

M.L. 2015 Project Abstract

For the Period Ending June 30, 2018

PROJECT TITLE: Updating National Wetland Inventory for Minnesota - Phase 5

PROJECT MANAGER: Steve Kloiber

AFFILIATION: Minnesota DNR

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FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION: M.L. 2015, Chp. 76, Sec. 2, Subd. 03e

APPROPRIATION AMOUNT: \$1,500,000

AMOUNT SPENT: \$4,472,838

AMOUNT REMAINING: \$27,162

Overall Project Outcomes and Results

Updating the National Wetland Inventory (NWI) is a key component of the State's strategy to ensure healthy wetlands and clean water for Minnesota. This effort is a multi-agency collaborative under leadership of the Minnesota Department of Natural Resources. These data are intended to replace the original 1980s NWI data. The NWI data provide a baseline for assessing the effectiveness of wetland policies and management actions. These data are used at all levels of government, as well as by private industry and non-profit organizations for wetland regulation and management, land use, conservation planning, environmental impact assessment, and natural resource inventories. The update project is being conducted in phases with data released for each region as it is finalized.

In this fifth phase of the overall effort, we provided updated wetland inventory maps for 20,385 square miles of northeastern Minnesota covering 15 counties in central and northern MN. With the completion of this phase, updated NWI data is now available for about 80% of the state.

The updated NWI were mapped in accordance with federal wetland mapping guidance. This update used spring aerial imagery acquired in 2013 and 2014, summer imagery acquired in 2015, and lidar elevation data as well as other ancillary data. Quality assurance of the data included visual inspection, automated checks for attribute validity and consistency, as well as a formal accuracy assessment based on an independent field data. Further details on the methods employed can be found in the technical procedures document for this project located on the project website (http://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html).

Project Results Use and Dissemination

All wetland map data and aerial imagery are available free of charge to the public. The data have been made available through the Minnesota Geospatial Commons (<https://gisdata.mn.gov/>) as well as through an online wetland viewer. A new wetland finder application will be deployed this fall to replace the previous wetland viewer. A copy of the data has also been provided to the US Fish and Wildlife Service for inclusion in the national wetland database.

Use of the NWI data is being promoted through a variety of channels. The DNR will be giving presentations about the NWI data at both the Minnesota Water Resources Conference and the Minnesota GIS/LIS Conference. We are also developing a communications plan to identify audiences, key messages, and various communications mechanisms (e.g. presentations, press release, websites, social media, etc.). The DNR's communications effort will be timed to coincide with the release of the full statewide NWI update, which we expect in December 2018.



Environment and Natural Resources Trust Fund (ENRTF)

M.L. 2015 Work Plan

Date of Final Report: August 31, 2018

Date of Work Plan Approval: June 11, 2015

Project Completion Date: June 30, 2018

Does this submission include an amendment request? No

PROJECT TITLE: Updating the National Wetland Inventory for Minnesota – Phase V

Project Manager: Steve Kloiber

Organization: Minnesota DNR

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Web Address: http://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html

Location: Fifteen counties in Central Minnesota: Aitkin, Beltrami, Benton, Carlton, Cass, Crow Wing, Hubbard, Itasca, Kanabec, Mille Lacs, Morrison, Pine, Stearns, Todd, Wadena

Total ENRTF Project Budget:	ENRTF Appropriation:	\$1,500,000
	Amount Spent:	\$1,472,838
	Balance:	\$27,162

Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 03e

Appropriation Language:

\$1,500,000 the first year is from the trust fund to the commissioner of natural resources to continue the update and enhancement of wetland inventory maps for Minnesota. This appropriation is available until June 30, 2018, by which time the project must be completed and final products delivered.

I. PROJECT TITLE: Updating the National Wetland Inventory for Minnesota – Phase V

II. PROJECT STATEMENT:

Over the past 100 years, about half of Minnesota's original 22 million acres of wetlands have been drained or filled. Some regions of the State have lost more than 90 percent of their original wetlands. Urban development, agricultural drainage, mining, road construction, and utility projects result in additional losses each year. The function and quality of remaining wetlands are often impaired. Updating the NWI is a key component of the State's strategy to monitor and assess wetlands in support of efforts to assure healthy wetlands and clean water for Minnesota.

- NWI is the only comprehensive inventory of wetlands for Minnesota. To protect wetlands, we need to know how many wetland acres we have and where they are. We can't manage what we don't measure. Unfortunately, the current NWI is inaccurate in many places because it is 25-30 years out-of-date and some of the original imagery used was relatively coarse scale.
- NWI is an important screening tool for land use planning and for identifying potential wetland impacts. State, regional and local agencies use the NWI for making land use decisions, including planning for transportation and utility services. Wetland programs such as Minnesota's Wetland Conservation Act and the US Army Corps' Clean Water Act Permit Program rely on the NWI as the initial resource for identifying potential impacts of proposed projects. Having accurate maps upfront prevents problems later on; saving time and money for permit applicants and wetland program managers as well as preventing wetland impacts.
- NWI is useful for strategic wetland restoration planning. Funds for wetland restoration are limited; therefore, it is important to get the most benefit possible for our restoration dollars. Wetland maps provide useful information for strategic wetland restoration planning. The NWI includes information about partly drained and ditched wetlands that may be potential wetland restoration opportunities. In addition, the updated NWI will provide enhanced attributes to support assessment of wetland function. The updated and enhanced NWI will also help target wetland restoration in a way that complements the functions and values of existing wetlands.

This is the fifth phase of a six-phase project to update the National Wetland Inventory (NWI) maps for Minnesota using modern, high-resolution imagery and elevation data. This project phase will: 1) update NWI maps for 1,588 USGS quarter quadrangles of 15 counties in central Minnesota (see attached map). The data required for updating the NWI maps in this proposal was already acquired through a previously funded project phase. High-resolution elevation data (LiDAR) were also acquired through a separate project. Wetland maps and aerial imagery will be produced by contractors under the supervision of the DNR. All wetland map data and aerial imagery will be available free of charge to the public.

III. OVERALL PROJECT STATUS UPDATES:

Amendment Request (10/21/15) – Approved by the LCCMR (10/27/15):

Through discussions between DNR and LCCMR, the DNR has agreed to reduce the amount it is charging for direct and necessary costs. This amendment proposes to shift \$30,560 from division and regional program management to the budget line for contract mapping services (\$48,272 - \$30,506 = \$17,712). The total DNR direct and necessary costs will be reduced from \$62,282 to \$31,722. These funds will be used to expand the scope of services to incorporate additional watercourse mapping into the NWI update for central Minnesota. This addition is similar to what was done for the southern MN project phase and will be a useful addition supporting various riparian corridor analyses. There is no change in the overall cost.

The breakdown of the remaining direct and necessary costs is as follows:

- Financial Support (\$11,930)

- Communication Support (\$1,141)
- Planning Support (\$704)
- Procurement Support (\$235)
- Division and regional program management (\$17,712)

The \$17,712 remaining for divisional and regional program management covers the costs of clerical and business office support.

Amendment Request (9/3/15) – Approved by the LCCMR (9/8/15):

This amendment proposes to shift \$40,000 from the project manager salary budget line to the budget line for contracted wetland mapping services. The project manager salary had retained approximately six months additional salary from the original proposal assuming that this grant would be the last phase of the overall project and that the additional time would be needed to wrap up the full project. The additional salary won't be needed because the remaining wetland mapping will require an additional phase that includes this salary cost. At the same time, the bids for wetland mapping services came in slightly higher than expected. Shifting these funds from PM salary to wetland mapping services will allow us to deliver the same overall result at no change in the overall cost.

Project Status as of January 31, 2016:

The first report period of the project began with issuing a request for proposals for wetland mapping services. Ducks Unlimited was selected as the best value proposal for the Central Minnesota NWI update. The contract with DU will include two value-added enhancements; edge-matching data between the various completed project area and extended watercourse mapping for all watercourses contained within the DNR Public Water Inventory. A service level agreement was also develop with the DNR Resource Assessment Program (RAP) to support the project. RAP will be pre-processing data and providing it to DU. RAP will also be participating in field work and quality control review of draft NWI data.

A project kick-off meeting and planning workshop were held on November 19 and 20. DU has continued to refine their wetland mapping process. RAP has been working on compiling and pre-processing data. A project wide 15-meter resolution layer for the compound topographic index (CTI) was obtained from the University of Minnesota and provided to DU. RAP is compiling a new 3-meter DEM and a 3-meter slope grid which should be ready for transfer to DU within a week or two. We anticipate that the remaining data pre-processing for the topographic position index (TPI) as well as the lidar intensity layer and the maximum height of first return layer should be complete by late February. DU will be conducting a pilot test of the latest wetland mapping procedure and providing the results of the test for review.

Project Status as of July 31, 2016:

Ducks Unlimited (DU) in conjunction with the MN DNR and the US Fish and Wildlife Service conducted field work for the central MN NWI project from April 25th through May 1st 2016. The team visited 151 sites. DU has also completed and submitted the technical procedures manual.

RAP has completed all data preprocessing and delivered the data. DU formatted and imported the data into the GIS software for processing. The project area has been split into 375 "project" tiles that follow non wetland features to limit the edge-matching process. Currently all data has been imported, tiled and had the water features extracted. The semi-automated extraction of emergent, shrub and forest types as well as the smoothing process has been completed for 64 quarter quads. DU has completed the draft data for 19 of the 375 project tiles. The draft data are being provided to the DNR through a web mapping service.

The University of Minnesota has hired and trained field crews to conduct the field validation data collection for northwest Minnesota. Sites have been selected for field visits and initial field work was initiated on the first

week of May, 2016. Data have been collected and validated for 680 sites as of July 28, 2016. Data for the remaining few hundred sites will be collected by the end of this summer.

Project Status as of January 31, 2017:

DU has completed the draft data for an additional 25 of the 375 project tiles for a total of 44 tiles (12% complete). Another 26 have been through delineation and wetland classification and are going through an internal QA review by DU.

The DNR has updated the online review tool for the draft data. The previous review tool was five years old and relied on an obsolete web platform. The tool allows stakeholders to view and comment on the draft NWI data. Comments are then reviewed by the DNR and forwarded to DU as appropriate for updates. The DNR is currently developing an online user guide as a resource for stakeholders.

RAP has provided additional field data to DU for sites in Stearns and Benton Counties, helping to refine the photo-interpretation process. DNR and RAP have begun reviewing the draft data provided by DU.

The University of Minnesota completed the acquisition of field validation data for northwest Minnesota. A file geodatabase including data for just over 1,000 field sites was submitted to the DNR in December 2016. About 56% of these points were located in wetlands of varying types. The rest were located in uplands. The DNR is currently reviewing these data for completeness and accuracy.

Amendment Request (2/6/17) – Approved by the LCCMR (2/9/17)

This is a work plan amendment request to redirect a portion of the \$5,000 budget line item for in-state travel for out-of-state travel. This amendment would redirect \$1,500 for this purpose. There are some savings on in-state travel because travel costs to the Minnesota GIS conference to present project results has been covered by the MNIT training budget. The specific purpose of the proposed out-of-state travel is to attend the annual meeting of the Association of State Wetland Managers. The meeting is to be held in Shepherdstown, West Virginia from April 10 to April 13, 2017. This meeting provides an opportunity for state and federal wetland managers to share information about their various program activities with one another. There are two sections of the meeting agenda that deal specifically with wetland mapping including developments in wetland mapping standards, new wetland mapping tools, and GIS-based wetland functional assessment. This is an opportunity to gain wider visibility for the LCCMR funded wetland mapping efforts as well as to gain information that may benefit this project.

Project Status as of June 23, 2017:

DU has completed the draft data for an additional 53 of the 375 project tiles for a total of 97 tiles (26% complete draft data). Another 37 tiles (10%) have been through delineation and wetland classification and are going through an internal QA review by DU.

The DNR has deployed the updated online review tool along with a user guide. The tool is being used by the DNR Resource Assessment Program (RAP) and the U.S. Fish and Wildlife Service (USFWS) to provide comments on the draft NWI data. Other project stakeholders are also being invited to use the tool to review and comment on the draft data. RAP and USFWS have reviewed draft NWI data for Stearns and Todd counties along with southern Mille Lacs County. Comments for the Stearns County area have been submitted to DU for their action. A meeting was held in March between DNR and DU to discuss the initial review comments. We also held a project status meeting in April with the project team for both the northwest and central update areas.

The DNR is has finished its review of the field validation data provided by the University of Minnesota for completeness and accuracy. The final database contains 6,921 field validation points. Of these, 4,103 are wetlands (59%) and the remainder are upland sites. These data are being used to assess the classification accuracy of the final statewide wetland GIS data layer. The total number of points acquired far exceeded the contractual minimum of 2,500 (500 points per project phase). There are some gaps in spatial coverage, mostly in

northeastern MN and mostly due to accessibility issues. To address these gaps, the DNR will supplement additional points derived from photo-interpretation and other available sources of information. Work on this activity is now complete.

Amendment Request (6/2/2017) – Approved by the LCCMR (6/27/2017):

As the NWI update project approaches completion, we have realized some cost savings. Savings for the central Minnesota update include \$17,712 from a policy change that no longer allows DNR to charge for support at the division level.

An important part of the update of the NWI has been to develop and refine modern mapping methods that efficiently incorporate current technology and high-resolution data such as lidar. Given the size, scope, and length of the project, it was inevitable that improvements in the methods would result in some differences in the data from early project phases to later phases. This amendment will address differences in the quality of the linework for the first mapping area (east-central Minnesota) to make it more consistent with later phases.

An automated procedure was used to create preliminary wetland boundaries defined by pixels in the aerial imagery. This results in a very fine, saw-toothed, jagged appearance to some wetland boundaries when the user is zoomed in very close. These boundaries have far more vertices than are really necessary to describe the boundary, which means that the data are larger and slower than optimal. For later project phases, the procedures incorporated an improved algorithm to smooth and simplify these wetland boundaries.

For this task, the data for east-central Minnesota will be processed through an additional algorithm to reduce the number of extraneous vertices and make the quality of the line work more consistent with data from subsequent update areas. Once the boundaries have been simplified, the data need to undergo a quality assurance review to find and fix any problems that may have been created through this process, such as small gaps and overlaps. This process will include running the USFWS QA/QC tool and addressing any problems found. The additional cost for performing the simplification and performing the post-hoc QA/QC analysis is \$15,000. This work is proposed as a contract amendment under the current central Minnesota NWI update with Ducks Unlimited. For the remaining \$2,712 that will not be spent on DNR divisional support, we propose to incorporate these funds into the line item for MNIT support, specifically targeted for additional support to maintain the web map and online review tools associated with the NWI project.

Project Status as of January 31, 2018:

DU has completed all the data pre-processing and image segmentation for the entire project area. The main remaining task is interpretation, QA/QC, and running the model to assign HGM classes. DU has also created a mask layer to assign the landscape position component of the HGM class. DU has submitted draft data for 51% of the project area. The DNR has submitted reviewer comments for 61% of the draft data (about 31% of the total project area). DU also completed work on smoothing out the linework for the east-central project area to make this area more consistent with the linework for adjacent areas that were completed in later phases.

Overall Project Outcomes and Results:

Updating the National Wetland Inventory (NWI) is a key component of the State's strategy to ensure healthy wetlands and clean water for Minnesota. This effort is a multi-agency collaborative under leadership of the Minnesota Department of Natural Resources. These data are intended to replace the original 1980s NWI data. The NWI data provide a baseline for assessing the effectiveness of wetland policies and management actions. These data are used at all levels of government, as well as by private industry and non-profit organizations for wetland regulation and management, land use, conservation planning, environmental impact assessment, and natural resource inventories. The update project is being conducted in phases with data released for each region as it is finalized.

In this fifth phase of the overall effort, we provided updated wetland inventory maps for 20,385 square miles of northeastern Minnesota covering 15 counties in central and northern MN. With the completion of this phase, updated NWI data is now available for about 80% of the state.

The updated NWI were mapped in accordance with federal wetland mapping guidance. This update used spring aerial imagery acquired in 2013 and 2014, summer imagery acquired in 2015, and lidar elevation data as well as other ancillary data. Quality assurance of the data included visual inspection, automated checks for attribute validity and consistency, as well as a formal accuracy assessment based on an independent field data. Further details on the methods employed can be found in the technical procedures document for this project located on the project website (http://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html).

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Updated Wetland Maps for Central Minnesota

Description:

Produce updated wetland maps for 1,588 USGS quarter quadrangles (20,314 miles²) for 15 counties in central MN (see attached map). The map production will be conducted by contractors under the supervision of the DNR and will be based on recommendations for wetland mapping methods developed by the University of Minnesota (UMN) through a previous phase of this project. This work will consist of digital photo-interpretation, topographic analysis of LiDAR data, and analysis of ancillary data such as soils maps and forest inventory maps, as well as quality control review. The project will require substantial input data and generate a large dataset. Secure, reliable data storage and back up will be provided by MN.IT. Completed digital map data will be available to the public through several websites, including the DNR and the U.S. Fish and Wildlife Service.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 1,380,000
Amount Spent: \$ 1,352,838
Balance: \$ 27,162

Outcome	Completion Date
1. Draft wetland maps for 15 counties	October 2017
2. Quality control review of draft data	January 2018
3. Final updated NWI data for 15 counties	March 2018
4. Data management and distribution	April 2018

Activity Status as of January 31, 2016:

The first report period of the project began with issuing a request for proposals for wetland mapping services. Ducks Unlimited was selected as the best value proposal for the Central Minnesota NWI update. The contract with DU will include two value-added enhancements; edge-matching data between the various completed project area and extended watercourse mapping for all watercourses contained within the DNR Public Water Inventory. A service level agreement was also develop with the DNR Resource Assessment Program (RAP) to support the project. RAP will be pre-processing data and providing it to DU. RAP will also be participating in field work and quality control review of draft NWI data.

A project kick-off meeting and planning workshop were held on November 19 and 20. DU has continued to refine their wetland mapping process. RAP has been working on compiling and pre-processing data. A project wide 15-meter resolution layer for the compound topographic index (CTI) was obtained from the University of Minnesota and provided to DU. RAP is compiling a new 3-meter DEM and a 3-meter slope grid which should be ready for transfer to DU within a week or two. We anticipate that the remaining data pre-processing for the topographic position index (TPI) as well as the lidar intensity layer and the maximum height of first return layer should be complete by late February. DU will be conducting a pilot test of the latest wetland mapping procedure and providing the results of the test for review.

Activity Status as of July 31, 2016:

Ducks Unlimited (DU) in conjunction with the MN DNR and the US Fish and Wildlife Service conducted field work for the central MN NWI project from April 25th through May 1st, 2016. The team visited 151 sites. DU has also completed and submitted the technical procedures manual.

RAP has completed all data preprocessing and delivered the data. The following data products were delivered to DU:

- 3m Average Intensity Model from 1st Returns
- 3m Maximum Height Model from 1st Returns
- 3m Digital Elevation Model from Ground Returns
- 3m Hillshade Model from Ground Returns
- 3m Slope Model in Radians from Ground Returns
- 3m Topographic Position Index (TPI) Model
- 3m Compound Topographic Index Model

DU formatted and imported the data into the GIS software for processing. The project area has been split into 375 “project” tiles that follow non-wetland features to limit the edge-matching process. Currently all data has been imported, tiled and had the water features extracted. The semi-automated extraction of emergent, shrub and forest types as well as the smoothing process has been completed for 64 quarter quads. DU has completed the draft data for 19 of the 375 project tiles. The draft data are being provided to the DNR through a web mapping service.

Activity Status as of January 31, 2017:

DU has completed the draft data for an additional 25 of the 375 project tiles for a total of 44 tiles (12% complete). Another 26 have been through delineation and wetland classification and are going through an internal QA review by DU. Related to this activity, the intermediate milestone dates for the wetland mapping were adjusted to more accurately reflect current knowledge. While the intermediate milestones have been shifted, the overall project timeline remains the same.

The DNR has updated the online review tool for the draft data. The previous review tool was five years old and relied on an obsolete web platform. The tool allows stakeholders to view and comment on the draft NWI data. Comments are then reviewed by the DNR and forwarded to DU as appropriate for updates. The DNR is currently developing an online user guide as a resource for stakeholders.

RAP has provided additional field data to DU for sites in Stearns and Benton Counties, helping to refine the photo-interpretation process. DNR and RAP have begun reviewing the draft data provided by DU.

Activity Status as of June 23, 2017:

DU has completed the draft data for an additional 53 of the 375 project tiles for a total of 97 tiles (26% complete draft data). Another 37 tiles (10%) have been through delineation and wetland classification and are going through an internal QA review by DU.

The DNR has deployed the updated online review tool along with a user guide. The tool is being used by the DNR Resource Assessment Program (RAP) and the U.S. Fish and Wildlife Service (USFWS) to provide comments on the draft NWI data. Other project stakeholders are also being invited to use the tool to review and comment on the draft data. RAP and USFWS have reviewed draft NWI data for Stearns and Todd counties along with southern Mille Lacs County. Comments for the Stearns County area have been submitted to DU for their action. A meeting was held in March between DNR and DU to discuss the initial review comments. We also held a project status meeting in April with the project team for both the northwest and central update areas.

Activity Status as of January 31, 2018:

DU has completed all the data pre-processing and image segmentation for the entire project area. The main remaining task is interpretation, QA/QC, and running the model to assign HGM classes. DU has also created a mask layer to assign the landscape position component of the HGM class. DU has submitted draft data for 51% of the project area. The DNR has submitted reviewer comments for 61% of the draft data (about 31% of the total project area). DU also completed work on smoothing out the linework for the east-central project area to make this area more consistent with the linework for adjacent areas that were completed in later phases.

Final Report Summary:

The final updated NWI data for the central Minnesota project area was delivered to the DNR along with the metadata and a final version of the project technical procedures document. In addition to the 1,588 quarter quads (20,385 square miles) developed under this project phase. The data was delivered as a single seamless GIS data layer and has been edge-matched to the adjacent project areas for the northeast, east-central, and southern project areas. The data were reviewed and accepted by the DNR.

The DNR will be making a few formatting changes to the data and updated the metadata to ensure consistency with earlier phases of the project. The data will be made available through the Minnesota Geospatial Commons (<https://gisdata.mn.gov/>) as well as through an online wetland viewer. The DNR will also forward a copy of the data to the US Fish and Wildlife Service for inclusion in the national database for the NWI.

ACTIVITY 2: Field Data Acquisition for Northwestern Minnesota

Description: Data acquisition will include a field-based assessment of wetland type for 400 to 500 sites chosen using a stratified random selection process. This task will complete the field data acquisition component for the statewide update of the NWI. The field data will be used to assess the accuracy of the wetland maps developed from remote sensing data. To maintain the independence of the field data, the field data acquisition will be managed by the U MN, Remote Sensing and Geospatial Analysis Laboratory and the data will not be shared with the mapping contractor.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 120,000
Amount Spent: \$ 120,000
Balance: \$ 0

Outcome	Completion Date
1. Field data acquisition for 17 counties in northwestern MN	December 2016

Activity Status as of January 31, 2016:

A contract was developed and executed with the University of Minnesota Remote Sensing and Geospatial Analysis Laboratory (RSGAL) to conduct the acquisition of field validation data for northwest Minnesota. This field work will be performed from approximately May through September of 2016.

Activity Status as of July 31, 2016:

The University of Minnesota has hired and trained field crews to conduct the field validation data collection for northwest Minnesota. Sites have been selected for field visits and initial field work was initiated on the first week of May, 2016. Data have been collected and validated for 680 sites as of July 28, 2016. Data for the remaining few hundred sites will be collected by the end of this summer.

Activity Status as of January 31, 2017:

The University of Minnesota completed the acquisition of field validation data for northwest Minnesota. A file geodatabase including data for just over 1,000 field sites was submitted to the DNR in December 2016. About 56% of these points were located in wetlands of varying types. The rest were located in uplands. The DNR is currently reviewing these data for completeness and accuracy. The current budget balance (\$66,634) at the time

of this status update for this activity reflects a lag between the completion of the activity and the processing of the final invoice.

Activity Status as of June 23, 2017:

The DNR has finished its review of the field validation data provided by the University of Minnesota for completeness and accuracy. The final database contains 6,921 field validation points. Of these, 4,103 are wetlands (59%) and the remainder are upland sites. These data are being used to assess the classification accuracy of the final statewide wetland GIS data layer. The total number of points acquired far exceeded the contractual minimum of 2,500 (500 points per project phase). There are some gaps in spatial coverage, mostly in northeastern MN and mostly due to accessibility issues. To address these gaps, the DNR will supplement additional points derived from photo-interpretation and other available sources of information. Work on this activity is now complete.

Activity Status as of January 31, 2018:

This activity was completed previously.

Final Report Summary:

The DNR has reviewed and accepted the field validation data provided by the University of Minnesota for completeness and accuracy. The final database contains 6,921 field validation points. Of these, 4,103 are wetlands (59%) and the remainder are upland sites. These data are being used to assess the classification accuracy of the final statewide wetland GIS data layer. The total number of points acquired far exceeded the contractual minimum of 2,500 (500 points per project phase). There are some gaps in spatial coverage, mostly in northeastern MN and mostly due to accessibility issues. To address these gaps, the DNR will supplement additional points derived from photo-interpretation and other available sources of information.

V. DISSEMINATION:

Description:

Wetland maps and related data developed by this project will be disseminated through web-based data distribution hubs and online viewing through web mapping applications. The primary data access website for the State of Minnesota is the [Minnesota Geospatial Commons](#). The primary online mapping application for viewing the data will be [Minnesota NWI Viewer](#). Furthermore, the data are likely to be picked up and served by other sites and applications beyond the ones listed here. Publicity for this effort will include presentations at professional conferences as well as publication in selected newsletters and journals. Conference presentations will include at least two of the following venues; the Minnesota Water Resources Conference, the Minnesota GIS/LIS Conference, the Annual Minnesota Wetlands Conference, and the Conference of the Minnesota Association of Watershed Districts.

Status as of January 31, 2016:

Presentations on the NWI were provided to potential data users at both the GIS/LIS conference (Duluth) and the Minnesota Water Resources Conference (St. Paul). The presentations covered the overall project status of past, present, and future phases of the project as well as information on data availability and access.

Status as of July 31, 2016:

We prepared a manuscript for a book chapter on the methods used for the hydrogeomorphic classification of the NWI, based on the methods used for the northeast MN NWI update. The same method is being used for the central MN NWI update. In addition, the final NWI data for phase 4 of the NWI update (northeast MN) was posted to the Minnesota Geospatial Commons and a press release has been drafted for this data release for this closely related data.

Status as of January 31, 2017:

The updated NWI data for the northeast was added to a web service and a web application with the previously completed project areas for east-central and southern MN. This web application provides easy access to the data for non-expert users (<http://www.dnr.state.mn.us/eco/wetlands/map.html>).

Status as of June 23, 2017:

Potential reviewers from DNR and BWSR field offices have been invited to participate in the review of the draft NWI data. We will also be coordinating with these staff for a broader effort to engage local reviewers.

Status as of January 31, 2018:

We have reached out to numerous local data users to engage them in reviewing the draft data. We have contacted county GIS coordinators and SWCD wetland specialists in Benton, Cass, Hubbard, Kanabec, Mille Lacs, Pine, Todd, and Wadena counties.

Final Report Summary:

All wetland map data and aerial imagery are available free of charge to the public. The data have been made available through the Minnesota Geospatial Commons (<https://gisdata.mn.gov/>) as well as through an online wetland viewer. A new wetland finder application will be deployed this fall to replace the previous wetland viewer. A copy of the data has also been provided to the US Fish and Wildlife Service for inclusion in the national wetland database.

Use of the NWI data is being promoted through a variety of channels. The DNR will be giving presentations about the NWI data at both the Minnesota Water Resources Conference and the Minnesota GIS/LIS Conference. We are also developing a communications plan to identify audiences, key messages, and various communications mechanisms (e.g. presentations, press release, websites, social media, etc.). The DNR’s communications effort will be timed to coincide with the release of the full statewide NWI update, which we expect in December 2018.

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Budget Category	\$ Amount	Overview Explanation
Professional/Technical/Service Contracts:	\$ 1,461,278	(1) MNIT project manager at 0.65 FTE for 2-years; (\$180,000) (2) A service level agreement with DNR Resource Assessment Office for data processing, field work, quality assurance, and other support; (\$177,000) (3) A joint powers agreement with the University of Minnesota for field data collection; (\$100,000) (4) A service level agreement with MN.IT for providing data management services and support for data distribution and web mapping; (\$23,000) (5) A competitive bid contract for wetland mapping services. (\$981,278)
Equipment/Tools/Supplies:	\$ 2,000	Software maintenance for specialized geospatial software used for quality control.
Travel Expenses in MN:	\$ 5,000	In-state mileage, lodging and travel expenses for project coordination, field reconnaissance, and outreach meetings.
Other: DNR Direct and Necessary	\$31,722	DNR’s direct and necessary business services

Support*		required to support this proposal
TOTAL ENRTF BUDGET:	\$ 1,500,000	

* Direct and Necessary expenses include both Department Support Services (Human Resources, IT Support, Safety, Financial Support, Communications Support, Planning Support, and Procurement Support) and Division Support Services. Department Support Services are described in the agency Service Level Agreement, and billed internally to divisions based on rates that have been developed for each area of service. These services are directly related to and necessary for the appropriation. Department leadership services (Commissioner’s Office and Regional Directors) are not assessed. Division Support Services include costs associated with Division business offices and clerical support. Those elements of individual projects that put little or no demand on support services such as large single-source contracts, large land acquisitions, and funds that are passed-thru to other entities are not assessed Direct and Necessary costs for those activities. For this work plan, single source contract activity with an associated cost of \$520,000 has not been assessed Direct and Necessary costs. In addition to itemized costs captured in our proposal budget, direct and necessary costs cover HR Support (\$0), Safety Support (\$0), Financial Support (\$11,930), Communication Support (\$1,141), IT Support (\$0), Planning Support (\$704), Procurement Support (\$235), and division and regional program management (\$17,712) that are necessary to accomplishing funded programs/projects.

Explanation of Use of Classified Staff: The DNR contracts for project management services for this project through MN.IT Services. The MN.IT project manager was originally hired as an unclassified DNR employee. This position was reorganized to MN.IT Services under a statewide consolidation of IT services and is now proposed to be changed to a classified employee. This position has been funded by the ENRTF program for 0.65 FTE. There is currently no other source of funding for managing the NWI project and once the project is complete the agency will secure other funds to continue funding this position.

Explanation of Capital Expenditures Greater Than \$5,000: N/A

Number of Full-time Equivalent (FTE) Directly Funded with this ENRTF Appropriation: 0.65 FTE for 2-years (1.3 FTE) through a service level agreement with MNIT

Number of Full-time Equivalent (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 7 FTE for two years (14 FTE)

B. Other Funds:

Source of Funds	\$ Amount Proposed	\$ Amount Spent	Use of Other Funds
Non-state			
	\$0	\$0	
State			
In-Kind Contribution from Wetland Program Coordinator	\$10,000	\$7,500	Project Coordination and Planning
TOTAL OTHER FUNDS:	\$10,000	\$7,500	

* Significant matching fund have been used in past phases (see funding history); however, these funds are usually not identified until after the work phase has been initiated.

VII. PROJECT STRATEGY:

A. Project Partners: Partners providing in-kind services for this project include the Minnesota Department of Natural Resources, the Minnesota Pollution Control Agency, the Minnesota Board of Water and Soil Resources, the U.S. Fish and Wildlife Service, and the Minnesota Dept. of Administration’s Geographic Information Office.

B. Project Impact and Long-term Strategy: This is the fifth phase of a multi-phase project to update the NWI for the entire state of Minnesota. The estimated total budget for the project is \$7.5 million. With this appropriation, the total amount received from ENRTF to date will be \$5,650,000 (75% of the total estimated

cost). Upon completion of this phase, our progress will be 100% completion for imagery and field data acquisition and approximately 75% completion for wetland mapping.

C. Funding History:

Funding Source and Use of Funds	Funding Timeframe	\$ Amount
ENRTF – Imagery, Methods, Standards	FY09-11	\$550,000
ENRTF – Imagery, Wetland Mapping (east-central), Methods	FY11-14	\$1,100,000
ENRTF – Imagery, Wetlands Mapping (southern)	FY13-15	\$1,500,000
ENRTF – Imagery, Wetlands Mapping (northeast)	FY14-16	\$1,000,000
USGS/NGA – Imagery	FY10	\$25,000
St. Louis County – Imagery	FY10	\$24,999
MPCA Clean Water Legacy – Imagery	FY10	\$111,000
DNR – Heritage Enhancement Fund – Imagery	FY10	\$181,064
DNR/NOAA – Coastal Zone Program – Imagery	FY10	\$24,227
USGS/NGA – Imagery	FY11	\$75,000
Metropolitan Council – Imagery	FY11	\$65,750
Metropolitan Mosquito Control District – Imagery	FY11	\$7,000
McLeod County – Imagery	FY12	\$24,000
Sibley County – Imagery	FY12	\$29,000
Murray County – Imagery	FY12	\$35,000
US Fish and Wildlife Service – Wetland Mapping (North Shore)	FY13-14	\$75,000
Carlton County – Imagery	FY14	\$23,475
Camp Ripley – Imagery	FY14	\$8,898
Itasca County – Imagery	FY14	\$86,841
Clay County – Imagery	FY14	\$31,091
Wilkin County – Imagery	FY14	\$23,266
Mille Lacs County – Imagery	FY14	\$13,769
White Earth Reservation – Imagery	FY14	\$34,231
Fond du Lac Reservation – Imagery	FY14	\$3,000
Beltrami County – Imagery	FY15	\$54,499
Polk County – Imagery	FY15	\$59,863

VIII. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS: N/A

IX. VISUAL COMPONENT or MAP(S): SEE MAP ATTACHMENT

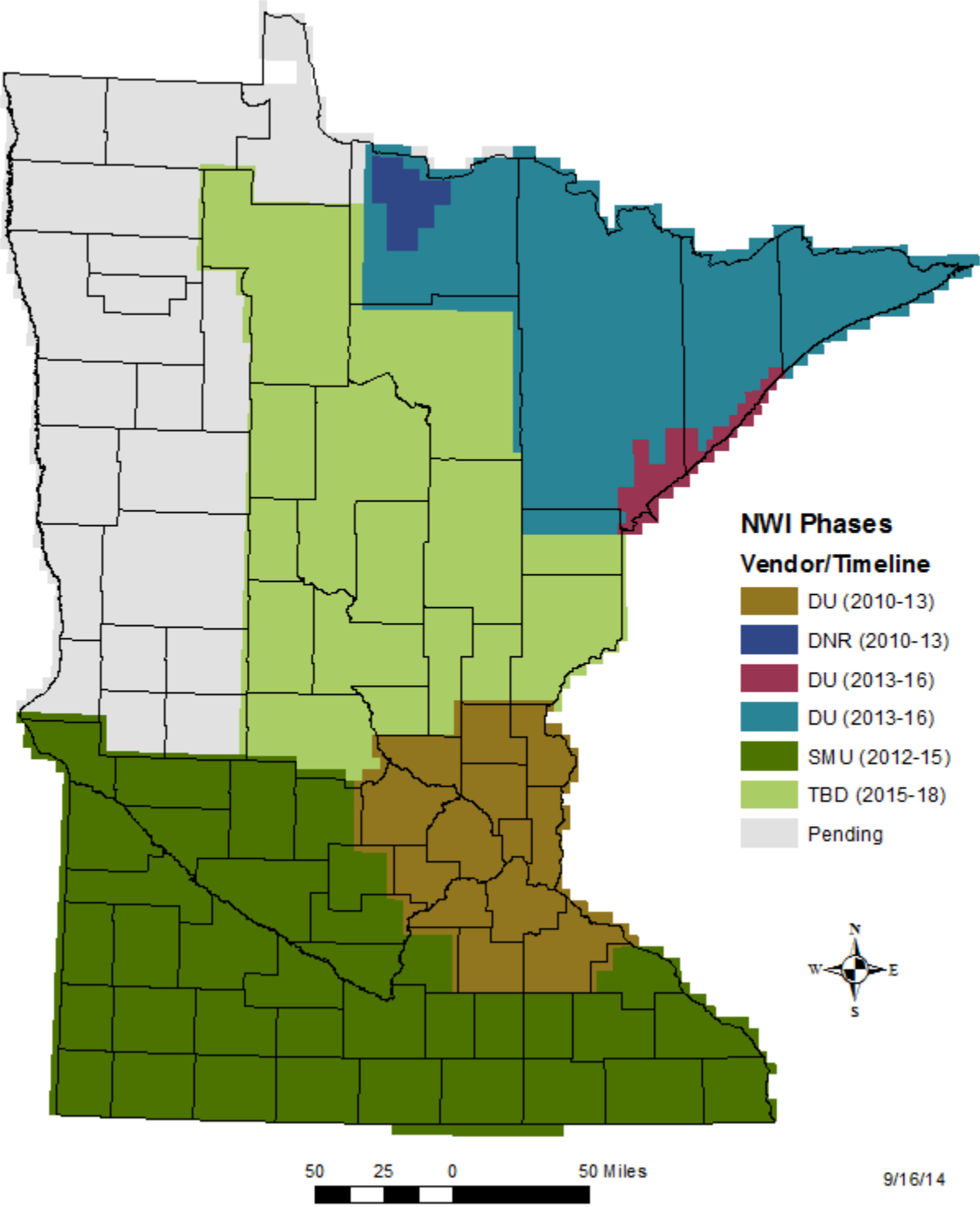
X. RESEARCH ADDENDUM: N/A

XI. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than January 31, 2016, July 31, 2016, January 31, 2017, July 31, 2017 and January 31, 2018. A final report and associated products will be submitted between June 30 and August 15, 2018.

MAP ATTACHMENT

NWI Production Status



The map production area for this grant (central Minnesota) is shown in the light green color.



Environment and Natural Resources Trust Fund
M.L. 2015 Project Budget

Project Title: *Updating the National Wetland Inventory for Minnesota – Phase V*
Legal Citation: *M.L. 2015, Chp. 76, Sec. 2, Subd. 03e*
Project Manager: *Steve Kloiber*
Organization: *Minnesota DNR*
M.L. 2015 ENRTF Appropriation: *\$ 1,500,000*
Project Length and Completion Date: *3 Years; June 30, 2018*
Date of Final Report: *August 31, 2018*

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	Updating Wetland Maps			Field Data Acquisition				
Professional/Technical/Service Contracts								
<i>Project Manager; Service Level Agreement with MNIT for 0.65FTE for 2 years (78% salary, 22% benefits)</i>	\$160,000	\$147,646	\$12,354	\$20,000	\$20,000	\$0	\$180,000	\$12,354
<i>Contract for Wetland Mapping Service - Ducks Unlimited</i>	\$996,278	\$995,000	\$1,278				\$996,278	\$1,278
<i>Service Level Agreement with DNR Resource Assessment Office for data processing and quality assurance support</i>	\$177,000	\$177,000	\$0				\$177,000	\$0
<i>Service Level Agreement with MN.IT for data management, distribution, and web services</i>	\$25,712	\$22,979	\$2,733				\$25,712	\$2,733
<i>Joint Powers Agreement with University of Minnesota for field data acquisition</i>				\$100,000	\$100,000	\$0	\$100,000	\$0
Equipment/Tools/Supplies								
<i>Software maintenance for quality control review</i>	\$2,000	\$1,031	\$969				\$2,000	\$969
Travel expenses in Minnesota								
<i>In-state mileage, lodging and travel expenses for project coordination, field reconnaissance, and outreach meetings.</i>	\$3,500	\$108	\$3,392				\$3,500	\$3,392
Travel expenses outside Minnesota								
<i>Lodging and travel expenses for coordination meeting with federal and state wetland managers</i>	\$1,500	\$644	\$856				\$1,500	\$856
Other								
<i>DNR's direct and necessary costs cover HR Support (\$0), Safety Support (\$0), Financial Support (\$11,930), Communication Support (\$1,141), IT Support (\$0), Planning Support (\$704), Procurement Support (\$235) that are necessary to accomplishing funded programs/projects.</i>	\$14,010	\$8,430	\$5,580				\$14,010	\$5,580
COLUMN TOTAL	\$1,380,000	\$1,352,838	\$27,162	\$120,000	\$120,000	\$0	\$1,500,000	\$27,162