NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: **WWUMM Water Quality Modeling Integration and Modeling Update**

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

Sponsor Business Name: **South Platte Natural Resources District**

Sponsor Contact's Name: **Galen Wittrock**

Sponsor Contact's Address: **551 Parkland Drive, PO Box 294, Sidney, NE 69162-02**

Sponsor Contact's Phone: **308.254.2377**

Sponsor Contact's Email: **gwittrock@spnrd.org**

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

   Grant amount requested. $ **240,000**

   - If requesting less than 60% cost share, what %? **N/A**

   If a loan is requested amount requested. $ **N/A**

   - How many years repayment period? **N/A**
   - Supply a complete year-by-year repayment schedule. **N/A**

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. **N/A**
- What is the population served by your project? **N/A**
- Provide a demonstration of need. **N/A**
- **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☒	Obtained: YES☐	NO☐
DNR Surface Water Right	N/A☒	Obtained: YES☐	NO☐
USACE (e.g., 404/other Permit)	N/A☒	Obtained: YES☐	NO☐
FEMA (CLOMR)	N/A☒	Obtained: YES☐	NO☐
Local Zoning/Construction	N/A☒	Obtained: YES☐	NO☐
Cultural Resources Evaluation	N/A☒	Obtained: YES☐	NO☐
Other (provide explanation below)	N/A☒	Obtained: YES☐	NO☐

4. **Partnerships**

List each Partner / Co-sponsor, attach documentation of agreement:

North Platte Natural Resources District

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

The South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD) are the sole entities of the Western Water Use Management Modeling (WWUMM) project. Their primary responsibility includes engaging a qualified consultant to ensure the project is completed on schedule and within the allocated budget.

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 cost of the entire project is $400,000. The SPNRD and the NPNRD will provide 40% of this total, with the Water Sustainability Fund providing the remaining 60%. There are no other sources of funding for the project.

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!

Western Water Use Management Modeling (WWUMM): Analyzing Nebraska's Water Future

In Nebraska, water fuels agriculture, industry, and communities, making its management a top priority. The Western Water Use Management Modeling (WWUMM) project, led by the North Platte and South Platte Natural Resources Districts (NPNRD and SPNRD), is a powerful tool integrating groundwater, surface water, and soil water balance models to guide innovative planning along the upper North Platte and South Platte Rivers. From conjunctive management to aquifer sustainability, WWUMM delivers critical insights. This enhancement project elevates it further by adding advanced water quality modeling—focusing on nitrate contamination—while supporting the NRDs' Integrated Management Plan (IMP) goals of reducing consumptive use and enhancing streamflow. The benefits reach farmers, industries, municipalities, and downstream users, building a sustainable future.

The NRDs are already taking bold steps—water allocations, acreage retirements, recharge projects, and consumptive use leases. The WWUMM upgrades and enhancements will measure these efforts, analyze the changing conditions, and help refine strategies with precision, offering communities clear, actionable solutions.

WWUMM Water Quality Modeling Integration and Modeling Update

Project Outline: Elevating the "Analysis" Impact

- **MT3D Integration for Water Quality:** Building on more than 15 years of rich data—climate, geology, hydrology, soils, and land use—WWUMM now incorporates MODFLOW's MT3D

package. This leap forward models nitrate transport through advection, dispersion, and diffusion, while simulating reactions like denitrification. It reveals how nitrates move from aquifers to streams like the North Platte River or Pumpkin Creek, and vice versa, offering a holistic view of contamination pathways. Calibrated with decades of nitrate measurements, cropping patterns, and fertilizer data from the NRDs' Phase 2 and 3 areas, MT3D answers critical questions: How long do nitrates take to impact surface water? Will levels rise without action? How effective are practices like cover crops or split fertilizer applications? Scenario testing—e.g., comparing no-fall-fertilizer policies to traditional methods—will guide cost-effective solutions tailored to local conditions.

- **Land Use Updates Through 2025:** Annual refreshes with satellite imagery, CropScape, and NRD records will track shifts like irrigation changes, extending beyond NPNRD and SPNRD to neighboring regions (e.g., Wyoming, Colorado), updating 2010 data for a broader view.
- **Enhanced Soil Crop (ESC) Model:** New automation for tract transfers, retirements, and water quality inputs, plus clear maps, sharpens decision-making.
- **Mapping Terraces and Playa Lakes:** These features will be mapped to refine aquifer recharge estimates, especially in wet years.
- **NeDNR Compliance and Outreach:** Updates align with Robust Review standards, while reports and an updated WWUMM Education Portal engage stakeholders.

Why It Matters: With expanded nitrate-focused modeling, fresh data, and smarter tools, WWUMM equips the NRDs to protect aquifers, enhance streams, and empower communities. Funding this project invests in a resilient, science-driven water future for Nebraska and beyond!

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):

Tasks	Year 1$	Year 2$	Year 3$	Remaining	Total $ Amt.
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.

Tasks	Year 1	Year 2	Total
Enhancing the Model with MT3D and More	$100,000	$90,000	$190,000
Land Use Datasets Through 2025: Keeping It Current	$20,000	$20,000	$40,000
Land Use Dataset Through 2025: Expanding Beyond Borders	$20,000		$20,000
ESC Model: Smarter Tools, Bigger Wins	$20,000	$10,000	$30,000
Mapping Terraces and Playa Lakes	$15,000	$15,000	$30,000
NeDNR Checklist: Staying on Track		$20,000	$20,000
Documentation, Education, and Collaboration	$25,000	$45,000	$70,000
Totals	$200,000	$200,000	$400,000

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; **N/A**

1.A.2 Describe the plan of development (004.01 A); **N/A**

1.A.3 Include a description of all field investigations made to substantiate the feasibility report (004.01 B); **N/A**

1.A.4 Provide maps, drawings, charts, tables, etc., used as a basis for the feasibility report (004.01 C); **N/A**

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

1.A.6 Discuss each component of the final plan (004.01 E); **N/A**

1.A.7 When applicable include the geologic investigation required for the project (004.01 E 1); **N/A**

1.A.8 When applicable include the hydrologic data investigation required for the project (004.01 E 2); **N/A**

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). **N/A**

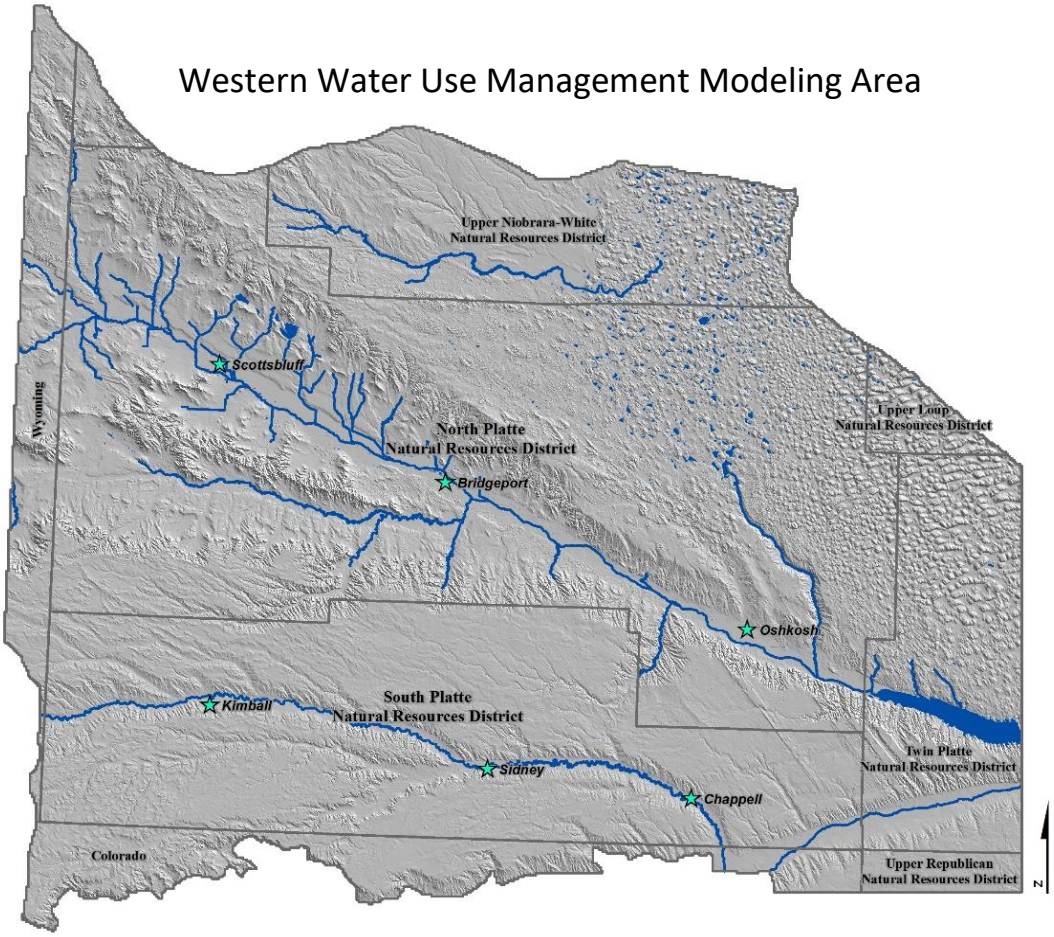
If "NO", it is considered mostly non-structural, so answer the following:

1.B.1 Insert data necessary to establish technical feasibility (004.02);

1.B.2 Discuss the plan of development (004.02 A);

Western Water Use Management Modeling (WWUMM): Analyzing Nebraska's Water Future

In Nebraska, where water is the lifeblood of agriculture, industry, and communities, the stakes for effective resource management have never been higher. The Western Water Use Management Modeling (WWUMM) project, spearheaded by the North Platte and South Platte Natural Resources Districts (NPNRD, SPNRD, or NRDs), offers a groundbreaking solution to safeguard this precious resource along the upper North Platte and South Platte Rivers. The WWUMM is a vital tool that harnesses groundwater, surface water, and soil water balance models to empower innovative water planning. From conjunctive management and well pumping to acreage transfers and aquifer sustainability, WWUMM delivers the insights needed to make smart, impactful decisions.



This enhancement project takes WWUMM to the next level by integrating advanced water quality modeling, with a sharp focus on tackling nitrate contamination in groundwater. For the NRDs, this means identifying nitrate sources, tracking their movement, and evaluating

strategies to reduce levels effectively. Beyond water quality, the upgrade enhances the NRDs' ability to assess management actions, supporting their Integrated Management Plan (IMP) goals of reducing consumptive use and increasing streamflow. The benefits ripple out to local farmers, industries, municipalities, and downstream users, paving the way for a sustainable tomorrow.

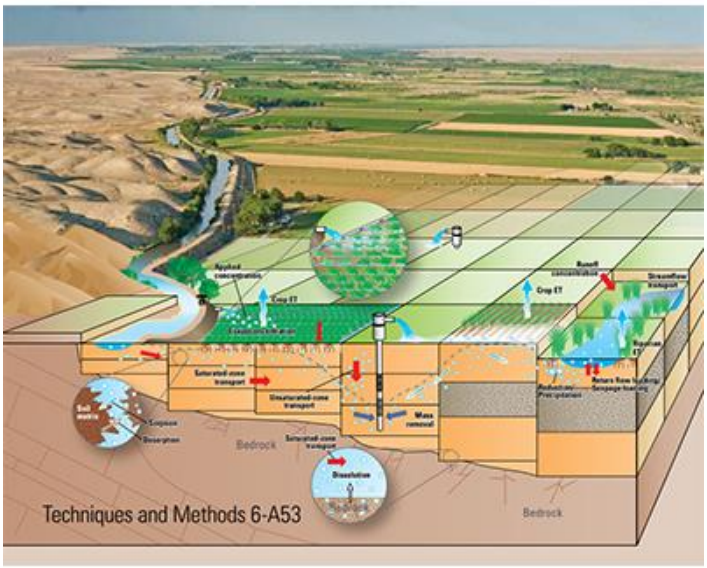
The NRDs are already making waves with bold initiatives—allocations, certified acreage retirements, recharge projects, and consumptive use leases. With WWUMM's enhanced capabilities, they can measure these successes, adapt to changing conditions, and refine their approach with confidence. This project is about more than numbers—it's about equipping communities with clear, actionable answers and showing how every effort counts.

WWUMM Water Quality Modeling Integration and Modeling Update

Project Outline: Elevating the "Analysis" Impact

1. Enhancing the Model with MT3D and More

Built on 15 years of rich data—climate, geology, hydrology, soils, and land use—WWUMM already simulates rivers, aquifers, and their interactions with impressive detail. Now, we're adding the MODFLOW MT3D package and complementary tools to unlock a transformative leap to complete water quality modeling, with a particular emphasis on nitrate dynamics. This isn't just an upgrade—it's a game-changer for understanding and managing groundwater health.



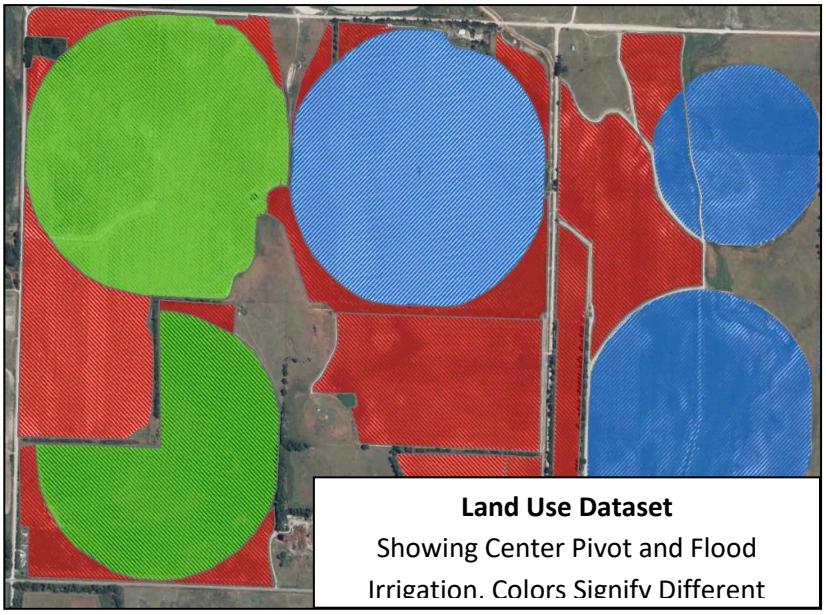
The MT3D and other ancillary packages, designed to work seamlessly with MODFLOW's groundwater flow simulations, brings a sophisticated suite of capabilities to the WWUMM. It models the transport of contaminants like nitrates through processes such as advection (movement with water flow), dispersion (spreading due to aquifer heterogeneity), and diffusion (molecular movement), offering a granular view of how nitrates travel through the subsurface. Beyond transport, MT3D can simulate key chemical reactions, such as denitrification (nitrates are converted to nitrogen gas), providing critical insights into natural attenuation processes that could reduce contamination over time. This feature is especially valuable in Nebraska's aquifers, where denitrification rates can vary with soil type, oxygen levels, and organic carbon availability. All these features can now be explored within the modeling.

A standout strength of MT3D and associated packages is the ability to capture interactions between groundwater and surface water bodies, such as the North Platte River, South Platte River, Pumpkin Creek, and Lodgepole Creek. By simulating how nitrates move from aquifers into streams—and vice versa—the model offers a holistic perspective on contamination pathways. This is essential for the NRDs, who need to understand not only groundwater quality but also its downstream impacts on surface water users and ecosystems. For example, MT3D can quantify how nitrate-rich groundwater discharge affects stream water quality, a critical management consideration.

The MT3D integration builds on a wealth of existing data: decades of groundwater nitrate measurements, detailed records of cropping patterns, and nitrogen fertilizer applications from the NRDs' Phase 2 and 3 areas. This historical data will be used to calibrate the model, ensuring its predictions are rooted in real-world conditions. Looking ahead, as the NRDs expand soil sampling to measure nitrogen concentrations at greater depths, MT3D's flexibility will allow these inputs to be incorporated seamlessly, refining our understanding of how nitrates migrate from the soil zone into the aquifers. The model can also integrate data on land management practices—such as irrigation rates or fertilizer timing—enabling scenario testing with unprecedented detail.

With MT3D in the WWUMM toolkit, the NRDs can tackle a suite of pressing questions:

- **How do nitrates move through the aquifer and how long does it take to impact surface water quality?** MT3D's time-step simulations will map nitrate travel times and concentrations, revealing lag effects between detection and impacts.
- **Without intervention, will nitrate levels rise, hold steady, or decline?** Baseline scenarios will project future trends, accounting for current nitrogen sources and sinks.
- **If nitrogen leaching stops, how long will elevated nitrate levels persist?** MT3D's ability to model residual nitrate decay along with removal through well pumping and surface water discharge will guide long-term planning.
- **How do practices like cover crops, precision nitrogen applications, or crop rotation reduce nitrate leaching?** By adjusting input parameters—such as timed fertilization or enhanced soil retention—MT3D will quantify the effectiveness of each strategy, offering a clear path to actionable solutions.



Land Use Dataset
Showing Center Pivot and Flood Irrigation. Colors Signify Different

The power of MT3D lies not just in its technical prowess but in its practical applications. For instance, the NRDs can simulate the impact of a no-fall-fertilizer policy across an area, then compare nitrate concentration outcomes against a fall application approach. Or they can test how split-application or nitrogen inhibitors alter leaching rates under varying rainfall scenarios. These "what-if" analyses will empower the NRDs to prioritize management practices that deliver the biggest bang for their buck, tailoring solutions to local geology, hydrology, and farming realities. By bridging the gap between science and strategy, MT3D transforms WWUMM into a decision-making powerhouse for water quality management.

2. Land Use Datasets Through 2025: Keeping It Current

WWUMM thrives on fresh, accurate data, and we're delivering this with updates through 2025. Using a streamlined process—blending satellite imagery, CropScape – Crop Data Layer, and NRD information—we'll refresh land use datasets annually. Shifts from flood-to-center-pivot irrigation will be mapped and the datasets will be attributed with crop types, water use, and well details. This keeps WWUMM sharp and ready to support the NRDs' forward-thinking decisions.

3. Land Use Dataset Through 2025: Expanding Beyond Borders

WWUMM's reach extends beyond NPNRD and SPNRD, covering portions of Upper Niobrara White, Twin Platte, Upper Loup, Upper Republican NRDs, and parts of Wyoming and Colorado. Land use data in these areas, stuck at 2010, will be updated through 2025. This ensures the model captures water use and movement accurately across regions, strengthening the NRDs' planning efforts.

4. ESC Model: Smarter Tools, Bigger Wins

The Enhanced Soil Crop (ESC) Model is a workhorse, automating crop use, pumping, and recharge calculations while powering Robust Review analyses. This project adds new features—automating irrigated tract transfers and retirements for greater accuracy and consistency. Plus, ESC will support MT3D with inputs like water quality data and help turn outputs into clear, compelling maps. It's a boost that makes decision-making faster and smarter.

5. Mapping Terraces and Playa Lakes

Terraces and playa lakes dot the NRDs' landscapes, quietly boosting recharge by capturing runoff. We're mapping these features to refine WWUMM's estimates, especially for wet years when their impact shines. Small but mighty, they'll enhance our understanding of aquifer health and guide long-term management.

Map showing Terraces and a Playa Lake in Kimball County, Nebraska

6. NeDNR Checklist: Staying on Track

NeDNR's Checklist Evaluation ensures model updates align with Robust Review standards. We'll compare each WWUMM tweak to past versions and run fresh analyses, keeping everything compliant and credible. It's a key step to maintaining trust and precision.

7. Documentation, Education, and Collaboration

This project wraps up with thorough documentation, strong teamwork between NRDs and NeDNR, and updates to the WWUMM Education Portal. Reports will detail every advance, while the portal shares the story with constituents—making water management accessible and inspiring.

Why This Matters: A Stronger, Smarter Future

This WWUMM enhancement isn't just an update—it's a catalyst for progress. With MT3D's nitrate-analyses capabilities, refreshed data, and sharper tools, we're equipping the NRDs to protect aquifers, enhance streams, and empower communities. It's a practical, science-backed path to sustainability that benefits Nebraska and beyond. Fund this project, and you're investing in a healthier, more resilient water future—let's make it happen!

1.B.3 Describe field or research investigations utilized to substantiate the project conception (004.02 B);

The Western Water Use Management Modeling (WWUMM) project equips the North Platte Natural Resources District (NPNRD), South Platte Natural Resources District (SPNRD), and Nebraska Department of Natural Resources (NeDNR) with advanced tools for modeling crop consumptive use, groundwater, and surface water. These tools enhance the management of river, stream, and aquifer systems across the modeling area. Building on decades of development since the Cooperative Hydrology Study began in 1997, the current WWUMM reflects extensive data collection and refinement. This project advances that legacy by incorporating water quality modeling and updating key components to improve accuracy and relevance. Three excerpts from prior research investigations, included below, validate the foundation of this proposed effort. This WWUMM project will sustain and enhance this critical modeling framework, ensuring precise, science-based water management for the NRDs and NeDNR.

1. **The report entitled "Groundwater Flow Model for the Southern Half of the Nebraska Panhandle" by Richard R. Luckey dated 2013 provides the following description of previous work:**

"Luckey and Cannia (2006) previously described this study area and much of this section is repeated directly from that report. The earliest studies of groundwater in western Nebraska

were done by Darton (1899, 1903, and 1905). Meinzer (1917) did a brief investigation of Lodgepole Creek Valley and Bjorklund (1957) did a more extensive study of the area. Cady and Scherer (1946) did the first of several studies of Box Butte County. Later studies of Box Butte County included those of Nace (1953), Souders and others (1980), and Pettijohn and Chen (1984). Wenzel and others (1946) studied Scotts Bluff County, Babcock and Visher (1951) studied the Dutch Flats area, and Babcock and Visher (1952) studied the Pumpkin Creek valley, which is predominately in Banner and Morrill Counties. Bjorklund and Brown (1957) studied the South Platte valley. Smith (1969) studied Cheyenne County, Smith and Souders (1971) studied Kimball County, and Smith and Souders (1975) later studied Banner County.

Large area studies after the Darton (1905) study began with the Missouri River Basin Commission (1975). This was later followed by the Missouri Basin States Association (1982a and 1982b). A study of the entire High Plains aquifer was reported by Gutentag and others (1984) and Weeks and others (1988). Pettijohn and Chen (1983a and 1983b) did more detailed reports on the Nebraska portion of this study of the High Plains aquifer. Conservation and Survey Division (1998) did a report on the groundwater resources of the entire state of Nebraska. Stanton and others (2011) prepared water budgets for the entire High Plains aquifer.

More recent groundwater studies in the North Platte valley include those of Steele and others (1998), Verstraeten and others (2001), and Steele and others (2002). These studies covered only small parts of the study area. Studies of canal bed sediments and canal leakage potential include Kress and others (2004), Ball and others (2006), Burton and others (2009), and Vrabel and others (2009). Studies of western Nebraska that included a groundwater flow model or other detailed numerical analysis include Missouri River Basin Commission (1975), Lappala and others (1979), Missouri Basin States Association (1982a and 1982b), Pettijohn and Chen (1984), Luckey and others (1986), McLean and others (1997), Luckey and Cannia (2006), Ayers (2007), Peterson and others (2008), and Stanton and others (2010).

Studies of the geology of western Nebraska of particular importance to the current study include Swinehart and Diffendal (1997) and Swinehart and others (1985). Land-use studies were published for 1982 (Dappen and Merchant, 2004), 1997 (Dappen and Tooze, 2001), 2001 (Dappen and Merchant, 2003), and 2005 (Dappen and others, 2006). Testhole descriptions have been published for most of the counties in the study area. These include Arthur County (Diffendal and Goeke, 2000), Banner County (Smith, 2000a), Box Butte County (Smith, 2000b), Cheyenne County (Diffendal, 2000), Deuel County (Diffendal, 1999), Garden County (Smith and Swinehart, 2000), Keith County (Diffendal and Goeke, 2004), Kimball County (Smith 2000c), Morrill County (Souders and Swinehart, 2000), Perkins County (Dreeszen, 2000), and Scotts Bluff County (Sibray and Smith, 2000).”

2. **The summary of the Luckey, 2013 report follows:**

"This report documents a groundwater flow model of 11,100 mi^2 of the southern two-thirds of the Nebraska Panhandle. The study area extends from the limit of the High Plains aquifer on the south to groundwater divides and flow lines on the north and from 6 mi into Wyoming on the west to the dam on Lake McConaughy on the east. Groundwater generally flows from west to east in the study area, and more locally flows to streams that drain the area. Geologic units that make up the High Plains aquifer include the fractured Brule Formation, Arikaree Group, Ogallala Group, Broadwater Formation, and various sediments of Quaternary age. Saturated thickness in the study area ranges from essentially zero to over 800 ft.

The largest saturated thickness occurs beneath the Sand Hills in the northeastern part of the study area. Elsewhere, saturated thickness is quite variable, and in places is controlled by paleovalleys. Prior to settlement, recharge occurred because of precipitation on rangeland. This recharge ranged from less than 0.20 in/yr on the tablelands in the southwestern part of the study area to more than 2.4 in/yr in the Sand Hills in the northeastern part. Beginning in the late 1800s, canals were used to irrigate land and this caused additional recharge. The primary natural discharge from the aquifer was baseflow to streams and rivers that drain the area. Prior to development of the surface-water system, most of the discharge occurred to the North Platte River and its western tributaries had little flow. In the east, Blue Creek received substantial discharge from the aquifer. A secondary mechanism for discharge from the aquifer was evapotranspiration where the water table was near land surface. The largest such area is in the Sand Hills in northern Garden County and southern Sheridan County where there are numerous lakes. There also is evapotranspiration from the riparian forests along the North Platte River and South Platte River.

Beginning in about the 1950s, pumpage for irrigation became a substantial artificial discharge from the aquifer. The history of the groundwater flow system was broken into three periods: the pre-canal period before the late 1800s; the pre-ground-water development period before the early 1950s; and the groundwater development period after the early 1950s. In the model, the first period ended in 1895, the second period ended in 1953, and the third period ended in 2011.

MODFLOW-2000 was selected as the groundwater flow modeling code for this study. The code uses block-centered finite-difference techniques to solve the groundwater flow equation at numerous points throughout the study area. The study area was divided into 177,780 cells of 40 acres each in the model. The pre-canal period was simulated using a 2,000-year period with time steps of 5 or 10 days. The pre-ground-water period was simulated with 5-day time steps for an irrigation period and a non-irrigation period each year. The groundwater development period was simulated using 5-day time steps for monthly periods. The external boundaries of the model included lateral fixed head (water-level) boundaries, lower no-flow boundaries at the base of the aquifer, and the simulated water table. Internal boundaries of the model included streams, lakes, springs, and evapotranspiration areas.

Two aquifer properties were estimated during calibration of the model: hydraulic conductivity and specific yield. Hydraulic conductivity, which describes the flow through the aquifer under laboratory conditions, ranged from 7 ft/d in part of the Arikaree Formation to 150 ft/d in part of the Quaternary age alluvium. Specific yield, which describes release of water from storage in the aquifer, ranged from 0.135 to 0.15 (dimensionless). Other model inputs adjusted during model calibration included streambed conductance and paleovalleys. Streambed conductance, which is one parameter that controls stream-aquifer interaction, ranged from 1.0 ft/d per foot of length to 20 ft/d per foot of length in the calibrated model. Paleovalleys were used to adjust both base of aquifer and hydraulic conductivity. Within paleovalleys, base of aquifer was lowered 200 ft and hydraulic conductivity was increased to 120 ft/d. Two aquifer stress, recharge and pumpage, were estimated in concurrent studies and were provided to this study. These stresses were not changed during model calibration.

Other model inputs were set during model construction and were not changed during model calibration. Simulated 1953 water levels at 297 targets ranged from 100 ft below observed values to 86 ft above observed values. The weighted average difference was -2.9 ft and the unweighted average difference was -7.2 ft. The weighted mean absolute difference was 7.2 ft and the unweighted mean absolute difference was 20.6 ft. Simulated fall 1952 baseflow for north side tributaries to the North Platte River above Pumpkin Creek was about the same as observed baseflow. Simulated spring 1953 baseflow for the same tributaries was 19 percent greater than observed baseflow. The largest simulated inflow component of the 1952-53 water budget was recharge and the largest outflow component was streamflow.

The overall error in the water budget was 546 acre-feet, compared to overall recharge of 1,197,000 acre-feet. Simulated 2010-11 water levels at 85 targets ranged from 71 ft below observed values to 94 ft above observed values. The average difference was +2.5 ft. For 1953-2011, there were 8,290 targets at 131 sites. The weighted average difference was -2.5 ft and the unweighted average difference was -4.6 ft. The weighted mean absolute difference was 10.0 ft and the unweighted mean absolute difference was 17.0 ft. Simulated fall 2010 baseflow for north side tributaries to the North Platte River above Pumpkin Creek was about 18 percent greater than observed baseflow. Simulated spring 2011 baseflow for the same tributaries was 12 percent greater than observed baseflow. The average simulated 1953-2011 baseflow to the North Platte River at Lewellen was about 1,320 ft3/s while the average observed baseflow was about 1,290 ft3/s. The largest simulated inflow component of the 2010-11 water budget was recharge and the largest outflow components were streamflow, pumpage, and decrease in storage. The overall error in the water budget was 4 acre-feet, compared to overall recharge of 2,009,500 acre-feet."

3. **The report entitled "WWUM Modeling Chronological Index of Documentation" by Thad Kuntz, P.G. dated 10/21/2016 provides the following description of previous work completed on the WWUMM:**

"This document serves as a chronological index, including authors of the various reports and documentation that have been completed for this effort.

Chronological Index of Documentation

2009

Email, maps, and other documentation of high resolution GPS points along the North Platte River and tributaries, South Platte River, and Lodgepole Creek. October 21, 2009, through March 2, 2012.

2010

Irrigated Acreage Assessment Recommendation by Leonard Rice Engineers, June 2, 2010

Memorandum to Thad Kuntz, North Platte Natural Resources District; Streamflow accretion by model cell – shapefile stream_depletion_100902 by Richard R. Luckey, High Plains Hydrology, September 3, 2010

Documentation of Unit Response Functions created for Western Water Use Model of the Nebraska Panhandle by Richard R. Luckey, High Plains Hydrology, December 16, 2010

2011

Memorandum to Thad Kuntz, P.G.; Brule Formation Fractures in NRD Priority Area 1 – Preliminary Results by Dennis McGrane, C.P.G., P.E. and Stephanie Ashely, G.I.T., Leonard Rice Engineers, January 3, 2011

Documentation of Shapefiles for the MODFLOW Stream Package of the Western Water Use Model in the Nebraska Panhandle by Richard R. Luckey, High Plains Hydrology, February 2, 2011

Western Water Use Model METRIC Presentation Review Memorandum to Thad Kuntz; RE: 28 March 2011 METRIC Presentation Review by Marc Groff, 7 April 2011

Characterization of Fractures in the Brule Formation Surrounding Lodgepole Creek, Pumpkin Creek, and The North Platte River, Western Nebraska by Stephanie Ashley, Nebraska Department of Natural Resources, June 29, 2011

2012

WWUM Model Historical Consumptive Use & Pumping Estimates Memorandum to Thad Kuntz, North Platte NRD; Use of StateCU to Develop Historical Consumptive Use and Pumping Estimates, April 2012

Western Water Use Management Model Irrigated and Dryland Acreage Assessment by Leonard Rice Engineers, May 2012

Permit Map Memorandum to Doug Hallum, Nebraska DNR, Ron Cacek, NPNRD, Rod Horn, SPNRD, and Marc Groff, The Flatwater Group; Permit Maps for Irrigated Acreage in the North Platte River, Pumpkin Creek, and Lodgepole Creek Basins by Kara Sobieski, Leonard Rice Engineers, July 16, 2012

Western Water Use Management Model Western Canal Service Area Acreage Classification Comparison Memorandum to Western Water Use Management Model Technical Team; Western Canal Acreage Comparison by Marc Groff, 30 Aug 2012

WWUM Technical Memorandum Colorado Pumping and Recharge Estimates by Leonard Rice Engineers, December 19, 2012

2013

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Ground Water Flow Model for the Southern Half of the Nebraska Panhandle by Richard R. Luckey, High Plains Hydrology, LLC, June 2013

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Western Water Use Management Model Ground Water Model Integration Training Manual by Mark Mitisek, Leonard Rice Engineers, July 2013

Hydrograph Separation Methods Used to Estimate Groundwater Discharge for Assistance in Calibration of the Western Water Use Model by Jesse Bradley, Nebraska Department of Natural Resources, Thad Kuntz, Adaptive Resources, Inc., and Richard R. Luckey, High Plains Hydrology, October 2013

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Western Water Use Management Model Historical Crop Consumptive Use Analysis, Final Report, by Kara Sobieski, Wilson Water Group, July 2014

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Strait Line Diagram of the North Platte River from Whalen Diversion Dam in Wyoming to Lewellen, Nebraska, Wilson Water Group, February 2015

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Quality Assessment and Calibration of the Regionalized Soil Water Balance Model, Thad Kuntz, 4/3/2015, Report to Western Water Use Management Modeling Joint Board

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Western Water Use Management Modeling, Modeling Data Integration and Calibration Plan by: Thad Kuntz, Adaptive Resources, Inc., Scottsbluff, Nebraska; Jesse Bradley, Nebraska

Department of Natural Resources, Lincoln, Nebraska; Doug Hallum, Nebraska Department of Natural Resources, Lincoln, Nebraska; Kara Sobieski, Wilson Water Group, Lakewood, Colorado; Mark Mitisek, Leonard Rice Engineers, Denver, Colorado; Marc Groff, The Flatwater Group, Lincoln, Nebraska; Dick Luckey, High Plains Hydrology, Aurora, Colorado; November 2015

Technical Documentation: Update of Stream Baseflow Calibration Targets, Thad Kuntz, P.G., and Joe Reedy, 12/14/2015, Report to Western Water Use Management Modeling Joint Board

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Technical Documentation: Water Level Calibration Target Results, Thad Kuntz, P.G., and Joe Reedy, 1/26/2016, Report to Western Water Use Management Modeling Joint Board

The Western Water Use Model: Regionalized Soil Water Balance Model, The Flatwater Group, Inc., 24 June 2016

Western Water Use Management Ground Water Model Update through April 2014, Thad Kuntz, P.G., and Joe Reedy, 5/20/2016, Report to Western Water Use Management Modeling Joint Board

This WWUMM project is substantiated by a comprehensive suite of research investigations, fully documented at https://www.spnrd.org/western-water-use-management-model. This resource details the prior studies and data underpinning the proposed project, providing a robust foundation for its development and implementation. The WWUMM is built on this established research, delivering advanced tools to enhance water management for the SPNRD, NPNRD, and NeDNR.

1.B.4 Describe any necessary water and/or land rights (004.02 C); **N/A**

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).

The Western Water Use Management Modeling (WWUMM) project introduces no known impacts on existing structural measures. Instead, it provides a critical analytical framework for the South Platte Natural Resources District and North Platte Natural Resources District to evaluate future projects, rules, and management strategies mandated by their Integrated Management Plans, rules and regulations, and

Groundwater Management Plans. The WWUMM will assess initiatives affecting streamflow, aquifer levels, and groundwater quality, as well as those designed to enhance streamflow or improve water quality, ensuring their effectiveness through robust modeling.

Anticipated analyses include the impacts of allocations, certified groundwater acreage retirement, canal excess flow recharge projects, surface water consumptive use leasing, and regulations targeting groundwater quality improvements. These efforts aim to bolster streamflow, curb groundwater declines, and enhance water quality, requiring sophisticated modeling to measure their success. The WWUMM will also calculate first and second increment depletion obligations under the Nebraska New Depletions Plan by identifying post-July 1, 1997, groundwater-irrigated acres and their associated depletions. Additionally, the project will leverage a comprehensive land-use dataset to analyze shifts from less efficient flood irrigation to more efficient center-pivot sprinkler systems, providing insights into how these changes influence surface and groundwater systems, including quality. This WWUMM project will equip the NRDs with the tools to assess and optimize these management actions, ensuring sustainable water resources for the future.

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.

The Western Water Use Management Modeling (WWUMM) project employs advanced modeling techniques and sophisticated numerical groundwater modeling to address complex water sustainability challenges. The next best alternative—relying on basic data, rudimentary processes, and simplified analytical calculations for assessing groundwater depletion and water quality—falls far short of the WWUMM's capabilities. This alternative approach would be excessively labor-intensive, overly reductive, and insufficiently rigorous, likely failing to withstand scientific or regulatory scrutiny. By contrast, the WWUMM provides a precise, comprehensive, and defensible solution essential for effective water resource management. This project ensures access to state-of-the-art tools that surpass outdated methods, delivering reliable outcomes critical to the sponsor Natural Resources Districts' sustainability goals.

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. (Title 261, CH 2 - 005).

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).

The total project cost is $400,000. These costs are for payment to consultants to complete the scope of work.

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).

The Western Water Use Management Modeling (WWUMM) project will directly and significantly increase water sustainability within the sponsor Natural Resources Districts (NRDs) by delivering a robust analytical framework to evaluate the impacts of water use and quality. This initiative will enable the NRDs to assess the degree to which current water practices and quality levels are sustainable without necessitating additional management interventions. In cases where sustainability is at risk, the WWUMM will serve as a critical tool for modeling the effects of various management strategies, providing data-driven insights to guide decision-making and achieve long-term water sustainability.

The project is fundamental to the NRDs' efforts to implement and refine management actions outlined in their Integrated Management Plans, Groundwater Management Plans, and associated Rules and Regulations. By facilitating the evaluation of these actions' effectiveness, the WWUMM will empower the NRDs to achieve and maintain sustainable water use and quality across their districts. This capacity is essential for meeting statutory obligations and ensuring the resilience of water resources over time. This WWUMM project will provide the NRDs with an indispensable resource to advance their mission, safeguard water supplies, and promote environmental and economic stability in the region.

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).

See attached Table (Attachment A).

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.)

The Western Water Use Management Modeling (WWUMM) project is an indispensable initiative for the sponsor Natural Resources Districts (NRDs) in Nebraska. This project is critical to fulfilling the NRDs' obligations as outlined in their Integrated Management Plans (IMPs) and Groundwater Management Plans (GMPs). These plans establish specific goals and objectives aimed at ensuring sustainable water resource management, and the WWUMM project provides the essential framework for assessing whether these targets have been achieved. Nebraska Revised Statutes §46-709 mandates that NRDs utilize the "best available information" in executing these responsibilities. The WWUMM project represents the most cost-effective and reliable means of meeting this statutory requirement, as no comparable alternative exists to evaluate progress toward these objectives using high-quality, evidence-based data. The goals and objectives embedded in the IMPs and GMPs are inherently valuable, as they are designed to comply with state-mandated requirements that safeguard the long-term sustainability of water resources in the project region.

Furthermore, the WWUMM project plays a pivotal role in supporting Nebraska's commitments under the Platte River Recovery Implementation Program (PRRIP), an interstate agreement executed by the Governors of Nebraska, Colorado, and Wyoming, alongside the U.S. Secretary of the Interior. Through the PRRIP, Nebraska has pledged to meet specific obligations to its partner states and federal agencies. The WWUMM project is vital for providing the data and analysis necessary to demonstrate compliance with these commitments. Without this project, Nebraska risks forfeiting the substantial benefits afforded by the PRRIP, which are tied to the Endangered Species Act and the conservation of four key species in the Central Platte River: the endangered whooping crane, least tern, and pallid sturgeon, and the threatened piping plover. The PRRIP delivers significant advantages to Nebraska by satisfying U.S. Fish and Wildlife Service requirements for water users in the Platte River Basin. Absent this program, achieving compliance could impose direct costs and economic losses amounting to hundreds of millions of dollars. For instance, the Environmental Impact Statement for the PRRIP estimated that alternative approaches could entail costs of approximately $250 million, with annual economic output in the Platte River Basin reduced by more than $10 million. By enabling Nebraska to meet its PRRIP obligations efficiently, the WWUMM project not only ensures regulatory compliance but also preserves economic stability and supports environmental stewardship.

Funding this WWUMM project will empower the NRDs to fulfill their statutory duties, uphold Nebraska's interstate commitments, and secure the ecological and economic benefits of sustainable water management. This initiative represents a strategic

investment in the future of Nebraska's water resources and the well-being of its communities.

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.

See the attached documents that present the NRDs' budgets for FY 2024-2025 and the attached letters documenting that the NRDs intend to budget adequate funds for FY 2025-2026 and FY 2026-2027 (Attachment B).

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

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 (i.e. timing vs nesting/migration, etc.).

This Western Water Use Management Modeling (WWUMM) project will have no adverse effects on the natural environment. By providing advanced analytical tools to enhance water management, it supports the South Platte Natural Resources District and North Platte Natural Resources District in promoting sustainable practices that preserve ecological integrity. This project ensures a positive contribution to environmental stewardship with no detrimental impacts.

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

The NRDs have a wide range of statutory responsibilities and authorities, including but not limited to Nebraska Revised Statutes §2-3,201 through 2-3,243 and the Ground Water Management and Protection Act (Nebraska Rev. Statutes §46-701 through 46-756). As Nebraska's preferred regulator of groundwater, they are clearly both qualified and responsible for carrying out the proposed project. Specifically, Nebraska Rev. Statutes §46-707(f) confers to the NRDs the power to "conduct investigations and cooperate or contract with ... public or private corporations, or any association or individual on any matter relevant to the administration of the [Ground Water Management and Protection] act." The NRDs have several potential funding sources available to use in meeting their share of the project cost.

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

The Western Water Use Management Modeling (WWUMM) project is designed to support the sponsor Natural Resources Districts (NRDs) in fulfilling critical requirements of their Integrated Management Plans (IMPs), developed in accordance with the Basin-Wide Plan for the Upper Platte River Basin. Both the IMPs and the Basin-Wide Plan are mandated by the Nebraska Ground Water Management and Protection Act (GWMPA), underscoring the project's foundation in state law. Additionally, Nebraska is a signatory to the Platte River Recovery Implementation Program (PRRIP), an interstate agreement with significant environmental and economic implications. The WWUMM project will provide the NRDs and the State of Nebraska with the tools and data necessary to demonstrate compliance with PRRIP obligations, reinforcing the state's commitments to its partners. Furthermore, the project aligns with the NRDs' Groundwater Management Plans (GMPs), also established under the GWMPA. By enabling compliance with the IMPs, GMPs, Basin-Wide Plan, and PRRIP, the WWUMM represents a vital investment in meeting statutory and interstate requirements. Funding this project will strengthen Nebraska's capacity to manage its water resources effectively and sustainably, ensuring adherence to these interconnected obligations.

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. **N/A**

10.B Attach proof of ownership for each easements, rights-of-way and fee title currently held. **N/A**

10.C Provide assurance that you can hold or can acquire title to all lands not currently held. **N/A**

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

The Nebraska Legislature has explicitly entrusted the South Platte and North Platte Natural Resources Districts (NRDs) with the responsibility of managing groundwater and hydrologically connected surface water resources. This mandate is enshrined in a broad array of statutory authorities, including Nebraska Revised Statutes §2-3,201 through §2-3,243 and the Ground Water Management and Protection Act (GWMPA), Nebraska Revised Statutes §46-701 through §46-756. These laws outline the NRDs' obligations to develop and implement effective management tools to fulfill their duties. The Western Water Use Management Modeling (WWUMM) project directly supports these statutory requirements by providing an advanced, data-driven solution for water resource management. Notably, Nebraska Revised Statutes §46-707(f) empowers the NRDs to "conduct investigations and cooperate or contract with agencies of the United States, agencies or political subdivisions of

this state, public or private corporations, or any association or individual" on matters pertinent to the GWMPA's administration. This WWUMM project exemplifies this authority, enabling the NRDs to execute their legislative charge with precision and efficacy. This project will equip the NRDs with an essential tool to meet their legal obligations, ensuring sustainable water management across the region.

12. Identify the probable consequences (environmental and ecological) that may result if the project is or is not completed.

This Western Water Use Management Modeling (WWUMM) project is designed to have no adverse environmental or ecological impacts. By focusing on advanced modeling and data analysis to support sustainable water management, the project enhances resource stewardship without disrupting natural ecosystems or ecological processes. This environmentally neutral approach ensures that the initiative aligns with conservation goals while delivering critical benefits to the sponsor Natural Resources Districts and the broader region. Funding this project supports a sustainable, non-invasive solution that prioritizes ecological integrity alongside effective water management.

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 to 6 for items (1) - (9); and 0 to 3 for items (10) - (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 72 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.

Approximately 62,000 residents of the North Platte Natural Resources District (NPNRD) and South Platte Natural Resources District (SPNRD) depend on the High Plains Aquifer as

their primary source of drinking water. According to the Nebraska Department of Energy and Environment's 2024 Nebraska Groundwater Quality Monitoring Report, water quality challenges in the region are escalating. One community public water supply system faces mandatory requirements due to elevated nitrate levels, while two others must treat their water to address high uranium concentrations. Additionally, at least five communities are required to conduct quarterly nitrate testing. The report's annual maps reveal a decades-long trend of increasing nitrogen contamination, compounded by naturally occurring uranium and arsenic, signaling a persistent and growing threat to drinking water quality in the region.

For the water users in these districts, viable solutions are limited. Future options include identifying alternative drinking water sources—likely from other groundwater reserves—or implementing stricter regulations to enhance groundwater quality. However, both NPNRD and SPNRD are designated as fully appropriated or overappropriated, meaning any new groundwater use must avoid adversely affecting existing users. Addressing water quality degradation may require the districts to impose new regulations or compel communities to adopt costly treatment systems, which carry significant implementation and maintenance expenses.

To navigate these challenges effectively, the Western Water Use Management Modeling (WWUMM) project is indispensable. This initiative provides the most advanced, scientifically robust modeling tools to:

- **Evaluate the impact of new water quality regulations;**
- **Assess the feasibility and effects of developing alternative water sources, ensuring no harm to existing users; and**
- **Support data-driven decisions to safeguard drinking water supplies.**

By funding the WWUMM project, this grant will empower the NPNRD and SPNRD to address pressing water quality issues, protect the health of 62,000 residents, and ensure sustainable access to safe drinking water in a region facing complex hydrological constraints. This investment is critical to meeting the immediate and long-term needs of these communities.

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 Western Water Use Management Modeling (WWUMM) project is a vital resource for the South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD) in achieving the goals and objectives outlined in their Integrated Management Plans (IMPs) and Groundwater Management Plans (GMPs). These plans, detailed in Attachments C and D, represent the NRDs' strategic frameworks for sustainable water management, as mandated by Nebraska law.

The SPNRD's initial IMP was jointly adopted with the Nebraska Department of Natural Resources (NeDNR) on June 20, 2008, and updated on August 19, 2009. A second increment IMP was adopted by SPNRD on August 6, 2019, approved by NeDNR on August 9, 2019, and took effect on September 11, 2019, with planning for the next increment underway. Similarly, the NPNRD's first IMP was jointly adopted with NeDNR on August 13, 2009, updated on April 16, 2013, and followed by a second increment IMP adopted by NPNRD on August 8, 2019, approved by NeDNR on August 9, 2019, and effective as of September 11, 2019. The WWUMM has played a pivotal role in assessing the success of the first and second increments of these IMPs and remains essential for shaping the goals and objectives of future increments. Additionally, the SPNRD's most recent GMP was adopted in 2002, while the NPNRD's current GMP dates to 1993, both of which guide groundwater management efforts within the districts.

By providing advanced modeling and analytical capabilities, the WWUMM project enables the SPNRD and NPNRD to implement, monitor, and refine their IMPs and GMPs effectively. Funding this initiative will ensure the continuation of a proven tool that supports compliance with state mandates, drives progress toward sustainable water management, and informs future planning increments for the benefit of the districts and their communities.

<u>SPNRD IMP</u>

The vision of the SPNRD's IMP is to work together for the greater good of all citizens of the South Platte Natural Resources District and to cooperatively develop and implement a local Integrated Surface Water/Ground Water Plan that has an acceptable degree of certainty of 1) maintaining a sufficient water supply for use by present and future generations, 2) maintaining, enhancing and protecting the region's agricultural economy and the viability of its cities and villages, and 3) promoting the growth of economic activities while seeking to avoid adverse impacts on the environment.

The goals and objectives of the SPNRD IMP are to 1) incrementally achieve and sustain a fully appropriated condition, 2) ensure that no act or omission of the SPNRD would cause noncompliance by Nebraska with any interstate compact or decree or other formal state contract or agreement pertaining to any groundwater or surface water use or supplies,

and 3) keep the IMP current, maintain consistency with the Basin-Wide Plan, and keep water users informed of items relating to plan implementation.

The SPNRD has outlined a forward-thinking vision in its IMP to unite stakeholders for the collective benefit of all citizens. This vision drives the collaborative development and implementation of a local Integrated Surface Water/Groundwater Plan designed to: 1) ensure a reliable water supply for current and future generations with an acceptable level of certainty; 2) sustain, strengthen, and safeguard the region's agricultural economy while supporting the vitality of its cities and villages; and 3) foster economic growth without compromising environmental integrity. The SPNRD's IMP goals and objectives reinforce this vision by aiming to: 1) progressively achieve and maintain a fully appropriated condition; 2) prevent any action or inaction by the SPNRD that could jeopardize Nebraska's compliance with interstate compacts, decrees, or formal agreements related to groundwater or surface water; and 3) ensure the IMP remains up-to-date, aligned with the Basin-Wide Plan, and transparent to water users regarding implementation progress.

<u>NPNRD IMP</u>

The NPNRD has articulated a comprehensive vision in its IMP to guide sustainable water resource management. This vision includes: 1) balancing water use and supply to optimize economic, social, and environmental benefits for both the near and long term; 2) protecting existing users, the local economy, environmental health, and recreational opportunities to the greatest extent possible; 3) managing the total water supply to ensure sustainability while accommodating growth and evolving usage patterns; and 4) acknowledging multiple causes of streamflow depletion and equitably distributing mitigation responsibilities where feasible. The NPNRD's IMP goals and objectives further this vision by aiming to: 1) incrementally achieve and maintain a fully appropriated condition while preserving economic vitality, social well-being, and environmental health; 2) prevent or mitigate human-induced reductions in river or stream flows, ensuring compliance with interstate decrees, compacts, or agreements; and 3) keep the IMP aligned with the Basin-Wide Plan and maintain transparent communication with water users.

The WWUMM project is indispensable to both the NPNRD and SPNRD in realizing these ambitions. By providing advanced modeling and analytical tools, the WWUMM enables the NRDs to evaluate progress toward their IMP goals, assess the effectiveness of management strategies, and ensure sustainable water use across their districts. The project builds on a robust foundation of prior efforts, beginning with the adoption of the NPNRD's and SPNRD's initial IMPs in 2009. Since then, the NRDs, in collaboration with the NeDNR, have conducted annual basin-wide meetings, established detailed monitoring protocols, and undertaken extensive studies and data collection. These efforts feed into

the statutorily mandated Robust Review modeling evaluation, which relies on the WWUMM to deliver precise, actionable insights.

Funding the WWUMM project will sustain this critical work, empowering the SPNRD and NPNRD to meet their IMP objectives, comply with legal mandates, and secure a balanced, sustainable water future for their communities. This investment supports a proven, science-based approach to resource management that has been refined over more than a decade of dedicated effort.

SPNRD and NPNRD GMPs

The SPNRD and NPNRD have established clear goals within their GMPs to secure sustainable groundwater resources for their communities. The SPNRD's GMP aims "to maintain an adequate supply of groundwater for all reasonable uses into the future," defining an adequate supply as one that meets current annual demands without depleting aquifers or compromising groundwater quality. Similarly, the NPNRD's GMP seeks to "maintain an adequate supply of acceptable quality groundwater to forever fulfill the reasonable groundwater demands within the North Platte NRD," encompassing needs for domestic, municipal, agricultural, industrial, wildlife habitat, and other beneficial uses as determined by its residents.

The WWUMM project is instrumental in achieving these objectives by providing the SPNRD and NPNRD with advanced, data-driven insights essential for informed decision-making. This initiative equips the districts with the critical information needed to implement effective management actions, ensuring a reliable, long-term groundwater supply that meets current and future demands without degradation. Funding the WWUMM project will empower the NRDs to uphold their commitments to sustainable groundwater management, safeguarding this vital resource for the benefit of their communities and ecosystems.

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 Western Water Use Management Modeling (WWUMM) project will significantly advance water sustainability in the South Platte Natural Resources District (SPNRD) and

North Platte Natural Resources District (NPNRD) by delivering a sophisticated decision support system. This system will provide the essential tools to implement management actions that enhance aquifer recharge, mitigate aquifer depletion, and boost streamflow, ensuring a resilient water supply for the region.

The WWUMM will optimize aquifer recharge efforts, a proven strategy employed by the NRDs since 2011. Both districts have leveraged excess surface water flows by diverting them into canals—such as Farmers Canal, Central Canal, Belmont Canal, and Enterprise Canal in NPNRD, and Western Canal in SPNRD—allowing water to infiltrate the ground through canals, laterals, and recharge pits. To amplify these efforts, NPNRD has developed a key recharge pit complex within the Enterprise Irrigation District, while SPNRD has established 13 pits within the Western Irrigation District. The WWUMM's modeling tools will enhance these initiatives by identifying optimal diversion timings and volumes, and quantifying their benefits, thereby maximizing groundwater replenishment.

Additionally, the WWUMM will empower the NRDs to reduce aquifer depletion and increase streamflow through informed regulatory decisions. In areas experiencing stream depletions—such as the North Platte Valley, South Platte Valley, Pumpkin Creek Valley, and Lodgepole Creek Valley—both SPNRD and NPNRD have implemented pumping allocations to curb over-extraction. Similarly, in regions facing aquifer declines, such as the Ogallala and Arikaree Formations in SPNRD's Tablelands, allocations have been enacted to stabilize water levels. The WWUMM has already facilitated numerous critical evaluations, enabling the NRDs to determine precise regulatory measures that mitigate depletion, enhance streamflow, and secure a sustainable water future.

By funding this WWUMM project, this grant will equip the SPNRD and NPNRD with a cutting-edge tool to refine and expand their water management strategies. This investment will directly contribute to aquifer health, streamflow restoration, and long-term water sustainability, benefiting the districts' communities and ecosystems.

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 Western Water Use Management Modeling (WWUMM) project will advance multiple water supply goals—such as conserving and preserving water resources and ensuring aquifer sustainability—by delivering a comprehensive decision support system to the South Platte

Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD). This system equips the NRDs with the capability to predict the potential benefits of diverse water quantity and quality management strategies, quantify their real-world impacts, and provide actionable guidance for future decisions. Over the long term, these data-driven insights will be critical to achieving and sustaining the districts' water supply objectives. Without ongoing investment in the WWUMM project, the NRDs lack the tools to assess the effectiveness of their efforts, leaving the success of these vital goals uncertain and unattainable with confidence. Funding this initiative ensures the SPNRD and NPNRD can make informed, impactful management choices, securing a sustainable water future for their communities.

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 Integrated Management Plans (IMPs) of the South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD) address the critical interplay of hydrologically connected surface water and groundwater, with the primary aim of achieving and sustaining a fully appropriated condition in their overappropriated regions. The aquifers in these districts face significant stress due to the region's exceptionally low average precipitation, amplifying the challenge of maintaining sustainable water supplies. To address this, both NRDs have implemented rules and regulations that cap groundwater pumping per irrigated acre, striving to balance the maximization of beneficial consumptive use with the need to minimize adverse impacts on aquifers and streamflow.

The Western Water Use Management Modeling (WWUMM) project is essential to this effort, equipping the SPNRD and NPNRD with a powerful decision-making tool to determine the optimal level of regulation required to meet their IMP goals. By providing detailed modeling and analysis, the WWUMM enables the NRDs to implement precise, effective water management strategies that safeguard aquifer health and streamflow while supporting the region's economic vitality. This benefits Nebraska's residents by ensuring that any necessary water-use restrictions are carefully calibrated, limiting economic impacts on the SPNRD and NPNRD communities to only what is essential for sustainability. Funding the WWUMM project will empower the NRDs to protect both their natural resources and the livelihoods of their residents, contributing to a resilient and prosperous future for 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.

The total cost of this Western Water Use Management Modeling (WWUMM) project is $400,000 and represents a critical and cost-effective investment for the South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD). No technically comparable alternative exists to deliver the same benefits, making the WWUMM indispensable for achieving the goals and objectives outlined in the NRDs' Integrated Management Plans (IMPs). This project is essential not only for evaluating whether these goals have been met but also for guiding adaptive management strategies as future challenges emerge. Without the WWUMM, the NRDs lack a viable, economical means to assess progress toward these statutorily mandated objectives, which are designed to ensure long-term water sustainability in the region—an inherently cost-effective mission.

Beyond local benefits, the WWUMM project supports Nebraska's obligations under the Platte River Recovery Implementation Program (PRRIP), an interstate agreement endorsed by the Governors of Nebraska, Colorado, and Wyoming, and the U.S. Secretary of the Interior. The PRRIP imposes specific commitments on Nebraska to its partner states and federal agencies, tied to the Endangered Species Act and the conservation of four Central Platte River species: the endangered whooping crane, least tern, and pallid sturgeon, and the threatened piping plover. The WWUMM is vital for demonstrating compliance with these commitments, preserving Nebraska's access to PRRIP benefits that shield water users in the Platte River Basin from U.S. Fish and Wildlife Service requirements. Without the PRRIP—and by extension, the WWUMM—these obligations could cost Nebraska hundreds of millions in direct expenses and lost economic output. The PRRIP Environmental Impact Statement estimates alternative compliance approaches at approximately $250 million, with annual economic losses exceeding $10 million in the Platte River Basin.

Funding this WWUMM project is a strategic investment that ensures the SPNRD and NPNRD meet their IMP goals, fulfills Nebraska's interstate commitments, and averts significantly higher costs. This project delivers unmatched value by safeguarding water sustainability, economic stability, and environmental compliance across the region.

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.

The Western Water Use Management Modeling (WWUMM) project is indispensable to Nebraska's ability to fulfill its commitments under the Platte River Recovery Implementation Program (PRRIP), a vital interstate agreement. Nebraska's obligations are detailed in the Nebraska New Depletions Plan (NNDP), a key component of the PRRIP's Water Plan. The NNDP mandates that Nebraska offset any Platte River streamflow depletions caused by new or expanded water uses since July 1, 1997. To comply, the South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD) have implemented a range of management actions aligned with their Integrated Management Plans. However, assessing the effectiveness of these actions and verifying compliance with the NNDP hinges on the WWUMM's advanced modeling, updated management inputs, and analytical results. Without this project, Nebraska lacks the precise tools and data required to credibly demonstrate adherence to the NNDP for water uses within the sponsor NRDs, jeopardizing the state's standing in this critical interstate framework. Funding this WWUMM project ensures Nebraska can meet its PRRIP obligations, reinforcing the SPNRD and NPNRD's efforts to sustain water resources while upholding legal and cooperative commitments.

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.

The groundwater supply managed by the South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD) is a cornerstone of Nebraska's and the United States' economic and societal well-being. Depletion of this resource would have profound consequences for public security, health, and safety, threatening critical infrastructure and community stability. Sustainable management of this supply through informed decision-making is paramount, and the Western Water Use Management Modeling (WWUMM) project is essential to achieving this goal.

The urgency of this issue is underscored by the United States Department of Homeland Security's Office of Cyber and Infrastructure Analysis report, Analysis of High Plains Resource Risk and Economic Impacts (August 2015, Attachment E). This report examines the risks

posed by ongoing depletion of the High Plains aquifer in Kansas and Nebraska, projecting that, under current water use practices, sixty counties in Kansas and seven in Nebraska could exhaust their groundwater supplies within 100 years. This finding highlights the national significance of proactive water management and the potential cascading impacts on local, regional, and national economies if action is not taken.

The WWUMM project directly addresses this challenge by equipping the SPNRD and NPNRD with a robust suite of modeling tools to assess groundwater availability and quality, evaluate the effects of current practices, and predict future changes. By informing management decisions, the WWUMM ensures that water use is optimized to preserve this vital resource for present and future generations, delivering clear benefits to public security, health, and safety. Funding this project will empower the NRDs to mitigate the risks of depletion, protect critical infrastructure, and sustain the well-being of their constituents, aligning with both state and national imperatives for resource resilience.

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 South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD) encompass nitrogen management subareas where elevated nitrate levels in groundwater pose a significant challenge to water quality. The Western Water Use Management Modeling (WWUMM) project will be enhanced with advanced tools to track the direction and movement of water and nitrates within the aquifer, providing critical insights into future water quality trends. This upgrade is essential for the NRDs to develop effective strategies for managing non-point source pollution.

The upgraded WWUMM's data and analyses will empower the NRDs to refine their non-point source pollution management approaches, balancing the needs of diverse water users—such as domestic and municipal supplies—while supporting agricultural producers. By leveraging existing nitrate levels in groundwater, producers can reduce fertilizer input costs, improving water quality and enhancing economic efficiency in crop production. This expansion of the WWUMM to include water quality analysis tools is vital for understanding potential changes in groundwater quality and evaluating the success of the NRDs' efforts to mitigate degradation. Funding this project will provide the SPNRD and NPNRD with a cutting-edge resource to address this pressing environmental issue, delivering benefits to public health, agriculture, and sustainability across the region.

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 Western Water Use Management Modeling (WWUMM) project is strongly supported by its local jurisdictions, the South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD). These NRDs demonstrate their commitment through sustained financial backing via their tax levy authority. For fiscal year 2024-2025, the NPNRD's tax levy is set at 4.6577¢ per $100 of valuation, while the SPNRD's is 4.6954¢ per $100 of valuation, reflecting a reliable funding stream to ensure the project's success.

Additionally, the sponsor NRDs have historically leveraged supplementary resources to sustain this effort, including the Interrelated Water Management Plan Program Fund, administered by the Nebraska Department of Natural Resources, and the Nebraska Environmental Trust, which supported the WWUMM during its integration with the Cooperative Hydrology Study (COHYST). This robust local support underscores the NRDs' dedication to the WWUMM and its critical role in water management. Grant funding will complement these investments, amplifying the project's capacity to deliver sustainable outcomes for the region.

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 Western Water Use Management Modeling (WWUMM) project is integral to the water management strategies of the South Platte Natural Resources District (SPNRD) and North Platte Natural Resources District (NPNRD). The SPNRD's initial Integrated Management Plan (IMP), adopted with the Nebraska Department of Natural Resources (NeDNR) on June 20, 2008, and updated in 2009, advanced to a second increment on August 6, 2019 (effective September 11, 2019), with further increments in development. The NPNRD's IMP, first adopted on August 13, 2009, updated in 2013, reached its second increment on August 8, 2019 (effective September 11, 2019). The WWUMM has proven vital in evaluating the success

of these initial increments and will guide the formulation of future goals and objectives. Complementing these efforts, the SPNRD's Groundwater Management Plan (GMP) was last updated in 2002, and the NPNRD's GMP in 1993. The WWUMM has an essential role in ensuring the NRDs' IMPs and GMPs achieve long-term water sustainability through data-driven decision-making.

SPNRD IMP

The SPNRD envisions its IMP as a collaborative effort to benefit all citizens by developing and implementing a local Integrated Surface Water/Groundwater Plan. This plan ensures with reasonable certainty: 1) a sustainable water supply for current and future generations; 2) the preservation, enhancement, and protection of the region's agricultural economy and the vitality of its cities and villages; and 3) the promotion of economic growth while minimizing environmental harm.

The SPNRD's IMP goals and objectives are to: 1) progressively achieve and maintain a fully appropriated condition; 2) safeguard Nebraska's compliance with interstate compacts, decrees, and agreements related to water use; and 3) keep the IMP current, aligned with the Basin-Wide Plan, and transparent to water users. This WWUMM project will provide the SPNRD with critical tools to realize this vision and meet these objectives, ensuring sustainable water management that balances economic prosperity, community well-being, and environmental stewardship.

NPNRD IMP

The NPNRD envisions its IMP as a framework to: 1) balance water use and supply, optimizing economic, social, and environmental benefits for both the short and long term; 2) safeguard existing users, the local economy, environmental health, and recreational opportunities to the fullest extent possible; 3) sustain the total water supply while accommodating growth and evolving uses; and 4) equitably address multiple causes of streamflow depletion.

The NPNRD's IMP goals and objectives are to: 1) incrementally achieve and maintain a fully appropriated condition while preserving economic vitality, social well-being, and environmental integrity; 2) prevent or mitigate human-induced streamflow reductions, ensuring compliance with Nebraska's interstate decrees, compacts, and agreements; and 3) keep the IMP aligned with the Basin-Wide Plan and transparent to water users. This WWUMM project will equip the NPNRD with essential tools to realize this vision and achieve these goals, fostering sustainable water management that supports the district's communities, economy, and ecosystems.

This WWUMM project is vital to the SPNRD and NPNRD, providing indispensable tools to evaluate progress toward the goals of their IMPs. Since the adoption of their initial IMPs in 2009, the NRDs, in partnership with the NeDNR, have laid a strong foundation for success through annual basin-wide meetings, a rigorous monitoring protocol, and extensive studies

and data collection. These efforts feed into the statutorily mandated Robust Review, which relies on the WWUMM to deliver comprehensive modeling and analysis. Funding this project will ensure the NRDs can assess and refine their strategies, building on over 15 years of dedicated work to achieve sustainable water management and meet their IMP objectives.

SPNRD and NPNRD GMPs

This WWUMM project is essential to the SPNRD and NPNRD in fulfilling the goals of their GMPs. The SPNRD's GMP aims "to maintain an adequate supply of groundwater for all reasonable uses into the future," defined as a supply sufficient to meet current demands without depleting aquifers or compromising water quality. Similarly, the NPNRD's GMP seeks to "maintain an adequate supply of acceptable quality groundwater to forever fulfill the reasonable groundwater demands" for domestic, municipal, agricultural, industrial, wildlife habitat, and other beneficial uses valued by its residents. The WWUMM project supports these goals by delivering critical data and analysis to guide management actions, ensuring a sustainable groundwater supply for the long term.

Spanning nearly 5 million acres and serving approximately 62,000 residents, the SPNRD and NPNRD rely on effectively managing the groundwater and hydrologically connected surface water resources. The local aquifers support a wide range of vital uses—agricultural, domestic, livestock, industrial, and municipal—making its sustainability paramount. The project's stakeholders, the nearly 62,000 people within these NRDs, stand to benefit directly from enhanced water security and quality. Funding the WWUMM will empower the NRDs to implement informed, sustainable water management practices, safeguarding this essential resource for current and future generations across the region.

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.

This Western Water Use Management Modeling (WWUMM) project is pivotal to Nebraska's fulfillment of its obligations under the Platte River Recovery Implementation Program (PRRIP), a statewide priority enshrined in an interstate agreement signed by the Governor and backed by substantial general fund appropriations through the Nebraska Department of Natural Resources. The WWUMM is indispensable for ensuring Nebraska meets its commitments under the PRRIP, particularly those outlined in the Nebraska New Depletions Plan (NNDP), a core component of the PRRIP's Water Plan. The NNDP mandates that

Nebraska offset Platte River streamflow depletions from new or expanded water uses since July 1, 1997.

The South Platte Natural Resources District and North Platte Natural Resources District have implemented management actions through their Integrated Management Plans to comply with the NNDP. However, verifying the success of these efforts relies on the WWUMM's advanced modeling and analysis. Without this project, Nebraska cannot accurately document compliance for water uses within the sponsor NRDs, risking its obligations under the PRRIP. Successful implementation benefits approximately 500,000 irrigated acres in the Platte River Basin developed post-1997, sustaining their contribution to Nebraska's economy by preserving their viability for irrigated agriculture. Funding this WWUMM project will secure these economic gains, reinforce Nebraska's interstate commitments, and ensure sustainable water management across the state.

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 South Platte Natural Resources District and North Platte Natural Resources District will pay 40% of the project cost, contributing $160,000 to the project. This funding source is made available through the budgets of the sponsor NRDs, which are provided through their tax levy authority. Attached are copies of the NRD budgets showing their commitment to the project and letters documenting the NRDs intent to include the appropriate matching funds in their budgets for Fiscal Years 2025-2026 and 2026-2027 (See Attachment B). The budgetary commitment authority ensures the project will proceed and be completed.

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 Western Water Use Management Modeling (WWUMM) project will empower the North Platte Natural Resources District (NPNRD) and South Platte Natural Resources District to effectively manage the hydrologically connected water supplies of the North Platte River, South Platte River, Pumpkin Creek, and Lodgepole Creek. By delivering critical data and analysis, the WWUMM will enhance watershed health and function, enabling informed

decisions on water consumption, supply replacement through managed recharge or streamflow augmentation, and the quality of both streams and groundwater. A tangible example of its value is the NPNRD's use of the WWUMM to guide the operations and assess the benefits of the Enterprise Canal Recharge Project near Mitchell, Nebraska, along the North Platte River—a now-operational initiative demonstrating the project's real-world impact. Funding the WWUMM will strengthen the NRDs' capacity to sustain these vital watersheds, ensuring balanced water use, improved quality, and long-term ecological resilience across the region.

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.

The Western Water Use Management Modeling (WWUMM) project is a significant part of the NeDNR's objective of Integrated Management Modeling efforts for the Upper Platte River Basin. This can be seen on page 38 of the Annual Report and Plan of Work for the Nebraska State Water Planning and Review Process, submitted to the Governor and Legislature by the DNR in September of 2019. As stated in the report, "(t)he model integrates watershed, surface water operations, and groundwater modeling components to create tools capable of analyzing varied management scenarios. Scenarios have included conjunctive management projects, well pumping, alternative surface water operations, etc." It also states that "The models are being used to help achieve and measure progress towards the goals of the Upper Platte Basin NRDs' IMP's." The utilization of the WWUMM in this effort is documented on the NeDNR's website at https://upjointplanning.nebraska.gov/.

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.

The Platte River Recovery Implementation Program (PRRIP) represents a federal mandate under which Colorado, Wyoming, and Nebraska ensure compliance with the U.S. Endangered Species Act (ESA) for the federally listed least tern, pallid sturgeon, piping plover, and whooping crane. This interstate agreement provides regulatory certainty, averting the need for alternative, potentially burdensome water management actions by states or individual

users. This Western Water Use Management Modeling (WWUMM) project is critical to Nebraska's ability to fulfill its PRRIP obligations, specifically those outlined in the Nebraska New Depletions Plan (NNDP), a key element of the PRRIP's Water Plan. The NNDP requires Nebraska to offset Platte River streamflow depletions from new or expanded uses since July 1, 1997.

The South Platte Natural Resources District and North Platte Natural Resources District have implemented management actions through their Integrated Management Plans to align with the NNDP. However, verifying the success of these efforts depends on the WWUMM's advanced modeling and analysis. Without this project, Nebraska cannot accurately document compliance for water uses within the sponsor NRDs, risking its commitments under the PRRIP. Funding the WWUMM will ensure the state meets this federal mandate, protecting endangered species while supporting sustainable water management and regulatory stability for the region.