

**Category 4: Business Plan Implementation in Support of the
NSDI Future Directions Fifty States Initiative:
Property Boundary Data - Capture and Integration Pilot**

Keywords: assessing, cadastral, deeds, geolibrary, maine, megis, parcels, property, registries, tax maps;

Maine – Final Report

- a) Date
May 19, 2011
- b) Agreement Number
G10AC00169
- c) Project title
Piloting the Municipal-State-Federal Partnership for Cadastral Data in Maine FINAL REPORT
- d) Applicant Organization
Maine Library of Geographic Information (GeoLibrary)
Maine Office of Geographic Information Systems (MEGIS)
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- f) Collaborating Organizations:
Town of Bar Harbor, Maine - provided guidance on the town-county-state cadastral flow
Hancock County - provided on-line access to deeds
Maine Library of Geographic Information (GeoLibrary) – provided guidance, in-kind hardware and support
Maine Office of Geographic Information Systems (MEGIS) - provided project administration application development support
Maine Revenue Service - provided information on unorganized territories
Maine Land Use Regulatory Commission - provided information on unorganized territories
University of Maine, Machias - provided staff resource to collate parcel data
Hancock County Planning Commissions – provided coordination between towns and UMM technical staff
College of the Atlantic - provided parcels data for towns already digitized
US Geological Survey – provided coordination with related NSDI and Federal projects

A significant number of municipalities who were active participants in the GeoLibrary Parcel Grants program are playing a role¹. The Maine GeoLibrary has involved a wide array of additional participants and stakeholders to ensure that any proposed implementation will have the widest and most diverse participation and acceptance.
- g) Executive Summary
The GeoLibrary Board has implemented the concepts defined in its 2008 Integrated Land Records Information System Business Plan (funded by a 2007 CAP Category 3 award) as a

¹ A complete list of Maine GeoLibrary Parcel Grant recipients is included as Appendix F.

pilot for a County in Maine. The 2008 Business Plan outlined a conceptual framework and identified function specifications for this system. This project has conducted a pilot based upon that framework and specifications. Maine's long history of interagency and interjurisdictional GIS planning and implementation has been helpful in developing a successful pilot.

This project used existing parcels and parcel standards developed as a result of earlier Maine GeoLibrary parcel grants to towns where available. This project focused on:

- creating a composite parcel dataset for Hancock County,
- developing a Parcel Map Viewer application
- providing links to the Hancock County deed registry documents from the viewer, and
- outlining a maintenance mechanism for keeping parcels up to date.

For nearly two decades Maine counties, municipalities and the Office of GIS have worked piecemeal to standardize and assemble this essential resource. This initiative was the next logical step in realizing the goals of statewide integrated land records information.

Access to uniform digital property parcels has been identified as the most pressing core component lacking in Maine's geospatial data framework since at least 2001. The 2002 Statewide Needs Assessment was significantly motivated by growing realization of this need by a large number of GIS users throughout Maine government. Subsequent reports and study groups, including the Counties GIS Needs Assessment², the Development Tracking Steering Committee, the recent state geospatial strategic plan, and independent efforts have reasserted this need.

PROJECT NARRATIVE

(1) Project Scope

a) Status of state's strategic and business planning activities

In 2007, the Maine GeoLibrary received a CAP award to update Maine's geospatial strategic plan, align it with National States Geographic Information Council guidelines, and the "Fifty States" Initiative. Additionally, a functional specification and business plan was completed specifically for cadastral data, the Maine Integrated Land Record Information System (ILRIS, now known as "GeoParcels") to integrate with the Maine GeoPortal. Both products were finalized in early 2009 and are posted on the Maine GeoLibrary web site (<http://www.maine.gov/geolib>). Thus, Maine's geospatial strategic plan is very fresh, as is the business plan regarding unification of cadastral data in Maine. The requirement for cadastral data and its unification is clear in the state's strategic plan. This project has taken that plan to the next step toward implementing Maine GeoParcels.

b) Business plan development and implementation

This project has built on the findings of the 2007 Category 3 grant and its resulting land record business plan, and has taken steps towards statewide implementation of the cadastral data needs.

For Maine, the trickiest part of the unified approach to cadastral data is the fact that such data are managed by many independent organizations, each with a separate part of the process. Maine's approximately 500 municipalities maintain, at their own leisure and with their own

² CAP Grant Funded project report at: http://www.maine.gov/geolib/MECo_Report_Final.pdf

standards, their tax map base. Well-funded towns or cities can thus have very accurate and current cadastral data in digital format, which are generally easily brought into a state system. Adjacent towns may have less revenue and just have paper maps updated at regular intervals. Other more remote towns may use a paper tax map base with only hand-written updates as needed. Still other towns have no parcel maps at all, relying solely on local knowledge of who lives where. Maine also has approximately 500 unorganized territories (about half the state) that are sparsely populated, where property taxes and land development are managed by state government. These unorganized territories, despite having very few residents, have higher-quality cadastral data.

This Category 4 Project funded a pilot for a unified approach to management of cadastral data. Using a single county, Hancock, we developed a unified cadastral layer and tied it to assessing and title records, all through an online application which is publicly accessible. With this pilot Maine has been able to test and refine the processes outlined in the ILRIS business plan. Hancock County made an excellent test case because it is a small county, yet runs the gamut of possible scenarios likely to be encountered elsewhere in Maine, including urban areas such as Ellsworth, small towns such as Southwest Harbor, and unorganized territories. Additionally, the County Registrar is amenable to providing online access to deed records.

Using Hancock County, Maine has:

- Digitized and collated cadastral data into a single unified composite, using an updated version of the state standard for parcels. The parcel data standard was updated under the recommendation of the previously mentioned Cat 3 business plan. This collation effort involved inventory and acquisition of existing parcel information from each town in the county. This information came in all stages of readiness for the composite, from no tax maps to fully aligned and up-to-date parcel data. The majority of towns had paper parcel maps which were digitized for this project. The collecting, digitizing, and collating work was done by the University of Maine in Machias.
- Outlined an update process, based on the varying needs and abilities of the municipalities and the state, to provide annual updates which can be further fed up to *The National Map* and support the NSDI framework. The outlined maintenance process is a combination of tools to convert local data to a state standard and support to assist low-tech towns with the process.
- Developed a prototype web application which provides public access to cadastral data and related tax records and deed documents.

With more understanding of these processes and systems for Hancock County, Maine can now take the lessons learned and apply them to the whole state.

This project was also helped by partnering with US Geological Survey (USGS). USGS was already funding a project in Maine to inventory and collect municipal data in Maine's GeoPortal, and was interested in having cadastral data as a layer in *The National Map*. This project is a natural corollary to the data inventory project, where the same contacts can be used to take the data collection further. Maine utilized its USGS Geospatial Liaison heavily in this project.

This project advances Maine's geospatial strategic plan by furthering the development of the cadastral framework. This project continues to link the geospatial community with the State's Chief Information Officer, as MEGIS falls under the CIO's direct jurisdiction, and the principal investigator herein serves as the CIO's personal representative on the GeoLibrary Board. This project has advanced both the state's spatial data infrastructure and the NSDI by

furthering the goal of statewide cadastral data built to uniform standards; cadastral data being an NSDI framework layer, and the one most difficult for Maine to complete.

(2.2) Previous NSDI/CAP Participation and Applicability:

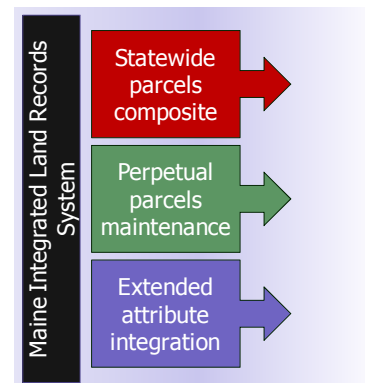
The 2004 Category 3 CAP Grant that resulted in the Maine Counties GIS study is a critical pillar in the ongoing evolution of this effort. This grant evaluated the potential role of county government in the use of GIS to improve county services including deeds registries, emergency response and law enforcement. An important aspect of this report was provision of GIS services to municipalities.

A number of issues/opportunities have converged that make the proposed studies very relevant to Maine and the state's overall implementation of GIS. It is clear that GIS plays an important role in answering Governor John Baldacci's call to regionalize municipal services. GIS is needed to support government's strategic planning process for regionalization. In addition, the GIS services needed by local government to support day-to-day operations may be best provided through a regionalized system.

Additionally, the CAP Category 2 Metadata Training and Outreach (2002) grant as well as the Category 4 Clearinghouse Integration with OpenGIS Services (2003) grant have advanced the technical framework of the State's geospatial resources to the point where many of the structural impediments to such an undertaking have been removed.

All of these earlier efforts culminated into the development of a conceptual framework and functional specifications as part of the 2007 Category 3 CAP Grant. This framework consists of 3 main components:

- Creation of a statewide parcel composite
- Development of a perpetual maintenance system and network to ensure these records are kept current
- Adding value to these data through technical association of individual records with other data sources through extended attributes sets.



The results of the 2007 Grant positioned the GeoLibrary to take the next step in implementation of a system to meet the identified goals.

(3) Commitment to Effort

Partner Organizations

The main partnering organizations included:

- Maine GeoLibrary Board - the state's primary geospatial coordinating organization, several Board members provided direct support in oversight of the project, including coordination with other stakeholders, review of deliverables, and advice and expertise. The GeoLibrary also provided two servers on which to run the pilot Map Viewer application.

- Maine Office of GIS - the state's primary geospatial service provider, the State GIS Manager provided project oversight, direct management of project goals and review of deliverables, and advice and expertise. MEGIS also provided hosting, software, and support services for the pilot application.
- US Geological Survey - via the state's geospatial liaison, USGS provided project oversight and advice, and coordination with the USGS-funded data inventory project already underway. USGS also provided guidance regarding integration of the data into *The National Map* and the NSDI.
- University of Maine, Machias - provided a staff resource to work with the towns to collate cadastral and assessor's data, develop a list of needs for annual updates, and coordinate with the GeoLibrary, MEGIS, and USGS. This staff resource was the same one used for the USGS data inventory, ensuring consistent communication with the towns.
- College of the Atlantic - provided local knowledge of the municipalities in Hancock County including digital cadastral data the College had already collected.
- Hancock County - provided online access to electronic deed documents.
- Town of Bar Harbor - assessor's office provided local knowledge and expertise of cadastral data in neighboring communities, and processes for linking to county data.
- Maine Revenue Service and Maine Land Use Regulation Commission - provided cadastral data and related data for unorganized territories in Hancock County.
- Hancock County Planning Commission – provided coordination between towns and the University staff to assist in getting access to parcel information.

(4) Project Results

This project has been executed in three distinct phases:

1. Collation of spatial cadastral data for Hancock County - a geospatial intern contacted all municipalities in Hancock County, Maine and gathered cadastral data and assessing data for the project. The information was found to be in various levels of sophistication from a couple of towns with no tax maps to Bar Harbor and others with publicly available GIS-based parcel information. Note - this process was also partially funded through a USGS partnership grant G09AC00157, which is a complementary project. Cadastral data for unorganized territories in the county was provided by the Maine Land Use Regulation Commission (LURC). Parcel data was brought to the parcel standards previously determined by MEGIS. During this process the Parcel Standard was updated, as outlined by the 2008 Conceptual Framework project, and approved by the GeoLibrary.

2. Outline of a maintenance process - one of the key difficulties in having a composite parcels layer is ongoing maintenance of the data. Along with the collation of cadastral data in Hancock County, and based on an updated version of the State's published parcel data standard, a set of processes for updates to the composite cadastral data on an annual basis has been developed and "conceptually" tested in a variety of situations. Hancock County was a great choice as a pilot project because it is small, but also runs the gamut of cadastral data possibilities - from cities with well-developed digital data to small towns with paper tax maps (and even a couple that did not

have tax maps). It also includes state-regulated unorganized territories which are state-maintained.

3. Creation of a web-based "GeoParcels" application - the county-wide parcels were used in a web mapping application based on open GIS standards and using open-source software. A similar application already existed for LURC parcels only, so that application was used as a base for this GeoParcels Viewer application. This Viewer integrates seamlessly with the Maine GeoPortal, the state's metadata clearinghouse for geospatial data. The cadastral data in the GeoParcels application was tied electronically to the Hancock County registrar's database and, where available, municipal assessing data. The results are provided through a single interface with simple querying functionality.

4.1 Parcel Data Collection and Composite Development

The parcel data for Hancock County were compiled by the University of Maine at Machias GIS Service Center from a wide range of sources acquired with assistance from the Hancock County Planning Commission (HCPC). Nine towns had only paper tax maps of widely varying quality and update status (one of these provided their maps and assessment data near the end of the project and as a result are still being digitized as of this writing). Paper maps were scanned, georeferenced, digitized, and attributed with map and lot numbers. Three towns provided CAD data which were converted to shapefile format. Two of these were of very poor spatial quality, and while every effort was made to correct accuracy issues and inconsistencies, these layers will likely be of limited usefulness until they are revisited. Wherever possible, the paper maps and CAD data were rectified with the Maine 1:24,000 township layer, and where this was impossible, discrepancies were marked as "in dispute."

Twenty-four towns had GIS parcel data that had been digitized previously. Most of these layers required editing to correct topological errors and incorporate road right-of-ways. Also, these pre-existing layers were rectified with the state township layer, wherever possible. Where there were extensive or unresolvable discrepancies, they were marked as "in dispute."

Assessment data were provided by the towns or their assessing agents in spreadsheet format, or in one case, in a digital copy of their commitment book. Some towns were reluctant to provide assessment data, citing concerns about privacy, and one town elected to provide valuations only without information about ownership. The assistance of HCPC in helping town officials to understand the value of digital town records was critical, and in the end all but two towns provided assessment data. Many town officials lacked the technical skill required to export a spreadsheet from the assessment data management programs, and HCPC staff had to provide assistance.

UMM staff formatted the assessment data and attributed the digital parcel attributes to conform to state standards, and by joining the assessment and parcel data, compiled lists of unmatched parcels and records. For 11 towns, the maps, CAD data or GIS layers provided by the towns had not been updated in five or more years, so the lists of unmatched records and parcels for these towns were extensive. Now that the data are digitized and mismatches identified, future updates should be less expensive and more easily accomplished for the towns that have previously been unable to make more frequent updates.

Several issues arose during the project that delayed the compilation of the Hancock County data. First, since the digitizing and much of the attribute data processing was done by student interns at the UMM GIS Service Center. While this arrangement provided an important educational opportunity for the students, they sometimes required more supervision, at times, than had been anticipated and budgeted. Also, the data and maps provided by the towns were of such widely varying quality and in such diverse formats that student workers often lacked the technical skills to process the data, requiring additional time and attention from their supervisors who had additional academic responsibilities.

4.2 Data Maintenance Process

The effort of maintaining up to date parcel information in a statewide composite for Maine is complicated. This is because parcel information is currently maintained by the 500 or so individual towns; in different media, using different standards, with varying levels of automation and sophistication. Several towns across Maine do not even have paper tax maps. Some just scribble updates or hand draw in parcel changes, and sometimes ten years can go by without an update. So a maintenance process at the State level must be multi-faceted to include standards, outreach, active pursuit, and support.

Our current working premise is to include basic data which allows the user to get to somewhere else for more complete data. This does two things: 1) calms the privacy concerns because it makes data like Parcel Owner a little harder to get and 2) provides more current information as the ownership data is likely to be more up to date at the town's site. We decided that in our conversations with others, towns, etc. that we should distinguish between valuation data and parcel data in the assessors' databases. These databases usually have both areas of data but we are most interested in parcel data at this time.

This premise of minimal attributes does, however, reduce the overall usefulness of the composite data for multiple parcel queries. An additional attribute that would be useful to have in the composite is Current Land Use. This attribute gives a user interested in statewide or regional patterns some good information to work with. We decided against including this attribute at this time because of the many concerns that the information is frequently not accurate. This is not a field that assessors rely on so they may not keep it updated. We are pursuing this information on a separate track and have spawned a subcommittee to develop a Land Use Coding Standard.

4.2.1 Standards

A Parcel Data standard exists and has been updated for the GeoParcel effort. We have developed an Assessing Data Submission Standard which is a minimum requirement that should not be difficult for a town to meet because it is consistent with their "Commitment" submission requirements. This minimum can be exceeded by a town that wishes to, but participating towns must meet the required list.

Standard GeoParcel Attribute Fields:

1. The required Commitment attributes: Map-Lot, Physical Address, Last sale book and page.
2. Include any ID used to link to the town's assessor database and/or GIS data.
3. Include a "date attributes last updated" field
4. Will add later – Current-Use Land Use Codes

Standard Parcel Composite Fields:

1. A "Date Parcels Last Updated" field.
2. Feature Level Metadata in the parcel composite to be able to include parcel level metadata.
3. GIS Area – an acreage amount calculated by the GIS.
4. If available, we will also carry a link to the Municipal Assessor's web site data.

We have identified a need for standardized Land Use Coding but there are no standards in place today so we intend to include this type of data in the future but not today. We have charged a sub-committee with developing a standard. This committee includes municipal assessors and has begun its work. The GeoParcels attribute standards will be updated once a Land Use Code Standard is adopted.

4.2.2 Outreach

Because maintaining GeoParcels will take some work on the part of municipal assessors, we believe that Outreach to the assessors is necessary. We must convey the importance of maintaining parcel information on a statewide basis and its benefits must be understood by the municipalities for this effort to work. Outreach must include: 1) publicizing the effort and its benefits and 2) coordination on a regional basis. We feel regional coordination is necessary to engender trust and local understanding.

We need to create a market for GeoParcels in order to get regular updates from towns. Why should a town update their GIS parcel records yearly and get their updates to GeoParcels?

Some of the benefits of GeoParcels we have identified include:

- It should reduce the number of requests each town gets for data
- Town officials can use the viewer to look at their own parcel data – for small towns this can be very handy.
- Parcels are shown on the most current orthophotography which is helpful for small towns who don't have internal capability and would also be attractive to assessors.
- Is likely to be easier and cheaper than what a town might do on its own?
- Should help promote economic development
- Should be helpful for planning purposes
- Towns like to “keep up with the Joneses” - their neighboring towns

4.2.3 Active Pursuit

Every April 1st each municipality in Maine is required to submit a commitment of their valuation to Maine State Govt. Data updates often occur after that and also sometimes during the winter. To get the most for our efforts we decided that the GeoLibrary should actively seek out data updates twice a year – around July and February. It will take an active request from the GeoLibrary to get updates from most towns.

Some towns will want to update more often and our process will allow towns to make more updates. For some of those towns that update more often, they have the ability to self update our version of their town's data as they maintain their own version. For towns that send data for us to update our parcel composite, automated routines will be written to run the pieces that can be automated because this will be a significant chunk of the towns and the number of these towns will grow. We will also offer support to towns that do not have the capability to send us their data or to update it themselves.

For the semi-annual updates, as a minimum, we will request those data fields that are required in the commitment as an attribute “table”. We will also request parcel geometry updates but we know that they are updated less often. A 3 – 5 year cycle for updating the geographic data is about right for those towns that don't do annual updates.

4.2.4 Support and Coordination

It is clear that someone at the state level must guide, coordinate and support parcel maintenance activities. Since we have outlined an active pursuit of updates for attributes once per year and geographic updates every 3 years, we must fund and put into place a mechanism to do this.

We look to a regional approach to help coordinate the several hundred towns and to existing organizations if at all possible. In many cases coordination can be done through existing regional planning groups such as Regional Planning Commissions (RPCs) and Councils of Governments (COGs). In our pilot we found that having the Hancock County Regional Planning Commission involved was very helpful to getting information from the towns. Towns tend to trust the RPCs and COGs because of the existing relationship they have so it makes it easier to get what is needed to digitize parcels. We found that cooperation can come down to a simple thing like a

town has only one copy of their tax maps and is nervous about having them brought out of town for digitizing.

The private sector also plays a big part in parcel maintenance. We see the RPCs in a coordination role with the towns, not as the creator or updater of parcels, although we know some do this type of work today. The RPCs can take a role as the QA for parcels done by the private sector. We may put out an RFP to develop a short list of vendors who would be willing to digitize and/or update parcel data to the state standards in each geographic area.

Funding is always the biggest obstacle to an initiative like this one due to its nature of benefiting many but no one entity enough to fully fund it. A few ideas we have for funding are to follow the State Orthophoto Program's lead in terms of county/regional accumulation of funds to get an area flown or asking assessors to add a little money to their parcel update projects to get their resulting data into the composite. This would not be much additional cost and would relieve the towns from posting their data at their convenience.

4.3 GeoParcels Viewer

One of the key components of this project was the ability for the public to see the results of the parcel program, through a web-accessible viewer. We entered into an agreement with four counties in Oregon to share an open-source code base for viewing and querying cadastral data, based on MapServer and GeoMoose (both open-source web-mapping tools). The data for Hancock County will be loaded into this viewer in June 2011 and provided online from the MEGIS website (<http://www.maine.gov/megis>).

(5) Conclusion

It is unreasonable to expect that a solution for a statewide property records system can be architected and deployed under a \$45,000 program. This is a large, complex and intractable problem that is not easily solved. However, we have found that through an incremental approach we have been able to make strides, we have built support and enthusiasm, and we have mapped out how such a system should work and how it might be developed. This project gave us the opportunity to pilot our ideas and to develop them more fully. Though funding the implementation of our system is still elusive, particularly in these economic times, we now have the details we need to move forward. We are confident that by keeping a large number of stakeholders involved, holding expectations high, minimizing waste and redundancy, and maintaining continuity and consistency of vision over the long view, we can build a dependable, sustainable cadastral framework for Maine.

NEXT STEPS

Maine has already begun to implement this project beyond just Hancock County. We requested an additional \$200,000 in cadastral data funding as part of our broadband mapping grant, which was provided. These data will help to bring parcel data together for most of Maine, and integrate such data with assessor's data and deeds records (where counties allow this - not all do). We will expand our viewer and work with our code development partners in Oregon to embrace a wide variety of cadastral functionality for end users. Where we need the most assistance is in the maintenance process, which is the most challenging part of the cadastral framework.

CAP FEEDBACK

Maine has received several CAP grants and has found them very helpful in developing processes that support geospatial coordination. The assistance we received was sufficient for the pilot project, but not for implementation at a statewide extent.