

Minnesota Cadastral I-Plan¹

Theme

Cadastral data comprise the official record of land ownership within Minnesota. For purposes of the Implementation Plan, cadastral data are defined as the current record of ownership combined with a digital map that illustrates the boundaries of each ownership parcel. Minnesota delegates responsibilities for maintaining property records to its counties. All ownership records ultimately are tied to original land surveys performed as part of the Public Land Survey.

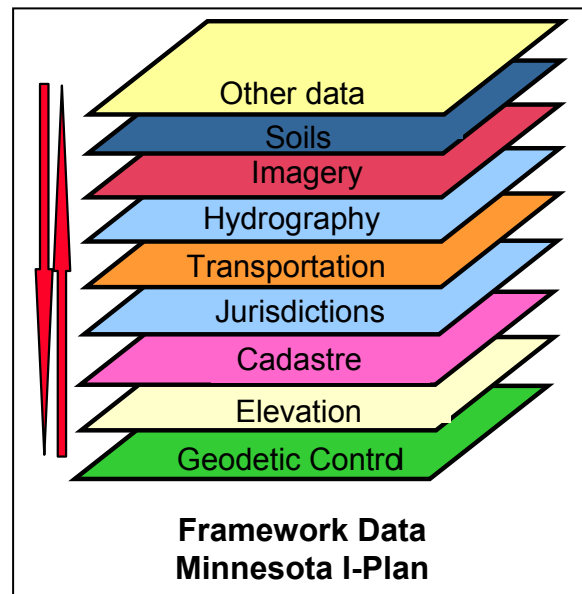
The purpose of the Cadastral I-Plan is to:

- (1) Identify the resources, processes, organizational structures and strategies needed to develop and maintain records that describe and map the pattern of ownership within the state of Minnesota, including assembly of locally-produced parcel data into a statewide view, and
- (2) Support the operational needs of organizations operating within Minnesota.

Vision

The Cadastral I-Plan envisions a collaborative solution that provides:

- ✓ Statewide assembly of electronic datasets comprised of commonly needed spatial and attribute cadastral data
- ✓ Data that are readily useable and meet the broad user community's desired specifications for accuracy, completeness, currency, security, and metadata.
- ✓ Interoperability within the cadastral dataset itself, with the other data layers that comprise the Minnesota Spatial Data Infrastructure, and cadastral data from adjoining states.
- ✓ Greater efficiencies to data producing organizations participating in the statewide solution.
- ✓ Funding and other incentives to the data producers to encourage and aid in participation.



¹ Version 1.1 of the MN Cadastral I-Plan includes changes discussed and authorized at the Minnesota Governor's Council on Geographic Information LRM committee meeting on 12/12/02.

Definitions

The Cadastral I-Plan assumes the following definitions of terms.²

Cadastre: An official register of the quantity, value, and ownership of real estate, used in apportioning taxes.

Cadastral Map: A map showing the boundaries of subdivisions of land, usually with the bearings and lengths thereof and the areas of individual tracts, for purposes of describing and recording ownership. A cadastral map may also show culture, drainage and other features relating to the value and use of land.

Parcel: A single piece of land described in a single description in a deed or as one of a number of lots on a plat, separately owned either publicly or privately and capable of being conveyed separately.

PLSS: Definition needed [To be added].

Guiding Principles in Creating a Statewide Cadastral Map

The following principles will guide the development of the statewide cadastre and cadastral map.

- ✓ **Focus on Commonly Needed Data:** The desired data specifications shall be defined through a broadly representative and collaborative process that respects the differences in the various regions of the state. The statewide solution will comprise a common subset of the commonly needed data defined by each region.
- ✓ **Limit to Internal Business Need:** No organization, whether serving as a primary producer or area aggregator shall be asked to perform a task for the statewide solution for which they do not have perceived internal business need or statutory responsibility.
- ✓ **Prohibit Modifications:** Area aggregators of data received from primary producers shall assemble multiple primary units into statewide aggregations without modifications to “smooth” transitions from one unit (county) to the next. Only the projection may be modified to facilitate assembly of aggregation units. A notification process should be instituted for users to communicate anomalies to be investigated by the primary producers.
- ✓ **Respect and Accommodate Differences:** Desired specifications endorsed for statewide solutions shall respect and accommodate variations in primary producer internal business needs.
- ✓ **Insure Interoperability:** Aggregations of parcel data shall be interoperable – work together as if one dataset.

² Definitions for cadastre and cadastral map are adapted from Definitions of Surveying and Associated Terms. Definition for parcels is from *Glossary of Mapping Sciences* (1994).

- ✓ **Respect Access Limitations:** Public-sector producers of the parcel data have deferring opinions on whether or not to impose a cost recovery fee for parcel data development and associated licensure requirements. Those who choose to impose such a fee also differ on whether or not to waive it for government organizations and others (i.e., academic, non-profits). The statewide policy must respect these differences but also foster as much consistency as possible in the related policies.
- ✓ **Roles and Responsibilities:** In order to keep the cadastral layer as an on-going collaboration of data collection and distribution, data producers, aggregators, and distributors shall clearly understand and acknowledge their respective roles and responsibilities.

Status

Minnesota has been working towards developing a statewide strategy to develop and maintain a parcel-based cadastre of ownership for many years. A statewide model program for land records modernization, developed under the auspices of the Minnesota Governor's Council for Geographic Information, currently serves as a framework for such a program.³ It would provide funds to help Minnesota's counties develop and/or maintain parcel records to meet local needs, but following guidelines that would facilitate statewide integration. This LRM program has not yet been funded, but serves as a basis for ongoing discussion and contains guidelines for local expenditures authorized independently of the statewide initiative.

Currently, about a third of Minnesota's counties maintain parcel-based GIS systems and another third have begun such development. The Minnesota I-Plan envisions a time when all counties are maintaining such systems to meet their own needs and so that county data may be integrated into a statewide cadastral layer.

The Public Land Survey System serves as the basis for all land ownership within Minnesota; this "land net" is an integral component of Minnesota's cadastral I-Plan. The PLSS is a system of survey control founded in the principles of property law as well as the science of measurement. It is the basis for the description, collection, and mapping of cadastral information, including parcel ownership and location relative to neighboring parcels.

The geodetic control network, described in Minnesota's Geodetic I-Plan, is a system of survey control founded in the science of measurement and often serves as the basis for the collection and mapping of earth science data such as the geographic extents of floods, or fire or blow down areas, not just parcel data

Through cooperation between county surveyors, the Minnesota Department of Transportation, and the National Geodetic Survey, the PLSS is being tied to the geodetic control network to provide a seamless, vertical integration network of cadastral and earth science datasets. However, only about half of Minnesota's counties have full-time county surveyors; fewer counties have completed acquiring geodetic values for their Public Land Survey corners.

³ The proposal and related documentation are available at <http://www.gis.state.mn.us/committe/land/lrm2000/lrm.htm#resources>.

At this time, the Minnesota Department of Transportation maintains an Internet site containing geodetic control information, but neither MnDOT nor any other organization maintains an official record of county geodetic control data for Public Land Survey corners.

Source

The principal data producers within Minnesota are its 87 counties. However, public agencies and tribal governments also own considerable land. A complete statewide cadastral layer will necessarily require the participation of all organizations with land ownership or recordation responsibilities. These include counties, the state's land-holding agencies, federal agencies such as the U.S. Forest Service and Bureau of Land Management, and tribal governments.

Collectively, federal agencies own and manage 3.4 million acres within Minnesota. The US Forest Service is the largest owner, with 2.8 million acres concentrated within five northeastern counties, but federal ownership exists in 61 of the 87 Minnesota counties. Other significant federal landowners include the Fish and Wildlife Service, the National Park Service, the Bureau of Land Management, and the Army Corps of Engineers. Each manages its land and struggles to coordinate ownership and boundary information with local counties, with neither having complete basic survey or title information.

Other federal agencies manage programs within Minnesota that require information about parcels. For example, the Farm Service Agency has developed and maintains parcel boundary information to help its county staff working on economic and environmental programs with local farmers. Parcel data has been developed in all but Lake and Cook counties, averaging 2,500 parcels per county – more than 200,000 farm parcels statewide. Ideally, the FSA would work closely with counties to develop a single representation of these parcels, with counties maintaining the base map and FSA adding information it needs to support its programs.

The state owns even more land than the federal government, distributed among every county in the state. Owning more than 5.6 million acres within Minnesota, the state is the 3rd largest landowner in the nation, behind the federal government and the state of Alaska. The Department of Natural Resources alone owns 5.3 million acres, but the Department of Transportation, the Department of Military Affairs, and the University of Minnesota also have significant holdings. Like their federal counterparts, these agencies manage their land and struggle to coordinate ownership and boundary information with local counties, with neither having complete basic survey or title information. One example is "title spotting" performed by MnDOT staff, who dig through county records to identify land-owners who might be impacted by highway expansion or maintenance. This is tedious work that could benefit greatly from local parcel maps.

Finally, Indian tribal governments own more than one million acres of land within Minnesota, with the Red Lake band owning more than 800,000 acres, mostly within Beltrami County. Significant concentrations of tribal trust lands also are located within Clearwater and Lake of the Woods counties. Counties generally map boundaries of Indian reservations, but not cadastral details within those boundaries. Improved coordination between tribal governments and counties potentially offers increased efficiencies and reduced costs to both the tribes and Minnesota's counties.

Standards

No standard for cadastral mapping has been adopted for Minnesota counties. However, several guides to best practices parcel mapping have been prepared for county use. The Minnesota cadastral I-Team will consider available best practices, guidelines and standards and evaluate how they might apply to the Minnesota plan. Notable resources include:

- ✓ *Implementation Guide for Parcel-Based GIS in Minnesota Local Government* (1997). This "blueprint" was developed for local units of government as a guide to implementing parcel-based GIS in Minnesota.⁴
- ✓ *Identifying Land Parcels: Is a Statewide Standard Needed?* (1997). This report examines parcel identification numbers used by Minnesota's 87 counties and the need for a standardized statewide format. It offers a solution for integrating county data into a regional and statewide datasets without impacting local practices. MetroGIS has adopted this solution for assembling county parcel data for the Twin Cities metropolitan region.⁵
- ✓ *MetroGIS Parcel Specifications*. The MetroGIS initiative has developed specifications for data aggregated from county parcel sources.⁶ The specifications have been developed with the active involvement of parcel data stewards within all seven of the metropolitan area counties and represent a common framework that permits county data to be aggregated to provide coverage for multicounty regions. The MetroGIS regional specifications may form the basis for a statewide solution for aggregating county parcel data.
- ✓ *Cadastral Data Content Standard for the National Spatial Data Infrastructure (FGDC Subcommittee on Cadastral Data, Revised 2002)*. The Cadastral Data Content Standard provides semantic definitions of objects related to land surveying, land records, and land ownership information. The standard facilitates data sharing for all levels of government and the private sector.

Priority

Statewide surveys of Minnesota's GIS users, conducted in 1994 and 1999, consistently reveal parcel data to be among the state's highest priority data needs.⁷ The high priority of parcel data has also been clearly identified by several other formal assessments, including those conducted by MetroGIS for the seven-county Twin Cities region, where significant investments have been made to meet this need.

Estimated Total Investments in Theme

⁴ See <http://www.gis.state.mn.us/iisac/gisindex.html> for the Implementation Guide.

⁵ See <http://www.mnplan.state.mn.us/Report.html?Id=1858> for the report. The MetroGIS policy is described at <http://www.metrogis.org/data/standards/index.shtml#parcels>.

⁶ See http://www.metrogis.org/data/datasets/parcels/index.shtml#data_specs for details about the MetroGIS specifications.

⁷ The results of the 1994 survey are summarized in the 1999 report of the Minnesota Governor's Council on Geographic Information, *Guidebook to Priority GIS Data*. See http://www.gis.state.mn.us/pdf/priority_data.pdf.

A recent survey of Minnesota counties identified 42 counties that have either begun to construct or have completed development of a digital parcel database for their GIS. The methods of developing county parcel datasets vary throughout the state. Some counties have established geodetic control of Public Land Survey corners and subsequently mapped tax descriptions using coordinate geometry; others have adjusted vectorized tax map drawings to fit within the relative locations of the Public Land Survey corners as digitized from USGS quadrangle maps. Accuracies vary from less than one foot to 40 feet, respectively.

The total investment in data development by Minnesota's counties is estimated at about \$9,000,000. In addition, several state agencies and tribal governments have developed parcel data for some of their holdings.

Estimated Current State and Local Contributions

Minnesota's parcel data has all been produced by counties with local funds. Several attempts to secure state funding to accelerate development of county parcel data have been made. None of these efforts have been successful thus far.

Resources Needed

Additional funding, appropriate standards and guidelines, and a framework for implementation are needed to complete an integrated statewide cadastral database. The I-Team will continue to work on specifying and acquiring the needed resources.

Likely Source for Resources

Until now, funding and staff resources to develop county, state, federal and Indian parcel data have been provided by the producing organizations. These are likely to remain the primary sources, as parcel data are needed to support their activities. Counties are expected to continue making the largest investments. However, these sources will be inadequate to produce statewide cadastral coverage within the foreseeable future. Supplemental funding will continue to be sought from state and federal sources.

Investments Needed to Complete Theme

Based upon an estimate derived from Minnesota Department of Revenue records of almost 2.5 million parcels in Minnesota, total costs for developing digital parcel data where none currently exist is between \$10 and \$15 million, assuming specifications that call for geodetic control for the Public Land Survey and data entry using coordinate geometry or equivalent high-accuracy procedures.

Current Funding Allocated

A survey of Minnesota counties, planned for completion in early 2003, may provide a basis for this estimate. Estimates of investments from cities, state and federal agencies, and tribal

governments also are needed to address this issue. These stakeholders can maximize the efficiencies of their investments by collaborating to meet common needs.

Overcoming the Funding Gap

Clearly, parcel mapping benefits Minnesota's local units of government, particularly its counties, which have been the principal source of funding thus far. We expect counties to continue to invest in parcel data development, as parcel data is important to many of its functions. However, local funding will not be adequate to overcome the gap any time soon.

Several initiatives have been proposed by Minnesota organizations for funding to help develop parcel data for areas that have not yet produced it. They have focused on three distinct sources:

- (1) the state's general fund,
- (2) supplemental fees associated with real estate transactions, and
- (3) the Minnesota Environmental Trust Fund administered as a grant from the Legislative Commission on Minnesota Resources.

None of the initiatives have been successful. The I-Team will continue to pursue these options, but federal sources of funding will be required to accelerate development of Minnesota cadastral data as part of the National Spatial Data Infrastructure.

As a frame of reference, the MN Governor's Council on Geographic Information assumed an expenditure of \$10 million/year to implement a statewide program in its 2000 Land Records Modernization initiative (<http://www.gis.state.mn.us/committe/land/lrm2000/LRMprogram.htm>). The initiative has not been funded and the Council is not currently actively advocating the solutions offered in that initiative.

Recommended Data Stewards

County governments are the appropriate primary data stewards for most parcel data within Minnesota, supplemented by parcel data maintained by state, federal and tribal organizations for data owned by those entities. A "statewide" cadastre would be built from those sources. Costs for assembling this statewide view would not be borne by the primary data stewards. A state agency, with an appropriate source of funding, would be designated as the steward for the assembled dataset.

To accommodate the range of business needs within the state and optimize efficiencies, as expressed by guiding principles adopted for the I-Plan, regional organizations may assemble local data into intermediate aggregations, where appropriate. For example, the Metropolitan Council has assumed this area aggregator role for the seven county Minneapolis-St. Paul region, on behalf of the MetroGIS collaborative. If other organizations assume a similar role within other regions, such regional aggregations could become sources for producing a statewide cadastre.

Maintenance Recommendations

Most data would continue to be maintained by counties and other land holding entities. Periodically, updated source data would be reassembled to create new regional and statewide views, as appropriate. The primary data producers would not bear costs for this process.

Estimated Maintenance Costs

For the purposes of this plan, costs for keeping cadastral data current are limited to costs associated with mapping newly created parcels after all parcels have been initially mapped. Based upon recent data from the Minnesota Department of Revenue, about 15,000 parcels are created annually within the state. Estimated costs to map these new parcels is about \$250,000/year. This estimate will be revised as needed.

I-Team Members

The Minnesota Cadastral I-Team, formed under the auspices of the Minnesota Governor's Council on Geographic Information, is comprised of members of the Council's Land Records Modernization Committee. Committee members as of January 6, 2003 are listed in the table that follows:⁸

Jay Wittstock, Wright County (Co-Chair)	Denny Kron, Stearns County
Lisa M. Skipton, Goodhue County (Co-Chair)	Sherry Leabo, Ottertail County
Bob Ader, US Bureau of Land Management	Dan LeVahn, MN Department of Transportation
David Arbeit, LMIC	Chris Mavis, SEH
Jeanine Barker, Lyon County	Lee Meilleur, Legislative GIS Office
Joan Barnes, DBA Systems	Lonnie Meinke, Winona County
Luci Botzek, MN Assoc. of County Officers	Gail Miller, Renville County
David Claypool, Ramsey County	Sarah Morton, East Central RDC
Jeff Coate, University of Minnesota	Jane Mueller, Beltrami County
Scott Conn, Upper Minnesota Valley RDC	Alan Radke,
Will Craig, University of Minnesota	Victoria Reinhardt, Ramsey County
Pat Cummens, ESRI	Mike Ryan, Minnesota Office of Technology
Mary Durward, St. Louis County	Ken Saffert, City Engineers Assoc. / City of Mankato
Jon Fiskness, Arrowhead RDC	Randy Schreifels, Stearns County
Dan Falbo, ESRI	Bruce Shepperd, Minnesota DNR
Rick Gelbmann, Metropolitan Council	Ken Staupé, US Forest Service
Dave Gorg, MN Department of Transportation	Jeff Storlie, St. Louis County
Jeff Grosso, City of St. Paul	Annette Theroux, Pro-West and Associates
Dan Hockert, US Farm Services Agency	Kent Treichel, MN Department of Revenue
Randall Johnson, MetroGIS	Dave Weirens, Assoc. of Minnesota Counties
Charles Kost, SSU GIS Center	Kay Wruckle, Martin County
Jay Krafthefer, MN Dept. of Transportation	Dave Yapel, Arrowhead RDC
Tim Krohn, Fond du Lac Tribe	

⁸ For an updated list of members, see www.gis.state.mn.us/commit.htm.