1. Title Page

Improvements to the Pahrump Valley Basin 162 Groundwater Model and Supplemental Predictive Model to Enhance Forecasting Capabilities and Proactively Preserve Native Environments (The Basin 162 Project).

A proposal to the Bureau of Reclamation
In Response to the Notice of Funding Opportunity No. R23AS00446

WaterSMART: Applied Science Grant for Fiscal Year 2023

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October 17, 2023

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3. Technical Proposal: Executive Summary

Date: October 17, 2023
Applicant: Nye County Water District
Location: 2101 E Calvada Blvd., Suite 100 Pahrump, NV 89048

Project Summary The Nye County Water District (NCWD), with support from Nye County, the Town of Pahrump, the Private Well Owners Association, and the three private utilities in the Pahrump Valley Basin, proposes to work with the Desert Research Institute (DRI) to incorporate new and recently available hydrologic data into the Pahrump Valley Basin 162 Groundwater Model and develop a predictive model to improve groundwater management and forecasting capabilities within the Valley. The project will use newly acquired well locations, borehole lithology, groundwater level measurements, and hydrologic data to enhance the existing model's accuracy and to develop a predictive model to forecast how the Valley's water resources will be impacted by planned future groundwater development and climate change. The improved groundwater flow model and predictive model will be used to develop integrated strategies for effective water management among three key stakeholder communities: Well owners and utility-scale providers to develop cooperative measures for maintaining balanced, reliable water supplies; environmental groups currently working with the US Fish and Wildlife Service to preserve and revive native phreatophytes and threatened and endangered species in the Valley; and the Valley residents to understand and support necessary measures to sustain water resources into the future, particularly in the light of climate uncertainty.

Length of Time and Estimated Completion Date: The proposed project encompasses activity from April 2024 through September 2026. All project work will be completed by September 2026.

Federal Facilities: The proposed project is not located on a federal facility. Routine water sampling and data collection efforts already underway by NCWD and partner agencies will continue in Nye County and the Town of Pahrump to support model calibration.

4. Technical Proposal: Detailed Project Description

Applicant Category

The NCWD is seeking funding under the Applicant Eligibility for Category A.
The NCWD is an eligible entity as a special district government. The bill forming the NCWD was approved on June 18, 2007, by the Nevada Legislature pursuant to Nevada Revised Statutes 2007, Chapter 542, under Selected Special and Local Acts. The bill, also known as the Nye County Water District Act, became effective July 1, 2007. The NCWD serves Nye County, Nevada, and is based in the Town of Pahrump, in Nye County, Nevada, in the Western U.S. Section 8 of the Act provides the NCWD with water delivery power authority.

Detailed Project Description: The Nye County Water District (NCWD) proposes to incorporate new hydrologic data to improve the Pahrump Valley Basin 162 (Basin 162) Groundwater Model and develop a predictive model to improve forecasting capabilities within the Valley. The existing model was developed by the Desert Research Institute (DRI) initially based on aquifer property zones and hydrogeologic units in the Death Valley Regional Groundwater Flow System (DVRFS) model (Belcher and Sweetkind, 2010). The DRI model used Groundwater Modeling

System (GMS) software as a pre- and post-processor and graphical interface supporting MODFLOW-NWT (Niswonger et al., 2011). DRI refined several factors to develop a model specific to Basin 162 but lacks sufficient data points and detailed lithologic and hydrologic information critical to obtaining a more comprehensive depiction of the Basin and could not address the complexities from faulting. DRI's August 2023 report stated "…much of the fault delineation is distant from areas where water levels are known and simulating other sections proved to be detrimental to model calibration" (Rybarski, 2023). Information is available through existing well logs, hydrologic studies, and from local drillers, utilities, and other commercial entities. Unfortunately, neither Nye County nor the NCWD have the resources to support the efforts needed to compile, enter, and process this information.

NCWD proposes to use a combination of RockWorks and Groundwater Vistas software to provide a three-dimensional visualization of both the subsurface lithology and complex groundwater flow mechanisms. RockWorks Advanced level package will allow both DRI and NCWD to address the multiple mapped faults in the Basin to better understand localized groundwater flow. The combined software use will not only allow an enhanced groundwater model suited address the complexities of Basin 162's aquifer systems, but also provide a means of visually depicting the system in both two and three-dimensional settings. The system will promote improved understanding among stakeholders by depicting conditions through enhanced visualization. Additionally, by integrating RockWorks software into the Basin 162 modeling program, NCWD and DRI can incorporate work completed by the U.S. Geological Survey using the same software program for the adjacent Amargosa Desert Basin.

A robust groundwater model and forecasting capacity, particularly in the vicinity of the Basin's spring locations would benefit initiatives like the Nevada Native Seeds Program by informing optimal locations and timing for successful replanting efforts. These measures are possible through administrative measures implemented to reduce or eliminate pumping from the springs.

Funding from the Bureau of Reclamation (BOR) will be used to:

- Collect, QA/QC, enter, and process available data, to improve the DRI MODFLOW-based groundwater flow model.
- Purchase and train DRI and NCWD personnel on RockWorks software.
- Integrate the DRI Model into a more robust flow model that will be combined with a predictive model to provide forecast capabilities for both water resource management and species preservation and habitat restoration measures.
- Coordinate a Technical Working Group, comprised of stakeholders directly involved in well drilling, water utility operations, and other water resource management functions to leverage access to additional lithologic and hydrologic data. This group may also make recommendations to improve water resource management strategies and best management practices.
- Establish the improved model and forecasting capabilities as common groundwater management tools for water managers throughout Basin 162 to work from in making basin-wide water management decisions.

- Identify nature-based solutions for water quality enhancements, including preserving undeveloped areas and promoting native vegetation seeding/planting to enhance surface attenuation.
- Enhance stakeholder education and community outreach activities to increase understanding of the mechanisms impacting groundwater sustainability.
- Launch an outreach and education campaign to garner support from stakeholders throughout the Basin to promote broad-based use and long-term support for the Basin 162 Project.

This project will accomplish the Notice of Funding Opportunity's (NOFO) objectives by improving access to and use of hydrologic data, developing and improving water management tools, supporting threatened and endangered species needs, and improving modeling and forecasting capabilities in Basin 162, also referenced herein as the Basin 162 Project.
The Basin 162 Project will span a two-year timeframe from the award date to its currently estimated completion date, September 30, 2026.
The Basin 162 Project will be on County-owned and private lands. The project is not located on a federal facility.

NCWD will work in collaboration with three public utility companies, Nye County Public Works, Nye County Planning Department, and other stakeholders in Pahrump, Nevada, as well as the Division of Water Resources and other agencies to share data, evaluate and standardize current water data collection methods, and create partnerships to reduce impacts of drought conditions and climate change throughout the region.

Technical Proposal: Goals
The goals of this project are to create an improved groundwater flow model and predictive model for use in developing integrated strategies for effective water management among three key stakeholder communities:

- Private well owners and utility-scale providers to develop cooperative measures for maintaining balanced, reliable water supplies.
- Environmental groups like the Southern Nye County Conservation District, the Habitat Conservation Network, UNR Cooperative Extension, and other entities currently working with the US Fish and Wildlife Service to preserve and rehabilitate native phreatophytes and threatened and endangered species in the Valley; and
- Pahrump Valley residents to understand and support necessary measures to sustain water resources into the future, particularly in the light of climate uncertainty.

The approach to the project will be initiated upon notification of the grant award and will entail four tasks: 1) Project Management and Reporting; 2) Data Research and Model Improvement; 3) Community Outreach and Engagement; and 4) Review and Evaluation of Basin 162 Project Applications and Deliverables. The Project Management Task would include procurement of software and all reporting requirements to both the NCWD and the Bureau of Reclamation. Data Research and Model Improvement would include new data acquisition by both NCWD, and the Technical Working Group led by the NCWD Project Manager, and Community Outreach and Engagement activities would be coordinated through an Outreach Team led by the NCWD

General Manager. Both the Technical Working Group and the Community Outreach Team would participate in review and evaluation of the Basin 162 Project.

5. Technical Proposal: Project Location

The Pahrump Valley Basin 162 forecasting capabilities, data improvements and water management Study will take place in Nye County, Nevada. The northwestern portion of the Pahrump Valley Basin is in the Town of Pahrump (Figure 1), serving a population of over 44,738 (US Census Bureau, 2020). The Town of Pahrump is located 60 miles from Las Vegas, Nevada's largest city (Figure 1), and the significant distance and mountainous terrain between the communities isolates the population from larger water infrastructure. The Pahrump Valley Basin, Nevada hydrographic basin 162, is in southern Nevada and eastern California. Approximately 789 square miles of the 984-square mile basin is within southern Nevada (Figure 2).

Figure 1: *Project Location*

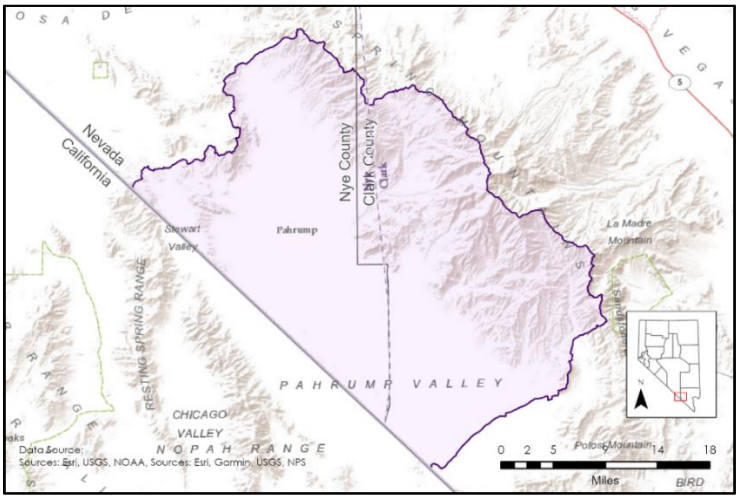

Figure 2. *Pahrump Valley Basin 162*

6. Technical Proposal: Data Management Practices

Any spatially explicit data or tools developed in the performance of an award made under this NOFO will be developed in industry standard formats that are compatible with Geographic Information System (GIS) platforms.

7. Technical Proposal: Responses to Evaluation Criteria

E.1.1. Evaluation Criterion A—Water Management Challenge(s)

1. Describe the water management challenge(s).

The water management challenges faced within Basin 162 include: 1) Loss of native habitat resulting in adverse impacts to threatened and endangered species due to historic over-pumping of springs, 2) Overallocation of water rights versus perennial yield of the Basin, and 3) Lack of forecasting capabilities to help identify and implement measures for proactive habitat reclamation and water management strategies.

The Town of Pahrump solely relies on groundwater from Pahrump Valley Basin 162 for its water source. Water management challenges in the Basin 162 Project include spring stoppage from historic over-pumping and drought, and loss of native habitat resulting in threats to endemic species in the Basin. The habitat loss led to some increased damage when intermittent storm events cause high velocity, sediment-loaded floodwaters (previously captured, to an extent by native vegetation) to damage down-gradient development in the Pahrump Basin.

Additionally, the Pahrump Valley Hydrographic Basin is one of Nevada's most over-appropriated basins, with permitted groundwater rights that exceed the State Engineer's Office's perennial yield, or estimated average annual recharge, of 20,000-acre feet annually. Table 1 provides a breakdown of perennial yield of basin 162, existing and future domestic wells with estimated usage at 0.5 AFA per domestic well, total potential groundwater withdrawal which is calculated using existing water rights plus domestic well pumpage and an estimated over allocation in acre-feet (AF)

PAHRUMP HYDROGRAPHIC BASIN	
EXISTING PERMITTED WATER RIGHTS	60,416 AF
EXISTING + FUTURE DOMESTIC WELLS	9,750 AF
*POTENTIAL GROUNDWATER WITHDRAWAL	70,166 AF
PERENNIAL YIELD	20,000 AF
OVER ALLOCATION	50,166 AF
*Potential groundwater withdrawals are the sum of: 1.) Existing water rights 60,416 AF. (Ref. DWR website Jun. 2015) 2.) An estimate of existing and future domestic wells at 0.5 AF per domestic well (estimated at 11,000 existing + 8,500 future)	

Table 1. *Perennial yield of 20,000 AF versus potential groundwater withdrawal (Shaw Report 2017).*

The declining water availability from this singular water source stresses the importance of the NCWD's ability to develop sustainable management practices for the groundwater resource, particularly in light of competing interests ranging from private well owners concerned their wells will run dry, commercial utilities struggling to meet service area demands, and the local business community working to maintain operations.

2. Describe the **concerns or outcomes** if this water management challenge is not addressed?

If the water management challenges are not addressed, the over-allocated groundwater rights may be fully withdrawn, exceeding the perennial yield and thus evacuating the available water supply within the Basin. The springs, which had finally started recovering through careful management of water resources in their vicinity, will be insufficient to offset over-pumpage across the basin. Populations of phreatophytes, threatened and endangered species, and other native vegetation across the Valley will decline unless they have access to isolated perched aquifers segregated from the rest of the Valley's groundwater system.

Private well owners whose well depths are shallower than those of the municipal and commercial-scale utility users in the area will see their supply wells fail first. As shallower perched aquifers are depleted, the users dependent on those supplies will need to either tie in with the water utility for their area or begin importing water from other sources. As the utility well fields fail due to lack of water, Valley residents will be forced to either find a resource from outside the Basin or abandon the basin as water resources are depleted.

The few residents that stay will see continued decline of native vegetation in the Valley, potentially replaced by invasive grasses or depleted vegetation entirely. Soils along the alluvial fan, no longer stabilized by native plants and their root systems, will exacerbate the adverse effects of seasonal monsoonal storms that provide most of the Basin's annual precipitation. As rain falls at the crest of the Spring Mountains and travels along the washes of the range's alluvial fan, the stormwaters gain momentum and velocity. Down-gradient dwellers will be inundated with these monsoonal floodwaters, loaded with rocks, soils, and sediment that will fill stormwater challenges and overflow detention basins, unloading soils around and inside structures built on the alluvial fan and in the Pahrump Valley Basin.

Unfortunately, numerous private well owners have already had to deepen their wells to access new, deeper water supplies. Similarly, the Town of Pahrump has already experienced the results of increased sediment-loading in floodwaters from monsoonal storm events along several major washes due to a combination of native vegetation die off and anthropogenic activity along the fan. Climate change is expected to exacerbate water scarcity and sediment load and redistribution during future flood events if mitigation measures are not enacted.

3. Explain **how** your project will address the water management issues identified in your response to the preceding bullets and provide support for your response.
    a. Water supply reliability for municipal, agricultural, tribal, environmental, or recreational water uses,

The project will improve water management for environmental applications by providing forecast information for groundwater elevation and spring data. Understanding projected groundwater levels is valuable for developing strategies for use in habitat conservation and future reclamation project siting, including reseeding of native vegetation through initiatives including the Nevada Native Seed Partnership. Similarly, the improved model's detailed lithology would assist in directing the design and monitoring the relative success of strategies proposed in the Pahrump Basin 162 Groundwater Management Plan to increase groundwater

quantity. One of these strategies would use the Nye County Planning Department's recent flood mapping to site Rapid Infiltration Basins to increase groundwater recharge from stormwater runoff and improve spring health (NCWD, 2018).

The study will focus on developing and improving tools and methodology to increase groundwater level data collection and water reliability forecasting. This approach directly addresses the issue of water supply reliability for various purposes, including municipal, agricultural, tribal, environmental, and recreational uses.

b. management of water deliveries,

Improved modeling and forecasting tools would help water managers identify and implement water resource strategies for balancing availability and reliable water delivery throughout the Basin. By understanding where groundwater resources are strained by lower transmissivity, permeability, and other constraints more easily identified through the improved DRI model, water managers can modify pumping rates from specific wells or use alternative groundwater wells to help alleviate areas of over-pumping within the Basin's aquifer system. The Pahrump Basin 162 Groundwater Management Plan (NCWD, 2018) cites redistribution of pumping as one of eight Priority Items to promote sustainable groundwater management in the Basin.

c. water marketing activities,

The USGS Ground Water Atlas of the United States: California, Nevada (HA 730-B) lists two principal aquifer types in the Pahrump Valley. The aquifer type currently addressed in the existing DRI model is a Basin-Fill aquifer. However, the USGS Atlas references an additional carbonate-rock aquifer located beneath the basin-fill aquifer. The carbonate-rock aquifer transmits water beneath the Pahrump Valley but has not been developed due to the drilling depths required to access the aquifer (thought to be at depths ranging from 5,000 to 15,000 feet below land surface). The Pahrump Basin 162 Groundwater Management Plan (NCWD, 2018) recommended improvements to the deep carbonate aquifer component of the DRI model to allow for future development and use of the deep aquifer system.

d. drought management activities,

The improved DRI model and forecasting capabilities will be essential in anticipating areas within Basin 162 that are most susceptible to drought and other effects of climate change. Similarly, lithologic information would inform water resource managers of potential locations to site artificial recharge projects – and to monitor the relative effectiveness of each project.

e. conjunctive use of ground and surface water,

Recommendations from the Pahrump Basin 162 Groundwater Management Plan (NCWD, 2018) included using Rapid Infiltration Basins (RIBs) to capture stormwater runoff to mitigate flood-related impacts while supplementing groundwater quantities. Design and hydrologic information from existing RIBs located throughout the Pahrump Valley would be included in the improved model to improve water resource managers' understanding of that mechanism and its effectiveness in groundwater recharge, and potentially identify optimal design and configurations to accomplish the dual of objectives of flood control and water recharge.

f. water rights administration,

The improved DRI model will be used in conjunction with recommendations from the Pahrump Basin 162 Groundwater Management Plan (NCWD, 2018) to adjust over allocation of water rights by crediting reuse, recharge, and over dedication of water rights. Locational data for existing water rights (including points of diversion and points of use), cross-referenced with well data will inform water resource managers on specific locations of over-allocation and identify opportunities for appropriate allocation reduction measures.

g. ability to meet endangered species requirements,

As stated in the supporting letter from the U.S. Fish and Wildlife Service included in the attachments, the improved DRI model and forecasting capabilities are important to understanding the how groundwater-dependent species in the Pahrump Valley Basin and Amargosa Watershed will impact federally listed species including the Amargosa vole, Amargosa niterwort, and other endemic species. The Southern Nye County Conservation District and the Habitat Conservation Assistance Network can use the model to help monitor the effectiveness of the work they are doing to remove Salt Cedar and Russian olive trees, among other invasive plants. Each Salt Cedar plant, for example, can consume up to 200 gallons of water per day per plant, outcompeting native vegetation for spring-fed habitat areas and adversely impacting spring recovery.

A list of additional species expected to be present in the Pahrump Valley was obtained from U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) website accessed 2023. The following threatened, endangered, or candidate species were identified as having potential to inhabit the area if appropriate habitat were present: southwest willow flycatcher (Empidonax traillii extimus) (Endangered), the yellow-billed cuckoo (Coccyzus americanus) (Threatened), the Mojave Desert tortoise (Gopherus agassizii) (Threatened), the monarch butterfly (Danaus plexippus) (Candidate), and the spring-loving centaury (Centaurium namophilum) (Threatened).

Both bird species require wetland and/or riparian habitat for foraging, shelter, and breeding. The monarch butterfly requires native milkweeds for breeding habitat and food for larvae, and flowering plants and trees/shrubs for adults, typically present within riparian corridors or other mesic sites. Such habitat could be supplemented by higher groundwater levels and the restoration of local springs including Manse Springs, Stump Springs, and the former Bennetts Spring. Thus, as springs across the Pahrump Valley recover and begin to discharge, timing for restoration of native vegetation to restore habitat for

Developing a new predictive model will create a more robust tool for water management and forecasting capabilities in the Pahrump basin. Models such as this will assist not only NCWD as well as interested stakeholders and the public in its mission of conserving sensitive, endangered, and endemic species for future generations of Americans.

h. watershed health,

The Basin 162 Project's approach to improving modeling and forecasting functionality in the valley will engage a broad spectrum of stakeholders to promote understanding and use of the model in contexts familiar to each stakeholder. Although water managers in the Pahrump Valley, including the NCWD, three water utilities, and the Private Well Owners Association can use Project to manage water resources, they may be unaware of or lack control over land use impacts on the watershed. Similarly, recreational efforts, including off-road racing, roads and road

construction, and a myriad of other activities within the Pahrump Valley have the potential to impact watershed health, so an awareness of the groundwater model beyond the water management community and its use as an educational and informational tool is a major component of the Basin 162 Project.

i. Restore a natural feature or use a nature-based feature to reduce water supply and demand imbalances, the risk of drought or flood, or to increase water supply reliability for ecological values,

The arid-west region contains mostly ephemeral dry washes that only flow during storm events. The greatest annual precipitation in the Pahrump Valley is concentrated along the peaks of the Spring Mountains. As precipitation falls during storm events, it travels down steep gradients in washes that are often devoid of vegetation. As water velocity increases, sediment load (including soil and rocks) increases until these flood waters reach structures along the fan or in the Valley Basin. Pahrump lacks a stormwater control system making the town susceptible to flooding and associated erosional deposition from storm events. Over pumping, especially to support historic agricultural developments, reduced native vegetation and dried up local springs, exacerbating the impacts of both drought and flood.

Over the past decade, Pahrump Valley residents and local government leaders have taken active measures to understand and work with their federal agency partners to restore local springs, eradicate invasive species, and replant native vegetation. Thus, the Basin 162 Project to improve the DRI model and forecasting capacity extends beyond its immediate value to water resource managers, to proponents for ecological restoration so both stakeholder groups can coordinate their respective efforts. As native vegetation is restored and serves to stabilize soil, filter sediment load, and reduce stormwater velocity, multiple positive impacts will be achieved toward.

j. conservation and efficiency

Understanding current and future water levels in the valley could help water managers work with local residents and businesses to identify and implement measures for conservation and efficiency. The improved DRI model and forecasting tools, particularly with the three-dimensional enhancements available using the RockWorks and Groundwater Vistas software, will provide excellent visualization tools for use in explaining challenging concepts to water users throughout Basin 162. Water Resource Managers can use the tools to visually demonstrate why development and implementation of conservation and efficiency measures are important, and conversely, can monitor the impacts and effectiveness of such measures over time.

k. other improvements to water supply reliability?

Improving the DRI model through additional well location and lithologic data will assist in understanding aquifer characteristics across a greater portion of Basin 162. In preparing this application, NCWD reached out to local well drillers, utilities, and private well owners to request commitments for access to additional data not readily available through publicly managed databases to help fill data gaps in the model, thereby increasing the value of the model in identifying new potential locations for siting new wells to be used in balancing water resources more efficiently, thus improving water supply reliability across the Basin.

E.1.2. Evaluation Criterion B—Project Benefits

1. Describe how the **need for the project** was identified. Was the proposed project identified using a collaborative process with input from multiple and diverse stakeholders?

In January 2014, the Nye County Board of Commissioners and the Nevada Division of Water Resources formed the Basin 162 Groundwater Management Plan Advisory Committee (GWMPC) to address the over-appropriation of water rights in the Basin and to develop recommendations for improving opportunities for sustainable water resource management. Between January 2014 and September 2015, the GWMPC held monthly public meetings and workshops to obtain information and formulate recommendations for groundwater management planning within the basin from diverse stakeholders. The GWMPC documented more than 180 ideas to balance available water within the Basin. Ultimately, they formulated a list of priority items to implement as part of the Basin 162 Groundwater Management Plan and recognized the need for groundwater modeling to use as a planning tool (NCWD, 2015). DRI developed a calibrated transient groundwater flow model in 2016.

From 2015 to 2018, the NCWD, the Nye County Board of Commissioners, the Nevad Division of Water Resources, and the Pahrump Regional Planning District worked collaboratively to implement the list of priority items identified in the Basin 162 Groundwater Management Plan. One of the recommendations resulting from this collaborative effort included recommendations for improving the DRI model through incorporation of additional data from aquifer characterization (NCWD, 2018).

2. Describe **how** the tool, method, or information will be applied and ***when*** it will be applied.

The method for identifying and compiling new geologic and hydrologic information into the improved DRI model will begin as soon as the Technical Working Group is assembled. Communications among NCWD, DRI, and the members of the Technical Working Group will be critical in not only compiling the data for entry, but in performing quality assurance and quality control of the data. Great Basin Drilling, the largest local drilling company in the Pahrump Valley, has offered to provide new well data, groundwater levels, and hydrologic information for incorporation into the model to supplement NCWD's Water Level Monitoring Program. NCWD and DRI will coordinate with the Technical Working Group to develop data collection and reporting methodology that will be important in obtaining standardized information from Great Basin Drilling and other members of the Technical Working Group.

The Technical Working Group will review and provide comments on iterative versions of the model to garner interest and comments from this diverse group, comprised of water system operators, wastewater system managers, water utility representatives, and similar entities, in addition to NCWD and DRI. The Technical Working Group forum will provide a venue for the member stakeholders to not only provide data inputs for the model, but also to learn and understand how these inputs are applied and a range of factors influencing the model. Representatives participating in the Technical Working Group would be tasked with identifying and evaluating Best Management Practices (BMPs) unique to their industry that would enhance positive model outcomes (e.g., coordinating water pumping strategies across different utility jurisdictions, collecting and reporting aquifer test data, sharing RIB designs and maintenance strategies, etc.). Thus, the Technical Working Group would work with the improved DRI model

and forecasting tools to evaluate scenarios for their respective BMPs and better understand the applications of these tools.
Nye County Water managers will have immediate access to the new tools because they will have assisted in their development and application. The tools and methods for improving and updating those tools will be developed and applied throughout the two-year project timeline.

Will the tool or information be used immediately, or will additional work need to be done before the tool is used?
Information from the improved model and forecasting tools would be used by the Technical Working Group throughout the tools' development.

Describe, in detail, the extent of benefits that can be expected to occur upon implementation of the project and provide support for your responses.
The improved groundwater flow model and predictive model will be used to develop integrated strategies for effective water management among three key stakeholder communities: Well owners and utility-scale providers to develop cooperative measures for maintaining balanced, reliable water supplies; environmental groups currently working with the US Fish and Wildlife Service to preserve and revive native phreatophytes and threatened and endangered species in the Valley; and the Valley residents to understand and support necessary measures to sustain water resources into the future, particularly in the light of climate uncertainty.

Benefits to occur upon implementation of this project include collaboration within the Technical Working Group, comprised of (among others) well owners, commercial-scale water utilities, and NCWD to use the information gathered to identify and implement water resource management strategies. Environmental groups, including the Southern Nye County Conservation District, the Habitat Conservation Assistance Network, US Fish and Wildlife, and similar stakeholders can use the forecasting tools to anticipate conditions for spring habitat restoration and can report other conservation measures (such as Salt cedar and Russian olive tree removal) that may positively impact water levels in specific locations. The Community Outreach Team will be charged with communicating Technical Working Group findings and accomplishments to enhance understanding of the overall program and support for measures needed to ensure sustainability of not only water resources within Basin 162 but also of the Pahrump community.

Who will use the tool or data developed under this proposal and **how** will they benefit from the project? Support could include but is not limited to letters from stakeholders expressing support for the project and explaining how they will benefit.
The Basin 162 Project and data developed for use in the improved model and forecasting tools will be used by the NCWD, the Private Well Owners Association, and the three water utilities in the Pahrump Basin to identify and implement water resource management strategies. The US Fish and Wildlife and other ecological and environmental organizations would use the forecasting tool to plan and implement restoration activities to rehabilitate spring habitats and conserve threatened and endangered species. The Town of Pahrump, the Pahrump Regional Planning Commission, Nye County Planning Department, the Nye County Natural Resources and Federal Facilities Office would use the model to understand water resource management challenges and constraints as they relate to future land use planning initiatives. Finally, residents throughout the Pahrump Valley would have access to and provided information regarding the

Basine 162 projects and how it can provide information about the water resources they depend on for the future sustainability of their community.

How will the project improve ***water management decisions***?
Throughout the span of the two-year project and upon completion, the Project will provide opportunities within the Technical Working Group for identification, evaluation, and implementation of water resource management strategies – not only by water resource managers, but by other stakeholders that impact watershed health, including environmental groups, land use planning organizations, and other entities. The iterative approach to improvements to the DRI model and forecasting tools will enable stakeholders to use the model to help evaluate select strategies and how they may impact water resources in the Basin. As stakeholders propose specific strategies for evaluation through the improved model (as applicable), they can use the results to select the most appropriate strategy for the desired outcome. For example, if three different scenarios for balancing water supplies across the Basin are considered and each scenario is run through the improved model, the outcome can be used to select the optimal scenario.

Describe if the results of your project will be ***applicable elsewhere***. What additional work would need to be done to make the project results transferable to others?
NCWD has already seen unanticipated outcomes from its work to simply develop this application. In reaching out to diverse stakeholders, we found many were unfamiliar with the existing DRI groundwater model or its applications and discussed how their organization would benefit from a better understanding of the forecasting capabilities of the model. Some disagreed with the initial approach to data collection and offered suggestions for expanding the program by involving local area drillers and the Private Well Owners Association to contribute not only lithologic data but also routine groundwater level measurements. The Great Basin Drilling suggested preparation of a guidance document to ensure consistent methods for data collection and a means of evaluating data quality.

NCWD anticipates the iterative model development approach and documents developed through the Technical Working Group and by the Community Outreach Team will be most applicable for use in other locations. For example, the documents would include:

- The Technical Working Group's water management strategies for specific industries (e.g., wastewater disposal, stormwater management, water balancing methods across different water utility jurisdictions, etc.).
- Model data collection methodology guide for well installers, owners, and managers.
- The Community Outreach Team's approach to awareness and application of the improved model and forecasting tools and unexpected outcomes from outreach activities.

To what extent will the project address the water management challenges described in E.1.1.?
The first challenge water management challenge, loss of native habitat resulting in adverse impacts to threatened and endangered species due to historic over-pumping of springs, would be addressed by using the improved DRI model and forecasting tools to work with water resource managers throughout the basin to balance water resources to reduce water draw-down and prevent over-pumping, especially in the vicinity of the springs.

The second challenge, overallocation of water rights versus perennial yield of the Basin would be addressed by using the Basin 162 Project to evaluate the ability of RIBs and similar features in Basin 162 to sufficiently increase water quantity to justify crediting reuse and recharge as a means of increasing perennial yield calculations.

The third challenge, lack of forecasting capabilities to help identify and implement measures for proactive habitat reclamation and water management strategies, would be directly addressed, as the Basin 162 Project includes development of forecasting capabilities. This tool would inform environmental groups, including the Nevada Native Seed Partnership Program on optimal seasons and timeframes for planting native seeds and perform other restoration measures to encourage regrowth of native vegetation and return of endemic species to the area.

3. Explain how your project complements other similar efforts in the area where the project is located.

This project will complement the Nye County Planning Department's flood mapping program and the Southern Nye County Conservation District and Habitat Conservation Assistant Network's habitat restoration program. Flood mapping information would identify locations where strategic restoration of habitat by planting native vegetation can be used to slow stormwater velocities and sediment loading from Spring Mountain washes. Rapid Infiltration Basins sited at the base of the Spring Mountain washes could be developed to recharge the local aquifer while preventing down-gradient flooding. The improved DRI model could provide sufficient lithologic data to inform optimal the design of the RIB.

E.1.3. Evaluation Criterion C—Project Implementation

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

2. Describe the work plan for implementing the proposed scope of work. Such plans may include, but are not limited to:

The project approach and methodology are summarized as follows and the anticipated products from this project are summarized in Table 2.

<u>Task 1: Project Management and Reporting.</u>

a. Upon Notice of Award, the NCWD General Manager will develop the sub-award document for DRI for review and approval by the NCWD Governing Board.
b. The NCWD Project Manager will convene a kick-off meeting with the stakeholder working group.
c. The stakeholder working group will be divided into two main sub-groups: the Community Outreach Team and the Technical Working Group.
d. Subject to budget availability, the NCWD may contract with a Community Outreach specialist to assist with agenda and meeting summary documents, facilitate meetings (as needed), report development, and in-kind matching from stakeholders.
   Months 0 – 3 – Sub-award document and procurement approvals.
   Months 1 – 24 – On-going reporting Technical Working Group and Community Outreach meetings.
   Costs $35,499.60

Task 2: Data Research and Model Improvement

a. DRI and NCWD will obtain training in the RockWorks and Groundwater Vistas Software Programs.
b. The Work Plan will be developed by a Technical Working Group, who will use available data to expand on the initial project approach, goals, and objectives as stated in this application.
c. The NCWD Project Manager will monitor and maintain the Work Plan schedule and assignments and facilitate interactions among the Technical Working Group members and DRI.
d. The Technical Working Group will be tasked with supporting DRI's modeling efforts by working with DRI.

Months 0 – 2 – NCWD and DRI Software Training.
Months 1 – 18 – Technical Working Group Meetings and Tasks.
Costs $251,302.90

Task 3: Community Outreach and Engagement

a. The Community Outreach Team will be tasked with developing a Community Outreach and Stakeholder Engagement Plan to formalize communication forums and methodologies (i.e., social media, print media, community meetings, etc.).
b. The Community Outreach Team will be led by the NCWD General Manager.
c. Outreach and Educational recommendations to enhance community awareness and support for the Project will be implemented by members of the Community Outreach Team with support from DRI and the NCWD Project Manager, under the oversight of the NCWD General Manager.

Months 12 – 24
Costs $78,234.20

Task 4: Review and Evaluation of Basin 162 Project Applications and Deliverables

a. Upon completion of the DRI Model, all Stakeholders will be asked to review and recommend applications for the improved model and new forecasting capabilities.
b. Each application will be documented for follow-up by the appropriate Stakeholder group.
c. Technical and guidance documents will be part of this task.

Months 18 – 24
Costs $64,371.60

Provide a summary description of the *products* that are anticipated to result from the project.

Table 2. Anticipated Product Results

Product	**Detailed Description**
Guidance Documents	Technical Working Group Work Plan and Methodology Guide for Data Collection; Community Outreach and Engagement Plan; Best Management Practices by Industry for Water Resource Management
Presentations and Meetings	NCWD Governing Board, Nye County Board of Commissioners, Pahrump Regional Planning Commission, Private Well Owners Association, Nye

	County Park and Recreation Advisory Board, Wildlife Management Advisory Board
Reports	Pahrump Valley Basin 162 Improved Model and Forecasting Report, Bureau of Reclamation Project Status Reports and Final Project Report
Models and Data	Lithologic and Groundwater Model in RockWorks and Groundwater Vistas software platforms with associated ArcGIS-compatible data files

Who will be involved in the project as project partners?

NCWD is the applicant for this project and has partnered with the Desert Research Institute to complete the Basin 162 Project. Project partners that will contribute technical expertise and help identify and obtain lithologic and hydrologic data as part of the Technical Working Group include Nye County Natural Resources and Federal Facilities Office; Nye County Planning Department; Desert Utilities, Inc.; Pahrump Utility Company, Inc.; Great Basin Water Company; Private Well Owners Association; and Great Basin Drilling. Project partners that will serve as the Community Outreach Team will include: the Town of Pahrump; Southern Nye County Extension Office of the University of Nevada; US Fish and Wildlife Service; Pahrump Regional Planning Commission; and other local stakeholders as identified through the Community Outreach and Engagement Plan.

Identify staff with appropriate credentials and experience and describe their qualifications.
Staff with appropriate experience and credentials to complete this project include Nye County Water District General Manager, Daniel Weeks; Nye County Water District Geoscientist III; John Klenke; Desert Research Institute Associate Research Scientist; Susan Rybarski; and a Graduate Student to be assigned at a later date.
Susan Rybarski has extensive experience in groundwater modeling and associated research. She is the lead technical researcher for the Basin 162 Project, and an Associate Research Scientist in Hydrology for the Division of Hydrologic Sciences of the Desert Research Institute. She has published several peer-reviewed documents on complex groundwater models throughout Nevada, including her most recent, DRI Publication No. 41298, entitled “Revised Modeling Assessment of Pahrump Valley, Nevada: Final Report” (Rybarski, 2023).

Have the project team members accomplished projects similar in scope to the proposed project in the past either as a lead or team member?
John Klenke and Susan Rybarski have worked on the Pahrump Valley Basin groundwater modeling program for the NCWD since 2015, when the first DRI model was completed. They updated the model in 2020 and again in 2023. Ms. Rybarski led the research and developed the groundwater model and updates on behalf of DRI.

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

Yes, the team is capable of proceeding with the tasks within the proposed project immediately upon entering into a financial agreement with the Bureau of Reclamation. The NCWD and DRI worked cooperatively to develop this application for funding.

E.1.4. Evaluation Criterion D—Dissemination of Results

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

Engagement of the Technical Working Group and the Community Outreach Team early in the proposed scope of work is to encourage community participation, and therefore investment in and support for recommendations resulting from the Basin 162 Project. Overallocation of water rights within the Basin and physical indications that over pumping is adversely impacting the natural and anthropogenic environment are evident through discontinued spring flows, natural habitat declines, and domestic wells running dry. Residents have access to previous modeling efforts but reported them as too complex or esoteric to apply to the general public. Bringing residents and stakeholders into the process of developing the model will demystify the factors that influence the results of modeling and forecasting tool applications. Active stakeholder and community engagement in developing the model will garner support for strategies and measures that will be implemented to ensure the Pahrump Valley has a sustainable future.

If the applicant is the primary beneficiary of the project, explain how the project results will be communicated internally, and to interested stakeholders and interested water resources managers in the area, if appropriate.

The project results will be communicated internally through Nye County Water Board (NCWB) meetings held every other month on the second Tuesday. These meetings are open to the public and recorded for post viewing purposes. Interested stakeholders and water resource managers will have access to the water data, models, and information regarding groundwater and water quality information and project related details as members of either the Technical Working Group or the Community Outreach Team.

If the applicant is not the primary beneficiary of the project (e.g., universities or research institutes), describe how project results will be communicated to project partners and interested water resources managers in the area.

N/A – Applicant is the primary beneficiary.

Describe how the project results will be shared with other water managers in the West that could use the information to support water management objectives.

Sharing the project results with other water managers in the Western United States to support their water management objectives is essential for fostering collaboration and disseminating valuable information. NCWD will provide key guidance documents, project reports, and data on its website and participate in regional and national forums to share lessons learned, tools developed, and measures identified and implemented to accomplish water management objectives. Additionally, DRI will develop a per-reviewed technical publication on the improved model and forecasting tools.

By adopting a multi-faceted approach to sharing project results, including electronic formats, web applications, stakeholder engagement, reports, and conferences, the project can effectively disseminate valuable information and support water management objectives not only in Nye

County but also throughout the Western United States. This collaborative and transparent approach enhances the project's impact and relevance to a broader audience of water managers and researchers.

E.1.5. Evaluation Criterion E—Presidential and Department of the Interior Priorities

E.1.5.1 Sub-criterion No. E1. Climate Change

Please describe how the project addresses climate change and increases resiliency.

Climate change in the Desert Southwest has increased temperatures, extended drought conditions, and increased the intensity of sporadic rain events resulting in increasingly damaging floods in the Pahrump Valley. The Basin 162 project, combined with the Nye County Planning Department's recently completed flood mapping and conservation efforts by the Habitat Conservation Assistance Network to restore native habitat will combine to improve resiliency in the Pahrump Valley. Improved understanding of the local lithology, required to develop the improved DRI model, will be used to help develop RIB structures to capture floodwaters as recharge to the groundwater table. Native vegetation will help stabilize soil and reduce sediment loads in floodwater, and forecasting tools will improve water resource management strategies to balance water demand and increase water delivery reliability.

How will the project build long-term resilience to drought? How many years will the project continue to provide benefits? Please estimate the extent to which the project will build resilience to drought and provide support for your estimate.

In light of climate uncertainty, resiliency to drought will rely upon the resolve of the local community to support the tools developed using Bureau of Reclamation funding for the Basin 162 Project. However, NCWD anticipates direct involvement within the community to develop and understand if not the improved model and forecasting tools, then the value of recommendations developed by the Technical Working Group in conjunction with Community Stakeholders. DRI reports indicate forecasting may be possible (subject to obtaining the additional data needed for model improvements) to 2070 (Rybarski, 2023). Thus, community engagement in implementing measures to address drought conditions by actively using the improved model and forecasting tools should build resilience to 2070.

Will the proposed project reduce greenhouse gas emissions by sequestering carbon in soils, grasses, trees, and other vegetation? Does the proposed project seek to reduce or mitigate climate pollution such as air or water pollution? Does the proposed project contribute to climate change resiliency in other ways not described above?

Yes, increasing native vegetation through habitat and spring restoration, implementing sustainable water management measures, and thereby improving the overall health of the water shed will decrease greenhouse gas emissions and assist in sequestering carbon in the soils. Finally, best management practices employed to control measures that may adversely impact groundwater quality and management should serve to prevent air and water pollution.

E.1.5.2 Sub-criterion No. E2 Disadvantaged or Underserved Communities:

The Town of Pahrump is in southern Nye County, Nevada and has a population of 37,303 based on information from the 2016-2020 American Census Survey (ACS) estimates. Out of those 37,303, 38% are classified as low income. That is 6% more than the State average, and 8% more than the Country average.

Please use the Council on Environmental Quality's interactive Climate and Economic Justice Screening Tool, available online at Explore the map - Climate & Economic Justice Screening Tool (geoplatform.gov) to identify any disadvantaged communities that will benefit from your project.

The Justice Screening Tool for the Majority of Nye County and within the Town of Pahrump identifies most communities are identified as disadvantaged for several resources. These include the following: Health (heart disease, low income, life expectancy) Workforce development (unemployment, high school education), Climate change (population loss), housing (Lack of indoor plumping) and Legacy Pollution (Formerly used Defense Site, and low income) (geoplatform.gov).

The town of Pahrump has an age demographic of 56 percent being between the ages of 10 – 64. Heart disease is shown as the highest 92-97th percentile. Low income is observed between 60-87th percentile. Unemployment rates show 85-92nd percentile.

If applicable, describe how the project benefits those disadvantaged or underserved communities identified using the tool.

The water quality of the groundwater in Pahrump is considered at risk due to the annual nitrogen discharge from Individual Sewer Disposal System (ISDS) (septic), estimated to be about 227,000 pounds per year (Shaw, 2017). If the current trend continues, nitrate levels in the aquifer are expected to rise and pose a potential risk to public health. As most of the underserved community, particularly the low income and underemployed, get their drinking water from groundwater, any impact to the aquifer will have a direct impact to the quality of water that the residents use at home. Since all residents of the Town of Pahrump get their drinking water from the aquifer, additional recharge will ensure that their current water supply is protected.

E.1.5.3. Sub-criterion No. E.3 Tribal Benefits

Does the proposed project directly serve and/or benefits a Tribe, supports Tribally led conservation and restoration priorities, and/or if the project incorporates or benefits Indigenous Traditional Knowledge and practices.

The proposed project does not directly serve or benefit Tribal lands. However, the project results will benefit members of the Western Shoshone and Paiute Tribes who live in the Pahrump Valley.

Does the proposed project support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe?

The proposed project does not support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe.

8. Project Budget: Budget Proposal

The total project cost is $437,808.30 to complete Tasks 1-4. Matching contributions for this project will be provided by the NCWD, through salary and fringe benefits of part-time and full-time staff working directly on the project. Other non-federal funding sources will be provided by stakeholder sources and will be provided through letters of commitment. NCWD is requesting $283,584.30 from the Reclamation under this Notice of Funding Opportunity (NOFO). The remaining $154,224.00 will be provided by local funds as a non-federal cost share (***Please see***

8. Project Budget

Table 3: *Summary of Non-Federal and Federal Funding Sources*

Funding Sources	**Amount**
Total Project Cost	**$300,000**
1. NCWD	$75,000.00
Non-Federal Subtotal	$75,000.00
Requested Reclamation Funding	**$225,000.00**

Table 4*: Total Project Cost*

Source	**Amount**
Cost to be reimbursed with Federal funding requested	$225,000.00
Cost to be paid by the applicant (NCWD)	$75,000.00
Value of third-party contributions	$0.00
Total Project Cost	**$300,000.00**

8.1 Budget Narrative:

All costs included in this proposal are directly related to the project and necessary for the project implementation and completion. The non-federal contribution is 25 percent, and the federal contribution is 75 percent.

Table 5*: Budget Proposal*

Budget Item Description	**Computation**	**Computation**	**Quantity Type**	**Total Cost**
	$/Unit	**Quantity**		
Salaries and Wages				
John Klenke (Project Manager)	$91.30	620	hours	$ 56,606.00
Susan Rybarski (PI)	$58.80	404	hours	$ 23,755.20
TOTAL				**$ 80,361.20**
Fringe Benefits				
John Klenke, PM	57.70%	$ 56,506.00	Percent of salary	$ 32,603.96
Susan Rybarski	52.00%	$ 23,755.20	Percent of salary	$ 12,352.70
Daniel Weeks	0.00%	$ 4,307.80	Percent of salary	$ -
Graduate Student	35.40%	$ 44,108.40	Percent of salary	$ 15,614.37
Community Outreach Facilitator	0.00%	$ 71,500.00	Percent of salary	$ -
TOTAL				**$ 60,571.04**
Equipment				
N/A				$ -

Supplies and Materials				
Rockworks Software	$5,000	2	Software License	$ 10,000.00
Groundwater Vistas	$4,900	2	Software License	$ 9,800.00
TOTAL				**$ 19,800.00**
Contractual/Construction				
Daniel Weeks (General Manager)	$30.77	144	hours	$ 4,430.88
Graduate Student	$35.40	1350	hours	$ 47,790.00
Community Outreach Facilitator	$125.00	400	hours	$ 50,000.00
TOTAL				**$ 102,220.88**
Travel (from Reno to Pahrump**)**				
DRI: GSA Hotel Rates	$ 107.00	6	Days	$ 642.00
DRI: GSA Milage	$ 0.57	300	Miles	$ 171.00
DRI: Per Diem	$ 59.00	6	Days	$ 354.00
DRI: Rental Car	$ 200.00	6	Days	$ 1,200.00
Contingency	$ 105.00	6		$ 630.00
TOTAL				**$ 2,997.00**
Total Direct Costs				
Indirect Costs	0	0	0	$ -
TOTAL ESTIMATED PROJECT COSTS				**$ 265,950.12**

Salaries and Wages:

NCWD will contribute in-kind wages for permanent full-time staff members to this project. Project Manager, John Klenke, ($91.30/hour) will commit 620 hours in total, and Principal Investigator, Susan Rybarski ($58.80/hour) will commit 404 hours in total for the project duration.

Fringe Benefits:

The only fringe benefits associated with the Project are the fringe benefits received by the Project Manager (PM), John Klenke and DRI Principal Investigator (PI), Susan Rybarski. Project Manager receives benefits of 57.70%, Principal Investigator receives 52.0%, and the graduate student receives 35.40%.

57.7% NCWD benefits for permanent, full-time employees and 35.4% for limited-term employees, including Graduate students. (*Please see **Appendix D. Wages and Salaries**).*

Travel:

$3,000 is requested for the PI to travel from Reno, Nevada to Pahrump, Nevada to attend conferences, presentations, and meetings as part of the project's implementation and competition.

Equipment: N/A

Supplies and Materials:

At a cost of $5000.00 each, project staff will purchase (2) Rockworks software licenses and at a cost of $4,900 each, the project staff will purchase (2) Groundwater Vistas software licenses to aid the project manager and student researcher in completing research tasks.

Contracts:

Daniel Weeks, A Nye County Water District General Manager will assist ($30.77/hour) in total of 144 hours over the course of the project. A Community Outreach Facilitator will assist in this project ($125/hour) for 400 hours in total. A Graduate Student will be hired with Reclamations funds. This Graduate student will work 40 hours/week ($35.40/hours) on this project for the project's duration, totaling 1350 hours.

Third-Party In-Kind Contributions:

Third-Party In-Kind Contributions	**Amount**	**Quantity**	**Units**		**Total**
Desert Utilities Inc. (DUI)	$500.00	24	months	$	12,000.00
Great Basin Drilling (GBD)	$5,000.00	24	months	$	120,000.00
Pahrump Utility Company Inc. (PUCI)	$200.00	24	months	$	4,800.00
Nye County Natural Resources and Federal Facilities Office (NCNRO)	$376.00	24	months	$	9,024.00
TOTAL In-Kind Match				**$**	**145,824.00**

Other Expenses: None anticipated.

Total Direct Costs: Reclamation is requested to contribute $225,000 toward direct costs. NCWD will provide a match of $75,000.

Budget Narrative Attachment). The estimated project cost estimates for Non-Federal, Federal and In-kind Contributions are listed in Tables 3 and4 of the Budget Narrative Attachment Files.

Project Budget: Budget Narrative

Please see ***Budget Narrative Attachment***.

9. Environmental and Cultural Resources Compliance

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts. The proposed project comprises water quality modeling and data analysis of existing well logs. Modeling and data collection for forecasting functionality would research existing documents for lithologic and hydrologic information. There would be no impacts to soil, air, or water quality.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project? A list of additional species expected to be present in the Pahrump Valley was obtained from U.S. Fish and Wildlife Service Information for Planning and Consultation (IPaC) website accessed 2023. Based on the proposed objectives of the project, including development of a forecasting tool that would assist in the restoration of habitat for these species, the project is anticipated to result in a positive effect for these species.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States"? If so, please describe and estimate any impacts the proposed project may have. Based on the current regulatory interpretations, there are no surface waters associated with the project that extend across State jurisdictional boundaries. As such, the project does not fall under CWA jurisdiction as "Waters of the United States".

When was the water delivery system constructed? Although individual domestic and agricultural groundwater wells have been installed since the 1920's in the Pahrump Valley and three water utilities currently provide delivery service in three service areas across Basin 162, the proposed project does not include activities that would involve physical disturbance to infrastructure or earth-disturbing activities.

Will the proposed project result in any modification of or effects to individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously. The proposed project would not result in the modification of any irrigation system.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering

this question. There are no structures, features, or buildings associated with the proposed project area.

Are there any known archeological sites in the proposed project area? Although there are known archeological sites in the proposed project area, this project would not entail disturbance of the sites or other activity that would trigger requirements for State Historic Preservation Office involvement.

Will the proposed project have a disproportionately high and adverse effect on low income or minority populations? The proposed project would not have disproportionate effects on low income or minority populations.

Will the proposed project limit access to, and ceremonial use of, Indian sacred sites or result in other impacts on tribal lands? The project would not limit access to, or ceremonial use of, Indian sacred sites or result in other impacts on tribal lands.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

The proposed project would not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

10. Required Permits of Approvals

None.

11. Overlap or Duplication of Effort Statement

This proposed project does not overlap or duplicate previous efforts.

12. Conflict of Interest Disclosure

No actual or potential conflict of interests exists at the time of submission.

13. Uniform Audit Reporting Statement

NCWD is required to complete a Single Audit for the most recently closed fiscal year (Year Ended June 30, 2022) NCWD EIN is 27-4596218 and the report is available through the Federal Audit Clearinghouse website.

14. Certification Regarding Lobbying

As this application requests more than $100,000 in Federal funding, the applicant certifies the statements in 43 CFR Part 18, Appendix A. Standard Form-LLL, “Disclosure Form to Report Lobbying” was submitted with this application.

15. Letters of Support

Letters of support for the Project are included in ***Appendix B*.**

16. Letter of Partnership

Not applicable. (Category B Applicants only)

17. Official Resolution

Nye County Water District Governing Board will hold a board meeting on November 14, 2023, to discuss and deliberate the financial accountability and legal obligations associated with receipt of the funding opportunity and forward the resolution to the U.S. Department of the Interior.

18. Letter of Funding Support

Letters of support for the Project are included in ***Appendix C*.**

References

Benedict. S., Smith. D., Wickelman. P. (Shaw Engineering). (2017). Nye County Water District Pahrump Groundwater Plan Evaluation in Regard to Identifying Projects for Preliminary Engineering Reports.

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United States Fish and Wildlife, Information for planning and Consultation resource list (IPaC) Accessed on 08/30/2023. Available at: https://ipac.ecosphere.fws.gov/location/BY7W3MDZJVGWDJPUV3P46JPCYI/resources

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Websites Accessed:

https://www.nyecountywaterdistrict.net/35/Water-Conservation (nyecounty.net)

https://www.fs.usda.gov/nac/resources/tools/index.shtml (usda.gov)

https://www.fs.usda.gov/nac/resources/tools/index.shtml (usds.gov)

Appendix B

Letters of Support

Town of Pahrump
Nye County Government Center
2100 E. Walt Williams Drive
Suite 100
Pahrump, NV 89048
Phone (775) 727-5107
Fax (775) 727-0345

Nye County
Nye County Government Center
2100 E. Walt Williams Drive
Suite 100
Pahrump, NV 89048
Phone (775) 751-7075
Fax (775) 751-7093

Town of Pahrump

October 9, 2023

Mr. Daniel Weeks
General Manager
Nye County Water District
2101 E. Calvada Blvd., Suite 100
Pahrump, NV 89048

Subject: **WaterSMART: Applied Science Grants for Fiscal Year 2023**

Dear Mr. Weeks:

I fully support the Nye County Water District's (NCWD) application for the Bureau of Reclamation WaterSMART: Applied Science Grants for Fiscal Year 2023. I understand that NCWD is requesting funding to improve and develop hydrologic data for water management located in the Pahrump Hydrographic Basin 162.

As the Pahrump Town Manager, I know that the NCWD is working to support measures to implement sustainable water reliability, longer-term water resource management, and improve ecological benefits for the Pahrump Valley. I appreciate NCWD's work to coordinate with several agencies, such as the Nye County Planning and Public Works Departments and other stakeholders, to develop a comprehensive approach to flood control, groundwater management, and ecological rehabilitation through data collection, native seeding, and groundwater monitoring efforts. This development and forecasting study are consistent with and built upon recommendations developed in the Pahrump Basin 162 Groundwater Management Plan.

Pahrump's future depends on clean drinking water and the coordination and cooperation of multiple stakeholders throughout the Pahrump Valley to ensure the Town's water supply is sustainable and reliable and encompasses the natural balance through restoration efforts.

The Town of Pahrump proposes to support the application by assisting with public outreach and stakeholder coordination and by encouraging Pahrump Businesses to provide recent hydrologic data, as appropriate, for incorporation into the Desert Research Institute's groundwater and precipitation models. Additionally, we can provide in-kind support through staff participation in meetings and data-gathering associated with this project. We are willing to track these costs and contribute this in-kind match toward the project.

Sincerely,

Tim Sutton,
Town of Pahrump Manager

EXTENSION
College of Agriculture,
Biotechnology & Natural Resources

October 13, 2023

Mr. Daniel Weeks
General Manager
Nye County Water District
2101 E. Calvada Blvd., Suite 100
Pahrump, NV 89048

SUBJECT: Support for WaterSMART: Applied Science Grants for Fiscal Year 2023

Dear Mr. Weeks:

Southern Nye County Extension supports the Nye County Water District (NCWD) in their application for funding through the Bureau of Reclamation for an Applied Science Grant. The addition of new hydrologic data and development of a predictive model component will not only provide tools for Water System Operators and the NCWD to use in managing groundwater resources, but the predictive model will provide educators with a forecasting model and updated tools to better understand anticipated groundwater levels into the future.

Extension supports development of the forecasting and modeling study as it may result in the preservation of native species unique to the region, including the native wildflowers and Pahrump Valley Buckwheat. Extension Master Gardeners gather and utilize native seeds to support the revitalization of the native desert landscape. A modeling system to evaluate existing water system operations and forecast groundwater trends will be invaluable in helping the Service identify and implement measures to mitigate the effect of climate change on native species in the Pahrump Valley.

Extension is willing to commit to the support of this project by committing staff time toward project coordination, and meeting participation to improve groundwater forecasting tools and recommendations based on hydrologic information from the improved model.

Hayley Maio
Extension Educator, Southern Nye County

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Southern Nevada Fish and Wildlife Office
4701 North Torrey Pines Drive
Las Vegas, Nevada 89130

October 11, 2023
Sent electronically

Mr. Daniel Weeks
General Manager
Nye County Water District
2101 E. Calvada Blvd., Suite 100
Pahrump, NV 89048

SUBJECT: Nye County Water District's WaterSMART Applied Science Project for Fiscal Year 2023

Dear Mr. Weeks:

For many years the Southern Nevada Fish and Wildlife Office (Service) has been involved in discussions, research, and planning with the National Park Service, Bureau of Land Management, US Geological Survey, and other non-federal partners such as Nye County and Desert Research Institute on groundwater models to better understand the greater Death Valley Regional Flow System. Understanding groundwater flow in southern Nye County, Nevada and in southeastern Inyo County, California, is critical to protecting the many listed and endemic species in the Amargosa River Watershed.

Gathering more data and improving groundwater models for the Pahrump Valley Basin is important to understanding impacts from groundwater use and climate change on the lower Amargosa Watershed. This area is of critical importance to the Service due to the concentration of groundwater dependent federally listed species that occur there, such as the Amargosa vole and Amargosa niterwort.

The Service supports landscape scale research and modelling projects such as Nye County Water District's Applied Science WaterSMART project to improve the existing Desert Research Institute Groundwater Model for the Pahrump Valley Basin and to develop a new predictive model to create a more robust tool for water management and forecasting capabilities in the basin. Models such as this will assist the Service in its mission of conserving sensitive, endangered, and endemic species for future generations of Americans.

Sincerely,

Glen Knowles
Field Supervisor