NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

Section A.

ADMINISTRATIVE

PROJECT NAME: Conceptual Design of Dams for Multiple Beneficial Uses

PRIMARY CONTACT INFORMATION

Entity Name: Central Platte Natural Resources District

Contact Name: Jesse Mintken

Address: 215 Kaufman Ave, Grand Island, NE 68803

Phone: (308) 385-6282

Email: mintken@cpnrd.org

Partners / Co-sponsors, if any: Nebraska Natural Resources Commission

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

   Grant amount requested. $ 84,410

   Loan amount requested. $ Click here to enter text.

   If Loan, how many years repayment period? Click here to enter text.

   If Loan, supply a complete year-by-year repayment schedule.
   Click here to enter text.

   Are you requesting less than 60% cost share from the fund?
   No
   If so what % ? Click here to enter text.

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

Nebraska Game & Parks Commission (G&P) consultation on Threatened and Endangered Species and their Habitat	N/A☒	Obtained: YES☐	NO☐
Surface Water Right	N/A☒	Obtained: YES☐	NO☐
USACE (e.g., 404 Permit)	N/A☒	Obtained: YES☐	NO☐
Cultural Resources Evaluation	N/A☒	Obtained: YES☐	NO☐
Other (provide explanation below) Click here to enter text.	N/A☒	Obtained: YES☐	NO☐

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

YES☐ NO☒

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

YES☐ NO☒

If yes attach a copy to your application. Click here to enter text.

If yes what is the population served by your project? Click here to enter text.

If yes provide a demonstration of need. Click here to enter text.

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

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

N/A☐ YES☒ NO☐

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

YES☐ NO☒

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

If yes, describe the changes that have been made since the last application. Click here to enter text.

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

Section B.

DNR DIRECTOR'S FINDINGS

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

YES☐ NO☒

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

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

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

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

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

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

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

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

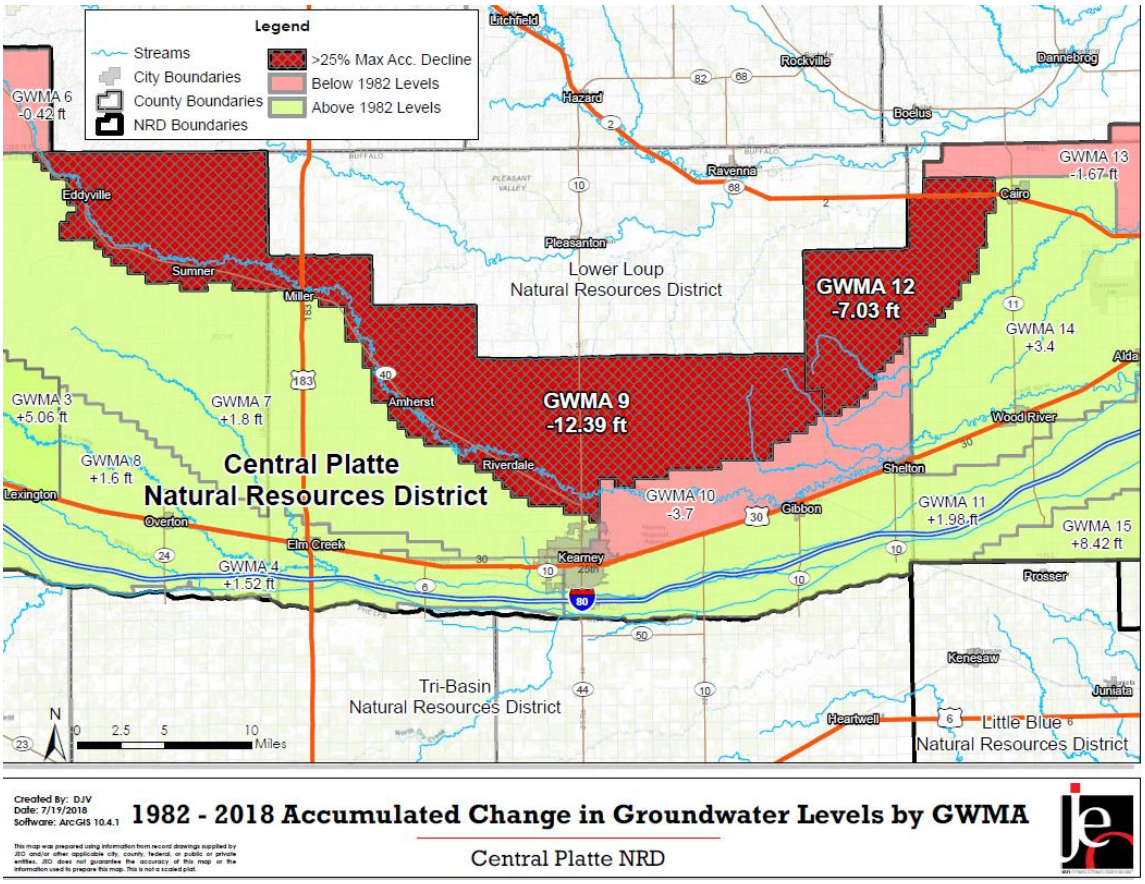
Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria (004.01 E 3). Click here to enter text.

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

A discussion of the plan of development (004.02 A);

PROJECT BACKGROUND. Groundwater levels have declined in portions of the Central Platte Natural Resources District (CPNRD) with the areas of greatest decline in Groundwater Management Area (GWMA) 9 and 12. Consequently, this reduction in groundwater availability may lead to water restrictions and additional management actions by CPNRD and the State of Nebraska. To remedy this

untenable situation, the CPNRD wants to recharge the groundwater in areas of declines, thereby increasing water-levels for conjunctive use. Conceptually, there are various recharge methods available, but one of the most effective option is to use dams to infiltrate water into the ground to recharge the aquifer. This can be accomplished by constructing new dams or improving existing dams.



To conceptually design the dams, a hydrologic watershed model will be used in connection with engineering design standards and guidelines. Together, they will serve as a tool to determine the number and location of future dams. The storage and recharge data can then be incorporated into large scale soil water balance, unsaturated-zone, and groundwater flow models to estimate the volume of water that can be returned to the aquifer and to simulate groundwater flow. With this information, water resources managers and decision-makers can proceed with final design of dam structures, develop cost opinions, and determine the timeline for groundwater restoration.

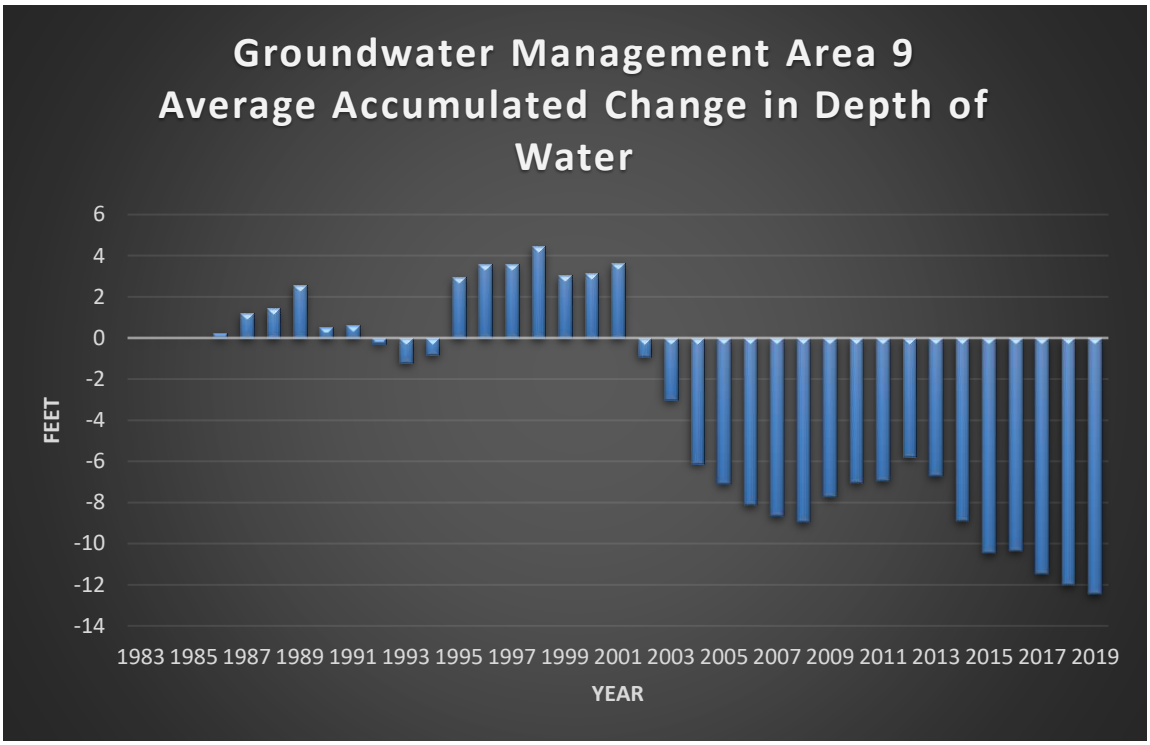
This project is feasible. It will rely on hydrologic models, physical data, and standard engineering practices to conceptually design, prioritize, and program for the eventual construction of needed dam structures.

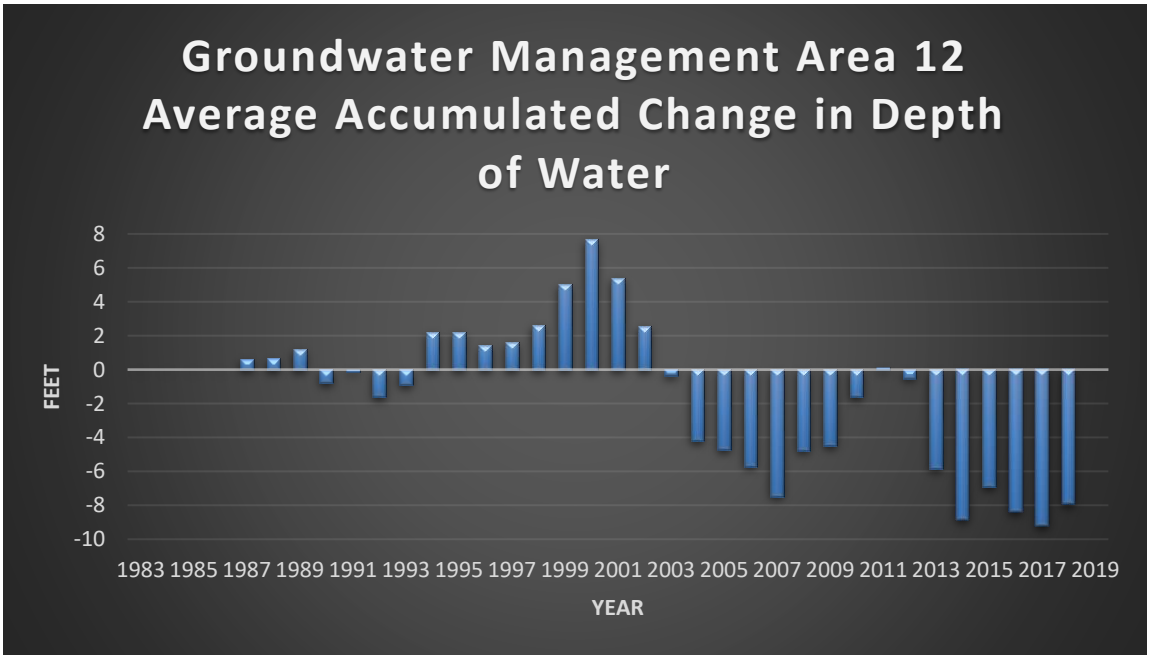
BENEFITS

- Groundwater Recharge. Dams will capture and impound water, so it can infiltrate into the ground and recharge the aquifer. This project will focus primarily on GWMA 9 and 12 and the surrounding area. These GWMA have recorded the greatest groundwater declines in the CPNRD.
- Surface Water Storage. Dams will capture and impound surface runoff, so it can infiltrate into the ground and recharge the aquifer. Without these dams, excess runoff will flow into streams and rivers and eventually leave the State of Nebraska.
- Prioritization Matrix for Design and Construction. This project will provide CPNRD with a comprehensive prioritization matrix for the final design and eventual construction of the dams. This will allow for accurate budgeting, planning, and scheduling for dam construction.
- Flood Reduction. Excess flows will be stored in reservoirs to reduce peak flows from flood events and to provide water storage for increased groundwater recharge.
- Restoration of Base Flow. As groundwater levels increase due to recharge, stream reaches that are classified as “losing streams” can possibility turn into “gaining streams.” A situation where groundwater is seeping into the stream as base flow will improve streamflow stability and continuity.
- Water Quality Improvement. Reducing peak flood flows will promote bank stabilization and prevent mobilization of sediment and other pollutants.
- Wetlands Restoration and Creation of Wildlife and Waterfowl Habitat. Shallow water in the upstream areas of the reservoirs will create wetlands and provide excellent habitat for wildlife, fish, and waterfowl.

METHODOLOGY. This planning initiative will use hydrologic models, detailed physical data, and applicable engineering standards for the conceptual design, prioritization, and programming for the eventual construction of new, or improvements to, existing. The watershed model will use rainfall/runoff numerical analysis, coupled with hydrologic and physical data, to determine the water balance and to quantify recharge rates and volumes. Data such as topography and drainage area (LiDAR derived), precipitation, evapotranspiration, soils, runoff, and other parameters will be integral part of the analysis. The product will be a conceptual design of dams for multiple beneficial uses. The study will target key areas of greatest groundwater declines in GWMA 9 and 12 and the surrounding area, but the tool can be applied to sites anywhere in the CPNRD.

Once the analysis is complete, pertinent information such as storage and recharge rates and the volume of water can be incorporated into the USGS One Water unsaturated-zone and groundwater model. Development of the One Water model is not part of this study. The ultimate outcome for the conceptual design of dams for multiple beneficial uses can be used by CPNRD to identify landowners that will set aside lands, taking them out of production, and converting them to storage and recharge basins.





TASK 1: Identification of New Dam Sites or Improvement of Existing Dam Sites. The objective of this task is to identify new dam sites and existing dams that can be improved. The listing of all existing dam sites in CPNRD was previously identified in the 2017 CPNRD Dam Inventory and Ranking project. Potential dam sites will be classified by using a combination of data including: satellite and aerial imagery, hydrology, LiDAR, land use, engineering and physical parameters.

Task 1.1: Existing Dam Sites. The 2017 Dam Inventory and Ranking project identified 140 existing dams in GWMA 9 and 12. Based on this inventory, this planning initiative will identify up to 25 existing dams for improvement. Some of the following information is available for the existing dams:

- Purpose/type
- Ownership
- Age of structure
- Hazard classification
- Dimensions
- Length
- Width
- Depth
- Primary spillway characteristics
- Auxiliary spillway characteristics
- Energy dissipation structures
- Design plans and as-built drawings
- Operation and maintenance and safety inspection records
- Reservoir surface-acre and storage volume/capacity

Task 1.2: New Dam Sites. Future dam sites will be identified using multiple sources including datasets assembled for the 2017 Dam Inventory and This planning initiative will identify up to 125 new dam sites. While the focus area of the project will be in GWMA 9 and 12 and the surrounding area, any site in the NRD can be evaluated, as needed. Datasets will include:

- Satellite and aerial imagery
- Topographic maps
- -30-, 10-, 1-meter grid elevation data
- LiDAR or other digital elevation models
- NRCS Web Soils Survey: soils type, hydrologic soil group, Runoff Curve Number, and other data
- Land use including: certified irrigated acres, National Agricultural Statistics Service crop type, and CALMIT data
- Political boundaries and infrastructure such as roads or bridges
- Hydrography of perennial streams and rivers, and streamflow data
- Climate data such as: precipitation, evapotranspiration, solar radiation, temperature, and other climate data
- Well information including: location, logs, and other data pertaining to monitoring, irrigation, municipal, and domestic wells
- Geology data including: Conservation and Survey Division test hole logs, geologic maps, and Airborne Electromagnetic (AEM) data
- Groundwater levels
- Saturated thickness and transmissivity

Task 2: Conceptual Design of New Dam Sites and Improvements to Existing Dam Sites. The objective of this task is to develop a conceptual design and preliminary

engineer's opinion of construction cost for up to 125 new and 25 existing dams. Furthermore, a prioritization matrix will be developed for final design and eventual construction of prioritized dams. The design, prioritization, and programming of these prioritized dams will be based on data realized from Task 1, technical guidelines, costs, and standard engineering practices. Key evaluation criteria will analyze the localized water balance, recharge potential, storage capacity, design and construction considerations, and cost for final design and construction. During this task, a determination will be made as to whether the dams fall under the jurisdiction of the Nebraska Department of Natural Resources (NeDNR) Safety of Dams and Reservoirs Act and require a Permit to Impound Water. A non-regulatory binding Hazard Potential Classification of the dams will also be made during this Task. Once the analysis is complete pertinent, information such as storage volumes and recharge rates and will be incorporated into the USGS One Water unsaturated zone and groundwater model. The One-Water model is being created as a part of a separate and ongoing study.

Conceptual design input parameters:

- Topography
- Hydrology
- Drainage area
- Soils
- Location
- Climate conditions
- Land use
- Engineering criteria and guidelines

Conceptual design output parameters:

- Dam dimensions, top and base width, height, length
- Elevations: top of dam, spillways, outlet channel, pond bed
- Slopes of the embankment
- Spillway pipe diameter and length
- Berms or shoulder structures
- Stage storage data including: elevation, surface area, storage volume
- Erosion rates
- Estimation of the useful life of the structure
- Construction materials
- Quantities
- Conceptual design and conceptual engineer's opinion of construction costs

Numerous detailed design standards, criteria, and guidelines will be in used this project, including:

- NeDNR Classification of Dams. https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/dam-safety/resources/Classification-Dams.pdf

- NRCS Technical Release TR-60 Earth Dams and Reservoirs https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=24937.wba
- NRCS Conservation Practice Standard No. 378-1 Pond https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046898.pdf
- NRCS Conservation Practice Standard No. 410-1 Grade Stabilization https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1263175.pdf
- NRCS Technical Release TR-55 Urban Hydrology for Small Watersheds https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf
- USBR Water Resources Technical Publication: Design of Small Dams https://www.usbr.gov/tsc/techreferences/mands/mands-pdfs/SmallDams.pdf
- USACE Engineering Manual 1110-2-1420 Hydrologic Engineering Requirements for Reservoirs https://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-1420.pdf?ver=2013-09-04-070800-890
- NOAA Atlas 14 Point Precipitation Frequency Estimates https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html
- Nebraska Probable Maximum Precipitation (PMP) Study Report and Appendix F. https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/dam-safety/resources/Nebraska-PMP-Study.pdf

Task 3: Incorporating the Design into the One-Water Unsaturated-Zone and Groundwater Model. The objective of this task will be to incorporate the conceptual design of dams for multiple beneficial uses into the USGS One Water unsaturated-zone and groundwater model. Incorporation of storage volumes and dam locations will be a critical factor in evaluating groundwater recharge and developing the long-term construction program. The One Water model will simulate recharge and groundwater flow. To prevent duplication of work and expediate incorporation, careful coordination between the dam designers and groundwater modelers will be crucial. Datasets and results will be shared with all parties and the exchange of information will be a critical aspect of the process.

Task 4: Permitting Support. Due to the nature of this project (conceptual design, prioritization, and programming), no permits will be required. However, while assembling background data and during the conceptual design, important permit information will be identified and assembled. Background information and data will evidentially be provided for U.S. Army Corps of Engineers Section 404 Program Permit, NeDNR Safety of Dams and Reservoirs Act, NeDNR Permit to Impound Water, Nebraska Department of Environmental Quality (NDEQ) NPDES Construction Stormwater General Permit, and the Endangered Species Act.

Task 5: Project Management. The objective of this task will be to manage and coordinate the processes required to produce a practical and usable, yet visionary plan for the eventual construction of prioritize dams (new and improved). Through effective project management, the conceptual design will be of excellent quality, on-time, and on-budget. Effective coordination and communication between the various project partners, designers, and hydrologic modelers will be critical for success. Project management tasks will include:

- Prepare and updating the project schedule
- Contract administration services
- Communicate and coordinate and integrate various technical disciplines to facilitate efficient completion of project
- Distribute necessary information to project team members
- Execute the Quality Assurance/Quality Control (QA/QC) plan and update as needed
- Submit progress reports and invoices as required by the Natural Resources Commission

SERVICES NOT INCLUDED IN THIS PROJECT

- Final design services
- Final engineer's opinion of estimated construction costs
- Permit preparation and submittal
- Bidding Assistance
- Construction Services
- Develop of the One-Water unsaturated-zone and groundwater model

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

The planning initiative will use standard engineering principles of practices, guidance documents, and the previously completed 2017 CPNRD Dam Inventory and Ranking project to conceptually design new and improved dams for multiple beneficial uses. Since this project is at the conceptual design level, the final deliverable will not require the seal of a Nebraska Registered Professional Engineer, however the work will be under the direction of a professional engineer to ensure a quality design, accurate modeling, and smooth transition to final design. The project will adhere to engineering standards and may use the following criteria and guidance documents:

- NeDNR Classification of Dams, 2013 Edition.
- NRCS Technical Release TR-60 Earth Dams and Reservoirs
- NRCS Conservation Practice Standard No. 378-1 Pond
- NRCS Conservation Practice Standard No. 410-1 Grade Stabilization
- NRCS Technical Release TR-55 Urban Hydrology for Small Watersheds
- USBR Water Resources Technical Publication: Design of Small Dams
- USACE Engineering Manual 1110-2-1420 Hydrologic Engineering Requirements for Reservoirs

- NOAA Atlas 14 Point Precipitation Frequency Estimates
- Nebraska Probable Maximum Precipitation (PMP) Study Report and App F.

The 2017 CPNRD Dam Inventory and Ranking project located, identified, delineated, and compiled pertinent engineering information of over 140 existing dams in GWMA 9 and 12 that were between 1-5 acres in surface area. The results of this inventory were coupled with reservoirs identified by NeDNR that were greater than 5 acres. This work was accomplished by using remotely sensed data using LiDAR data, imagery, and ArcGIS based analysis. Spatial analysis tools were used to identify embankments that blocked the natural flow paths (dams) in watersheds. These locations were then verified by imagery. An innovative 'fill' technique was employed to quantify the storage volume of the impounded area. Another outcome of this inventory was improving management identification of hazards.

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

Since this project is at the conceptual design level, securing water and/or land rights will not be required. However, during the analysis, any dams with the capacity to impound more than 15 acre-feet will be identified and noted since they will eventually require a NeDNR Application for a Permit to Impound Water. This will expediate the actual permit application during final design. Water rights determinations will be part of the final design. The cost of land will be included in the conceptual engineer's opinion of cost. Future dam siting will be based on willing sellers and not eminent domain.

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

This project will identify up to 150 sites for conceptual design, including the improvement of up to 25 existing dams and the design of up to 125 new dams. The conceptual design will be based on engineering standards and best management practices. The process will ensure compliance with regulatory and engineering standards to help protect life, infrastructure, and private property downstream of the dams.

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

To conceptually design future dams, key evaluations will need to be made, such as the localized water balance, recharge potential, storage capacity, design and construction considerations, and cost opinions for final design and construction activities. Technical experts will direct engineers and scientists to perform the work

with state of the art conceptual design software, populated with extensive datasets that are available for free, on-line. This proven methodology is the most economical way to accomplish the work, while delivering a technically accurate product that can be used by water resources managers and other decision makers. A more economical method is not available. Additionally, since the conceptual design of dams for multiple beneficial uses will identify up 150 sites in GWMA 9 and 12 and the surrounding area, CPNRD will have a comprehensive prioritization matrix for the eventual construction of prioritized dams (new and improved) which will allow for accurate budgetary programming for construction related activities.

3. Document all sources and report all costs and benefit data using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies shall be fifty (50) years or with prior approval of the Director, up to one hundred (100) years [T261 CH 2 (005)].

Engineering cost information will come from primarily the following sources:

- The first source of cost data will come from JEO Consulting Group, Inc.'s cost estimating database. Costs complied in the estimating database includes actual engineering design costs at the 30% (conceptual), 60%, 90% and final design, and data from JEO's proven experience with preparing opinion of costs for dam development and actual bids received from general contractors for similar construction projects. Information includes: unit pricing, lump sum, material type and cost, bonding/insurance, mobilization, design, construction administration, and contingency.
- The second source of cost data will be Agren Pond Builder software. Pond Builder is based on NRCS design criteria. It allows pricing based on a variety of pond sizes, pool depths, dam heights, and pipe sizes. Each option lists an associated cost for the pond. Every report contains a complete cost estimate based on county derived costs, an aerial photo showing dam location, and the size of the permanent and temporary pool.
- The third source of benefit cost data will be Water Resources Council. (1983). *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. The period of analysis for an economic feasibility study will be fifty (50) years.
- The planning initiative will delineate the cost per acre-foot of water recharged to the groundwater. The duration for returning recharge flows back to the Platte River (through the groundwater system) will be calculated by USGS One Water unsaturated zone and groundwater model. Development of the unsaturated zone and groundwater models are being created in a separate and ongoing study.

    - Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual

operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01).

Cost data will be from the JEO Consulting Group, Inc cost estimating database. Costs complied in the estimating database includes actual engineering design costs at the 30% (conceptual), 60%, 90% and final design, and data from JEO's proven experience with preparing opinion of costs for dam development and actual bids received from general contractors for similar construction projects. Information includes: unit pricing, lump sum, material type and cost, bonding/insurance, mobilization, design, construction administration, and contingency.

Cost data will be Agren Pond Builder software. Pond Builder is based on NRCS design criteria. It allows pricing based on a variety of pond sizes, pool depths, dam heights, and pipe sizes. Each option lists an associated cost for the pond. Every report contains a complete cost estimate based on county derived costs, an aerial photo showing dam location, and the size of the permanent and temporary pool.

- Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe any intangible or secondary benefits separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, such that the economic feasibility of the project can be approved by the Director and the Commission (005.02).

Benefit cost data will be from the Water Resources Council. (1983). *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*. The period of analysis for an economic feasibility study will be fifty (50) years.

The project will delineate the cost per acre-foot of water recharged to the groundwater. The duration for returning recharge flows back to the Platte River (through the groundwater system) will be calculated by USGS One Water unsaturated zone and groundwater model. Development of the unsaturated zone and groundwater models are being created in a separate and ongoing study.

- All benefit and cost data shall be presented in a table form to indicate the annual cash flow for the life of the proposal, not to exceed 100 years (005.03).

The period of analysis for an economic feasibility study will be fifty (50) years.

- In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, the economic feasibility of such proposal shall be demonstrated by such method as the Director and the Commission deem appropriate (005.04).

The calculation of primary tangible benefits will be done as described in Section B. 3. of this application.

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

The CPNRD has a General Fund established for District operations including funding for various unspecified water and natural resources projects. The total property tax requirement in CPNRD is $5,639,132.09 and is all for the General Fund. Based on the total valuation for CPNRD of $17,409,965,131.00 the levy for the General Fund is 0.03239. A portion of the General Funds will be designated for the Conceptual Design of Dams for Multiple Beneficial Uses project.

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

I, Lyndon Vogt General Manager for the Central Platte Natural Resources District, am authorized to commit financial resources in support of this application. The Central Platte Natural Resources District will commit $56,270 in both local financial support and in-kind services for the application. As of Fiscal Year, 2017/2018 the total property tax requirement in CPNRD is $5,639,132.09 and is all for the General Fund. Based on the total valuation for CPNRD of $17,409,965,131.00 the levy for the General Fund is 0.03239. Revenues generated from local taxes will be used for all necessary operation, maintenance and replacement costs of the structure in the future

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

Not applicable

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

This project will develop a priorization matrix that will provide a practical and usable, yet visionary guide for the final design and eventual construction of up to 150 new and improved dam structures. By developing the plan in a logical sequence, there will be time to address and minimize impacts on the natural environment. It is anticipated that most of the dam structures will be small, so

therefore, the environmental consequences should have limited negative impacts on the natural environment. Delineation of wetlands will be made during the final design phase, so therefore, the CPNRD will not seek reimbursement from the Natural Resources Commission for wetland delineation services. The project and its planned development minimize impacts to the environment by:

- Utilizing mostly smaller dams, which have little impact on the larger environment, including wetlands and stream biota
- Construction can be completed by small equipment, which do not require the construction of roads or bridges; therefore, impacts will be temporary and minimal
- Dams on perennially flowing streams may be designed to allow for fish passage.
- Stabilizing the streambed will improve the natural environment by reducing erosion and sediment transport
- Increasing habitat diversity within the stream will improve the natural environment

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

CPNRD has statutorily authority under Neb. Rev. Stat. 2-3229 for prevention and control of erosion, soil conservation, and management of water supplies for beneficial uses. Furthermore, Neb. Rev. Stat. 2-3230 and 2-3232 enables NRDs to develop facilities, works, studies, and complete demonstration projects that furthers the purposes of the NRD. Finally, NRDs have the statutorily authority and jurisdiction to manage groundwater resources through the Nebraska Groundwater Management and Protection Act (Neb. Rev. Stat. 46-702, 46-703,46-704). In summary, these statutes provide NRDs with the legal authority to regulate groundwater quantity and quality management.

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

The CPNRD is listed by NeDNR as either Fully or Over-Appropriated in the 2017 Annual Evaluation of Availability of Hydrologically Connected Water Supplies https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/water-planning/statewide/FAB/2017AnnualReport/ReportSummaryAndTableOfContents2017_2.pdf. GWMA 9 and 12 and the surrounding area are listed as Fully Appropriated and are considered to have hydrologically connected groundwater and surface-water. Since the area is hydrologically connected, by increasing groundwater levels, base flow could increase and thereby return flows to the Platte River. This project will work under the requirements of the Central Platte Natural Resources District Integrated Management Plan (IMP) http://cpnrd.org/wp-content/uploads/2018/07/Integrated-management-plan-CPNRD.pdf. The IMP was adopted by the CPNRD on July 23, 2009, and by the NeDNR on August 13, 2009. The original IMP became effective on September 15, 2009. A revised IMP was

adopted on March 22, 2012 and became effective on May 21, 2012. This project will forward the intent and requirements of the CPNRD Rules and Regulations for the Enforcement of the Nebraska Groundwater Management and Protection Act http://cpnrd.org/wp-content/uploads/2015/11/GW-Management-RR2017.pdf. These rules and regulations were adopted on February 23, 2006 and last amended on August 31, 2017. The project will work towards compliance with the implementation the Upper Platte Basin-Wide Plan Second Increment and the associated updates to the IMP. This project will supply background information and data for U.S. Army Corps of Engineers Section 404 Program Permit, NeDNR Safety of Dams and Reservoirs Act, NeDNR Permit to Impound Water, and Nebraska Department of Environmental Quality (NDEQ) NPDES Construction Stormwater General Permit, and ESA requirements.

10. Are land rights necessary to complete your project?

YES☐ NO☒

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

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

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

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

The CPNRD has statutorily authority under Neb. Rev. Stat. 2-3229 for prevention and control of erosion, soil conservation, and management of water supplies for beneficial uses. Furthermore, Neb. Rev. Stat. 2-3230 and 2-3232 enables NRDs to develop facilities, works, studies, and complete demonstration projects that furthers the purposes of the NRD. Finally, NRDs have the statutorily authority and jurisdiction to manage groundwater resources through the Nebraska Groundwater Management and Protection Act (Neb. Rev. Stat. 46-702, 46-703,46-704). In summary, these statutes provide NRDs with the legal authority to regulate groundwater quantity and quality management.

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

It is anticipated that most of the dams identified in the conceptual design will be small structures. Therefore, the environmental consequences will be minimized, and most likely, beneficial. The benefits will include, but not be limited to:

- Increased groundwater recharge
- Increased habitat diversity through creation of shallow areas in the upstream portion of the reservoirs. This will provide waterfowl habitat, fisheries, and creation or at least replacement of wetland areas.
- Reduced streambed scour and streambank erosion because of reduced peak flows
- Improved water quality by reducing sediment transport during runoff events

The proposed recharge structures are likely to be small to avoid adverse environmental impacts that are inherent with larger structures, such as negative impacts to wetlands, riparian areas, and native fish species.

Section C.

NRC SCORING

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

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

Notes:

- The responses to one criterion *will not* be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.

- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted in parenthesis. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.

- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

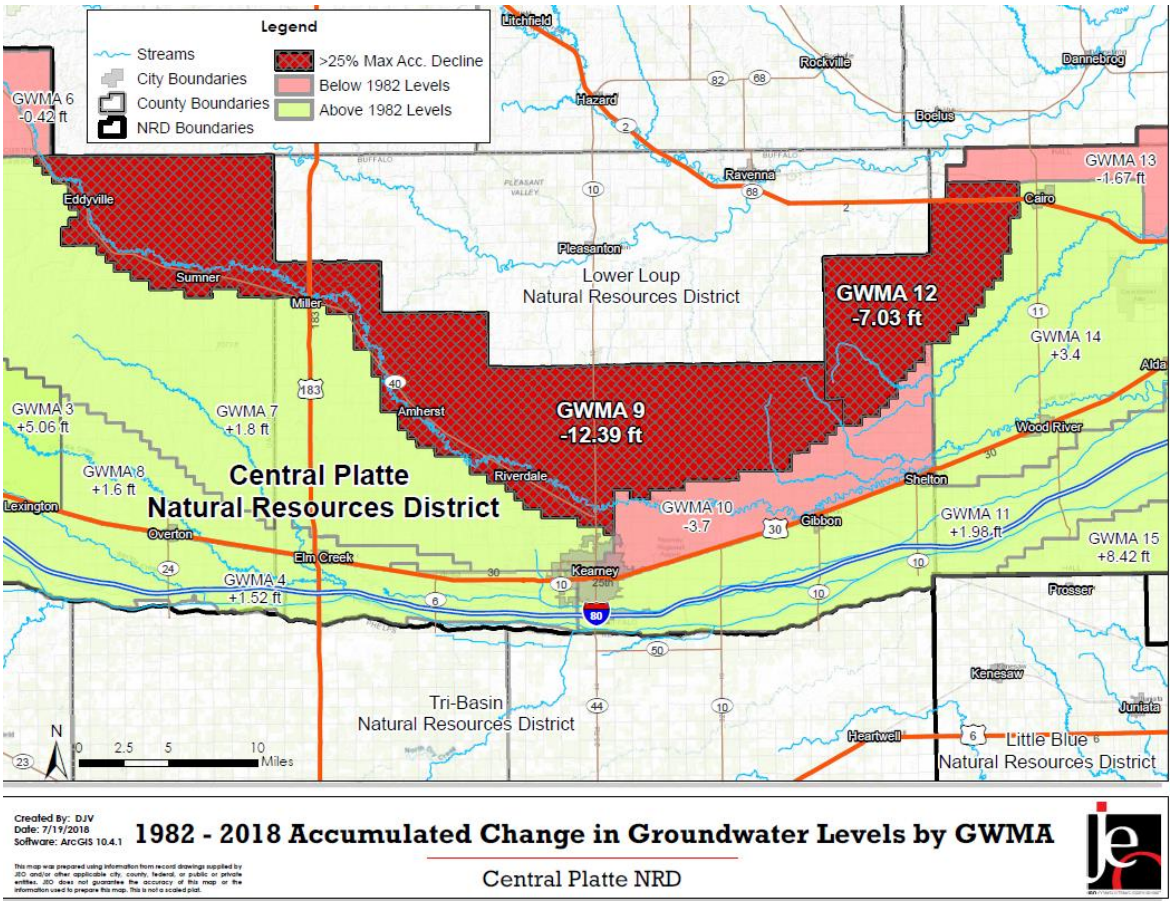
Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;

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

   Groundwater levels have declined in portions of the Central Platte Natural Resources District (CPNRD), with the areas of greatest decline in Groundwater Management Area (GWMA) 9 and 12. GWMA 9 lies immediately north of Kearney,

Nebraska. Consequently, this reduction in groundwater availability depletes local drinking water supplies which may ultimately lead to water restrictions and additional management actions by CPNRD and the State of Nebraska. Furthermore, since surface water and groundwater are hydrologically connected in GWMA 9 and 12 and the surrounding area, declines in groundwater recharge could negatively impact streamflow and groundwater flows to the Platte River and to the South Loup River.



According to the American Community Survey 5-Year Estimate (2012-2016), of the population in the study area is estimated at 50,000, including the City of Kearney. The water supply is for the following uses:

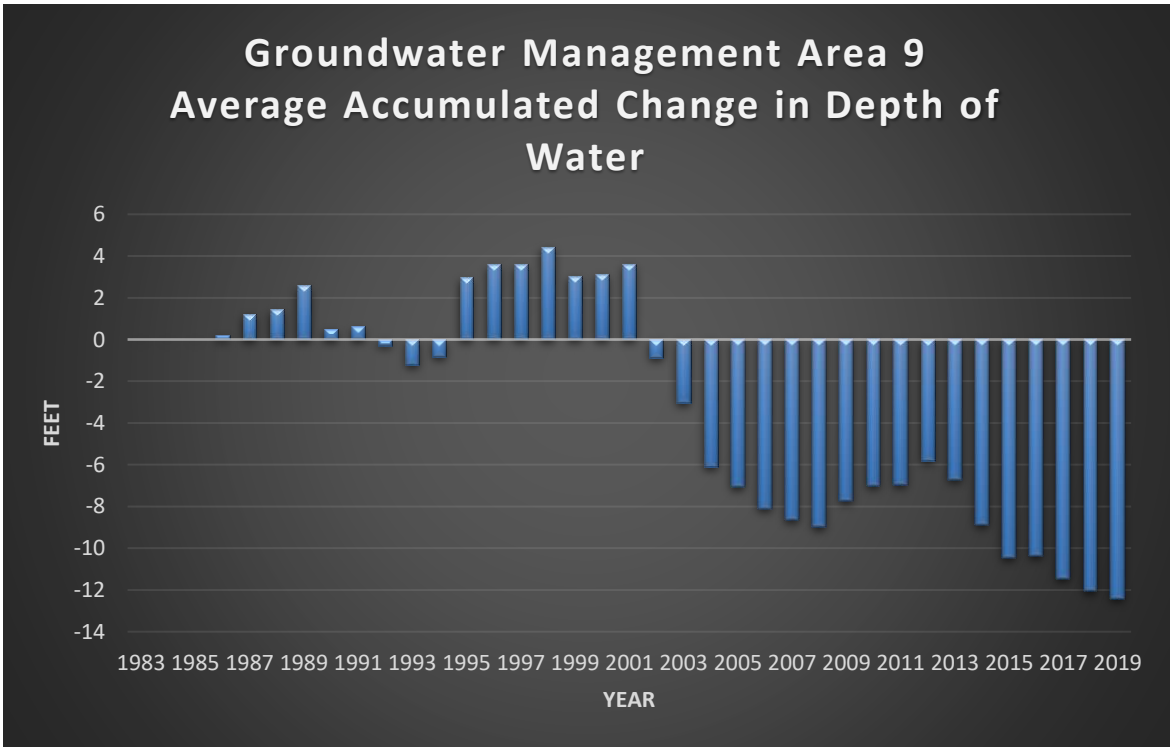
USGS, 2015 Water Use Data for the Study Area (million gallons per day)

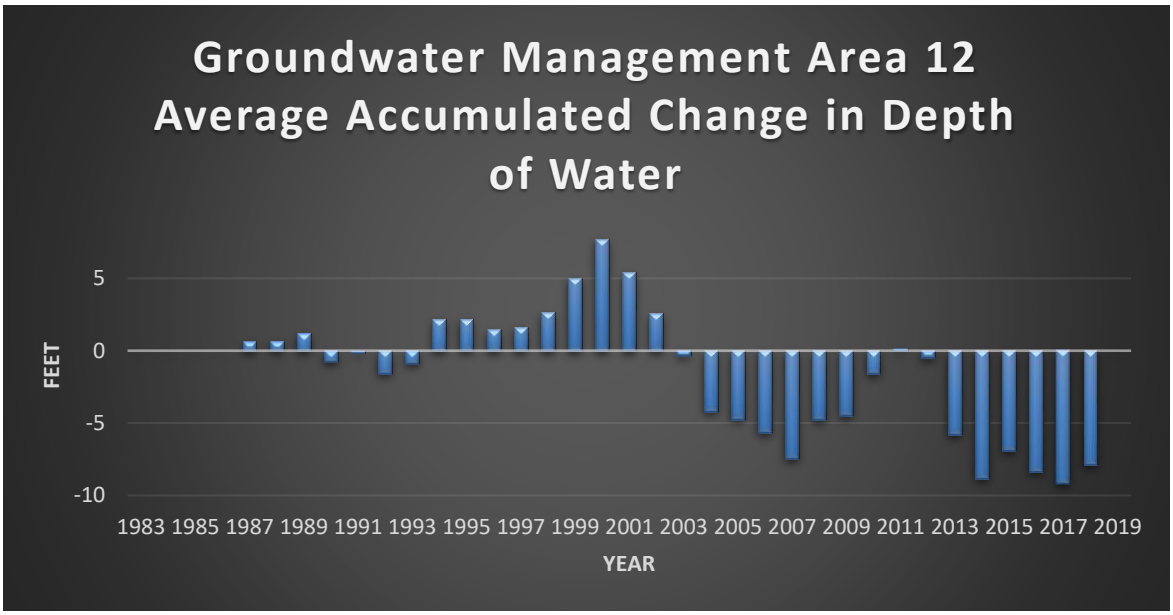
Thermal Electric	0
Irrigation	205
Public Supply	6.45
Industrial	2.11
Total	217

CPNRD has addressed the groundwater declines in GWMA 9 and 12 since creation of the management areas and the NRD, itself. GWMA 9 and 12 and the

surrounding area are listed as Fully Appropriated and are considered to have hydrologically connected groundwater and surface-water. Since the area is hydrologically connected, by increasing groundwater levels, base flow could increase and thereby return flows to the Platte River. This project will work under the requirements of the Central Platte Natural Resources District Integrated Management Plan (IMP) http://cpnrd.org/wp-content/uploads/2018/07/Integrated-management-plan-CPNRD.pdf. The IMP was adopted by the CPNRD on July 23, 2009, and by the NeDNR on August 13, 2009. The original IMP became effective on September 15, 2009. A revised IMP was adopted on March 22, 2012 and became effective on May 21, 2012. This project will forward the intent and requirements of the CPNRD Rules and Regulations for the Enforcement of the Nebraska Groundwater Management and Protection Act http://cpnrd.org/wp-content/uploads/2015/11/GW-Management-RR2017.pdf. These rules and regulations were adopted on February 23, 2006 and last amended on August 31, 2017.

As groundwater levels have been declining in GWMA 9 and 12 since the drought period in 2001 through 2003, respectively. These declines have been persistent, and they are increasing in magnitude. The results for area stakeholders are, at a minimum, increased pumping costs. In the worse-case, the relocation of wells where there is adequate supply. Over the long-term (since GWMA 9 is immediately north of Kearney) supply concerns could arise in the city's municipal wellfield. Without this project to capture and impound surface water for recharge of the groundwater, water will continue to flow out of the CPNRD and the State of Nebraska and its beneficial use will be lost.





2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;

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

This project will work to meet the requirements of the CPNRD Integrated Management Plan (IMP) http://cpnrd.org/wp-content/uploads/2018/07/Integrated-management-plan-CPNRD.pdf. The IMP was adopted by the CPNRD on July 23, 2009, and by the Nebraska Department of Natural Resources (NeDNR) on August 13, 2009. The original IMP became effective on September 15, 2009. A revised IMP was adopted on March 22, 2012 and became effective on May 21, 2012. This project will work to meet the requirements of the CPNRD Rules and Regulations for the Enforcement of the Nebraska Groundwater Management and Protection Act http://cpnrd.org/wp-content/uploads/2015/11/GW-Management-RR2017.pdf. These rules and regulations were adopted on February 23, 2006 and last amended on August 31, 2017. The project will work towards compliance with the implementation the Upper Platte Basin-Wide Plan Second Increment and the associated updates to the CPNRD IMP.

Goals 1. Secure any future water supply projects that are shown to be feasible, beneficial, and desirable. Groundwater Management Areas 9 and 12 and the surrounding area are listed as Fully Appropriated and are considered to have hydrologically connected groundwater and surface-water. For this reason,

increasing groundwater levels will increase base flow, returning flow to the Platte River.
Goal 2. Provide for a total consumption of water that does not exceed a fully appropriated status.
Goal 3. Maintain for present and future generations the District's water resources while promoting programs that allow economic growth.
Goal 4. Provide, for present and future generations, an adequate supply of quality water for feasible and beneficial uses.
Goal 5. Minimize and/or resolve conflicts between water users.
Goal 6. Ensure that the plan complies with the law and with interstate agreements, and to meet basin-wide goals.

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

   List the following information that is applicable:

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

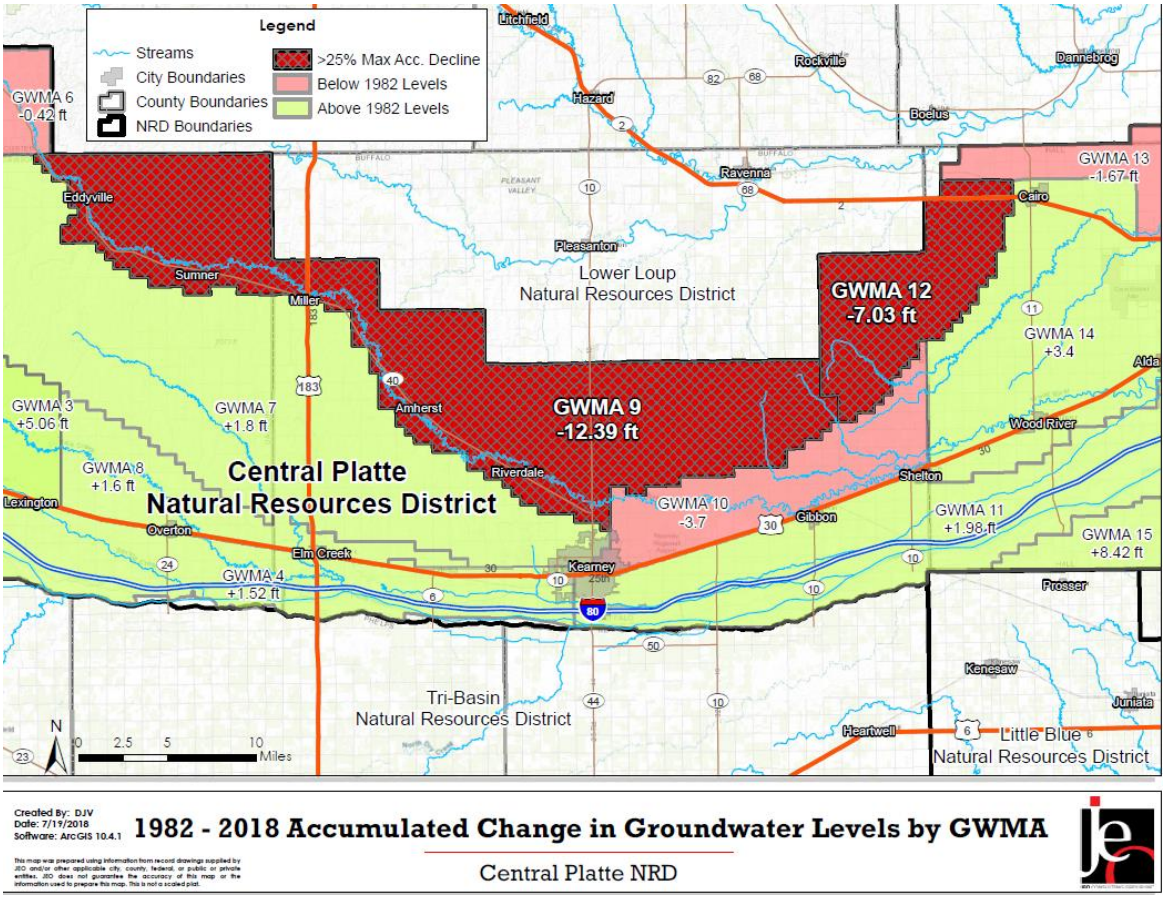
   A major benefit of dams is that they retime streamflow, by capturing excess water that otherwise will flow out of District/State. The proposed project will focus on CPNRD GWMA 9 and 12 and the surrounding area. These are the areas of greatest groundwater declines in the NRD. This project will determine the amount of groundwater recharge produced by conceptually designing 150 new or improved dams for multiple beneficial uses. This project will use hydrologic models, detailed physical data, and applicable engineering standards for the conceptual design, prioritization, and programming for the eventual construction of new or improvement of existing dams. The watershed model will use rainfall/runoff numerical analysis, coupled with hydrologic and physical data, to determine the water balance and to quantify recharge rates and volumes. Data such as topography and drainage area (LiDAR derived), precipitation, evapotranspiration, soils, runoff, and other parameters will be integral part of the analysis. The product will be a conceptual design of dams for multiple beneficial uses. The study will target key areas of greatest groundwater declines in GWMA 9 and 12 and the surrounding area, but the tool can be applied to sites anywhere in the CPNRD, if needed.

   Once the analysis is complete, pertinent information such as storage and recharge rates and the volume of water can be incorporated into the USGS One Water unsaturated-zone and groundwater model. Development of the One Water model is being created in a separate project. The ultimate outcome for the conceptual design of dams for multiple beneficial uses can be used by CPNRD to identify

landowners that will set aside lands, taking them out of production, and converting them to storage and recharge basins.

Since all GWMA 9 and 12 and the surrounding area are in hydrologically connected areas, declines in groundwater will negatively impact streamflow. It is likely that the groundwater declines will cause “losing streams” or surface water seeping into the groundwater. This losing stream reduces baseflow and result in less streamflow for the Platte River and possibility the South Loup River.

Even though GWMA 9 and 12 and some of the surrounding area are in CPNRD, the groundwater declines ignore political and even watershed boundaries. The groundwater declines extend into the Lower Loup Natural Resources District (LLNRD), crossing over the Platte River Basin into the Loup River Basin. This project will delineate recharge water for the primarily the Platte Basin, however it is possible that it will alleviate the groundwater declines in the South Loup Basin. The USGS One Water unsaturated-zone and groundwater model will make this determination.



4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits,

wildlife habitat, conservation of water resources, and preservation of water resources;

- List the goals the project provides benefits.
- Describe how the project will provide these benefits
- Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

The conceptual design of dams for multiple beneficial uses is a feasible engineering project. Goals include:

GOALS

- Use dams to retime streamflow by capturing excess water that can be used for recharge
- Increase baseflow which will result in more streamflow for the Platte River and possibility the South Loup River.
- Reduce peak flows
- Improve water quality
- Provide habitat
- Use standard engineering practices and hydrologic and physical data to conceptually design, prioritize, and program dam construction activities.

BENEFITS

- Groundwater Recharge. Dams will capture and impound water, so it can infiltrate into the ground and recharge the aquifer. This project will focus primarily on GWMA 9 and 12 and the surrounding area. These GWMA have recorded the greatest groundwater declines in the CPNRD.
- Surface Water Storage. Dams will capture and impound surface runoff, so it can infiltrate into the ground and recharge the aquifer. Without these dams, excess runoff will flow into streams and rivers and eventually leave the State of Nebraska.
- Prioritization Matrix for Design and Construction. This project will provide CPNRD with a comprehensive prioritization matrix for the final design and eventual construction of the dams. This will allow for accurate budgeting, planning, and scheduling for dam construction.
- Flood Reduction. Excess flows will be stored in reservoirs to reduce peak flows from flood events and to provide water storage for increased groundwater recharge.
- Restoration of Base Flow. As groundwater levels increase due to recharge, stream reaches that are classified as “losing streams” can possibility turn into “gaining streams.” A situation where groundwater is seeping into the stream as base flow will improve streamflow stability and continuity.
- Water Quality Improvement. Reducing peak flood flows will promote bank stabilization and prevent mobilization of sediment and other pollutants.

Wetlands Restoration and Creation of Wildlife and Waterfowl Habitat. Shallow water in the upstream areas of the reservoirs will create wetlands and provide excellent habitat for wildlife, fish, and waterfowl.
If the conceptual design of dams for multiple beneficial uses is not implemented, groundwater declines in GWMA 9 and 12 and the surrounding area will likely continue. Consequently, as the reduction in groundwater availability depletes, water supplies for irrigation, public consumption, and industrial uses, it is likely that water restrictions and additional management actions by CPNRD and the State of Nebraska will be needed.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

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

   The conceptual design of dams for multiple beneficial uses will help maximize use of Nebraska's water resources by capturing and impounding the water and preventing it from flowing out of CPNRD and the State of Nebraska; losing its beneficial use.

   Water supply projects cannot increase the total volume of available water, but these types of projects can retime release of stored water from periods of excess to periods of need. The dams will retime excess stream flows by ponding water that will recharge the groundwater and thereby reduce groundwater declines. This action will possibility restore base flow, provide long-term streamflow benefits, and help maximize the beneficial use of Nebraska's water by Nebraskans and provide beneficial uses in the Platte River Basin and possibility cross over to the Loup River Basin.

   This project will not reduce beneficial streamflows or aquifer benefits for any user or group of users. No opposition to these projects is known.

   The project provides a benefit to the state's residents by implementing cost-effective, environmentally-friendly, and typically small-scale projects that will not adversely impact land-owners or rely upon regulations to address groundwater declines and streamflow depletions. The benefits will extend far beyond the study area. Through the use of new and improved dam structures groundwater levels within GWMA 9 and 12 will likely be restored and result in increased stream baseflow. This will be important to water consumers, particularly during periods where water use exceeds supplies. The information gathered from monitoring the projects will help educate the public on the importance of water sustainability and can be used as demonstration sites when encouraging other landowners across the CPNRD service area to support similar recharge project on their lands. This

information will be valuable to the CPNRD, but will also be shared with other NRDs, municipalities, and state agencies that are pursuing similar recharge concepts.

6. Is cost-effective;

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

The conceptual design of dams for multiple beneficial uses will determine probable constructions costs, operations and maintenance (O/M) costs, land acquisition costs, alternative options, and value of benefits gained. Engineering cost information will come from primarily the following sources:

Cost data will be from the JEO Consulting Group, Inc cost estimating database. Costs complied in the estimating database includes actual engineering design costs at the 30% (conceptual), 60%, 90% and final design, and data from JEO's proven experience with preparing opinion of costs for dam development and actual bids received from general contractors for similar construction projects. Information includes: unit pricing, lump sum, material type and cost, bonding/insurance, mobilization, design, construction administration, and contingency.

The second source of cost data will be Agren Pond Builder software. Pond Builder is based on NRCS design criteria. It allows pricing based on a variety of pond sizes, pool depths, dam heights, and pipe sizes. Each option lists an associated cost for the pond. Every report contains a complete cost estimate based on county derived costs, an aerial photo showing dam location, and the size of the permanent and temporary pool.

The third source of benefit cost data will be Water Resources Council. (1983). *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* https://www.federalregister.gov/documents/2014/12/24/2014-30170/economic-and-environmental-principles-and-guidelines-for-water-and-related-land-resources. The period of analysis for an economic feasibility study will be fifty (50) years.

The project will delineate the cost per acre-foot of water recharged to the groundwater. The duration for returning recharge flows back to the Platte River (through the groundwater system) will be calculated by USGS One Water model. Development of the One Water models is being developed in a separate and ongoing study.

Project Budget

Task	Total Cost
Task 1: Identification of New Dam Sites or Improvement to Existing Dam Sites	$35,920
Task 2: Conceptual Design of New Dam Sites and Improvements to Existing Dam Sites	$61,880
Task 3: Incorporating the Design into the Unsaturated-Zone and Groundwater Models	$23,600
Task 4: Permit Support	$4,400
Task 5: Project Management:	$14,880
Total	**$140,680**

To conceptually design future dams, key evaluations will need to be made, such as the localized water balance, recharge potential, storage capacity, design and construction considerations, and cost opinions for final design and construction activities. Technical experts will direct engineers and scientists to perform the work with state of the art conceptual design software, populated with extensive datasets that are available for free, on-line. This proven methodology is the most economical way to accomplish the work, while delivering a technically accurate product that can be used by water resources managers and other decision makers. A more economical method is not available. Additionally, since the conceptual design of dams for multiple beneficial uses will identify up 150 sites in GWMA 9 and 12 and the surrounding area, CPNRD will have a comprehensive prioritization matrix for the eventual construction of prioritized dams (new and improved) which will allow for accurate budgetary programming for construction related activities.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

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

   The conceptual design of dams for multiple beneficial uses will help the State of Nebraska meet the requirements of the Platte River Recovery Implementation Program (Program) https://platteriverprogram.org/about/program-details. This interstate agreement was initiated on January 1, 2007 between Nebraska, Wyoming, Colorado, and the Department of the Interior, to address endangered species issues in the central and lower Platte River basin. The species considered in the Program, referred to as “target species”, are the whooping crane, piping plover, interior least tern, and pallid sturgeon. A key milestone for the First Increment of the Program (2007 to 2019) is reducing deficits to United

States Fish and Wildlife Service (USFWS) Platte River target flows by an average of 130,000 –150,000 acre-ft annually.

New and improved dams will not increase the total volume of available water, but rather they will store and retime the water from periods of excess to periods of need. The dams will retime excess stream flows by ponding water that will recharge the groundwater, reduce groundwater declines, possibility increasing baseflow, and ultimately help erase the deficits to the USFWS Platte River target flows.

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the Untied States such that their incapacitation would have a debilitating effect on public security or public health and safety;

- Identify the property that the project is intended to reduce threats to.
- Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
- Identify the potential value of cost savings resulting from completion of the project.
- Describe the benefits for public security, public health and safety.

The conceptual design of dams for multiple beneficial uses will identify critical infrastructure protected by new and improved dams. Also, once constructed, the dams will reduce streambed scour and bank erosion that can harm adjacent infrastructure such as buildings, roads, and bridges. By regulating streamflow with dams, valuable farmland and residential land will be protected. Restoring groundwater levels will provide agricultural producers a reliable water supply for irrigation, and to protect domestic water supplies for individual well owners and municipalities that rely on groundwater for their water supply.

There is an extensive network of roads, bridges, and culverts throughout GWMA 9 and 12 and the surrounding area. Streambank and streambed degradation destabilizes streams and threatens surrounding property and infrastructure. This is a serious issue throughout Nebraska, particularly related to bridges. The cost for repairing and replacing bridges is high and the environmental permitting requirements associated with large streambank stabilization projects is challenging. If groundwater levels continue to decline, communities and individual land owners might have to drill new wells to replace lost supplies. Dry wells are a threat to critical infrastructure.

The project provides a potential cost savings to government agencies by preventing channel degradation and streambank stabilization from migrating channels, which would undermine the integrity of the infrastructure. Additionally, drilling wells and connecting the delivery system (piping and pumps) is expensive.

The conceptual design of dams for multiple beneficial uses will provide public safety benefits by preventing the degradation of streambanks and streambeds that can undermine the integrity of infrastructure and protecting critical water supplies.

9. Improves water quality;

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

The water quality issues of concern in GWMA 9 and 12 and the surrounding area are primarily caused by agricultural runoff that transports fertilizers, pesticides, bacteria, and sediment.

Dams protect downstream waterways from the impact of agricultural runoff pollution by trapping and filtering pollutants within the reservoir particularly during high flow events. The shallow areas of the reservoir will help remove nutrients and settle out sediment with enhanced wetland vegetation. Bacteria and pesticides in the runoff be reduced through natural attenuation and degradation within pooled areas. Sediment will be trapped within the reservoir areas and as a result downstream sediment loads will be reduced. Wetland plants will “uptake” excess fertilizers and thereby reducing transport of pollutants to the groundwater.

Other remedies to the water quality issues are to use agricultural best management practices. Even though UNL extension, NRCS, and the CPNRD promote BMPs, the pollution continues. The dams will provide additionally treatment in conjunction with these BMPs.

In 1987, CPNRD Groundwater Quality Management Program http://cpnrd.org/wp-content/uploads/2015/11/GW-Management-RR2017.pdf.was established and it was the first in the Central Platte Valley to address widespread high groundwater nitrate problems. Over the last 30 years, nitrate levels in the groundwater and vadose zones have been reduced using a long-term, common sense management approach. Until the Program was adopted, nitrate levels in some areas had increased to 19 ppm; now the current average is down to 14 ppm.

Changes have been made over the years. Cost-share practices that help producers reduce water and fertilizer applied have been modified to implement new practices. Reporting requirements have also evolved with the reporting form now online to save producers time and taxpayers money. Nearly 800 producers participate in the Program and are credited for lowering contamination levels

through their management efforts. Another effective learning tool are the 400 demonstration sites located on local producers' fields.

Although average nitrate levels have dropped 5 ppm in 30 years, there are still high nitrate areas throughout the District. The NRD will continue to work with producers to implement best management practices and regulations as needed to reach safe nitrogen levels in our groundwater.

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

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

The CPNRD has a General Fund established for District operations including funding for various unspecified water and natural resources projects. The total property tax requirement in CPNRD is $5,639,132.09 and is all for the General Fund. Based on the total valuation for CPNRD of $17,409,965,131.00 the levy for the General Fund is 0.03239. A portion of the General Funds will be designated for the Conceptual Design of Dams for Multiple Benefits project.

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

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

The conceptual design of dams for multiple beneficial uses project will work to meet the requirements of the Central Platte Natural Resources District IMP http://cpnrd.org/wp-content/uploads/2018/07/Integrated-management-plan-CPNRD.pdf. The IMP was adopted by CPNRD on July 23, 2009, and by the NeDNR on August 13, 2009. The original IMP became effective on September 15, 2009. A revised IMP was adopted on March 22, 2012 and became effective on May 21, 2012. This project will work to meet the requirements of the CPNRD Rules and Regulations for the Enforcement of the Nebraska Groundwater Management and Protection Act http://cpnrd.org/wp-content/uploads/2015/11/GW-Management-RR2017.pdf. These rules and regulations were adopted on February

23, 2006 and last amended on August 31, 2017. The project will work towards compliance with the implementation the Upper Platte Basin-Wide Plan Second Increment and the associated updates to the CPNRD IMP.

Goal 1. Secure any future water supply projects that are shown to be feasible, beneficial, and desirable. Groundwater Management Areas 9 and 12 and the surrounding area are listed as Fully Appropriated and are considered to have hydrologically connected groundwater and surface-water. For this reason, increasing groundwater levels will increase base flow, returning flow to the Platte River.
Goal 2. Provide for a total consumption of water that does not exceed a fully appropriated status.
Goal 3. Maintain for present and future generations the District's water resources while promoting programs that allow economic growth.
Goal 4. Provide, for present and future generations, an adequate supply of quality water for feasible and beneficial uses.
Goal 5. Minimize and/or resolve conflicts between water users.
Goal 6. Ensure that the plan complies with the law and with interstate agreements, and to meet basin-wide goals.

A primary purpose of the conceptual design of dams for multiple beneficial uses project will be to determine groundwater recharge. With this information sustainable water use can be quantified. According to the American Community Survey 5-Year Estimate (2012-2016) of the population in the study area is estimated at 50,000, including the City of Kearney.

According to the USGS, the 2015 Water Use for the study area is:
USGS, 2015 Water Use Data for the Study Area (million gallons per day)

Thermal Electric	0
Irrigation	205
Public Supply	6.45
Industrial	2.11
Total	217

Stakeholders include:
- Buffalo, Hall, and, Dawson Counties
- Cities of Kearney, Gibbon, and Ravenna
- Villages of Amherst, Elm Creek, Miller, Pleasanton, Riverdale, Shelton
- Landowners
- Irrigation Districts
- Industrial stakeholders
- Commercial stakeholders
- NeDNR
- USFWS
- Platte River Recovery Implementation Program
- Nebraska Department of Environmental Quality

- Nebraska Emergency Management Agency

The citizens and agencies in Buffalo County will be the primary beneficiaries of the conceptual design of dams for multiple beneficial uses, however the project will benefit to the entire State of Nebraska.

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.
- Describe how the project will address each issue and/or problem.
- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

This project will address the water management issues of both water quantity and water quality. Problems addressed will include: groundwater declines, complying with fully- and over-appropriated basin requirements of hydrologically connected surface and groundwater areas, Platte River flow deficits, flood control, water quality and habitat degradation.

According to the American Community Survey 5-Year Estimate (2012-2016) of the population in the study area is estimated at 50,000, however all citizens of Nebraska will receive the benefits of this project by capturing water that would otherwise flow out of Nebraska and provide no beneficial use to Nebraskans.

The conceptual design of dams for multiple beneficial uses will provide the following:

Benefits

- Groundwater Recharge. Dams will capture and impound water, so it can infiltrate into the ground and recharge the aquifer. This project will focus primarily on GWMA 9 and 12 and the surrounding area. These GWMA have recorded the greatest groundwater declines in the CPNRD.
- Surface Water Storage. Dams will capture and impound surface runoff, so it can infiltrate into the ground and recharge the aquifer. Without these dams, excess runoff will flow into streams and rivers and eventually leave the State of Nebraska.
- Prioritization Matrix for Design and Construction. This project will provide CPNRD with a comprehensive prioritization matrix for the final design and eventual construction of the dams. This will allow for accurate budgeting, planning, and scheduling for dam construction.
- Flood Reduction. Excess flows will be stored in reservoirs to reduce peak flows from flood events and to provide water storage for increased groundwater recharge.

- Restoration of Base Flow. As groundwater levels increase due to recharge, stream reaches that are classified as “losing streams” can possibility turn into “gaining streams.” A situation where groundwater is seeping into the stream as base flow will improve streamflow stability and continuity.
- Water Quality Improvement. Reducing peak flood flows will promote bank stabilization and prevent mobilization of sediment and other pollutants.
- Wetlands Restoration and Creation of Wildlife and Waterfowl Habitat. Shallow water in the upstream areas of the reservoirs will create wetlands and provide excellent habitat for wildlife, fish, and waterfowl.

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

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

The conceptual design of dams for multiple beneficial uses will be joint venture between the CPNRD and the Nebraska Natural Resources Commission.

Project Budget

Task	Total Cost
Task 1: Identification of New Dam Sites or Improvement to Existing Dam Sites	$35,920
Task 2: Conceptual Design of New Dam Sites and Improvements to Existing Dam Sites	$61,880
Task 3: Incorporating the Design into the Unsaturated-Zone and Groundwater Models	$23,600
Task 4: Permit Support	$4,400
Task 5: Project Management:	$14,880
Total	**$140,680**
CPNRD 40% Contribution	$56,270
Nebraska Natural Resources Commission 60% Contribution	$84,410

CPNRD has committed to 40% of the total project cost. A letter of financial commitment can be found in Appendix A. No other partnerships are anticipated.

If the CPNRD’s request for financial support is not selected for funding by the Nebraska Natural Resources Commission, then the project will be delayed until other funding sources become available. Meanwhile the groundwater declines will

likely continue, water quality will continue to degrade, and property and critical infrastructure will remain unprotective from peak flows.

14. Contributes to watershed health and function;

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

The conceptual design of dams for multiple beneficial uses project will promote healthy watersheds by supporting:

- Dynamic hydrologic and geomorphologic processes by improving baseflow and by reducing peak flows. This will stabilize stream beds and prevent streambank erosion.
- Habitat of sufficient size and connectivity to support native aquatic and riparian species by creating wetlands in the shallow areas of the reservoirs and by providing habitat for wildlife.
- Physical and chemical water quality conditions able to support healthy biological communities.

The project area will cross into four watersheds classified by the USGS as Hydrologic Unit Codes (HUC-8s). The watersheds are:

- South Loup HUC-8, HUC identification number 10210004
- MUD HUC-8, HUC identification number 10210005
- Wood HUC-8, HUC identification number 10200102
- Middle Platte-Buffalo, HUC identification number 102001101

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

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

The conceptual design of dams for multiple uses project will use the 2017 Annual Report and Plan of Work for the State Water Planning and Review Process. Specifically, this project meets the following Annual Report objectives:

1. *Maintain data, information, and analysis capabilities for water planning, including specific programs for collecting, maintaining, and distributing information on streamflows, as well as analyzing water uses and water supplies across the state.* Extensive datasets and information will be assembled for this project. This information will be shared with the partners, stakeholders, other agencies, and the public.
2. *Provide staff and resources to support planning and implementation of water resources projects;* CPNRD has a staff of 21 people that work in the management of natural resources. The Assistant General Manager will lead

the effort for this project. Other technical experts involved in the project will include: a hydrologist, water resources specialist, GIS specialists, biologist, data and compliance officer, resource conservationist, information/education specialist, and programs coordinator.

3. *Support locally developed water management plans for conjunctively managing hydrologically connected ground and surface water supplies;* The project will support the IMP that was adopted by the CPNRD on July 23, 2009, and by the NeDNR on August 13, 2009. A revised IMP was adopted on March 22, 2012 and became effective on May 21, 2012. http://cpnrd.org/wp-content/uploads/2018/07/Integrated-management-plan-CPNRD.pdf This project will work to meet the requirements of the CPNRD Rules and Regulations for the Enforcement of the Nebraska Groundwater Management and Protection Act http://cpnrd.org/wp-content/uploads/2015/11/GW-Management-RR2017.pdf. These rules and regulations were adopted on February 23, 2006 and last amended on August 31, 2017. The project will work towards compliance with the implementation the Upper Platte Basin-Wide Plan Second Increment and the associated updates to the CPNRD IMP.
4. *Provide resources to map and identify areas vulnerable to flood damage.* During the conceptual design, areas protected by the dams will be identified. This information can be provided to the communities, counties, NeDNR and FEMA.
5. *Participate in interagency collaboration with federal agencies, state agencies, local natural resources districts (NRDs), and other water interest entities on various water resources programs and projects.* The conceptual design of dams for multiple uses will provide important information and help in collaboration with multiple agencies and organizations including:
    - NeDNR
    - Irrigation Districts
    - Public utilities
    - USFWS
    - LLNRD
    - Platte River Recovery Implementation Program members
    - Nebraska Department of Environmental Quality
    - Nebraska Emergency Management Agency

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

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

    The conceptual design of dams for multiple uses will help the State of Nebraska meet the requirements of the Platte River Recovery Implementation Program

(Program). This interstate agreement was initiated on January 1, 2007 between Nebraska, Wyoming, Colorado, and the Department of the Interior to address endangered species issues in the central and lower Platte River basin. The species considered in the Program, referred to as “target species”, are the whooping crane, piping plover, interior least tern, and pallid sturgeon. A key milestone for the First Increment of the Program (2007 to 2019) is reducing deficits to United States Fish and Wildlife Service (USFWS) Platte River target flows by an average of 130,000 –150,000 acre-ft annually.

Documentary evidence of the federal mandate can be found at https://platteriverprogram.org/about/program-details

New and improved dams will not increase the total volume of available water, but rather they will store and retime the water from times of excess to times of need. The dams will retime excess stream flows by ponding water that will recharge the groundwater, reduce groundwater declines, increase baseflow and could ultimately help erase the deficits to the USFWS Platte River target flows.

The project will help further the relationship between the federal mandate and water sustainability goals in the following area;

- Remediate or mitigate threats to drinking water by increasing groundwater levels and possibility restoring base flow to streams;
- Contribute to multiple water supply management goals including flood control, reducing threats to property damage, agricultural uses, municipal and industrial uses, recreational benefits, wildlife habitat, conservation, and preservation of water resources;
- Provide increased water productivity and enhance water quality;
- Use the most cost-effective solutions available
- Comply with interstate compacts, decrees, other state contracts and agreements and federal law

The Clean Water Act (1972) established a precedent for protecting the quality of water resources from pollution and degradation. The conceptual design of dams for multiple beneficial uses will also contribute to these goals of protecting the quality and quantity of water supplies. Section 401 requires that Federally permitted activities comply with the Clean Water Act standards, State water quality laws, and other laws as appropriate. This project will include data sources and a protocol to assist the district in ensuring a sustainable water supply is available during periods of drought.

Section D.

PROJECT DESCRIPTION

1. Overview

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

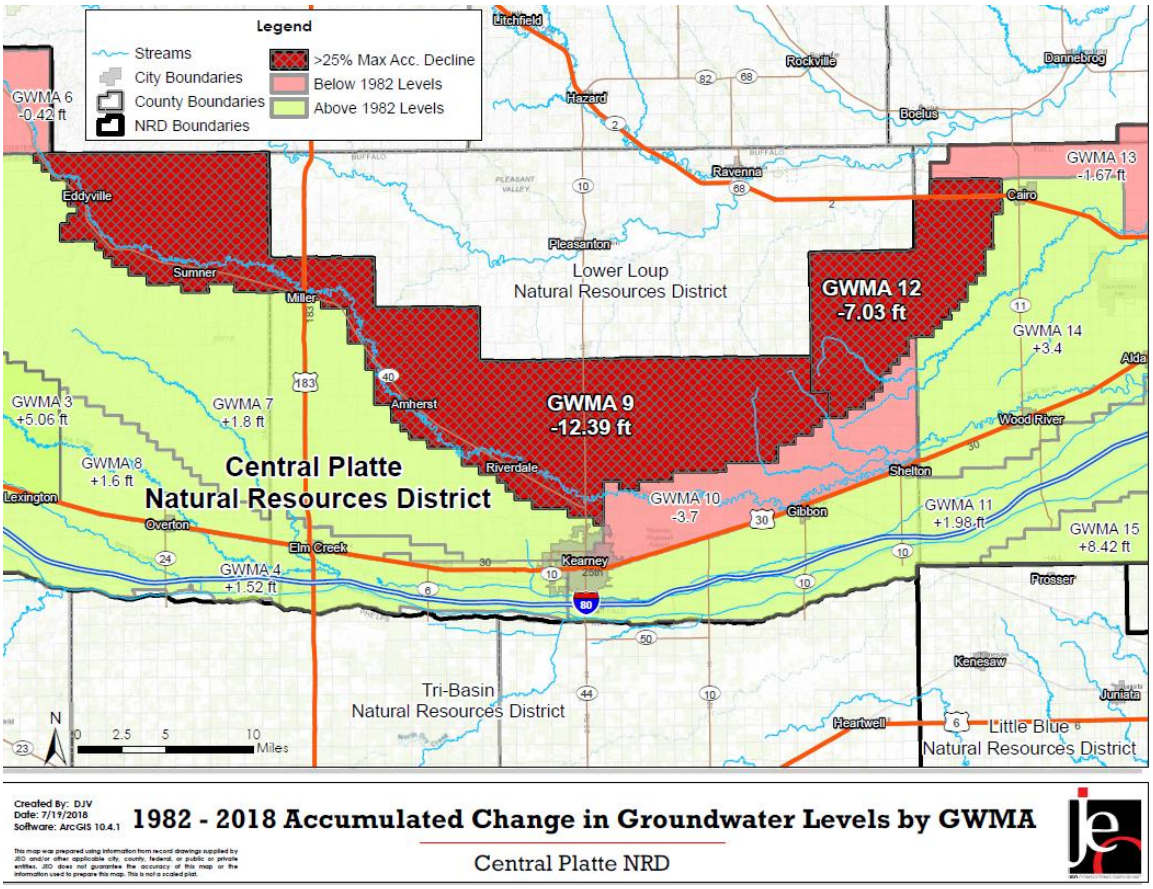
Groundwater levels have declined in portions of the Central Platte Natural Resources District with the largest declines in Groundwater Management Area 9 and 12. Consequently, this reduction in groundwater availability has led to water restrictions and management actions. To remedy the untenable situation, the CPNRD wants to recharge the groundwater in areas of declines. This can be accomplished by constructing new dams and improving existing dams.

To determine the most effective locations of dams for recharge, a hydrologic model used in conjunction with engineering standards can serve as a tool to determine the number and location of the dams required. The storage and recharge data can be incorporated into an unsaturated-zone groundwater model (developed separately from this project) to estimate of the volume of water that can be returned to the aquifer and to simulate groundwater flow. This project will provide a conceptual engineering design and prioritize construction. With this information water managers and decision-makers can finalize design, plan construction, estimate costs, and the develop a long-term timeline to restore the groundwater resource.

2. Project Tasks and Timeline

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

PROJECT BACKGROUND. Groundwater levels have declined in portions of the Central Platte Natural Resources District (CPNRD) with the areas of greatest decline in Groundwater Management Area (GWMA) 9 and 12. Consequently, this reduction in groundwater availability may lead to water restrictions and additional management actions by CPNRD and the State of Nebraska. To remedy this untenable situation, the CPNRD wants to recharge the groundwater in areas of declines, thereby increasing water-levels for conjunctive use. Conceptually, there are various recharge methods available, but one of the most efficacious option is to use dams and other structures to infiltrate water into the ground to recharge the aquifer. This can be accomplished by constructing new dams or improving existing dams.



To conceptually design the dams, a hydrologic watershed model will be used in connection with engineering design standards and guidelines. Together, they will serve as a tool to determine the number and location of future dams. The storage and recharge data can then be incorporated into large scale soil water balance, unsaturated-zone, and groundwater flow models to estimate the volume of water that can be returned to the aquifer and to simulate groundwater flow. With this information, water resources managers and decision-makers can proceed with final design of dam structures, develop cost opinions, and determine the timeline for groundwater restoration.

This project is feasible. It will rely on hydrologic models, physical data, and standard engineering practices to conceptually design, prioritize, and program for the eventual construction of needed dam structures.

BENEFITS

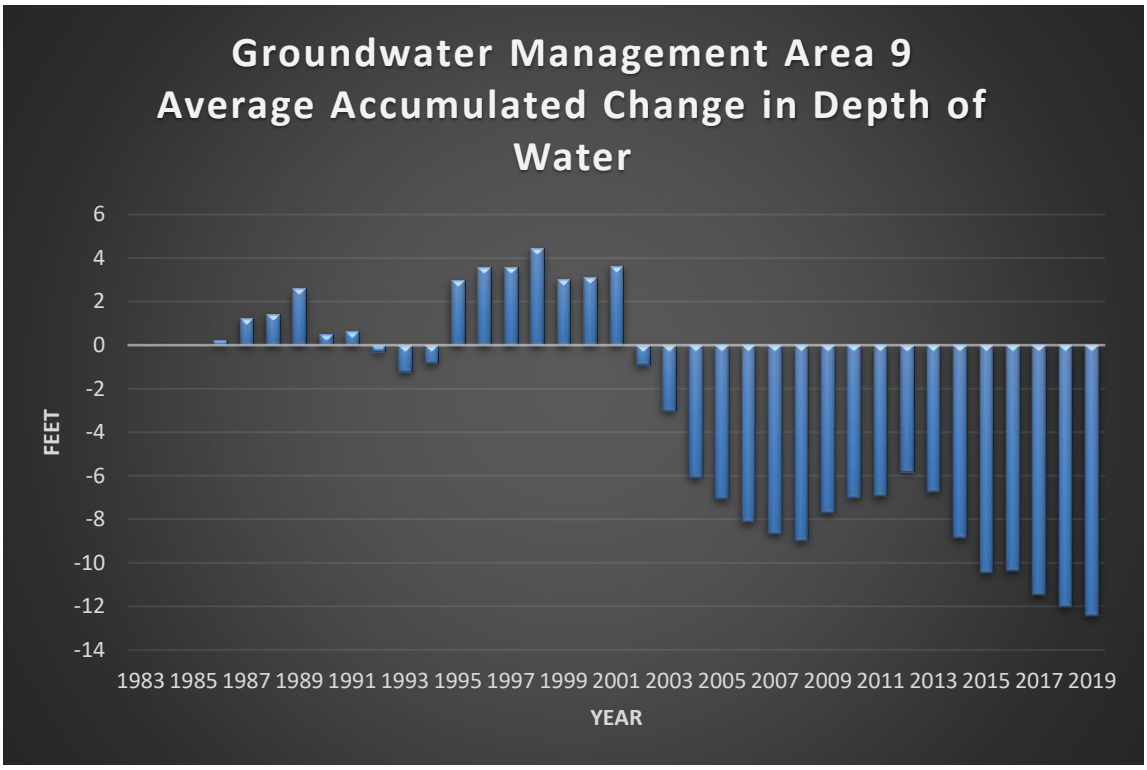
- Groundwater Recharge. Dams will capture and impound water, so it can infiltrate into the ground and recharge the aquifer. This project will focus primarily on GWMA 9 and 12 and the surrounding area. These GWMA have recorded the greatest groundwater declines in the CPNRD.

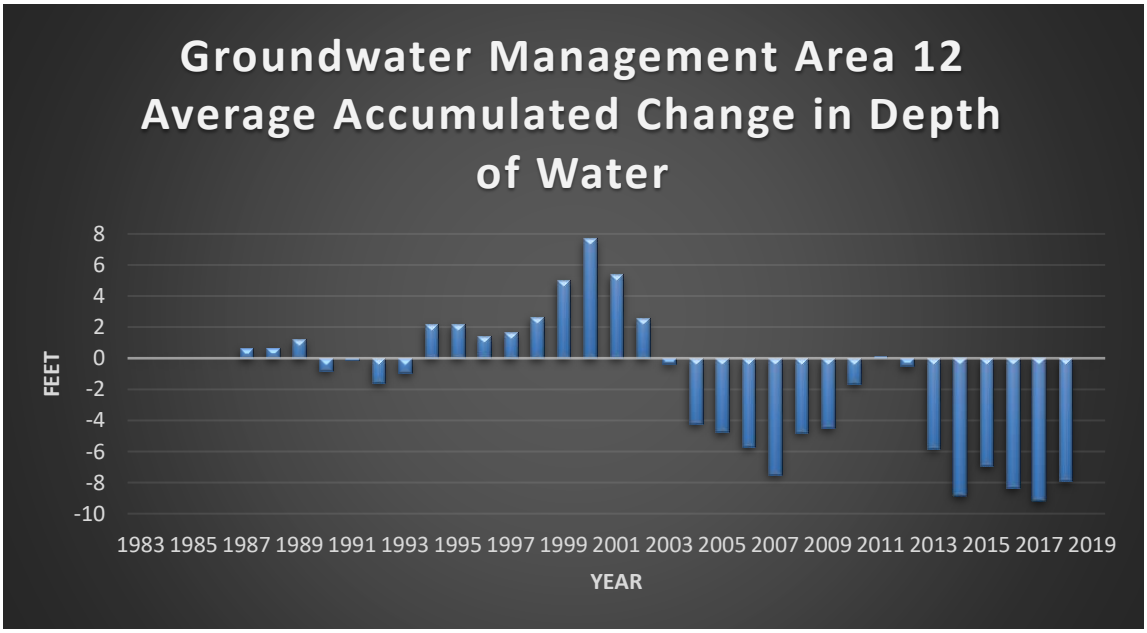
- Surface Water Storage. Dams will capture and impound surface runoff, so it can infiltrate into the ground and recharge the aquifer. Without these dams, excess runoff will flow into streams and rivers and eventually leave the State of Nebraska.
- Prioritization Matrix for Design and Construction. This project will provide CPNRD with a comprehensive prioritization matrix for the final design and eventual construction of the dams. This will allow for accurate budgeting, planning, and scheduling for dam construction.
- Flood Reduction. Excess flows will be stored in reservoirs to reduce peak flows from flood events and to provide water storage for increased groundwater recharge.
- Restoration of Base Flow. As groundwater levels increase due to recharge, stream reaches that are classified as “losing streams” can possibility turn into “gaining streams.” A situation where groundwater is seeping into the stream as base flow will improve streamflow stability and continuity.
- Water Quality Improvement. Reducing peak flood flows will promote bank stabilization and prevent mobilization of sediment and other pollutants.
- Wetlands Restoration and Creation of Wildlife and Waterfowl Habitat. Shallow water in the upstream areas of the reservoirs will create wetlands and provide excellent habitat for wildlife, fish, and waterfowl.

METHODOLOGY.

This planning initiative will use hydrologic models, detailed physical data, and applicable engineering standards for the conceptual design, prioritization, and programming for the eventual construction of new, or improvements to, existing. The watershed model will use rainfall/runoff numerical analysis, coupled with hydrologic and physical data, to determine the water balance and to quantify recharge rates and volumes. Data such as topography and drainage area (LiDAR derived), precipitation, evapotranspiration, soils, runoff, and other parameters will be integral part of the analysis. The product will be a conceptual design of dams for multiple beneficial uses. The study will target key areas of greatest groundwater declines in GWMA 9 and 12 and the surrounding area, but the tool can be applied to sites anywhere in the CPNRD.

Once the analysis is complete, pertinent information such as storage and recharge rates and the volume of water can be incorporated into the USGS One Water unsaturated-zone and groundwater model. Development of the One Water model is not part of this study. The ultimate outcome for the conceptual design of dams for multiple beneficial uses can be used by CPNRD to identify landowners that will set aside lands, taking them out of production, and converting them to storage and recharge basins.





TASK 1:
Identification of New Dam Sites or Improvement of Existing Dam Sites. The objective of this task is to identify new dam sites and existing dams that can be improved. The listing of all existing dam sites in CPNRD was previously identified in the 2017 CPNRD Dam Inventory and Ranking project. Potential dam sites will be classified by using a combination of data including: satellite and aerial imagery, hydrology, LiDAR, land use, engineering and physical parameters.

Task 1.1: Existing Dam Sites. The 2017 Dam Inventory and Ranking project identified 140 existing dams in GWMA 9 and 12. Based on this inventory, this planning initiative will identify up to 25 existing dams for improvement. Some of the following information is available for the existing dams:

:

- Purpose/type
- Ownership
- Age of structure
- Hazard classification
- Dimensions
- Length
- Width
- Depth
- Primary spillway characteristics
- Auxiliary spillway characteristics
- Energy dissipation structures
- Design plans and as-built drawings
- Operation and maintenance and safety inspection records
- Reservoir surface-acre and storage volume/capacity

Task 1.2: New Dam Sites. Future dam sites will be identified using the multiple sources including datasets assembled for the 2017 Dam Inventory and This planning initiative will identify up to 125 new dam sites. While the focus area of the project will be in GWMA 9 and 12 and the surrounding area, any site in the NRD can be evaluated, as needed. Datasets will include:

- Satellite and aerial imagery
- Topographic maps
- -30-, 10-, 1-meter grid elevation data
- LiDAR or other digital elevation models
- NRCS Web Soils Survey: soils type, hydrologic soil group, Runoff Curve Number, and other data
- Land use including: certified irrigated acres, National Agricultural Statistics Service crop type, and CALMIT data
- Political boundaries and infrastructure such as roads or bridges
- Hydrography of perennial streams and rivers, and streamflow data
- Climate data such as: precipitation, evapotranspiration, solar radiation, temperature, and other climate data
- Well information including: location, logs, and other data pertaining to monitoring, irrigation, municipal, and domestic wells
- Geology data including: Conservation and Survey Division test hole logs, geologic maps, and Airborne Electromagnetic (AEM) data
- Groundwater levels
- Saturated thickness and transmissivity

Conceptual Design of New Dam Sites and Improvements to Existing Dam Sites. The objective of this task is to develop a conceptual design and preliminary engineer's opinion of construction cost for up to 125 new and 25 existing dams. Furthermore, a prioritization matrix will be developed for final design and eventual construction of prioritized dams. The design, prioritization, and programming of these prioritized dams will be based on data realized from Task 1, technical guidelines, costs, and standard engineering practices. Key evaluation criteria will analyze the localized water balance, recharge potential, storage capacity, design and construction considerations, and cost for final design and construction. During this task, a determination will be made as to whether the dams fall under the jurisdiction of the Nebraska Department of Natural Resources (NeDNR) Safety of Dams and Reservoirs Act and require a Permit to Impound Water. A non-regulatory binding Hazard Potential Classification of the dams will also be made during this Task. Once the analysis is complete pertinent, information such as storage volumes and recharge rates and will be incorporated into the USGS One Water unsaturated zone and groundwater model. The One-Water model is being created as a part of a separate and ongoing study.

Conceptual design input parameters:

- Topography
- Hydrology
- Drainage area
- Soils
- Location
- Climate conditions
- Land use
- Engineering criteria and guidelines

Conceptual design output parameters:

- Dam dimensions, top and base width, height, length
- Elevations: top of dam, spillways, outlet channel, pond bed
- Slopes of the embankment
- Spillway pipe diameter and length
- Berms or shoulder structures
- Stage storage data including: elevation, surface area, storage volume
- Erosion rates
- Estimation of the useful life of the structure
- Construction materials
- Quantities
- Conceptual design and conceptual engineer's opinion of construction costs

Numerous detailed design standards, criteria, and guidelines will be in used this project, including:

- NeDNR Classification of Dams. https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/dam-safety/resources/Classification-Dams.pdf
- NRCS Technical Release TR-60 Earth Dams and Reservoirs https://directives.sc.egov.usda.gov/OpenNonWebContent.aspx?content=24937.wba
- NRCS Conservation Practice Standard No. 378-1 Pond https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1046898.pdf
- NRCS Conservation Practice Standard No. 410-1 Grade Stabilization https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1263175.pdf
- NRCS Technical Release TR-55 Urban Hydrology for Small Watersheds https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044171.pdf
- USBR Water Resources Technical Publication: Design of Small Dams https://www.usbr.gov/tsc/techreferences/mands/mands-pdfs/SmallDams.pdf
- USACE Engineering Manual 1110-2-1420 Hydrologic Engineering Requirements for Reservoirs https://www.publications.usace.army.mil/Portals/76/Publications/EngineerManuals/EM_1110-2-1420.pdf?ver=2013-09-04-070800-890
- NOAA Atlas 14 Point Precipitation Frequency Estimates https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html
- Nebraska Probable Maximum Precipitation (PMP) Study Report and Appendix F. https://dnr.nebraska.gov/sites/dnr.nebraska.gov/files/doc/dam-safety/resources/Nebraska-PMP-Study.pdf

Task 3: Incorporating the Design into the One-Water Unsaturated-Zone and Groundwater Model. The objective of this task will be to incorporate the conceptual design of dams for multiple beneficial uses into the USGS One Water unsaturated-zone and groundwater model. Incorporation of storage volumes and dam locations will be a critical factor in evaluating groundwater recharge and developing the long-term construction program. The One Water model will simulate recharge and groundwater flow. To prevent duplication of work and expediate incorporation, careful coordination between the dam designers and groundwater modelers will be crucial. Datasets and results will be shared with all parties and the exchange of information will be a critical aspect of the process.

Task 4: Permitting Support. Due to the nature of this project (conceptual design, prioritization, and programming), no permits will be required. However, while assembling background data and during the conceptual design, important permit information will be identified and assembled. Background information and data will evidentially be provided for U.S. Army Corps of Engineers Section 404 Program Permit, NeDNR Safety of Dams and Reservoirs Act, NeDNR Permit to Impound

Water, Nebraska Department of Environmental Quality (NDEQ) NPDES Construction Stormwater General Permit, and the Endangered Species Act.

Task 5: Project Management. Project Management. The objective of this task will be to manage and coordinate the processes required to produce a practical and usable, yet visionary plan for the eventual construction of prioritize dams (new and improved). Through effective project management, the conceptual design will be of excellent quality, on-time, and on-budget. Effective coordination and communication between the various project partners, designers, and hydrologic modelers will be critical for success. Project management tasks will include:

- Prepare and updating the project schedule
- Contract administration services
- Communicate and coordinate and integrate various technical disciplines to facilitate efficient completion of project
- Distribute necessary information to project team members
- Execute the Quality Assurance/Quality Control (QA/QC) plan and update as needed
- Submit progress reports and invoices as required by the Natural Resources Commission

SERVICES NOT INCLUDED IN THIS PROJECT

- Final design services
- Final engineer's opinion of estimated construction costs
- Permit preparation and submittal
- Bidding Assistance
- Construction Services
- Develop of the One-Water unsaturated-zone and groundwater model

TIMELINE: This project will take approximately 330 days from notice-to-proceed (NTP) until completion. Assuming NTP in January 2019:

TASK 1: Identification of New Dam Sites or Improvement of Existing Dam Sites	January – March 2019
Task 2: Conceptual Design of New Dam Sites and Existing Dam Sites	April – August 2019
Task 3: Incorporating the Design into the One-Water Unsaturated-Zone and Groundwater Model.	July-November 2019
Task 4: Permit Support	February-July 2019
Task 4: Project Management	January – November 2019

3. Partnerships

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

CPNRD will be the lead agency and responsible party for the project. The grant agreement will be between CPNRD and the Nebraska Natural Resources Commission. The U.S. Geological Survey is developing and implementing the One Water unsaturated-zone groundwater model for CPNRD. Development of the One Water model is under separate agreement between the USGS and CPNRD and work is ongoing. Completion of the conceptual design of dams for multiple beneficial uses is not dependent on the USGS model, rather it supplies recharge data for incorporation into the USGS model.

4. Other Sources of Funding

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

CPNRD is asking that the Water Sustainability Fund cost share 60% (WSF) - 40% (CPNRD) for the cost of development of the conceptual design of dams for multiple beneficial uses. The cost breakout is:

Project Budget

Task	Total Cost
Task 1: Identification of New Dam Sites or Improvement to Existing Dam Sites	$35,920
Task 2: Conceptual Design of New Dam Sites and Improvements to Existing Dam Sites	$61,880
Task 3: Incorporating the Design into the Unsaturated-Zone and Groundwater Models	$23,600
Task 4: Permit Support	$4,400
Task 5: Project Management:	$14,880
Total	**$140,680**
CPNRD 40% Contribution	**$56,270**
Nebraska Natural Resources Commission 60% Contribution	**$84,410**

5. Support/Opposition

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

Support

The Lower Loup Natural Resources District (LLNRD) supports the Conceptual Design of Dams for Multiple Beneficial Uses project. The letter of support from LLNRD is attached in Appendix A. This project will be adjacent to the LLNRD which

as an area that is experiencing similar groundwater declines. Through outreach and education CPNRD reaches out to landowners to inquire about interest in participating in this project. The projects will be located exclusively on the lands of those willing landowners and no adverse impacts to neighboring lands are anticipated.

Opposition
There is no known opposition to the project.