacles and relationships with impacts on activities within the bounded territory, activities that cross the boundaries. The research presented here points out that the introduction of GI technologies is part of neo-liberal attempts to reorganize local administrative functions. Administrative information technologies are boundary objects that impact administrative functional divisions, administrative politics. These boundary objects also link intra-administrative, inter-administrative, local, regional, national, and global interactions. How changes occur is contentious, political, and fraught with tension, as actors alter rhizomatic relationships to support the desired outcomes. Other components of these changes (standards, policies, regulations, mandates, etc) still require analysis.

Further, the political dimensions of this research remain can be extended to come to a better understanding of internal governmental resistance to neo-liberal governance. The boundary object characteristics of administrative boundaries aid in analyzing the political strength of technical objects. Diane Vaughan (Vaughan, 1999) shows that organization and administration are often the invisible work *inside* the reflexive production of sciences and technologies that interactionist studies can ably reveal. As Madeleine Akrich writes, "They [technical objects] may change social relations, but they also stabilize, naturalize, depoliticize, and translate these into other media. After the event, the processes involved in building up technical objects are concealed. The causal links they established are naturalized. There was, or so it seems, never any possibility that it could have been otherwise" (Akrich, 1992, p. 222). Although the politics of reconfiguring administrative boundaries needs more study, this research suggests that interactions and corresponding meanings are stabilized in objects beyond the pale of sociology's emphasis on social relationships. Technical objects, in the particular multi-dimensional analysis of boundary objects constrain our activities and reinforce distinct politics. Again, as Madeleine Akrich remarks, "It is in this sense, and only

in this sense, that technical objects build our history for us and "impose" certain frameworks" (ibid.).

In closing, it follows that the possible broader relevance of this work lies in its contribution to understanding the neo-liberal reorganization of governance in the US and other countries (for example the European Union's new member states) that have embraced neo-liberal regulatory regimes (Böröcz and Kovács, 2001). Administrative boundaries are boundary objects that become crucial elements in the ongoing neo-liberally orientated process of redefining American government. The current dominant role of neo-liberal philosophies are part of fundamental debates in the U.S. about decentralization and federalism. The ability to use information technology to distribute ("out-source") functions and services to local levels of administration while enforcing conformity with national-level policies through standards and regulations substantially alters the administrative hierarchy and erodes local control as infrastructures and standards become more critical in this new model of governance. Critical cartographies have still many opportunities to contribute to understanding the Foucauldian regimes of local administrations in the US and elsewhere. The local struggles resulting from the introduction of technologies point to the contentions surrounding the ongoing reconfiguration of administrative geographies in the United States.

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References

- Akrich, Madeline. 1992. The de-scription of technical objects. In, *Shaping Technology/Building Society*, edited by W. Bijker and J. Law. Cambridge, MA: The MIT Press.
- Barry, Andrew, Thomas Osbourne, and Nikolas Rose (eds.) 1996. *Foucault and Political Reason. Liberalism, neo-liberalism and rationalities of government*. Chicago: The University of Chicago Press.

- Blumer, Herbert. 1969. *Symbolic Interactionism*. Englewood Cliffs, NJ: Prentice-Hall.
- Böröcz, József, and Melinda Kovács. 2001. *Empire's New Clothes: Unveiling EU-Enlargement*. Holly Cottage, UK: Central Europe Review.
- Callon, Michel, John. Law and Arie. Rip (eds.) 1986. *Mapping the Dynamics of Science and Technology. Sociology of Science in the Real World*. London: MacMillan.
- Castells, Manuel. 1985. *High technology, space, and society*. Beverly Hills, Calif.: Sage Publications.
- Castells, Manuel. 2000. *The rise of the network society*. 2nd ed. Oxford; Malden, MA: Blackwell.
- Clarke, Adele. 1990. A social worlds research adventure. The case of reproductive science. In, S. E. Cozzens and T. F. Gieryn (eds), *Theories of Science in Society*. Bloomington: Indiana University Press.
- Clarke, Adele E., and Susan Leigh Star. 2003. Symbolic interactionist science, technology, information and biomedicine studies. In, L. Reynolds and N. Herman-Kinney (eds.), *Handbook of Symbolic Interactionism*. Walnut Creek, CA: Alta Mira Press.
- de Tocqueville, Alexis. 1988. *Democracy in America*. Edited by J. P. Mayer. New York: HarperPerennial.
- Foucault, Michel. 1991. Governmentality. In, G. Burchell, C. Gordon and P. Miller (eds.), *The Foucault Effect: Studies in Governmentality*. Chicago: University of Chicago Press.
- Garrety, Karin. 1997. Social worlds, actor-networks and controversy. *Social Studies of Science* 27 (5):727-773.
- Giddens, Anthony. 1998. *The Third Way. A Revival of Social Democracy*. Malden, MA: Polity Press.
- Glaser, Barney G., and Anselm L. Strauss. 1967. *The Discovery of Grounded Theory*. Chicago: Aldine Publishing Co.
- Graham, Stephen, and Simon Marvin. 2001. *Splintering urbanism: networked infrastructures, technological mobilities, and the urban condition*. London; New York: Routledge.

- Graham, Stephen, and Simon Marvin. 2001. *Splintering Urbanism. Networked infrastructures, technological mobilities, and the urban condition*. Londong: Routledge.
- Habermas, Jürgen. 1984. *Theory of Communicative Action*. Translated by T. McCarthy. Vol. 1. London: Heinemann.
- Harvey, David. 1989. *The Condition of Postmodernity*. Cambridge: Blackwell Publishers.
- Harvey, Francis. 2002. *Potentials and Pitfalls for Vertical Integration for the NSDI. Final Report of a Survey of Local Government Perspectives* [pdf]. Harvey, Francis, Sep 2000 2000 [cited July 2002 2002]. Available from <http://www.tc.umn.edu/~harve024/research/fw-comp.PDF>.
- Harvey, Francis, and David Tulloch. 2003. Building the NSDI at the Base: Establishing Best Sharing and Coordination Practices among Local Governments. Minneapolis, MN and New Brunswick, NJ: University of Minnesota.
- Judd, Dennis R. 1979. *The Politics of American Cities. Private Power and Public Policy*. Boston, MA: Little, Brown and Company.
- Latour, Bruno, and Steve Woolgar. 1979. *Laboratory Life: The Social Construction of Scientific Facts*. Beverly Hills: Sage.
- Latour, Bruno. 1988. *The Pasteurization of France*. Translated by A. Sheridan and J. Law. Cambridge, MA: The Harvard University Press.
- Latour, Bruno. 1993. *We Have Never Been Modern*. Translated by C. Porter. Cambridge: Harvard University Press.
- Latour, Bruno. 1999. Give me a laboratory and I will raise the World. In *The Science Studies Reader*, edited by M. Biagioli. New York: Routledge.
- Law, John (ed.). 1991. *A Sociology of Monsters: Essays on Power, Technology and Domination*. In, J. Eggleston, R. Frankenberg and G. Fyfe (eds), *Sociological Review Monograph*. London: Routledge.
- Law, John, and John Hassard (eds.) 1999. *Actor Network Theory and After*. Oxford: Blackwell Publishers/The Sociological Review.
- Massey, Doreen. 1994. *Space, Place, and Gender*. Minneapolis: University of Minnesota Press.

- Mitchell, Timothy. 2002. *Rule of Experts. Egypt, Techno-Politics, Modernity*. Berkeley: University of California Press.
- Monmonier, Mark. 1995. *Drawing the Line: Tales of Maps and Cartocontroversy*. New York: Henry Holt.
- Post, Stephanie Shirley. 2002. Local government cooperation: The relationship between metropolitan area government geography and service provision. Paper read at Annual Meetings of the American Political Science Association, 29Aug - 1Sep 2002, at Boston, MA.
- Reynolds, Larry, and Nancy Herman-Kinney (eds.). 2003. *Handbook of Symbolic Interactionism*. London: Altamira Press.
- SANDAG. 2002. Fact Sheet: The forum for regional decision making. San Diego: SANDAG.
- Scott, James C. 1998. *Seeing Like A State*. New Haven, CT: Yale University Press.
- Star, Susan L., and James R. Griesemer. 1989. Institutional ecology, "translations," and boundary objects: Amateurs and professionals in Berkeley's museum of vertebrate zoology. *Social Studies of Science* 19:387-420.
- Strauss, Anselm. 1990. *Basics of qualitative research: grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications.
- Strauss, Anselm. 1993. *Continual Permutation of Action*. New York: Aldine de Gruyter.
- Thompson, Morris. 1987. *Maps for America*. Washington DC: US Department of the Interior, Geological Survey.
- Thrower, Norman J. W. 1966. *Original Survey and Land Subdivision*. Chicago: Rand McNally.
- Tomlinson, Roger F. 1968. A Geographic Information System for Regional Planning. In, G. A. Stewart (ed.) *Symposium on Land Evaluation, Commonwealth Scientific and Industrial Research Organization*. Melbourne: MacMillan of Australia.
- Tulloch, David L., Daniel Barnes, David Bartholomew, David Danielson, and Nancy von Meyer. 1997. The Wisconsin Land Information Program: Supporting Community Land Information System Development. *Surveying and Land Information Systems* 57 (4):241-248.
- Tulloch, David L., and Ben J. Niemann. 1996. Evaluating Innovation: The

Wisconsin Land Information Program. *Geo Info Systems* 6 (10):40-44.

Vaughan, Diane. 1999. The role of the organization in the production of technoscientific knowledge. *Social Studies of Science* 29 (6):913-943.

Wheeler, James O., Yuko Aoyama, and Barney Warf. 2000. *Cities in the telecommunications age: the fracturing of geographies*. New York: Routledge.