D R A F T

TO: Library Commission

FROM: Jim Hill

DATE: November 15, 2006

SUBJECT: Role of MSL/NRIS Relating to GIS

At the commission meeting on October 11, 2006, you asked me to provide you an analysis of the optimal GIS Operating Environment from the MSL point of view as a counterpoint to the Report on the Common GIS Operating Environment (Report) prepared recently for the State Chief Information Officer.

After much thought and discussion with MSL management, I've come to the conclusion that in a truly cooperative relationship, the roles and responsibilities described in the 2003 Memorandum of Understanding between MSL and Information Technology Services Division (ITSD) are appropriate. Staff from both agencies worked hard to make this document the basis for a good cooperative working relationship that recognized the mandates of both agencies. We are therefore reasonably satisfied with the role of MSL as described in the Report – as interpreted by MSL and represented in my response to the Report dated September 14, 2006 (copy attached) – as that role is generally consistent with the MOU. As we testified to the drafters of the report, MSL would not desire to assume the functions of the ITSD GIS Bureau unless merging of the programs is absolutely necessary in order to achieve true coordination. On the other hand, we also stated clearly our position that moving the state information management and access functions of the library to ITSD would not be acceptable to the Library Commission.

In our opinion, if there is a problem with the Report, it is not with the role described for MSL. The problem is that the role of ITSD is not well defined, leaving open the possibility that ITSD may interpret its role in a manner that is not consistent with or supportive of the MSL role – the very situation that, in our opinion, is at the heart of the ongoing conflict between the two agencies . This is a complex situation, with many players each having a point of view, a long history of conflict, and having the changing nature of information management and access at its center.

Although geospatial information is the focus of the current conflict, similar issues will need to be resolved as MSL evolves from managing a print-based state publications collection to an electronic collection. The basis for the conflict results from different interpretations of two Acts – the Montana Information Technology Act (MITA) and the Montana Land Information Act (MLIA). Clarification of interpretation of these two Acts as they apply to MSL, through policy, rule, or amendment of the Acts, is necessary to truly resolve this conflict for the long term.

It is my opinion that the real reason we are unable to rectify this situation is that we have not yet been able to communicate the issues to persons who are in the position to set policy and provide guidance to staff. The situation is therefore driven by staff who act in

accordance with their personal perceptions or interpretations, not necessarily in accordance with true management buy-in or direction.

I believe there are three questions at the heart of this issue:

1. As government information evolves from print-based to electronic, is the Library Commission role of ensuring current and long-term access to public information produced by government still valid?
2. Given that the Library Commission remains responsible for ensuring current and long-term access to public information, what is the balance between the decision-making power of the Library Commission and the decision-making power of the State CIO in his oversight role relating to information technology as provided for in MITA? If a new Geographic Information Officer (GIO) position is filled, the same question will apply.
3. Given that the Library Commission remains responsible for ensuring current and long-term access to public information, and given the ITSD intent to centralize management of information technology resources, what responsibilities can (or should) the Library Commission hand over to ITSD while still maintaining the Commission's responsibility to carry out its mission?

I certainly don't have the answers to these questions, but I do have opinions.

1. As government information evolves from print-based to electronic, is the Library Commission role of ensuring current and long-term access to public information produced by government still valid?

Some would argue that facilitating access to current electronic information can be left to the private sector (e.g. Google). Others may grant that, for public information, access must be somehow assured by government – not left to the private sector. Even then, some would argue that access in the electronic world can be assured by providing only search and discovery functions – that the actual data can remain in the hands of producers or others instead of being assimilated and managed by the library as has been the case regarding print publications. In this scenario, keeping the links between the discovery function and the actual data synchronized is an issue, as files are posted, altered, renamed, moved, or discarded when no longer deemed pertinent by the producer. For some of the information cataloged by MSL this is just a fact of life, as it would be impossible for MSL to assimilate and manage for long-term access much of the data and information referenced in its catalogs.

However, I believe, and current law seems to support the concept, that MSL's responsibilities for public information produced by government are greater. Ensuring current, widespread, and long-term access is fairly straightforward in the print world, but is anything but straightforward in the electronic world. I believe that MSL's responsibility goes far beyond pointing the user at the source. Ensuring that government agencies and Montana citizens are able to locate and obtain public information now and

in the future, and ensuring that all MSL patrons have access to this information, requires much more than pointing patrons to its last known location.

When public state information is in electronic format, other issues arise. Often, multiple versions exist at multiple locations, giving rise to the question, "what is the authoritative version?" The names or locations of electronic documents change frequently, often without notice and without consideration of the consequences, breaking the link between discovery and access. Many potential users of information published electronically may not be able to consume the information in the format in which it is produced, due to hardware or software limitations, or due to their lack of expertise regarding the electronic format of the document. Hardware and software evolution will very likely render the published version unusable for future generations.

Geospatial data has unique issues affecting access and use. In addition to the concerns expressed above, geospatial datasets from diverse sources, in their native format, are often difficult to integrate into a single project. MSL has attempted to improve the utility of geospatial datasets in many ways. We have cut very large files representing large geographic areas into small files for easier consumption. We have grouped small files into larger files representing geographic areas of common interest (counties or watersheds), again, for easier consumption. We have served the same dataset in its native format and in compressed format for ease of use for different customers. We have processed sets of files representing small geographic areas to ensure that they form a cohesive dataset when viewed at a regional or statewide level. MLS has re-projected diverse datasets produced in incompatible coordinate systems into a common base map representation to facilitate the use of datasets from multiple sources. As GIS technology evolves, MSL continually adopts new data storage formats and converts existing datasets to the new formats.

Geospatial datasets in their native format are also of use to a very limited population, generally IT staff with GIS knowledge. We have in the past attempted to expose these valuable datasets to a wider audience. MSL often serves the same datasets through direct access, download, online viewing applications, and presented as preformatted maps, again, to enable widespread use by information technology professionals as well as non-professionals.

Electronic state publications are in need of similar treatment. In order to enable widespread use and ensure long-term availability, MSL may have to store and serve the document in several formats using different media, or may have to develop methods to preserve the links between serial publications or extricate multiple individual publications from a single file. MSL may have to identify and obtain the means to continue to read these publications as computer hardware and software evolve.

Many of these functions may seem non-traditional for libraries; however, it is the historical library attention to user needs that, in my opinion, makes the library the logical agency to continue to provide these functions. Certainly, for public information generated by government, merely placing a record in our card catalog (or geospatial data

clearinghouse) to point the user to a source of the information is not a satisfactory solution to the need for widespread and permanent public access.

2. Given that the Library Commission remains responsible for ensuring current and long-term access to public information, what is the balance between the decision-making power of the Library Commission and decision-making power of the State CIO in his oversight role relating to information technology as provided for in MITA.

The passage of the Montana Information Technology Act (MITA) placed extensive oversight powers regarding "information technology resources" in the hands of the CIO and ITSD. These oversight powers have been broadly interpreted and applied, and are considered by ITSD and the CIO to extend beyond information technology to include content – public information generated by state agencies. This results in a significant overlap with the oversight functions of the library commission. The passage of the Montana Land Information Act (MLIA) provides ITSD with specific oversight powers relating to GIS and geospatial data, the focus of the current discussion between the two agencies and a harbinger of the soon to come greater discussion regarding state publications.

The significant powers of ITSD under these two Acts, which provide ITSD input to the MSL budget at the governor's office, significant control over other available funds, significant control over data flow from producers, and significant control over all IT-related purchases – and which seemingly give that agency the option of acquiring, storing, managing, and providing access to government information – impinge on the powers and duties of the library commission, both in terms of its decision-making capability and in terms of its responsibility to carry out its mandate. Greatly complicating this matter is the fact that the GIS Bureau of ITSD seemingly desires to acquire, manage and provide direct access to geospatial data, contending that the MSL role should be limited to entering a record into our GIS clearinghouse pointing at ITSD as the manager and source for the information. In this narrow interpretation, the GIS clearinghouse operated by MSL becomes nothing more than an electronic card catalog for geospatial datasets.

I believe that the legislature choose to place the responsibility for ensuring current and long-term access to Montana's public information in the hands of a library commission for good reason. The seven-member board ensures that:
- Important decisions affecting access to public information are not in the hands of any single individual.
- Decisions regarding access to public information are removed from the politics that might affect other executive branch agencies, including the office of the Governor.
- Decisions regarding access to public information are made by persons knowledgeable of the laws and public policy regarding public information and patrons rights.

When considering the legal, societal, ethical, and technical aspects of public information access, it only makes sense that the State Librarian, under the oversight of the Library Commission, must remain responsible for safeguarding access to public information. The CIO's oversight role as it applies to MSL should, in my opinion, be limited to advice on technical issues and should not limit in any way the ability of the State Librarian and Library Commission to carry out their mandates as they deem appropriate.

Formal clarification of the roles and responsibilities of the CIO as they relate to the Library Commission and the State Librarian would likely take amendment of both MITA and MLIA. Clarification may be more easily accomplished via rule or policy, but such approaches may not have the impact necessary to truly resolve questions of responsibility and authority for the long term.

3. Given that the Library Commission remains responsible for ensuring current and long-term access to public information generated by government, and given the ITSD intent to centralize or consolidate[1] management of information technology resources, what responsibilities can (or should) the Library Commission hand over to ITSD while still maintaining the Commission's responsibility to carry out its mission?

While we are cautiously optimistic that MSL could function well in a scenario wherein MSL IT infrastructure is placed in the ITSD data center but managed by MSL – the centralization option – we believe that the Library Commission would not be fulfilling its responsibilities by handing off responsibility for management and access of public information to ITSD – the consolidation option. The actions MSL takes in assimilating, managing, and modifying its collection are not incidental to MSL's function, they are in many ways the primary function of MSL. Although these functions can technically be carried out by others, MSL is the agency expected to have knowledge of its patrons needs and having the responsibility to meet those needs. Without direct management of its collection, MSL would no longer be readily able to modify the datasets comprising its collection as deemed necessary to best serve its patrons changing needs, would have a more difficult time maintaining the links between the data and our data discovery applications, would not be assured that the information would remain available in the form and manner that it deems appropriate, and would not be assured that internal ITSD decisions would not drive decisions regarding access.

As a direct and very current example of the nature of our current relationship with ITSD, I give you the content of an email message from the ITSD GIS Bureau chief to me on October 13 regarding the recently acquired aerial imagery data layer.

> When I was gone to Knoxville/Little Rock, the NAIP uncompressed images were delivered to us. In keeping with the spirit of the Common Operating Picture, ITSD will process and load this imagery into SDE, host at the existing ITSD State Data Center, and deliver it both through web services and download. We actually

---

[1] ITSD defines "centralization" as placing agency IT infrastructure within the ITSD data center in a manner that allows the agency to retain management control over the infrastructure, and "consolidation" as handing off agency IT needs to ITSD, to be served by ITSD through service level agreements.

D R A F T

> believe there are better solutions out there than the SDE option, however
> researching those solutions will have to wait until we have more time. We will
> work with MSL staff to insure that the metadata is properly formatted and
> delivered through the MSL metadata clearinghouse/portal. When we are finished
> processing the data, the original external drives will be available for check-out.
> As I understood from the MSL response to the Common Operating Picture, MSL
> still intends to host this data as well, however if you want to explore other options
> ITSD is committed to work with you to meet your needs.

For the record, MSL//NRIS has assimilated, processed, added value to, stored, managed, and provided access to the previous aerial imagery data layers and fully expected to do the same for the 2006 dataset. We have been operating SDE (a spatial database for storing geospatial data) for years, have long been delivering geospatial data through web services as part of our program to provide widespread access, and have provided direct download capability in several ways for all of the datasets in our collection. Handing off all of these functions would constitute a major change in the way that we do business and would constitute a significant change in the way that users access those services.

This single email touches on many of the issues discussed above. Decisions regarding public information are made by ITSD staff without engaging MSL as to the consequences of those decisions. Assumptions are made regarding the interpretation of the Report that impinge on MSL's ability to carry out its mandate. ITSD assumes the assimilation, storage, management, and access role for this particular GIS dataset, relegating the MSL role to that of an electronic card catalog. MSL is offered the opportunity to acquire the data, but in doing so would now appear to be duplicating that which ITSD is doing.

It must be noted that the Report recommends that geospatial data be stored in a "GIS warehouse" at ITSD. The report also recommends that MSL remain the manager of "archival" geospatial data – that which the library maintains for long-term access purposes. As might be expected, interpretations vary on what constitutes a GIS warehouse, who should manage data in the GIS warehouse, and what constitutes archival data. These and many other questions must be answered in order to ensure an effective cooperative relationship between the agencies. The Report would place this type of decision-making in the hands of a Geographic Information Officer (GIO) in a neutral position within the office of the Governor.   The reality, however, is that the GIO will likely be staffed at ITSD under the state CIO. Regardless of the placement of the GIO, the Report does not recognize any decision-making or policy-setting role of the Library Commission in these matters.

I hope this information is helpful to you in determining the best course of action to pursue to resolve current issues relating to geospatial data, to facilitate the coming discussion regarding state publications, and to ensure that MSL can continue to fulfill its mandate.

D R A F T

Attachment: MSL response to CIO Report on GIS Operating Environment

TO: Dick Clark, CIO

CC: Darlene Staffeldt, State Librarian
             Montana State Library Commission
             Montana Land Information Advisory Council
             NRIS Advisory Committee
             Amy Carlson, OBPP
             Nancy Hall, OBPP

FROM: Jim Hill, Administrator, Digital Library Division, MSL

SUBJECT: CIO Report on GIS Operating Environment

DATE: September 14, 2006

We appreciated the opportunity to review the report from your GIS advisory committee
and to hear the discussion regarding the report at the MLIAC meeting on September 7th.
I'm sorry that you missed the meeting; I highly recommend that you listen to the tape of
the meeting in order to receive the full benefit of the discussion.

We at MSL were very satisfied to see that the report recognizes and supports MSL's
continued role regarding geospatial data. We were also gratified to hear the MLIAC
members' support of the conclusions and recommendations relating to MSL and NRIS.
Although MLIAC did not take formal action on the report, I believe all concerned are
hoping for and expecting to see an immediate and positive outcome from this effort.

Although the report itself has no formal bearing on the work of MSL, we are anxious to
be responsive to the issues leading up to the assessment. Regarding MSL and NRIS, the
recommendations of the report are generally consistent with MSL statutes, our Library
Commission approved strategic plan, and the still-valid MOU between ITSD and MSL
signed in 2003 which describes the respective roles of MSL and ITSD regarding
geospatial data. Implementing the report recommendations requires no change in MSL
statute or other MSL guidance. We are therefore happy to provide you the following
summary of MSL/NRIS activities as they relate to the recommendations in the report.

Recommendation 6: **The NRIS should be the GIS Clearinghouse for the State of
Montana. In this capacity the NRIS performs a GIS Data Library function by being
the <u>primary</u> gateway (Montana GIS Data Portal) for spatial information access by
state and local agencies, and the public.**

This recommendation supports current operations at MSL/NRIS. MSL/NRIS:
  * collects, manages, and provides multiple avenues of discovery for metadata
    relating to all geospatial datasets of interest to the Montana GIS community
    and all users of Montana-related geospatial data;

- ensures metadata are readily available for all significant datasets in its collection;
- assists producers of geospatial data in the development of metadata;
- provides input into the development/evolution of metadata standards;
- trains producers of geospatial data in the development of metadata to improve the quality of metadata in the clearinghouse;
- trains library patrons in the use of metadata to help locate data and ensure it is used appropriately; and,
- will soon replace our long-standing FGDC metadata node with a comprehensive metadata Portal based on the ESRI model (in process).

We must note, however, that we have been unable to staff a full-time metadata coordinator position since ITSD withdrew our funding for that position several years ago. We are therefore seeking additional funding through the upcoming legislative session to support our metadata activities.

Recommendation 5, "Data enhancements and applications for MSDI usability and access may be done by any agency . . ."

The definition of Clearinghouse and Portal used in the report are very applicable to the MSL role. However, they do not, by themselves, describe broader avenues of access to geospatial data and derivative or value-added products provided by MSL that are well used by our patrons and partners. Recommendation 5 is therefore particularly appropriate for MSL. In actuality, the metadata storage and discovery services described under "clearinghouse" and "portal" serve only a fraction of our users - primarily GIS professionals. Most of our patrons, GIS professionals and laymen alike, discover and obtain the data and information they seek via numerous other data discovery, visualization, and access systems at the library, which we will continue to support and enhance as necessary to best serve our patrons.

Recommendation 7: Any public or private entity may provide GIS data through the Montana GIS Data Portal. However, the <u>primary</u> responsibility for providing MSDI data access through the portal is that of the Data Steward.

MSL/NRIS has always and will continue to strongly encourage all data producers to provide metadata to the clearinghouse, and will encourage producers to "take ownership" of the metadata they produce to keep it current and maintain links to datasets. In that regard, we will:
- continue to assist producers of geospatial data in the development of metadata;
- continue training both producers of geospatial data and library patrons in the development and use of metadata; and,
- use a team approach to development and maintenance of the Portal to ensure all entities depending on the Portal to provide an avenue of access for their data have input to its design and operation.

Recommendation 8: The NRIS GIS Data Portal function is <u>not</u> limited to GIS natural resource information, but should include all GIS data resources relevant to Montana.

This recommendation is consistent with our past analysis of MSL/NRIS functions and duties under general library statutes and represents no change in operation for MSL/NRIS. We will continue to provide multiple avenues of discovery and access for all geospatial datasets.

Recommendation 9: The GIS data archival responsibility should remain with the NRIS, except where that function is performed by the data source entity.

MSL will continue to work with all data producers to ensure that copies of their data remain accessible for use. Ensuring stable, long-term access to public data and information, not limited to geospatial information, is a fundamental aspect of our library function. The reality is that most often, users of data outside of the producing agency do not access production databases or datasets, but in fact access copies of datasets, which are often subsets, stripped of information, not intended for publication (e.g. personal identifiers). MSL routinely receives copies of datasets from agencies to offer for public access, and to eliminate the need to expose production data. MSL uses these copies as the basis for its internal information access tools and, where appropriate, maintains the copies for long-term access.

Recommendation 10: GIS Application development services should be phased out of the NRIS. Application services in this context means application services other than those performed to provide data access.

This recommendation requires no change within MSL, as NRIS performs application development services <u>only</u> when it serves to provide or improve access to information, in accordance with its agency mandate. However, in accordance with the spirit of the recommendation - that NRIS should focus its attentions on its internal information access applications - MSL/NRIS has for some time encouraged its partners to seek application development services elsewhere, and is seeking additional funding and staffing to better support its internal operations. A favorable outcome to the current NRIS EPP funding request will go a long way toward enabling us to focus on our internal operations as recommended in the report.

Recommendation 11: The DOA, ITSD Data Center should serve as the <u>primary</u> GIS Data Warehouse. All GIS, non-source data content will be stored at the ITSD Data Warehouse.

MSL supports the concept of centralization of its data infrastructure and information assets in the new data center to be built to serve all agency IT infrastructure needs. We understand that ITSD is currently in the position of having to add capacity even to serve its own needs until the data center can be built. On the other hand, MSL has a robust data center capable of handling its data and information storage responsibilities for the next

few years without further significant investment. MSL's highly popular data discovery and access tools and services also depend on our ability to store and manipulate the data. In order to avoid having to add capacity at the old ITSD data center to store geospatial data and in order to take advantage of the investments already made at MSL, MSL will continue to store the data and information comprising its collection within its on-site data center at this time. MSL is committed to working with ITSD to determine how best to take advantage of the new data center while serving MSL business needs in the most efficient manner possible and to ensure a smooth transition of its infrastructure and information assets to the new facility when the time comes.

Other Recommendations:

The summary above addresses those recommendations in the report that relate directly to MSL/NRIS. Other recommendations also have a significant effect on MSL/NRIS and on the entire Montana GIS community.

Recommendation 1: Create a Geospatial Information Office for the State and hire a Geospatial Information Officer (GIO) who will report directly to the Governor's Office, with responsibility and oversight for managing the geospatial information efforts across all State agencies.

Recommendation 12: The DOA, ITSD, GIS Service Bureau, including the State GIS Coordinator, should be realigned to report to the GIO.

Aside from suggesting moving the GIS Bureau to the office of the Governor and describing the coordination activities of that office, the report contains little specificity regarding the functions and duties of the bureau - particularly those relating to data layer creation and maintenance. It is clear from the discussion in the report that your GIS advisory committee sees the need for GIS coordination and fund administration to take place in a neutral setting. The discussion during the MLIAC meeting of the GIS Bureau's use of MLIA funds for purposes other than coordination highlighted the problematic nature of the current situation, wherein the agency responsible for overseeing the MLIA fund also competes for funding for purposes beyond its coordination and fund administration role. Several MLIAC members suggested that the coordination role should be separated from the data layer maintenance role, which seems to be the intent of the report - although that is not clearly stated.

We encourage you to consider the benefits to an approach compatible with the generally accepted protocol in which data stewards are selected on the basis of the relationship of the agency business needs to the particular data layer. With funding available via MLIA grants, the Department of Transportation would be encouraged to steward the transportation layer (they were once very desirous of doing so); Disaster and Emergency Services would be encouraged to steward the critical structures layer (again, they have previously expressed interest), and the Department of Revenue might take on the cadastral layer. MSL/NRIS would consider stewardship of layers for which no other steward agency exists, as it has done for the hydrography layer. In this scenario, steward

agencies would be on an equal footing in competing for MLIA funds and the funding would more likely be granted on the basis of priority of need for the data layers.

I will present your report and these thoughts to the NRIS Advisory Committee and the Library Commission for consideration and will advise you of any recommendations made by these groups regarding MSL's activities as they relate to this report. I encourage you to attend future meetings of these two groups to facilitate open discussion of the issues and concerns regarding GIS and geospatial data in Montana.