

# **Yellowstone County GCDB Accuracy Improvement**



**A request for MLIA funding  
Fiscal Year 2013-2014**

**Submitted by  
Yellowstone County  
Geographic Information Systems  
January 2013**

**Primary Applicant:**

Name of principle individual: Annette Cabrera  
Name of agency/entity: Yellowstone County  
Street: P.O. Box 35043  
City: Billings  
County: Yellowstone  
State: MT  
Zip Code: 59107  
Contact email address: [acabrera@co.yellowstone.mt.gov](mailto:acabrera@co.yellowstone.mt.gov)  
Contact fax address: 406-256-2736  
Contact phone: 406-256-2773  
Department: Information Services  
Division: Geographic Information Systems

**Project Partner:**

Name of contact: William Grayson  
Name of Agency: US Bureau of Land Management  
Street: P.O. Box 36800  
City: Billings  
County: Yellowstone  
State: MT  
Zip Code: 59107  
Contact email address: [wgrayson@blm.gov](mailto:wgrayson@blm.gov)  
Contact phone: 406-896-5009

**Project Partner:**

Name of contact: Stewart Kirkpatrick, State GIS Coordinator  
Name of Agency: Montana State Library  
Street: P.O. Box 201800  
City: Helena  
County: Lewis and Clark  
State: MT  
Zip Code: 59620  
Contact email address: [skirkpatrick@mt.gov](mailto:skirkpatrick@mt.gov)  
Contact phone: 406-444-9013

**Date Submitted:**

**Date Received by State:**

**Descriptive Title of Applicant's Project:**

Spatial accuracy improvement of the Bureau of Land Management's (BLM) Geographic Coordinate Data Base (GCDB) in Yellowstone County, Montana

## Relevance and Public Benefit

Montana's cadastral data layer is based on the Bureau of Land Management (BLM) Geodetic Control Database (GCDB). This database is known to be inaccurate up to several hundred feet in some areas. When more spatially accurate data is collected using global positioning system (GPS) methodology (i.e. road and structure locations), it does not vertically align with cadastral data (and all other layers based on cadastral data including fire districts, election districts, school districts, etc.). This causes confusion for non-GIS users when viewing the layers overlaid with each other. It also produces inaccurate results when analyzing data which relies on accurate vertical alignment. One example would be incorrectly identifying structures (collected via GPS) within an emergency response zone (based on spatially inaccurate GCDB data) which could result in delayed response time to the emergency.

The solution to this problem is to acquire better control points which can then be incorporated into the GCDB data, thus allowing for improvement to the Geodetic Control framework, adjustment of the Cadastral framework, as well as the Boundaries framework. This solution directly ties to the FY13\_14 Land Plan Priority A2: 'MSDI Framework layers are developed, integrated, maintained, disseminated and preserved in an efficient and standardized manner' and grant category B1.1 'MSDI data partners contributing to statewide framework data may apply for grants according to the published MLIA grant application process'. This grant proposal will not only improve the accuracy of the mentioned MSDI framework layers, an additional benefit is the enhancement of vertical integration with all framework layers.

In order to ensure consistent collection, additional survey control points will meet or exceed the functional specifications for GCDB enhancement contracts that have already been developed and used for previous successful projects of this type.

This proposal is multi-jurisdictional in several ways. Yellowstone County will be working in partnership with the State level via theme stewards (grant category B1.2 'Those data partners must work in advance with the MSDI Theme Stewards to provide data in common formats that promote data integration'), the federal level through the Bureau of Land Management involvement, and managed at a local level. The control collected will improve the accuracy of the GCDB which is a federal dataset and is used by local surveyors as well as incorporated into the statewide geodetic control framework.

The Yellowstone County cadastral geodatabase is integrated with many data layers including subdivisions, certificates of survey, legal and ownership parcels, mobile home parks, condominiums/townhomes, railroad leases, rights of way, easements, parks, fire districts, public lands, tax increment districts, multiple zoning districts, election districts, soil districts, school districts, school attendance boundaries, levy districts, irrigation districts, water and sewer districts, drain districts, municipal boundaries, emergency service districts and more. The GCDB serves as the foundation for these layers. Therefore more spatially accurate GCDB will benefit each of these districts individually but also as a whole for the public and other governmental agencies which need this information for various projects/purposes.

The local surveying community will benefit from the additional control data collected and uploaded to the Montana Control Point Database which is accessible via the Montana GIS Portal meeting grant category B3.1 'Statutorily qualified Organizations that wish to expose spatial data holding to the public by producing standardized metadata and publishing it through the Montana GIS Portal'. Also, additional corner records will be filed and kept in the Yellowstone County Clerk and Recorder's Office for future reference by the public.

Perhaps most importantly, the general public will benefit as seen by the emergency response example.

## Scope of Work

**Project Goal:** To improve the spatial accuracy of the GCDB in Yellowstone County

### **Objective 1:** Finalize Scope of Work

- Yellowstone County will prioritize corners for collection and develop scope of work
- Yellowstone County will produce maps of prioritized corners divided into geographical collection areas

#### **Deliverables:**

- Scope of work document
- Maps for each collection area

### **Objective 2:** Hire contractor

- Yellowstone County will create and post Invitation to Bid
- Yellowstone County, in coordination with grant partners, will review bids and select contractor
  - **Deliverable:** Signed contract

### **Objective 3:** Develop Collection plan

- Contractor will research corner recordation via Yellowstone County Survey Interactive Mapping Site and other available resources including County and City Government personnel, local surveyors, and local utility companies to ascertain if additional PLSS control has been collected and is publicly available.
- Contractor will produce maps for each collection area that at a minimum has the points to be collected differentiating those with and without corner records, the 2011 NAIP aerial imagery and road centerline data.
- Contractor will schedule a meeting with all interested parties to take place after the initial review to inquire whether participants have useable geographic coordinates that they would be willing to submit to the project. The Project team will meet to discuss, review, and finalize the data collection plans.
- Contractor will develop a data collection plan for each collection area based on their estimation of the ease of coordinate collection, availability of existing coordinates, relative existing accuracy, and estimated final accuracy after adjustment.
- Yellowstone County will produce and provide a letter for use by the Contractor to serve as an introduction to landowners as to the purpose of the project

#### **Deliverables:**

- Maps for each collection plan area updated based on additional resources
- Meeting held
- Collection plan document
- Letter provided

### **Objective 4:** Collect approximately 200 corner locations

- Contractor will collect, or obtain from existing sources, coordinate positions on all points designated in the collection plan. Coordinates collected by the Contractor will have a certifiable accuracy of less than 1-meter. Contractor must be able to certify an accuracy for coordinates obtained from other sources, however that accuracy may be greater than 1-meter.

#### **Deliverable:**

- Certification by the Contractor's Public Land Surveyor, stating that all points collected or obtained from other sources meets the accuracy requirement

**Objective 5: Submit collected data**

- Contractor will submit collected points and metadata to the BLM for review and acceptance
- Contractor will submit all project metadata and all metadata on collected or obtained points in a format that meets the specifications of the Montana Control Point Database. The coordinates and metadata will be entered into the MCPC Input spreadsheet to meet the specifications of the Montana Control Point Database.
- Contractor will file documents with the Yellowstone County Clerk & Recorder

**Deliverables:**

- Points and accompanying metadata received by BLM for review
- Coordinates and accompanying metadata entered in the MCPC Input Spreadsheet
- Corner documents are recorded

**Objective 6: Yellowstone County Data Adjustments**

- Yellowstone County personnel will update the cadastral data and integrated layers using the adjusted GCDB. This objective is not included in the timeline as acceptance and processing time by the BLM and subsequently, acceptance and processing time by MSL varies. However, Yellowstone County will make these adjustments within two months of receipt by Yellowstone County of the adjusted GCDB.

**Deliverable:**

- As is currently the case, Yellowstone County will make daily updated cadastral and administrative boundary data available via downloads by the Montana State Library Geographic Information Division

**Project Timeline:**

Generally each phase is dependent on previous phase completion. However, coordinate collection could begin as research and data collection planning is completed in each collection area.

<b>Objective</b>	May to June 2013	July to Aug 2013	Sept to Oct 2013	Nov 2013 to April 2014	May to June 2014
SOW finalized	xxxxxxxx				
Contract signed		xxxxxxxx			
Plan collection			xxxxxxxxxx		
Coordinate collection				xxxxxxxxxx	
Submit data					xxxxxxxxxx

**Project Management and Organizational Capability**

Annette Cabrera, Yellowstone County GIS Manager, will oversee this project and provide supervision of staff from Yellowstone County. She has over 22 years of GIS experience and managed a similar grant in 2009. The 2009 grant encompassed 26 townships. The project was required to collect 193 corners but upon completion, a total of 215 corners were collected. These corners were added to the Montana Control Point Database, Yellowstone County geodetic control data set, and incorporated into the GCDB. Corner record documents were filed with the Yellowstone County Clerk & Recorder. Due to extreme weather conditions the project had delays but was successfully completed before the end of the fiscal year.

As part of a prior grant, Ms. Cabrera supervised the creation of a complete spatial data set of all corner documentation on file with the Yellowstone County Clerk & Recorders office and an associated interactive mapping site (<http://www.co.yellowstone.mt.gov/mapping/survey/survey.asp>) for use by surveyors and other interested parties. This data layer is continually updated as new documents are recorded.

Ms. Cabrera has been actively involved in the development and/or maintenance of several MSDI framework layers including cadastral, transportation, structures, geodetic control, and boundaries since their inception.

Mike Powell, GIS Technician, has over 15 years of GIS experience including over 10 years with Yellowstone County. He is responsible for maintaining cadastral, geodetic control and boundary data for the County. Mr. Powell will assist with the control collection planning and review of the deliverables.

Stewart Kirkpatrick, Montana State GIS Coordinator/Geodetic Control Theme Steward, will assist with contractor selection, contract specifications and project planning.

William Grayson, BLM Project Manager, will review collection plans, point metadata, adjusted townships, contractor reports and be responsible for acceptance of data related to the GCDB deliverables.

Yellowstone County will issue an Invitation to Bid to Registered Land Surveyors and/or companies employing Registered Land Surveyors for this project. Selection of successful bidder will be decided based on qualifications as submitted with input from participating partners.

## Budget

**Personnel:** Yellowstone County Personnel - estimated at 160 hours at County billing rate of \$50/hour which includes fringe benefits. This estimation is based on hours spent for the 2009 grant which had a similar scope of work. Some tasks will be accomplished more efficiently due to previous experience and automation of processes. However, because this grant is to further refine the GCDB, determining specific corners to collect will be more time consuming. Also, additional data layers that are based on the GCDB/cadastral data have been developed and will require additional time to adjust.

**Travel:** None anticipated

**Equipment:** Existing hardware and software will be used

**Supplies:** As needed for maps, reports, etc.

**Contractual:** Professional services will be provided by successful bidder.

Cost estimations are based on the following factors:

- The 2009 Yellowstone County grant cost per point was approximately \$300.
- Current cost per point based on consultation with other local governments range between \$238 and \$571.
- Due to the need for specific corners to achieve desired results, it is assumed that a higher percentage of undocumented corners will be collected. This translates to a higher cost per point.
- BLM now accepts resource grade GPS collection (previously survey grade was required)

Based on these factors a cost per point is estimated at \$300. 200 points @ \$300 = \$60000

Applicant share: Funding is available from the county's GIS Department Reserve Fund.

**Other:** None anticipated

No maintenance costs are anticipated for the corners collected in this project.

**Applicant budget summary**

Category	MLIA Share	Applicant Share	Other Share	Total
a. Personnel		8000		8000
a.1 Fringe Benefits				
b. Travel		0		0
c. Equipment		0		0
d. Supplies		150		150
e. Contractual	45000	15000		60000
f. Other		0		0
<b>Totals</b>	<b>45000</b>	<b>23150</b>		<b>68150</b>

**Statements of Support**

See attached

**Renewable Grant Accountability Narrative**

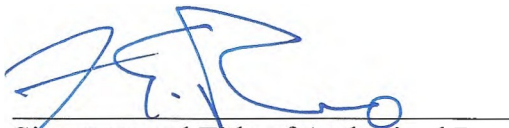
N/A

**Application Signature**

I hereby certify that the information and all statements in this application are true, complete and accurate to the best of my knowledge and that the project or activity complies with all applicable state, local and federal laws and regulations. I further certify that this project will comply with applicable statutory and regulatory standards.

I further certify that I am (by my signature) authorized to enter into a binding agreement with the Montana State Library to obtain a grant if this application receives approval.

James E. Reno  
Yellowstone County Commissioner



Signature and Title of Authorized Representative(s) of Public Entity Applicant

Date: 2/5/2013