Montana Land Information Plan

Effective:
 July 1, 2017 to June 30, 2018 (State Fiscal Year 2018)
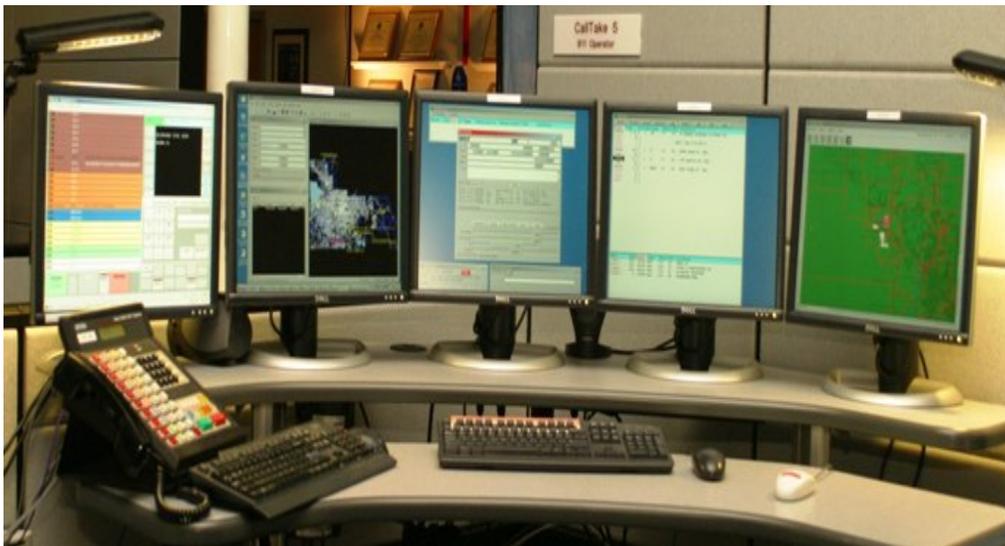
Photo courtesy of the National Public Safety Telecommunications Council

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I. Introduction and Overview

The Montana Land Information Act (MLIA) requires that the Montana Land Information Advisory Council (MLIAC or the Council), under the legislative authority of the Montana State Library (MSL), prepare an annual Land Information Plan (the Montana Land Information Plan or the Land Plan) that describes Montana's priority needs to collect, maintain, and disseminate land information (MCA 90-1-404(c)). Those priority needs are used in part to allocate funds from the state land information account. In order to define the priority needs, MSL has solicited advice from the Council, the Montana Spatial Data Infrastructure (MSDI) Theme Stewards, and other stakeholders.   Priorities must be consistent with the intent of the MLIA which recognizes the importance of digital land information for all sectors of Montana society. It also recognizes the need to ensure that digital land information is:

- Collected consistently – in accordance with standards;
- Maintained accurately - in accordance with standards; and
- Made available in common ways for all potential uses and users, both private and public.

The priorities documented in this plan describe tasks that the Council, as representatives of the larger Montana GIS community, deem critical to the work of Montana GIS users and are high priorities for data integration, maintenance and require statewide coordination.

These priorities represent key areas of focus during the plan period and are in addition to the day to day work that is conducted by MSL staff and local state and federal partners to develop and use the 15 Framework themes formally recognized by the Council and collectively referred to as the MSDI. Readers are encouraged to review online summary information about the MSDI (http://geoinfo.msl.mt.gov/Home/msdi) to learn more about theme data, its construction and maintenance, theme stakeholders, funding and support, cross-MSDI theme relationships and current related projects.

The Land Plan also reflects Montana's vision for a spatial data infrastructure that encourages and integrates data developed at the local level by those who are considered the authoritative data sources into a statewide resource that meets the needs of all Montana stakeholders. Grant priorities documented in the plan support this vision.

Finally, as is required by statute, the Land Plan contains a budget designed to accomplish the goals of the plan. By defining annual priorities, the plan provides a roadmap that directs the collective efforts of MSL, the Council, and MSDI Theme Stewards. This plan also provides guidance for our partners including the Montana Association of Geographic Information Professionals (MAGIP), GIS practitioners and others interested in contributing to the development and maintenance of the MSDI and furthering the interests of GIS in Montana.

II.   *Funding, Timeline and Grant Process*

MSL administers funds collected through the state land information account. These funds are generated through collection of recordation fees as described in MCA 7-4-2637 ((3) iii). This account represents a significant funding source to accomplish the priorities of the Land Plan. As is documented in the MSDI summary information referenced above and the Land Plan budget, MSL and other GIS partners also rely heavily on additional sources of funding to support GIS in Montana.

Since established in 2005, the state land information account has proven to be a source of funding subject to a variety of external factors including fluctuations in real estate markets and the oil and gas industry. Currently collections appear to be increasing from an all-time low in FY 2014 however collections have never reached the point where they can support MSDI needs and a robust grant program.   For this reason, the budget for this year's Land Plan shows only a modest increase over the FY 2017 plan. The budget still remains well below previous years' budgets and projected funding does not support overall needs for MSDI and grant funding.

FY 2015/FY 2016 Collection Comparison
FY2015 ($761,908.12) FY2016 ($801,187.46)
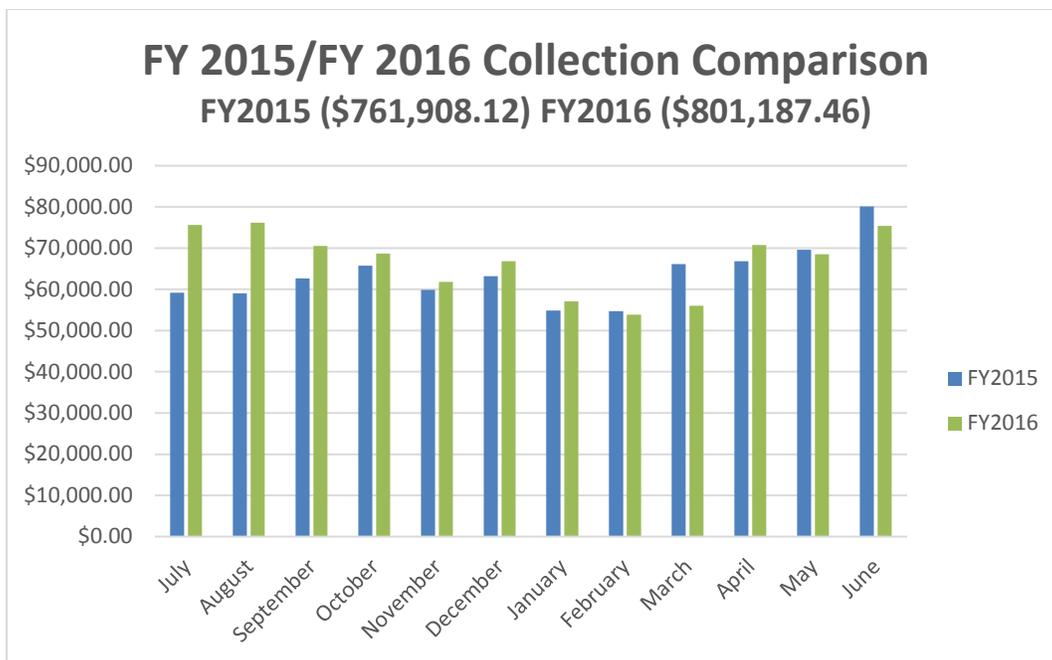
MSL makes use of MLIA funding for MSDI and GIS Coordination priorities specified in this plan. To document specific work objectives to address the priority goals for data development and GIS Coordination, MSL, in conjunction with the other MSDI Stewards will submit a work plan by May 1, 2017 for Council review. Some MSDI tasks may be undertaken by parties other than MSL; however, MSL will assume ultimate accountability for meeting the plan's objectives. These objectives documented in the work plan will be met over the course of state fiscal year 2018 (July 1, 2017 through June 30, 2018). Publication of the Land Plan in January informs the MLIA grant application process. The Council seeks grant applications from local, regional and tribal jurisdictions that will address the Land Plan grant

priorities through one-year MLIA grants. In accordance with Administrative Rule 10.102.9105 the grant application process will be announced by January 15, 2017. Announcements will be made through MAGIP, the Montana Association of Counties (MACo), the MLIAC distribution list and other communication channels. Grant applications must be received by MSL by February 15, 2017.   Review and ranking of grant applications is conducted by a subcommittee of the Council. Final grant awards are approved by the MSL Commission in June, 2017. Grants are administered by MSL and are awarded for the period beginning July 1, 2017. Grant work should be completed by June 30, 2018.

III. FY 2018 Land Plan Priorities

Section 90-1-404, MCA, requires MSL to administer the MLIA. This work is funded in part through the state land information account as well as additional funding sources including state general fund, (see Section IV) grants, and contracts.

Administrative and Coordination Functions

MSL Duties - MSL takes pride in carrying out this work in a manner that is efficient and accountable. MSL will:

- Carry out the duties of the department as described in § 90-1-404, MCA;
- Administer the MLIA grant program; and
- Staffing support for the Council.

MSDI Framework - To ensure that MSDI framework layers are developed, integrated, maintained, disseminated, and preserved in an efficient and standardized manner, MSL will:

- Conduct new data collection, ongoing maintenance data discovery through the Montana Data List, data delivery via download and web services, archival assessment and other projects as per the MSDI work plan;
- Engage stakeholder work groups to seek input on the priorities and best practices for data development;
- Support data partners through on-site visits, on-line training and other activities that promote data and technology transfer;
- Continue to expand a Montana spatial data archive that includes annual MSDI entries; and
- Develop an annual MSDI work plan, to be incorporated into the MSL work plan that prioritizes actions, supports data partners and identifies funding needs.

GIS Coordination - MSL is responsible for GIS coordination through outreach and education that is targeted to reach the GIS community. Specifically, MSL will:

- Support the creation of metadata that can be incorporated into the MSL GIS Data List;

- Support local data providers as they adopt appropriate data standards and data collection methodologies;
- Provide technical support to users of the MSDI;
- Preserve and improve relationships with MSDI data providers through support and local visits that foster knowledge transfer;
- Attend appropriate meetings and conferences including MACo, Montana Association of Planners, Montana State IT Conference, MAGIP, the National States Geographic Information Council and other meetings of subject matter experts;
- Advocate for the use of MSDI data;
- Provide consultation and advice to MLIA grant applicants as they strive to best meet the MLIA grant criteria.

Priorities for data development, integration, and coordination

In addition to the day to day administrative and coordination functions, the Land Plan identifies the following priorities for data development, integration, and coordination. Local and tribal entities are encouraged to apply for grants that build capacity at the local level as described in the following categories.

1. Land Records

The need to improve the accuracy of land record information continues to be critical for the overall accuracy of the MSDI and numerous other GIS datasets. Hundreds of townships are still in need of accuracy enhancement. Each enhancement requires planning, technical expertise, and communication so users know when data has changed. From a technical perspective the projects require:

1. Improved tools for surveyors to provide data they have already collected;
2. Alignment of coincident data such as boundaries;
3. Timely and efficient change management that provides users notifications when changes to the CadNSDI (the geospatial representation of the Public Land Survey System (PLSS)) are planned and when they actually happen.

1.a. Next Generation 9-1-1 Data Standardization

Current 9-1-1 systems are reaching end of life and the use of mobile devices as replacements for traditional land lines is ballooning. Support for the creation of a statewide Next Generation 9-1-1 (NG 9-1-1) system that utilizes standardized data incorporates MLIA's most basic vision; "…digital land information is collected consistently, maintained accurately in accordance with standards…" (§ 90-1-402, MCA) While compliance with the National Emergency Numbers Association standards for address points, road centerlines and emergency responder jurisdictional boundaries will require both funding and effort to achieve, the benefit is that these standards can improve the data currently contained in the statewide MSDI data sets. This is a critical time for local data providers need to assess, improve, and build workflows that will maintain this data in order to be ready for NG 9-1-1 implementation.

MSL will continue to serve as the lead subject matter expert to the 9-1-1 Advisory Committee. MSL will continue to attend local government coordination meetings to provide guidance regarding GIS data needs and will ensure staff aids local governments by reviewing, assessing, improving and maintaining street centerlines, address points and jurisdictional boundaries that will be required for NG 9-1-1.

MSL will continue to review NG 9-1-1 relevant MSDI datasets including road centerlines, address points and jurisdictional boundaries, to identify data improvement needs as we learn more about the NENA standards and/or as the state adopts NG 9-1-1 data standards.

Data partners should apply for grants that would enable them to assess, improve and maintain required NG 9-1-1 data, including road centerlines, address points and jurisdictional boundaries, according to the NENA standards.

1.b. County Land Records

MSL manages the Cadastral Administration through Streamlined Parcel Adjustment Workflows (CATSPAW) project to make use of ESRI's parcel fabric to improve vertical integration of the data within the Montana Cadastral Database. This work improves the accuracy of local control data, tax parcel data, administrative boundaries, etc., and aligns that data with aerial imagery. This work improves the quality of statewide MSDI data and it ensures the continued value of the Council's multi-year investment in county grants to support the collection of local Geographic Coordinate Database points.

Ongoing work to support the Montana CadNSDI will require continued coordination with the Bureau of Land Management and local governments to identify and prioritize areas for accuracy adjustments. MSL will make accuracy adjustments to the CadNSDI by incorporating additional control data created from corner recordation records held by county governments and new land surveys. In areas where the CadNSDI has been adjusted, MSL will vertically align all associated tax parcels and administrative boundaries.

Data partners should apply for grant funding that enables them to continue to collect local land records and control data that will develop and enhance administration of county records.

2. *Natural Resource Data*

Substantial resources from State and Federal partners are invested every year for the collection, maintenance, and delivery of natural resource data. For these efforts to benefit the MSDI natural resource themes, specifically Hydrography, Land Use/Cover, and Wetlands, the activities of individual agencies need improved coordination and communication to identify priority data collection and integration strategies and update schedules

2.a. Montana Hydrography Dataset

The Hydrography theme lead at MSL is the state steward for the National Hydrography Dataset (NHD). The United State Geological Survey (USGS) NHD data structure and editing routines make it difficult for Montana to support the federal/state stewardship model while still attempting to meet state and local hydrography needs. As a result, over the last several years, MSL, with input from the Hydrography Working Group, has begun to focus work on a Montana Hydrography Data which better aligns to the needs of the partners as opposed to the current NHD. Some of these needs include keeping this critical data current as there are constant natural changes each year in water quantity and flow, and adding more local-scale data.

MSL will continue to coordinate the Montana Hydrography Working Group and hold meetings approximately quarterly. This group is the primary sounding board for State agencies to express their hydrography data needs. The DNRC, Department of Environmental Quality, Fish Wildlife and Parks, and the Montana Climate Office are regular, active participants.

MSL will continue to coordinate with the DNRC to carry out Water Information System recommendations made in the 2015 State Water Plan.

MSL will continue to develop workflows that expedite the MSDI hydrography dataset editing process, especially when revisions are obtained in bulk or extracted from existing spatial datasets. Editing efforts will primarily focus on improving the spatial alignment of streams, rivers, and lakes and adding more local-scale features, such as canals, ditches, springs, and small dams and reservoirs that are not currently in the statewide dataset. Additional attention will be given to improving feature attributes, primarily flow classification (perennial, intermittent, or ephemeral).

MSL will continue to coordinate editing efforts with Glacier National Park and to seek additional sub-stewards of the hydrography dataset. Data partners are encouraged to apply for grant funds to support development of local-scale spatial data that can be added to the statewide dataset, such as canals and ditches, irrigation infrastructure, and storm water drainage systems.

2.b. Land Cover

There is a critical need for consistent annual funding to support the Land Cover and Wetlands themes. The Land Cover theme cannot be treated as a stationary product that has limited need for updates. Aggressively continuing work on the Wetlands theme cannot be treated as optional. These themes provide essential information to public and private land managers and the need for a long-term, sustainable funding strategy to support them is imperative. Given the continued reduction in MLIA funds, the current data priorities of MSL presented in this plan do not address the needs of these vital data sets. Just as the statutory responsibility of MSL for the Water Information System provided leverage to secure funding for the Water Information Manager position, MSL's statutory responsibility for the Natural Resource Information System may provide an opportunity to obtain funding sources through future legislative action for the long-term needs of the Land Cover and Wetlands themes.

The Montana Natural Heritage Program (MTNHP or the Heritage Program) acts as the state steward for the Land Use/Land Cover (LULC) dataset. In prior years, staff and resources at the UM Spatial Analysis Lab were utilized to update and maintain this data. While MTNHP was able to update this data during FY2016, this was done using one-time project funding and there is still no sustainable funding for future updates. For successful implementation of statewide natural resource planning activities, such as the Governor's Sage Grouse Habitat Conservation Program and forest and Range Management Initiative, there is a critical need for the LULC mapping to be kept current and ideally incorporate data with greater spatial resolution.

The DNRC and the US Forest Service map fire boundaries yet neither agency coordinates the delivery of this data to the LULC theme steward to assist with updates to the Land Cover Mapping and there is no established annual schedule for updating the Land Cover mapping to reflect changes due to forest and grassland fires. Likewise, there is no established interagency protocol or schedule for incorporating land use changes mapped by the State Department of Revenue as part of their land use taxation process. This is also the case for LULC changes mapped by county and local jurisdictions. Data from natural resource inventories conducted by Federal agencies such as the Natural Resources Conservation Service (NRCS) have also mapped classes of Land Use and Land Cover that could be incorporated and improve the MSDI LULC data. These and other projects have also acquired and pre-processed the Landsat satellite imagery needed for updating the MSDI LULC. Yet without funding for MTNHP staff with the skills required for development and maintenance of the MSDI LULC, not only will the data become further out of date, but it is unlikely that the Heritage Program will be able to retain the essential staff and skillset to perform future updates.

2.c. Wetlands

MTNHP had hoped to have a single statewide MSDI theme for wetlands in spring of 2016 by including historic (1980s) National Wetlands Inventory (NWI) mapping. However, after further investigation, this NWI mapping was found to be composed of a combination of:

> Outdated Mapping (NWI Legacy): This is based on ink lines drawn on aerial photographs taken from 1980-1989 at a scale of 1:58,000 to 1:65,000 that were later transferred to digital file. Only wetland features were mapped and classified; riparian areas were NOT mapped. While cartographers attempted to capture all wetlands in Montana regardless of size, the imagery did not support it. Therefore, small or linear wetlands are represented as points or lines, or not at all. While this mapping met FGDC standards at the time it was created, it no longer meets current FGDC standards.

> Incomplete Mapping (NWI Scalable): This is a recent addition (2012-2014) to the NWI prepared by the USFWS using an automated ArcMap mapping process and is intended to be an interim product. The data are generalized wetland mapping and are to be used for landscape level (small scale) use only. According to the USFWS, "these interim products may include map information at different scales, classification level(s), or resolution." In Montana, creation of the

scalable layer involved applying the Cowardin classification system to the "swamp/marsh" features on USGS Topographic maps, some of the river and lake features in the USGS NHD and other ancillary data layers. The incomplete mapping does not satisfy any FGDC standard.

In order to fully inform data users of the differences and limitations associated with these wetland mapping products as compared to the recent MTNHP wetland and riparian mapping product, MTNHP will make all three datasets and associated metadata available for separate download on the Montana Wetland and Riparian Framework MSDI download page. MTNHP will continue to seek funding for recent wetland and riparian mapping, focusing on areas where the absence of riparian mapping compromises the value of the data for planning and analysis (e.g., the Rocky Mountain Front) or where land use change has rendered the other datasets obsolete (e.g., portions of the Hi-Line).

3. *Local and Tribal GIS development*

The results of several grants from previous cycles that provided funding for rural county Web GIS development were impressive. The challenge is to keep this momentum going for other rural counties not yet invested in the technology. MSL, in coordination with local entities, will:

- Explore opportunities to create regional GIS consortiums that leverage a multi-jurisdictional approach to problem solving using GIS analysis to demonstrate the value of GIS to policy makers; and,
- Encourage localized GIS solutions that demonstrate the value of GIS in improving the quality of life for Montana citizens and building grass roots support for location based services.

IV.   *FY 2018 Land Plan Budget*

The FY 2018 Land Plan Budget represents a modest increase of $21,500 over FY 2017. This increase is reasonable given the current slight uptick in revenues in the MLIA account. A final determination for the amount of available grant funds will be made at the end of March, 2017, in accordance with administrative rule. If additional funds are available, there may be an opportunity to further increase grant funding.

Digital Library	General Fund**	MLIA Funds	NRIS State Core	Coal Tax	Anticipated Contracts/Grants	Total
PERSONAL SERVICES *	722,356	495,000			80,000	1,297,356
OPERATIONS						
Fixed Costs, General Operations	469,368	55,000		41,500	20,000	585,868
Council		10,000				10,000
UM Heritage Contract	168,092	10,000	283,523			461,615

SUB-TOTAL	**1,359,816**	**570,000**	**283,523**	**41,500**	**100,000**	**2,354,839**
MLIA GRANTS - FY 18 Budgeted		**230,000**				**230,000**
TOTAL DIGITAL LIBRARY	**1,359,816**	**800,000**	**283,523**	**41,500**	**100,000**	**2,584,839**

*GIS Personal Services FTE	General Fund	MLIA funds
User Services Staff (incld. Coordinator)	1 FTE	1 FTE
Information Management	1.9 FTE	4 FTE
Information Products	2 FTE	1 FTE
Total FTE	4.9 FTE	6 FTE

** Projection based on FY17 Appropriation

V.   *Future focused planning*

The current Land Plan reflects the priorities deemed most pressing by the Council that can be addressed within the scope of existing resources. MSL and the Council recognize that numerous opportunities exist for improved GIS data and services in Montana that are not currently being directly addressed but that warrant future consideration.

- **Climate data**: The Montana Climate Office housed at the University of Montana has discussed forming a working group, but has no budget (estimated .25 FTE) for this activity. This kind of coordination will become more important in future years as climate information is more tightly integrated with broad-based policy decisions. A climate-specific working group could also identify products and formats of interest. A broader collaboration through a working group could identify additional avenues for funding and opportunities for new products.
- **Elevation data**: The National 3D Elevation Program (3DEP) led by the USGS is being developed to respond to growing needs for high-quality topographic data. The National Enhanced Elevation Assessment identified Flood Risk management as the top business use for enhanced elevation data with a benefit nationwide of $295 to $502 million dollars annually. In Montana alone, Flood Risk Modeling (Flood Plain Mapping) and Mapping of Riverine areas are the primary drivers for enhanced elevation with the potential for $600,000 in annual benefit to the state from an enhanced elevation dataset. (http://www.dewberry.com/services/geospatial/national-enhanced-elevation-assessment) The 3DEP program estimates it will distribute over $100M to state and local partners at a 50% match rate to acquire quality level 2 (Q2) LIDAR data. The problem Montana faces is that the estimated

cost for statewide data at today's collection rates for Q2 data is $48M at a time when the state is struggling just to pay maintenance of cadastral data. A pre-proposal submitted by the Montana Bureau of Mines and Geology, for Q2 LIDAR over Roosevelt, Daniels and Sheridan Counties is estimated at $1.8 Million, meaning the state's share would be approximately $900,000; more than the MLIA account took in during FY 2014. Clearly some compromise needs to be worked out with USGS so that Montana can obtain higher quality topographic data at an affordable cost. Montana does not have an identified state steward for elevation and lack of funds prevents our participation in the USGS 3D Elevation Program (3DEP). Without leadership and funding to obtain higher resolution elevation data, GIS users have not been actively engaged in discussions around this dataset.

- **Geographic Names**: Significant edits to the Geographic Names Information System (GNIS) have been submitted to USGS by MSL though the edits have not been incorporated into the USGS master database.   For this reason, maintaining the Montana Geographic Names database results in a redundant and laborious workflow for the MSDI Geographic Names theme lead.

- **Imagery**: MSL continues to ask whether Montana stakeholders are ready and/or able to form a consortium that would pursue acquisition of higher resolution imagery than what NAIP can provide. At this point it appears there is little resolve to do this however the state's revised appraisal cycle along with local government needs may create more opportunity in the future.

- **Federal Support of MSDI**: Several MSDI stewards and leads have noted the fragmented efforts between their programs and corresponding federal agencies that historically led data development and supported state efforts. Examples of the shift in support are noted above as they relate to PLSS, NHD and Geographic Names. Other MSDI stewards simply noted that they have noticed that, primarily due to budget limitation, federal agencies have significantly reduced external coordination activities in the last few years. Some successful instances of Federal coordination are worth noting. For example, the U.S. Department of Transportation 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. Ideally, these types of positive coordination efforts should be the norm. Another example is the successful coordination between the NRCS and MSL which supports a streamlined integration of annual updates to the SSURGO soils data into the MSL data discovery and access portal and the Data Bundler applications. There is opportunity for representatives on the Council to actively seek innovative ways to improve communication and coordination between levels of government to prevent and reverse what appears to be jurisdictional movement in opposite directions on several MSDI issues.

- **GIS Coordination**: Opportunities for increased GIS Coordination abound. In addition to increasing engagement with federal partners, MSL should increase support to the State GIS Community of Interest and staff should engage local governments through the use of tools like ArcGIS Online. To that end, MSL should seek opportunities to make funding for such tools affordable for all local governments. Finally, the GIS coordinator and staff should work with the Statewide Library Resources Division of the State Library to more fully adopt GIS technology across the library, to

support adoption of GIS technology by libraries around the state and to increase access to and use of GIS data by Montanans in every community.

VI. *Summary*

Informed by the accomplishments and ongoing needs identified by previous Land Plans and MLIAC members, and within the funding resources that currently exist, the FY2018 Land Plan identifies key priorities for ongoing GIS development and coordination in Montana. These priorities included:

- Targeted work to improve the accuracy of land records at both the state and local level and vertical integration of adjustments in other MSDI themes;
- Support for local, regional, and statewide efforts to develop a NG 9-1-1 system for Montana that relies on local road centerlines, address points and jurisdictional boundaries, according to the NENA standards;
- Ongoing development of the Montana Hydrography Dataset in partnership with the NHD work group. Development includes improved processes for editing the dataset and the identification and inclusion of locally significant features;
- Work to identify funding to continue to maintain the Land Cover dataset;
  - Mapping USGS quads for which no current or historical mapping exists and evaluating historic mapping; and,
- Continuing to build capacity for local and tribal GIS programs.

To accomplish these tasks, this Land Plan allocates $800,000 in MLIA funds for GIS Coordination, MSDI development and grants to local, regional, and tribal governments. MSL and the Council are mindful of the fact that current funding only allows us to accomplish a portion of the ongoing work necessary to develop a robust and well-adopted GIS infrastructure in Montana as envisioned by the Montana Land Information Act. MSL also recognizes a need to increase GIS coordination activities with a variety of partners, including local governments, and state and federal agencies to further the vision of a Spatial Data Infrastructure that encourages and integrates data developed at the local level by those who are considered the authoritative data sources into a statewide resource that meets the needs of all Montana stakeholders.