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DEPT. OF NATURAL RESOURCES

WaterSMART Applied Science Grant Application

Platte River Decision Support System (DSS) for Excess Flow

April 21, 2021

Notice of Funding Opportunity
No. R21AS00289

Grants for Fiscal Year 2021

U.S. Department of the Interior
Bureau of Reclamation

TABLE OF CONTENTS

Figures

Tables

TECHNICAL PROPOSAL

1.0 EXECUTIVE SUMMARY

Date: April 2021

Applicant Information:

Applicant Name: Nebraska Department of Natural Resources

City: Lincoln; County: Lancaster; State: Nebraska

Eligible Applicant: Category A – State

Project Name: Platte River DSS: Phase 4 – Water Management Tools and Stakeholder Outreach

Water is one of Nebraska's most valuable resources. Nebraska must develop better ways to utilize excess flow (unappropriated water) on the Platte River in the wake of increasing climate variability and its impact on water resources. The Nebraska Department of Natural Resources (NeDNR) is the primary surface water permitting agency in Nebraska. The NeDNR is developing a systematic approach for water allocation decisions during excess flow events to increase efficiency, transparency and accountability while simplifying the process and reducing the regulatory burden on customers applying for use of the excess water. This vision has come to fruition through a water management tool that calculates the quantity and duration of water in excess of current state protected flows (appropriated water rights) by river reach, and Platte River Recovery Implementation Program (PRRIP) target flows that support a variety of endangered species. PRRIP is a collaborative interstate endangered species program governed by Nebraska, Wyoming, Colorado, Department of Interior, and other key water users to develop and implement water projects to reduce shortages to target flows. The NeDNR has embarked on development of the Platte River Decision Support System (DSS) to utilize the best available science and technology towards management decisions for sustaining water resources within the basin. The DSS provides a vital tool to Nebraska's water managers to leverage opportunities to retime water supplies through storage and groundwater recharge, to support planning efforts to maintain a balance between water uses and supplies. NeDNR initiated DSS development in 2018 and is pursuing this grant to complete the Water Management Tools, which are the remaining core tools of the DSS, and Stakeholder Outreach Phase (Phase 4) of the Platte River DSS. Successful implementation of Phase 4 of the Platte River DSS will result in water management tools that will increase water supply reliability through forecasting within the Platte River Basin, support NeDNR water administration in avoiding water allocation conflicts, and meet the entire list of the water management objectives defined in the WaterSMART funding opportunity.

Period of Performance: August 2021 to August 2023 (24 months)

Is Project on a Federal Facility: The project is <u>not</u> located on a Federal Facility

2.0 TECHNICAL PROJECT DESCRIPTION

2.1 PROJECT PURPOSE

NeDNR has developed a systematic approach and a process for making water allocation decisions during excess water supply events to support basin-wide water management goals and objectives. The Platte River Decision Support System (DSS) will increase efficiency, transparency, and accountability while simplifying the process and reducing the regulatory burden on customers applying for the use of excess water for beneficial use. The intent of the DSS is to streamline the application, submittal, review, and approval processes for users looking to utilize excess flow. Additionally, it implements scientific, economic, environmental, and statutory information from multiple data sources to improve excess flow forecasting and rapid decision-making by NeDNR water managers. The user-friendly tools are delivered through a centralized web-based interface. Stakeholders and NeDNR water managers will be able to easily utilize the DSS for quickly responding to rapidly changing water resource conditions along the Platte River.

This grant is being sought to complete Phase 4 of the DSS. Upon completion, stakeholders will be able to request excess flow, receive notifications that they are allowed to divert, review timing of the diversion, access and monitor data and reports, and receive feedback about completed projects. Additionally, water managers will have improved excess flow forecasting and communication features, and tools for NeDNR water administration to allocate excess flow during events and evaluate the outcomes of those allocations compared to basin conjunctive management goals and objectives.

2.2 BACKGROUND

Project Need

Spanning nearly 310 miles across the State of Nebraska, the Platte River is a vital water resource to Nebraskans, providing a vast array of socioeconomic and environmental benefits (Figure 1). The Platte River and its water management features provide flood control, recreation, and fish and wildlife habitat (Platter River Basin Water Users, PRRIP website). Consequently, it is important for water managers to create more efficient and effective tools for water management to balance all interests within the Platte River Basin.

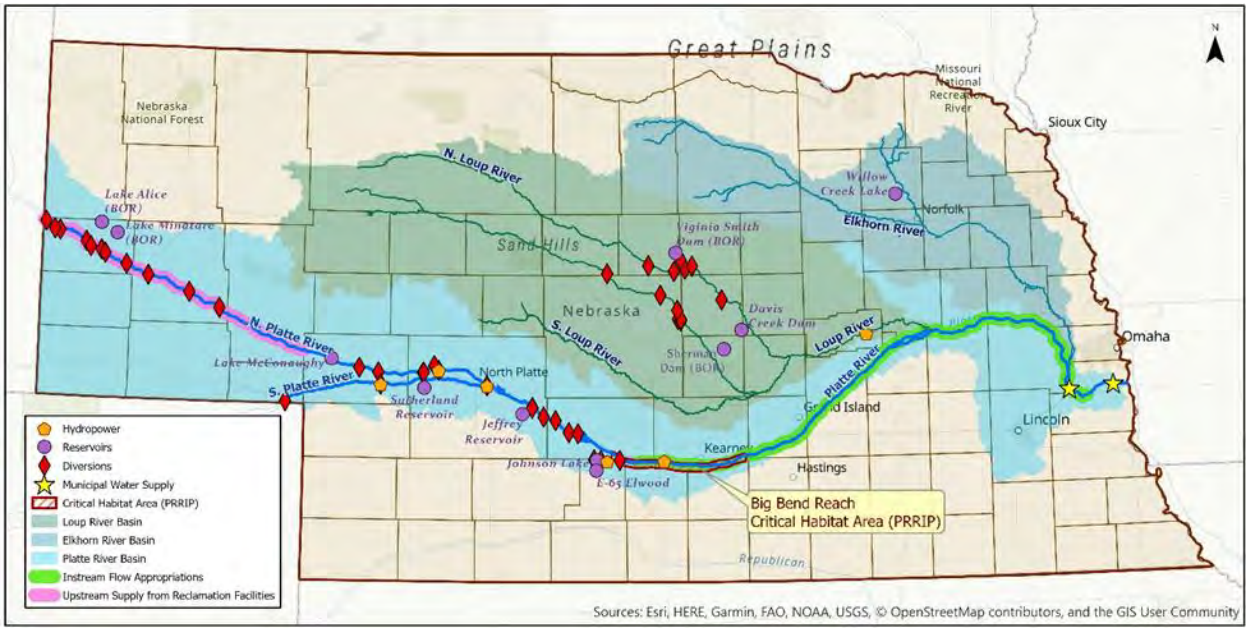
The Platte River Basin is a complex hydrologic system, marked by variable and sometimes rapidly changing conditions. Water scarcity has historically resulted in significant conflicts between water users. Within the last several decades, competing water demands from irrigation for increased crop production, increased municipal use for fast-growing Nebraska populations, and industrial demand have resulted in depletions to streamflow. These variable conditions, complexity, and conflicts, highlight the need for management action to improve and maintain water sustainability into the future.

Excess flow is the amount of streamflow that passes by a certain location on a river or stream that is more than is required to support all existing water allocations, demands, and uses simultaneously at that location. Adjusting the timing of excess flows through Conjunctive Water Management (CWM) helps provide water supply stability for Nebraska all year long. CWM is an adaptive process that utilizes the connection between surface water and groundwater to maximize water use, while minimizing impacts to streamflow and groundwater levels in an effort to increase the overall water supply of a region and improve the reliability of that supply.

Retiming of excess flow diversions and managing recharge are examples of the management activities aimed at fulfilling the goals and objectives of the Upper Platte Basin Wide Plan, the Upper Platte Basin

individual Natural Resource Districts (NRDs) Integrated Management Plans (IMPs) and the Nebraska New Depletions Plan. Project sponsors are stakeholders within the basin that are working to develop projects

Figure 1. Map of Key Water Management Features within the Platte River Basin



that have the capability of diverting and utilizing excess flow. Throughout this application, the term 'sponsors' is used to refer to this group of stakeholders. The success of these activities is evaluated through an annual Robust Review. One of the significant outcomes of the 2019 Robust Review was that the management actions taken to recharge and retime excess flows have had positive impacts on streamflow throughout the Basin (Upper Platte Joint Planning, 2019a).

The Solution

An interactive Platte River decision support system (DSS) for managing excess flow is a water management tool currently being developed to increase water supply reliability through daily stream gage data and forecasted hydrologic information within the Platte River Basin. Nebraska's vision for the DSS encompasses the following:

- Determine quantities and locations of excess flow in specific extents of the Platte, North Platte, and South Platte Rivers;
- Provide forecasting of potential excess flows in the near future;
- Allow for a streamlined application submittal, review and approval process by project sponsors seeking excess flow;
- Prioritize projects to maximize the effectiveness of excess flow diversions in meeting basin water management goals;
- Monitor and track outcomes from excess flow decisions; and
- Be accessible and transparent to stakeholders and the public.

Key Strategies

The key strategies of the Platte River DSS include:

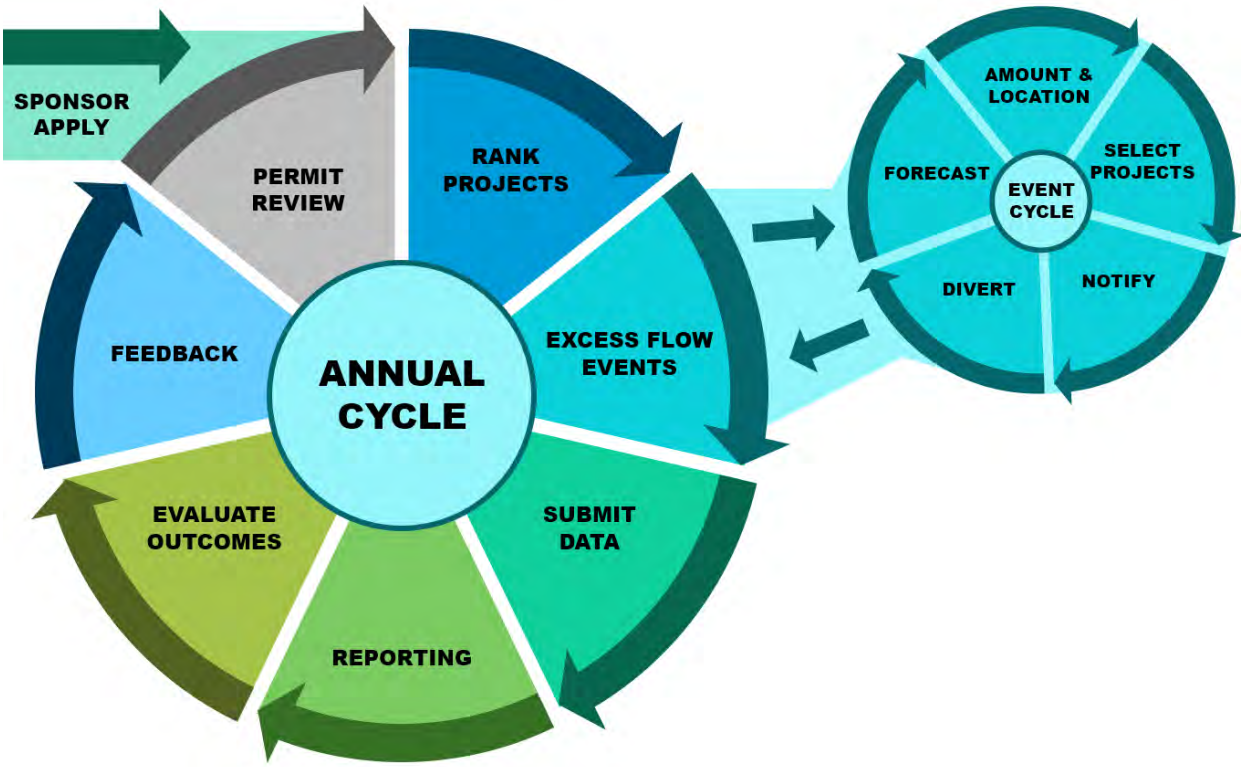
- Integration of existing NeDNR tools and models to use the best available science and data;

- Inclusion of a transparent decision-making process with stakeholders;
- Establishment of an administrative process specifically structured for excess flow projects;
- Development of an efficient and effective tool for identifying and selecting the best projects to receive excess flow which can be utilized on a daily basis as excess flow is available; and
- Incorporation of a process for reviewing outcomes and project performance from previous years to inform future permits and projects.

Phased Approach

The Platte River DSS is being developed through a phased approach. This approach allows for each successive phase of the DSS to build upon the foundations of the previous phase which, when complete, will provide NeDNR with the ability to quickly and effectively respond to excess flow events through each stage of the annual water cycle decision-making process illustrated in Figure 2.

Figure 2. Annual Excess Flow Decision-Making Process



Phase 1: Project Implementation Planning (Completed) used a 5-day Design Sprint (Figure 3) so NeDNR could collaboratively and rapidly develop the vision and strategy for development of the DSS. A Design Sprint is an innovative approach for solving complex problems in a compressed time period through a focused, collaborative environment. It has proven effective for designing, prototyping, and testing ideas to rapidly align teams under a shared vision. This phase resulted in development of a master implementation strategy for the DSS.

Figure 3. 5-Day Design Sprint Methodology

Phase 2: Development of the Excess Flow Calculation Engine (Completed) focused on building the calculation engine for determining quantity and location of excess flow in the Platte River and deployment of the DSS platform. The calculation engine was developed through close coordination with NeDNR divisions and the Nebraska Office of the Chief Information Officer and is built upon NeDNR's existing Platte Water Accounting Program (PWAP). The DSS "Flow Board" developed included visualization of current and forecasted excess flow status and key flow information such as gains, losses, and demands for each reach of the Platte River (See Appendix B for Flow Board Snapshots). Preliminary dashboards and visualization tools have been developed and refined through input from NeDNR.

Phase 3: Permit Application and Administration Processes (80% Complete) is anticipated to be completed by December 2021. Phase 3 focuses on developing external (stakeholders) and internal (NeDNR Water Managers) interfaces for the excess flow application process. Externally, the development focused on delivering a streamlined application, submittal, review, and approval process for users looking to utilize excess flow, called the Sponsor Portal. Through the Sponsor Portal, project sponsors can submit their application and Annual Operating Plans (AOP) to obtain an excess flow permit. A DSS Public Landing Page with DSS Login for the Sponsor Portal was developed, providing excess flow information, benefits of optimizing excess flow management, NeDNR's role to transparently and effectively manage Platte River Flow, and specifics on where, when, and how the DSS is used. The DSS Public Landing Page also includes a DSS water administration dashboard specifically structured to display current streamflow conditions relevant to the determination of excess flow for the public. Snapshots of the Sponsor Portal and Public Landing page are provided in Appendix B.

Internally, development focused on providing NeDNR management tools that facilitate timely review and approval of applications; and ranking of projects approved for use of excess flow during an event. NeDNR is immediately notified once an application is submitted through the internal Sponsor Portal and may review the application package and provide timely permit approval. An Internal Ranking Interface was developed for NeDNR to evaluate and rank the projects approved for excess flow against scientific, economic, environmental, and statutory considerations (See Appendix B for Ranking Interface Snapshots). Currently, the foundation of the Evaluate Outcomes Interface is being developed. NeDNR will access this to evaluate excess flow use through each event and communicate these outcomes with stakeholders. NeDNR will use this feedback loop to refine and optimize the use of excess flow in the Platte River Basin. The team is also developing the workflow, data mapping, and conceptual prototypes for three modules that are planned for development in Phase 4: Development Communications and Notifications, Requests, and the Event Analysis and Action Module.

Phase 4: Water Management Tools and Stakeholder Outreach: the WaterSMART Applied Science Grant is being sought to complete this phase of the Platte River DSS. The overall objective of Phase 4 is to develop and implement the conceptual prototypes completed in Phase 3: The Communications and Notifications, Requests, and the Event Analysis and Action Modules. During excess flow events, the Event Analysis and Action module will allow NeDNR Water Administration to select the ranked projects approved for excess flow and notify the sponsor that they can divert excess flow. The Communications, Notifications and Requests modules will streamline and document the communications between internal NeDNR water

managers and the project sponsors, providing the transparency and speed needed under rapidly changing conditions. The other objectives include expanding the geography of the DSS, conducting stakeholder outreach and collecting DSS feedback, monitoring and refining the decision-support and forecasting tools, enhancing the Evaluate Outcomes module to link with existing systems, interacting with the Sponsor Portal and Event Analysis and Action Modules, and programming an archive system for storing evaluation results. Phase 4 is planned to begin in August 2021 and will be complete by August 2023. The specific tasks describing the activities that will be included in Phase 4 are detailed in Section 2.3, Project Description.

Existing Systems

Using the best available science and data is a key strategy in developing the Platte River DSS, including integration with existing NeDNR tools as follows:

- *PWAP* – Platte Water Accounting Program (PWAP) is NeDNR's water accounting program and serves as the backbone for the excess flow calculations.
- *Aquarius* – The program is used statewide by NeDNR to collect water gaging data that will share information with the DSS
- *IWIP* – The Integrated Water Information Portal (IWIP) is a web application that NeDNR developed to assist in issuing opening and closing notices to canal operators. The DSS will share information with IWIP.
- *ModeIs* – Several existing groundwater models and surface water operations models have been identified to be potential sources of information for decision support during project ranking for improved CWM.

2.3 PROJECT DESCRIPTION

Platte River DSS Phase 4 Description and Work Plan

Phase 4 will be completed in seven tasks detailed below. Upon completion, all of the core Platte River DSS internal and external modules necessary to fully support decision-making through the entire excess flow annual cycle, as previously shown in Figure 2, will be developed.

Task 1 – Development of Communications and Notifications Module

A core objective of the DSS is to provide a transparent decision-making process through effective communication with stakeholders and the public. This includes providing a streamlined communications system through which NeDNR may send email communications regarding the excess flow application process and rapidly notify sponsors that excess flow is available to divert. The Communications and Notifications module will be programmed from the conceptual prototype developed in Phase 3, and includes the following activities:

- Program and deploy the Base Communications Module in the DSS. This module will support email communications from all DSS modules by providing a mechanism to queue custom DSS messages to be sent to desired recipients in an automated fashion using existing NeDNR email services. These messages could be automatically generated from workflow changes, such as submitting an excess flow request from a sponsor, or could be a direct message from NeDNR staff, such as for specific allocation decisions directed to sponsors.
- Program and deploy the Notification Center User Interface in the DSS. This will notify users of excess flow messages directly in the web interface of the DSS. The feature will provide redundancy in communications with DSS users who may have missed email messaging related to excess flow and assurance that all registered DSS users will have access to the same information.

- Program and deploy the Communications Preferences Interface in the DSS so users may control and edit their communications preferences. This includes the user's ability to change the email address and contact information for DSS messaging.

Task 2 – Development of Requests Module

The Requests module will be developed to allow sponsors with approved excess flow permits to login to the DSS Sponsor Portal and request excess flow once an event occurs. The requests completed through the module will link to the Events Analysis and Action Module (Task 3) so that during an excess flow event, NeDNR Water Administration can use the information to allocate the requested excess flow rapidly and notify the sponsor that the diversion can be initiated. The Requests Module will be programmed from the conceptual prototype developed in Phase 3.

Task 3 – Development of Events Analysis and Action Module

The Events Analysis and Action module will be programmed and deployed based on the conceptual prototype developed in Phase 3. NeDNR Water Administration will use the module to allocate water to ranked projects during excess flow events. Water Administration will use the DSS Flow board and Dashboard to identify current and forecasted excess flow events. This module will be used to rapidly allocate the excess flow during an event and notify the sponsor that water is available for diversion per their permit. Development and deployment will include:

- Quick access to the existing DSS Flow board and DSS Water Administration Dashboard for monitoring current and forecasted excess flow conditions.
- Information linked from Requests Module on what projects have requested excess flow for diversion.
- Interface to view projects by rank that have requested excess flow. Select project and input the allocation amount, timeline, and provide link to notify sponsors that they may divert the excess flow.
- Develop event data management and archive system for capturing and storing inputs and results. This will allow the NeDNR to revisit the stored inputs and results in the future to provide a history of the available data at the time of the decision. The application will be designed to allow authorized users to 'finalize' the event analysis for the event, locking in a snapshot that will remain unchanged going forward.

Task 4 – Expand Geography

This task will expand components of the DSS to include the North Platte River in Nebraska upstream of Lake McConaughy, the Loup River Basin, and Elkhorn River Basin. This will allow NeDNR to apply the beneficial water management tools of the DSS to a larger geographic area. Only select modules of the DSS would be expanded since not all aspects of the DSS would be applicable to the different geographic areas. The excess flow forecasting tools developed in Phase 2 and the Sponsor Portal developed in Phase 3 will be expanded to allow for the acceptance, review, and approval of excess flow permit applications, ranking, and excess flow allocation in this broader geographic region. Educational materials on the DSS excess flow management tool will be prepared and disseminated to stakeholders and the public to benefit Nebraska's larger geographic area.

Task 5 – Design Sprints for Focused Engagement

NeDNR has selected a modified agile process for the Platte River DSS development that includes ongoing feedback to refine and improve the DSS. Three Abbreviated Design Sprints will be conducted internally with NeDNR at various stages of the project to refine the methodology and approach involved with

development of the Phase 4 internal and external modules. Stakeholder representatives, specifically from irrigation districts, NRDs and canal operators, will be included in the sprints as available to facilitate focused engagement and solicit feedback on the functionality of the Phase 4 DSS external modules in support of diverting excess flow for recharge projects. The results from the sprints will also be used to improve dissemination of results to stakeholders and the public.

Task 6 – Monitor and Refine Decision Support and Forecasting Tools

Through comparison of DSS forecasted excess flow measurements and actual excess flow availability, NeDNR and the consultant team will monitor the existing DSS excess flow tracking and forecasting tools to refine the accuracy of the decision-support tools in accordance with prior appropriation. This is necessary to confirm when excess flows are available and ensures that the proper amount is allocated to approved permits such that a water right downstream is not negatively affected.

Task 7 – Enhance the Evaluate Outcomes Module

A key aspect of NeDNR's overall strategy for the Platte River DSS is to evaluate and track outcomes from previous excess flow events to allow water managers to continually learn from the effectiveness of past water management decisions to improve and refine the decision-making process in the future. Previous years' outcomes will be incorporated into future rankings of projects and will be used in the feedback loop that NeDNR and Stakeholders can use to refine and improve operations. The foundation of the Evaluate Outcomes module is being developed in Phase 3; however, Phase 4 will build upon this foundation with the features needed to allow sponsors to submit operations data through the DSS. Phase 4 will also develop the internal DSS evaluation tools to compare data submitted with expectations defined in the application and the actual project performance to better measure the project's effectiveness. The following activities will be conducted:

- Program and deploy functionality for authenticated users to upload and submit data that is not automated to NeDNR for each of their projects by event for which they were provided excess flow. The portal will be designed to accept data for pre-determined data types (such as diversion amount, diversion rates and duration, measured return flows, etc.). The data upload process will include data submittal requirements, including data file format, attributes, and appropriate data units. The portal will be set up to notify the sponsor after receiving excess flow that data submittal is needed. This portal's content will be developed in close focus on the needs of water planning, through the Evaluate Outcomes Module, and the permitting divisions.
- Link the Outcomes Module to Aquarius, NeDNR's data repository for stream flow gaging, to access diversions and records associated with automated data collection.
- The DSS will be linked to IWIP to exchange information between the systems related to the issuing of opening and closing notices to canal operators.
- Program the logic within the interface to automatically pull the stream gage diversions from Aquarius for the date range that a canal was diverting excess water and convert the excess flow diversions into volume. This information will be exportable to create a recharge file for uploading into the state's groundwater models.
- Program and deploy the archive system for capturing and storing evaluated outcome results.

3.0 PROJECT LOCATION

The project's geographic extent includes the Platte River Basin, stretching across the entire state of Nebraska, as previously depicted in Figure 1 and provided as a PDF map (.pdf). The DSS is focused on

the main stem of the major rivers within the Platte River Basin, including the Platte River, North Platte River, South Platte River, Loup River, and Elkhorn River.

4.0 EVALUATION CRITERIA

The DSS for Platte River excess flow is a strong match for the Applied Science WaterSMART grant, meeting the program goals to develop water management tools and improve modeling and forecasting capabilities of excess flow in the State of Nebraska in support of conjunctive water management. The DSS has been developed to specifically meet these goals and provide a solution to a number of NeDNR water management challenges that are directly applicable to this funding opportunity.

4.1 EVALUATION CRITERION A – BENEFITS TO WATER SUPPLY RELIABILITY

1. Describe the water management issue(s) that your project will address. Describe the severity of the water management issues to be addressed through your project.

Spanning nearly 310 miles across the State of Nebraska, the Platte River is a vital water resource to Nebraskans, providing a vast array of socioeconomic and environmental benefits. The waters of the Platte River serve the people of Wyoming, Colorado, and Nebraska in many ways. Water projects in the Platte River Basin, including 15 major dams, provide municipal and industrial water supplies for about 5 million people (~approximately 80% of Nebraska's population), irrigate 3.5 million acres of farmland, and generate tens of millions of dollars of renewable hydroelectric power annually. Nebraska's current water supply is insufficient to meet the competing water demands during both wet and dry time periods. Shortages have severe consequences including conflicts over water, meeting target flows for endangered species, impacts to the 3.5 million acres of cropland, and threats to municipal water supplies for the 80% of Nebraska's population including the fast-growing metropolitan areas of Lincoln and Omaha. Surpluses result in equally severe, albeit different, socioeconomic, public health, and environmental consequences.

Figure 4. Contrasting hydrologic conditions in the Platte River

Studies conclude that new water uses developed after July 1997 resulted in an average annual depletion of nearly 24,800 acre-feet to streamflow in Nebraska's Platte River Basin (Upper Platte Joint Planning, 2019b). Conversely, the crest levels at various locations in Nebraska's Platte River have exceeded the flood stages in more than 10 years since 1997 (NWS webpage). The hydrologic conditions summary displayed on the Platte River Program webpage illustrate how the Platte River near Grand Island, Nebraska varies between dry, normal and wet conditions every year (Platte River Hydrologic Conditions, PRRIP website).

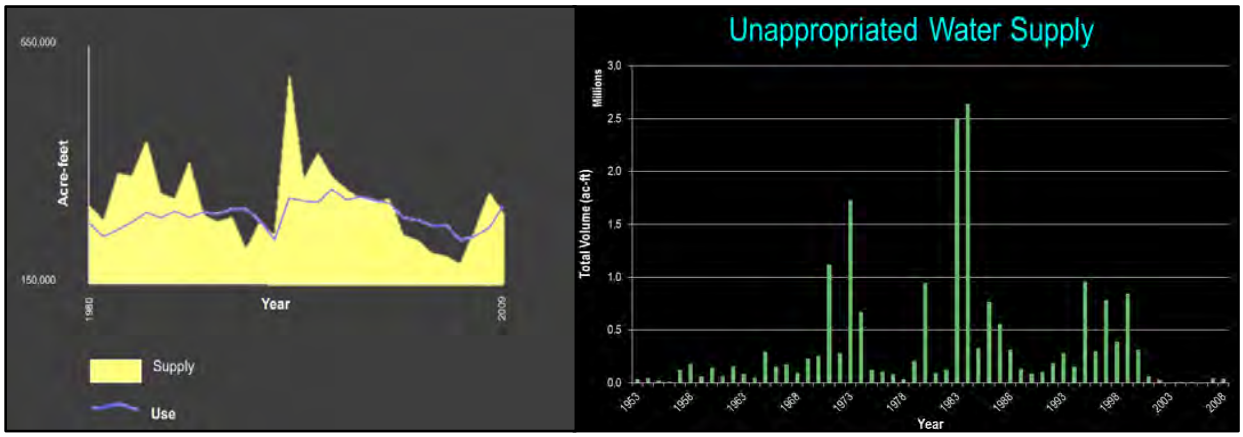
The unprecedented flooding events across the state of Nebraska in 2019 further emphasized the need to develop processes to better utilize excess flow to sustain the socioeconomic and environmental qualities of the Platte River Basin.

Nebraska suffered more than an estimated $1.3 billion in damages (NPR, 2019). Thirty stream gages of Nebraska reached all-time record levels (NeDNR, Nebraska Flooding: March 2019). Forty-one breaches to federal and non-federal levees were reported by the U.S. Army Corps of Engineers (USACE). Levees along the Platte and Missouri rivers received the most damage (350 miles) as both river systems reached record heights. In total, 104 cities, 81 counties and 5 tribal nations in Nebraska received State or Federal Disaster Declarations due to the flood events.

2. Describe how your project will address the water management issue(s) identified in the preceding bullet.

As shown below in Figure 5, excess water occasionally becomes available in the Platte River Basin. NeDNR has identified that utilizing excess water (unappropriated water supply) efficiently and judiciously provides sustainable benefits to basin stakeholders.

Figure 5. Availability of water in the Platte River Basin



In 2009, the NeDNR adopted the first ten-year increment of the Upper Platte Basin-Wide Plan and individual Natural Resources District (NRDs) Integrated Management Plans (IMPs) to establish goals and objectives for conjunctive management of surface and groundwater. In response, the NeDNR has carried out a number of controls and management actions to address these depletions (Upper Platte Joint Planning, 2019a). A management action employed to address the depletions is to better capture and store (above ground and underground) unappropriated flow during times of excess and release the water during times of shortage. A groundwater modeling evaluation of the impacts on streamflow from these actions over the first ten-year increment plan found that the management actions taken to recharge excess flows have had positive impacts on streamflow throughout the basin (Upper Platte Joint Planning, 2019a), contributing to nearly 11,400 acre-feet in depletion offsets during the first increment of the plan (Upper Platte Joint Planning, 2019b). These findings are being used to achieve the goals and objectives for the second increment of the plan and further contribute to the origin and need for the Platte River DSS to improve and continue this management action's success. The second increment (2019-2029) Upper Platte Basin-Wide Plan is a guiding document for major integrated water management goals in the Basin and is attached in Appendix C.

This project completes the management tools necessary to provide a holistic, centralized decision-support tool to first, forecast these events for improved timing of water availability; and second, to help the water managers transparently identify, prioritize, and rapidly allocate to the projects that can capture the excess flow when such events occur. This will improve water supply reliability and by extension, assist with meeting the goals and objectives of offsetting depletions in the basin.

3. Explain how your project will contribute to one or more of the following water management objectives and provide support for your response.

a. Water Supply Reliability

The Platte River DSS is a water management tool that improves water supply reliability by identifying the daily and forecasted amount and location of excess flow within the basin. This information is used by NeDNR to better capture and store unappropriated flow during times of excess and release the water during times of shortage. The system operates continuously with daily updates through system water accounting and the embedded excess flow calculation engine; thus, it provides improved understanding of water availability in the basin on a continual basis to support rapid response for diverting, storing, or recharging the basin's water supplies using the excess flow. Task 6 (Monitor and Refine Decision Support and Forecasting Tools) will further refine the DSS excess flow forecasting calculation accuracy to improve response and effectiveness of excess flow management, thus increasing water supply reliability within the basin.

b. Management of Water Deliveries

The Platte River DSS has been developed to help Nebraska's water managers identify excess flow in the Platte River, make informed water administrative decisions on allocating that excess flow to projects that best serve the basin, and effectively manage those water deliveries through the DSS framework to ensure the protection of existing water users and environmental flows. Task 3 (Development of Events Analysis and Action Module) will alert NeDNR water administration to excess flow events and rapidly notify sponsors to allocate water for beneficial diversion. This process makes the management of water deliveries more transparent, efficient and reliable.

c. Water Marketing Activities

The DSS framework directly supports more transparent and accessible marketing of excess flow for beneficial use in support of conjunctive management. Completion of Phase 4 of the DSS will provide additional modules necessary to facilitate action from the coordinated efforts between the NeDNR and NRDs, Irrigation Districts, and Canal Companies to divert excess flow and put the flow to beneficial use for payment by the NeDNR. The Stakeholders identify recharge projects and use the DSS Sponsor Portal to acquire a permit for excess flow diversion. Once permitted, the DSS helps water managers prioritize the projects that 1) meet targeted goals in an excess flow diversion decision and 2) have the best cost benefit ratio. Consideration of these factors, among others has been integrated in the DSS Ranking module developed in Phase 3, which considers the cost per acre-foot (AF) of credit, and achievement of targeted goals among other factors the NeDNR uses to evaluate the effectiveness a project has on meeting water management objectives. All ranking factors used in any decision-making process will be available for review by project sponsors. Once ranked, the projects will be queued in the newly developed Events Analysis and Action Module (Task 3) proposed for development as part of this project. When excess flows are available, the module will allow the water managers to notify the stakeholders to divert their permitted excess flow grant. The proposed enhancements to the Evaluate Outcomes Module (Task 7) will provide the one-stop shop user interface needed by NeDNR water planning to effectively review the dates and amounts of excess flow diversions, facilitate the evaluation of recharge benefits from the events, and facilitate making payments to the irrigation district, canal operator, or other stakeholder per their contract term. Thus, the exchange of payment process for excess flow in support of the state's conjunctive management goals is facilitated directly through the core programming and existing modules of the DSS. This will be exercised further through the aforementioned modules developed in Phase 4.

d. *Drought Management Activities*

An important aspect of drought management is identifying and promoting projects that significantly impact retiming water to increase baseflow in the river during periods of drought. Phase 4 activities will build upon the ranking module developed in Phase 3, giving NeDNR the ability to make rapid decisions on the projects that have been evaluated, scored, and ranked based on metrics that assist in managing drought. Task 3 (Development of Events Analysis and Action Module) will support drought management activities by providing NeDNR Water Administration with the tool needed to rapidly make excess flow allocation decisions during events, by choosing the stakeholder projects that have the most potential to increase baseflows during periods of drought through diversion and storage of excess flow.

e. *Conjunctive use of Ground and Surface Water*

NeDNR has been proactive in adopting the first and second increments of the Upper Platte Basin-Wide Plan and in collaborating with the individual NRDs to establish IMPs for conjunctive management of surface and groundwater throughout the state. The forecasting tools of the DSS forecast quantities and locations of excess flow so that NeDNR can systematically make decisions on utilizing that flow. The tools were needed to assist NeDNR with conjunctive management as a part of The Ground Water Management and Protection Act (Neb. Rev. Stat. §§ 46-701 through 46-753) which outlines the requirements for NeDNR to annually evaluate the expected long-term availability of hydrologically connected water supplies. With Task 6 (Monitor and Refine Decision Support and Forecasting Tools), these tools will be refined to inform and improve conjunctive use of ground and surface water within the Platte River Basin. Completion of Task 7 (Enhance the Evaluate Outcomes Module) will include enhanced tools for evaluating the outcomes from excess flow events against the basin-wide and IMP goals and objectives. NeDNR water planning will link files from excess flow event data to water models for conjunctive management analyses.

f. *Water Rights Administration*

One of the driving purposes of the DSS is to support NeDNR with improved water rights administration of excess flow permits for projects in the basin. Task 1 (Development of Communications and Notifications Module) and Task 2 (Development of Requests Module) will provide key components to improve water rights administration for both NeDNR permitting and water administration managers. This will first, allow NeDNR permitting and administration to communicate with stakeholders regarding the status of excess flow permit applications and notify permit holders when excess flow events occur. Second, the communication features will allow stakeholders to directly log into the DSS through the Sponsor Portal and request excess flow once their excess flow permit has been approved and an excess flow event occurs. Third, the development of advanced project evaluation under Task 3 (Events Analysis and Action Module) will provide administrators with a queue of ranked projects available to divert excess flow during an event, improving the efficiency and timeliness of excess flow administration during events. The queue of ranked projects is developed through various metrics that ensure optimal benefits to basin-wide goals and protection of existing water rights in the Platte River System. Maximum potential demands within each reach of the Platte River from existing water rights were calculated and embedded into the excess flow calculation engine of the DSS during the previous Phase 2 to ensure these water rights are protected and conflicts are avoided. The NeDNR will be monitoring the DSS forecast daily to identify whether a potential excess flow event is approaching, which will allow for rapid and effective administration of excess water to permitted entities.

g. Ability to Meet Endangered Species Requirements

Several threatened or endangered species are listed within the Platte River Basin. Additionally, a final Whooping Crane designated Critical Habitat area is located along the Platte River within the project area (Figure 1). The effectiveness of a project to meet the Target Flows for endangered species and Instream Flow Appropriations are important considerations for all tasks and phases of DSS development. Information on both endangered species target flow and instream flow demands have been integrated into the Platte River DSS and are core components in calculating and evaluating the available natural flow in the river system; hence, these components have become key metrics in ranking excess flow projects prior to excess flow events and allocation. Additionally, to allow water managers to continually learn from the effectiveness of past water management decisions, the Task 7 (Enhance the Evaluate Outcomes Module) enhancements will include development of key tools needed for NeDNR to evaluate the excess flow event outcomes against the PRRIP goals and objectives within each basin to ensure that not only are endangered species requirements met, but that they are a priority in evaluating excess flow events and water allocation decisions. All work completed in this project will be in compliance with the PRRIP and Nebraska New Depletion Plan which meets the Endangered Species Requirements in this area.

h. Watershed Health

Since the DSS is built for implementation in the entire Platte River Basin, well-managed water resources in the overall basin will largely improve holistic watershed health by maintaining water sustainability, reducing wear on water infrastructure, help aquatic habitats during extreme events, and improve sediment and water quality by reducing erosion due to flooding.

i. Conservation and Efficiency

During the process of ranking projects after development of Task 3 (Event Analysis and Action Module), projects capable of taking excess flow from the system with immediate benefits will be queued for rapid notification and allocation during those events. The Platte River DSS supports NeDNR's ongoing water conservation efforts by improving the reliability and availability of water supplies in the system. Managing recharge through excess flow diversions is one of the management activities aimed at fulfilling the Upper Platte Basin Wide Plan's (Appendix C) goals and objectives and the Upper Platte Basin individual NRD IMPs to offset water resource depletions.

j. Other Improvements to Water Supply Reliability

Activities under Task 6 (Monitor and Refine Decision Support and Forecasting Tools) will further refine the DSS excess flow forecasting calculation's accuracy to improve the NeDNR's understanding of water availability in the system. Upon completion, the DSS will provide information on consistent water availability in the basin so that NeDNR water managers can make informed and rapid decisions during both high and low flow events. The stakeholders and public will also benefit from the forecasts' transparency and can plan their water use accordingly.

4. Describe to what extent your project will benefit one of the water management objectives listed in the preceding bullets.

Completing the Platte River DSS's key water management features will provide NeDNR with a valuable tool to maximize excess flow effectiveness, monitor and track outcomes of excess flow events, and provide an accessible and transparent framework to stakeholders and the public. Further, it fulfills the agency's objective to develop a decision-support tool that provides the features to quickly respond to rapidly

changing water resource conditions along the Platte River, ensuring that economic growth and vitality in the basin continue.

Upon completion, the Platte River DSS extent will encompass nearly the entire 310-mile stretch of the Platte River from the western Nebraska-Wyoming-Colorado Stateline to near the eastern Nebraska-Iowa Stateline where the Platte River meets the Missouri River. This includes the North Platte and South Platte confluence in west-central Nebraska. Completion of the DSS will improve water supply reliability for about 5 million people (~approximately 80% of Nebraska's population), and management of water deliveries for water projects in the entire Platte River Basin, including 15 major dams, municipal and industrial water supplies, and 3.5 million acres of farmland. This includes 29 existing canals that may divert excess flow to beneficial projects, seven reservoirs, and five hydropower diversions. Water Marketing and Drought Management Activities will be promoted in five major natural resources districts. Since Conjunctive Ground and Water Resources Management and Water Rights Administration are the core objectives of NeDNR, these benefits will be realized across the Platte River Basin. PRRIP currently maintains 10,000 acres of habitat and has a target to restore approximately 29,000 acres of habitat along the Platte River corridor protecting several threatened and endangered species like the critical Whooping Cranes, the American Burying Beetle, Blowout Penstemon, Northern Long-eared Bat, Least Tern, Piping Plover, Pallid sturgeon, Prairie Bush-clover, and Western Prairie Fringed Orchid (Land Plan, PRRIP website). DSS helps ensure these targets are met and protected during hydrologic variability in the Platte River. The Platte River DSS will assist water managers in prioritizing projects for beneficial use of excess flow, helping to ensure efficient use and conservation of water supplies in the basin.

5. Explain how your project complements other similar applicable to the area where the project is located.

The Platte River DSS project compliments a number of applicable projects in the region. The NeDNR has been working collaboratively with five Upper Platte River Basin NRDs through the Overappropriated Area Committee (POAC) to evaluate and provide updates on management activities aimed at fulfilling the goals and objectives of the Basin-Wide Plan (BWP) for Joint Integrated Water Resources Management of Overappropriated Portions of the Platte River Basin, Nebraska; NRD IMPs; and Nebraska New Depletion Plan (NNDP) for PRRIP. The Platte River DSS complements and supports these activities through tools that both help to achieve excess flow management activities and evaluate the outcomes from those actions:

- Daily excess flow status and 7-day forecasting
- Application submittal, review and approval
- Ranking of permitted projects per basin goals and objectives
- Rapidly allocate excess flow during an event for beneficial use
- Water Planning tools to export calculated and stream gage data from events to use for annual review of outcomes

PRRIP, Central Nebraska Public Power and Irrigation District (CNPPID), Nebraska Public Power District (NPPD), NRDs, and other entities are currently requesting excess flow permits for beneficial projects within the basin, and letters of support are also attached in Appendix D. The DSS complements these permitting activities by simplifying and streamlining the process for water managers and stakeholders requesting excess flow, so that NeDNR water managers can focus on making informed and rapid decisions on beneficial use and balance during those events. The Sponsor Portal was initially developed during Phase 3 for permit applications and Phase 4 activities will add the features needed to complete this system. The application submittal, review, and approval process will be further streamlined through Task 1 (Development of Email Communications and Notifications Module), Task 2 (Development of Requests Module), and Task 3 (Development of Events Analysis and Action).

4.2 EVALUATION CRITERION B – NEED FOR PROJECT AND APPLICABILITY OF PROJECT RESULTS

1. Will the project result in an applied science tool(s) or information that is readily applicable, and highly likely to be used by water resource managers in the West?

Yes! Upon completion of this project through Phase 4, the Platte River DSS (an applied science tool) will include all of the core functionality needed to support decision-making and action regarding basin excess flow. Development of the DSS has been driven by the urgent and compelling need for better scientific tools for Nebraska's water managers to improve water supplies' sustainability in the complex Platte River Basin. The NeDNR has already invested about $1.2 million over 3 years in previous Phases of the DSS. Phase 4 of the DSS will complete the tool, making the processes available for immediate use by NeDNR water managers and all stakeholders. Management of excess flows in the Platte River is an important topic with stakeholders in the Platte River Basin, NeDNR has received feedback, overwhelming support, and is anticipating strong interest and participation by stakeholders in utilizing the completed Platte River DSS.

a. Explain who has expressed the need and describe how and where the need for the project was identified (even if the applicant is the primary beneficiary of the project). For example, was the need identified as part of a prior water resources planning effort, determined through the course of normal operations, or raised by stakeholders? Provide support for your response (e.g., identify the entities that have expressed a need or cite planning or other documents expressing a need for the project).

Nebraska's water managers and stakeholders alike have expressed the need for the project. These entities include PRRIP, CNPPID, NPPD, NRDs, and other sponsors which are currently requesting excess flow permits for beneficial projects within the basin. Transparent, streamlined, and effective management of excess flow in the Platte River Basin is vital to ensure continued economic growth in the basin and water resource sustainability. The tool will help water managers effectively identify and prioritize projects in the Platte River Basin that can capture flows during times of excess for beneficial use, and track outcomes against basin goals and objectives. The DSS offers a streamlined application, submittal, review, and approval process for utilizing excess flow for stakeholders. Key features will be developed through this project to increase communication and transparency throughout the entire decision-making and action process. Letters of support are presented in Appendix D of this application.

b. Will the results of your project inform water resource management actions and decisions immediately upon completion of the project, or will additional work be required?

Yes, the results of this project will immediately inform and continue informing water management actions and decisions. Task 1 (Development of Email Communications and Notifications Module) will allow the water managers, NeDNR, and stakeholders to be informed about the water resource management actions and decisions initiated by NeDNR. Development of Events Analysis and Action Module (Task 3) will be used by NeDNR Water Administration to immediately allocate water to ranked projects during excess flow events, and thus directly inform their water resource management actions. Additionally, the completion of the Platte River DSS will immediately inform the public about water resource management actions and decisions in the Platte River Basin through the public landing page.

c. If applicable, will the results of your project be transferrable to other users and locations? Note: not all water management solutions are transferrable?

Yes. Task 4 (Expand Geography) will build upon the excess flow forecasting and management tools previously developed in the DSS, to adapt portions of the DSS to other basins including the North

Platte River upstream of Lake McConaughy, the Loup River Basin, and the Elkhorn River Basin (shown in Figure 1). While not all DSS modules will be applicable to the other basins, several modules and educational materials of excess flow management tool will provide benefit to a larger geographic area. Specifically, forecasting tools developed in Phase 2 and Sponsor Portal developed in Phase 3 will be expanded to allow for the acceptance, review, and approval of excess flow permit applications, ranking, and allocation of excess flow in this broader geographic region. Additionally, the DSS structure is being designed so that it is compatible with other state-wide IT projects that NeDNR already has in place. It is envisioned that this same DSS structure could be utilized across the state.

d. If the applicant is not the primary beneficiary of the project (e.g., Category B applicant), describe how the project beneficiaries have been or will be involved in planning and implementing the project?

The applicant, the NeDNR, and Stakeholders within the Platte River Basin will be the primary beneficiaries of the Project. Stakeholder support and feedback is continually solicited and collected to improve the planning and implementation of the project. The abbreviated Design Sprints (Task 5) will further facilitate engagement and open communication with the NeDNR water managers and stakeholders for planning and implementation.

4.3 EVALUATION CRITERION C – PROJECT IMPLEMENTATION

1. Briefly describe and provide support for the approach and methodology that will be used to meet the objectives of the project.

For each phase of the Nebraska Platte River DSS project, a six-step implementation strategy has been used to define and implement the phase. This strategy aims to systematically meet the NeDNR's decision support needs by simplifying complicated processes into management tasks and building consistent results that incorporate data, analysis, decision-making, implementation, engagement, feedback, and refinement processes. These six steps include: 1) defining the objectives, 2) outlining the roles, 3) identifying the resources, 4) focused engagement, 5) developing interactive prototypes, and 6) implementation. The implementation approach and methods for each task were summarized in Section 2.3. To summarize, the project will be implemented by incorporating the above strategy through the following:

Objectives:

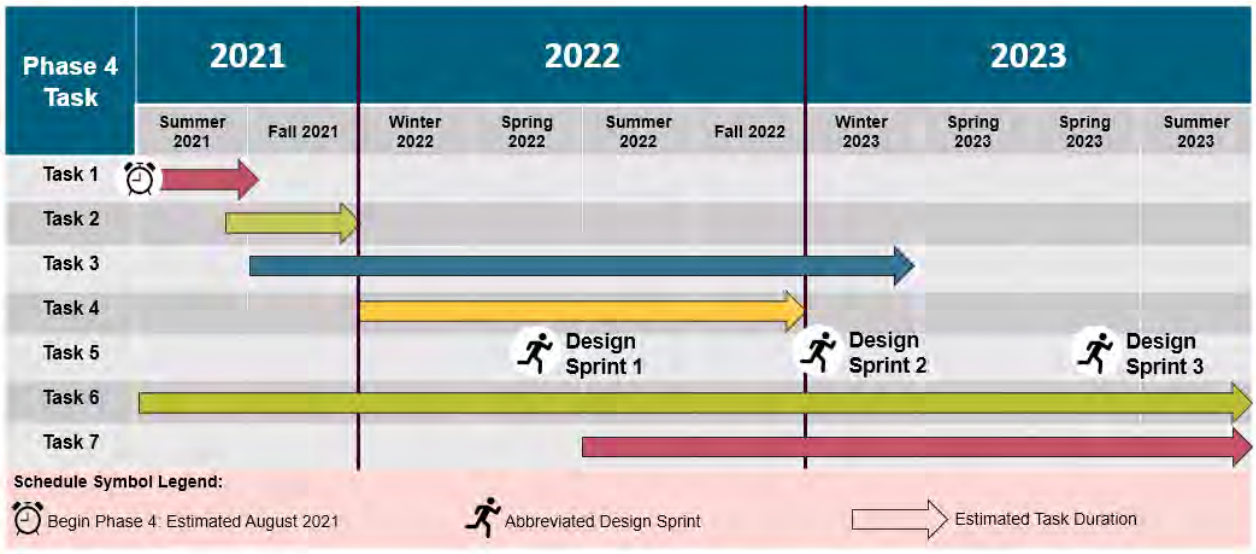
- Develop the Email Communications and Notifications Module in the DSS to support streamlined and rapid communications between NeDNR and stakeholders.
- Develop the Requests Module so that stakeholders can easily use the web based DSS to request excess flow, and all NeDNR to be alerted of the request for allocation.
- Develop the Events Analysis and Action Module for NeDNR water administration to allocate water to available projects during excess flow events.
- Expand the geography of the DSS to include the upper Platte River Basin to the Wyoming state line, the Loup River Basin, and the Elkhorn River Basin to provide benefits of the DSS across the state.
- Engage stakeholders through interactive Design Sprints when available and incorporate feedback into the DSS.
- Build the DSS calculations and tools for evaluation of outcomes to provide a feedback loop to the NeDNR and stakeholders that can be used to continuously refine and improve use of excess flow.
- Develop DSS processes and interface to collect data from stakeholders through automated methods and sponsor data entry. The data will be used in project performance analysis, outcomes evaluation, and future project ranking.

- Develop the DSS processes and tools for reporting results from excess flow administration with stakeholders and the public to facilitate a transparent decision-making process.

2. Describe the work plan for the project. Include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.

The project's work plan is described under the Project Description and Work Plan presented previously in Section 2.3. The timing and duration of the major tasks, milestones and dates are shown in Figure 6. Deployment of Phase 4 is anticipated for August 2021.

Figure 6. Schedule Summary and Key Milestones



3. Provide a summary description of the products that are anticipated to result from the project. These may include data, metadata, digital or electronic products, reports, and publications. Note: using a table to list anticipated products is suggested.

The products that are anticipated to result from each task of the project will be incorporated as added functionality into the existing Platte River DSS framework. These are summarized below in Table 1.

Table 1. Summary of DSS Phase 4 Products

DSS Phase 4 Task	Products Resulting from Task
Task 1 – Development of Email Communications and Notifications	• Feature Tracking document detailing the development of task modules. • DSS Email Communications Interface • DSS Notification Center Interface • DSS Communications Preferences Interface • Tiered access to DSS by entities and public access to educational materials
Task 2 – Development of Requests Module	• Feature Tracking document detailing the development of the task module.

DSS Phase 4 Task	Products Resulting from Task
	• DSS Requests Interface
Task 3 – Development of Events Analysis and Action Module	• DSS Events Analysis and Action Interface • Interface link to Requests Interface (Task 2) • Archive system for capturing and storing decisions and results
Task 4 – Expand Geography	• DSS geographic extent which includes the North Platte River Basin to the Wyoming state line, the Loup River Basin, and the Elkhorn River Basin
Task 5 – Design Sprints for Focused Engagement	• Technical memorandums summarizing results and conclusions, recommendations, and next steps • Incorporation of developed concepts into the developing Phase 4 modules. • Dissemination of materials from Design Sprints to stakeholders/public as needed.
Task 6 – Monitor and Refine Decision Support and Forecasting Tool	• Technical memorandum(s) detailing decision-support monitoring outcomes and needed refinements. • Refined forecasting tool
Task 7 – Enhance the Evaluate Outcomes Module	• DSS Sponsor Portal for online data submittal • DSS linkage to NeDNR data repository for efficient information exchange • Programmed logic to auto fill stream gage information from the data repository link • Functionality to export files necessary for uploading to models and outcomes evaluation • Archive system for capturing and storing outcomes results

4. Identify staff with appropriate credentials and experience and describe their qualifications. Describe the process and criteria that will be used to select appropriate staff members for any positions that have not yet been filled. Describe any plans to request additional technical assistance from Reclamation or via a contract. Please answer the following:

a. Have the project team members accomplished projects similar in scope to the proposed project in the past either as a lead or team member?

Yes. Mr. Tom Riley, NeDNR Director, and Mr. Jesse Bradley, NeDNR Assistant Director, will provide overall administration and oversight of the project on behalf of the NeDNR. Ms. Jennifer Schellpeper, Water Planning Division Manager, for the NeDNR will be the representative for the NeDNR providing overall project management, and reporting will be performed by the NeDNR's office personnel. Collectively this group has over 60 years of experience in water resources management with a

significant percentage of that experience targeted on improving water resources management outcomes using science-based decision making and tools such as the DSS.

Due to the specialized nature of the DSS and schedule constraints, NeDNR selected EA Engineering, Science, and Technology, Inc., PBC, with team subcontractor RESPEC (EA Team) to support development of the Platte River DSS through a competitive process. Together, the EA Team brings over 50 years of experience creating linked watershed modeling systems and decision support tools to meet state and federal agencies' goals. The EA Team has successfully completed the first two Phases of the Platte River DSS and is in progress on Phase 3. The team has developed innovative Open-Source Models and DSS across the nation through long-term US Environmental Protection Agency (EPA) and U.S. Geological Survey (USGS) contracts, and has direct experience developing large-scale models and DSS's in the Platte River Basin. The EA Team provides a dedicated team of professionals and subject matter experts that use an iterative development process focused on testing user experience throughout the project to ensure that clients' needs are met. Detailed Qualifications and Bios of team members are included as Appendix E.

b. Is the project team capable of proceeding with tasks within the proposed project immediately upon entering into a financial assistance agreement? If not, please explain the reason for any anticipated delay.

Yes. NeDNR has strong support from agency leadership and the DSS serves as one of the agency's highest priorities due to its support of a wide variety of agency functions. The DSS development is being managed by Jennifer Schellpeper (Water Planning Division Manager). The dedicated EA Team has committed to making this project a priority throughout its duration and has already demonstrated the necessary capacity and depth of talent to provide the services per the proposed schedule and budget. This team is presently developing Phase 3 of the Platte River DSS and will seamlessly, and immediately transition to Phase 4 development. No positions will need to be filled by the NeDNR nor the EA Team to execute the project. Additionally, no additional technical assistance from Reclamation is anticipated to be needed.

4.4 EVALUATION CRITERION D – DISSEMINATION OF RESULTS

Describe how the tools, frameworks, or analyses being developed will be disseminated, communicated, or made available to water resources managers who may be interested in the results.

In addition to NeDNR, the main beneficiaries of the Platte River DSS will be the Stakeholders and Nebraskans within the Platte River Basin that are directly vested and impacted by decisions ensuring that excess flows are used in the most beneficial and scientifically sound way possible. Water is the life blood of Nebraska, serving as a cornerstone for continued economic and environmental vitality, thus key objectives of the DSS are centered on transparent decision-making and effective outreach, communication, and dissemination of results with stakeholders and the public related to the DSS platform. This approach is the best approach to dissemination of the data because it relays the same critical water supply and use data to all decision makers simultaneously, while at the same time provides the opportunity for NeDNR to share educational materials with all water users in the basin.

The DSS provides an exceptional platform for dissemination of results and educational materials to Stakeholders and the public. The project team has found that using a variety of methods to educate and disseminate materials to stakeholders has resulted in reaching the largest audience across the vast geographic extent of the basin. The NeDNR has committed resources in Phase 3, and will continue to expand upon communication efforts through Phase 4 using a variety of methods:

- The initial DSS Public Landing Web Page was developed in Phase 3 to begin educating the public and stakeholders on the NeDNR's development and use of the DSS. Rollout of new features developed through Phase 4 will be communicated to the public through both this web page and the subsequent communication methods.
- Since 2018, marketing to Stakeholders has been accomplished through email communications, the public landing page referenced above, and direct communication with NeDNR staff. These efforts will continue through Phase 4.
- Initiated in Phase 3, and continuing in Phase 4, the project team will be conducting group and one-on-one information meetings with stakeholders to acclimate them to the DSS, provide training, and gather feedback on ways the DSS may be improved.
- The Sponsor Portal, accessible directly from the Public landing page, allows Stakeholders to easily access the web-interface from anywhere, upload their applications and annual operating plans, and review a status dashboard showing the progress with the approval process.
- The primary purposes of Task 1 (Development of Communications and Notifications Module) and Task 2 (Development of Requests Module) are to further streamline and foster increased communication and transparency with stakeholders and the public, encourage stakeholders to develop opportunities for beneficial use of excess flow, allow them to easily request excess flow, and rapidly notify them when excess flow is available for use.
- Task 5 Design Sprints for Focused Engagement is specifically designed to seek continuous feedback on the DSS functionality and usefulness from both the perspective of the NeDNR and stakeholders. The feedback will be used to incorporate seasonal and annual maintenance necessary to refine the useability and maintain relevance of the DSS.
- Task 7 (Enhance the Evaluate Outcomes Module) will complete the DSS feedback loop necessary for full communication with the stakeholders throughout the annual excess flow cycle. Stakeholders will be able to upload data from their excess flow diversions after events, NeDNR will evaluate the outcomes, and provide feedback to stakeholders. Project performance evaluation will be used as one of the metrics to evaluate projects for the next annual excess flow cycle.
- A Reclamation-sponsored webinar presentation will be conducted, as required by the BOR Applied Science Grant. The project team will present the Platte River DSS, focusing on its success in supporting the previously summarized water management issues.
- Throughout the life of the project, the project team will seek opportunities to present the Platte River DSS project and outcomes at relevant local and regional conferences. This will ensure a wider audience is aware of the useability, ongoing and future efforts on the Platte River DSS.
- Interim performance reports will be submitted to the BOR at least semi-annually summarizing the status of the project, milestones, schedule, scheduling issues and additional pertinent information as necessary. At the completion of the project, a final performance report will be provided summarizing the outcome of the project objectives, the benefits achieved including collaboration, and photographs documenting the design sprints and applicable screen captures from the DSS Interface.

5.0 PROJECT BUDGET

5.1 FUNDING PLAN AND LETTERS OF COMMITMENT

The total proposal budget is $400,000 (see SF-424A). The Nebraska Department of Natural Resources will be providing the $200,000 of cash cost-share to support this proposal (see Appendix D for letter of Financial Commitment). These funds are currently available and have been set aside within the agency budget to support the project if the proposal is successful. **Table 2** summarizes non-Federal and Federal sources of funding for the proposed project.

Table 2. —Summary of Non-Federal and Federal Funding Sources

SOURCE	AMOUNT
Federal Entities	
Costs to be reimbursed with the requested Federal funding	$ 200,000
Non-Federal Entities	
Costs to be paid by the applicant: Nebraska Department of Natural Resources	$ 200,000
Value of third-party contributions	$ 0
TOTAL PROJECT FUNDING	**$ 400,000**

5.2 BUDGET PROPOSAL

The NeDNR proposes to apply all Federal and Non-Federal funds that may be associated with the grant agreement to funding the continued development and implementation of the Platte River DSS through the proposed Phase 4 tasks. A summary of the estimated project costs by funding source is presented in **Table 3**. The Budget Proposal presented in **Table 4** has been prepared using the prescribed outline from the Notice of Funding Opportunity (NOFO).

Section 2.3 of this application provides a summary of the Scope of Work Tasks necessary for the successful completion of the project. The Federal and local cost share funding will be used to cover all costs associated with staff, consultant and contract employee time required to perform the Scope of Work.

Table 3. —Project Funding Sources

FUNDING SOURCES	PERCENT OF COSTS SHARE	TOTAL COSTS BY SOURCE
Costs to be reimbursed with the requested Federal funding	50%	$ 200,000
Costs to be paid by the applicant	50%	$ 200,000
Value of in-kind contributions	-	$ 0
TOTAL PROJECT COST	**100%**	**$ 400,000**

Table 4. —Budget Summary – Aggregate of Project Costs

BUDGET ITEM DESCRIPTION	COMPUTATION		QUANTITY TYPE	TOTAL COST
	$/Unit	Quantity		
Salaries and Wages				$ -
Fringe Benefits				$ -
Equipment				$ -
Supplies and Materials				$ -
Contractual/Construction				
Platte River DSS Phase 4	$ 400,000	1	Per Contract	$ 400,000
Third-Party In-Kind Contributions				$ -
Other				$ -
TOTAL DIRECT COSTS				$ 400,000
Indirect Costs				
Indirect Costs – 0%				$ -
TOTAL ESTIMATED PROJECT COSTS				$ 400,000

5.3 BUDGET NARRATIVE

a. Salaries and Wages

Mr. Tom Riley, NeDNR Director, and Mr. Jesse Bradley, NeDNR Assistant Director, will provide overall administration and oversight of the project on behalf of the NeDNR. Ms. Jennifer Schellpeper, Water Planning Division Manager, for the NeDNR will be the representative for the NeDNR providing overall project management, and reporting will be performed by the NeDNR's office personnel. In this regard, the Agency's office personnel, which will consist of Natural Resources Division Managers, including Mr. Jeremy Gehle and Mr. Mike Thompson, Natural Resources Engineers and Specialists, Water

Management Coordinators, Analysts, and Planners, and IT Manager, Ms. Kim Menke, IT Supervisor, and Senior Application Developers, will perform project-related administration support and grant reporting. Additionally, the NeDNR will use accounting staff for tracking costs, maintaining financial records, and invoicing. Work performed by NeDNR staff will be completed as part of the Agency's daily operations and will not be included as part of the local cost share commitment. Bios for the identified agency personnel have been included as Appendix E.

The NeDNR will not be asking for reimbursement or reporting any "In-Kind" contributions for any Salaries and Wages costs. The NeDNR is proposing not to track these costs separately from daily operations, even though employees will be providing services necessary for completion and implementation of the grant-funded project. Accordingly, no expenses under "Salaries, Wages, and Fringe Benefits" have been included in Table 4.

b. Travel

Local travel by NeDNR staff will be covered under the Agency's operating budget. Accordingly, no expenses have been included under "Travel" in Table 4. Estimated travel expenses for the consultant team selected for the Project are included in the "Contractual" line item.

c. Equipment

Equipment expenses have not been included in the budget because the NeDNR is not expected to purchase or lease any equipment as part of this project. Any computers or other equipment necessary for development, implementation, and application of the project will be provided by the NeDNR. Accordingly, no "Equipment" expenses have been included in Table 4.

d. Materials and Supplies

This project is for the development, implementation, and application of a decision support system. Acquisition of office supplies needed for the project will be a general operating expense of the NeDNR that will take place outside of the grant agreement. Accordingly, no "Materials and Supplies" expenses have been included in Table 4.

e. Contractual

Due to the specialized nature of the DSS, NeDNR hired a consultant. Through a competitive process in accordance with Agency policies, NeDNR selected EA Engineering, Science, and Technology, Inc., PBC, with team subcontractor RESPEC (EA Team) to support development of the Platte River DSS. Together, the EA Team brings over 50 years of experience creating linked watershed modeling systems and decision support tools to meet the goals of state and federal agencies. The EA Team has successfully completed the first two Phases of the Platte River DSS and is in progress on Phase 3.

One contract, totaling an estimated $400,000, will be executed for development and implementation of the grant project's Phase 4 Tasks 1 through 7. The Task details are summarized in Section 2.3. The following provides a brief summary and contract cost breakdown of the work to be carried out by the EA Team:

- Task 1 – Development and Implementation of Email Communication Logic and Notifications Module ($31,000).
- Task 2 – Development and Implementation of Requests Module ($29,000).
- Task 3 – Development and Implementation of Events Analysis and Action Module ($142,000).

- Task 4 – Expand Geography: expand select, existing modules to the Wyoming State Line, Loop River Basin, and Elkhorn River Basin ($20,000).
- Task 5 – Prepare materials and conduct Stakeholder Design Sprints ($50,000).
- Task 6 – Conduct monitoring and refinement of existing tracking and forecasting tools to ensure and improve decision-making process ($30,000).
- Task 7 – Program and Implement Evaluate Outcomes Module Enhancements ($98,000).

f. Third-Party In-Kind Contributions

No third-party in-kind contributions are budgeted for this project. As noted above, the NeDNR will not be asking for reimbursement or reporting any "In-Kind" contributions for any Salaries, Wages, or Fringe Benefit costs.

g. Environmental and Regulatory Compliance Costs (as applicable to the project)

The project proposed for funding will not result in any physical changes to the environment and therefore no environmental and regulatory compliance costs have been budgeted for this project in Table 4.

h. Other Expenses

All project expenses are included in the cost items described above. Therefore, no costs are associated with this budget category in Table 4.

i. Indirect Costs

No indirect costs are budgeted for this project. Therefore, this category does not apply in Table 4.

j. Total Costs

The estimated budget for the proposed project is presented in Table 4. The total budget for the project is estimated at $400,000, with $200,000 in requested grand funds (Federal Cost Share) and $200,000 in Non-Federal Cost Share funds to be furnished by the NeDNR. The total Federal Cost Share requested is 50 percent of total project costs with the remainder contributed by the Applicant.

6.0 ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

Proposed project activities will not require environmental or cultural resources compliance through the National Environmental Policy Act (NEPA). A final Whooping Crane designated Critical Habitat area is located along the Platte River within the Platte River Basin illustrated on Figure 1. This critical habitat area extends along the Platte River corridor through Dawson, Gosper, Phelps, Buffalo, and Kearney counties. Additionally, the American Burying Beetle, Blowout Penstemon, Northern Long-eared Bat, Least Tern, Piping Plover, Pallid sturgeon, Prairie Bush-clover, and Western Prairie Fringed Orchid are listed as Threatened and Endangered Species within the Platte River Basin. The development and implementation of Phase 4 of the Platte River DSS as proposed in this grant application will not affect any species listed or proposed to be listed as a Federal endangered or threatened species or designated critical habitats. As discussed in Section 1.0, 2.2, 2.3, and 4.1g the Platte River DSS will be used to ensure target flows, based on the current hydrologic condition of the Platte River, are met, which helps improve and maintain habitat for several of the target species listed above.

7.0 REQUIRED PERMITS OR APPROVALS

No permits or additional approvals will be required to complete Phase 4 of the Platte River DSS for excess flow.

8.0 LETTERS OF SUPPORT AND FINANCIAL COMMITMENT

Reclamation funds are being requested from the Applied Science Grant Program to assist the NeDNR with development of the Platte River DSS, Phase 4. NeDNR's letter of Financial Commitment is presented in Appendix B. Additionally, the NeDNR has received overwhelming support from stakeholders within the Platte River Basin for continued development and completion of the Platte River DSS. Letters of Support are included in Appendix D from the CNPPID, North Platte Natural Resources District (NPNRD), Central Platte Natural Resources District (CPNRD), NPPD, Tri-Basin Natural Resources District, South Platte Natural Resources District (SPNRD), and Twin Platte Natural Resources District (TPNRD).

9.0 OFFICIAL RESOLUTION

The Nebraska Department of Natural Resources (NeDNR) will be the agency responsible for administering the grant award. The NeDNR has committed existing budget resources to ensure the financial and legal obligations associated with receiving Federal financial assistance through the WaterSMART Applied Science Grants FY21 will be met. The Director of NeDNR has provided a signed letter to indicate this commitment (see Appendix D).

Appendix A: References

References

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Appendix B: Platte River DSS Snapshots

Appendix C: Upper Platte Basin-Wide Plan Second Increment (2019-2029)

Appendix D: Letters of Support and Financial Commitment

NEBRASKA

Good Life. Great Water.

DEPT. OF NATURAL RESOURCES

Pete Ricketts, Governor

Bureau of Reclamation
Financial Assistance Support Section
Attn: Matthew Reichert
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee members,

This letter is to document our agency's support and financial commitment for the development of the Platte River Decision Support System (DSS) Phase IV work activities. The NeDNR has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology towards management decisions for sustaining the water resources of the Platte River Basin. The Platte River serves approximately eighty percent of Nebraska's population, provides significant energy assets, irrigates over two million acres of farmland, and provides streamflows for threatened and endangered species. Water management tools that support timely and effective utilization of periodic and variable excess river flows are key components of Nebraska's water management strategies for meeting current and future water demands.

As Director of the Nebraska Department of Natural Resources, I am authorized to commit the necessary financial resources in support of this application. Our agency will commit $200,000 in matching financial support for this grant application. I will ensure that our agency is able to work with staff from Reclamation to meet established deadlines for entering into all necessary contracts. The Platte River DSS will play a key role in supporting our agency's water allocation decisions during excess streamflow events while increasing efficiency, transparency and accountability for appropriators applying for use of the excess water. As the lead state agency for surface water permitting activities and applicant for this project, I urge the Bureau of Reclamation to positively recognize the importance and need for support and funding of this effort.

Sincerely,

Thomas E. Riley

Thomas E. Riley, P.E.
Director

Thomas E. Riley, P.E., Director
Department of Natural Resources
301 Centennial Mall South
P.O. Box 94676
Lincoln, Nebraska 68509
OFFICE 402-471-2363
FAX 402-471-2900
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415 Lincoln St.
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Holdrege, NE 68949-0740

CENTRAL
Nebraska Public Power
and Irrigation District

Phone: (308) 995-8601
Fax: (308) 995-5705
Web: www.cnppid.com

April 14, 2021

Bureau of Reclamation
Financial Assistance Support Section
Attn: Matthew Reichert
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee members,

This letter serves to document our support for the continued development of the Platte River Decision Support System (DSS) through Phase IV work activities. We understand that NeDNR has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology towards management decisions for sustaining water resources of the Platte River Basin.

The Platte River serves a large portion of Nebraska's population, provides opportunity for our significant energy assets, irrigates over two million acres of farmland, and provides streamflow information for threatened and endangered species. Water management tools that support timely and effective utilization of periodic and variable excess river flows is a key component of Nebraska's water management strategies for meeting current and future water demands.

Simplification of the process and the reduction of the regulatory burden on customers by providing a streamlined application, submittal, review, and approval process for users looking to utilize excess water is important to the future of effective water management. As a stakeholder within the Platte River Basin, this could be realized through the DSS Sponsor Portal. The Sponsor Portal foundation was developed in early phases and allows us to easily apply for permits to use excess flow and view the current streamflow conditions relevant to the determination of excess flow. The full benefits will be realized through the Phase IV activities when expansion of the DSS toolbox and Sponsor Portal foundation will offer stakeholders increased interactivity, transparency, and the ability to provide active feedback on enhancements to the DSS for improved use.

Optimizing the use of water resources in the Platte River Basin through the use of effective water management tools for the benefit of Nebraska citizens is crucial. As a power producer, irrigation district and reservoir owner within the Platte River Basin, CNPPID supports the NeDNR's application and also believes the Bureau of Reclamation's support is very important to this effort.

Sincerely,

Devin Brundage
General Manager
Central Nebraska Public Power and Irrigation District

NORTH PLATTE
Natural Resources District

Chimney Rock
on the Oregon Trail

P.O. Box 280 • 100547 Airport Rd. • Scottsbluff, NE 69363-0280 • Phone: 308 632-2749 • Fax: 308 632-4346

April 13, 2021

Bureau of Reclamation
Financial Assistance Support Section
Attn: Matthew Reichert
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee members,

This letter is to document our support for the continued development of the Platte River Decision Support System (DSS) through Phase IV work activities. The NeDNR has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology towards management decisions for sustaining water resources of the Platte River Basin.

The Platte River serves approximately eighty percent of Nebraska's population, provides significant energy assets, irrigates over two million acres of farmland, and provides streamflows for threatened and endangered species. Water management tools that support timely and effective utilization of periodic and variable excess river flows is a key component of Nebraska's water management strategies for meeting current and future water demands.

One of the key features of the Platte River DSS is to simplify the process and reduce the regulatory burden on customers by providing a streamlined application, submittal, review, and approval process for users looking to utilize excess water. As a stakeholder within the Platte River Basin, this has been realized through the DSS Sponsor Portal. The Sponsor Portal foundation was developed in early phases and allows us to easily apply for permits to use excess flow and view the current streamflow conditions relevant to the determination of excess flow. The full benefits will be realized through the Phase 4 activities, when expansion of the DSS toolbox and Sponsor Portal foundation will offer stakeholders increased interactivity, transparency, and the ability to provide active feedback on enhancements to the DSS for improved use.

Optimizing the use of water resources in the Platte River Basin through the use of effective water management tools for the benefit of Nebraska citizens is crucial. As a STAKEHOLDER within the Platte River Basin, we fully support the NeDNR's application and urge the Bureau of Reclamation to recognize the importance and need for its support and funding.

Sincerely,

John Berge, General Manager
North Platte Natural Resources District
100547 Airport Rd
Scottsbluff NE 69361

CPNRD
CENTRAL PLATTE
NATURAL RESOURCES DISTRICT

215 Kaufman Ave Grand Island NE 68803
T: (308) 385-6282 F: (308) 385-6285
www.cpnrd.org

Bureau of Reclamation
Financial Assistance Support Section
Attn: Matthew Reichert
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee members,

This letter is to document our support for the continued development of the Platte River Decision Support System (DSS) through Phase IV work activities. The NeDNR has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology towards management decisions for sustaining water resources of the Platte River Basin.

The Platte River serves approximately eighty percent of Nebraska's population, provides significant energy assets, irrigates over two million acres of farmland, and provides streamflows for threatened and endangered species. Water management tools that support timely and effective utilization of periodic and variable excess river flows is a key component of Nebraska's water management strategies for meeting current and future water demands.

One of the key features of the Platte River DSS is to simplify the process and reduce the regulatory burden on customers by providing a streamlined application, submittal, review, and approval process for users looking to utilize excess water. As a stakeholder within the Platte River Basin, this has been realized through the DSS Sponsor Portal. The Sponsor Portal foundation was developed in early phases and allows us to easily apply for permits to use excess flow and view the current streamflow conditions relevant to the determination of excess flow. The full benefits will be realized through the Phase 4 activities, when expansion of the DSS toolbox and Sponsor Portal foundation will offer stakeholders increased interactivity, transparency, and the ability to provide active feedback on enhancements to the DSS for improved use.

Optimizing the use of water resources in the Platte River Basin through the use of effective water management tools for the benefit of Platte Basin water users and its citizens is crucial. As a Natural Resources District within the Platte River Basin, we fully support the NeDNR's application and urge the Bureau of Reclamation to recognize the importance and need for its support and funding.

Sincerely,

Lyndon Vogt

Lyndon Vogt
General Manager
Central Platte Natural Resources District

Nebraska Public Power District

"Always there when you need us"

April 15, 2021

Bureau of Reclamation
Financial Assistance Support Section
Attn: Matthew Reichert
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee members,

This letter is to document our support for the continued development of the Platte River Decision Support System (DSS) through Phase IV work activities. The NDNR has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology towards management decisions for sustaining water resources of the Platte River Basin.

The Platte River serves approximately eighty percent of Nebraska's population, provides significant energy assets, irrigates over two million acres of farmland, and provides streamflows for threatened and endangered species. Water management tools that support timely and effective utilization of periodic and variable river flows is a key component of Nebraska's water management strategies for meeting current and future water demands.

One of the key features of the Platte River DSS is to simplify the process and reduce the regulatory burden on appropriators by providing a streamlined application, submittal, review, and approval process for users looking to utilize excess water. The Sponsor Portal foundation was developed in early phases and allows NPPD to easily apply for permits to use excess flow and view the current streamflow conditions relevant to the determination of excess flow. The full benefits will be realized through the Phase 4 activities, when expansion of the DSS toolbox and Sponsor Portal foundation will offer NPPD increased interactivity, transparency, and the ability to provide active feedback on enhancements to the DSS for improved use.

Optimizing the use of water resources in the Platte River Basin through the use of effective water management tools for the benefit of Nebraska citizens is crucial. As a user of excess flows within the Platte River Basin, NPPD supports the NDNR's application and urges the Bureau of Reclamation to recognize the importance and need for its support and funding.

Sincerely,

Joe L. Citta, Jr
Director of Corporate Environmental &
Water Resources

GENERAL OFFICE
1414 15th Street / P.O. Box 499 / Columbus, NE 68602-0499
Telephone: (402) 564-8561 / **Fax**: (402) 563-5527
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Tri-Basin NRD
1723 Burlington
Holdrege, NE 68949

Natural Resources District

Phone: (308) 995-6688
Toll Free: 1-877-995-6688
Fax: (308) 995-6992
Email: tribasin@tribasinnrd.org

U.S. Bureau of Reclamation-Financial Assistance Support Section
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee members,

Tri-Basin NRD, a local natural resources management agency in south-central Nebraska, supports the continued development of the Platte River Decision Support System (DSS). The NeDNR has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology to help us make management decisions that sustain the water resources of the Platte River Basin.

Approximately eighty percent of Nebraska's population lives within the Platte River Basin. The water resources of the Platte support significant energy assets, irrigate over two million acres of farmland, and provide streamflows for threatened and endangered species. Water management tools that support timely and effective utilization of excess river flows is a key component of Nebraska's water management strategy for meeting current and future water needs.

One of the key benefits of the Platte River DSS is to reduce the regulatory burden on water users by providing a streamlined application, submittal, review and approval process for water users seeking to utilize Platte streamflows that exceed existing water rights and habitat management targets. The Sponsor Portal feature allows us to easily apply for permits to use excess flows and view current streamflow conditions relative to the threshold for excess flow. The full benefits will be realized through the Phase 4 activities, when expansion of the DSS toolbox and Sponsor Portal foundation will offer stakeholders increased interactivity, transparency, and the ability to provide active feedback on enhancements to the DSS for improved use.

Optimizing the beneficial use of water resources in the Platte River Basin through the use of effective water management tools for the benefit of Nebraska citizens is crucial. Tri-Basin NRD fully supports the NeDNR's application. We urge the Bureau of Reclamation to recognize the importance of this water management tool and the benefits of providing support and funding to accelerate its development.

Sincerely,

John Thorburn
Manager

Kimball Cheyenne Deuel

South Platte Natural Resources District

551 Parkland Drive, PO Box 294 Sidney, Nebraska 69162
(308) 254-2377 FAX (308) 254-2783 www.spnrd.org

April 12, 2021

Bureau of Reclamation
Financial Assistance Support Section
Attn: Matthew Reichert
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee Members:

This letter is to document our support for the continued development of the Platte River Decision Support System (DSS) through Phase IV work activities. The Nebraska Department of Natural Resources (NeDNR) has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology towards management decisions for sustaining water resources of the Platte River Basin.

The Platte River serves approximately eighty percent of Nebraska's population, provides significant energy assets, irrigates over two million acres of farmland, and provides streamflows for threatened and endangered species. Water management tools that support timely and effective utilization of periodic and variable excess river flows is a key component of Nebraska's water management strategies for meeting current and future water demands.

One of the key features of the Platte River DSS is to simplify the process and reduce the regulatory burden on customers by providing a streamlined application, submittal, review, and approval process for users looking to use excess water. As a stakeholder within the Platte River Basin, this has been realized through the DSS Sponsor Portal. The Sponsor Portal foundation was developed in early phases and allows us to easily apply for permits to use excess flow and view the current streamflow conditions relevant to the determination of excess flow. The full benefits will be realized through the Phase 4 activities, when expansion of the DSS toolbox and Sponsor Portal foundation will offer stakeholders increased interactivity, transparency, and the ability to provide active feedback on enhancements to the DSS for improved use.

Optimizing the use of water resources in the Platte River Basin using effective water management tools for the benefit of Nebraska citizens is crucial. As a stakeholder, we fully support the NeDNR's application and urge the Bureau of Reclamation to recognize the importance and need for its support and funding.

Sincerely,

Rod L. Horn, General Manager
South Platte Natural Resources District

TWIN PLATTE NATURAL RESOURCES DISTRICT

April 14, 2021

Bureau of Reclamation
Financial Assistance Support Section
Attn: Matthew Reichert
P.O. Box 25007, MS 84-27810
Denver, CO 80225

Dear Mr. Reichert and Application Review Committee members,

This letter is the Twin Platte Natural Resources District (TPNRD) support for the continued development of the Platte River Decision Support System (DSS) through Phase IV work activities. The Nebraska Department of Natural Resources (NeDNR) has embarked on a multi-year effort to develop the Platte River DSS to leverage the best available science and technology towards management decisions for sustaining water resources of the Platte River Basin.

The Platte River serves eighty percent of Nebraska's population, provides significant energy assets, irrigates over two million acres of farmland, and provides stream flows for threatened and endangered species. Water management tools that support timely and effective utilization of periodic and variable excess river flows is a key component of Nebraska's water management strategies for meeting current and future water demands.

One of the key features of the Platte River DSS is to simplify the process and reduce the regulatory burden on customers by providing a streamlined application, submittal, review, and approval process for users looking to utilize excess water. This has been beneficial for the TPNRD through the DSS Sponsor Portal. The Sponsor Portal foundation was developed in early phases and allows the TPNRD to easily apply for permits to use excess flow and view the current streamflow conditions relevant to the determination of excess flow. The full benefits will be realized through the Phase 4 activities, when expansion of the DSS toolbox and Sponsor Portal foundation, will offer the TPNRD increased interactivity, transparency, and the ability to provide active feedback.

Optimizing the use of water resources in the Platte River Basin through the use of effective water management tools for the benefit of Nebraska citizens is crucial. The TPNRD is a stakeholder within the Platte River Basin and fully supports the NeDNR's application. The TPNRD urges the Bureau of Reclamation to recognize the importance and need for this funding.

Respectfully,

Kent O. Miller, P.E.
General Manager

Great Western Bank Center
111 South Dewey Street - 2nd Floor - P O Box 1347 - North Platte, NE 69103-1347
Phone (308) 535-8080
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Appendix E: Key Staff Qualifications and Bios

Appendix E - Project Team Qualifications and Bios

Name	Project Role	Years of experience	Education
Nebraska Department of Natural Resources			
Tom Riley	Agency Director	30	▪ M.S. Civil Engineering ▪ B.S. Civil Engineering
Jesse Bradley	Agency Assistant Director	15	▪ M.S. Hydrogeology ▪ B.S. Environmental Geology
Jennifer Schellpeper	Project Lead	20	▪ M.S. Natural Resources Management ▪ B.S. Natural Resources Management
Jeremy Gehle	Water Administration Project Lead	20	▪ B.S. Water Science
Kim Menke	IT Project Lead	33	▪ B.S. Computer Science
Mike Thompson	Permitting Lead	32	▪ B.S. Geology
Consultant Team- EA Engineering, Science, and Technology, Inc., PBC			
Ashley Schroeder	Project Manager	18	▪ M.S. Environmental Science and Policy and Master's Certificate in Geographic Information Systems ▪ B.A. Geography – Geographic Information Systems
Dale Schlautman	Senior Technical Review	30	▪ M.S. Agricultural and Biological Systems Engineering
Subcontractor- RESPEC			
Paul Senne	Development Manager	12	▪ M.S. Public Affairs-Environmental Policy and Natural Resource Management ▪ B.S. Geography
Tong Zhai	Lead Developer	18	▪ Ph.D. Agricultural and Biological Engineering

Nebraska Department of Natural Resources Team

Tom Riley, NeDNR Director

Tom is the Director at the Nebraska Department of Natural Resources (the Department). He is a graduate of the University of Nebraska where he received a Bachelor of Science in Civil Engineering and a Master of Science in Civil Engineering. He is a registered professional engineer in Nebraska and a member of the American Society of Civil Engineers. He has worked with water users and stakeholders across the state of Nebraska to help solve their unique and challenging water resource problems. Prior to coming to the Department, he spent over three decades consulting for customers across the Nebraska and the country, most recently at the Flatwater Group, where he was a company founder. Tom has worked extensively on Nebraska's compacts and decrees along with consumptive management projects throughout the state. His water projects include irrigation and water supply, conjunctive management, restoration of Nebraska's unique saline wetlands, and stream and reservoir restoration.

Jesse Bradley, NeDNR Assistant Director

Jesse is the Assistant Director at the Nebraska Department of Natural Resources (the Department). During his 15 years at the Department, he has held a variety of responsibilities. He first began working in the Department's Water Planning Division in 2006 as an Integrated Water Management Analyst, supporting various analytical and numerical modeling efforts aimed at assessing the connection of groundwater pumping on hydrologically connected streams. From his analyst role he moved into roles focused on coordinating and managing technical and planning activities with other staff in the division and working closely with local natural resources districts across the state to develop and implement integrated water management plans. He also worked extensively on the implementation of several interstate Compacts and Decrees, and the Platte River Recovery and Implementation Program. Since moving into his role as Assistant Director, he has worked to coordinate efforts amongst the Department's permitting, water administration, and water planning functions. Jesse holds a Bachelor of Science in environmental geology and Master of Science in hydrogeology and is a licensed professional geologist in the State of Nebraska.

Jennifer J. Schellpeper, NeDNR Project Lead

Jennifer is the Division Head of Water Planning for the Nebraska Department of Natural Resources (the Department). During her 20 years at the Department, she has held a variety of responsibilities beginning in groundwater and surface water permitting, then moving to planning to coordinate implementation of the newly settled North Platte Decree and the Platte River Recovery Implementation Program. Since the passage of new laws in 2004, she has worked with other Department team members to develop and implement integrated management plans, including focused work on education and outreach about integrated management planning in Nebraska. In her current role as Division Manager, she manages the development and implementation of integrated management plans across the state and coordinates implementation of interstate water agreements. Jennifer holds a Bachelor of Science and Master of Science in natural resources management with specializations in math and water science.

Jeremy Gehle, NeDNR Water Administration Lead

Jeremy is the Manager of the Water Administration Division at the Nebraska Department of Natural Resources (the Department). Over his 20 years at the Department, Jeremy has filled a variety of roles. He first began working in the Department's Lincoln Field Office in 2000 as a Natural Resources Specialist, supporting various efforts including administration of Nebraska's surface water statutes, operating, and maintaining the Department's stream gages, and conducting dam safety inspections. In 2013, Jeremy took over as the Supervisor for the Lincoln Field Office.

From his Lincoln Field Office Supervisor role, he moved into the Data and Engineering Services Coordinator position in 2014, coordinating the collection and dissemination of stream gaging and survey data from field staff to internal users and to the public at large. Jeremy has been in his current position of Water Administration Division Manager since 2016 where he oversees the workload of all the field offices across the state including surface water administration, compact compliance, and the Department's stream gaging program. Jeremy grew up on a family farm near Seward Nebraska and worked with both groundwater and surface water irrigation. He holds a Bachelor of Science in Water Science with an emphasis on policy and economics from the University of Nebraska. Jeremy also earned a certificate from the Nebraska Water Leader's Academy in 2018.

Kim Menke, NeDNR Information Technology (IT) Lead

Kim Menke is the Division Manager for the Information Technology Division at the Nebraska Department of Natural Resources (NeDNR). She has been with NeDNR since July of 1988; she has held a variety of responsibilities. Some of these responsibilities include, Application Developer, GIS Analyst, and a Business Coordinator. Kim currently oversees the IT Division which develop web based and desktop applications, GIS applications, interactive maps, coordinate IT procurement, provide security, and general IT support across all divisions at NeDNR. Kim has been involved in numerous IT activities including, creating applications online for the public, such as Water Sustainability Fund and NeRAIN reporting. She has worked closely with other Department teams in developing the Integrated Water Information Project. This application spans across divisions where staff track dams, wells, water rights, etc. within a common interface. Kim has also been involved in developing several GIS applications, which include, dam inspection, pump check reporting, and interactive maps for the public and internal staff. She received her Bachelor of Science degree in Computer Science from University of Nebraska at Kearney with specializations in Mathematics and Statistics.

Mike Thompson, NeDNR Surface Water Permitting Lead

Mike is the Manager of the Permits and Registrations Division at the Nebraska Department of Natural Resources. As with other veteran team members, Mike has assumed numerous roles through his 30 + years of experience. He began his tenure with the Department with field office experience of conducting water administration during times of shortage, investigations of water use projects, low hazard dam inspections and stream gaging. From there he moved on to interstate water issues assisting the state hydrologist with compact and court decree compliance-related work, most notably on the Republican River Compact and the North Platte Decree. Mike assisted in deploying geographic information system technology to the field offices and implemented the digitization of irrigation project map data. For the past 14 years, Mike has been the head of the Permits and Registrations team. The permitting activity includes surface water appropriations to divert, store and beneficially use the waters of Nebraska. In addition, his division processes groundwater transfer permits for industrial and municipal uses. The division also registers all groundwater wells completed in Nebraska. The surface water permit and groundwater well database information that is maintained by the team is disseminated to the public via web-based online applications.

Consultant- EA Engineering Science and Technology, Inc., PBC team

Ashley Schroeder, Project Manager

Ashley has over 18 years of experience with diverse project and educational background and currently serves as Project Manager/Senior Environmental Scientist. She has direct experience working with multiple state regulatory agencies and programs in support of diverse environmental projects. Ashley has extensive experience working within the project area of the Platte River Basin, having supported Platte River groundwater recharge feasibility studies, Proof of Concept projects for the Platte River Recover Implementation Program (PRRIP), and preparation of numerous watershed water quality management plans for municipalities and Natural Resources Districts (NRDs) in Nebraska, and for communities in Iowa. She is also proficient in GIS application and deliverables development, including ArcGIS Online (AGOL) product development, and client-specific tools, asset management, geodatabase design and management, geospatial data modeling and analytics. She specializes in development and implementation of environmental science and compliance applications and tools. She is responsible for monitoring the execution of project activities, planning and budgeting, and technical coordination. Ashley holds a Master of Science in Environmental Science and Policy, with a certificate in Geographic Information.

Dale Schlautman, Senior Technical Review

Dale's more than 30 years of experience include water resources engineering, dam design, groundwater recharge studies, and agricultural design and permitting. Dale specializes in groundwater analysis, including groundwater flow, transport modeling, and surface water and groundwater interaction. Dale is responsible for providing subject matter expertise and senior technical guidance on the project. Dale holds a Master of Science in Agricultural and Biological Systems Engineering and is a registered Professional Engineer in Nebraska and eight other states.

Subconsultant- RESPEC

Paul W. Senne, Project Manager

Paul Senne is the Engineering Technologies Program Lead for RESPEC's Water and Natural Resources division. Mr. Senne has been with RESPEC since February of 2013, prior to which he spent five years as a GIS developer for the State of Minnesota Board of Water and Soil Resources (BWSR) and one year as a GIS analyst for the Minnesota Legislature. Mr. Senne specializes in environmental and natural-resource management related technology projects and has more than 12 years gaining a wide breadth of experience in using technology to understand watershed processes and support management efforts. This includes project management, web application development, spatial analysis in support of hydrology and watershed modeling including LiDAR driven terrain analysis, large temporal dataset acquisition and processing and modeling software development. Mr. Senne is the technical lead for RESPEC on the DSS project and works with NeDNR and EA Engineering to gather technology requirements, plan, support, and monitor progress by RESPEC's developers and communicate progress. Mr. Senne received a bachelor's degree from Valparaiso University in Geography and a Master of Public Affairs from the School of Public and Environmental Affairs in Environmental Policy and Natural Resource Management at Indiana University, Bloomington.

Tong Zhai, Lead Programmer

Dr. Zhai has over 18 years of experience in the development model codes and decision support systems. He is the lead programmer for SWMM User Interface Re-Engineering and the USGS Surface and

Groundwater and SARA Water Quality Toolboxes. Dr. Zhai holds a Ph.D. in Agricultural and biological Engineering. Dr. Zhai is an environmental and agricultural engineer with 20 years of experience working in academia and industry in the areas of environmental and natural resources engineering and life sciences. He has wide ranging experience in ecosystem models, hydraulic models, large scale hydrologic surface and groundwater models such as SWAT, SWMM, HSPF, MODFLOW, and HEC-RAS, among others. Dr. Zhai has developed many decision-support systems for environmental impact assessment, using both open source and proprietary software and GIS technologies and on both desktop and Web platforms. He is a core developer for a number of environmental and hydrologic software systems of national prominence, such as EPA BASINS, Python-QGIS SWMM, EPANET software. He also developed the GIS-enabled Surface water and Groundwater Toolbox software for U.S. Geologic Survey. He is also the core developer for an award-winning Best Management Practice (BMP) optimization decision support system to optimize BMP deployment strategy at minimum cost to achieve maximum pollutant reduction. Dr. Zhai's clients include state environmental agencies, EPA, USGS, USDA, and Army Corps. of Engineers.