# The United States Mortgage Crisis and Cadastral Data

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**Key words**: Cadastre, Parcels, Mortgage Crisis

## SUMMARY

The symptoms of the recent mortgage crisis can be seen in distressed mortgages, foreclosures, and decreasing real estate values across America. These conditions have also impacted financial markets around the world. Many believe that if the United States had maintained a national multipurpose cadastral layer, it would have been in a better position to respond to this crisis. In fact, the call for a Federal approach to a land record system was made in the 1980, the National Research Council report titled "Need for a Multipurpose Cadastre. The case has been made that if such an approach had been implemented, information about local land parcels, in combination with timely and standardized mortgage data, could have served as an early warning system for decision makers to address the situation. This paper reviews several aspects of the management of parcel data in the United States and identifies several factors relating to the mortgage situation that may provide the impetus for the Federal government to take an active role in the use and support of parcel data. The 2007 National Research Council report, "National Land Parcel Data: A Vision for the Future," is serving as a blueprint for how the Federal government could harness existing technology to collect, monitor, analyze, report, and map critical data for 150 million land parcels across the country. The recommendations of the report have received widespread endorsement and the Federal Geographic Data Committee has highlighted the need for the Federal government to place a high priority on adopting the recommendations. At the same time there are serious efforts underway to incorporate parcel data into the systems that monitor mortgage and banking transactions. Furthermore the Bureau of Land Management is working closely with local and state governments to improve the survey data required to improve the representation of parcels and the Department of Housing and Urban Development is taking measures to obtain county parcel data to assist with the distribution of almost $6 billion in funds to assist neighborhood stabilization programs. The combination of forces resulting from the problems in the mortgage markets may provide the catalyst for change.

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## 1. INTRODUCTION

Over the past couple of years the United States has come under considerable criticism for its role in the collapse of real estate markets and related financial systems. Some of this criticism has been linked to the absence of Federal oversight of land record systems. The purpose of this paper is to provide a context for understanding the legal and institutional arrangements relating to a national approach to land parcels in the United States and to provide a glimpse into the current situation that suggests that the mortgage crisis may serve as the necessary impetus for a major change in the US policy regarding parcel data management. This sense of optimism is reinforced by the following statements by major representatives of the Federal Government.

Michael Howell, Deputy Administrator of the Office of Management and Budget (OMB) and Co-Chair of the Federal Geographic Data Committee (FGDC) Steering Committee, stated during his welcoming statement at the Mortgage Crisis Stakeholders Meeting in May:

"This meeting is very timely, we are working across governments and with multiple stakeholders to develop effective responses to deal with the distressed housing and mortgage markets. We need to be open to innovative and creative ways to address this complex set of problems and take advantage of new tools and capabilities to develop effective responses. Parcel data is an excellent case in point. I think you will see from some of the examples today the powerful capabilities that land parcel data can provide when combined with other data sets and analytical tools and technology" (FGDC Cadastral Subcommittee, 2009)

Karen Siderelis, chair of the FGDC stated in the introduction to the 2009 Annual Report:

"Land parcel data combined with other geographic information are essential to such functions as the management of emergency situations, development of domestic energy resources, management of private and public lands, support of business activities, and monitoring of regulatory compliance. The feature story of this year's report underscores the need for a coordinated system of land parcel information across the country." (FGDC, 2009)

## 2. LAND RECORDS AND THE MORTGAGE CRISIS

There is widespread agreement that the collapse of the real estate markets and associated problems with mortgages and derivative products precipitated major downturns in financial markets in the United States and around the world. The real estate market went through a period of readjustment that saw property values decline leaving individuals with mortgages that exceeded the current market value of their house. These rates for "underwater" property

may be as high as 24% in some parts of the country (Wall Street Journal, 2009). Concurrently, many individuals who had entered into adjustable rate mortgages found themselves with monthly payments they could no longer afford. Of course, this was exacerbated by huge jumps in unemployment. The culmination of the events led to a wrath of foreclosure signs to spring up across the county. While the nation wide foreclosure rate is .24% one in every 93 homes in Nevada is in foreclosure status (Realtytrac, 2010).

During the rise of the housing bubble early in the last decade derivative products based on mortgages became a favorite of Wall Street bankers and were sold around the world. As property values declined and foreclosures exploded the declining value of the mortgage based derivative products had major ramifications on both domestic and international financial institutions. Since these economic problems are directly associated with real estate markets there has been criticism of the way parcel and cadastre data have been managed in the United States. Probably the most direct and damning accusations have been leveled by Roberge and Kjellson in their paper "What Have Americans Paid (and Maybe the Rest of the World) for Not Having a Public Property Rights Infrastructure?" As the authors state:

"In effect, we believe that a good property rights infrastructure could have mitigated the effect of the land market crisis and thereby avoided the loss of many hundreds or even thousands of billion dollars. This paper indicates that the lack of a sound property rights infrastructure in the USA has contributed to the collapse of its land market. Of course, this is not the only cause of the mortgage crisis. The negligence of the government to control the banking system and the fact that banks have been too loose in their loan controls is obvious. But in crisis times, good, reliable, and accessible information available on time is of critical importance. When this information is missing or hard to obtain without any guarantee of reliability the crisis will become like a storm in the warm waters and it becomes a hurricane. And this is what happened last year in the USA." (Roberge and Kjellson, 2009)

While the criticism from the international community may focus attention on the way land records are managed in the United States there have also been strong and ongoing calls for change from within the country. For example, thirty years ago the National Research Council in the landmark study The Need for a Multipurpose Cadastre noted that:

"There is a critical need for a better land-information system in the United States to improve land-conveyance procedures, furnish a basis for equitable taxation, and provide much-need information for resource management and environmental planning."

Even then several local governments were maintaining digital parcel data systems. In fact, the NRC report optimistically stated:

"Current technology is adequate in most cases for the surveying, mapping, data collecting, filing and dissemination of information. … Advancement in computer applications, communication networks and copying processes promise of more-efficient use of the

multipurpose cadastre. …The major obstacles in the development of a multipurpose cadastre are the organizational and institutional requirements." (National Research Council, 1980)
A fresh look by the National Research Council at the need for a national approach to land parcel data culminated in the publication of the 2007 report *Land Parcel Data: A Vision for the Future* (National Research Council, 2007). This report contains a detailed analysis of the current situation in the United States and offered nine specific recommendations about how to change the system. Since its publication this report has gained considerable attention and widespread endorsement. In effect, it has provided the context and blueprint for change.

## 3. PARCEL DATA IN THE UNITED STATES

### 3.1 Overview

The management of land records represents a particularly challenging environment for the U.S. Federal government. All matters relating to the use, value, ownership and taxation of private property are controlled by over 4000 county or equivalent autonomous governments. In fact, in many urban areas several versions of the same parcels are maintained by city and county governments, as well as, the private sector title companies. Since the Federal government is not directly involved in the production or maintenance of these parcels it does not automatically have access to them and there is no specific mandate for local governments to share their data. As a result there is often little or no standardization of these parcels even within individual states. While many counties freely share their data other consider their parcel data to be a valuable asset that is a source of revenue to support their programs.

The FGDC Cadastral subcommittee estimates that about 82% of the approximately 150 million private parcels are in digital formats (FGDC Cadastral Subcommitee, 2009). Most of the standardization and consolidation of these parcels is done by firms in the private sector who have seized on a value of parcel data for a wide number of applications relating to real estate. For example, at least one firm states that it has at least parcel point coverage for 122 million parcels (First American, 2010). Other firms build applications on these parcel bases to support real estate sales or to track foreclosures. For example one widely used system provides an estimate of the current value of more than 93 million properties. There are also some very creative parcel based initiatives, such as the New York Times Web based foreclosure map built on a parcel level of data across the three state New York Metropolitan area (New York Times, 2009).

It is also interesting to observe that Google Map has started to include parcel boundaries for many parts of the country. Although Google is not currently using the parcels as the major source for its geocoding engine as it does in Australia it is drawing a great deal of attention. For example, a recent blog noted:

"all I have to say is the powers that be in the federal government are missing an opportunity if they don't wake up and take this as a signal that a national cadastre is what is needed. It ought to be under some sort of federal control and guideline. And they just got side-swiped by this by what Google is doing." (Francica, 2009)

Within the public sector there are several states that are actively coordinating and standardizing parcel data for counties within their borders. There is also an active program within the National States Geographic Information Council (NSGIC) to develop state coordinating offices that would work directly with the Federal Geographic Data Committee under the Fifty States Initiative (NSGIC, 2005).

### 3.2 Federal Government Organizational Issues

Coordination of geographic information at the Federal level in the United States is based on a stewardship model under the oversight of the Federal Geographic Data Committee (FGDC). The FGDC was established in 1994 under an Executive Order 12906 from President Clinton (Office of the President, 2004). Stewardship responsibilities are delegated under the Office of Management and Budget (OMB) which is part of the Executive (Presidential) branch. Cadastral data is designated as one of eight framework layers.

### 3.3 Bureau of Land Management (BLM)

Under OMB circular A-16 (OMB, 200) the Bureau of Land Management (BLM) is the designated steward for Cadastral data. According to this circular cadastral data describe "the geographic extent of past, current, and future right, title, and interest in real property, and the framework to support the description of that geographic extent" The BLM has chaired an active working group for the management of cadastral data. The Cadastral Subcommittee includes widespread participation from many stakeholders and has provided a number of important services. These include providing guidance for the development of a data content standard, conducting inventories of existing parcels, developing best practice studies and business plans. The BLM has been actively providing the framework for improving the accuracy of parcel geometry across the nation. For example, it maintains the Geographic Coordinate Data Base (GCDB) which is a collection of geographic information representing the Public Land Survey System (PLSS) and some Non-PLSS surveys. Under A-16 BLM is also the designated steward for Federal Land Ownership Status. Therefore, BLM has the responsibility for "Federal land ownership status includes the establishment and maintenance of a system for the storage and dissemination of information describing all title, estate or interest of the federal government in a parcel of real and mineral property" (OMB, 2002). This means that BLM is responsible for oversight of 258 million acres of surface lands and 700 million acres of mineral estate.

### 3.4 Department of Housing and Urban Development (HUD)

The FGDC structure differentiates between cadastral and housing information. Under the FGDC organizational structure Housing and Urban Development (HUD) is steward for housing.

"HUD's database maintains geographic data on homeownership rates, including many attributes such as HUD revitalization zones, location of various forms of housing assistance, first-time home buyers, underserved areas, and race" (OMB, 2002)

Unlike cadastral data, housing is not considered to be a framework layer and there has been little effort to develop a functioning working group or data content standard. HUD staff does participate on the cadastral subcommittee although several representatives attended the May mortgage stakeholders meeting. Even before the current mortgage crisis HUD operated numerous grant programs for housing development and compliance issues that relate to specific land parcels, their owners, and housing. In fact the National Research Council in its report *GIS for Housing and Urban Development* proposed that HUD create an urban spatial data infrastructure that includes parcel-level data. This parcel based Urban SDI would require the participation of local government, finance agencies including Fannie Mae and Freddie Mac, realtors, and market researchers. (National Research Council, 2003)

## 4. MORTGAGE AND HOUSING ISSUES

As the previous discussion suggests there has been considerable debate about the proper role of the Federal Government in the management of parcel and housing data. While agencies such as the Department of Homeland Security (DHS) have recognized the need for parcel level data during all stages of disaster recovery (See *Successful Response Starts With a Map,* National Research Council, 2005) those parts of the Federal government charged with financial oversight have not appreciated the need for detailed geographic analysis. The recent economic meltdown has changed that. In fact, the crisis may provide the impetus for change.

### 4.1 Context

The US government has been actively involved in supporting home ownership at least since the days of the great depression. The efforts over the last two years to initiate new programs to stem the foreclosure crisis have shed light on public policy and existing programs to intercede in the housing market. Some observers suggest that the predatory lending practices that led to many of the recent problems are the direct result of efforts to promote redevelopment of distressed areas under the Community Reinvestment Act (CRA) of 1977 which was "intended to encourage depository institutions to help meet the credit needs of the communities in which they operate, including low- and moderate-income neighborhoods, consistent with safe and sound banking operations." (FFIEC, 2010)

While the CRA was designed to counter discriminatory lending practices, it may have had an unintended role in creating the instability in the mortgage markets. It is likely that federal programs may have encouraged private home ownership among some individuals who were unable to meet their obligations and did not understand adjustable rate mortgages. As one observer noted

"After decades of redlining practices that starved many urban communities for credit and denied loans to racial minorities, today a growing number of financial institutions are flooding these same markets with exploitative loan products that drain residents of their wealth." (Squires, 2005)

The relevant question is whether the Federal government was in a position to monitor the situation? According to a 2000 report *Curbing Predatory Home Mortgage Lending* published by the National Task Force on Predatory Lending in there was a clear indication of existing problems. The task force co-chaired by the Secretary of Housing and Urban Development, noted that:

"FHA (Federal Housing Administration) will customize data from its Neighborhood Watch system to develop early warning indicators of emerging foreclosure "Hot Zones." …help local officials better assess real estate trends and spot possible patterns of appraisal abuse. . This public information will include performance data on individual appraisers generated by the Credit Watch for Appraisers system and posted on the HUD website." (National Task Force on Predatory Lending, 2000)

### 4.2 Home Mortgage Disclosure Act (HMDA)

While the CRA was a direct effort to encourage reinvestment the Home Mortgage Disclosure Act (HMDA) established the mechanism to monitor lending practices and explicitly track"Red lining" practices. Under this act mortgage lenders must report the outcome of every mortgage application in urban areas. An extensive record keeping and reporting system has been established to support the program. Through a web based interface it is possible to download extensive information about individual mortgage applications for census tracts on an annual basis. HMDA reporting is controlled by the Federal Reserve and represents a major oversight of home mortgage activity by the Federal Government. However, as the real estate bubble began to deflate the HMDA data was not able to provide information about current conditions at the appropriate level of geographic detail.

The issue of appropriate geographic resolution is directly related to the need for a national parcel data effort. It is interesting to note that Ben Bernanke, the Chair of the Board of Governors of the Federal Reserve System who is an authority on housing issues has explicitly recognized that the concentration of foreclosures can have detrimental impacts on a neighborhood.

In May 2008 when he specifically addressed mortgage delinquencies and foreclosures he called for direct involvement by the Federal Government to address the issues.

"Moreover, it is important to recognize that the costs of foreclosure may extend well beyond those borne directly by the borrower and the lender. Clusters of foreclosures can destabilize communities, reduce the property values of nearby homes, and lower municipal tax revenues. At both the local and national levels, foreclosures add to the stock of homes for sale,

increasing downward pressure on home prices in general. In the current environment, more-rapid declines in house prices may have an adverse impact on the broader economy and, through their effects on the valuation of mortgage-related assets, on the stability of the financial system. Thus, finding ways to avoid preventable foreclosures is a legitimate and important concern of public policy." (Bernanke, May, 2008)

As he stated in a Decemer 2008 speech

"Foreclosures impose large costs on families who face the loss of their homes and reduced future access to credit. But the public policy case for reducing preventable foreclosures does not rely solely on the desire to help people who are in trouble. Foreclosures create substantial social costs. Communities suffer when foreclosures are clustered, adding further to the downward pressure on property values. Lower property values in turn translate to lower tax revenues for local governments, and increases in the number of vacant homes can foster vandalism and crime." (Bernanke, December, 2008)

It is also valuable to understand Chairman Bernanke's acknowledgement that location of foreclosures can infect a neighborhood just like the spread of diseases. During the December 2008 speech He cited an interesting report by three economists *The Contagion Effect of Foreclosed Properties* (Harding et al, 2008) This research examined a sample of approximately 600,000 repeat sales transactions that were divided into four rings at 300, 500, 1000 and 2000 feet from each house. The authors claimed that "Properties that were in foreclosure but were located more than 2000 feet (approximately three city blocks) from the repeat sales property were not considered to be "nearby" and are assumed to have negligible impact on the subject property." Therefore they explicitly state that the relevant geographic distance to study the impact of foreclosures is less than 2000 feet. It is important to put this range into perspective with respect to the size of Census Tracts used in HMDA reporting. The average census tract is 54.4 square miles and a 2000 foot radius is .455 square miles. In other words, the average Census Tract is more than 100 times the size of the largest appropriate level of detail to analyze the impact of neighboring foreclosures on an individual property. The results of the analysis clearly reveal the contagious impact of foreclosed property on property values. They conclude that, "The discount is roughly one percent per nearby foreclosed property and appears to be roughly proportional to the number of nearby distressed properties. The discount diminishes rapidly as the distance to the distressed properties increases." For example, if there are 4.5 foreclosed properties within 300 feet of ones house the market value is reduced by approximately 7%. The graphs portray a distinct distance decay function in the relationship between distance and number of foreclosed properties and impact on property values. The clear conclusion is that HMDA reporting is not appropriate to monitor this contagious process either from a temporal or spatial requirements. By inference there is a strong case for using parcel level analysis at the national level.

The public statements by the previous HUD director and the current Chairman of the Federal Reserve have been used to create a dialog between the FGDC and these organizations.

## 5. CATALYSTS FOR CHANGE

As noted in the introduction there are several signs of encouragement regarding a change in US policy regarding Federal Government involvement in land records. While the seeds for these changes have been sown over the past three decades, the reaction to mortgage crisis may provided the impetus for them to sprout. The following is a list of significant activities that demonstrate that movement is underway.

### 5.1 Endorsement of NRC Recommendations

The recently created National Geospatial Advisory Committee and National States Geographic Information Council have unanimously endorsed the nine recommendations from the 2007 National Research Council Land Parcel Data: A Vision for the Future. These recommendations include:

-The Federal Government should establish the positions of Federal land parcel coordinator and national land parcel coordinator to develop a single land parcel database for all federally managed lands, as well as develop a land parcel business plan and a funding plan.

-Every State should establish the position of cadastral/parcel coordinator and develop a business plan for border-to-border parcel coverage within each State.

-The FGDC should identify the role of parcel data with respect to public buildings and facilities, cultural resources, governmental units, and housing.

-The Department of the Interior should establish an Indian lands parcel coordinator who would coordinate and develop a program for Indian trust parcels.

-To be eligible to participate in Federal geospatial programs, State and local governments should be required to make a minimal set of land parcel attributes as defined by the Cadastral Subcommittee (which are needed for a national land parcel database) available in the public domain.

-Congress and the U.S Census Bureau should explore options for placing addresses and their coordinates in the public domain while protecting privacy.

### 5.2 Requests by BLM

The BLM has submitted requests to establish positions for both Federal and national land parcel coordinators as recommended by the National Research Council. (Figures 1 and 2))

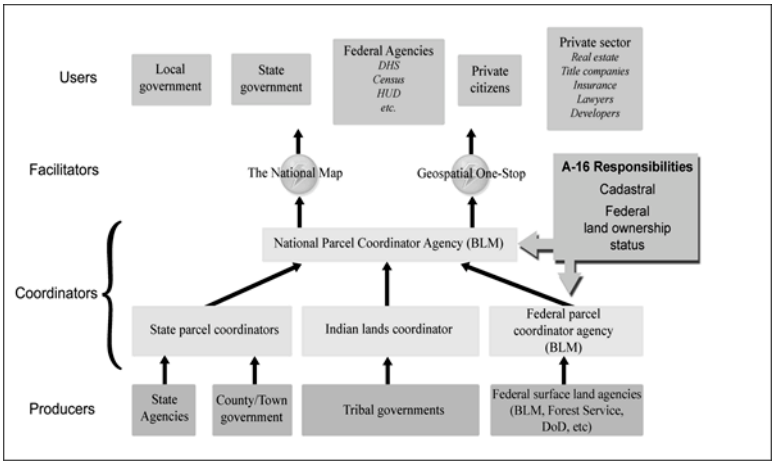

Figure 1. The current organization for parcel mangement. (NRC,2007)

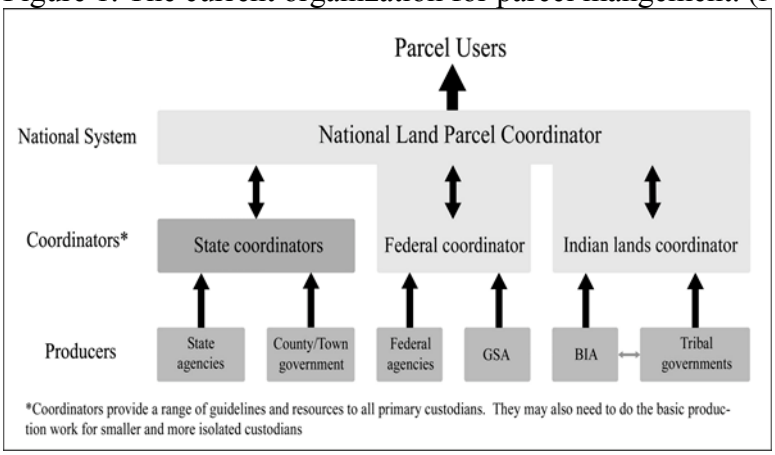

Figure 2. The proposed structure for parcel management (NRC, 2007)

### 5.3 Mortgage Crisis Stakeholder Meeting May 2009

The FGDC commissioned a study by its Cadastral Subcommittee of the importance of parcel level information to monitor the mortgage activity. As part of this study a stakeholders meeting was held in Washington in May. There were over fifty participants at the meeting representing federal agencies, state and local governments, non-governmental organizations and the private sector. (FGDC Cadastral Subcommittee, 2009)

#### 5.3.1 Findings

Some of the findings: were

-Local government parcel level information is essential to the monitoring of the distressed housing market.

-Many private firms are actively creating, assembling and standardizing parcel data for a wide range of customers including the Federal Government.

-Currency requirements for monitoring the distressed housing market for transactional data (mortgages and sales) are at least quarterly, with monthly availability preferable.

### 5.3.2 Recommendations

The specific recommendations coming from the meeting were

-Add the local Parcel ID to the HMDA data.

-Develop a Parcel Early Warning System.

-Complete the standardization and availability of parcel data nationwide.

### 5.3.3 Next steps

The report also recommended the establishment of a National Coordination Work Group that would consist of the FGDC Cadastral Subcommittee, International Association of Assessing Officers (IAAO), HUD, Department of Homeland Security and the Census Bureau. Suggested objectives of the work group would be to continue the effort that began at the meeting.

## 5.4 FGDC Annual Report Places Priority on Land Parcels

The FGDC published its annual report with a theme of "The U.S. Mortgage Crisis and Land Parcel Data" and explicitly stated that National Land Parcel Data is a Priority for the upcoming year. The annual report highlighted the excellent work of the Cadastral Subcommittee in conducting the research on the mortgage crisis, providing updates to the existing national inventory of cadastral data, providing updated parcel data to the wild land fire community, and working to establish sustainable standardized parcel datasets at the State level. Working with the BLM the subcommittee also participated in the development of standardized Public Land Survey System (PLSS), FGDC cadastral data content standards and publication guidelines.

## 5.5 Discussion with Federal Reserve

There have been serious discussions with the Federal Reserve about including the Parcel identification (PIN) as part of HMDA reporting. These efforts have been coordinated by the Cadastral Subcommittee and The Management Association for Private Photogrammetric Surveyors (MAPPS). Federal Reserve staff are analyzing the feasibility of implementing such a change and the appropriate legal mechanism.

## 5.6 House of Representatives Banking Regulations

The House of Representatives has been working to incorporate parcel level information into new banking regulations. This includes a September 17 hearing of the Oversight and Investigations Subcommittee of the House Committee on Financial Services. The hearing which included testimony from MAPPS focused on the importance on parcel level data to monitor banking Troubled Asset Relief Program (TARP). Input from the hearing was used during the debate over The U.S. House of Representatives bill H.R. 1242 that passed on December 2 by a vote of 421-0. The bill amends the Emergency Economic Stabilization Act of 2008 by providing for additional monitoring and accountability of TARP. It calls for the Secretary of the Treasury to ensure the official TARP accountability database "provides geospatial analysis capabilities."

### 5.7 Congressional Research Service Report on National Land Parcel Database

In July, 2009 the Congressional Research Service (CRS) of the Library of Congress published a report *Issues Regarding a National Land Parcel Database*. The report analyzed the legislative and regulatory approaches that could be used to establish a national land parcel data base. It also reviewed the NRC recommendations and the feedback from the The National Geospatial Advisory Committee (NGAC) about the need for a national approach. While not specifically endorsing the recommendations the CRS concluded that "A truly national land parcel cadastre would likely require strong partnerships between the federal government and state and local governments."

### 5.8 HUD Request for Quotation for County Data Records

Recent initiatives by HUD may be the most direct evidence that the mortgage crisis is impacting Federal government interests in parcel data. In December HUD issued a request for quotation (RFQ) for County Data Records Project (HUD, 2009). This RFQ is significant from several viewpoints. First, it acknowledges that the fact that the United States does not currently maintain a parcel data base. "Currently there is no national database maintaining these data for the federal government.." Second, it specifically acknowledges that parcel level data is important for monitoring the mortgage crisis. "Recent increases in foreclosures and devastating natural disasters have intensified the urgency for access to up-to-date information on homes and communities.". Third, it expresses intent to use locally maintained parcel data to support its programs. This includes the $5.92 billion under the Neighborhood Stabilization Program (NSP) that would create mechanisms for the purchase and redevelopment of foreclosed upon homes and residential properties, to purchase and rehabilitate homes and residential properties that have been abandoned or foreclosed upon, to establish land banks for home that have been foreclosed upon and to demolish blighted structures and redevelop demolished or vacant properties. Fourth HUD also acknowledges that it has an interest in becoming the long term steward of housing information based on parcel level data. "The data will initially be used to evaluate the impact of the Neighborhood Stabilization Program (NSP), but may be used on a long-term basis to analyze other HUD programs that alleviate foreclosures, stabilize communities and help in recovery efforts after natural disasters."

## 6. SUMMARY

There is substantial evidence that the major economic impact relating to the recent disruption of mortgage markets is prompting the Federal government to take serious steps toward a national approach to land records. Since there is little or no direct Federal government role in private cadastre records it will have to establish new policies and programs that will facilitate partnerships with the local governments that produce and maintain the necessary data. From a technical viewpoint there are many private sector activities that have demonstrated the business case for maintaining national parcel data. The National Research Council has developed a blueprint for creating such a system based on a distributed set of services that could link to the authoritative data maintained by appropriate local government entities and coordinated by the 50 states. The recommendations of the report have received wide spread endorsement. An analysis of existing Federal bank monitoring systems suggests that they were unable to identify the outbreak of the crisis or to adequately monitor its spread. Consequently, the Federal Reserve is reviewing its procedures to determine how it can improve the geographic and temporal resolution of the records to better monitor changes in the housing markets. Bills that will impact the nature of new banking regulations are recognizing the need for assets to be "geospatially enabled". At the same time The Bureau of Land Management is working directly with local governments to improve the survey/measurement based coordinates are used to represent parcels and to greatly improve the accurate boundaries of Federal Lands. There are also active programs beginning by the Department of Housing and Urban Development that will utilize local parcel data to assist with significant programs aimed to stabilize and revitalize neighborhoods. All of these activities suggest that change is in the air.

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## BIOGRAPHICAL NOTES

David J. Cowen is a Distinguished Professor Emeritus at the University of South Carolina. . He is currently a member of the National Geospatial Advisory Committee, a member of the NRC Board on Earth Sciences and Resources, and a National Associate of the National Academy of Sciences. Between 2000 and 2006 he chaired the Mapping Science Committee of the National Research Council and recently chaired the NRC Study Committee "Land Parcel Databases: A National Vision". He is the 2005 recipient of the ESRI Lifetime Achievement Award in GIS.

Donald A. Buhler is the Chief Cadastral Surveyor of Bureau of Land Management of the Department of Interior. The Cadastral Survey Program oversees the maintenance and propagation of the Public Land Survey System (PLSS), including all Federal interest lands and Native American lands. The rectangular grid system of the PLSS is used as a basis for legal and land descriptions for most of the United States and becomes part of the permanent land records of the United States. In addition, the Cadastral Survey Program is the main architect and builder of the geographic coordinate data base, a foundational data layer of geographic information systems in both the public and private sector. He is a Fellow of the American Congress of Surveying and Mapping, a member of the National Society of Professional Surveyors and a delegate for the United States delegation of the Fédération Internationale des Géomètres. He is Co-Chair of the Cadastral Subcommittee and a member of the Coordination Committee of the Federal Geographic Data Committee.

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