

NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Aerial Electromagnetic Survey of the Bazile Groundwater Management Area

PRIMARY CONTACT INFORMATION

Entity Name: Upper Elkhorn Natural Resources District

Contact Name: Stephanie Butler

Address: 301 N. Harrison St., O'Neill, NE 68763

Phone: 402-336-3867

Email: subtler@uenrd.org

Partners / Co-sponsors, if any: Lower Niobrara NRD, Lewis and Clark NRD, Lower Elkhorn NRD

1. Dollar amounts requested: (Grant, Loan, or Combination)

Grant amount requested. \$289,196.00

Loan amount requested. \$ 0

If Loan, how many years repayment period? [Click here to enter text.](#)

If Loan, supply a complete year-by-year repayment schedule.
[Click here to enter text.](#)

2. Permits Needed - Attach copy for each obtained (N/A = not applicable)

Nebraska Game & Parks Commission
(G&P) consultation on Threatened and
Endangered Species and their Habitat

N/A Obtained: YES NO

Surface Water Right	N/A ✓	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
USACE (e.g., 404 Permit)	N/A ✓	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Cultural Resources Evaluation	N/A ✓	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Other (provide explanation below) Click here to enter text.	N/A ✓	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>

3. Are you applying for funding for a combined sewer over-flow project?

YES NO

If yes, do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality?

YES NO

If yes attach a copy to your application. [Click here to enter text.](#)

If yes what is the population served by your project? [Click here to enter text.](#)

If yes provide a demonstration of need. [Click here to enter text.](#)

If yes and you were approved for funding in the most recent funding cycle, then resubmit the above information updated annually but you need not complete the remainder of the application.

4. If you are or are representing an NRD, do you have an Integrated Management Plan in place, or have you initiated one?

N/A YES NO

5. Has this application previously been submitted for funding assistance from the Water Sustainability Fund and not been funded?

YES NO

If yes, have any changes been made to the application in comparison to the previously submitted application? [Click here to enter text.](#)

If yes, describe the changes that have been made since the last application. [Click here to enter text.](#)

No, I certify the application is a true and exact copy of the previously submitted and scored application. (Signature required) [Click here to enter text.](#)

6. Complete the following if your project has or will commence prior to next July 1st.
This project will not begin unless grant funding is obtained.

As of the date of submittal of this application, what is the Total Net Local Share of Expenses incurred for which you are asking cost share assistance from this fund? \$ **None**

Attach all substantiating documentation such as invoices, cancelled checks etc. along with an itemized statement for these expenses. [Click here to enter text.](#)

Estimate the Total Net Local Share of Expenses and a description of each you will incur between the date of submittal of this application and next July 1st for which you are asking cost share assistance from this fund.

\$ [Click here to enter text.](#)

Section B.

DNR DIRECTOR'S FINDINGS

Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?

YES NO

- 1(a). If yes (structural), submit a feasibility report ([to comply with Title 261, CH 2](#)) including engineering and technical data and the following information:

A discussion of the plan of development ([004.01 A](#));
Click here to enter text.

A description of all field investigations made to substantiate the feasibility report ([004.01 B](#)); Click here to enter text.

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report ([004.01 C](#)); Click here to enter text.

A description of any necessary water and land rights and pertinent water supply and water quality information, if appropriate ([004.01 D](#));
Click here to enter text.

A discussion of each component of the final plan including, when applicable ([004.01 E](#));

Required geologic investigation ([004.01 E 1](#)); Click here to enter text.

Required hydrologic data ([004.01 E 2](#)); Click here to enter text.

Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria ([004.01 E 3](#)). Click here to enter text.

- 1(b). If no (non-structural), submit data necessary to establish technical feasibility including, but not limited to the following ([004.02](#)):

A discussion of the plan of development ([004.02 A](#));

The Aerial Electromagnetic (AEM) survey is conducted via helicopter and will not harm the environment. Any structures that must be avoided will be designated before the survey begins.

A description of field or research investigations utilized to substantiate the project conception ([004.02 B](#));

If chosen for funding, the Natural Resources Districts (NRDs) will contract with Aqua Geo Frameworks LLC. This company has conducted AEM surveys in other parts of the state and will utilize the same necessary planning protocols as previously employed. The survey should take two to four days and there will be no over flight of homes, buildings, livestock or other major structures. Proper notification will be made to authorities and the public prior to the survey.

A description of the necessary water and/or land rights, if applicable (004.02 C); N/A

A discussion of the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure (004.02 D).
N/A

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

The AEM survey method is the latest technology for obtaining data on subsurface hydrogeology. Currently, our best data comes from test holes drilled by the Conservation Survey Division and other agencies. These test holes provide important information, but are scattered across the area and leave large areas without any data. Flown in ~3 mile grids, the AEM survey will provide nearly continuous high density, high quality data of the subsurface and provide an image of the region's aquifers to a depth of 900-1,000 feet.

3. Document all sources and report all costs and benefit data using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies shall be fifty (50) years or with prior approval of the Director, up to one hundred (100) years [T261 CH 2 (005)].
 - Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01).

This project will require no construction, operation or maintenance costs.

- Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe any intangible or secondary benefits separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, such that the

economic feasibility of the project can be approved by the Director and the Commission (005.02).

This project will increase water sustainability by providing an additional resource for the NRDs to utilize when managing groundwater. This survey will provide insight into areas that need greater attention and/or additional management in order to sustain the water resource for current and future uses.

- All benefit and cost data shall be presented in a table form to indicate the annual cash flow for the life of the proposal, not to exceed 100 years (005.03). [Click here to enter text.](#)
- In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, the economic feasibility of such proposal shall be demonstrated by such method as the Director and the Commission deem appropriate (005.04). [Click here to enter text.](#)

4. Provide evidence that sufficient funds are available to complete the proposal.

Please see appendix 1 for the partnering NRDs valuations and levy information.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace).

Please see appendix 1 for the partnering NRDs valuations and levy information.

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal.

N/A

7. Describe how the plan of development minimizes impacts on the natural environment.

The AEM survey is conducted via helicopter and will not harm the environment. Any structures that must be avoided will be designated before the survey begins.

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

The NRDs will contract with Aqua Geo Frameworks LLC to complete the project. This company has conducted these types of surveys in other parts of Nebraska. Furthermore, the NRDs have authority to conduct studies, investigations and surveys needed to enhance water sustainability under the Groundwater Management Protection Act, Chapter 46, Article 7 and Nebraska § 2-3232.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

This project will supplement the groundwater management plans and the integrated management plans already in place by the local NRDs. As information

is gained by conducting the AEM survey, the NRDs can make updates and changes of these plans to better sustain and manage the groundwater resource.

10. Are land rights necessary to complete your project?

YES NO

If yes, provide a complete listing of all lands involved in the project.
[Click here to enter text.](#)

If yes, attach proof of ownership for each easements, rights-of-way and fee title currently held.
[Click here to enter text.](#)

If yes, provide assurance that you can hold or can acquire title to all lands not currently held.
[Click here to enter text.](#)

11. Identify how you possess all necessary authority to undertake or participate in the project.

Nebraska's Natural Resources Districts (NRDs) have authority for this project under the Groundwater Management Protection Act, Chapter 46, Article 7 and Nebraska § 2-3232 which states that NRDs have the authority to "make studies, investigations, or surveys and do research as may be necessary to carry out its authorized purposes, enter upon any land, after notifying the owner or occupier, for the purpose of conducting such studies, investigations, surveys, and research, and publish and disseminate the results."

12. Identify the probable environmental and ecological consequences that may result as the result of the project.

The AEM survey is conducted via helicopter and will not have any negative environmental or ecological consequences. Any structures that must be avoided will be designated before the survey begins.

Section C.

NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

Notes:

- The responses to one criterion will not be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.
- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted in parenthesis. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.
- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;
 - Describe the specific threats to drinking water the project will address.
 - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
 - Provide a history of issues and tried solutions.
 - Provide detail regarding long range impacts if issues are not resolved.

The Bazile Groundwater Management Area (GWMA) is an area identified by the Lower Niobrara, Lewis and Clark, Upper Elkhorn and Lower Elkhorn NRDs as an area with high levels of nitrate in the groundwater. The average median nitrate

concentration for the area is 12 parts per million (ppm) with a peaks well over the 10ppm federal health standard set by the Environmental Protection Agency. Over 7,000 residents live in the Bazile GWMA and utilize groundwater as their drinking water source. All of the ten communities utilize groundwater to supply residents with drinking water. Of the ten communities, four are currently under administrative order for high nitrates, with only one treating for nitrates. The other communities are exploring options to drill new wells to provide drinking water with lower levels of nitrates. While the NRDs have had water management plans in place since the 1980s, nitrate levels have continued to rise. As the levels have continued to rise and the area affected has spread, the NRDs joined forces with the Nebraska Department of Environmental Quality to create the Bazile GWMA Plan. The Bazile GWMA Plan has both short and long term goals of reducing nitrate levels in the groundwater through encouraging voluntary adoption of agricultural and urban best management practices. If the nitrate levels are not abated, more communities will face administrative orders leading to costly well drilling or treatment options. Rural residents are also affected as private wells are susceptible to high nitrate levels in groundwater. Data obtained from the AEM survey will be available to help communities when looking for potential new well sites and establishing wellhead protection plans. While drilling a new well will not solve the nitrate problem in the long run, it will allow time for agricultural best management practices to take effect. This survey will also give information about the quantity of water, allowing the NRDs to better manage for quantity as well as quality.

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;
 - Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
 - Provide the history of work completed to achieve the goals of this plan.
 - List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

The Lower Niobrara, Lewis and Clark, Upper Elkhorn and Lower Elkhorn NRDs are requesting grant assistance to fulfill the goals of the Bazile Groundwater Management Plan. This plan was developed in 2014 in conjunction with the Nebraska Department of Environmental Quality and existing NRD groundwater management plans and integrated management plans.

The goals of the Bazile GWMA Plan are:

Short Term (5 years)

- 1.) Educate landowners, agricultural producers, commercial properties and residents on the importance of environmental stewardship and good groundwater quality.
- 2.) Reduce the trend of increasing nitrate concentrations in the Bazile GWMA.

Long Term goals (>20 years)

- 1.) Reduce and maintain groundwater nitrate concentration to below the maximum contaminant level of 10 ppm
- 2.) Maintain an adequate and sustainable supply of groundwater to provide sufficient quantities for domestic, municipal, agricultural and industrial uses
- 3.) Ensure groundwater contamination and other activities do not impair surface water beneficial uses

These goals are being met by one-on-one contact with agricultural producers and community leaders. Agricultural and urban demonstration sites highlighting best management practices have been established and showcased during field days. Cost-share assistance for best management practices is provided through NRD and Nebraska Environmental Trust funds. Water sustainability funds will be used to conduct the AEM survey to provide additional information to maintain an adequate and sustainable supply of groundwater for multiple uses and provide communities with helpful information about their wellhead protection areas. This information will help to achieve the goals of the Bazile GWMA Plan through additional data about the underground hydrology that will be used to better manage the groundwater resource as well as providing tools to educate the public. This survey will provide information on locations where groundwater and surface water are hydrologically connected so that additional precautions can be taken to protect surface water. This survey will also provide information on the quantity of groundwater in specific areas, aiding communities who are looking for areas to drill additional wells.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

List the following information that is applicable:

- The location, area and amount of recharge;
- The location, area and amount that aquifer depletion will be reduced;
- The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;
- Provide a detailed listing of cross basin benefits, if any.

This project will focus on the Bazile GWMA, which covers 21 townships (483,842 acres), parts of four NRDs and parts of Knox, Antelope and Pierce counties. This area includes parts of the Niobrara River Basin, Missouri River Basin and the Elkhorn River Basin. While the recharge model for the Bazile GWMA has not yet been released (USGS, personal communication), past studies show that recharge in north-central Nebraska on irrigated agricultural land ranges from 3.9-5.7 inches/year (USGS, 2011). Information gained from this survey will give the NRDs greater insight into which areas need additional management based on their underground hydrology. These management decisions will focus on the NRD's goals of reducing aquifer depletion and increasing aquifer recharge.

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;
 - List the goals the project provides benefits.
 - Describe how the project will provide these benefits
 - Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

The goals of this project are to:

1. **To increase understanding of the aquifer(s) within the Bazile GWMA by conducting an AEM survey and using the collected and historic data to construct a hydrogeologic framework of the AEM surveyed areas**
2. **Be able to use the collected information for management purposes such as refining the management activities currently in use to reduce nonpoint source pollution by mapping recharge areas, define the aquifer geometry and characteristics and groundwater flow. This will provide economic benefits to the Nebraska Taxpayer by efficiently using the tax dollars in the best possible manner**
3. **Have the ability to use the collected data to develop new public water supply wells within well head protection areas**
4. **To increase understanding of the aquifer characteristics of the area relating to the volume and geologic/geographic distribution of aquifer material, allowing for a better understanding of aquifer longevity and its resilience to drought conditions**
5. **To provide precise information on the locations for future test holes, recharge monitoring efforts and observation/monitoring wells**
6. **Provide a data report on the survey results**

By conducting this AEM survey, a better understanding of the subsurface hydrogeology will be obtained. This data will assist the NRDs to make informed decisions on groundwater management for agricultural, urban and recreational uses. Having additional information will give communities more information about potential well drilling sites, will give the NRDs and the public a 3-D vision of the groundwater resource and will assist with nitrate management to protect water quality for both groundwater and surface water users. Conducting an AEM survey will give the NRDs more information to delineate management areas to help alleviate these issues. This project will provide information that current resources and actions will never obtain. Decisions made based on this

information will help with reaching the Bazile GWMA Plan's long term goals of lowering and maintaining the groundwater nitrates below the federal health standard.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;
 - Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
 - Describe the beneficial uses that will be reduced, if any.
 - Describe how the project provides a beneficial impact to the state's residents.

Having a better understanding of the underground geology and locations of groundwater confined aquifers will maximize the increased beneficial use of groundwater in the Bazile GWMA. Knowing areas of reduced groundwater access will help the NRDs better manage the resource and provide information for creating more localized management areas and to provide a basis for groundwater allocations if necessary. Information obtained from this project will be shared with other NRDs and state agencies to give insight into other nitrate contaminated areas across the state.

6. Is cost-effective;

- List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.
- Compare these costs to other methods of achieving the same benefits.
- List the costs of the project.
- Describe how it is a cost effective project or alternative.

This project will have no construction costs, O/M costs, land or water acquisition costs. Currently there are no alternative means of acquiring this data. The cost of this project is \$812,071.36. This price estimate includes the AEM flight survey, data interpretation and a final report from Aqua Geo Frameworks LLC (see Appendix 3). The NRDs and the West Knox Rural Water System (RWS) will be providing past and current data collection, project management/ collaboration and will assist with data interpretation from the survey. In addition to in-kind match, the NRDs are contributing \$96,254.00 of cash match.

Column A	Column B	Column C	Column D	Column E	Column F
1. Source of Funds ►	Water Sustainability Fund	NRD in-kind match	NRD Cash match		TOTALS ▼
2. Budget Category ▼					
3. AEM Surveys	\$176,500.00	\	\	\	\$176,500.00
4. Database Development	\$28,000.00	\	\	\	\$28,000.00
5. Geophysical Analysis	\$51,000.00				\$51,000.00
6. Hydrogeologic framework and report	\$129,950.00				\$129,950.00
7. LNNRD*		\$55,856.20	\$10,000.00		\$65,856.20
8. LENRD*		\$61,240.00	\$46,254.00		\$107,494.00
9. LCNRD*		\$35,000.00	\$30,000.00		\$65,000.00
10. UENRD*		\$62,271.16	\$10,000.00		\$72,271.16
11. West Knox RWS*		\$116,000.00			\$116,000.00
*See attached explanations					
18. TOTALS ►	\$385,450.00	\$330,367.36	\$96,254.00		\$812,071.36

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;
 - Identify the interstate compact, decree, state contract or agreement or federal law.
 - Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.
 - Describe current deficiencies and document how the project will reduce deficiencies.

N/A

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;
 - Identify the property that the project is intended to reduce threats to.
 - Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
 - Identify the potential value of cost savings resulting from completion of the project.
 - Describe the benefits for public security, public health and safety.

No property damage will occur during this project. The AEM survey will be conducted using a helicopter and any infrastructure that must be avoided will be identified prior to the survey. Local authorities will be contacted prior to the survey and announcements will be made to inform the public. This project will benefit public health by increasing the quality of drinking water.

9. Improves water quality;
 - Describe what quality issue(s) is/are to be improved.
 - Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
 - Describe other possible solutions to remedy this issue.
 - Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

The Bazile GWMA has groundwater nitrate concentrations above the 10 ppm federal health standard and the levels are continuing to rise. Conducting an AEM survey will help improve water quality by providing the NRDs with additional data to better manage the groundwater. This additional data will help pin-point areas

with water quality and quantity issues for better management. Area recharge can be estimated by conducting an AEM survey, allowing NRDs to better manage areas that are highly susceptible to nitrogen leaching. This new information will work in conjunction with the NRD's groundwater management plans, integrated management plans and the Bazile GWMA Plan.

This project will focus on the Bazile GWMA, which covers 21 townships (483,842 acres), parts of four NRDs and three counties. Groundwater provides the drinking water source for over 7,000 residents in the ten communities within the Bazile GWMA. Groundwater in this area is used for residential, industrial, agricultural and recreational uses, all of which will benefit from information gained by the AEM survey.

Currently, the NRDs manage groundwater quality through groundwater management plans. While these plans call for the collection of quality data, they cannot provide information on the underground geology and aquifers. This survey will provide additional data that will increase the effectiveness of the NRD groundwater management plans and integrated management plans.

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- Identify the local jurisdiction that supports the project.
- List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.
- List other funding sources for the project.

The NRDs will be supporting this project primarily through in-kind match, cash match and project collaboration. See Appendix 1 for each NRD's property tax levy and valuations.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.
- Provide the history of work completed to achieve the goals of these plans.
- List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.
- Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- List all stakeholders involved in project.
- Identify who benefits from this project.

The local jurisdiction in the Bazile GWMA for sustainable water use is the Lower Niobrara, Lewis and Clark, Upper Elkhorn and Lower Elkhorn NRDs. To date, the NRDs have been managing for the nitrate issue through their individual groundwater management plans and phase system. As nitrate concentration increases, the area enters a different phase with additional reporting and required best management practices. As results have not been obtained as quickly as desired, the NRDs have joined forces together with the Nebraska Department of Environmental Quality to create the Bazile GWMA Plan to address nitrate issues in the area. This survey will focus on the Bazile GWMA, which covers 21 townships (483,842 acres), parts of four NRDs and three counties. Groundwater provides the drinking water source for over 7,000 residents in the ten communities within the Bazile GWMA. Every resident in the area will benefit from increased water quality. Groundwater in this area is used for residential, industrial, agricultural and recreational uses, all of which will benefit from information gained by the AEM survey. Furthermore, the AEM survey will focus on the wellhead protection areas to provide communities with additional knowledge of where to drill new wells to provide residents with safe drinking water. Goals of the Bazile GWMA project are to:

Short Term goals (5 years)

- Educate landowners, agricultural producers, commercial properties and residents on the importance of environmental stewardship and good groundwater quality.
- Reduce the trend of increasing nitrate concentrations in the Bazile GWMA.

Long Term goals (>20 years)

- Reduce and maintain groundwater nitrate concentration to below the maximum contaminant level of 10 ppm
- Maintain an adequate and sustainable supply of groundwater to provide sufficient quantities for domestic, municipal, agricultural and industrial uses
- Ensure groundwater contamination and other activities do not impair surface water beneficial uses

Funding from the Water Sustainability Fund will be used to assist with these goals in an indirect manner; information gained from the survey will help the NRDs make better informed management decisions to help alleviate nitrate levels in the groundwater. All four of the NRDs are stakeholders in this project and support from the communities has been obtained (see support letters in Appendix 2).

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.
- Describe how the project will address each issue and/or problem.

- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

Nitrate contamination is a statewide issue and one that NRDs are constantly monitoring and researching remediation methods. Other NRDs and agencies have conducted an AEM survey and made the results available to the public. As the amount of this information is collected, insight can be gained on underground geology and nitrate contamination management which can be used in other portions of the state. This project will focus on the Bazile GWMA, which covers 21 townships (483,842 acres), parts of four NRDs and three counties. Groundwater provides the drinking water source for over 7,000 residents in the ten communities within the Bazile GWMA.

13. Contributes to the state's ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- List other funding sources or other partners, and the amount each will contribute, in a funding matrix.
- Describe how each source of funding is made available if the project is funded.
- Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.
- Describe how you will proceed if other funding sources do not come through.

This project is seeking sole funding from the Water Sustainability Fund. If approved, the NRDs will provide an additional \$96,254.00 towards the total project cost.

14. Contributes to watershed health and function;

- Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.

The Bazile GMWA includes parts of the Niobrara River Basin, Missouri River Basin and the Elkhorn River Basin as well as the Sandhills, North-Central Tableland and the Northeast Nebraska Glacial Drift groundwater regions. Conducting an AEM survey in the Bazile GWMA will give the NRDs greater detail of the hydrogeologic framework and a better idea of local recharge of the area, allowing for better management decisions of the watersheds.

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.

- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

This project will help meet objectives in the Nebraska Department of Natural Resources' Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process from September 2014. Objectives listed in NDNR's Annual Report include:

- **Maintain data, information and analysis capabilities for water planning, including specific programs for collecting, maintaining and distributing information on stream flows, as well as analyzing water uses and water supplies across the state;**
- **Provide staff and resources to support planning and implementation of water resources projects;**
- **Support locally developed water management plans for managing hydrologically connected water supplies;**
- **Provide resources to map and identifying areas vulnerable to flood damage; and**
- **Provide coordination of federal agencies, state agencies, local natural resources districts (NRDs) and other water interests for the development of water resources programs and projects.**

This proposed project would help support locally developed water management plans for managing hydrologically connected water supplies by contributing additional data for the NRDs to utilize when amending their existing groundwater management plans and integrated management plans. This project would also aid NDNR's objective to provide coordination of federal agencies, state agencies, local natural resources districts (NRDs) and other water interests for the development of water resources programs and projects. Data obtained by the AEM survey would be made available to the public and all interested agencies for the advancement of understanding underground hydrology.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- Describe the federal mandate.
- Provide documentary evidence of the federal mandate.
- Describe how the project meets the requirements of the federal mandate.
- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

N/A

Section D.

PROJECT DESCRIPTION

1. Overview

In 1,000 **characters** *or less*, provide a brief description of your project including the nature and purpose of the project and objectives of the project.

The Bazile Groundwater Management Area (GWMA) is located in northeast Nebraska in parts of four Natural Resources Districts (NRDs). Managing for nitrate contamination has been a priority in this area for 20+ years. To assist with this management, the NRDs are requesting aid to conduct an aerial electromagnetic (AEM) survey over the area.

Flown in grids, the survey will provide continuous quality data of the subsurface. The 2-4 day non-invasive survey has no over flight of major structures and authorities will be notified. Data on percentages of the aquifer materials, the amount of saturation and location/relationship of such materials is obtained. A combination of geophysical, geologic, remote sensing and GIS technologies will be applied to build a framework of the area’s river basins.

This survey will help to protect water sustainability for ground and surface water users for current and future uses. Data on aquifer recharge, aquifer depletion, leaching susceptibility and threats to drinking water will be obtained. This survey is a cost-effective way to achieve the goals of the NRD’s groundwater management plans, IMPs and their collective Bazile GWMA Plan.

2. Project Tasks and Timeline

Identify what activities will be conducted by the project. For multiyear projects please list what activities are to be completed each year.

Month/Year	Task Description:
Spring/Summer 2016	Begin analysis and interpretation of available data. Prepare final AEM flight plans
March-April 2017	Complete AEM data collection and QA/QC data
May-July 2017	Invert and analyze data and begin development of the interpretation and new hydrogeologic framework.
July- September 2017	Complete report and present results of data report

3. Partnerships

Identify the roles and responsibilities of agencies and groups involved in the proposed project regardless of whether each is an additional funding source. List any other sources of funding that have been approached for project support and that have officially turned you down. Attach the rejection letter.

Partner	Contribution
Conservation and Survey Division	Technical support and project collaboration
Nebraska Department of Environmental Quality	Technical support and project collaboration
Lower Niobrara NRD	Technical support, data collection and project collaboration, cash match
Lower Elkhorn NRD	Technical support, data collection and project collaboration, cash match
Lewis and Clark NRD	Technical support, data collection and project collaboration, cash match
Upper Elkhorn NRD	Technical support, data collection and project collaboration, cash match
West Knox Rural Water System	Technical support, data collection and project collaboration
City of Creighton	Technical support and project collaboration
City of Plainview	Technical support and project collaboration
Village of Wausa	Technical support and project collaboration
Village of Royal	Technical support and project collaboration

4. Other Sources of Funding

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

A grant proposal for this project has been submitted to the Nebraska Environmental Trust. Trust award announcements will be made in February of 2016. Award not confirmed.

Other funding sources are provided in the table below – amounts are confirmed.

Column A	Column B	Column C	Column D	Column E	Column F
1. Source of Funds ►	Water Sustainability Fund	NRD in-kind match	NRD Cash match		TOTALS ▼
2. Budget Category ▼					
3. AEM Surveys	\$176,500.00	\	\	\	\$176,500.00
4. Database Development	\$28,000.00	\	\	\	\$28,000.00
5. Geophysical Analysis	\$51,000.00				\$51,000.00
6. Hydrogeologic framework and report	\$129,950.00				\$129,950.00
7. LNNRD*		\$55,856.20	\$10,000.00		\$65,856.20
8. LENRD*		\$61,240.00	\$46,254.00		\$107,494.00
9. LCNRD*		\$35,000.00	\$30,000.00		\$65,000.00
10. UENRD*		\$62,271.16	\$10,000.00		\$72,271.16
11. West Knox RWS*		\$116,000.00			\$116,000.00
*See attached explanations					
18. TOTALS ►	\$385,450.00	\$330,367.36	\$96,254.00		\$812,071.36

5. Support/Opposition

Discuss both support and opposition to the project, including the group or interest each represents.

N/A

LITERATURE CITED:

Stanton, J.S., Qi, S.L., Ryter, D.W., Falk, S.E., Houston, N.A., Peterson, S.M., Westenbroek, S.M., and Christenson, S.C., 2011, Selected approaches to estimate water-budget components of the High Plains, 1940 through 1949 and 2000 through 2009: U.S. Geological Survey Scientific Investigations Report 2011–5183, 79 pgs.

