

MSL Progress Report for Statement of Work

Report for 1st and 2nd Quarters FY16

The tables below come from Appendix 1, the Scope of Work for Operation of the Montana Natural Heritage Program, and Appendix 2, the Scope of Work for FY16 Wetlands and Land Cover MSDI Framework Services under the Contract for Services between the Montana State Library and the University of Montana for state fiscal years 2016 and 2017 (award number 20150731). The right column describes the status and progress during the reporting period. The status is generally summarized as in progress, completed, or not active, but also may include annotations.

Tasks in the left column of the tables list **Administrative, Information Services, Botany, Ecology, and Zoology** services from Appendix 1 and **Wetlands and Land Cover MSDI Framework Services** from Appendix 2.

The tables list four categories of tasks and services:

- 1) **Core Services:** Essential tasks and services that will be delivered principally with Core funding provided by this contract.
- 2) **Supplemental Core Services:** Essential tasks and services for which there is not sufficient Core funding but which will be delivered dependent on acquiring discretionary funding support from partner agencies.
- 3) **Project Supported Services:** Additional tasks and services that augment the essential core tasks and services that may be provided pending the availability of project funding.
- 4) **MSDI Core Services:** Wetland, Riparian, and Land Cover data development and coordination services for the Montana Spatial Data Infrastructure delivered primarily with Montana Land Information Act funds.

Core Administrative Services

Core Administrative Services	
	1 st & 2 nd Quarter FY 16 (July 1, 2015 – December 31, 2015)
1. Coordinate all program activities with Partners and program areas	Ongoing <ul style="list-style-type: none"> - The annual MTNHP Partners Committee meeting was held December 7, 2015 at Montana Wild in Helena and was attended by over 40 partners. A meeting summary and links to powerpoints is posted on the MTNHP website at: http://mtnhp.org/about/announce.asp#PartnersMtg2015 - Expanded an existing task tracking document in One-Note for coordination of activities across program areas within MTNHP, between MTNHP and MSL, and between MTNHP and key partners.

	<ul style="list-style-type: none"> - Established weekly coordination meetings with Information Services staff and biweekly coordination meetings with database and web programming staff, and approximately monthly program manager's meetings. All staff meetings will be held approximately quarterly. - Numerous meetings were held with staff at FWP, BLM, USFS, DEQ, NRCS, UM, TNC, MT Audubon, Department of Commerce, Land Trusts, NatureServe, Malmstrom Air Force Base, and MSL.
2. Administer contracts and grants	<p>Ongoing</p> <ul style="list-style-type: none"> - MTNHP managed approximately 60 agreements during the reporting period - New project agreements initiated during the reporting period include, Howellia Survey and Monitoring Data with the Swan Ecosystem, Data Service Support for the USFS, Tepee Macroinvertebrate identification for the USFS, Data Service Support for the NRCS, Harlequin Duck, Amphibian, and Bat Monitoring for the USFS, Statewide Wetland Mapping for DEQ and MLIA, 2016 Wetland Plant Identification class support from DEQ, National Wetland Condition Assessment field sampling in 2016 for DEQ, and Information to Support Weed Management for the Department of Agriculture
3. Promote use of Heritage data resources through outreach and training sessions	<p>Ongoing</p> <ul style="list-style-type: none"> - MTNHP information resource trainings were provided to the Montana Education Association and Montana Federation of Teachers, the Department of Commerce, Malmstrom Air Force Base environmental planning staff, and NRCS. - Future MTNHP information resource trainings were scheduled with MSL for librarians statewide, Land Trusts, the Invasive Species Advisory Council, NRCS, and attendees of the Montana Wetland Council Meeting.
4. Collaborate with Library staff to effectively represent the mandate, activities, and products of MTNHP through publications, reports, brochures, posters, maps, fact sheets, social media, etc.	<p>Ongoing</p> <ul style="list-style-type: none"> - Held biweekly coordination meetings with State Librarian & Digital Information Manager / CIO - Participated in regular MSDL Managers meetings - Provided an information overview and MTNHP contacts list to allow MSDL staff to answer patron questions directly. - Printed additional MTNHP information services pamphlets
5. Participate in regional and national network coordination meetings and conference calls to help ensure continued compatibility and to take advantage of opportunities and advocate for initiatives that would benefit Montana.	<p>Ongoing</p> <ul style="list-style-type: none"> - Participated in NatureServe Network Member Program coordinators calls, spatial methodology review team calls, and predictive distribution modeling team calls.
6. Finish an updated revision of the FY15-20 MTNHP 5-year Strategic Plan	<p>Completed</p> <ul style="list-style-type: none"> - The FY16-FY20 strategic plan was finalized in mid-December after review by MTNHP program managers and feedback from MTNHP partners at the 2015 annual partners meeting.

Core Information Services Program Services

1 st & 2 nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Respond to requests for MTNHP information used in Environmental Assessments, Environmental Impact Statements, and other planning and resource management activities	Ongoing - Responded to 325 requests involving SOC reviews for environmental assessments.
2. Work with NatureServe to develop procedures and methods to conduct regular data exchanges.	On hold - This task is pending completion of task 3 below to ensure that element occurrence information has all of the appropriately associated element information.
3. Develop procedures and methods to upload state element data to and download global element data from the BIOTICS 5 database	On hold - We are currently waiting on NatureServe to develop their portions of the exchange process for element information. This has been targeted for the fall of 2016 by NatureServe.
4. Administer databases for editing and storage of MTNHP data including: <ol style="list-style-type: none"> a. Coordinate overall MTNHP server architecture and development with MSL b. Design and maintain appropriate relational databases for botany, zoology, and ecology data. c. Administer MTNHP databases on internal server including database security and routine backup to prevent catastrophic loss d. Develop and maintain procedures and methods to disseminate information to web-facing servers external to the firewall e. Develop and maintain data processing and QC procedures for core databases 	In Progress - We continue to coordinate server architecture with MSL. - See task 7 below for update on botany database. - MTNHP databases are now all being administered on SQLPROD. Most MTNHP information is backed up off site regularly to the SITSD data center in Helena. Additionally, all MTNHP information is backed up using a raided 25 TB Drobo Drive array system that is stored off site at the Program Coordinator's house. - MTNHP staff continually work with MSL staff to manage nightly jobs that migrate information over to SQLWEB to serve information up on MTNHP websites. - Data processing and QC standards are in the progress of being updated in order to deal with larger and larger data exchanges. For example, we just received 1.2 million bird observation records from the Ebird database which will need to be collapsed into seasonal representations for individual species, compared with existing records to prevent duplication, and evaluated for appropriate spatial and temporal presence. Automated routines are being developed to ensure QA/QC of this information
5. Migrate all MTNHP databases from SQLINT to SQLPROD	Completed - The following databases were migrated from SQLINT to SQLPROD by November: Biotics01 NHP NHPBat NHPBotany NHPEcology NHPGen NHPLandMan NHPLayerData NHPLayerGrids NHPReference NHPSpecies NHPTools NHPWeb

	NHPZoology Stewardship NHPThumbsPlus WetlandRiparian
6. Maintain a core photo database on SQLPROD	Ongoing - We use Thumbs Plus photo management software linked to a SQL database, NHPThumbsPlus, on SQLPROD to manage information on a growing photodatabase that currently includes over 88,000 photos. Many fields in this photodatabase are underpopulated and thus many of these photos cannot be shared on MTNHP websites. We are working on getting more and more photos attributed so that they can be shared on our websites.
7. Work with Botanist to design and implement a revised and updated Botany database for observations and species occurrences	In Progress - A new relational database for botany data is under construction that will track plant observations and plant surveys. Where possible the architecture of this database is being aligned with the zoology database in order to take advantage of data management scripts and web programming that has been developed for animals.
8. Continue to work with Digital Library Division staff to enhance discovery of biological information in the MSL geographic information web and other MSL web sites.	Ongoing - We continue to work with MSL on discovery of MTNHP information.
9. Provide regular updates on the website, social media, and through emails as new resources become available (including reports, web tools, MapViewer, Species SnapShot, and Montana Field Guide enhancements, etc.).	Ongoing - Announcements of important MTNHP developments and releases of new reports continue to be posted on the MTNHP homepage. - A plan is being developed to use Instagram to post Montana Species, Wetland, and Ecological Systems photos to users in order to direct web traffic to the accounts on the Montana Field Guide. - Facebook posts have not been initiated in recent months pending a redesign of the MTNHP Facebook page which is scheduled for late spring of 2016.
10. Continue to maintain and improve the functionality and ease of use of Natural Heritage Program web pages	Ongoing - See task 15 below.
11. Finish the conversion of the MTNHP web site to conform to the Montana web standard including mobile device compatibility	In Progress - Work continues on updates to mobile compatibility and we are using this opportunity to clean up a variety of underlying coding. The Montana Field Guide now performs well on mobile devices.
12. Collaborate with the Digital Library Division User Services Team in the design and implementation of a Division wide process for tracking, managing, fulfilling and reporting mediated requests and user support. a. Participate in a Digital Library Division planning team for the implementation of a division wide request management system b. Participate in cross-training of the User Services Team in MTNHP services and resources.	In Progress - MTNHP developed a simple Request Tracking tool using a SQL database as the backend and Microsoft Access tables as the front end for entry of requests. Request tracking for requests other than standard environmental assessment Species of Concern reports, which will continue to be tracked in the old NRIS Request Router, were initiated on January 4, 2016. This simple request tracking tool can be imported by MSL-DLD when ready. - We have participated in MSL-DLD planning team meetings and look forward to additional opportunities to train MSL-DLD staff on MTNHP information resources.
13. Develop "Harold" type self-serve SOC search and review functionality for partners with certain privileges and for in-house data requests	In Progress - Programming on a new Environmental Assessment Summary tool has been

	<p>initiated. This tool will allow users to digitize boundaries for a polygon of interest and the resulting polygon will then be intersected with a grid of hexagons that contain pre-generated summaries of documented species, potential species, land cover, wetland and riparian mapping, land management, biological reports and custom field guides. The application will then do on-the-fly summaries of attributes across the selected hexagons and deliver the overall summaries to the user.</p>
<p>14. Continue to develop, maintain , improve, and collaborate on easy-to-use methods for data contributors to submit animal, plant, and habitat information, including observations, submitted directly to MTNHP, observations submitted to partners (e.g. iNaturalist and Ebird), plot data, and photographs</p>	<p>No progress during this reporting period.</p>
<p>15. Continue to maintain and improve the functionality and ease of use of the MTNHP core web apps including Montana Field Guide, MapViewer, Species SnapShot, and Species of Concern web reports</p>	<p>Ongoing</p> <ul style="list-style-type: none"> - The Montana Field Guide, Species of Concern Report, Species Snapshot, and MapViewer were updated to show status ranks under the new 2015 State Wildlife Action Plan rather than its predecessor that was released in 2005. - Mile markers on highways and railroads were added to the MapViewer application in response to a request from MDT. - The Discover It search was added to the list of web search engines for articles on individual species or ecological systems. - Worldcat and PDF links in the field guide species accounts were discontinued after it was discovered that many of the PDFs required purchase and WorldCat identifier links were not stable. - A new tool to deliver custom field guides generated from users spatial and status filter selections has been released on the Species Snapshot web page. This has proven to be so popular with users that additional spatial filters are being added for Major Land Resource Areas, Forest Service Districts, Fishing Access Sites, Wildlife Management Areas, National Parks, National Wildlife Refuges, Bird Conservation Regions, Watersheds, Important Bird Areas, Important Plant Areas, and Conservation Districts. Furthermore, we are working on implementing these same filters in the Advanced Search option of the Montana Field Guide. -
<p>16. Continue to work with the MSL Digital Library Division staff to effectively cross reference and integrate new MTNHP information and data with the MSL catalogue, search methods, and reference services.</p>	<p>Ongoing</p> <ul style="list-style-type: none"> - We provided 12 MTNHP reports to the State Publications Librarian that we completed in the past few years that need to be placed in the MSL catalogue.
<p>17. Maintain the Natural Heritage Program's reference system for literature on the plants, animals, and habitats of Montana</p>	<p>Ongoing</p> <ul style="list-style-type: none"> - 301 literature references on Montana plant and animal species and biological communities were added to the MTNHP reference system. Many of these were made available to users via accounts in the Montana Field Guide. - Approximately 90% of the hard copy zoology files have been scanned into digital .pdf documents so that all files can be managed digitally moving forward and to allow for offsite backups to protect against catastrophic loss.

Supplemental Core Information Services Program Services

1 st & 2 nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Create and maintain secure map services for MTNHP data that Partners can consume in their GIS or web applications, including species occurrences and animal/plant point observation data	<p>Ongoing</p> <ul style="list-style-type: none"> - A Species of Concern ARC-IMS map service continues to be delivered to MDT, BLM, and USFS. In collaboration with MSL-DLD staff we are investigating practicalities of upgrading this to an ARC-GIS feature service that would allow those agency users to select and analyze data. Alternatively, we are considering regular exchanges of File Geodatabases with these agencies to allow them to do the same thing free of any constraints posed by firewalls etc. on map or feature services. - The MSDI Land Cover and Wetland map services continue run and can be consumed in local GIS environments by anyone.
2. Provide support to train and inform agency Partners in effectively using technical resources, services, and applications, through webinars, PowerPoint presentations at professional meetings, or agency groups	<p>Ongoing</p> <ul style="list-style-type: none"> - MTNHP information resource trainings were provided to the Montana Education Association and Montana Federation of Teachers on October 15, Malmstrom Air Force Base environmental planning staff on November 3rd, NRCS on November 9th, and Department of Commerce on December 1st. - Future MTNHP information resource trainings were scheduled with MSL for librarians statewide, Land Trusts, the Invasive Species Advisory Council, NRCS, and attendees of the Montana Wetland Council Meeting.
3. Gather information from users about user information needs, format/access preferences, and the effectiveness of our delivery systems and tools	<p>Ongoing</p> <ul style="list-style-type: none"> - Partner feedback is provided during various MTNHP information resource trainings and meetings attended by MTNHP staff. - We also received feedback from MTNHP partners at the annual MTNHP partners meeting on December 7th: see the meeting summary posted at: http://mtnhp.org/about/announce.asp#PartnersMtg2015 - In preparation for a future training to land trusts, feedback from land trusts was provided in response to an MTNHP generated survey.
4. Evaluate ArcGIS on-line capabilities and develop strategy	<p>In Progress</p> <ul style="list-style-type: none"> - We evaluated ArcGIS on-line during the course of working on Species of Concern polygons for the USFWS's Information for Planning and Conservation website in order to get feedback from a variety of data partners. We plan to use ArcGIS on-line in the future to share datasets in a dynamic and interactive manner as needed. We plan to re-evaluate ArcGIS on-line capabilities to deliver information to our partners more broadly at some point in the next biennium. - We also plan to investigate the potential of AppStudio for ArcGIS to allow partners to view predictive distribution models and other information via Apps on their smart phones, Survey123 for ArcGIS to allow partners to collect animal and plant observations via Apps on their smart phones, and Collector for ArcGIS to allow MTNHP staff and agency partners to gather animal and plant observations.
5. Examine the feasibility of developing techniques and tools for mobile data collection for staff and citizen scientist's	<p>No Progress</p> <ul style="list-style-type: none"> - We plan to evaluate Collector for ArcGIS and iNaturalist for mobile data collection by agency partners and the general public, respectively, in 2016.

6. Continue to participate in a work group with MSL Geographic Information to develop a new workflow for land information data creation, maintenance, and dissemination that includes the managed areas, conservation easements, public lands and private conservation lands data.	In Progress - We continue to consult with the MSL-DLD GIS Programmer/Analyst lead on the land management data in order to make sure that all map features represented in the past are properly considered for current and future display.
7. Continue to maintain and update a statewide Land Management GIS database in collaboration with MSL Geo Info program	In Progress See Task 6 above.
Project Supported Information Services Program Services	
1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Design, develop, and deploy a “Mid-level” functional access to MTNHP Species of Concern (SOC), habitat, and species list information in the Natural Heritage MapViewer to support planning and resource management activities of local government, private consultants, and conservation organizations	In Progress - See Task 13 under the Information Program Services Core Services above. It is our intent that this new Environmental Assessment Summary tool will be made available to project partners and consultants after they receive training on its use.
2. Work with MSL to identify, catalog, and make accessible via the Internet Archive gray literature and other unpublished reports and documents related to the flora, fauna, and ecological systems of Montana	Ongoing - We provided 12 MTNHP reports to the State Publications Librarian that MTNHP staff completed in the past few years which need to be placed in the MSL catalogue and made accessible via the Internet Archive.
3. Work with Zoology staff to design and implement a website to display bat acoustic and associated data in a dynamic manner that allows patrons to analyze bat activity patterns over time across the state.	No progress - pending time availability of web programmer.

Core Botany Program Services	
1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Maintain a comprehensive database and taxonomic list of vascular plants occurring in Montana.	Ongoing - Researching to determine the presence/absence of two plants reported for Montana that are categorized as Status Under Review. - Acquiring and reviewing data on new species for the State: <i>Castilleja kerryana</i> and <i>Anelsonia eurycarpa</i> . - Reviewing feedback that two species occurring in Montana were mis-identified, and may need to be removed from the Montana Vascular Plant Checklist & Field Guide.
2. Collect, evaluate, and manage observation data for vascular plants, including integrating regional databases of herbarium specimens.	Ongoing - Verified identification of numerous plant observations submitted by people (from all affiliations) for entry into database. - Verified identification of numerous observations on about 20 vascular plants categorized as “Status Under Review” for entry into database.
3. Work with Information Services staff to design and implement a revised and updated Botany database for observations and species occurrences	Ongoing - Worked with Database Manager and Program Coordinator to determine the changes needed in the botany database. New database is under construction.
4. Create species’ occurrences for vascular plant, bryophyte and lichen Species of Concern.	Ongoing - Corrected all data associated with a particular moss SOC after receiving verification on its true identification. Work was conducted in response to updating the Montana

	<p>Moss Checklist.</p> <ul style="list-style-type: none"> - Corrected the location of two lichen SOC's after receiving better information. Work was completed in response to a request by an MDT Biologist. - Created 14 SOs for vascular plant Species of Concern.
5. Review the status of vascular plants, assign state ranks and, where appropriate, assign global ranks, and document these status ranks	<p>Ongoing</p> <ul style="list-style-type: none"> - Under a Noxious Weed Trust Fund grant from the Department of Agriculture, we are researching and obtaining information (taxonomy, distribution, ecology, population, threats) on 45 vascular plants categorized as Status Under Review. State Ranks will be assigned in 2016. - Compared State rank results and methodology using the MTNHP Rank Calculator and NatureServe Rank Calculator and did some preliminary ranking. - Supervised former MTNHP Botanist who conducted a review of and completed the state ranking process for <i>Anelsonia eurycarpa</i> – S2 State Rank.
6. Respond to requests for information on the identification, biology, ecology, conservation status, management, and appropriate survey methods for vascular plants, bryophytes and lichens.	<p>Ongoing</p> <ul style="list-style-type: none"> - Responded to requests for information on vascular plants: 2 for TE plants, 1 SOC, and 5 for common species. - Responded to 1 request on a particular moss plant. - Responded to 1 request on a particular lichen SOC. - Responded to 1 request on a particular fungus.
7. Work with other Heritage staff to regularly exchange information with NatureServe.	<p>Ongoing</p> <ul style="list-style-type: none"> - Worked with NatureServe Botanists and a Data Assistant to inform them and get feedback on our process for reviewing the Montana moss and lichen checklists.
8. Work with other Heritage staff to maintain and improve content and delivery of botanical information on MTNHP websites, including Field Guide, SOC Report and MapViewer.	<p>Ongoing</p> <ul style="list-style-type: none"> - Botany Assistant and Botanist worked with the Web Programmer and Database Manager to fix numerous issues with Vitalis (literature database) and Thumbs-Plus (photo database).
9. Present information on MTNHP botanical services and data products, and Montana's plant resources at professional and public meetings.	<p>Ongoing</p> <ul style="list-style-type: none"> - Presented the 2015 botany program tasks / accomplishments and some 2016 objectives at the 2015 MTNHP Partner's Meeting.
10. Create and maintain information on vascular plants related to their taxonomy, biology, ecology, status, identification and management.	<p>Ongoing</p> <p>See #12 under Core Botany Program Services.</p>
11. Compile photographic images of vascular plants, bryophytes and lichens.	<p>Ongoing</p> <ul style="list-style-type: none"> - Trained Botany Assistant in organizing, annotating, captioning, and posting photos on the Field Guide and using Thumb's Plus Photo Database. Compiled and captioned multiple photos for each of 58 moss species and 10 "Status Under Review" vascular plants. - Receiving and verifying vascular plant photos from numerous sources and adding them to Thumb's-Plus photo database for future posting.
12. Compile literature on vascular plants, bryophytes and lichens.	<p>Ongoing</p> <ul style="list-style-type: none"> - Through Interlibrary Loan actively acquiring numerous articles and books on vascular plant, moss, and lichen taxonomy, ecology, and management. - Through the "botany network" received and read many peer-reviewed articles on particular vascular plants from agency and consulting botanists

	- Acquired the Grass and Sedge Family treatments by Flora of North America to be used in developing 2017 classes and specimen verification.
Supplemental Core Botany Program Services	
	1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)
1. Create associations between vascular plant Species of Concern and the Ecological Systems/habitats in which they occur.	On hold pending funding and staff time.
2. Create associations between vascular plant Species of Concern and the National Wetland and Riparian wetland and riparian map classes in which they occur.	On hold pending funding and staff time.
3. Compile and maintain a database of bryophyte and lichen taxa occurring in Montana.	Ongoing <ul style="list-style-type: none"> - Working with Dr. Joe Elliott to revise the 1993 Montana Moss Checklist and to find moss specimen data for future acquisition. - Met with Dr. Bruce McCune and MTNHP volunteer to develop a process and timeline to update the Montana Lichen List based on McCune's 2014 Montana Lichens: An Annotated List.
4. Review the status of bryophytes and lichens, assign state ranks and, where appropriate, assign global ranks, and document these status ranks	On hold pending funding and staff time. <ul style="list-style-type: none"> - One exception was to get an SOC moss verified by Dr. Dale Vitt. The identification led to the removal of this species from the SOC list and revised the listing in the State Checklist.
5. Collect, evaluate, and manage observation data for bryophytes and lichens.	Ongoing <ul style="list-style-type: none"> - Revised the locations of two lichen SOC species. - Added a few moss observations to the database. - Added a few lichen observations to the database.
6. Create and maintain information on bryophytes and lichens related to their taxonomy, biology, ecology, status, identification, and management.	See #12 under Core Botany Program Service
7. Maintain a subject guide of authoritative web resources relevant to vascular plants, bryophytes, and lichens.	See #12 under Core Botany Program Service
8. Develop and maintain a geodatabase of unique habitats such as fens that are of special importance for Montana's botanical resources.	Ongoing <ul style="list-style-type: none"> - Database is populated, but no new data entries have occurred.
Project Supported Botany Program Services	
	1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)
1. Conduct training sessions on the identification and ecology of Montana's vascular plants, bryophytes, and lichens.	Not Active due to lack of funding.
2. Monitor populations of ESA-listed and globally rare vascular plants.	Ongoing <p>Spalding's Catchfly (<i>Silene spaldingii</i>) for USFWS</p> <ul style="list-style-type: none"> - Monitoring: Collected Year-1 data from 10 transects on the Confederated Salish Kootenai Tribe's (CKST) land. The pilot study served to test the design for collecting demographic data. Demographic studies track individual plants through time and collect data on presence/absence (dormancy rate), plant height, reproductive characteristics, herbivory, and habitat cover (vascular, rock, bare soil, non-vascular), and disturbance (animal, weeds, physical). - Surveys: Visited 11 known SOs (sub-populations) on CSKT land to get updated

	<p>information.</p> <p>Water Howellia (<i>Howellia aquatilis</i>) for USFWS</p> <ul style="list-style-type: none"> - Monitoring: Surveyed 3 SOs that had burned and 3 unburned SOs to determine plant's status. Collected data using the USFS Monitoring protocol. <p>Ute Ladies'-tresses for MDT</p> <ul style="list-style-type: none"> - Verified species and surveyed project area for an MDT highway re-alignment project with MDT District Biologist and the consultant. Also re-visited two SOs to determine current status.
3. Conduct field surveys for vascular plants, bryophytes and lichens, focusing on Species of Concern and under-surveyed geographic areas.	<p>Ongoing</p> <p>BLM Sensitive Species Surveys</p> <ul style="list-style-type: none"> - Re-visited several SOs of known BLM Sensitive plants to collect updated information. - Trained BLM Botanist and Range Technician how to find and identify Idaho Sedge (<i>Carex idahoensis</i>) in the field - Shoshonea (<i>Shoshonea pulvinata</i>). Collected Year-7 data on a study spanning 25-years. Collected demographic data on 3 permanent transects installed in 1991. <p>Italian Peaks Survey for USFS</p> <ul style="list-style-type: none"> - Assisted expert Botanist and USFS in surveying a portion of the Italian Peaks to map 8 vascular plant SOCs and 1 potential vascular plant SOC. One of these species was the first known occurrence for Montana.
4. Develop reports and peer-reviewed publications on the distribution, taxonomy, biology, ecology, status, identification and management of Montana's vascular plants, bryophytes and lichens.	<p>Ongoing</p> <ul style="list-style-type: none"> - Completed Spalding's Catchfly report which summarized monitoring and survey data for CSKT and USFWS. - Working on Water Howellia report to Swan Eco Center to summarize and analyze monitoring data-sets collected by 2 USFS, 1 TNC, and 1 MTNHP studies. Also analyzing timber prescription, landowner, and climate data-sets relative to Water Howellia populations. - Working on Shoshonea report to BLM to statistically summarize and analyze all data collected from 1991-2015. - Reviewed draft survey report for the Italian Peaks rare plant survey.
5. Create predicted distribution maps for vascular plant, bryophyte and lichen Species of Concern.	<p>Ongoing</p> <ul style="list-style-type: none"> - Reviewed draft maps and variables used to predict distribution for federally-threatened plants (Spalding's catchfly, Water Howellia, and Ute ladies'-tresses) for the USFWS IPAC effort.
6. Compile and maintain data on other taxonomic groups: Fungi, Algae, Diatoms.	<p>Ongoing</p> <ul style="list-style-type: none"> - Obtained MTDEQ database on diatoms (150,000 observations identified by diatom experts). - Obtained database on <i>Didymosphenia</i> diatom that has been developed by MFWP and university researchers.

Core Ecology Program Services

1 st & 2 nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Respond to user requests for information on the distribution, composition, successional dynamics, conservation status, management, and appropriate survey methods for terrestrial and wetland communities	Ongoing <ul style="list-style-type: none"> - Respond to ~ 10 requests per month for vegetation community information, esp. wetlands, sagebrush, whitebark pine, and Russian olive - Respond to ~ 1 request per month about wetland survey methods
2. Respond to user requests for assistance using or interpreting wetland and land cover map products	Ongoing <ul style="list-style-type: none"> - Respond to ~ 2 requests per month for updated Land Cover mapping - Respond to ~ 6 requests per month for clipped or provisional wetland mapping - Respond to ~ 4 requests per month for help interpreting wetland mapping
3. Compile photographic images of wetland and terrestrial habitats representative of those found in Montana and make them available on MTNHP websites	Ongoing <ul style="list-style-type: none"> - Photographs from 2015 whitebark pine surveys entered into Thumbs Plus - Photographs from 2015 forested wetland ecosystems compiled and ready for entry into Thumbs plus
4. Create and maintain accounts for terrestrial and wetland land cover classes and/or ecological systems in the Montana Field Guide that describe the composition, distribution, status, successional dynamics, and management/restoration needs of each.	Ongoing <ul style="list-style-type: none"> - All forested ecosystem descriptions have been updated with new information on disturbance and dynamics; new references to support info all entered into Vitalis - In process of updating National Vegetation Classification (NVC) crosswalks in Ecological Systems Database so that updated ecosystem descriptions can be added to field guide. - Have developed new Ecological System description for Intermontane Prairie Potholes, a previously undescribed system in Montana
5. Work with Information Services staff to maintain and improve content of ecological information on Heritage websites, including wetland mapping and assessments, land cover mapping, ecological community accounts, and georeferenced photos.	Ongoing <ul style="list-style-type: none"> - Worked with Info Services staff to identify changes required to databases before assessment data can be integrated into MapViewer - Worked with Information Services staff to update wetland mapping status map
6. Collaborate with other Heritage Program and NatureServe ecologists from the Rocky Mountain Region to ensure compatibility of ecological mapping and classification systems	Ongoing <ul style="list-style-type: none"> - Continue to work with NatureServe to update the NVC. - Reviewed all NVC groups for Montana for next iteration of NVC
7. Update information on ecological communities and systems to reflect the 2015 National Vegetation Classification Standard mandated for use by all agencies receiving federal funds for vegetation classification activities.	In Progress <ul style="list-style-type: none"> - See number 4, second bullet point, and number 6 above.
8. Maintain a subject guide of authoritative web resources relevant to terrestrial and wetland communities	On hold pending staff time.

Supplemental Core Ecology Program Services

1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Assess the status of terrestrial and wetland communities and ecosystems, assign state ranks, and document the justification behind status ranks	Ongoing <ul style="list-style-type: none"> - Have developed the databases necessary to assign status rankings to individual wetlands - Continue to work with National Assessment and Monitoring workgroups to refine wetland assessment methods and create cross-state compatibility
2. Identify ecological sites of particular conservation concern that should be included in MTNHP information provided for environmental assessments	Ongoing <ul style="list-style-type: none"> - Creating new value-added wetland mapping geodatabase intended to support identification of “Wetlands of Special Significance”
3. Compile literature on terrestrial, and wetland communities with emphasis on those of conservation concern	Ongoing <ul style="list-style-type: none"> - References on forested ecosystem disturbance and dynamics were added to Vitalis - Current focus is on forested wetlands
4. Maintain crosswalks between different vegetation classification schemes to facilitate use of MTNHP products and products created by others	Ongoing <ul style="list-style-type: none"> - Have completed NVC-Ecological system crosswalk for wetlands
5. Work with Information Services to make wetland assessments available on the MTNHP website	On-Hold <ul style="list-style-type: none"> - Pending database revision to address incompatibly between different project databases
6. Compile vegetation data collected by others to support current and future vegetation classification and mapping efforts	Ongoing <ul style="list-style-type: none"> - Integrated forest service survey data into whitebark pine mapping - Worked with partners to prepare Landsat 8 imagery from 2014 and 2015 for further analysis
7. Present results of surveys or status assessments of terrestrial and wetland communities at professional and public meetings	Ongoing <ul style="list-style-type: none"> - Presented results of surveys and status assessments of Headwater wetlands at Montana Wetland Council October 29, 2015

Project Supported Ecology Program Services

1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Conduct field surveys for underrepresented or uncommon ecological communities in under-surveyed geographic areas	Ongoing <ul style="list-style-type: none"> - Continuing to map the distribution and extent of whitebark pine with 2015 surveys on the Bitterroot and Lolo NFs for the USFS - Surveyed and assessed the condition of 9 uncommon forested wetlands in northwestern Montana
2. Develop reports and peer-reviewed publications on the composition, distribution, and status of Montana's wetland and terrestrial communities.	Ongoing <ul style="list-style-type: none"> - Completed reports on Headwater wetlands in the Missouri Headwaters HUC and on results of assessments in the Blackfoot-Swan area
3. Evaluate the status of wetland and terrestrial communities with field surveys	Ongoing <ul style="list-style-type: none"> - Continued whitebark pine and forested wetland ecosystem surveys
4. Collaborate with partner agencies to develop ecological site descriptions when funding allows	Not Active - No current funding for this activity

Core Zoology Program Services

1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Respond to requests for information on the identification, biology, ecology, conservation status, management, and appropriate survey methods for vertebrate and invertebrate species.	Ongoing <ul style="list-style-type: none"> - Responded to just over four hundred requests from federal, state, and tribal personnel as well as consultants and members of the public.
2. Continue to gather, manage, and review animal point observation data in a statewide point observation database (POD) for all animal species.	Ongoing <ul style="list-style-type: none"> - 20,359 observations were added to the animal point observation database for 474 animal species. 23,670 observation records for 414 species were reviewed for final acceptance into the point observation database with a focus on Montana Species of Concern. - 1,331 structured survey locations for 12 different formal animal survey protocols were added to the structured survey database. - An additional 277,000 observation records (16% of all records in the database) still need to be reviewed for final acceptance into the database.
3. Work with Information Services staff to maintain and improve content of zoological information on Heritage websites.	Ongoing <ul style="list-style-type: none"> - Reviewed range maps shown on the Montana Field Guide and MapViewer web pages relative to observation data for 309 Montana SOC and PSOC and updated or created range maps where necessary for 63 species. - Worked with information services staff to revise the charts and data sections of the MapViewer web application. - Worked with information services staff to create additional spatial filters for display on the Species Snapshot web application so that custom Field Guides can be created for a variety of spatial boundaries across the state.
4. Collect and manage observational data on animal SOC that has been gathered by others.	Ongoing <ul style="list-style-type: none"> - 3,740 observations were added to the animal point observation databases for 109 Montana Animal Species of Concern and Potential Species of Concern.
5. Maintain animal species occurrences for existing SOC species from high value observations of animal SOC that can be used in environmental assessments.	Ongoing <ul style="list-style-type: none"> - Reviewed and/or updated 28,500+ observation records for animal Species of Concern in preparation for constructing species occurrences. All Species of Concern observation data that was pending a final review was reviewed. - Updated 9,500 species occurrences and created >700 new species occurrences for 37 vertebrate and 31 invertebrate species.
6. Maintain a complete taxonomic list of vertebrate animal species for Montana.	Ongoing <ul style="list-style-type: none"> - Updated taxonomy and four-codes for birds to correspond with the changes made in the American Ornithologists' Union 56th supplement to the Check-list of North American Birds. - Updated taxonomy for mammals to correspond with the Revised Checklist of North American Mammals North of Mexico, 2014.
7. Work with other Heritage staff to regularly exchange information with NatureServe.	Not Active <ul style="list-style-type: none"> - Scheduled for fall of 2016.

Supplemental Core Zoology Program Services

1 st & 2 nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Review the status of vertebrate and invertebrate animal taxa, assign state ranks, assist NatureServe with assigning global ranks when appropriate, and document these status ranks.	Ongoing - Reviewed the inventory and monitoring status of winter-breeding owls and Harlequin Ducks in conjunction with the Montana Animal Species of Concern Committee and removed Eastern Screech-Owl, Short-eared Owl, Great Horned Owl, Long-eared Owl, Northern Saw-whet Owl, and Harlequin Duck from the list of Species of Greatest Inventory Needs.
2. Create animal species occurrences for newly designated SOC species from high value observations of animal SOC that can be used in environmental assessments.	Not Active - No species were newly designated as Species of Concern during the reporting period.
3. Maintain species accounts, including state and Western Hemisphere range maps and observational maps, in the Montana Field Guide for all animal SOC.	Ongoing - See Core Zoology Program Services Task 3 above - Added literature to references section of the Montana Field Guide for Harlequin Duck, Evening Grosbeak, Sage Thrasher, Long-billed Curlew, Brewer's Sparrow, and Sage Sparrow.
4. Create predicted distribution models for animal SOC.	Ongoing - Examined potential to use coding to run models for numerous species at once. We think we can do this sometime in 2016, but it is likely to take the equivalent of one month of one staff members time to get this up and running.
5. Work toward a complete taxonomic list of invertebrate animal species for Montana.	Not active due to lack of funding and/or staff time.
6. Create and maintain species accounts, including state and Western Hemisphere range maps and observational maps, in the Montana Field Guide for animal species that are not SOC.	In Progress - See Core Zoology Program Services Task 3 above
7. Maintain a subject guide of authoritative web resources relevant to vertebrates and invertebrates.	Not active due to lack of funding and/or staff time.
8. Create predicted distribution models for animal species that are not SOC.	Ongoing - Examined potential to use coding to run models for numerous species at once. We think we can do this sometime in 2016, but it is likely to take the equivalent of one month of one staff members time to get this up and running.
9. Create associations between animal SOC and the Ecological Systems in which they are known to occur.	Not active due to lack of funding and/or staff time.
10. Create associations between animal species that are not Species of Concern and the Ecological Systems in which they are known to occur.	Not active due to lack of funding and/or staff time.
11. Create associations between animal SOC and the National Wetland and Riparian wetland and riparian map classes in which they occur.	Not active due to lack of funding and/or staff time.
12. Create associations between animals that are not SOC and the National Wetland and Riparian wetland and riparian map classes in which they occur.	Not active due to lack of funding and/or staff time.
13. Compile literature on vertebrate and invertebrate animal species with an emphasis on SOC and use it to update references and content in the Montana Field Guide.	Ongoing - See Supplemental Core Zoology Program Services Task 3 above - Compiled over 750 articles on Montana bat species which have not yet been added to the References section of the Montana Field Guide
14. Compile photographic images of vertebrate and invertebrate animal species and	Ongoing

locations where animal surveys have been conducted for Montana SOC.	<ul style="list-style-type: none"> - Loaded bat acoustic survey, mist net survey, and roost survey photos from MTNHP, FWP, USFS, and BLM surveys conducted in 2015 into the Thumbs Plus photo database. - Loaded Harlequin Duck survey photos from 2015 into the Thumbs Plus photo database.
15. Compile photographic images of vertebrate and invertebrate animal species and locations where animal surveys have been conducted for Montana non-SOC.	Ongoing <ul style="list-style-type: none"> - Loaded bat acoustic survey, mist-net survey, and roost survey photos from MTNHP, FWP, USFS, and BLM surveys conducted in 2015 to the Thumbs Plus photo database.
16. Scan animal species element files into optical character recognized PDF files so that they can be more readily shared with patrons, digitally archived, and serve as the basis for moving forward with a digital element file system; prioritize animal SOC over non animal SOC and prioritize field observation forms and notes over published articles. NHP staff will consult with MSL staff before providing the public access to copyrighted material.	Ongoing <ul style="list-style-type: none"> - While optical character recognized scans proved to be impossible, approximately 90% of the hard copy zoology files have been scanned into digital .pdf documents so that all files can be managed digitally moving forward and to allow for offsite backups to protect against catastrophic loss.
17. Work with Information Services staff to build the element reference files through automated literature database searches for individual species; prioritize animal SOC over non animal SOC.	Not active due to lack of funding and/or staff time.
Project Supported Zoology Program Services	
1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Conduct field surveys for vertebrate and invertebrate species with a focus on SOC and under-surveyed geographic areas and habitats.	Ongoing <ul style="list-style-type: none"> - Conducted acoustic and mist net surveys for bats in conjunction with USFS, BLM, and FWP across Montana and on USFS lands in the western Dakotas. - Conducted Harlequin Duck surveys across western Montana in conjunction with FWP and the USFS.
2. Develop reports, posters, books, web pages and peer-reviewed publications on the distribution, status, biology of, and human impacts on Montana's animal species.	Ongoing <ul style="list-style-type: none"> - Developed PowerPoint summaries of some of the bat acoustic and roost surveys for USFS, BLM, FWP, and Northwestern Energy
3. Present results of surveys or status assessments of animals at professional and public meetings.	Ongoing - Gave the following presentations: <ul style="list-style-type: none"> - Approximately 25 teachers at the Montana Education Association and Montana Federation of Teachers annual meeting on Amphibians, Reptiles, and Bats: an overview, in Billings on October 15th. - A general update on the Zoology Program to MTNHP partners at the annual MTNHP partners meeting in Helena on December 7th. - BLM, USFWS, FWP, MDT, USFS and Northern Rocky Mountain Grotto representatives on the status of bat and White-Nose Syndrome surveillance efforts in Montana via webinar on December 15th.

APPENDIX 2: SCOPE OF WORK
For FY16
Wetlands and Land Cover MSDI Framework Services

Core Wetlands and Land Cover Services

1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. Provide coordination and stewardship of the Wetlands MSDI GIS database if funding is available	Ongoing <ul style="list-style-type: none"> - Updated status maps and partners' maps for web page - Acquired additional "historic" NWI mapping for review
2. Participate in a work group with NRIS to develop a new workflow for hydrologic data creation, maintenance, and dissemination that includes the wetlands/riparian database	Ongoing <ul style="list-style-type: none"> - Attended meetings of the Hydrology workgroup
3. Provide coordination and stewardship of the MSDI Land Cover GIS database if funding is available	Ongoing <ul style="list-style-type: none"> - Added updates to structures and agriculture - "Burned in" Russian olive mapping completed in a different project
4. Working with NRIS, provide data and assist with maintaining map services and metadata for Wetlands and Land Cover data sets as part of the MSDI map services, and GIS Portal downloads	Ongoing <ul style="list-style-type: none"> - Worked with MSL to archive earlier wetland GDBs - Updated metadata and added current wetland mapping GDB to MSDI web services
5. If funding is available from MLIAC and other sources, maintain and update the 2013 statewide Land Cover data set based on the annual work plan included in the overall Land Information Plan submitted to MLIAC	Ongoing <ul style="list-style-type: none"> - Provided a partially updated Land Cover data set, without full metadata, to partners on request - Reviewed and provided input to MSDI Land Plan
6. Revise, add and delete map classification units as necessary to improve map usability, if funding is available	Ongoing <ul style="list-style-type: none"> - Reviewed ecological systems classification to determine whether it can be cross walked to NVC

Project Supported Wetlands and Land Cover Services

1st & 2nd Quarter FY 16 (July 1, 2015 – December 31, 2015)	
1. With outside project funding, develop a statewide data layer of wetland and riparian mapping information from NAIP imagery. Interpret and map wetlands and riparian areas for approximately 100 USGS Quads	Ongoing <ul style="list-style-type: none"> - Initiated discussions with tribal partners (Crow and Blackfeet) about additional wetland mapping - Continued to map wetlands with outside funding, completing ~ 50 quads
2. With outside project funding, conduct field surveys to improve land cover classification accuracy	Ongoing <ul style="list-style-type: none"> - Used EPA funding to evaluate forested ecosystems in NW Montana - Used Forest Service funding to map whitebark pine in Bitterroot and Lolo NFs
3. With outside project funding, conduct field surveys to improve wetland mapping accuracy	Ongoing <ul style="list-style-type: none"> - Used EPA funding to survey forested wetlands
4. With outside project funding, add attributes to wetland mapping to improve usability and transferability	Ongoing <ul style="list-style-type: none"> - With DEQ funding, began work on an "NWI++" product