

NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: PMRNRD IMP Groundwater Quantity Monitoring

SPONSOR'S PRIMARY CONTACT INFORMATION (Not Consultant's)

Sponsor Business Name: Papiro-Missouri River Natural Resource District

Sponsor Contact's Name: Paul Woodward, PE, CFM

Sponsor Contact's Address: 8901 S 154th Street, Omaha, NE 68138-3621

Sponsor Contact's Phone: 402-315-1772

Sponsor Contact's Email: pwoodward@papionrd.org

1. **Funding** amount requested from the Water Sustainability Fund:

Grant amount requested. \$ 243,000

- If requesting less than 60% cost share, what %? [Click here to enter text.](#)

If a loan is requested amount requested. \$ NA

- How many years repayment period? [Click here to enter text.](#)
- Supply a complete year-by-year repayment schedule. [Click here to enter text.](#)

2. **Neb. Rev. Stat. § 2-1507 (2)**

Are you applying for a **combined sewer overflow 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
- Attach a copy to your application. [Click here to enter text.](#)
- What is the population served by your project? [Click here to enter text.](#)
- Provide a demonstration of need. [Click here to enter text.](#)
- **Do not complete the remainder of the application.**

3. **Permits Required/Obtained** Attach a copy of each that has been obtained. For those needed, but not yet obtained (box “NO” checked), 1.) State when you will apply for the permit, 2.) When you anticipate receiving the permit, and 3.) Your estimated cost to obtain the permit.

(N/A = Not applicable/not asking for cost share to obtain)
 (Yes = See attached)
 (No = Might need, don't have & are asking for 60% cost share to obtain)

G&P - T&E consultation (required)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
DNR Surface Water Right	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
USACE (e.g., 404/other Permit)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
FEMA (CLOMR)	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Local Zoning/Construction	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Cultural Resources Evaluation	N/A <input checked="" type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>
Other (provide explanation below)	N/A <input type="checkbox"/>	Obtained: YES <input type="checkbox"/>	NO <input type="checkbox"/>

[Click here to enter text.](#)

4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:
 The PMRNRD would be the only sponsor for this project.

Identify the roles and responsibilities of each Partner / Co-sponsor involved in the proposed project regardless of whether each is an additional funding source.

NA

5. **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.

The total cost of this proposed project is \$405,000, with 60% from the WSF grant and 40% from the PMRNRD's general fund budget. No other funding sources are anticipated at this time.

6. **Overview**

In 1,000 words or less, provide a brief description of your project including the nature/purpose of the project and its objectives. Do not exceed one page!

The PMRNRD's voluntary Integrated Management Plan, adopted in 2014, has specific goals to develop and maintain a water supply and use inventory based on the best available data and analysis. This includes the objective to monitor and track changes in water consumption, inflows and outflows. Currently, analytical methods are used to estimate vegetative water use based on available precipitation and land use. These estimates have never been compared or calibrated to actual monitoring data in the PMRNRD IMP area.

Water use for irrigation can vary greatly in Eastern NE from needing 0 inches of irrigation annually to 12 inches or more. This irrigation water use need is highly dependent on variations in precipitation and available soil moisture. Current efforts to monitor precipitation in the PMRNRD IMP area, such as NeRAIN or Mesonet weather stations, do not accurately relate precipitation to actual irrigation water use.

The purpose of this project will be to monitor available water supplies and demands to identify relationships between irrigated water use and precipitation so that a complete balance of volumetric water use will be better understood. This will involve later use of monitoring data and relationships in ground and surface water modeling.

The proposed project will install flow meters on approximately 270 irrigation wells throughout the PMRNRD's IMP area. The PMRNRD will develop an online reporting tool through ArcGIS online to allow water users to submit their annual water use each year. Reporting annual water use will be an ongoing requirement even after the installation of all the flow meters is complete. The PMRNRD will use the water use data in our IMP and Lower Platte Basin Plan annual reporting. Once water use data is reported for each year, PMRNRD staff will obtain available growing season rainfall data from the National Weather Service and other sources. Tracking this precipitation against the water use from so many

wells will provide statistical relationships that can be used to project future water use as part of future water modeling efforts.

7. **Project Tasks and Timeline**

Identify what activities will be conducted to complete the project, and the anticipated completion date.

For multiyear projects please list (using the following example):

<u>Tasks</u>	<u>Year 1\$</u>	<u>Year 2\$</u>	<u>Year 3\$</u>	<u>Remaining</u>	<u>Total \$ Amt.</u>
Permits	\$18,000				\$18,000
Engineering		\$96,000			\$96,000
Construction		\$87,000	\$96,000		\$183,000
Close-out				\$8,000	\$8,000
				TOTAL	\$305,000

- What activities (Tasks) are to be completed.
- An estimate of each Tasks expenditures/cost per year.
- Activities in years 4 through project completion under a single column.

	Year 1	Year 2	Year 3	TOTAL
Flow Meter Cost Share	\$135,000	\$135,000	\$135,000	\$405,000

8. **IMP**

Do you have an **Integrated Management Plan** in place, or have you initiated one? **YES** **NO** **Sponsor is not an NRD**

Section B.

DNR DIRECTOR'S FINDINGS

Prove Engineering & Technical Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 004)

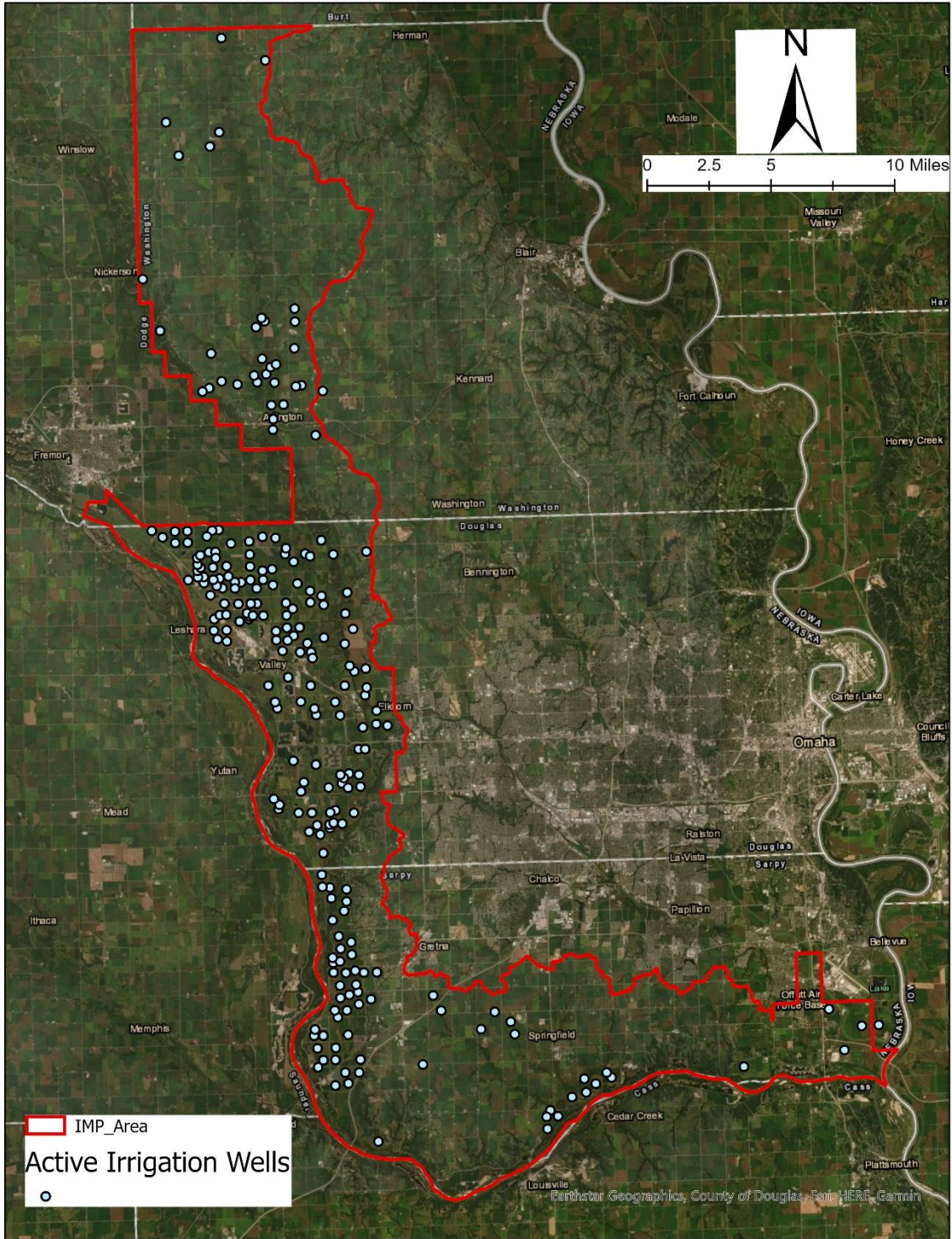
1. Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?

YES NO

If you answered "YES" you must answer all questions in section 1.A.
If you answer "NO" you must answer all questions in section 1.B.

If "YES", it is considered mostly structural, so answer the following:

- 1.A.1 Insert a feasibility report to comply with Title 261, Chapter 2, including engineering and technical data; NA
- 1.A.2 Describe the plan of development (004.01 A); NA
- 1.A.3 Include a description of all field investigations made to substantiate the feasibility report (004.01 B); NA
- 1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C); See map below of active irrigation wells in the PMRNRD IMP Area:



1.A.5 Describe any necessary water and/or land rights including pertinent water supply and water quality information (004.01 D); NA

- 1.A.6 Discuss each component of the final plan (004.01 E);
- 1.A.7 When applicable include the geologic investigation required for the project (004.01 E 1); NA
- 1.A.8 When applicable include the hydrologic data investigation required for the project (004.01 E 2); NA
- 1.A.9 When applicable include the criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3). NA

If “NO”, it is considered mostly non-structural, so answer the following:

- 1.B.1 Insert data necessary to establish technical feasibility (004.02); The use of flow meters to measure well water use is well documented and technically supported by several manufacturers. Flow meter accuracy is calibrated and then checked during installation. Many flow meters carry a manufacturer’s warranty up to 5 years. Gridded monthly and annual precipitation data will be downloaded from the National Weather Service’s products. Reports from each flow meter will be required annually and compared with growing season precipitation. Over time, extracted groundwater volume will be graphed against available precipitation, hopefully providing an inverse statistical relationship that can help better predict water use and provide forecasts during drought periods.
- 1.B.2 Discuss the plan of development (004.02 A); During the three-year timeframe of this grant, flow meters will be cost-shared and installed on approximately 270 active irrigation wells across the PMRNRD IMP area. The estimated cost of each flow meter is \$2,000. The total cost-share available to each well owner will be \$1,500 from the PMRNRD. The WSF grant will reimburse \$900 to the PMRNRD for each meter. Any additional costs will be the responsibility of the well owner. As soon as flow meters are installed, producers will be required to report groundwater pumped during every growing season following installation. The PMRNRD will develop an online reporting form and GIS data through ArcGIS Online.
- 1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B); NA
- 1.B.4 Describe any necessary water and/or land rights (004.02 C); No water rights or land rights are necessary for this project.
- 1.B.5 Discuss 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). NA

Prove Economic Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 005)

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative. Accurate monitoring data for the amount of groundwater used is difficult to estimate without having direct measurements. Potential alternatives to directly measuring the actual water pumped would be to directly measure the evapotranspiration (ET) from various land cover types within our IMP area. Accurately measuring actual ET can be very costly using equipment that can apply the Eddy Covariance Method. Such instruments and equipment can cost up to \$70,000 apiece and measuring the various crop types and geography across our IMP area would employ around 15 equipment sites. This would more than double the cost. Other methods for monitoring well water pumped do exist, but often require in depth analysis of pump tests for each well within the aquifer. Such pump tests could cost as much as \$10,000 apiece and would certainly limit the number of wells that could be measured.
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 is the project life, up to fifty (50) years; or, with prior approval of the Director up to one hundred (100) years, (Title 261, CH 2 - 005). Cost information for the flow meters was based on an assumed 8-inch service line to install the flow meter and a 50% cost of \$955 for a flow meter with mechanical index only as documented in Nebraska NRCS's 2021 Payment Schedule for EQIP. Rough costs for each flow meter were rounded up to \$2,000 each with the PMRNRD providing 75% cost-share, up to \$1,500 for each meter. The WSF grant would reimburse 60% of the NRD's cost, up to \$900 per flow meter. Any actual costs exceeding \$2,000 for each flow meter will be the responsibility of the well owner. Actual monetary benefits were not developed for this monitoring project.
- 3.A 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). Cost information for the flow meters was based on an assumed 8-inch service line to install the flow meter and a 50% cost of \$955 for a flow meter with mechanical index only as documented in Nebraska NRCS's 2021 Payment Schedule for EQIP. Rough costs for each flow meter were rounded up to \$2,000 each with the PMRNRD providing 75% cost-share, up to \$1,500 for each meter. The WSF grant would reimburse 60% of the NRD's cost, up to \$900 per flow

meter. Any actual costs exceeding \$2,000 for each flow meter will be the responsibility of the well owner. Actual monetary benefits were not developed for this monitoring project.

- 3.B 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 intangible or secondary benefits (if any) 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, in a way that justifies economic feasibility of the project such that the finding can be approved by the Director and the Commission (005.02). There is no generally accepted method for calculating primary tangible benefits for this project. The project will increase water sustainability across the PMRNRD IMP area and enhance data consistency with other NRDs. Benefits from this water quantity data collection improve groundwater model inputs and calibration. In the long-term, more accurate, real-world groundwater modeling saves economic costs on private producers borne by unnecessary regulations or restrictions.
- 3.C Present all cost and benefit data in a table to indicate the annual cash flow for the life of the project (005.03). NA
- 3.D 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, demonstrate the economic feasibility of such proposal by such method as the Director and the Commission deem appropriate (005.04). (For example, show costs of and describe the next best alternative.) Accurate monitoring data for the amount of groundwater used is difficult to estimate without having direct measurements. Potential alternatives to directly measuring the actual water pumped would be to directly measure the evapotranspiration (ET) from various land cover types within our IMP area. Accurately measuring actual ET can be very costly using equipment that can apply the Eddy Covariance Method. Such instruments and equipment can cost up to \$70,000 apiece and measuring the various crop types and geography across our IMP area would employ around 10 equipment sites. This would approximately double the cost. Other methods for monitoring well water pumped do exist, but often require in depth analysis of pump tests for each well within the aquifer. Such pump tests could cost as much as \$10,000 apiece and would certainly limit the number of wells that could be measured.

Prove Financial Feasibility

(Applicant must demonstrate compliance with Title 261, CH 2 - 006)

4. Provide evidence that sufficient funds are available to complete the proposal. As the only project sponsor, the PMRNRD will budget the required 40% cost-share

of \$54,000 each year over the next three fiscal years (July 2021 – June 2024). The PMRNRD's Draft FY 2022 budget proposes a property tax revenue of \$28,248,609 and total expenditures of \$79,667,927. This draft budget can be viewed online at:

<https://www.papionrd.org/wp-content/uploads/2021/06/JULY-FY22-BUDGET-DRAFT-1.pdf>

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace). As the only project sponsor, the PMRNRD will budget the required 40% cost-share of \$54,000 each year over the next three fiscal years (July 2021 – June 2024). The PMRNRD's Draft FY 2022 budget proposes a property tax revenue of \$28,248,609 and total expenditures of \$79,667,927. Future operation, maintenance, and replacement costs will be the responsibility of the well owner as required by PMRNRD regulations.
6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal. NA
7. Describe how the plan of development minimizes impacts on the natural environment (i.e., timing vs nesting/migration, etc.). Flow meters will be installed at existing irrigation well locations. These areas are generally already disturbed as cropland. It is not anticipated that there will be any environmental disruption as a result of this project.
8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds. NRDs are responsible for maintaining groundwater quality and quantity for municipal, domestic, and agricultural uses (Nebraska State Statute Chapter 2 Article 32 and Nebraska Groundwater Protection Act Chapter 46 Article 7). The NRD staff members have local knowledge of the area and groundwater resources. Paul W. Woodward is the Groundwater Management Engineer for the Papio-Missouri River NRD. He is a registered Professional Engineer, License No. E-12037, in the State of Nebraska.
9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state. Interest in this monitoring project and data collection is a response to numerous objectives and actions in various management plans. First, the PMRNRD's Integrated Management Plan (IMP) contains specific actions to continue to collect and analyze hydrogeologic data in support of NDNR's annual evaluation of hydrologically connected water resources. This water use data serves as the backbone for making evaluations and models as realistic and accurate as possible. Similar data collection objectives are called out in the Lower Platte River Basin Water Management Plan, dated October 2017. This plan provides an accounting of all new uses in the Lower Platte Basin and relies on utilizing the

best available geologic data to determine hydrologically connected influences. The PMRNRD proposed this flow meter monitoring project in order to maintain consistency of data collection across multiple NRDs. Finally, the PMRNRD's own Groundwater Management Plan (<https://www.papionrd.org/water-quality-supply/groundwater/groundwater-management-plan/>) recommends increase water quantity monitoring to support the goal of sustaining the quality and quantity of our groundwater supplies forever.

10. Are land rights necessary to complete your project? YES NO

If yes:

- 10.A Provide a complete listing of all lands involved in the project. [Click here to enter text.](#)
- 10.B Attach proof of ownership for each easement, rights-of-way and fee title currently held. [Click here to enter text.](#)
- 10.C 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. NRDs are responsible for maintaining groundwater quality and quantity for municipal, domestic, and agricultural uses (Nebraska State Statute Chapter 2 Article 32 and Nebraska Groundwater Protection Act Chapter 46 Article 7).
12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed. Flow meters will be installed at existing irrigation well locations. These areas are generally already disturbed as cropland. It is not anticipated that there will be any environmental disruption as a result of this project. Environmental and ecologic benefits would increase if groundwater is more efficiently used and conserved within the aquifer as a result of this project. Increase groundwater in storage improves wetland and stream hydrology and their related habitats.

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:

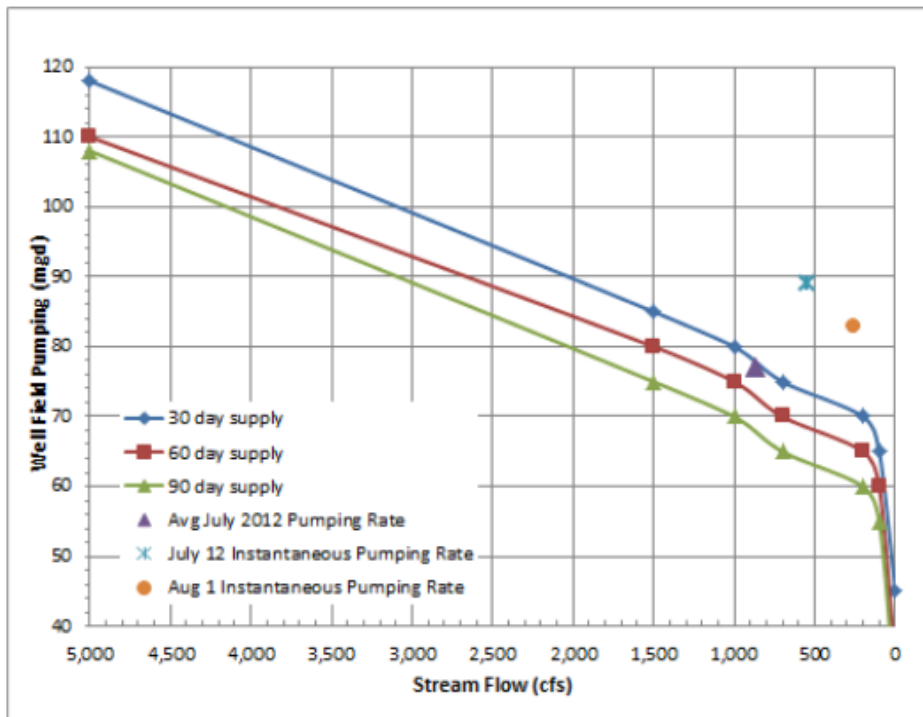
- The responses to one criterion *will not* be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which 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 above. 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 PMRNRD's IMP Water Quantity Monitoring project will provide invaluable data about water used from the same aquifer that provides drinking water to over 1 million Nebraskans in Omaha, Lincoln, Papillion and Fremont. Municipal water uses

from this aquifer are already measured each year and reported to the NRD, this project would measure the vast majority of other water used for irrigation. Considering the potential impacts drought may have on municipal drinking water supplies, monitoring and analyzing all uses in the Platte and Elkhorn River alluvial aquifer is important. The Lower Platte River Drought Contingency Plan describes the impact that drought can have on these major municipal well fields, especially Lincoln’s water supply. As flows decrease in the river, the pumping capacity of the Lincoln well field also decreases significantly as shown in the figure below. This limited pumping capacity forces Lincoln to implement water use restrictions.



Source: LWS Facilities Master Plan (City of Lincoln 2014b)

In the past, Lincoln has had to use these water use restrictions in order to maintain capacity for drinking water use. As drinking water is a priority use and Lincoln has an induced surface water right, Lincoln could make a call and suspend all surface water uses on the Platte River in Nebraska.

Monitoring and documenting actual water use over time will help improve groundwater modeling accuracy and therefore better predict the effect drought conditions may have on the rivers and their alluvial aquifer. If water use and precipitation are not calibrated to real world measurements, then modeling could over or under predict drought related impacts.

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 PMRNRD's IMP Water Quantity Monitoring project helps fulfill the goals of the PMRNRD's voluntary Integrated Management Plan, adopted in 2014. This IMP covers only those areas of our NRD that are within the Platte and Elkhorn River Basins. Specific goals in the IMP are to develop and maintain a water supply and use inventory based on the best available data and analysis. This includes the objective to monitor and track changes in water consumption, inflows and outflows.

To date, water quantity monitoring within the IMP area has been limited to continuous groundwater level monitoring between the Platte and Elkhorn Rivers. This work was done as part of USGS's study relating the interaction of surface water and groundwater movement, with funding from WSF Grant 4126.

The proposed project will monitor actual groundwater well extractions using flow meters and, in the vicinity of our continuous groundwater level recorders, be able to relate well drawdown to measured pumping.

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.

The PMRNRD's IMP Water Quantity Monitoring project will enhance water sustainability by measuring what is pumped and develop a relationship with precipitation to better inform irrigators about how much water is needed and when. Long-term, this should help reduce groundwater consumption across the PMRNRD's IMP area. Reduced pumping will help retain water in the shared aquifer between the Platte and Elkhorn River, which increases reliable streamflow in gaining sections of these rivers.

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 PMRNRD's IMP Water Quantity Monitoring project will provide multiple benefits across the Platte and Elkhorn River valley and its tributaries. First, measuring how much groundwater is pumped will better inform irrigators about their use and help identify water management improvements. More water retained in the aquifer will help improve streamflow for wildlife habitat and recreational uses. Municipal and industrial water uses will be better protected from overuse in the shared alluvial aquifer.

Long-term, this project should help reduce groundwater consumption across the PMRNRD's IMP area. Reduced pumping will help retain water in the shared aquifer between the Platte and Elkhorn River, which increases reliable streamflow in gaining sections of these rivers.

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.

The PMRNRD's IMP Water Quantity Monitoring project will directly measure groundwater pumping for irrigation and relate that to already available precipitation data. Long-term, this relationship will provide important information for irrigators about how much water is needed when. Over time, groundwater resources will be better conserved, allowing increased beneficial uses from the water saved. The alluvial aquifer along the Platte and Elkhorn River is a major source of drinking water to over half of the state's residents.

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.

Accurate monitoring data for the amount of groundwater used is difficult to estimate without having direct measurements. Potential alternatives to directly measuring the actual water pumped would be to directly measure the evapotranspiration (ET) from various land cover types within our IMP area. Accurately measuring actual ET can be very costly using equipment that can apply the Eddy Covariance Method. Such instruments and equipment can cost

up to \$70,000 apiece and measuring the various crop types and geography across our IMP area would employ around 10 equipment sites. This would approximately double the cost. Other methods for monitoring well water pumped do exist, but often require in depth analysis of pump tests for each well within the aquifer. Such pump tests could cost as much as \$10,000 apiece and would certainly limit the number of wells that could be measured.

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.

This project will help the PMRNRD work with other Lower Platte River Basin NRDs to achieve the basin goal of remaining 'not fully or over appropriated'. The PMRNRD Board of Directors understands that the potential to become fully appropriated is real and water management decisions need to be addressed in a consistent manner amongst all Basin NRDs. Datasets and information collected as part of this project will allow for smarter water management decisions and will lead to a future sub-regional groundwater flow model. This project will reduce the chances of the State needing to intervene with further IMP requirements. Areas of the PMRNRD are home to three federally listed endangered species in the Lower Platte Basin. This project will assist the state and NRDs in managing groundwater and surface water to meet its obligation under the instream flow appropriation permit granted to the Nebraska Game and Parks Commission for the central and lower Platte River on June 26, 1998 (with an instream flow priority date of November 30, 1993).

A specific topic of statewide interest that will be benefited by this project is using groundwater quantity monitoring data to better evaluate projects that may reduce the impacts of severe drought on the Lower Platte River and specifically the impact to Omaha and Lincoln water supplies. Drought was addressed as part of the Lower Platte River Drought Contingency Plan, completed in October 2019. There were several action items suggested in that plan, including new reservoirs within PMRNRD area or nearby, pumping from sandpits, and release from upstream sources to ensure an adequate supply to Lincoln and Omaha water supplies. Sound water management decisions throughout the Lower Platte Basin will benefit streamflows, which in turn, increase flows in the Platte River. Increased flows in the Platte, especially during drought, reduce the chances of either Lincoln or Omaha using their authority under Nebraska Revised Statue 46-233 for 'induced groundwater recharge' which could cause irrigators upstream of the Lincoln and Omaha wellfields to cease surface water irrigation when water level triggers reach a certain threshold. This project will help evaluate a

preferred alternative should action be taken as a result of the Drought Contingency Plan.

The proposed project will promote water conservation which will have a positive cumulative impact on stream flow by minimizing aquifer depletion. More educated decisions can be made by each Board, particularly within the hydrologically connected areas, which will help reduce pumping impacts on streamflow. The beneficial impacts will be maximized in areas with the highest stream flow depletion factor (SDF) as defined by the NeDNR SDF analysis.

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.

Protection of private property owner's ability to irrigate, with no additional or minimal regulations, is one of the largest goals to be achieved using the information to be provided by this project. Sound water management requires the use of the best available science, ensuring a sustainable water supply for not only irrigators, but also municipalities (including Lincoln and Omaha), and thousands of private well owners. As mentioned above, a severe drought could lead to Lincoln and Omaha utilizing their authority under Nebraska Revised Statute 46-233 for 'induced groundwater recharge' which could cause irrigators upstream of the Lincoln and Omaha wellfields to cease surface water irrigation when water level triggers reach a certain threshold. While necessary to supply municipal water sources, limiting irrigation harms the state's economy. This project may have the ability to help prevent such a priority call from occurring depending on accurate groundwater modeling and management decisions.

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.

Efforts to collect groundwater use data from flow meters as a result of this project will help identify irrigated acres that potentially cause additional recharge back into the groundwater aquifer and may therefore carry more nutrients or contaminants with it. Carefully monitoring and managing irrigation water use and efficiency can help improve groundwater quality in the long run.

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.

As the only project sponsor, the PMRNRD will budget the required 40% cost-share of \$54,000 each year over the next three fiscal years (July 2021 – June 2024). The PMRNRD's Draft FY 2022 budget proposes a property tax revenue of \$28,248,609 and total expenditures of \$79,667,927. This draft budget can be viewed online at: <https://www.papionrd.org/wp-content/uploads/2021/06/JULY-FY22-BUDGET-DRAFT-1.pdf>

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 Papio-Missouri River NRD (PMRNRD) is the primary local jurisdiction for this proposed project. The PMRNRD is a partner in the Lower Platte Basin Water Management Plan, the Lower Platte River Drought Contingency Plan, and has a joint voluntary Integrated Management Plan.

Lower Platte Basin Coalition – Basin Wide Water Management Plan

This project helps achieve the three listed purposes of the LPBC Basin Water Management Plan (October 2017) by making use of water quantity monitoring data and providing a consistent monitoring across NRD boundaries.

“The purpose of this Plan is to:

- 1) *Provide guidance and a framework for Coalition members to develop water use policies and practices that contribute to the protection of existing surface and groundwater uses, while allowing for future water development.*
- 2) *Assist in the development and maintenance of a water supply and use inventory, based on the best available data and analysis.*
- 3) *Provide consistency and information for incorporation into individual NRD Integrated Management Plans.”*

The goals of the LPBC Basin Wide Water Management Plan are:

- 1) Develop and maintain a water supply and use inventory based on the best available data and analysis.
- 2) Implement a water management plan for the Basin that maintains a balance between current and future water supplies and demands.
- 3) Develop and implement water use policies and practices that contribute to the protection of existing surface and groundwater uses while allowing for future water development.

This project helps support implementation of multiple water supply goals, including, agricultural use, municipal and industrial uses, conservation of water resources, and preservation of water resources, as listed in both NRDs IMPs and GWMPs.

Lower Platte Drought Contingency Plan

Drought Monitoring and Vulnerability Assessment

Collection of groundwater use data will enhance the assessment of monitored groundwater levels and allow for an improved vulnerability assessment of what those groundwater levels mean in terms of flash or long-term drought conditions.

Drought Mitigation Measures

Use of water quantity use data will greatly improve the accuracy of evaluations for proposed drought mitigation measures in LPNNRD and PMRNRD. Future groundwater modeling will play a very important role in the accurate assessment of these potential projects.

Papio-Missouri River NRD GWMP and IMP Goals

The PMRNRD GWMP was adopted on February 8, 2018. The rules and regulations are current as of March 1, 2018. Both have been issued by the PMRNRD and approved by the NeDNR. Specific goals and objectives within the GWMP that are achieved or assisted by this project include:

PMRNRD GWMP Goals

Overall Goal – “The District’s goal is to maintain the existing conditions of its groundwater reservoir quantity and quality – forever.

Sustainability Goal – “Water use is sustainable when it promotes healthy watersheds and aquifers, improves water quality, protects water supplies through BMPs, and manages surface and groundwater resources conjunctively to protect the ability of future generations to meet their needs.”

Objectives – Water conservation, policies and procedures, BMPs, wellhead protection, fertilizer management, water quality monitoring, and cost-share programs.

PMRNRD IMP GOALS

The PMRNRD IMP became effective in August 2018, after it was developed by the PMRNRD and NeDNR in a collaborative effort. An abbreviated summary of specific goals and objectives supported by this project include:

Goal #1 – Develop and implement water use policies and practices

Objectives – Utilize existing policies, manage invasive vegetation, evaluate conjunctive management projects

Goal #2 – Develop and maintain a water supply and use inventory

Objectives – Develop and implement data gathering, monitoring, and evaluation, coordinate with water suppliers

Goal #3 – Develop and implement water use educational programs for conservation

Objectives – Promote water use education, conservation, and reuse

Goal #4 – Work with upstream NRDs as part of the Platte River Basin Coalition

Objectives – Participate in Lower Platte Basin water management, evaluate conjunctive management alternatives, evaluate additional water resource supplies, maintain stream flows to protect and maintain public water supply

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.

The collection and use of flow meter data will help inform proactive management decisions and in turn prevent a potential fully appropriated designation by the State on hydrologically connected within the respective NRDs. This project will help the PMRNRD work with other Lower Platte River NRDs to achieve the NeDNR’s goal of having all basins ‘not fully or over appropriated’.

The PMRNRD Board of Directors understands that the potential to become fully appropriated is real and more attention will be given to water management policies as time goes on. Datasets and information analyzed will allow for smarter water management decisions and will lead to a future sub-regional groundwater flow model for the PMRNRD. This project will reduce the chances of the State needing to intervene with further IMP requirements. Sound water management decisions throughout the Lower Platte Basin will benefit streamflows, which in turn, increase flows in the Platte River. Increased flows in the Platte, especially during drought, reduce the chances of either Lincoln or Omaha using their authority under Nebraska Revised Statute 46-233 for ‘induced groundwater recharge’ which could cause irrigators upstream of the Lincoln and Omaha wellfields to cease surface water irrigation when water level triggers reach a certain threshold. This project may have the ability to help prevent such a priority call from occurring depending on accurate groundwater modeling and management decisions.

The estimated population, shown in Table 8, to benefit from this project includes the estimated population of PMRNRD and the City of Lincoln, due to part of its wellfield being located in the PMRNRD near Ashland.

Population Potentially Benefited

JURISDICTION	Total Population	No. of Communities	NRD Size (AC)
PMRNRD	780,000	30	1,116,800
Lincoln	293,905	1	N/A
TOTALS	1,138,405	59	2,147,800

*The 2020 estimated population

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.

The Papio-Missouri River NRD is the only project sponsor for this project. A breakdown of the annual expenses covered by the NRD and the WSF grant is shown below:

	Year 1	Year 2	Year 3	TOTAL
NRD Cost Share	\$54,000	\$54,000	\$54,000	\$162,000
WSF Grant	\$81,000	\$81,000	\$81,000	\$243,000
TOTAL	\$135,000	\$135,000	\$135,000	\$405,000

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 PMRNRD has an approved IMP and is an active partner in support of implementation the Lower Platte River Drought Contingency Plan and Lower Platte River Basin Coalition Basin Water Management Plan. These plans include similar goals aimed at maintaining adequate flows in the Elkhorn River and Lower Platte Rivers, and associated tributaries. Understanding the hydrological connection between groundwater and surface water is paramount in the success of these planning efforts and will direct actions within each NRD to maintain adequate flows through sound groundwater management.

The groundwater use data from flow meters will provide information to enhance integrated management decisions, ultimately leading to actions that will safeguard, or enhance streamflow as water demand and supply are balanced. This in turn directly contributes to watershed health and function, especially in the Lower Platte River, home to the endangered pallid sturgeon and least tern, and the threatened piping plover and a source of drinking water to Lincoln and Omaha. This project will assist the state and NRDs in managing groundwater and surface water to meet its obligation under the instream flow appropriation permit granted to the Nebraska Game and Parks Commission for the central and lower Platte River on June 26, 1998 (with an instream flow priority date of November 30, 1993). The primary major watersheds benefited through this project include Lower Platte River, Lower Elkhorn River, and Bell Creek.

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.

NeDNR Annual Report and Plan of Work - 2020

In September 2020, the NeDNR completed the most current Annual Report and Plan of Work. The NeDNR utilizes several of its program areas to implement the state water planning and review process. Four of the six implementation objectives identified in the Annual Plan of Work will be addressed through this project. They include:

1) 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;

This objective is achieved with the analysis of actual water quantity monitoring data within the PMRNRD IMP area.

2) Provide staff and resources to support planning and implementation of water resources projects;

NeDNR staff are involved with the PMRNRD IMP annual review and analysis. Collection of flow meter data is supported in the joint voluntary IMP.

3) Support locally developed water management plans for conjunctively managing hydrologically connected groundwater and surface water supplies;

Data collected on water uses will support the joint IMP, Lower Platte Basin Water Management Plan, and Lower Platte River Drought Contingency Plan.

4) Provide resources to map and identify areas vulnerable to flood damage;

NA

5) Participate in interagency collaboration with federal agencies, state agencies, local natural resources districts (NRD's), and other water interest entities on various water resources programs and projects; and

Interagency collaboration and consistent data collection will reduce future conflicts between NRDs, NeDNR, and other agencies related to water management in the Lower Platte River.

6) Consolidate and present information in a form that is understandable and useful to the public and interagency collaborators.

NA

[Click here to enter text.](#)

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.

NA