# NATURAL RESOURCE INFORMATION SYSTEM, MONTANA STATE LIBRARY

## Fiscal Year 2010 Report to THE NRIS ADVISORY COMMITTEE

Please accept this report regarding the Montana Natural Resource Information System (hereinafter referred to as NRIS) and the Montana Natural Heritage Program (hereinafter referred to as MTNHP) core services as is required by the Memorandum of Understanding (MOU), with our core funders.

### 1) PURPOSE

The operation of NRIS and MTNHP are the established by Chapter 650, Laws of 1983, and Chapter 395, Laws of 1985, and codified under Title 90, Chapter 15, MCA, This report documents the implementation of the appropriation made to the Department by the 61st Legislature under House Bill 2 to partially fund NRIS and MTNHP.

### 2) PRODUCTS AND SERVICES

a) MSL utilizes its General Fund allotment for NRIS and funding passed through from selected agencies under House Bill 2 (hereinafter referred to as core funding) to maintain NRIS and MTNHP and to provide primary or essential information products, services, and related expertise to governmental agencies, universities, private business, organizations, and the public, with emphasis on service to the agencies providing funding under House Bill 2 (hereinafter referred to as source agencies). Products and services developed and/or maintained during fiscal year 2010 (FY2010) include:

i) Maintenance of the infrastructure (hardware, software, physical plant) necessary to provide NRIS & MTNHP products and services including:

(1) Maintenance of a robust hardware platform to ensure the effective management, security and broad, consistent availability of NRIS & MTNHP information resources and services.

*(a) At the end of FY2009, NRIS purchased three new servers which form the platform of our upgrade to ArcGIS Server. AGS01 is the primary public web mapping service and application server. AGS02 also hosts applications and serves map services consumed by applications. Both servers host publication SQLServer Databases and File Geodatabases that feed those web mapping applications and services. SQLINT provides an internal editing environment for data processed by NRIS and MTNHP staff. As these data sets become ready for distribution they are pushed to the externally accessible publication environment (on AGS01 or AGS02).*

(2) Maintenance of a comprehensive suite of vendor software as necessary to maintain NRIS & MTNHP.

*(a) NRIS and MTNHP currently make use of ESRI's ArcGIS 9.3.1 desktop and server software. NRIS maintains ERDAS Imagine Professional software that is used to fill Image processing requests. NRIS also maintains a license of MrSID GeoExpress software used for editing and encoding (compressing to) MrSID Format raster data.*

*(b) NRIS maintains and supports the National Hydrography Dataset (NHD) GeoEdit tools needed to edit the USGS NHD. NRIS has two floating ArcInfo licenses that can be loaned out to groups interested in editing the NHD but that lack the resources or business need to support an ArcInfo license for other uses.*

*(c) NRIS is seeking to integrate project management software to streamline business workflows. NRIS has sought guidance from the ITSD PMO in this effort. Currently NRIS is exploring some freely available options while the PMO tries to settle on a Project Management and Project Portfolio Management recommendation for state agencies.*

(3) A system for archiving of datasets to ensure access to the historical record of natural resource information. NRIS will utilize expertise developed by the Library of Congress and other institutions to archive GIS datasets including imagery.

*(a) NRIS became an informational partner with the Geospatial Multistate Archive and Preservation Partnership (GeoMAPP). This effort is funded by the Library of Congress. GeoMAPP's first interim report was published in March of this year. NRIS looks forward to*

*continued partnership with GeoMAPP as we plan for and implement a geospatial archive based on standards and best practices developed by this national organization.*

*(b) MSL/NRIS has been identified in the MAGIP Imagery Framework Business Plan as the group responsible for developing and maintaining an archive of Imagery Framework data. Currently this consists of the 2005 NAIP data set which NRIS continues to provide download and web service access to. NRIS is working to identify the long term access needs for this data and intends to integrate it into the larger geospatial archive project.*

*(c) NRIS also maintains snapshots of a variety of data over time such as cadastral data. These datasets will be integrated into the geospatial archive project in order to make them more discoverable and accessible to interested patrons.*

*(d) DEQ has initiated discussions with NRIS to help identify data sets currently being served through the data list, the GIS Portal, or the Digital Atlas that are out of date and need to be identified as no longer current data. Working with DEQ, NRIS will establish a prototype for archiving data over time. NRIS will work with all of its partners to properly identify such data and determine the best way to make it discoverable and accessible as part of the geospatial archive project.*

ii) Maintenance and updates to the NRIS clearinghouse for important natural resource information, including:

(1) Tools that allow users easy access to natural resource information including the Montana GIS Portal, and other integrated mapping applications such as the Montana Digital Atlas and Topofinder I and II;

*(a) In FY2010 NRIS released a significant upgrade of the Montana GIS Portal (http://gisportal.mt.gov) on the ArcGIS Server 9.3 software.*

*(b) Also in FY2010, MSL released the Montana Place Names Companion (http://mtplacenames.org). The Companion is an online version of the publication released by the Montana Historical Society. This application was NRIS's first true test of ArcGIS software which will become the basis of a new Digital Atlas.*

*(c) MSL plans to release the ArcGIS version of our flagship application, the Digital Atlas in FY2011. The initial release will target Topofinder functionality, but when completed this project will be a long needed update to all of the NRIS core tools including the Digital Atlas, Topofinder, and Data Bundler.*

(2) Natural Heritage databases that document the status, observations, occurrences, range, predicted habitat and characteristics of Montana animals, plants and habitats, emphasizing those of conservation concern;

*(a) In FY2010, MTNHP released a first edition Checklist of Montana Vascular Plants http://mtnhp.org/Docs/020210_MT_Plant_List.pdf that provides the scientific and common names, global and state status ranks, origin (native or exotic), wetland indicator status, and coefficient of conservatism for 2,559 vascular plant species.*

*(b) At the end of FY2010, MTNHP Point Observation Databases surpassed a milestone of 1million animal observations (1,030,792), an increase of over 800,000 records in the last 5 years. In addition, 97,738 locations have been documented in the central databases where a structured animal survey was performed (e.g., bird point count or small mammal trapping station). This information has been made accessible to the general public, biologists, and natural resource managers via both the Natural Heritage Tracker http://mtnhp.org/Tracker/NHTMap.aspx and the Montana Field Guide http://fieldguide.mt.gov/ web applications and is used to respond to mediated requests such as environmental reviews for state agencies.*

*(c) In FY2010, MTNHP collaborated with a variety of species experts to conduct Species of Concern reviews for 9 fish species, 3 mammal species, and more than a dozen plant species. These reviews resulted in the removal of Gray Wolf (Canis lupus), Bog Laurel (Kalmia polifolia), Short-leaved Bluegrass (Poa arnowiae), Rocky Mountain Dandelion (Taraxacum eriophorum), and Showy Praire-gentian (Eustoma grandiflorum), and the addition of Iowa Darter (Etheostoma exile), Northern Redbelly Dace (Phoxinus eos), Pygmy Whitefish (Prosopium coulteri), Deepwater Sculpin (Myoxocephalus thompsonii), and Bloom Peak*

*Douglasia (Douglasia conservatorum). Species of Concern reports are available online at: http://mtnhp.org/SpeciesOfConcern/?AorP=a*

(d) *In FY2010, MTNHP zoology and ecology staff collaborated with species experts and partner agencies to create: (1) a poster, available at the Montana State Library and Montana Fish, Wildlife, and Parks Offices, summarizing the biology, identification, status, distribution, habitat use, host fish, and key watersheds of the freshwater mussels of Montana; and (2) a pamphlet checklist of Montana dragonflies and damselflies that includes information on each species' distribution, month of occurrence, distribution, and relative abundance: http://mtnhp.org/docs/2009_odonata_checklist.pdf.*

(e) *At the end of FY2010, MTNHP staff turned on the new Milk Marias Wetlands Assessment web site. In 2008, the MTNHP was awarded an EPA Wetland Program Development Grant to develop a long term rotating basin wetland monitoring and assessment program. The pilot project for the rotating basin assessment program took place in the Milk and the Marias watersheds located in north central Montana. A simple map and data retrieval web site was developed to provide access to the results http://mtnhp.org/ecology/assess/mm/*

(3) Statewide and regional data-layers made available through governmental agencies, organizations and the private sector including the Montana Spatial Data Infrastructure (MSDI) data sets.

(a) *Imagery - In addition to serving as a steward of the MSDI Framework as described in section iv, NRIS continues to provide several other statewide imagery data layers to patrons. NRIS continues to maintain the Aerial Photograph web site and has added access to the 2009 NAIP and the USGS Border Imagery from this page. This page has also been updated to encourage users to take advantage of web services hosted by NRIS and the Base Map Service Center (BMSC).*

*In addition to aerial photography, NRIS continues to participate as a member of the MontanaView consortium and hosts the group's web site in an effort to advance the availability of satellite imagery for Montana.*

(b) *Hydrography - NRIS continues to serve as the state steward of the United States Geological Survey (USGS) National Hydrography Data Set. NRIS is working with state agencies to migrate hydrography related data to use the high resolution NHD as its spatial reference to allow for more widespread sharing of these hydrography related data sets. Examples include the FWP fish data, the DEQ Water Quality data, and the DNRC water right point of diversion data.*

(c) *Soils – NRIS has a close partnership with the Natural Resources Conservation Service (NRCS) and continues to work closely with them to provide access to soil data for the state of Montana. The soils web pages hosted at NRIS for the NRCS were updated during FY10. These pages were reformatted to be more consistent with the standard state template and the content was updated to be more current and outdated links were removed.*

(d) *Land cover – NRIS makes several land cover datasets available including the National Land Cover Dataset (NLCS) Land Cover, land cover data from the Gap Analysis project, and land cover data from the USGS. The Natural Heritage Program is the steward of the MSDI land cover Framework Layer and is developing a modified version of the GAP Land Cover data set for use as the state framework Land Cover Layer.*

(e) *Wetlands – The MSDI Wetland Framework data steward is the Montana Department of Environmental Quality and they are supported heavily in this effort by the Montana Natural Heritage Program. More information about this framework dataset is available in section iv.*

(f) *Stewardship – MNTHP maintains Stewardship coverage in conjunction with staff at the Information Technology and Services Division of the Department of Administration.*

(g) *Cadastral - NRIS has traditionally made cadastral data available through our clearinghouse web site. With enhancements to the BMSC cadastral web site including the addition of downloadable county shapefiles NRIS no longer sees a need to provide this service. NRIS continues to create regular snapshots of the cadastral data set for archival purposes, but now directs user to the BMSC web pages for access to the most current cadastral data. This is a significant step forward in our work to provide more collaboration and to support the federated GIS model.*

(4) Reports, monographs, and reference materials;

(a) In FY2010, MTNHP produced the following reports and publications for partner funded projects (all MTNHP reports can be accessed online at http://mtnhp.org/reports.asp):

*Hendricks, P. 2009. Terrestrial Mollusk Surveys in Glacier National Park during 2008, including an illustrated key to all documented species. Report to Glacier National Park. Helena, MT: Montana Natural Heritage Program. 6 pp. plus appendices.*

*Hendricks, P. and B. Maxell. 2009. Montana. pp. 68-69. In: D.H. Olson (coord. ed.) Herpetological conservation in northwestern North America. Northwestern Naturalist 90: 61-96.*

*Kohler, N.S. and C.L. Currier. 2010. Checklist of Montana dragonflies and damselflies. Helena, MT: Montana Natural Heritage Program and Montana, Department of Fish, Wildlife, and Parks. Pamphlet.*

*Maxell, B.A., S. Blum, and K.V. Walker. 2010. Preliminary Report: Mapping Black-tailed Prairie Dog (Cynomys ludovicianus) colonies across Montana using the National Agriculture Imagery Program (NAIP) 2005 imagery. Report to the Miles City Field Office of the Bureau of Land Management and the Nongame Program of the Montana Department of Fish, Wildlife, and Parks. Helena, MT: Montana Natural Heritage Program. 27 pp. plus appendix.*

*McCaffery, R.M. and B.A. Maxell. 2010. Decreased winter severity increases viability of montane frog population. Proceedings of the National Academy of Sciences 107(19):8644-8649.*

*Mincemoyer, S. 2010. Checklist of Montana vascular plants: Dated April 12, 2010. Helena, MT: Montana Natural Heritage Program. 71 p.*

*Montana 2010 Animal Species of Concern Report - Online*

*Montana 2010 Plant Species of Concern Report - Online*

*Newlon, Karen R. and Meghan D. Burns. 2009. Wetlands of the Flathead Valley: Change and Ecological Functions. A report to the Montana Department of Environmental Quality and U.S. Environmental Protection Agency. Montana Natural Heritage Program, Helena, MT. 38 pp. plus appendices.*

*Newlon, Karen R. and Meghan D. Burns. 2009. Wetlands of the Gallatin Valley: Change and Ecological Functions. A report to the Montana Department of Environmental Quality and U.S. Environmental Protection Agency. Montana Natural Heritage Program, Helena, MT. 32 pp. plus appendices.*

*Stagliano, D. 2010. Invertebrate organisms undergoing changes in the Smith River. PBMR News 30(1): 10-11.*

*Stagliano, D. 2010. Mussels of Montana. Helena, MT: Montana Natural Heritage Program, Montana Fish, Wildlife, and Parks, and U.S. Fish and Wildlife Service. Poster. Available at Montana State Library and FWP offices statewide.*

*Stagliano, D.M. and B.A. Maxell. 2010. Aquatic Invertebrate Species of Concern: Updated Distributions, Vital Watersheds and Predicted Sites within USFS Northern Region Lands. Report to USDA Forest Service, Northern Region. Helena, MT: Montana Natural Heritage Program. 30 pp. plus appendices.*

(5) Metadata relating to all data and information in the Montana GIS Portal made available by NRIS & MTNHP.

*(a) 442 records for a wide variety of datasets, from a variety of publishers currently in the Montana GIS Portal. This is up slightly over the number of records that were in the previous release of the portal, but this number isn't necessarily indicative of the quality of the collection because, in addition to working with groups to encourage more metadata records in the portal, NRIS has also identified places where metadata records could be combined or otherwise streamlined to simplify the user experience. We continue to search for a good metric to provide insight to the depth of the metadata collection available in the Montana GIS Portal (see use statistics below).*

*(b) 4 of the 13 MSDI Framework layers are directly accessible through the Portal. Structures, Transportation, Imagery, and Hydrography are all returned by a search for Framework. Some or all of the MSDI cadastral, soils, wetlands, land cover, administrative boundaries, elevation, and hydrologic units available in the portal if searched for by name but they are not returned on a search for "Framework." We continue to seek a solution that will most effectively facilitate discovery of all MSDI Framework data.*

*(c) NRIS continues to research the best way to handle metadata collections in the portal and the best way to make the MSDI Framework metadata easily and directly accessible to Portal users.*

*(d) As NRIS works to develop a process for archiving spatial data records, we recognize a need to provide access to the metadata for these archived data sets through the portal as well. NRIS continues to research the best way to make that happen. Much will be learned in this regard as we work with DEQ on a prototype date archive.*

(6) Historical natural resource data.

*(a) As previously stated, once NRIS completes an inventory of data holdings, develops a spatial data collection policy, and develops a process for archiving historical data, we will work through the inventory to identify which data should be maintained as current and which data needs to be archived.*

*(b) In some cases agencies have approached NRIS when they maintain more current data than what NRIS is making available. In such cases NRIS will work with the agency to ensure that the best available data is being made available to patrons and that patrons clearly understand the time constraints around historic data.*

iii) Theme stewardship and stewardship assistance

(1) Both NRIS & MTNHP serve as state MSDI stewards. NRIS servers as the state and federal steward for the National Hydrography Dataset and is the co-steward of the OrthoImagery framework layer; MTNHP serves as the state steward for the land cover framework layer and assists the Department of Environmental Quality with the stewardship of the wetlands framework layer.

*(a) Imagery*

*(i) NRIS works with the ITSD Base Map Service Center to provide stewardship to the MSDI Imagery Framework. Though this arrangement existed informally for some time, FY2010 was the first year that an MSDI Imagery Framework business plan was developed as a joint project between these two groups. The FY2011 business plan was also developed in this manner and was made available in July 2010. During FY2010 NRIS and BMSC oversaw the delivery of the 2009 NAIP data from the United States Department of Agriculture/Farm Services Administration. BMSC has made the data available for direct access through an ArcGIS Server Image Server Service while NRIS made the compressed data available for web download. NRIS also maintains an archived copy of the "master" tiff images for archival purposes. Both groups have also filled requests for copies of the full data set via hard drive exchange. NRIS helps to maintain an Imagery Framework web site and organizes meetings of the MAGIP Imagery workgroup.*

*The 2005 and 2009 NAIP imagery is now used in a variety of web applications maintained by NRIS and our core partners. Use of a common imagery dataset makes our applications more useful and meaningful to users as they become familiar with this tool. By using and supporting a shared dataset, agencies ultimately realize cost savings created through collaboration and data sharing.*

*(b) Hydrography*

*(i) NRIS is the state steward of the USGS National Hydrography Dataset (NHD). During FY2010 NRIS has worked to revive interest in the MAGIP Hydrography Workgroup. The top goals for the Montana NHD in FY2010 and FY2011 are to (1) streamline the data exchange with the USGS through the use of the Exchange Network and (2) encourage more widespread usage of and contribution to the Montana NHD. To that end NRIS partners from DEQ, Montana Fish, Wildlife and Parks (FWP), and Montana Department of Natural Resources and Conservation (DNRC) have identified projects that could lead to more widespread interest among agency hydrography users (see below) and NRIS was again able to secure Montana Land Information Act (MLIA) grant funding to provide some support to those projects.*

*(ii) Based on input from the NHD Workgroup, in which most of our core partners participate, NRIS is currently developing a draft MSDI Hydrography Business Plan for review by the workgroup. NRIS has also worked to develop a Montana Association of Geographic*

*Information Professionals (MAGIP) Hydrography web presence and mailing list to improve communication among those interested in helping to develop this framework layer.*

*(iii) Framework development projects currently underway include NRIS efforts to develop an NHD web map service and an NHD Exchange Network node to streamline dataset maintenance.*

*(iv) Outreach efforts currently underway include work with FWP to determine the feasibility of developing and maintaining whole stream identifiers at the state or regional level to allow for the indexing of hydrography events along the full hydrographic feature.*

*DNRC is working to index Water Right Point of Diversion (POD) features to the high resolution NHD to allow for this data to be used in upstream and downstream network trace operations.*

*DEQ has recently indexed their Water Quality permitting data to the high resolution NHD to assist with modeling operations.*

*Each of these agencies is working with NRIS to identify and correct problems with the high resolution NHD positional accuracy and attribution that are revealed in the course of these projects..*

*Successful implementation of these projects will lead to wider use of the NHD. By using a common dataset to describe hydrography in the state agencies and patrons will have the ability to more easily share information, which will result in wider use of the data maintained by a variety of agencies. This will increase opportunities for date sharing and collaboration which will ultimately result in increased efficiencies and cost savings.*

*(c) Land Cover*

*(i) In FY2010, MTNHP's Spatial Analysis Lab completed final updates to the 2009 land cover layer which maps 78 land cover types (natural ecological systems as well as anthropogenically altered landscapes) across Montana. This information will soon be made available via an internet based mapping application which summarizes land cover for a variety of administrative boundaries. MTNHP was able to secure MLIA grant funding to provide additional support to land cover stewardship.*

*(d) Wetlands*

*(i) In FY2010, the MTNHP's Wetland and Riparian Mapping Center surpassed 1 million acres of mapped wetlands and riparian areas (1,133,322 acres in total) http://mtnhp.org/nwi/NWI_Status_map.asp with 843,052 acres of wetlands and 290,270 acres of riparian habitat. Wetland and riparian mapping information has been made accessible in multiple user friendly formats via a new web site: http://mtnhp.org/nwi/nwi_data.asp. MTNHP was again able to secure MLIA grant funding to provide on-going support to those projects.*

(2) NRIS works with the Montana Geographic Information Officer (GIO), the Montana Land Information Advisory Council (MLIAC), and the Base Map Service Center (BMSC) to ensure the long term success of all of the MSDI framework layers. Specifically, NRIS takes on the responsibility of providing assistance to the stewards of all of the natural resource framework layers: Hydrography, Geology, Hydrologic Units, Soils, Wetlands, Land Cover. A cooperative agreement between NRIS and BMSC to provide the similar stewardship assistance for OrthoImagery and Elevation.

*(a) NRIS is working with the Base Map Service Center to develop a shared MSDI web site which includes information about and access to all framework data layers. This is a direct response to concerns from both users and framework stewards about confusion and waste caused by the maintenance of two separate framework web sites (one at NRIS and another at ITSD).*

*(b) As part of this web site, NRIS is working to create consistent web pages in the pre-determined template for all natural resource oriented framework layers.*

*(c) NRIS is working to develop ArcGIS Server rest services for all natural resource layers.*

(3) MTNHP maintains the Montana Land Stewardship databases with information from public land management agencies, the Montana Department of Administration and other conservation landowners.

*(a) In FY2010, MTNHP updated the Stewardship coverage in conjunction with staff at the Information Technology and Services Division of the Department of Administration*

(4) MTNHP maintains compatibility with Natural Heritage programs in other states and provinces, and conduct a regular exchange/updating of state and national/global element data with NatureServe. Cooperate with NatureServe and other heritage programs to ensure that Montana has access to the most current and complete range wide data available, and that Montana's contributions to regional and national data syntheses is current and accurate.

*(a) MTNHP has monthly conference calls with NatureServe and Heritage Programs across North America to coordinate actions.*

*(b) MTNHP is planning another data exchange with NatureServe in the late fall or early winter of 2010.*

iv) Provide products and services to governmental agencies, universities, private business, organizations, and the public, including:

(1) Provide natural resource kiosks for self service natural resource data and information access through available public access computers via the internet. The initial emphasis will be on presenting current tools and applications with a focus on natural resources (Air information, Water information, Land information). This will help hone current applications and could spur the development of new tools to help users with a variety of tasks including access to preformatted maps, interactive information discovery, visualization and access applications, access to metadata relating to clearinghouse data, and direct access to raw datasets used by GIS, IT, and natural resource professionals. Within the Montana State Library these kiosks will be dedicated physical workstations with self help materials easily accessible to users. These materials will be made available to any interested libraries for distribution to their patrons;

*(a) NRIS staff as well as other staff from the Montana State Library is implementing a Geographic Literacy Campaign. This campaign encourages geographic awareness among librarians and library patrons and increases use of online applications that highlight Montana's natural resources. The campaign was launched last spring during a webinar and poster session at the annual conference of the Montana Library Association. MSL will launch our first prototype natural resource companion, the Hunting Companion, in time for hunting season. This online web site includes links to resources from the MSL, FWP and the BMSC. The web site is designed to help hunters and librarians answer four basic questions, what to hunt, when to hunt, where to hunt and how to hunt. Testing for the site was conducted by subject matter experts as well as a task force of librarians. The web site is currently in final review and will be launched in mid-August. Additional companions are planned at a rate of three to four a year. Other planned companions include fishing, farming and ranching, energy, recreation in Montana, and others. We will seek input and feedback from each of our partners as subject matter experts for these projects. We hope our partners see this as an opportunity to rely on the expertise of librarians to increase awareness of the work conducted by state government.*

*(b) Web Applications*

*(i) Since the release of the updated GIS Portal in October 2009 there have been over 12000 visits to the Montana GIS Portal with more than 42,000 portal pages viewed. This translates to roughly 1100-1200 visitors per month, 200-300 visitors per week, or 40-60 visitors a day during the work week.*

*(ii) NRIS's flagship applications continue to receive substantial use. The Digital Atlas received 100,000 visits and 420,000 pageviews since January averaging 15,000 visits and 70,000 pageviews per month. The Topofinder applications average 6500 visits and 82,0000 pageviews per month.*

*(iii) The Montana Field Guide, MTNHP's collaborative web application with Montana Fish, Wildlife, and Parks, also had about a 15% increase in use in FY2010 from that in FY2009. The Field Guide is being used by natural resource professionals around the state, K-12 and Universities around the state, and the general public in Montana and around the world. In the last year, the Montana Field Guide has received 223,400 visits with an average visit of about 3 minutes. Total use in FY2010 was 11,170 hours, equivalent to an*

*average use of 931 hours per month or 233 hours per week. It is typical for anywhere from 20 to 40 patrons to be using the Field Guide during business hours.*

*(iv) Since the middle of June 2007 when MTNHP's Natural Heritage Tracker application was released, it has had 9,240 hours of agency level use and 11,267 hours of public level use for a total of 20,507 hours of use; 570 hours per month or 142 hours per week on average. Use of the Natural Heritage Tracker application (http://mtnhp.org/Tracker/NHTMap.aspx) held steady in FY2010 and agency level access was dominated by 2 federal and 2 state partners as follows: U.S. Forest Service (29%); Montana Department of Fish, Wildlife and Parks (25%); Bureau of Land Management (24%); and the Montana Department of Transportation (15%).*

(2) Develop data and information discovery methods that broaden access to NRIS & MTNHP data and applications and link users of NRIS data and applications to related information (e.g. holdings represented in the Montana State Library catalog, and the Montana Memory Project map archive);

*(a) NRIS made some initial steps towards this early in FY2010, but efforts were hampered by the departure of the MSL Natural Resource Librarian. However, Montana state government publications digitized as part of the larger MSL digitization project, including MTNHP and core partner publications are continuing being added to our online repository found at: http://www.archive.org/details/MontanaStateLibrary. Additionally, staff is currently working to develop a more integrated map collection that will also be available online through this repository. Finally, MTNHP added a search component to the Montana Field Guide that allows users to quickly and easily discover and request via interlibrary loan relevant scholarly journals through the online library database, WorldCat.*

*(b) As stated above, in collaboration with the Montana Historical Society MSL released the Montana Place Names Companion (http://mtplacenames.org), an online version of the publication released by the Montana Historical Society. This application was NRIS's first true test of ArcGIS software which will become the basis of a new Digital Atlas. This application was the basis of an online trivia contest sponsored by the Billings Gazette and it has received rave reviews from librarians and patrons across the state.*

(3) Provide reasonable mediated request service to aid users who need NRIS & MTNHP data to augment the self service described above;

*(a) See below.*

(4) Respond to questions and information requests related to the identification, assessment, status and management of Montana's flora, fauna and natural communities, emphasizing species and habitats of conservation concern.

*(a) Mediated Requests*

*(i) NRIS and MTNHP conducted more than 1200 documented mediated requests for information in FY2010; 605 of these were for Species of Concern reviews for environmental reviews for conducted for our core partners.*

*(ii) Of note, the composition of mediated requests in FY2010 was as follows: state government (59.5%); local government (12.1%); private sector (20.8%); and federal government (7.3%) Two state agencies accounted for the vast majority of mediated requests. DNRC accounted for 31.7% of all requests and the DEQ accounted for 19.7% of all requests.*

(5) Assemble and serve information documenting the biology and management of species and habitats, and the stewardship status of public lands and conservation easements through the online Montana Field Guides, Species of Concern Search reports, and the Natural Heritage TRACKER web applications.

*(a) In FY2010, MTNHP completed major updates to the Montana Field Guide, a collaborative web site with Montana Fish, Wildlife, and Parks. These include: (1) release of an Ecological Systems Field Guide (http://fieldguide.mt.gov/displayES_LCLU.aspx) which provides detailed profiles of ecological systems mapped in Montana; (2) maps showing relative density and recency and charts showing elevational and temporal distributions of animal observations; (3) associations of animals with ecological systems that serve to crosswalk the animal and ecological systems portions of the field guide; (4) links and directed searches for articles*

*containing information on each species on the WorldCat, Google Scholar, Google Books, and Science.gov search engines to allow resource managers and the general public to more easily identify other sources of information on individual species as well as the repositories where they can access the articles; and (5) addition of 100 new bird calls from the Macaulay Library of Natural Sounds (calls are now available for all passerine birds commonly encountered in Montana).*

(b) *In FY2010 MTNHP created an online Species of Concern Report for plants and animals http://mtnhp.org/SpeciesOfConcern/?AorP=a to replace hard copy versions and allow status ranks to be updated in a more dynamic manner as new information becomes available. The online report includes an introduction, lists of the Species of Concern and Potential Species of Concern, and summaries of species added to, and removed from, the list.*

(c) *In FY2010, MTNHP added a module (see Photo Viewer tab) to the Natural Heritage Tracker application http://mtnhp.org/Tracker/NHTMap.aspx that georeferences 10,185 wetland photos associated with more than 9,600 wetland surveys conducted across Montana between 2000 and 2009. For agency biologists and resource managers this module codes wetlands as to the degree of structural and/or water quality impacts to the wetland in order to highlight wetlands for further evaluation and/or management attention.*

*(6)* Provide phone support, online tutorials, and user technical support, including group training, for access to clearinghouse information and use of information access tools;

(a) *See mediated requests above. Additionally, NRIS and MTNHP offered trainings on several of our core information products including the Natural Heritage Tracker application and the Montana GIS Portal. Training was conducted for a variety of groups as detailed below.*

(7) Participate in and promote interagency coordination and sharing of information through active participation in the activities of the Montana Land Information Advisory Council, the Montana Association of Geographic Information Professionals, and similar groups, and through participating in planning and reporting meetings with source agency representatives;

(a) *Montana Land Information Advisory Council*

(i) *The Montana State Librarian, Darlene Staffeldt, is a council Member*

1. *Darlene participated on the grants committee.*
2. *Jennie Stapp participated in the MLIAC funding subcommittee which prepared a proposal for the council to increase the overall funding for MSDI.*

(b) *ESRI ELA Users Group*

(i) *Evan Hammer participated in and is now the chair of the ELA training subcommittee.*

(ii) *Evan Hammer was a member of the ELA Renegotiation Team*

(c) *NRIS has participated in and presented to the GIS Manager's Forum*

(d) *Montana Association of GIS Professionals (MAGIP)*

(i) *Evan Hammer, Jennie Stapp, Diane Papineau, and Duane Lund presented at the MAGIP Fall Tech Session in Kalispell in October 2009. Evan Hammer also led the Hydrography and Imagery workgroup meetings held as part of this event.*

(ii) *Evan Hammer, Gerry Daumiller, Duane Lund, and Diane Papineau presented at the MAGIP Intermountain Conference in Bozeman in April 2010. Evan Hammer also led the Hydrography and Imagery workgroup meetings held as part of this event. Additionally, twelve MTNHP Ecology, Spatial Analysis Lab, Zoology, and Botany staff gave eight presentations at this conference. The conference was well attended by GIS professionals across Montana and the Intermountain West and NRIS and MTNHP received a great deal of positive feedback on our data products and data delivery devices. We are also very pleased that Duane Lund received the MAGIP Distinguished Achievement Award at this conference.*

(iii) *MTNHP Senior Ecologist, Linda Vance is the current MAGIP President*

(iv) *NRIS GIS Analyst Diane Papineau is a current MAGIP Board member.*

1. *In addition to the regular MAGIP board member duties, Diane has been heavily involved in the development of the MAGIP mentoring program and she also assisted with the 2010 Intermountain GIS Conference Planning*

(e) *NRIS is a voting member of the Groundwater Steering Committee and attends those meetings twice a year. This is important group for NRIS to be a part of as the issues addressed directly impact our core partners and patrons. This Committee is currently chaired by staff of DEQ.*

(8) Assisting source agencies to expose their data via the Internet in general, and the Montana GIS Portal in particular, in a manner that facilitates discovery, visualization and access, including developing standard templates and procedures relating to geospatial data dissemination, developing data sharing protocols and procedures that enable agencies to expose their data for access by others, including NRIS for incorporation in the NRIS clearinghouse, and providing limited technical support relating to source agency data dissemination services.

*(a) Information regarding the GIS Portal as well as the Montana Place Names application is previously presented in this report. Additionally, as stated, NRIS is working with MSDI natural resource theme stewards to develop web mapping services for their data that can be consumed by the wider GIS community. This work not only meets the mission of NRIS but supports the broader GIS federation model.*

v) Education, Training and Outreach

(1) Maintain staff having knowledge and expertise in GIS, information management and dissemination systems, web application development, network and web administration, vegetation ecology, zoology, botany, Montana's natural resources, natural communities and species of concern, and program administration, and maintain the office infrastructure necessary for staff to carry out their functions.

*(a) NRIS Staff member Duane Lund received his GIS Professional certification.*

*(b) NRIS Staff members Jeff Dobb, Gerry Daumiller, Diane Papineau, and Duane Lund participated in an Introduction to Geoprocessing Scripts Using python class.*

*(c) NRIS Manager Evan Hammer attended an Introduction to ArcGIS Server training session held in Bozeman during the April 2010 Intermountain GIS Conference.*

*(d) Evan Hammer and Jeff Dobb attended the Building Web Maps Using the ArcGIS API for Javascript training made available through the ESRI ELA Training Committee.*

*(e) Evan Hammer attended the Essentials of Management 2 training made available through the Department of Administration Professional Development Center.*

*(f) The Montana GIS Portal team received the 2009 Governor's Award for Excellence from the State Library. Additionally, the State Library received a Special Achievement in GIS Award from ESRI at the 2009 Users Conference.*

*(g) MTNHP's Aquatic Ecologist, Dave Stagliano, attended the 2010 Montana Chapter of the American Fisheries Society Meeting in Bozeman, Montana.*

*(h) MTNHP's Wetland Photointerpreters (Jessica Clarke, Erika Colaiacomo, Sloane Gray, Robin Lium, and Larissa Pfleeger) have taken a number of ESRI online courses on creating, editing, and managing geodatabases.*

*(i) MTNHP Zoology Staff (Bryce Maxell, Paul Hendricks, Susan Lenard, and Coburn Currier) attended the 2010 Montana Chapter of the Wildlife Society annual meeting in Helena, Montana.*

*(j) Karen Walker, MTNHP's Biological Data Systems Coordinator, attended a database administrator course focused on SQL in Minnesota.*

*(k) MTNHP Ecology Project Manager, Cat McIntyre, attended the 2010 Society for Wetland Scientists meeting in Salt Lake City.*

*(l) MTNHP Landscape Ecologist, Meghan Burns, attended the NatureServe core training and spent time with the Colorado Natural Heritage Program and EPA staff in Denver, Colorado.*

*(m) Botanist, Scott Mincemoyer, attended the 2010 NatureServe Conference in Austin, Texas and a meeting on botany data management across the Pacific Northwest in Seattle, Washington.*

(2) Conducting education and outreach activities to keep users advised of additions to and modifications of NRIS & MTNHP information resources and information access tools;

*(a) MTNHP Education and Outreach*

*(i) MTNHP Systems and Services Manager, Allan Cox, provided agency trainings to the Montana Department of Transportation and to DNRC on MTNHP products and the use of MTNHP web applications in June of 2010.*

*(ii) Linda Vance and Karen Newlon of MTNHP's Ecology Program gave talks on wetland mapping and wetland assessment at the National Water Quality Conference in Denver, Colorado, May 3rd through 6th 2010.*

*(iii) MTNHP Botanist, Scott Mincemoyer, helped organize the 2010 Rare Plant Conference in Missoula and he and Allan Cox gave presentations on MTNHP data products and services at the conference. The conference was well attended and MTNHP has received positive feedback on our data products and data delivery devices from a number of attendees.*

*(iv) MTNHP Interim Director and Senior Zoologist, Bryce Maxell, organized and co-presented a workshop on predictive distribution models for Montana's animal species at the 2010 Montana Chapter of the Wildlife Society Meetings in Helena. The workshop was attended by 30 people from federal, state, and tribal governments as well as the private sector. These models are likely to be widely used in the future and already being used by Montana Fish, Wildlife, and Parks, the U.S. Forest Service, and the Bureau of Land Management for land use planning. Bryce also recently gave invited presentations to: (1) the Northwest Partners for Amphibian and Reptile Conservation (PARC) meeting in Boise, Idaho on distribution and status assessments for amphibians and reptiles in Montana; (2) the Idaho Chapter of the Wildlife Society in Boise, Idaho, on baseline assessments for amphibians, reptiles, and bats in the portions of the Tongue and Powder River watersheds subject to Coal-Bed-Natural-Gas (CBNG) development; and (3) the Montana Prairie Dog Working Group in Great Falls, Montana on using the 2005 National Agriculture Imagery Program (NAIP) imagery to map the distribution of Black-tailed Prairie Dog colonies in Montana.*

*(v) MTNHP Zoologist, Paul Hendricks, gave a presentation on the distribution and status of the Terrestrial Mollusks of Montana at the 2010 Montana Chapter of the Wildlife Society Meetings in Helena.*

*(vi) At the end of FY2010, MTNHP Botanist, Scott Mincemoyer began conducting a series of 7 wetland plant identification workshops at locations across Montana designed to provide the basic skills to identify native and exotic wetland plant species. The workshops have been well attended and approximately 150 individuals from federal and state agencies, Non Government Organizations, tribes, local government planners, private consultants, and others who work with wetland vegetation are expected to attend. MTNHP has received a variety of positive feedback to the workshops held to-date.*

*(b) NRIS Education and Outreach*

*(i) NRIS hosted a USGS sponsored NHD LLID workshop at the Montana State Library in August 2009. A special guest speaker, Cindy McKay of Horizon Systems Inc., was brought in to discuss how the LLID might be integrated with the high resolution NHD. Attendees came from across the pacific northwest to participate in this workshop.*

*(ii) Diane Papineau presented the Montana GIS Portal to at the fall Disaster and Emergency Services Conference in Lewistown, MT.*

*(iii) Diane Papineau presented a class on GIS data sharing to the Carroll College Introductory GIS class in Helena, MT.*

*(iv) Duane Lund presented training on the NHD Hydrologic Event Management (HEM) tool to the DEQ Water Quality group at the Montana State Library in December 2009.*

*(v) Evan Hammer and Duane Lund represented the imagery and hydrography framework layers at the MSDI Theme Stewards workshop in January 2010.*

*(vi) Evan Hammer, Duane Lund, and Diane Papineau presented on Imagery, Hydrography, web services, and the GIS Portal at the MLIAC Tribal Nations Workshop in January 2010.*

*(vii) Diane Papineau presented an Introduction to GIS webinar to librarians across Montana in March 2010.*

b) Consultation on additional services and products: NRIS will provide the products and services described above and will respond to user requests to the maximum extent possible using the resources supported through core funding. If source agency information assimilation, management or dissemination needs extend beyond the services described above or if source agency requests for NRIS products and services exceed the ability of NRIS to respond in a timely manner, NRIS will work with agency staff to develop strategies and identify resources to meet agency needs.

   *i) Highlights regarding specific agency projects are highlighted in a cover letter presented to agency directors and NRIS Advisory Committee members. A more detailed summary of agency projects can be prepared upon request.*

Report prepared by:

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