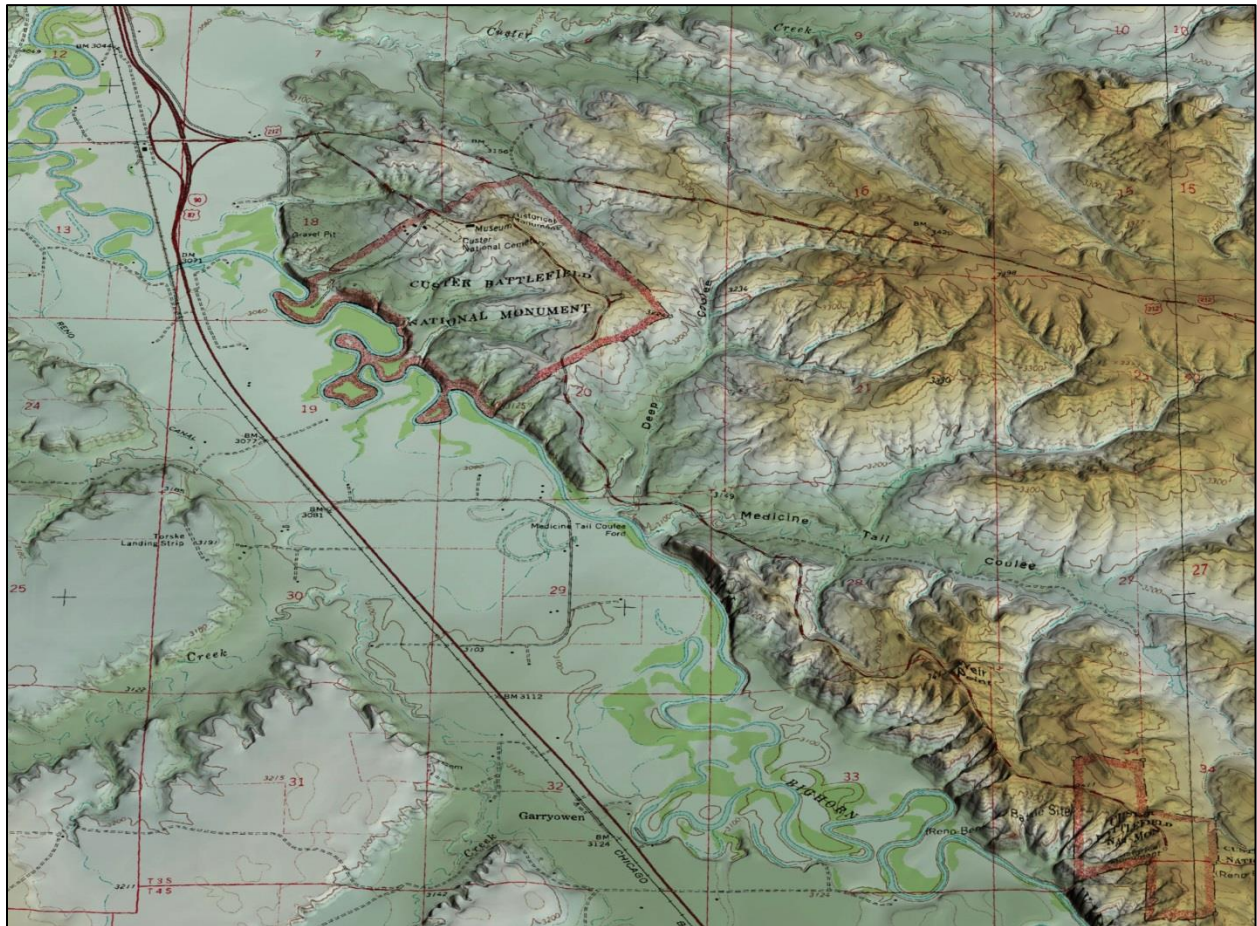*Montana Spatial Data Infrastructure (MSDI)*

MSDI Work Plan: Montana FY15/FY16

Compiled for the Montana Land Information Advisory Council
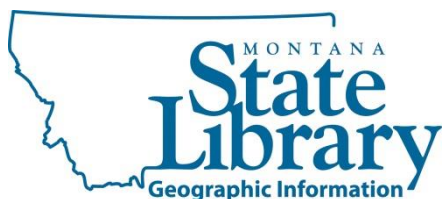

Final Draft: May 12, 2015

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Introduction

This Montana Spatial Data Infrastructure (MSDI) Work Plan provides the Montana Land Information Advisory Council (MLIAC) with an update about data development work and issues related to each of the 15 MSDI framework datasets (Administrative Boundaries, Cadastral, Climate, Elevation, Mapping Control, Geographic Names, Geology, Hydrography, Hydrologic Units, Land Use/Land Cover, Orthoimagery, Soils, Structures and Addresses, Transportation, and Wetlands).

The Work Plan highlights accomplishments and challenges with MSDI data development and stewardship by looking back at the previous Montana fiscal year and looking forward to the work anticipated for the coming Montana fiscal year. Also in this Work Plan are high level descriptions of identified issues that MSDI theme stewards have reported. These issues need guidance and attention from GIS leaders in the state such as the members of MLIAC to help resolve them.

This Work Plan accompanies and summarizes a much greater level of detail gathered over the past four months that is now published online for each theme via MSDI web pages linked from the Montana Geographic Information Clearinghouse website (http://geoinfo.msl.mt.gov/Home/msdi). This detailed information covers the following topics for each theme: data description, data construction, publishing and archiving, cross-MSDI relationships, data outreach, success stories, current projects, and research and development.

Appendix A is a list of Montana-specific GIS acronyms.

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GIS Coordinator's MSDI Annual Report

MSDI datasets are generally accepted as the best available, standardized, statewide spatial data that meet the essential digital geographic information needs of Montana's citizens, its government, commerce, legislature, area researchers, and more. For complete information about each of the 15 MSDI framework datasets, please visit http://geoinfo.msl.mt.gov/Home/msdi.

Look Back: Montana FY15

Significant milestones were achieved with several MSDI themes in FY15. On the Cadastral front the Montana State Library (MSL) took over the accuracy enhancement and publication of the digital Public Land Survey (known as CadNSDI Montana) from the U.S. BLM. Starting in January 2015, CadNSDI Montana is being published quarterly, with significant enhancements occurring in Yellowstone and Teton counties as well as on the Ft. Belknap and Crow Reservations.

Each area that is adjusted requires significant additional work to bring other data like tax parcels, public lands as well as administrative boundary themes such as county boundaries and school districts into alignment. MSL is still fine tuning the work flows associated with vertical integration of the many databases that are wholly or partially coincident with the PLSS and expects those workflows to be 90% complete by June 30, 2015. More information on this process can be found at http://mslapps.mt.gov/Geographic_Information/Applications/cadnsdi.

While the Cadastral upgrades may have taken center stage, several other important achievements need to be recognized and are summarized as follows:

- The Multi-State Control Point Database underwent substantial schema modifications and has been recognized by the FGDC Cadastral Subcommittee as the blueprint for creating a mapping control point database. The Montana State Library's work on control point standards is recognized as a model by the FGDC Cadastral Subcommittee at http://www.nationalcad.org/PLSSWorkgroup/PLSSWorkgroup.html
- The State Library's Water Information System, in conjunction with the state's Hydrography working group, published a hydrography stewardship and editing guide as well as an online application for submitting and viewing hydrography data edits via the Hydrography Edit Request Viewer. The Viewer allows users to view where hydrography dataset edits are being made and subject matter experts to propose where revisions are needed. More information on these and other hydrography achievements can be viewed at http://geoinfo.msl.mt.gov/home/msdi/hydrography

- Major data additions to the Climate theme were published by the Montana Climate Office in FY15. This data can be accessed at http://www.climate.umt.edu/products/default.php

Nationally, the Coalition of Geospatial Organizations (COGO) released a report card that grades the performance of the nation's geospatial infrastructure. While the report card was not entirely favorable, and was viewed negatively by some federal agencies tasked with federal stewardship of the NSDI, it was an important step in getting policy makers to understand the importance of geospatial data to the nation. The report can be viewed at http://cogo.pro/uploads/COGO-Report_Card_on_NSDI.pdf.

Subsequently a bipartisan group of senators has introduced the Geospatial Data Act of 2015 (S.740) that would provide more accountability for the collection and maintenance of the NSDI. The National States Geographic Information Council has compiled a summary of the act which is located at http://www.nsgic.org/public_resources/Geospatial_Data_Act_Flyer_032815.pdf . MLIAC has submitted a support letter to Senator Daines, a member of the Senate Committee on Commerce, Science and Transportation, which will hear the proposed bill.

Look Forward: Montana FY16

During this MSDI Work Plan development process MSDI theme leads were provided standardized annual report templates, initially populated with information about the theme that was captured from older reports and theme web pages. Theme leads were asked to update and return their report. At that point, hour-long interviews were scheduled with the theme leads to help insure that the annual reports captured all relevant information. After another iteration of review, final annual reports were compiled for each theme, including project status and proposed projects for Montana FY16.

While we initially planned to publish the content of these theme annual reports as an appendix to this document, the sheer length of the reports (over 100 pages) made that approach unwieldy. The content of the theme annual reports have been posted to each theme's web page (http://geoinfo.msl.mt.gov/Home/msdi). Access to this new information is provided through a series of links in each theme's the right navigation pane. For this MSDI Work Plan we have summarized one important proposed project for each theme with links to other proposed projects derived from each theme annual report.

Administrative Boundaries

Priority Project - Publish the subthemes that were aligned to CadNSDI Montana in 2014 and potentially publish other subthemes that will be aligned in FY15 and FY16. Examples of boundaries that were aligned but not published are county and school district boundaries. This work was put on hold due to the loss of staff however the position has been filled. There is a significant backlog of work to get many additional boundary datasets that currently comprise the Montana Natural Heritage Program's Managed Area Database aligned with CadNSDI Montana. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/administrative_boundaries/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/administrative_boundaries/Research

Cadastral

Priority Project - Research and define a transparent public lands transfer process where multiple stakeholders could publish transfers. Public land transfer information is an area that requires too many blind calls to agencies that have not designated accountability to one known person or department. A mutually-agreed upon, cross-agency cooperative work flow is needed so that when there is a land transfer the information is posted so that data and land management interested parties are notified. Other FY16 proposed projects can be found at http://geoinfo.msl.mt.gov/Home/msdi/cadastral/Projects.

Climate

Priority Project - The Montana Climate Office has had numerous requests for near-term climate projections. MCO staff will begin to evaluate different climate projections and how to characterize basins in Montana. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/climate/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/climate/Research

Elevation

Priority Project - In the absence of an MSDI Elevation theme steward, request that MLIAC (or designate) work with the MSDI Elevation Working Group to create a plan/strategic vision for obtain enhanced elevation data for Montana. One crucial step is to create a survey for the GIS community inquiring about the need for enhanced elevation data and possible funding sources. Create the survey in a manner that elicits use cases. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/elevation/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/elevation/Research

Geographic Names

Priority Project - Add GNIS citations and insertion dates to the database. The USGS has a citation for every record saying where (such as USGS maps, National Inventory of Dams, phone books, other specific maps, etc.) it came from and when the record was entered into the database. MSL has this data, but need to build a look-up table for the citations. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/geographic_names/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/geographic_names/Research

Geology

Priority Project – If this MSDI theme does include groundwater, mineral, and seismic data, update the MSL MSDI Geology page to reflect the groundwater, mineral and seismic map resources. If there is consensus that the MSDI Geology theme includes the groundwater, mineral, and seismic data in addition to geology, work with MSL to get links to those data published on the MSDI web page. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/geology/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/geology/Research

Hydrography

Priority Project - Propose ways to expedite the USGS NHD editing process for Montana. MSL's Water Information System has submitted a grant application to USGS to explore ways to submit bulk edits that were accomplished using alternative tools to the hydrography event management (HEM) tools provided by USGS. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/hydrography/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/hydrography/Research

Hydrologic Units

Priority Project - Discuss which HUC levels to publish in a standalone HUC dataset and which HUC levels to publish in a web map service. Part of the discussion could also include what data use statistics may be valuable to collect. Other FY16 proposed projects can be found at http://geoinfo.msl.mt.gov/Home/msdi/hydrologic_units/Projects.

Land Use/Land Cover

Priority Project - Upgrade all the forested ecological systems within National Forest boundaries using the latest VMap (this work is dependent on the availability of funding). Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/land_use_land_cover/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/land_use_land_cover/Research

Mapping Control

Priority Project - Increase outreach to surveying firms and encourage them to submit their GPS control points using the new MCPD spreadsheet and the new MCPD database schema. Other FY16 proposed projects can be found at http://geoinfo.msl.mt.gov/Home/msdi/mapping_control/Projects.

Orthoimagery

Priority Project - Obtain, host, and distribute the 2015 NAIP. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/orthoimagery/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/orthoimagery/Research

Soils

Priority Project - Create a User Outreach Plan. This would be based on research about who uses the soils data. Who are the audiences, what do they need to know in general; what are the idiosyncrasies of the data? Point users to the Soil data viewer; existing NRCS procedures and Help documents about SSURGO. Determine what outreach is NRCS data related and what outreach might be related to NRIS and ensure that the outreach related to NRIS is reflected on the NRIS home page. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/soils/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/soils/Research

Structures and Addresses

Priority Project - Coordinate with willing local governments to research automated update routines. Other FY16 proposed projects can be found at http://geoinfo.msl.mt.gov/Home/msdi/structures_and_-addresses/Projects.

Transportation

Priority Project - Meet with MSL Structures and Addresses staff, and potentially some local government data providers, to determine what MSDI road centerlines needs to be NG9-1-1 ready.   Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/transportation/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/transportation/Research

Wetlands

Priority Project - Complete mapping wetlands for 319 Montana USGS quads using existing BLM funding. Other FY16 proposed projects and enhancements can be found at:

- http://geoinfo.msl.mt.gov/Home/msdi/wetlands/Projects
- http://geoinfo.msl.mt.gov/Home/msdi/wetlands/Research

MSDI Work Plan for MLIAC and GIS Coordinator

As the individual MSDI theme reports were being compiled several issues were brought forward by the theme stewards and theme leads that they felt were beyond their ability and sphere of influence to resolve. They stressed that just as they are expected to compile a work plan, MLIAC and the GIS Coordinator should annually adopt an MSDI strategy to address the issues brought forth. MLIAC's strategy should focus on policy-related issues that need substantial progress before some MSDI proposed projects can be implemented. The GIS Coordinator's strategy should be to facilitate communication and accomplishments related to the issues. Below are four such issues, respectfully submitted by MSDI theme stewards and leads, for MLIAC and GIS Coordination guidance.

Issue 1: MSDI Data Development Funding

On numerous occasions over the past year MLIAC has been informed of the dwindling resources available through the Montana Land Information Account. The Montana FY15/16 Land Plan budget cut $100,000 from funds earmarked for MSDI work. Some themes such as Land Cover/Land Use can't attempt any new data enhancements if this funding is not available. Certain patterns suggest that even total economic recovery will not restore MLIA funding to past levels. It is time that the Council steps up and addresses the need for additional MSDI funding sources beyond MLIA. A funding plan needs to be prepared and submitted to the Governor's Budget Office before the next budget cycle begins in Montana FY16.

Issue 2: Next Generation 9-1-1 Planning

Any sort of honest examination of the readiness of Montana to implement the next generation of 9-1-1 technology would suggest that we are substantially behind neighboring states. North Dakota, South Dakota and Idaho all have documented plans in place and are in some stage of implementing those plans:

- North Dakota:
  http://www.ndaco.org/image/cache/NextGen_911_Master_Plan_-_Kimball.pdf

- South Dakota:
  http://dps.sd.gov/sd_911/documents/RPT130815skwSD911MasterPlan.pdf

- Idaho:
  http://www.bhs.idaho.gov/Pages/ECC/Docs/State%20911%20Plan.pdf

Any MLIAC action should engage with existing state efforts and organizations. The Montana legislature did pass HJ7, calling for an interim legislative committee to research the issue. It is unknown at this time whether that interim study will be prioritized.

In the past, the state has had an active 9-1-1 Advisory Council. MLIAC should press the Department of Administration for both state and local GIS representation on the re-formed 9-1-1 Advisory Council and ask for a determination on whether current 9-1-1 funds can be used by local address and road centerline providers to bring their data up to National Emergency Numbering Association (NENA) standards.

Issue 3: Establishing a State MSDI Elevation Theme Steward.

- Montana needs to establish a state MSDI Elevation Theme Steward. Montana can't reasonably expect to acquire higher resolution elevation data without a state champion that will advocate for such acquisition. The USGS has initiated the 3-DEP program that will match state's quality level 2 LIDAR acquisitions. However, without an organized effort or collection plan, we will not be able to take advantage of the program. State leadership to formulate Enhanced Elevation Strategic Vision and promote 3DEP as a resource at the state level is critical. MLIAC should work with the Governor's Office and other interested parties to establish and support such a role within a state agency.

Issue 4: Coordination with Federal Agencies

Several MSDI stewards and leads have noted the fragmented efforts between their programs and federal agencies that should be supporting state efforts. Examples of such disconnects are:

- The BLM Cadastral Survey at the state office, formerly a highly-supportive partner in state cadastral efforts, no longer responds to phone calls or emails. While asked, they appear to have no interest in participating as members of MLIAC.
- Significant edits to the Geographic Names Information System (GNIS) have been submitted to USGS by MSL. These edits have languished for over two years at USGS without incorporation into their master database resulting in a redundant and laborious workflow for the MSDI Geographic Names theme lead each and every time Montana Geographic Names database is published.
- MSL's Water Information System acts as the state steward for the National Hydrography Database (NHD) yet the USGS does not provide stable long-term funding to support this role. Additionally, USGS NHD data structure and editing routines make it difficult for states to remain in that federal stewardship model while still attempting to meet their own state and local hydrography needs, not the least of which is keeping this critical data current, reflecting the constant natural changes each year in water quantity and flow.
- Montana's new USGS National Map Liaison is now located in South Dakota and serves in that capacity for North Dakota, South Dakota, Wyoming, and Montana. We look forward to working with him. We do, however, notice that through time this role appears to be becoming less significant and more diluted in USGS's eyes. In the past, Montana had its own National Map Liaison. We're concerned about how a liaison with four jurisdictions instead of one (or two as of late) may mean that he's less focused and less responsive to Montana tasks. See also Issue 3 above.

Other MSDI stewards simply noted that they have noticed federal agencies, for a variety of reasons (probably including sequestration), have become much more inward facing in the last few years. If their perceptions are correct, perhaps less frequent or thorough communication and partnering with stakeholders such as MSDI theme stewards is somehow tied to the unfavorable NSDI grades in the COGO report card (COGO p.4).

It would be unfair to characterize all our coordination with federal agencies as unsatisfactory. For example the U.S. Department of Transportation (USDOT) recently sponsored a national address summit, reaching out to state and local address authorities for their expertise and ideas on how to construct a national address database. The costs for Montana state and local

representatives to attend was covered by USDOT. These types of positive coordination efforts should be the norm and not the occasional event. We believe that the state, the local, and the federal representatives on MLIAC should be actively searching out innovative ways to improve communication and coordination between these levels of government to prevent and reverse what appears to be jurisdictional movement in opposite directions on several MSDI issues.

Appendix A: Acronyms

Organizations	
FGDC	Federal Geographic Data Committee
MACO	Montana Association of Counties
MAGIP	Montana Association of Geographic Information Professionals
MARLS	Montana Association of Registered Land Surveyors
MLIAC	Montana Land Information Advisory Council
NSGIC	National States Geographic Information Council
URISA	Urban and Regional Information Systems Association
WGA	Western Governors' Association

Agencies/Companies	
BIA	Bureau of Indian Affairs, U.S. Department of Interior
BLM	Bureau of Land Management, U.S. Department of Interior
DMA	Defense Mapping Agency
DOA	Montana Department of Administration
DEQ	Montana Department of Environmental Quality
DNRC	Montana Department of Natural Resources and Conservation
ESRI	Environmental Systems Research Institute
FAA	Federal Aviation Administration
ITSD	Information Technology Services Division of the Montana Department of Administration. Now SITSD.
MBMG	Montana Bureau of Mines and Geology
MSL	Montana State Library
NRCS	Natural Resources Conservation Service, U.S. Department of Agriculture
NRIS	Natural Resource Information System of the Montana State Library
NGA (Formerly NIMA)	National Geospatial-Information Agency (formerly National Imagery and Mapping Agency), U.S. Military
SITSD	State Information Technology Services Division of the Montana Department of Administration
USFS	United States Forest Service, U.S. Department of Agriculture

USGS	United States Geologic Survey, U.S. Department of Interior
File Extensions	
DBF	Data Base File—the dBase file format, used with SHP
DGN	Design file—the Microstation drawing format
DWG	Drawing file—the AutoCad drawing format
DXF	Drawing Exchange Format—an AutoCad export file
EPS	Encapsulated Postscript file—a file format favored for graphics exchange
E00	An exchange format for ESRI coverage and grid datasets
GDB	Esri file geodatabase
GIF	Graphic Interchange Format—an image format commonly used on the Web
JPG (JPEG)	Joint Photographic Experts Group— an image format commonly used on the web
MDB	In GIS, an Esri personal geodatabase (becoming obsolete). More generally, the extension for a Microsoft Access database
PDF	Portable Document Format— an Adobe file format readable with free software (Acrobat Reader)
PNG	Portable Network Graphic— a format for web graphics
RTF	Rich Text Format— a generic word processing format
SBN	Part of a shape file— one of the files that store the spatial index of the features, also see SHP
SBX	Part of a shape file— one of the files that store the spatial index of the features, also see SHP
SHP	Shape file— an ESRI published spatial data format (comprised of multiple support files). See also: DBF, SBN, SBX, & SHX
SHX	Part of a shape file—the file that stores the index of the feature geometry, also see DBF & SHP
TIFF (also TIF)	Tag Image File Format—an image format commonly used in GIS
General	
CAD	Computer Aided Dispatch— a term for computer enabled dispatching
CAD	Computer Assisted (or Aided) Design (or Drafting)—a generic term for computerized drawings

CADD	Computer Assisted (or Aided) Design and Drafting
CadNSDI Montana	CadNSDI is a term used nationally to mean the spatial dataset representing the Public Land Survey System (PLSS). In Montana, this dataset is referred to as CadNSDI Montana
CFF	Cartographic Feature Files— the vector format USFS uses to publish data
CIR	Color Infrared Imagery
DEM	Digital Elevation Model— typically produced by USGS in 30 or 10 meter cell size
DLG	Digital Line Graph— a vector GIS format produced by USGS
DOQ	Digital Ortho Quad, (also DOQQ) — a quad based ortho image, from USGS, USFS, typically 1 meter in 7½' quad or quarter quad basis
DRG	Digital Raster Graphic—a scanned image of a USGS 7½' quad
DTM	Digital Terrain Model— a generic term for software terrain modeling
GCDB	See CadNSDI. Geographic Coordinate Database (GCDB)— a measurement-based digital representation of the Public Land Survey System created by the Bureau of Land Management , which served as a basis for CadNSDI (GCDB is now obsolete)
GIS	Geographic Information System or Geographic Information Science
GNIS	Geographic Names Information System—the official names of Geographic Places
HTML	Hyper Text Markup Language
IfSAR	Interferometric Synthetic Aperture Radar—airborne ifsar is a remote sensing method using radar
LiDAR	Light Detection And Ranging—a remotely-sensed digital product that is similar in principle to radar, using light instead of the microwave part of the radio-frequency spectrum
MLIA	Montana Land Information Act—passed by the 2005 Montana Legislature to provide a source funding for GIS coordination, data collection, maintenance, integration and distribution
MSDI	Montana Spatial Data Infrastructure
NED	National Elevation Dataset
NHD	National Hydrography Dataset
NSDI	National Spatial Data Infrastructure
NWI	National Wetlands Inventory

PRISM	Parameter-elevation Regressions on Independent Slopes Model— a tool used for climate mapping
PLSS	Public Land Survey System (also "PLS")
RAWS	Remote Automated Weather Station
SDE	Spatial Database Engine— an ESRI software package for serving data
SDTS	Spatial Data Transfer Standard—The vector format USGS uses for DLG version 3
TIGER®	Topologically Integrated Geographic Encoding and Referencing— U.S. Census Bureau vector data format
TIN	Triangulated Irregular Network—a generic term for terrain modeling using triangles
XML	Extensible Markup Language— a language use for applications and the internet