

National Land Parcel Data and Surveyors

Brent Jones

<http://www.spatialroundtable.com/post.cfm?entry=national-land-parcel-data-and-surveyors#logForm>

Will Surveyors Heed the Call?

I recently finished reading *National Land Parcel Data: A Vision for the Future*, and I think it serves as a call to action for all surveyors. The book articulates the demand for a good national parcel database, including some excellent policy discussion on how to get started and how to make progress. Every surveyor who plans to work for the next 10 years should read this book.

National Land Parcel Data: A Vision for the Future is a reminder that, with new technology, surveyors have the ability to manage parcels in a GIS using survey methodologies, such as least squares adjustments, maintaining record measurements, and tying to survey control. Those willing to integrate their survey knowledge and know-how with GIS will have the capability to enter the GIS market by helping to improve the accuracy of a parcel network, consequently improving all the data in GIS.

What I hear from a lot of surveyors is that they understand the value of a national parcel database but they don't necessarily see where they fit in with its development. I view this as a personal and professional challenge. For those of us surveyors who have integrated survey procedures and methodologies with GIS, we need to guide and convince our colleagues that adding these GIS services into their offerings is beneficial to both our profession and the GIS community. If surveyors don't step up to the plate and provide this, someone else will.

Are surveyors prepared to engage in the opportunities that a national parcel database presents?

John Matonich | President and CEO, ROWE Professional Services | February 22, 2010 at 2:59 PM

There have been a number of papers written extolling the virtues of a national parcel database, and it makes great sense from a number of perspectives. The troubling issue to me is the continued pushing aside of members of the surveying profession when the formulating discussions are taking place. The latest evidence of this is in the National Geospatial Advisory Committee. This is the advisory group to the Federal Geographic Data Committee (FGDC). In a recent action of reappointment of the committee by the Department of Interior, no members of the surveying community's private sector were included. To me, this was a serious mistake, as it is the private-sector surveyor who truly understands the framework of parcel boundaries and their differences across our country.

One of the reasons members of the surveying profession don't understand where they fit in is that they have had no input as to how a national parcel database should be established to meet the needs of the broad user of land boundaries. From private- to -public sector owners and users, this database has distinct advantages, but only if it is properly established with everyone's needs in mind. If this doesn't happen, the parcel database effectiveness can clearly be compromised or, in an even worse situation, misused.

[Peter Rabley](#) | President, International Land Systems | [February 22, 2010 at 3:51 PM](#)

With all due respect surely you dont wait to get asked to the dance? If surveyors are serious they have to get involved and drive their interests. No one is going to do it for the surveyors.

Data is misused all the time and always will be. I dont see that as a good hook to use as to why surveyors need to be involved. there are plenty of other good ones. If I want two different interpretations of a parcel boundary I send two different surveyors on different times. The law will always have fun with that.

Brent - question - any idea how many licensed surveyors in the US and what the median age is?

[Brent Jones](#) | Industry Manager, ESRI | [February 22, 2010 at 3:59 PM](#)

Peter - I think there are about 60,000 licensed land surveyors in the US and the median age is about 58.

[Ryan Hunsicker](#) | [February 22, 2010 at 8:24 PM](#)

Some consider me to be a young licensed land surveyor (32). I am in charge of a surveying team that helped build and continues to maintain a GIS parcel database that implemented surveying procedures and methodologies. This parcel database was built for one of the largest counties in the lower 48 states, containing about 900,000 parcels. The parcel database continues to be a resource that other public and private entities have used as a starting point to build their own GIS data, saving them time and money. The data that the survey team built includes a statement of how accurate the GIS data is relative to its

true position on the ground. This statement of accuracy, provided by a licensed land surveyor, gives weight to the data and confidence to the end users of the product. The accuracy statement allows other land surveyors and GIS users to make informed decisions about the parcel data. They can determine for themselves if the existing parcel database meets their positional accuracy needs or if they are stretching the data into the area of misuse. This accuracy statement should be marketed by land surveyors as something that they are in a unique position to provide to the national parcel database.

John Matonich | [February 23, 2010 at 5:36 AM](#)

Peter, I agree we can't wait to be asked to the dance and we haven't. We have been actively looking for opportunities to provide needed input, but continually get excluded from these types of processes. As to your comment about getting two different opinions, it isn't surprising considering the instrument being evaluated for boundary determination was likely authored by someone other than a surveyor which causes the confusion in the first place.

Tim Johnston | [February 24, 2010 at 8:11 AM](#)

I skimmed over the book using the link provided. I don't think it convinced me that a federal mandate should be forced upon the states. In my opinion, it should be up to the states and counties to maintain Land Use and Parcel data. The states are already responsible for all the "Needs and Benefits" that were listed in the article

- property values
- land use
- tax revenues
- ownership
- emergency response
- economic development and planning

Greg McArdle | [February 25, 2010 at 1:02 PM](#)

Being a surveyor myself, it is no surprise I would have to agree with John regarding instruments being authored by someone other than a surveyor causes confusion. There are occasions when surveyors submit a legal description to a second party only to have it grammatically revised per the second party's preferences. The second party may not understand that certain calls within the legal description carry intent of conveyance. This is only one example of an issue which leads to the question; why are surveyors not involved in the actual data entry to a larger database or a county equalization system at the time a parcel is created or conveyed? In my opinion, this action would drastically reduce the amount of "interpretations" stemming from instruments created in error. If original title is correct there is no need for another interpretation.

Knowledge of and acceptance of data misuse is why our land systems are currently in disarray. I do however agree this will always be the case until we enforce supervision when data changes hands. Surveyors need to be an integral part of administration along with maintenance of data as it is exchanged. This is the first step in building and designing the core for a National Land Parcel Data project. We have all of this technology and methodology that simply needs to be applied in the most cost effective manner. Why not guarantee spatial integrity at it's inception? Start now and amend existing data problems as they arise. Over time the data will only become more detailed and valuable to all public and private users.

Ryan, I would like to hear more about the obvious benefits created for different end users regarding the GIS you are involved in. This may help other surveyors understand what niche they can serve to provide knowledge that contributes to the cause. Please email any info you may wish to share.

Stevenson Sheppard | President and Co-Owner, Shyka, Sheppard & Garster Land Surveyors | [February 26, 2010 at 9:02 AM](#)

Few technical obstacles exist for surveyors to participate in a national parcel database. For years, surveyors have had ready access to GPS and CAD technologies, enabling them to produce georeferenced data using robust methodologies and techniques including electronic data collection and least-squares adjustments. Surveyors have long provided their clients with products in a variety of formats, from shapefiles to drawing files to three-dimensional surface data. However, a surveyor's most important

product, from a parcel standpoint, is his or her professional opinion about the location of a parcel's boundary. The boundary is not just a collection of observations and data but rather a synthesis of this data together with information gleaned from existing records and the application of case and statute law. It is the incorporation of this opinion into the national parcel database that will be most valuable. Most surveyors already participate, at least occasionally, in populating a parcel database by recording their surveys at the community or county level. Taking the next technical steps to participate in a national system should be readily accomplished.

Cultural and economic factors are the more likely obstacles to be faced by surveyors. Land surveying is most often accomplished one small project at a time. It has a long history of attracting introverts comfortable working by themselves or with a single partner in solitary settings. Robotic total stations, GPS, online municipal offices, and document registries and e-mail have given many surveyors additional opportunities to further isolate themselves. Apart from the occasional altruist, many of these folks are unlikely to be seen racing to become part of a larger opportunity.

Many surveyors work as sole proprietors, in partnerships, or in micro businesses. Without a financial carrot swinging in front of them, there is little incentive to expend resources participating in a national parcel database—resources that are typically needed to make next week's payroll. These small surveying firms face constant financial struggles ranging from cash flow problems to being too small to realize group-rate health insurance savings to always facing unfavorable rates for capital equipment financing or credit. Many microbusinesses would cringe at the thought but would have to acknowledge their virtual hand-to-mouth existences. This is not conducive to participating in a national parcel database without an adequate compensation mechanism.

Another typical business setting for surveyors is as a division of an engineering and/or architecture firm. In these situations, surveying is treated as a support service for other disciplines, and these surveyors often have little or no autonomy to grow into other areas or pursue other opportunities. There is apt to be little support in these firms for the expenditure of resources to participate in a national parcel database without a measurable return.

Additionally, surveying parcel boundaries is often practiced within a small geographic area where local knowledge is important. Accordingly, many surveyors have strong, proprietary perceptions of their work. Right or wrong, most surveyors feel that their existing body of work provides a competitive advantage, and many are loathe to share it. Again, adequate financial incentives might go a long way toward overcoming this.

Are surveyors prepared to engage in the opportunities presented by a national parcel database? Yes, they are prepared. Will they participate? Yes, but only if the opportunities include a reasonable, tangible return.

Ryan Hunsicker | [February 26, 2010 at 11:50 AM](#)

By using surveying procedures and methods the county's parcel database is currently being used by surveyors and GIS users as a backbone for many projects. Here are some examples of how end users are utilizing the counties parcel database.

The parcel database is currently being used as a starting point to build a flood control Right-of-way(R/W) inventory. Most of this R/W is defined by easements. The current process is to read the legal description of the easements and place them on the portion of land that easement encumbers. By knowing the spatial accuracy of the existing parcel data the surveyor interpreting the legal descriptions is able to make decisions if the easement needs to be adjusted to the parcel or if the parcel needs to be adjusted to the easement.

GIS technicians currently use street centerline data from the county's parcel data to create a street network. The street network is used to route emergency responders to the proper street address. Before the parcel database was created these same GIS technicians would digitize the data off of scanned paper maps and rubbersheet the data into their existing network. The increased accuracy from the data provided by land surveyor become an invaluable asset.

Survey field crews are using the parcel data to help them find property corners in the field. By being able

to know that the parcel data is within +/- 2 feet of its true position, the survey field crews have used the parcel data to get them in the general location of a property corner. (It's better to look in a 4 foot radius for an old wooden stake than a 10 or 20 foot radius for a wooden stake.)

Some cities and utility companies have adopted the county's parcel data for their own internal use, reducing the need to spend more tax dollars to build their own data from scratch. I have been told by some cities that the main reason the cities and utility companies use the county's parcel data is because they know that a land surveyor built the parcel data and that a statement of accuracy is provided along with the data.

The county currently does place our parcel data into an easy to use GIS program that overlays the parcel data on top of aerial photography for our elected officials and general county employees to use. A frightening concept for land surveyors is when non-surveyors place GIS parcel data on top of aerial photography in order to determine if the improvements on the land fit within parcel. This does happen within the county however the difference is the person looking at the data is aware of the spatial accuracy of the parcel data and the accuracy of the aerial photography. By having this spatial accuracy knowledge the elected official or county employee refrain from jumping to conclusions, instead they will call a land surveyor to ask questions about the data.

I am often asked by GIS users or general county employees who want to utilize the county's parcel data "Can you get the parcel closer to their true position?" Most of the time my answer is "Yes, but with increased accuracy comes an increase in cost". However as a land surveyor, I know where those surveying trouble areas are and that the current land records in this area date back to the late 1890's which allow me to answer that question. Here is where I think a land surveyor can play a crucial role in the national parcel database. I believe the land surveyor will be able to help deliver the best spatially accurate parcel data. For the land surveyor that is near the retirement age, this is an opportunity to help build a national parcel database. The seasoned land surveyor has the most knowledge on where those surveying nightmares are and what the best method is to place the parcels in the best possible location. I agree with Stevenson comment that we need to find a way to get the local land surveyor involved. There needs to be a revenue source that will encourage the local surveyor to contribute their knowledge

to the national parcel database. Technology will always be factor when our average age of land surveyor is 58. However there is no need for a seasoned land surveyor to have to learn a new software if they don't want to. I'm sure there are enough young surveyors or surveyors in training that are willing to answer that call. But what the young land surveyor (and I include myself in this group) need is leadership and guidance from our older generation. Most of the older generation land surveyors have the political capital experience to guide the younger generation of surveyors on the best approach to be involved with the national parcel database and help solve the difficult surveying problems.

Jan Van Sickle | [March 1, 2010 at 9:01 AM](#)

I have also recently read National Land Parcel Data: A Vision for the Future. I would like to second Brent's suggestion that we all read it carefully. There is a lot for us to talk about there, and not just in general terms. I believe we should get down in the weeds and really discuss the details. As is so often said, that's where the devil is. I suggest this because there is a history here. National Land Parcel Data: A Vision for the Future is in a long line of papers, books, and documents on essentially the same subject. For me, and perhaps for you, this discussion began in 1980 with the National Research Council's Need for a Multipurpose Cadastre. It looks to me like the issues involved have changed remarkably little in the intervening 30 years, but other things have changed. The technology has certainly advanced, and the attendant commercial and governmental pressures to proceed have increased — a lot. At this point, action is inevitable. The question is, what action? It has been my experience that large undertakings of data management can do much good, and they can do much harm. I believe that the prevailing outcome depends on the nature of the decisions made at the foundation.

A. Wayne Harrison | Chief Surveyor and Branch Manager, Cullian Engineering Co. | [March 2, 2010 at 8:36 AM](#)

It has been three decades since the idea of a national parcel database was first proposed, and yes, I think there are a lot of surveyors who are prepared to engage in the opportunities that a national parcel database presents. I encounter more and more surveyors and surveying firms every day that are utilizing GIS in their daily operations as well as finding new opportunities in providing GIS parcel and utility data. I am also seeing more geomatic/surveying programs that have incorporated or are considering

incorporating GIS courses into their programs to help create GIS-savvy surveyors. However, I believe the real question is what do we have to do to convince the surveyors— especially those that are sitting on the fence—that we need to do everything possible to continually engage and work with other GIS stakeholders, at all levels, during all stages of the development of a more accurate national parcel database? This continual interaction by surveyors with the other stakeholders can only lead to the creation of a parcel database that will be highly beneficial to all.

Nancy Vonmeyer | vice president, fairview industries | [March 9, 2010 at 9:55 PM](#)

In the March 2010 Professional Surveyor Magazine Craig Dylan published an article titled “A Long Survey” (the article is not published online that i could find). Mr. Dylan describes a GPS survey along the Delta-Mendota Canal in California completed by BLM Land Surveyors. The article on the use of the GPS is interesting especially the use of the GPS, GNSS and California Surveying Virtual Surveying Network (CSVSN). But as almost an aside he quotes the BLM Land Surveyor Tim Jackson on the time savings with CSVSN and efficiencies the BLM has gained in just five short years. The article also describes the benefits of capturing PLSS, property and right of way monumentation as part of these projects. The surveys found original monuments, identifying where property boundaries may need further survey work and even errors in places where reference monuments were used rather than the actual corners.

Through the canal boundary survey the GPS measurements found trends in subsidence, identifying areas at risk for further subsidence and compared past elevation observations to the new results. This information benefits the canal managers by providing information on where future infrastructure repairs maybe needed and where to watch for particular types of damage arising from subsidence.

Although not mentioned in the article, taking the results of this survey and combining it with other BLM and private land surveys to create a standardized representation of the PLSS that could be used by GIS staff and other land surveyors extends the benefits found by Mr. Jackson.

What if the results of this detailed and well research survey project could be rolled into county parcel mapping easily? The benefits would be extended beyond the source agency to the other agencies.

Couldn't this type of project be studied from a benefits perspective to create a financial case for the role of land surveys in improving decision making, improving the quality of public data sets and improving the public's perception of public data sets? Isn't the role land surveying more than establishing boundaries and improving individual data set quality? Extending the results to support future aerial photography control and supporting infrastructure management decisions puts the land survey directly into the day to day business of decision makers. I think there is a dollar benefit that is real. Mr Harrison and Mr Sheppard and Mr Hunsicker also seem to be driving at a real financial benefit.

Dr. Frank Derby | Professor of Surveying and GIS, Pennsylvania State University | [March 10, 2010 at 7:54 AM](#)

There are valid reasons for including a national land parcel database (NLPD) in the National Spatial Data Infrastructure (NSDI). In a presentation before the Congressional Subcommittee on Energy and Resources, representatives from the cadastral subcommittee of the FGDC argued, among other things, that an NLPD as a component in the current NSDI could have helped elucidate the high incidence of subprime lending practices within selected socioeconomic groups in targeted communities. The lack of such a database, according to the group, resulted in the mortgage crisis, engendering extensive foreclosures and bank failures that drove the country to the brink of economic collapse. An NLPD could improve the ability to monitor trends in mortgage and property values in the U.S.

Oftentimes, surveyors (myself included) tend to focus on the legal applications of parcel data and are quick to emphasize positional accuracy, thereby losing sight of nonlegal aspects. An essential consideration, therefore, is positional accuracy in an NLPD. I must emphasize here that I am not advocating that surveyors forsake accuracy. Ideally, an accurately surveyed NLPD would serve greater purposes, but what will be the acceptable level of accuracy and at what expense? It is my belief that local and state governments will be required to compile the parcel data layers which means that local surveyors' involvement will be required at those levels. If so, then there will be opportunities for surveyors to assist their counties in the development of the parcel layer. I hope that the National Geospatial Advisory Committee will request input from ACSM regarding minimum accuracy standards for the NLPD.

Creating and maintaining the NLPD would be another opening for surveyors to reclaim the leadership role in geospatial technology. They can do so by looking at their data as a societal resource rather than a proprietary asset for creating and interpreting boundary information. The ability to submit additional information to the parcel record for the betterment of the community or society as a whole is where the potential benefit really exists. Surveyors who study the technology beyond the concept of creating graphic layers are the ones who can benefit the most. Those surveyors can advise municipalities and counties about the potential that exists within the data that they already have. Business opportunities will come to surveyors who are willing to think outside the box and go out and market their services. They can start by getting involved in the GIS initiatives within their communities. Above all, surveyors must be willing to invest the time and resources to educate themselves about the technology and its potential benefits.

[Peter Rabley](#) | President, International Land Systems | [March 11, 2010 at 8:19 AM](#)

An excellent discussion - not always found on many blogs IMHO. Several points come out of this discussion that I can see:

1. cost - survey firms tend to be small and cash constrained as described in this blog. large contracts for the creation of highly accurate spatial parcel fabric are not there.
2. institutional fragmentation created by 3500 plus offices throughout the US collecting/maintaining parcel data or processing parcel (and related data). Trying to generate financial interest beyond ones "borders" is a tough sell - particularly nowadays.
3. interest in spatial accuracy. While those of us in the industry "get" the value (perceived and otherwise) in a more accurate parcel fabric - it is a hard sell to those who might fund it - i.e. county commissioners etc. I have yet to see any useful presentation of the ROI for a national spatial fabric that could lead to funding by anyone. I know there were some discussions about the use of Recovery Act money but that did not happen.
4. good enough - prevails. Most parcel fabric in the US is generated by the assessors office at the local level. they are not typically interested in spatial accuracy first - but good enough data. this is changing admittedly, with increased use of GPS and higher values on properties and misalignment's of data sets in urban areas the need for better parcel data is clear. But that represents perhaps 20% of the US land

mass (although probably a much larger % of the number of parcels).

5 lack of integration at the local level for land information. one of the potential drivers for change is to see the benefit derived from integrating the various stovepipes of land information at the local level - i.e. recorders office, tax/assessor, planning, public works etc. through the use of a good parcel fabric. this is changing but ever so slowly. Given that it is hard to get institutions within the same locality to integrate it gives some idea of the problem facing a national data set.

I think the private sector has already shown that it will probably be the first to create a national parcel set - e.g. First American. And so many will argue that why should it be a tax payers burden to fund it if the private sector is willing to pay for it. I know that the difficulties that FA faces in collecting and maintaining their purported 120 million parcel layer are large. And I am sure that they would very much like to see willing providers of data from the localities instead of what it is now. So perhaps the answer would lie in a public private partnership where localities freely share on a regular basis the parcel data to private firms in return for some percentage of the onsell and use of the parcel data. This in turn might stimulate a desire and possible funding by the private sector to upgrade the quality of the parcel data.

As to the idea of "non surveyors" creating trouble in legal descriptions being a root of issues of boundary descriptions. My point was that this was the best description i.e. evidence of a boundary available at the time. Even when a surveyor goes out to "survey" that description he or she is making their best estimate of where the boundary was. We cannot go back in time and cannot change that legal description. Hopefully the fixing of the boundary using techniques that result in coordinates of the property creates less dispute later on. But the boundary can always be disputed - even if first demarcated by a surveyor. And lawyers now that it is impossible to have two separate surveyors on different times come up with the same exact mathematical description of the property. it is why we don't guarantee boundaries themselves.

Very much enjoying the discussion.

[Eric Gakstatter](#) | Editor, Geospatial Solutions/GPS World | [March 12, 2010 at 1:00 PM](#)

Although not ideal, what exists today is working, in most cases. It serves the purpose for which it was created. That's the crux of the matter and that's why it's not going to change easily. There's no "killer app" for higher accuracy parcel data that's going to drive change. Yes, I agree there is a lot of upside, but not a single app will carry the ball, so to speak.

In fact, I contend that even if, by some miracle, we were able to muster \$500M (~\$10M per state) from somewhere, the problem of an accurate national parcel database would still not be solved. Throwing money at it is only a temporary pain reliever when what is really needed is for the right people to care enough and invest/immerse themselves into the cause.

I also contend that running the project as a national program would be a major disaster. Too much politics, too much inefficiency, too much bureaucracy. Yes, technical guidelines would be very helpful. In fact, technical reports by Ryan and others who have been successful on a local level would be invaluable for those who don't know where to start.

The interesting part of this discussion is that it's not a technical issue at all. We aren't talking about rocket science. The technical knowledge and the tools to accomplish this are well known. What is required is collaboration at the local level.

Why is collaboration at the local level so difficult when it's where people have the most control? Why wait around for years for a federal agency or a national association to provide "guidance" that really may not be that good?

If you really want to work towards a more accurate national parcel database, what keeps you from picking up the telephone and calling those with whom you need to collaborate with at a local level and start building relationships, educating, evangelizing? What's stopping you? Money? Time? Ego?

I wrote an article earlier this week with my thoughts on local collaboration between the RPLS and GISP. If you're interested in reading, here's the link...

<http://www.gpsworld.com/gis/get-it-surveyed-gis-9662>

Curt Sumner | Chair, Coalition of Geospatial Organizations | March 15, 2010 at 12:34 PM

I have read with interest the various perspectives of those who have responded to Brent's call for comments on this topic. I think the answer to the question of whether or not surveyors will heed the call to participate in the development of land parcel databases, national or otherwise, is dependent on how and why those systems are developed and their intended uses. Since the creation of GIS, there has been a headlong rush to get as much information into databases as possible for what is assumed or portrayed to be the lowest cost. I would venture to say that in the majority of instances, decisions regarding how this should be accomplished were made with little or no consultation with a professional surveyor. I agree with John Matonich that at least some surveyors have not waited to be "asked to the dance" but have actively pursued opportunities to be included, both individually and collectively through ACSM and NSPS. It is an undeniable fact, though, that in many cases, their input is not solicited, nor is it welcome. We often hear that surveyors are not needed for the development of particular sets of data that are to be inserted into a GIS because survey-grade accuracy isn't required to properly use the data. While there is truth to this, unfortunately, the data is sometimes utilized to make decisions for which surveyor-provided information is critical. Among these would be the development of a cadastral layer that is intended to be more than just a picture of what land parcels might look like, were they all surveyed and properly placed into a uniform geodetic framework. When local tax maps contain digital information about property boundaries that is in conflict with surveyor-generated data about that property, surveyors get very interested. They attempt to clarify the ramifications of simply ignoring the surveyor's data or, perhaps worse, trying to adjust the digital tax map to accommodate the surveyor-generated data, thus introducing the possibility of creating phantom parcels that do not actually exist. Too often, property owners (and others) are misinformed about the validity of data provided from the local tax map or GIS regarding the actual location of property boundaries, structures, easements, rights-of-way, flood zone limits, wetlands limits, etc. Surveyors are "prepared to engage in the opportunities that a national parcel database presents." The level to which they can participate depends on how well they have prepared themselves. Some may only be able to assist in the understanding of the intent of land

descriptions to be incorporated into a tax map. Others may be able to provide a wide range of services related to a database, from gathering and processing raw field data to creating the digital files, and assist in the interpretation and dissemination of the data. This is a topic about which discussion could (and probably will) go on for many years to come. Trying to fully cover all its aspects in this forum would be impossible. As noted earlier herein, though, a major challenge for surveyors in becoming involved is the perception by some that surveyors aren't required, or that they just get in the way, because utilizing their services is too expensive and time-consuming. The bottom line regarding surveyor participation in the creation and management of a national parcel database is the determination of how that database is to be used and whether or not there is recognition (spurred on by surveyors, or not) that surveyor-generated data is critical to the full potential of such a database being realized.