A. Applicant Information

Organization:	**The Regents of New Mexico State University**		
Address:	**Anderson Hall E1200** **Corner of Espina and Stewart St.,** **Las Cruces, NM 88003-8002**		
Contact Person:	**Alisha A. Giron**	Title:	**Asst. VP, Research Admin.**
Phone:	**575-646-1590**	Email:	**ras@nmsu.edu**
FED. Tax ID #	85-6000401	Date of Incorporation:	1888 *(non-profits only)*

B. Project Title

Provide a descriptive project title in 15 words or less in the space below. It should include the waterbody name (if applicable) and type of activity (Example: Trout Creek Riparian Habitat Improvement Project).

RINCON ARROYO WATERSHED STABILIZATION PROJECT TO REDUCE ECOLI NPS POLLUTION TO THE RIO GRANDE

C. Project Manager

Identify a project manager who will be responsible for oversight of the approved project including: administering contracts; ensuring technical viability of the project; ensuring funds expended are within the budget and in accordance with applicable law; and ensuring that quarterly fiscal and technical progress reports, and a final report, are submitted to NMED.

Name:	Sam Fernald		
Organization:	NMSU - New Mexico Water Resources Research Institute (NM WRRI)		
Phone:	575-646-4337	Email:	afernald@nmsu.edu

D. Start and End Dates

Indicate the planned beginning and ending dates of the project. The project start date cannot be earlier than July 1, 2020. Project terms of three years or less are preferred. Project terms initially planned cannot exceed four years in duration.

Planned project start date (mm/dd/yyyy):	07/01/2020	Planned project end date (mm/dd/yyyy):	06/30/2023

E. Plan Citation

Only those waters having completed Watershed-Based Plans (WBPs) listed at https://www.env.nm.gov/surface-water-quality/accepted-wbp/*, and/or completed Wetlands Action Plans (WAPs) listed at* https://www.env.nm.gov/surface-water-quality/wap*, are eligible. Projects may implement both types of plans. Identify the WBP or WAP that includes the proposed project or components thereof. Provide an internet link to the WBP or WAP.*

WBP or WAP citation information:	Paso del Norte Watershed Council (PdNWC). 2014. The Paso del Norte Watershed Based Plan Mitigation Measures to Reduce Bacterial Pollution in the Rio Grande. https://www.env.nm.gov/wp-content/uploads/sites/25/2017/06/PdNWC_WBP_Final_5-27-14.pdf

F. Planning Feedback

In addition to implementation activities, projects identified through this process may optionally revise or supplement existing WBPs and/or WAPs. Briefly describe the main aspects, if any, of the WBP and/or WAP which are obsolete, inaccurate, or of insufficient detail. Optionally, describe how the proposed project will address that deficiency.

This project will supplement the WBP's effectiveness. The WBP gives a thorough overview of planning considerations for this region, the Hatch and Mesilla Valleys. As is common, little data is available to predict the effect of best management practices (BMP's) in restoration projects such as these, where the approach is to slow and spread "flashy" flood flow, to both settle out bacterial and sediment transport (which can then harbor E. coli), and support increased vegetation cover to further increase infiltration and decrease hydrologic energy. The scale of needed restoration for stakeholders across arid rangelands is often overwhelming, and thus the ability to predict benefits is critical. The results of this project and the data from the effectiveness monitoring will link quantified effects to ecohydrologic landscape indicators that are used in management analysis.

G. Project Area

Priority waters for this application include the following:

1. *Stream reaches listed as impaired in the* 2018-2020 State of New Mexico Clean Water Act Section 303(d)/Section 305(b) Integrated Report (Integrated Report) *and having one or more U.S. Environmental Protection Agency (EPA) approved total maximum daily loads (TMDLs) to describe at least one impairment.*
2. *Stream sections identified in the* Integrated Report *in Category 4C.*
3. *Wetlands described within WAPs.*

Only those waters having completed WBPs and/or WAPs are eligible. The Integrated Report *is available at* https://www.env.nm.gov/surface-water-quality/303d-305b. *TMDLs are available at* https://www.env.nm.gov/surface-water-quality/tmdl. *Completed WBPs are available at* https://www.env.nm.gov/surface-water-quality/accepted-wbp. *Completed WAPs are available at* https://www.env.nm.gov/surface-water-quality/wap.

Identify the priority stream reach or reaches and/or wetlands within your proposed project area. For streams, provide the assessment unit name and ID number from the Integrated Report. *For wetlands provide the latitude and longitude of the centroid coordinates. Identify the watershed or watersheds where the proposed project is located in terms of 12-digit watersheds. Applicants may look up 12-digit watersheds at* https://gis.web.env.nm.gov/oem/?map=swqb *(select "Watershed Boundary Dataset" under the "Legend" tab). State the number of impaired stream miles and/or wetland acres that will be improved by the project, and acres of land to be directly improved by the project. Provide one or more maps of the project area, designed to print on 8.5" x 11" paper, at an appropriate scale, identifying project area boundaries.*

Assessment Units name and ID:	NM-2101_10: Rio Grande (Leasburg Dam to one mile below Percha Dam)
Wetlands:	N/A
12-digit Watersheds:	Phase I (addressed in this proposal) 130301020304 – Outlet Rincon Arroyo; overall project addressed 10-digit Rincon Arroyo Watershed 1303010203, with the additional 12-digit sub-watersheds: 130301020301 – Headwaters Barbee Draw, 130301020302 – Outlet Barbee Draw, 130301020303 – Headwaters Rincon Arroyo
Project area (stream miles):	Effect of watershed site is to approximately 14 miles of the Rio Grande reach (Leasburg Dam to one mile below Percha Dam, NM-2101_10), including the impaired reach from Rincon Arroyo outlet (at location of water quality station: RIO GRANDE NEAR RINCON AT NM 140 - 42RGrand126.9) to Leasburg
Project area (wetlands acres):	N/A
Project Area:	Phase I (this project): the restoration addresses a 154-acre subbasin with practices on 2.9 acres (compared to a similar control subbasin of 90 acres); Phase II (planned future project): The remaining Rincon Arroyo Watershed 134 sq. mile watershed
Project area map:	See attached Addendum 1 package

H. Problem Description

Indicate the cause or causes of impairment (i.e. impairment parameters) in the streams listed in the "Project Area" section that will be addressed by the project. For wetlands, enter the stressors that have been identified. Briefly describe what you know about the contributors to the impairment. Include land use, nonpoint sources of pollution, and related water quality problems in the watershed. If a Rapid Assessment Method (RAM) has been used to assess the wetland, summarize the RAM results in the narrative. Cite one or more sections in the WBP and/or WAP identified above that contain more information on the water quality or wetland condition problem.

Assessment Unit ID or Wetland Coordinates	**Assessment Unit or Wetland Name**	**Impairment Parameters or Wetland Stressors**
NM-2101_10 (2018 - 2020 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated List p242)	Rio Grande (Leasburg Dam to one mile below Percha Dam)	TMDL for E. Coli. Category 4A.

Assessment Unit or Wetland Narrative

The 2018 - 2020 State of New Mexico Clean Water Act §303(d)/§305(b) Integrated Report and the included Integrated List for assessment unit NM-2101_10 show the Rio Grande (Leasburg Dam to one mile below Percha Dam) is non supporting for Personal Contact for E. coli (NMED/SWQB, 2018, p242), by exceeding the standard requirement of the monthly geometric mean of E. coli bacteria 126 cfu/100 mL or less, single sample 235 cfu/100 mL or less. Based on data collected by the U.S. International Boundary and Water Commission (USIBWC), and additional data submitted by other entities, the Rio Grande from one mile downstream of Percha Dam to the international boundary with Mexico was listed as impaired for fecal coliform in the state of New Mexico CWA §303(d) Integrated List of Assessed Surface Waters in 2004. That same year, NMED conducted an intensive water quality survey which documented an exceedance of the New Mexico Water Quality Standards for the coliform bacteria Escherichia coli (E. coli) in the Rio Grande one mile downstream of Percha dam to the international

Assessment Unit ID or Wetland Coordinates	Assessment Unit or Wetland Name	Impairment Parameters or Wetland Stressors

boundary with Mexico. As a result, the listing was changed from fecal coliform to E. coli in 2006. Subsequently, a TMDL was calculated for the main stem of the Rio Grande in New Mexico below Elephant Butte Dam. The resulting document, Total Maximum Daily Load (TMDL) for the Main Stem of the Lower Rio Grande (from The International Boundary with Mexico to Elephant Butte Dam) was completed in 2007 (PdNWC WBP 2014, page 2). Additionally, the project affects a river reach that includes a NM Audubon Important Bird Area as mapped by NMDFG in their online conservation information system environmental review tool. The project is in the stream reach bordering on the Caballo Reservoir fish management plan waters. The project is downstream of a conservation opportunity area in the tributaries from the black range to Caballo Reservoir.

--The restoration approach proposed here is to slow and spread "flashy" flood flow, to both settle out bacterial and sediment transport (which then serves as a source of E. coli to the overlying water Fluke et al. 2019), and support increased vegetation cover to further increase infiltration and decrease hydrologic energy. In the following, we outline the problems of this site using Recovery Potential Indicator key sub-categories (indicated in quotation marks) from the EPA Recovery Potential Screening (RPS) Tool (EPA and USGS, 2018). Additionally, we conducted a preliminary RPS score assessment for where this HUC 12 watershed of this Phase I project, the Outlet Rincon Arroyo, scored a high recovery potential in a comparison to the Placitas Arroyo watershed across the Rio Grande (where major efforts to build dams are occurring), see the end of this section for detailed results. The following sections 1 through 5 detail the impairment scope and the conditions for impairment:

--1) Impairment: The largest source of E. coli pollutant to the impaired stretches of the Rio Grande in the Hatch and Mesilla Valley is from watershed range sources, as 41% is from livestock and wildlife sources (other than waterfowl) as measured from four representative sites in the region (PdNWC WBP 2014, p. 19). Most relevant to this project, the Rincon Arroyo watershed, 32% is from watershed range sources at the Leasburg Dam observation site on the Rio Grande, which is the approximately 14 miles downstream from the Rincon Arroyo outlet to the Rio Grande. The Rincon Arroyo watershed has been identified by the land manager stakeholders as the highest priority watershed for this impaired reach, and the sediment transport is estimated to be the highest for the Hatch and Mesilla Valley, at a rate of 36.2 AFY (acre-feet per year) (TTI and DSS, 2015).

--2) "Watershed natural structure" – "vegetation cover" conditions contributing to impairment: The condition of the watershed natural structure, particularly vegetation cover (as measured by % natural cover), influences nonpoint source pollution (NPS) as good vegetation cover conditions results in "decreased sheet flow, increased infiltration, decreased runoff and associated contaminants, reduced erosion and development of a healthier biotic community in the watershed" (PdNWC WBP 2014, p. 35), and thus an increase in vegetation cover is a goal to address the impairment. This area has a high percentage of bare ground (quantitative analysis using NDVI to be provided in this study), as communicated by stakeholders in the region, including the three main ranchers of the watershed and BLM managers. They have shared that vegetation cover has decreased in the region generally due to their perceived growing aridity, occurrences of drought, and potentially land management grazing practices out of coordination with the climatic conditions. (Also note the discussion in the management measures section that the historical vegetation cover on floodplains as measured by NDVI will be correlated to flows and restoration results and adjusted by a control region). (Note that the RPS Screening tool indicator title is: % Natural Cover, N-index2 (2006) in Watershed).

--3) "Flow and channel dynamics" conditions contributing to impairment – high energy "flashy" flood dynamics, which also results in sediment transport and low "soil stability": High hydrologic energy transports contaminants and sediment that harbors E. coli contaminants (Fluke et al. 2019). Hydrologic energy increases as vegetation density declines, as surface roughness exerts strong control over infiltration in dryland (arid and semi-arid regions) (Wilcox et al. 2003). The north end of the Hatch and

Assessment Unit ID or Wetland Coordinates	Assessment Unit or Wetland Name	Impairment Parameters or Wetland Stressors

Mesilla valley cites that "pollutant loading in the watershed upstream from Leasburg Dam is primarily related to storm related runoff that can best be described as flash flooding" (PdNWC WBP 2014, p. 37). Thus mitigation of hydrologic energy is a goal to address the impairment. Stakeholders in the Stormwater Coalition, including the Dona Ana Flood Commission, have shared that flooding and the intensity of flood events has been increasing, and that watershed restoration is a critical priority to address the source of the problem. (Note that the RPS Screening tool indicator title is: PHWA Hydrology Sub-Index, ER (2016), Soil Stability, Mean in WS, and Erosion Risk (INSTATE)).

--4) "Ecological history" and disturbance conditions contributing to impairment – drought and reduction of upland water soil moisture: the increased occurrences of drought in the region contribute to vegetation loss and increase in hydrologic energy and sediment and NPS transport. (Note that the RPI score tool indicator titles are: % Barren Land in WS (2016), % Shrub/Scrub in WS (2016), PHWA Water Use Vuln. Sub-Index, State (2016), PHWA Watershed Vulnerability Index, State (2016)).

--5) "Social context" conditions contributing to impairment – "level of information, certainty and planning to achieve large watershed management potential": Quantification of the benefits of watershed restoration practices that slow and spread the flow for this region are critical to be able to achieve the targeted goals of reducing sediment and bacterial contaminant transport on the scale of the Rincon Arroyo watershed and then across the Hatch and Mesilla Valleys. Predictive modeling approaches that quantitatively link structure to processes which achieve ecological and social benefits are needed to increase the rate of restoration success in drylands (James et al. 2013) (Note that the RPS Screening tool indicator titles are: PHWA Water Use Vuln. Sub-Index, State (2016), and PHWA Watershed Vulnerability Index, State (2016)).

---------Further introduction background to problem description: Throughout the Hatch and Mesilla Valleys, as is common across the Southwest, vegetation loss in upland watersheds is leading to floods that scour soils and transport sediment and the non-point source pollution (NPS) of E. coli bacterial. Higher flow energies and decreased infiltration are diminishing water storage across the landscape, negatively impacting the ecosystems and vegetation cover which is critical for catching and absorbing this NPS. The largest source of E. coli pollution to the impaired stretches of the Rio Grande in the Hatch and Mesilla Valley is from watershed range sources, as 41% is from livestock and wildlife sources (other than waterfowl) as measured from four representative sites in the region (PdNWC WBP 2014, p. 19). A large group of stakeholders, the South Central New Mexico Stormwater Management Coalition (Stormwater Coalition – see description of stakeholders in Management Measures section J), has identified that watershed restoration is a critical priority throughout the Hatch and Mesilla Valleys, as the sediment transport leads to clogging of downstream riparian areas and agricultural infrastructure, and increasing the occurrence of flooding (See Addendum I overall perspective and approach, p. 2). The Stormwater Coalition has chosen the Rincon Arroyo Watershed (HUC 1303010203, 134 sq. miles, 85,770 acres) as its high and first priority project. The restoration of this watershed will establish the approach, expected benefits, and extent of watershed restoration to achieve these benefits throughout the rest of the region. The group has been working with the USDA Natural Resource Conservation Service (NRCS) to submit a proposal to their Small Watershed Projects Program for a Watershed Protection and Flood Prevention project, with funding without a match requirement of up to $25m (before congressional approval is required) for the planning and implementation of restoration through small-scale flood protection measures. The project identified here to address one 154-acre subbasin with restoration practices in a 2.9-acres project. This project would serve as a Phase I to the larger project, and would provide information critically needed by the stakeholders as to the efficacy and benefits of the practices. The restoration approach proposed here is to slow and spread "flashy" flood flow, to both settle out bacterial and sediment transport (which then serves as a source of E. coli to the overlying water Fluke et al. 2019), and support increased vegetation cover to further increase infiltration and

Assessment Unit ID or Wetland Coordinates	Assessment Unit or Wetland Name	Impairment Parameters or Wetland Stressors
decrease hydrologic energy. This phase I project will test and validate the design and provide quantifiable indicators, allowing for prediction of the extent of restoration needed for the remainder of the Rincon Arroyo watershed and subsequently other watersheds in the region. --Preliminary RPS score assessment on this HUC 12 watershed, the Outlet Rincon Arroyo (130301020404), in comparison to the Placitas Arroyo (130301020403) watershed across the Rio Grande (where major efforts to build dams are occurring). The Rincon Arroyo watershed ranked 1st in priority, with a high recovery potential result in both the index (higher scores indicator recovery potential) and the stressor score (lower stressors indicate higher recovery potential). The RPI Score was 72.22 (versus Placitas with a 27.78), the Ecological Index score was 83.33 (versus Placitas of 16.67), and the low Stressor Index was 16.67 (versus Placitas with an 83.33). -Citations: -EPA and USGS. 2020. Overview: Selecting and Using Recovery Potential Indicators. https://www.epa.gov/rps/overview-selecting-and-using-recovery-potential-indicators -Fluke, J., R. González-Pinzón, and B. Thomson. 2019. Riverbed sediments control the spatiotemporal variability of E. coli in a highly managed, arid river. Front. Water 1. -James, J. J., R. L. Sheley, T. Erickson, K. S. Rollins, M. H. Taylor, and K. W. Dixon. 2013. A systems approach to restoring degraded drylands. Journal of Applied Ecology 50:730-739. -New Mexico Environment Department/Surface Water Quality Bureau (NMED/SWQB). 2018a. 2018-2020 State of New Mexico Clean Water Act Section 303(d)/ Section 305(b) Integrated Report. 64 pp. -New Mexico Environment Department/Surface Water Quality Bureau (NMED/SWQB). 2018b. 2018-2020 State of New Mexico Clean Water Act Section 303(d)/ Section 305(b) Integrated Report. Appendix A 303(d)/305(b) List. 369 pp. -Tetra Tech Inc. (TTI), and Del Sur Surveying LLC (DSS). 2015. Surveyor's Report - IBWC Channel Maintenance Alternatives and Sediment Transport Studies for the Rio Grande Canalization Project; Contract No. IBM09D0006. USIBWC. -Wilcox, B. P., D. D. Breshears, and C. D. Allen. 2003. Ecohydrology of a Resource-Conserving Semiarid Woodland: Effects of Scale and Disturbance. Ecological Monographs 73:223-239		

I. Goals

State one or more pollutant load reduction goals, hydrologic goals, or wetland condition goals for the project. An example pollutant load reduction goal is that a proposed project will reduce nitrogen loading by an estimated 1.5 pounds per day on average. An example hydrologic goal is that a proposed project will increase the critical low flow by 0.1 cubic feet per second. An example wetland condition goal is that the wetland's Ecological Condition Ranking as determined with a RAM for that type of wetland will increase from C (fair condition) to B (good condition). Provide a brief explanation of how the goals were developed. Cite one or more sections in the WBP and/or WAP identified above that contain more information on the pollutant load reduction, hydrologic, or wetland condition goals.

Assessment Unit ID (Enter "NA" for Wetlands)	Assessment Unit or Wetland Name	Current Impairment Parameters or Wetland Stressors	Load Reduction, Hydrologic, or Wetland Condition Goals of Proposed Project
NM-2101_10 (2018 - 2020 State of New Mexico Clean	Rio Grande (Leasburg Dam to	TMDL for E. Coli. Category 4A.	The measurable goals are tied to the problem Recovery Potential Indicator key sub-categories. 1) Impairment Goal: Load reduction by factor of 2. 2) Vegetation cover conditions goal: Increase the

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Water Act §303(d)/§305(b) Integrated List p242)	one mile below Percha Dam)		vegetation cover by 10% from the additional water supply to floodplain regions of 3 estimated flows in each of two monsoonal seasons (by the end of 2023). 3) Flow and channel dynamics goal: Create a reduction in flow that is equivalent to reducing a 25-year 24-hour event to a 10-year 24 event by the e.o. 2023 (peak and volume reductions of approx. 1/3), and reduce E. coli and sediment transport. 4) Ecological history (decreasing soil moisture) conditions goal: Increase the area of infiltration (connectivity of flood flow to floodplains) from 27% of the floodplain in a 10-year event to 90%. 5) Social context conditions goal – level of information, certainty and planning to achieve large watershed management potential: Produce a comprehensive quantitative indicator package (which synthesizes the results from the goals 1-4) that estimates of the extent of watershed restoration which is generalizable for future planning of this region, particularly the Rincon Arroyo Watershed and other watersheds in the Hatch and Mesilla Valley

Goal Narrative

1) Impairment Goal: We estimate that the restoration approach (see Addendum I for plans) conservatively will reduce the loading from this Phase I project by a factor of 2. Based upon the 2007 NMED TMDL document (as summarized in the PdNWC WBP 2014) of the average load for a mid-point flow from this impaired reach of 4.0 x 10^13 CFU/day, our estimation of the load contribution from this Phase I project subbasin (see Management Measure for calculations) is 6.5 x 10^9 CFU/day. Our target is thus a load reduction of a minimum of 3.2 x 10^9 CFU/day (day of flow events). Our approach has been documented to be particularly effective. Use of vegetation and incorporation of vegetative strips have been used to reduce E. coli numbers from farm and landscape water flow. For example, in annual grasslands, Tate et al. (2006), reported E. coli load reductions up to 48% (the reductions ranged from log 0.3 to log 3), depending on the width of the strips used. Parajuli et al. installed vegetative strips at the landscape level in an effort to reduce TMDL's in a northern Kansas watershed. Installation of vegetative strips reduced approximately 60% of the E. coli load and 63% of sediments (Parajuli et al. 2008). Staddon et al. (2001) documented 100-fold higher retention of Gram-negative bacteria in vegetated strips compared to bare soil (E. coli is Gram-negative). Based on these estimates (and others such as Harmet et al. 2018), we conservatively predict that we can reduce landscape-derived portion of the TMDL by a factor of 2. As to the mechanisms of E. coli retention in vegetative strips, sorption of bacteria to plant material and soils and specific attachment to plant roots is well-documented in the literature (e.g., Marshall, 1969; Dennis et al. 2010). The retention and sorption capacity of soils and plant roots for bacteria are high, and the expectation is the cells are strongly retained. For example Bashan and Levanony (1988) found the adsorption of a Gram-negative bacterium to soils was not reversible by water washing. This phase I project will establish indicators for E. coli load reduction that will be linked to key ecohydrologic indicators that are inputs to other landscape assessments, such as hydrologic modeling. This will produce E. coli indicators that will be generalizable to the region.

Assessment Unit ID (Enter "NA" for Wetlands)	Assessment Unit or Wetland Name	Current Impairment Parameters or Wetland Stressors	Load Reduction, Hydrologic, or Wetland Condition Goals of Proposed Project

2) Vegetation cover conditions goal: We conservatively estimate that the grass and annual forb vegetation response to two seasons of approximately 3 flows each will result in a minimum of 10% increase in vegetation response. Vegetation cover will be correlated to its effect on runoff peaks and volume as measured on the ground and analyzed in hydrologic modeling. We have modeled the Rincon Arroyo watershed using the Soil Conservation Service Curve Number (CN) method (USDA-NRCS 2004) in the HEC-HMS package (USACE 2018). The CN represents the effect on runoff from attributes of vegetation, soils and geology, and moisture conditions at the time of the event. The current soil and land classification type for this area results in a Curve Number of 82.5. We propose that since this area is in a valley bottom and that the interventions will result in full inundation of the 2.8 acre area, that the representative CN would shift from a "fair" condition to a "good" condition and to 78.9. We further propose that the 10% increase in vegetation response will reduce the CN to a 74.

3) Flow and channel dynamics goal: We estimated the 25-year 24-hour event using hydrologic modeling (Hec-HMS SCS Curve Number method as described in Goal 2) that the 2.9 acre area upon treatment currently could infiltrate 73% (2.8 AF) of the targeted flow quantity (3.6 AF). We estimate that the full targeted quantity with the increased vegetation response from increased water supply from the restoration treatment by 2023. We also predict that the reduction in hydrologic energy will reduce the site erosion by 20% as measured by the high resolution DEM's and LiDar provided by the Dona Ana Flood Commission (DACFC), and compared over preceding and upcoming periods (see Measures of Success for methodology).

4) Ecological history (decreasing soil moisture) conditions goal: Key to decreasing hydrologic energy is achieving the spreading of flow to achieve consistent inundation of a larger percentage of the floodplain. We estimate that the flow from a 10-year event currently inundates 27% of the area based upon a topographic analysis called a Topographic Wetness Index (TWI) using a GIS-based approach. TWI takes into account the amount of area contributing the flow and its slope (the more flow on flatter regions is more likely to be wet. We estimate with the restoration approaches we can increase that inundation of this area to 90% and achieve the infiltration described in goal 3 above, thus increasing the available water soil moisture.

5) Social context conditions goal – level of information, certainty and planning to achieve large watershed management potential: Goals 1-4 in the 2.8 acre site are required to establish generalizable indicators that allow for estimation of extent of restoration required to achieve goals in the region. These will facilitate planned near-future work to assess the extent of restoration required for the entirety of the Rincon Arroyo watershed, which will then inform restoration throughout the Hatch and Mesilla Valleys. As described in the problem statement, the Stormwater Coalition has been actively pursuing restoration in this region, and this lack of knowledge has been a barrier to moving forward to achieving restoration on this scale. See Measures Section J for the extent of the stakeholder involvement in the Stormwater Coalition. Citations:

--Bashan, Y. and H. Levanony. 1988. Adsorption of rhizosphere bacterium Azospirillum brasilense to soil, sand and peat particles. J. Gen. Microbiol. 134: 1811-1820.

--Dennis, P.G., A.J. Miller and P.R. Hirsch. 2010. Are root exudates more important than other sources of rhizodeposits in structuring rhizosphere bacterial communities? FEMS Microbiology Ecoogy. 72:313-327 --Harmet et al. 2018.

Vegetated treatment area (VTAs) efficiencies for E. coli and nutrient removal on small-scale swine operations. Internat. Soil Water Conserv. Res. 6:153-164 -- Marshall, K.C. 1969. Studies by Microelectrophoretic and Microscopic Techniques of the Sorption of Illite and

Assessment Unit ID (Enter "NA" for Wetlands)	Assessment Unit or Wetland Name	Current Impairment Parameters or Wetland Stressors	Load Reduction, Hydrologic, or Wetland Condition Goals of Proposed Project
Montmorillonite to Rhizobia . J. Gen. Microbiol. 56:301-306. -- P.B. Parajuli P., K.R. Mankin, P.Barnes, 2008. Applicability of targeting vegetative filter strips to abate fecal bacteria and sediment yield using SWAT Ag. Water Mange. 95:1189-1200. -- Staddon, A.W., M.A. Locke and R. J. Zablotowicz. 2001. Microbiological characteristics of a vegetative buffer strip soil and degradation and sorption of Metalochlor. Soil Sci. Soc. Amer. 65:1136-1142. -- USACE, H. E. C. HEC-HMS. http://www.hec.usace.army.mil/software/hec-hms/ --USDA-NRCS. 2004. Part 630 Hydrology: Chapter 10 Estimation of Direct Runoff from Storm Rainfall. National Engineering Handbook. Washington, DC, USA: Natural Resources Conversation Services, US Department of Agriculture.			

J. Management Measures

Briefly describe the management measures that will be implemented, and how they are related to pollutant load reduction, hydrology, or wetland condition. Cite one or more sections in the WBP and/or WAP identified in item E) above that support the selected management measures. Applicants are encouraged to cite technical publications such as the Wetlands Technical Guides at https://www.env.nm.gov/surface-water-quality/wetlands-technical-guides/ as sources of more information on management measures. Additional resources are listed in Appendix B of the New Mexico Nonpoint Source Management Plan (https://www.env.nm.gov/surface-water-quality/nps-plan/). For the purposes of this process, education and outreach activities are considered a category of management measure.

Management Measure #1: Restoration project to reduce E. coli load of subbasin by a minimum factor of 2
Management Measure #1 Description: The measures described below are planned to reduce the E. coli load from the watershed landscape by a minimum factor of 2 through the restoration practices promoting revegetation as a filter strip and reducing both the peak flow energy and volume of overland sheet flow. Our calculation for a load reduction by a factor of 2 results in a minimum reduction of 3.2 x 10^9 CFU/day (day of flow events). Our calculations are detailed as follows (See Addendum I for detail on data sources, p. 8): • Mid-point flow from this impaired reach = 4.0 x 10^13 CFU/day (2007 NMED TMDL document (as summarized in the PdNWC WBP 2014, and included in Addendum I, p. 8)). • Area of the watersheds that contribute to this impaired reach = 615,418 acres • Average per acre (4.0 x 10^13 CFU/day / 615,418 acres) = 6.5 x 10^7 cfu/day/acre • Phase I subbasin area = 154 acres • Weighting of this area (x2) (6.5 x 10^7 cfu/day/acre * 154 acres / 615,418 acres * 2) = 2.0 x 10^10 cfu/day/acre • 32% of the source of E. coli was measured to be from watershed sources (PdNWC WBP 2014) = 6.5 x 10^9 CFU/day • Load reduction by a factor of 2 (6.5 x 10^9 CFU/day / 2) = 3.2 x 10^9 CFU/day Notes: These numbers are conservative for following reasons (which emphasizes the importance of the aims of this project to not only reduce NPS loading but also to provide quantitative and comprehensive indicators that improve the ability to accurately predict the load reduction): i) the impaired load estimate

is a mid-point flow average, and a large source of the E. coli transport will be coming in short bursts from the high energy peak flows during the monsoon season delivering much higher loads at these peak points, ii) we are using an average load per acre across the watershed, while there will be areas of much higher sources of load than others, and we weight by a conservative factor of 2 for this Phase I subbasin (due to its close proximity to the outlet to the Rio Grande, having a high gradient, and experiencing high frequent runoff events relative to other subbasins in the watershed, thus load contributions are likely to be in the highest range of load contributions from the entire Rincon Arroyo watershed, which is estimated to be the highest load contribution to the region), and iii) the load reduction of 2 is likely much higher per the literature as detailed in the Goals section.

Management Measure #2: Restoration practices to slow, spread, and infiltrate flow to reduce E. coli transport

Management Measure #2 Description: We will install grade stabilization structures, provide areas of added native grass seed, and areas of fenced protection from cattle grazing, compare each area to each other and a non-treated control arroyo (see Addendum 1 for plans and detailed specifications on the practices). A summary of the management measure is that to spread flood flow from the channels to the adjacent floodplains, we will install stone lines along the contours, wire and brush weirs, and one rock dams in an area estimated to infiltrate the targeted flow reduction of approximately 1/3. See Sections I Goals and N Measures of Success for more detail on the quantification of the goals.

Management Measure #3: Effectiveness monitoring of goals 1-4

Management Measure #3 Description:
The summary of this management measure is as follows: conduct a Quality Assurance Project Plan (QAPP) for our environmental monitoring and modelling plan; install and monitor equipment to measure E. coli loads, flow and infiltration and utilize remote sensing ground-truthed with field measures to measure vegetation cover conditions. We will then calibrate the hydrologic modeling to the results to then derive the correlated hydrologic peaks to the measured indicators of E. coli load, vegetation cover, and area of inundation and connectivity of flood flow to the floodplains. A detailed description of these measurable goals and indicator methodologies can be found in the in detail in sections I Goals and N Measures of Success.

Management Measure #4: Co-production between team and stakeholders of synthesis report generalizable for the region

Management Measure #4 Description: To achieve the social context conditions goal – the level of information, certainty and planning to achieve large watershed management potential – we will have a steering committee of stakeholders, meet quarterly, and conduct field trips to assess the restoration implementation, results, and potential benefits. Annually, one field trip will include the ranchers in the area to develop and confirm correlations to the potential and realized results to increased upland range productivity. This assessment will be conducted collaboratively with the steering committee and other stakeholders. The team will work with the group to confirm, further develop, and refine how these findings establish generalizable indicators that allow for estimation of extent of restoration required to achieve goals in the region. The final indicators (with data and methods to arrive at these indicators) will be captured in a final plan (final report for this project) that will include per land management discipline (including at a minimum farmer, rancher, flood manager, irrigation infrastructure manager) the relevant estimation methods to predict the effect of this restoration approach. For example, for hydrologic modeling for flood management, this will include recommended indicator values tied to commonly available data (e.g. new Curve Number ranges) or the data needed to derive indicators (e.g an NDVI level tied to a Curve Number). Extent of stakeholder involvement: The Stormwater Coalition is a grass-roots, non-regulatory group that was established in 2010 to develop cross-agency regional watershed management collaboration with diverse stakeholders for stormwater management and to identify the watershed dynamics that affect its management. The signatories to a joint operating agreement include the Flood Commissions, Soil and Water Conservation Districts, and Counties in the watershed; the

Elephant Butte Irrigation District – the largest irrigation district in New Mexico; the Village of Hatch; and the City of Anthony. Collaborators extend throughout the watershed and include producers – both farmers and ranchers, federal agencies such as the Bureau of Land Management, the Natural Resource Conservation Service, and the US International Boundary and Water Commission; watershed groups such as the Paso del Norte Watershed Council; the New Mexico Water Resources Research Institute (NMWRRI), universities and associated organizations; and municipalities and their organizations, such as the City of Las Cruces (CLC).

K. Key Persons

Identify all key persons including the project manager who will be responsible for completing work plan objectives or tasks. Briefly describe qualifications of each key person. In describing qualifications, include past accomplishments related to each person's role in the project. Indicate which persons will work as contractors, and which will provide project assistance as matching effort.

Key Person 1:	Dr. Alexander (Sam) Fernald	NMWRRI at New Mexico State University (NMSU)	Project Manager
Key Person 1 Qualification Summary:	Sam Fernald is the Director of the Federally and State supported New Mexico Water Resources Research Institute (NM WRRI). Dr. Fernald leads the institute in its mission of developing and disseminating knowledge through research and on-the-ground collaborative projects with stakeholders that will assist the state, region, and nation in solving water resources problems. The NM WRRI, one of 54 water institutes in the nation, encourages university faculty statewide to pursue critical areas of water resources research while providing training opportunities for students, and provides an outlet for transferring research findings to the academic community, water managers and the general public. Professor Fernald also is a Professor of Watershed Management in the Department of Animal and Range Sciences at New Mexico State University. Dr. Fernald's earned degrees include a 1987 B.A. in international relations from Stanford University, an M.E.M. in 1993 in water and air resources from Duke University, and a Ph.D. in watershed science from Colorado State University in 1997.		
Contractor?	No		
Matching effort?	Dr. Fernald will provide 50% match, see budget for figures		
Key Person 2 (if applicable):	Connie Maxwell	NM WRRI / South Central Stormwater Management Coalition (Stormwater Coalition)	Project Leader, assessment of results, including hydrologic modeling, and project management with Dr. Fernald
Key Person 2 Qualification Summary:	Ms. Maxwell is an ecological planner who works with communities on local and regional levels. Her current work is a graduate research assistant with New Mexico Water Resources Research Institute (NM WRRI) while pursuing a doctorate at NMSU in the Water Science and Management Program under Dr. Sam Fernald's advisement. Her work has focused upon working with the Stormwater Coalition stakeholder group to design and conduct watershed		

	restoration within the Hatch/Rincon and Mesilla valleys. The Rincon Arroyo watershed has served as a priority project, and has been the subject of her doctoral research which provides the basis for this project. Ms. Maxwell plans to complete her PhD prior to the start of this project and continue at the NM WRRI as a Postdoctoral Scholar. She holds a Master's degree from UNM in Community and Regional Planning with a concentration in Natural Resources and a Bachelors of arts in English and Architecture from Columbia University. Maxwell co-founded the non-profit organization, the Alamosa Land Institute (ALI), in 2010 to engage in ecological planning and restoration with farmers and ranchers. ALI has been collaboratively introducing and testing innovative land management practices which focus upon restoring arroyos, riparian and agricultural valleys to slow and retain stormwater in watersheds, reduce sediment and pollutant transports, and recharge aquifers.		
Contractor?	No		
Matching effort?	Ms. Maxwell will provide 37% match, as well she will direct one student in coordination with other team experts (NMWRRI Graduate Assistant in the budget), which will be covered by 50% match. See budget for figures.		
Key Person 3 (if applicable):	Dr. Geoffrey Smith	NMSU	E. coli testing
Key Person 3 Qualification Summary:	Smith has directed the Microbiological component of three New Mexico Watershed studies based in the Cimarron, Lower Rio Grande and San Juan watersheds, which includes the WBP that governs for this project (PdNWC WBP 2014) for this project. He has over 50 publications in the Environmental Microbiology literature.		
Contractor?	No		
Matching effort?	Dr. Smith will provide 100% match in his services, as well he will direct one student (Community Hydrology Student Assistant in the budget), which will be covered by 50% match. See budget for figures.		
Key Person 4 (if applicable):	Dr. J. Philip King, PE, MBA	King Hydrology	Hydrologic modeling
Key Person 4 Qualification Summary:	Dr. King's contribution to this stakeholder-driven Phase I watershed restoration in the Rincon Arroyo watershed will be to advise on the hydrologic modeling in the project and to provide assessment of the assumptions, conceptual model, parameterization, calibration, outputs, and interpretation of results. He and other team members will also work with Dr. Geoffrey Smith to assess the relationship between episodic arroyo flow and the occurrence of E. coli in the runoff. He is uniquely qualified for these project activities. He has a long history of involvement in watershed management issues in south-central New Mexico. He has been on the faculty at New Mexico State University for thirty years as a Civil/Agricultural Engineer. His research includes several projects focusing on the hydrologic and hydraulic modeling of the surface water-groundwater processes of the Rio Grande. This work includes a study with Dr. Geoffrey Smith on the occurrence and sources of E. coli in the Rio Grande, funded by the Paso del Norte Watershed Council. He served as chair of the Board of Directors of the Doña Ana Soil and Water Conservation District and the Governor's designee to the NM Soil and Water Conservation Commission for two governors, roles in which he collaborated extensively with the South-Central New Mexico Stormwater Management Coalition. For more than 25 years, he has been a consultant for Elephant Butte Irrigation District		

	(EBID), and his work has given him unique perspective into the hydrology, hydraulics, institutional, and cultural environment of the Rio Grande.		
Contractor?	Yes		
Matching effort?	Dr. King will provide 20 hours match (16.7%). See budget for figures.		
Key Person 5 (if applicable):	John Gwynne, P.E., CFM	Stormwater Coalition / Dona Ana County Flood Commission (DACFC)	Steering Committee member
Key Person 5 Qualification Summary:	Mr. Gwynne is the director of the DACFC and the president of the Stormwater Coalition. He has been an active proponent of watershed restoration in the region and has decades of experience managing stormwater and coordinating with land and water managers in the region. He currently describes this effort as a "fundamental change in our philosophy from rushing to get stormwater as quickly as possible to the river to keeping the water in the watersheds for its functions there and capturing what we can."		
Contractor?	No		
Matching effort?	Mr. Gwynne will provide 54 hours of match (100% of his time), as well as contribute high resolution (1ft) DEM datasets to assess the previous erosion on the project site. See budget for figures.		
Key Person 6 (if applicable):	Zachary Libbin, P.E.	Stormwater Coalition / EBID	Steering Committee member
Key Person 6 Qualification Summary:	Mr. Libbin, the District Engineer at Elephant Butte Irrigation District (EBID), has been among the most active leaders of the Stormwater Coalition, serving as president for several years, as well as an active proponent of pursing watershed restoration in the region. Mr. Libbin led the effort to engage the NRCS and pursue their small watershed program to restore the entirety of the Rincon Arroyo watershed. EBID has been a leader of both the formation in 2011 of the Stormwater Coalition and the continuing management which has spanned over the last two decades. EBID commits to remain a key partner within the Stormwater Coalition and work to collaboratively further the goals of the collective group. EBID has long been actively engaged as well in addressing issues related to the establishment and maintenance of a viable watershed, specifically the watershed that is below Elephant Butte Reservoir in southern New Mexico, that contains the Hatch and Mesilla Valleys. EBID is the largest Reclamation irrigation district in New Mexico and play a major role in supplying surface water to their members in South Central New Mexico and West Texas and coordinating with other land and water managers under the Rio Grande Project.		
Contractor?	No		
Matching effort?	Mr. Libbin and other EBID employees will provide 54 and 92 hours of match respectively (100% of time). See budget for figures.		
Key Person 7 (if applicable):	Jessica Knopic	BLM LCDO	Steering Committee member and key project contact
Key Person 7 Qualification Summary:	Ms. Knopic is a civil engineer and has been on the Stormwater Coalition Rincon Arroyo / watershed restoration working group since its inception for the last three years. As the land owner, Bureau of Land Management, Las Cruces District Office (BLM LCDO), values the collaboration with and has		

	supported the stakeholder-driven watershed restoration efforts of the Stormwater Coalition to address the issues resulting from growing aridity and occurrences of drought in the entirety of the Hatch and Mesilla Valley.		
Contractor?	No		
Matching effort?	No, Ms. Knopic, and other BLM employees involved in clearances, are federal employees whose job duties support the proposed project.		
Key Person 8 (if applicable):	Chris Canavan	Enter organization of fifth key person.	Technical consultant. Liaison with USACE and NMED for 404 permit clearance.
Key Person 8 Qualification Summary:	Mr. Canavan is recently retired from the Surface Water Quality Bureau of the New Mexico Environment Department where he was classified as an Environmental Scientist-Supervisor with 14 years of experience with NMED and 24 years of combined experience working in surface water quality. During his time with NMED he was the project officer overseeing the PdNWC WBP and was responsible for the final draft of the plan. He currently teaches Watershed Management 318/518 in the Range Science Department at NMSU. EDUCATION- M.S. Interdisciplinary Studies (Limnology and Analytical Chemistry (1998), New Mexico State, B.S. Biology New Mexico State (1989), B.A. English New Mexico State (1988). EXPERTISE- watershed restoration plan development and implementation, fluvial geomorphology, technical writing (reports and grants), NEPA compliance reviews, water quality sampling and analysis. Mr. Canavan was also field project co-lead on the abiotic component (geomorphology) of the Gila, Playa lakes and Rio Grande/Pecos Rapid Assessment Method developed by NMED		
Contractor?	Yes		
Matching effort?	Mr. Canavan will provide 80% match and require 20% reimbursement for his services. See budget for figures.		
Key Person 9 (if applicable):	Chuck Caruso	AGRIMEX	Advisement on the planning, design and and supervison of the installation of restoration practices
Key Person 9 Qualification Summary:	Mr. Caruso has over 55 years of experience, including 34 years with the USDA- Natural Resources Conservation Service in New Mexico, installing upper watershed treatment measures to reduce erosion and increase vegetation on arid watersheds, similar to the proposed treatment on the Rincon Watershed Area. AGRIMEX is looking forward to assisting the sponsors of this project which will hopefully serve as a catalyst for the renovation of the entire Rincon Watershed.		
Contractor?	Yes		
Matching effort?	No		
Key Person 9 (if applicable):	Bidded installer – tbd	Enter organization of fifth key person.	Enter project role of fifth key person.
Key Person 9 Qualification Summary:	The contractor scopes of surveying and restoration installation will be bid.		
Contractor?	Yes		
Matching effort?	No		

L. Complementary Programs and Match

Describe related state, federal, or private programs or partners that will contribute effort or funding for the project. A minimum of 40% of the total project budget must be made up of nonfederal funds, in-kind labor, equipment, services, or other items of value that the applicant or other project partners will contribute to the project.

See budget for match amounts.--The New Mexico Water Resources Research Institute (NM WRRI) has a complementary program entitled the "Community Hydrology program" which shares goals with and will be funding activities which contribute to this project. The state funded Community Hydrology program emphasizes stakeholder input for targeted research to improve water management in New Mexico. This project to restore the Rincon Arroyo qualifies for the Community Hydrology program. NM WRRI will contribute labor and equipment to help with management goals to measure project impact on E Coli. Loads and to characterize on the ground restoration construction and impact for scaling to larger watershed restoration efforts. NM WRRI NMSU also has access to extensive laboratory testing facilities, the value of which contributes a match to this project.
–King Engineering & Associates, Inc. is involved in a complementary program with the Elephant Butte Irrigation District which shares goals with and will be funding activities which contribute to this project.
–The Steering Committee members have been actively working towards achieving watershed restoration in the Hatch and Mesilla Valley (see Management Measure #3 in Section J) and will be contributing effort towards this project.
–Project advisor Chris Canavan has been involved with the Stormwater Coalition and will be a technical advisor to the team and join the Steering Committee at key intervals.

M.Clearances

List any permits, certifications, and environmental or cultural clearances that will be needed to implement the project. Describe any progress that has already been made to obtain those permits, certifications and clearances. This information is requested so that the Evaluation Committee can evaluate readiness of the proposed project. Costs of any permits, certifications, and environmental or cultural clearances completed ***prior to*** *grant award are not reimbursable through any subgrant awarded under this SFA.*

The team will meet with the ACOE to present the project and secure any required Nationwide (404) permits. As the land owner, BLM commits to working with the team to complete the site specific analysis and clearances as required by NEPA and Bureau policy. BLM will work collaboratively toward the planned construction implementation goal of prior the 2021 monsoon season, with the planned construction approximate start date between April 15th and May 15th, 2021. The Las Cruces District Office (LCDO) has begun a Programmatic Environmental Assessment NEPA process on the Rincon Arroyo watershed in anticipation of restoration efforts through various funding sources, with the NRCS small watershed program being a large focus. BLM anticipates the Programmatic Environmental Assessment for the larger Rincon Watershed Stabilization Strategy to be complete early in 2021, and this will facilitate site specific NEPA requirements in this project area.

N. Measures of Success

Describe the indicators that will be used to document project success. Cite one or more sections in the WBP and/or WAP identified above that support the selected indicators. Example categories of indicators include: 1) direct water quality measurements used to detect changes in water quality and assess water quality against water quality standards; 2) measurements of

environmental parameters such as ground cover or canopy cover that will be used to model changes in pollutant loading or evaluate wetland condition; 3) implementation monitoring of successful installation or adoption of management measures coupled with load reduction estimates associated with those measures; 4) for wetlands direct measurement of soils, hydrology or plants that indicate wetland improvements; 5) improvement in RAM metric scores and/or RAM overall ranking for restored wetlands. Applicants are encouraged to select the most practical means of documenting project success. Direct measurement of water quality may not always be practical, as the scientific rigor required to detect statistically significant changes can be resource intensive. Monitoring should be adequately planned and supported.
Responses should tie directly to the WBP elements g., h., and i., related to establishing goals and measuring progress. Project activities that involve the collection, production, and use of environmental data must be conducted under a Quality Assurance Project Plan (QAPP), approved by EPA. Example project QAPPs are available at https://www.env.nm.gov/surface-water-quality/qapps/*. Standard Operating Procedures (SOPs) described at* https://www.env.nm.gov/surface-water-quality/sop *should be used to collect water quality data that NMED can use to assess water quality standards attainment, when practical.*

Find a description of the methodology for our measures of success, in the categories of our measurable goals.
1) Indicators for impairment Goal Load reduction by factor of 2: We will estimate E. coli load transport using turbidity as a proxy, and produce quantitative links to vegetative cover (see measure 2) and hydrologic flow (see measure 3) to predict extent of treatment required to achieve goals. We will directly measure E. coli load from the restoration site and a control arroyo site directly adjacent (see Addendum I for monitoring approach starting on p. 15), using EPA method 1603 for E. coli with data of critical interest from the summer monsoonal seasons of 2021, 2022, and 2023. We will use a Teledyne Avalanche Sampler (collects 4 samples and refrigerates them for up to 48 hours).
2) Indicators for vegetation cover conditions goal of 10% increase by 2023 (additionally as modified by a QAPP): To assess what percent vegetation cover change occurs due to the restoration measures, we will monitor the vegetation cover conditions with both remote sensing (NDVI on a 3m resolution) and field transect measures used by BLM for their AIM program for ground-truthing (Herrick 2017), corrected per the control subbasin conditions. To correlate the vegetation cover effect on hydrologic energy, specifically runoff peaks and volume, we will rerun our models and calibrate to the new runoff measures (see measure 3) to assess the changes to the Curve Number (as described in the Goals section). This then provides indicator measures for i) the response of vegetation cover to restoration, ii) effect of vegetation on runoff, and ii) effect of vegetation on E. coli transport.
3) Indicators for flow and channel dynamics goal of hydrologic peak and volume reductions of approx. 1/3 (additionally as modified by a QAPP): Note that tying E.coli transport to hydrologic peaks and flow volume is more practical than trying to tie it to sediment transport for two reasons: i) reliable sediment transport measures directly from water sampling are difficult to get, and ii) hydrologic dynamics are important to land managers and modeling is common. We will directly measure flow stage (height) and volume using a protected pressure transducer to derive runoff peaks and volume through model calibration at both the restoration subbasin and the control subbasin. Additionally we will directly measure infiltration rate using a submerged Alpha Mach iButton Temperature Rod, which uses temperature as a proxy to derive the infiltration rate (Moore 2007). This provides i) the effect of restoration on hydrologic energy, and ii) the ability to tie the other vegetation cover and E. coli load indicator measures to the hydrologic energy. We also predict that the reduction in hydrologic energy will reduce the site erosion by 20% as measured by the high resolution DEM's and LiDar provided by the Dona Ana Flood Commission (DACFC), and compared over preceding and upcoming periods (see

Measures of Success for methodology). DACFC is contributing high resolution aerial photography and LiDAR that meets the USGS QL2 standard for the 134 square mile Rincon Arroyo watershed. The DACFC has been developing a comprehensive collection of data sets using aerial photography and LiDAR since 2004. Each data set provides a snapshot of this area that will be compared to other data sets to see erosional changes that will be tied to previously-modeled hydrologic events of different energies. We can also evaluate migrating arroyos and flow paths, and changes in vegetation density. We have gauge data for the watershed outlet and have completed hydrologic modeling calibrated to that data for 2008- 2013, the data from this project will be analyzed in comparison to those events to establish robust correlations between hydrologic energy, erosion, and E. coli NPS transport. We will compare the historic data sets to the hydrologic modeling, and the results of this project (2010, 2014, 2018, and planned 2022-23).
4) Indicators for ecological history (decreasing soil moisture) conditions goal - increasing the connectivity of flood flow to the floodplain in a 10-year event from 27% to 90% (additionally as modified by a QAPP): We will install iButton Thermistor temperature sensors along the surface from the channel into the floodplain to verify the extent of inundation at different flow stages. This provides i) the effect of restoration on connectivity of flood flow to the floodplain and thus area of infiltration, and ii) the ability to confirm the effect of the area of infiltration on hydrologic energy.
5) Social context conditions goal measures – level of information, certainty and planning to achieve large watershed management potential: The data and results of the quantitative indicators documented to the extent that they provide standards that can be used as generalizable indicators for this region synthesized in the final report. The success measure will be the approval of the final plan by the steering committee and collaborating stakeholders facilitating prediction benefits of implementation of restoration to watershed land and water managers in this region.
Citations:
--Herrick, J. E., J. W. Van Zee, S. E. McCord, E. M. Courtright, J. W. Karl, and L. M. Burkett. 2017. Monitoring manual for grassland, shrubland and savanna ecosystems. Volume I: Quick Start. Volume II: Design, supplementary methods and interpretation. 0975555200. USDA - ARS Jornada Experimental Range: Las Cruces, New Mexico.
--Moore, S. J. 2007. Streamflow, infiltration, and recharge in Arroyo Hondo, New Mexico: Chapter F in Ground-water recharge in the arid and semiarid southwestern United States (Professional Paper 1703). 2330-7102. US Geological Survey.
--Planet Team. 2017. Planet Application Program Interface.). Space for Life on Earth. San Francisco, CA, USA: Planet Team.

O. Implementation Plan and Schedule

Describe the tasks needed to achieve project results. Task descriptions must include the person responsible for implementation, planned task start dates and completion dates, a completion benchmark for each task (for example, completed management measures), and a brief description of how the task will be accomplished. Add rows to or delete rows from the tables below as necessary.
Environmental monitoring or modeling conducted with support of funds administered by EPA must be conducted under a QAPP approved by EPA. ***If environmental monitoring or modeling is proposed, include a task early in the project term to develop a QAPP, or to extend the term of or otherwise revise an existing approved QAPP.***
Include a task for reporting. *See the Sample Agreement for more information on reporting.*

Task #	Task Title	Key Person	Planned Start Date	Planned End Date	Completion Benchmark
1	Project management and reporting	Sam Fernald	7/1/2020	6/30/2023	Final report submitted
2	Steering Committee	Connie Maxwell	7/1/2020	6/30/2023	Steering committee and stakeholders accept synthesis plan
3	Bid survey work & restoration work	Sam Fernald	7/1/2020	11/1/2020	Surveys contracted completed and restoration contract awarded
4	BLM required clearances	Jessica Knopic	Currently underway	No later than May 15th, 2021	BLM required clearances issued
5	ACOE permits	Connie Maxwell	7/1/2020	11/1/2020	ACOE issues either permit or determination of no permit required
6	QAPP for environmental monitoring and modeling	Connie Maxwell	8/1/2020	10/1/2020	QAPP complete and monitoring and modeling plans updated
7	Vegetation cover data collection and analysis	Connie Maxwell with students	September of each year	Each year December 1	Current vegetation cover conditions (NDVI and field cover) measures prior and after monsoon season
8.1	Management and installation of restoration (project and control arroyo)	Connie Maxwell working with contractors	April 15th, 2021	December 1, 2021	Installation complete and contractor work approved
9	Supervision of installation of restoration to set quality standards	Chuck Caruso	4/15/2021	12/1/2021	Installation complete, tested, and installation standards documented
10	Installation of monitoring equipment (project and control arroyo)	Connie Maxwell with students	4/15/2021	7/1/2021	Installation complete, tested, and data standards documented
11	E. coli data collection and analysis (monsoon season of highest interest)	Geoffrey Smith with students	Each year 7/1	Each year 12/1	Data documented and correlated to indicators and analysis complete
12	Hydrologic data collection and hydrologic and erosion analysis	J. Phillip King with Connie Maxwell	Each year 7/1	Each year 12/1	Data documented and correlated to indicators and analysis complete
13	Key findings recorded for Rincon Arroyo restoration plan	Connie Maxwell	10/31/2021	6/30/2023	Results correlated between indicators and benefits

Task #	Task Title	Task Description

1	Project management and reporting	Time duration description: Assuming the project begins 7/1/2020 (acceptable to team if project is awarded later), this activity duration is over the course of the project. Task description: Oversight of the approved project including: administering contracts; ensuring technical viability of the project; ensuring funds expended are within the budget and in accordance with applicable law; and ensuring that quarterly fiscal and technical progress reports, and a final report, are submitted to NMED
2	Steering Committee	This task is over the duration of the project. Task description: meet quarterly, conduct field trips to assess the restoration implementation, results, and potential benefits and synthesize generalizable indicators that allow for estimation of extent of restoration required to achieve goals in the region. The stakeholder group will be assessing this in the context of a near-future planned project to restore the remaining Rincon Arroyo with NRCS funding.
3	Bid survey work & restoration work	The task duration is anticipated to be approximately 4 months. Surveys will bid and contracted first to provide the quantity counts and locations for the restoration work. This information will be supplied to the bidders for the restoration work.
4	BLM required clearances	The task duration is anticipated to be complete to enable installation prior to the monsoon season. BLM will complete the Programmatic Environmental Assessment for the larger Rincon Watershed Stabilization Strategy and this will facilitate site specific NEPA and Bureau policy requirements in this project area
5	ACOE permits	The task duration is anticipated to be approximately 4 months. The team will meet with the ACOE to present the project and secure any required Nationwide (404) permits
6	QAPP for environmental monitoring and modeling	The task duration is anticipated to be approximately 2 months.
7	Vegetation cover data collection and analysis	The task duration is anticipated to be approximately 4 months each year with the vegetation monitoring itself conducted at the height of productivity, approximately each September.
8	Management and installation of restoration (project and control arroyo)	The initial installation will be complete prior to the monsoon season, 7/1/2021 (technically 7/15 so with a 2-week cushion). We will target an early start date of 4/15/2021 to accommodate unforeseen delays. After the monsoon season is complete, the contractor will return for a 1 week adaptive management adjustment period, to be complete approx. no later than December 1, 2021.
9	Supervision of installation of restoration to set quality standards	1st week of installation and review after monsoonal season runs.

10	Installation of monitoring equipment (project and control arroyo)	NMWRRI with subject experts and students will install the equipment prior to the restoration completion date
11	E. coli data collection and analysis (monsoon season of highest interest)	Dr. Geoffrey Smith and students to check equipment within 48 hours of each potential run.
12	Hydrologic data collection and hydrologic and erosion analysis	NMWRRI with subject experts and students
13	Key findings recorded for Rincon Arroyo restoration plan	Co-production between team and stakeholders of synthesis report generalizable for the region

P. Letters of Commitment and Letters of Support

Include with your application Letters of Commitment for Key Persons providing project assistance as match, stating their role or contribution to the project. A Letter of Commitment is required for each Key Person not employed by the applicant organization.

Include with your application copies of Letters of Support from key project participants and supporters such as contractors, landowners, public lands managers, watershed groups, user groups, and other agency partners. Letters of Support should state the role or contribution in the project for that specific agency or individual, where applicable. Letters of Support are not required but do assist with evaluating applications.

Q. Budget

The following table indicates the preferred budget format and an appropriate level of detail. Categories may include, but are not limited to, the examples shown below. Please revise this table (or insert your own) based on this example to provide a project budget. Additionally, cost acceptability is determined pursuant to Subpart E of 2 C.F.R. Part 200.
Hourly rates must reflect current market value and shall not exceed a wage rate of $640.38 per day or $80.04 per hour. ***The total for the CASH OR IN-KIND MATCH column must equal at least 40% of the total project cost.***

BUDGET CATEGORIES	COMPUTATION		Qnty Type	TOTAL COST	CWA 319 Funds	MATCH, Cash or In-Kind
	$/Unit and Unit	Qnty				
Personnel: (State number of hours and hourly rate for each person. Hourly salaries must not exceed $640.38 per day or $80.04 per hour.)		*subtotal-*		$ 28,117.21	$14,626.78	$13,490.43
Project Manager: Sam Fernald with administrative support from NM WRRI (0.01 FTE)	$65.36	75	hrs	$4,902.00	$2,451.00	$2,451.00
Key Person: Connie Maxwell, Project Leader, assessment of results, including hydrologic modeling, and project management with Dr. Fernald (0.07 FTE)	$25.00	429	hrs	$10,725.00	$6,786.30	$3,938.70

BUDGET CATEGORIES	COMPUTATION		Qnty Type	TOTAL COST	CWA 319 Funds	MATCH, Cash or In-Kind
	$/Unit and Unit	Qnty				
Key person: Geoffrey Smith, Biologist results assessment and testing of samples	$47.61	36	hrs	$1,713.96		$1,713.96
NMWRRI Graduate Assistant (YR 1 - 3 - 0.05 FTE)	$23.29	288	hrs	$6,706.25	$3,354.48	$3,351.77
NM WRRI Graduate Assistant Healthcare for 6 mos.	$ 200.00	6.00		$1,200.00	$600.00	$600.00
Community Hydrology Student Assistant (YR 1 - 3 - 0.05 FTE)	$10.00	287	hrs	$2,870.00	$1,435.00	$1,435.00
Fringe			*subtotal-*	$6,597.00	$3,511.07	$3,085.93
Project Manager @ 37.5% Fringe	37.5%			$1,838.25	$919.13	$919.12
Post Doctoral @ 37.5% Fringe	37.5%			$4,021.88	$2,544.86	$1,477.02
Professor @ 37.5% Fringe	37.5%			$ 642.74		$642.74
Graduate Assistantship @0.98% Fringe	0.98%			$65.72	$32.87	$32.85
Student Assistant @0.99% Fringe	0.99%			$28.41	$14.21	$14.20
TRAVEL			*subtotal-*	$1,840.00	$1,840.00	
Mileage - 40 roundtrips of 80 miles ea trip	$0.575	3200	miles	$1,840.00	$1,840.00	
EQUIPMENT			*subtotal-*	$11,000.00	$5,500.00	$5,500.00
Water quality - turbidity						
Teledyne ISCO Avalanche Composite Sampler (1/2 match)	$5,500.00	2	ea.	$11,000.00	$5,500.00	$5,500.00
SUPPLIES/MATERIALS			*subtotal-*	$31,248.46	$9,798.46	$21,450.00
Data: 1m DEM datasets for 2010, 2014, and 2018 for the Rincon Arroyo watershed (134 sq. miles)	$55.00	390	sq. miles	$21,450.00		$21,450.00
Seed for revegetation areas		1600	ft.			
Bouteloua gracilis, Muhlenbergia torreyi, Sporobolus airoides, Sporobolus cryptandrus	$19.45	10	ea.	$ 194.50	$194.50	
Electric fence for cattle exclosure at outlet area of site		1600	ft.			
Charger	$129.99	1	ea.	$ 129.99	$129.99	
T-Posts (12' spacing)	$3.79	133	ea.	$ 505.33	$505.33	
Wire	$119.99	7	ea.	$ 839.93	$839.93	
Connecting wire	$29.99	4	ea.	$ 119.96	$119.96	
Ground rods	$24.99	1	ea.	$ 24.99	$24.99	
Wire insulators (25 ea. Bag)	$9.99	20	ea.	$ 199.80	$199.80	
Crimping sleeves (100 ea.)	$18.99	10	ea.	$ 189.90	$189.90	

BUDGET CATEGORIES	COMPUTATION		Qnty Type	TOTAL COST	CWA 319 Funds	MATCH, Cash or In-Kind
	$/Unit and Unit	Qnty				
Flow stage monitoring well						
Perforated/screened pipe: Water Source Well Point, 2in x 36":	$74.99	2	ea.	$ 149.98	$149.98	
2 in. Well Point Drive Coupling	$14.54	2	ea.	$ 29.08	$29.08	
2 in. pipe, 5'		2	ea.			
Cap for pipe						
HOBO Water Level Data Logger Delux Kit (30')	$ 1,137.00	1	ea.	$1,137.00	$1,137.00	
HOBO Water Level (30 ft) Data Logger	$495.00	1	ea.	$ 495.00	$495.00	
Infitration						
Alpha Mach iButton Temperature Rod	$1,000.00	2	ea.	$2,000.00	$2,000.00	
iButtons for surface	$40.00	40	ea.	$1,600.00	$1,600.00	
Datalogger and housing	$300.00	2	ea.	$ 600.00	$600.00	
Staff gauge with wildlife cameras						
Wildlife cameras	$100.00	4	ea.	$ 400.00	$400.00	
model #: S-11330, uline, 100' (size 3/4", break strength of 2,250 lbs.)	$83.00	1	ea.	$ 83.00	$83.00	
Water testing misc supplies	$500.00	1	ea.	$ 500.00	$500.00	
Soil testing misc supplies	$350.00	1	ea.	$ 350.00	$350.00	
Miscellaneous supplies for vegetation surveys	$250.00	1	ea.	$ 250.00	$250.00	
CONTRACTUAL/ CONSTRUCTION		*subtotal-*		$56,029.81	$54,529.81	$1,500.00
Consultant/Contr - 1. King Engineering & Associates, Inc.		*subtotal-*		*$ 9,000.00*	*$7,500.00*	*$1,500.00*
Hydrologic modeling supervision and assessment *(20 hours match)*	$75.00	120	hrs	$9,000.00	$7,500.00	*$1,500.00*
Consultant/Contr - 2. Chuck Caruso		*subtotal-*		*$ 8,299.40*	*$8,299.40*	*$ -*
Restoration bidding and installation advising and supervision	$80.04	80	hrs	$6,403.20	$6,403.20	
Travel - 3 trips from Alb - 552 miles	$0.575	1656	miles	$ 952.20	$952.20	
Mileage - 5 roundtrips of 80 miles ea trip	$0.575	400	miles	$ 230.00	$230.00	
4 nights per diem (lodging)	$96.000	4	nights	$ 384.00	$384.00	

BUDGET CATEGORIES	COMPUTATION		Qnty Type	TOTAL COST	CWA 319 Funds	MATCH, Cash or In-Kind
	$/Unit and Unit	Qnty				
7 days per diem (M&IE - $41.25 1st & last day of travel, $55 others)	$330.000	1	rate	$ 330.00	$330.00	
Consultant/Contr - 3. Survey for installations - to be bid			*subtotal-*	*$640.32*	*$ 640.32*	*$ -*
Contour layouts with stakes driven	$80.04	8	hrs	$ 640.32	$640.32	
Consultant/Contr - 4. Installer - to be bid - 5 weeks installation			*subtotal-*	*$38,090.09*	*$38,090.09*	*$ -*
Fence installation				*$ 1,009.00*		
Labor	$25.00	40	hrs	$1,009.00	$1,009.00	
Practice: STONE CONTOUR LINES & ONE ROCK DAMS				*$27,960.00*		
Labor	$5.50	4200	l.ft.	$23,100.00	*$23,100.00*	
Equipment - Delivery				*$ 1,500.00*		
Stone capacity per dump truck (DT)		14	yd3			
Total stone to be delivered		140	yd3			
Dump truck loads & labor rate	$150.00	10.00	loads	$1,500.00	$1,500.00	
Supplies/Materials - Stone				*$ 3,360.00*		
Cost c.y. of stone	$24.00	yd3				
Lf per c.y. of stone	$1.00	yd3	30	l.ft.		
Total stone cost	$0.80	4,200	l.ft.	$3,360.00	$3,360.00	
Practice: BRUSH WEIRS				*$ 9,121.09*		
Labor	$4.13	1333	l.ft.	$5,505.29	$5,505.29	
Equipment - Delivery				*$150.00*		
Delivery	$150.00	1.00	loads	$ 150.00	$150.00	
Supplies/Materials - Posts & Net wire fence				*$ 3,465.80*		
Posts per l.ft.	$1.60	0.2	l.ft.			
Net wire per l.ft.	$1.00	1	l.ft.			
Cost	$2.60	1,333	l.ft.	$3,465.80	$3,465.80	
Steering Committee and project advisement (Non-federal match)			*subtotal-*	$17,679.06	$1,600.80	$16,078.26
John Gwynne, DACFC	$78.39	54	hrs	$4,233.06		$4,233.06
Zachary Libbin, EBID	$58.00	54	hrs	$3,132.00		$3,132.00
Dennis McCarville, EBID, and installer	$25.00	92	hrs	$2,310.00		$2,310.00
Chris Canavan	$80.04	100	hrs	$8,004.00	$1,600.80	$6,403.20
TOTAL DIRECT COSTS				*$152,511.54*	*$91,406.92*	*$61,104.62*
MTDC				*$141,511.54*	*$85,906.92*	*$55,604.62*
INDIRECT COSTS	*10%*			*$ 14,151.15*	*$ 8,590.69*	*$ 5,560.46*
Indirect Costs - Covers administrative support from NM WRRI. 319(h)(12) limits grant administrative costs (including indirect costs) to 10%.						

BUDGET CATEGORIES	COMPUTATION		Qnty Type	TOTAL COST	CWA 319 Funds	MATCH, Cash or In-Kind
	$/Unit and Unit	Qnty				
TOTAL PROJECT COSTS				$166,662.69	$99,997.61	$66,665.08
					match percentage	40.00%

R. Evaluation Criteria

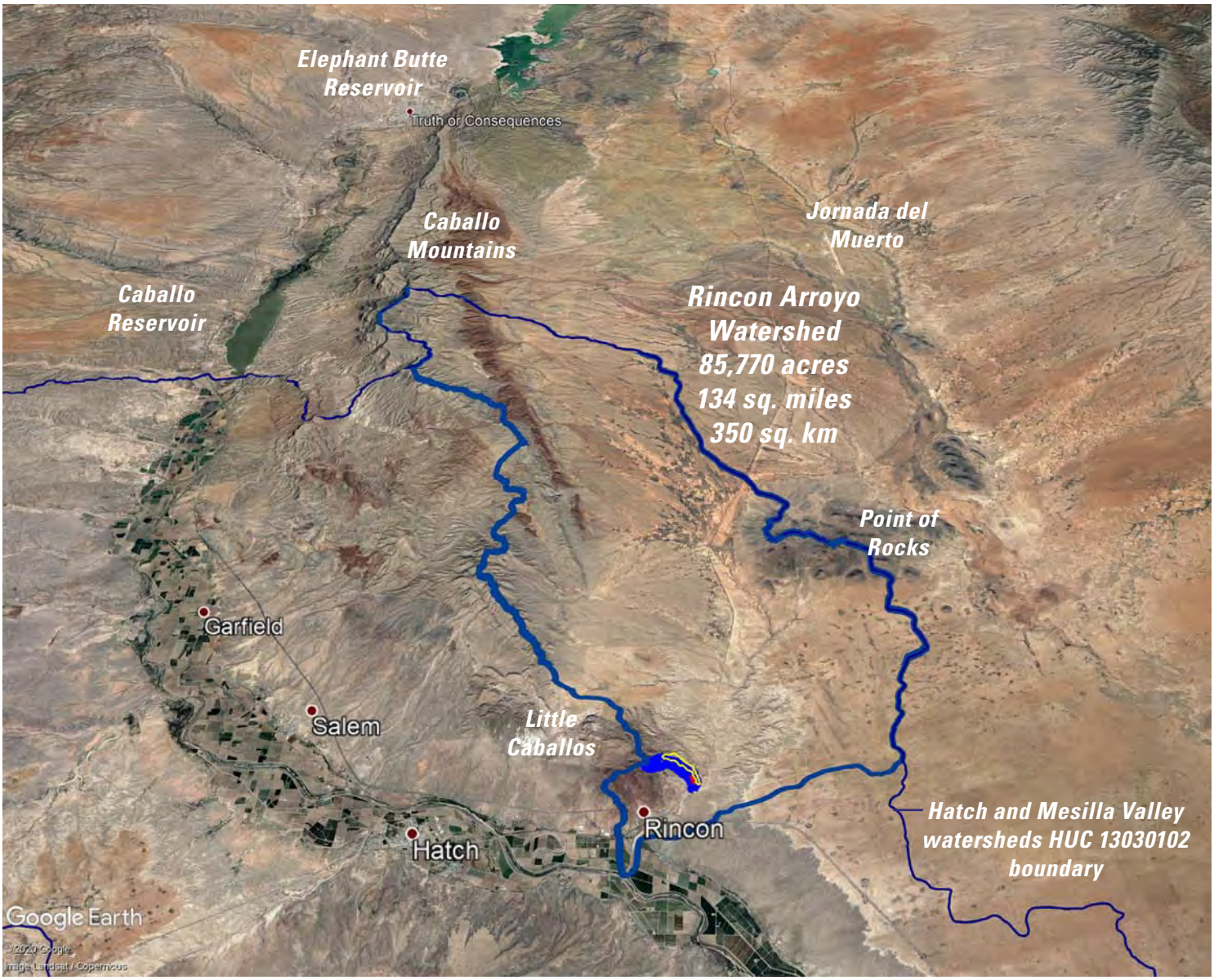
The following is a summary of evaluation factors with point values assigned to each. These weighted factors will be used in the evaluation of individual potential Offer or applications by sub-category.

Criterion	Description	Possible points
a.	**Program alignment** • Likelihood that project will produce long-term (*i.e.,* after 2023) measurable improvement in water quality or wetland condition ***(100 max. points)***. • Likelihood that project will produce measurable improvement in water quality or wetland condition by 2023 ***(75 max points)***. • Problem statement accurately does one or both of the following ***(25 max. points)***: o cites the 2018-2020 Integrated Report and (if applicable) at least one TMDL, and states a numerical pollutant load reduction goal or hydrologic goal applicable to the stream or; o provides a condition rank and score for the wetland as determined with an applicable RAM. • Recovery Potential Integrated Score (a scale of ***0-25 points***, based on **Attachment C** posted at https://www.env.nm.gov/surface-water-quality/funding-sources). • Project area is at least partly within a Conservation Opportunity Area identified by the New Mexico Department of Game and Fish (see https://www.nmert.org/) ***(0 points or 25 points)***.	250
b.	**Technical strength** • Selected management measures are appropriate for identified pollutant sources or wetland stressors and are aligned with a WBP or WAP ***(100 max. points)***. • A practical, effective means of documenting project success is presented ***(75 max. points)***. • The description of project tasks, associated schedule, and project area are clear and well developed ***(50 max. points)***. • Rationale for selection of the project area is presented and is aligned with a WBP or WAP ***(25 max. points)***.	250

Criterion	Description	Possible points
c.	**<u>Organizational strength</u>** • Roles, responsibilities, and qualifications of the Project Manager and other project partners are well described and appropriate to accomplish the goals of the project ***(50 max. points)***. • Past performance of Project Manager and other project partners indicate a high probability of project success ***(50 max. points)***. • Project partners are committed to assist with their portions of the project as described in the application and corresponding Letters of Commitment and Letters of Support ***(50 max. points)***. • The application provides a clear summary of the status of planning within the project area, and if a planning element is included, the element is appropriate for improving the WBP or WAP ***(50 max. points)***. • Environmental clearances are substantially complete, and agency partners are committed to assist with remaining tasks related to clearances ***(50 max. points)***.	250
d.	**<u>Value</u>** • Cost of project relative to expected long-term (*i.e.*, after 2023) pollutant load reduction or wetland condition improvement, considering maintenance and expected longevity of implemented management measures ***(75 max. points)***. • Costs of individual project components are fair relative to market conditions ***(75 max. points)***. • Cost of project relative to expected short-term (*i.e.*, by 2023) pollutant load reduction or wetland condition improvement ***(50 max. points)***. • Non-federal match appropriately complements federally funded project components and appears attainable ***(50 max. points)***.	250
Total		**1000**

rincon arroyo watershed stabilization project

NMED on-the-ground watershed restoration proposal - Addendum 1



applicant:

NEW MEXICO WATER RESOURCES RESEARCH INSTITUTE

NMWRRI WATER & COMMUNITY COLLABORATION LAB

team includes stakeholder collaborative group:

The South Central New Mexico Stormwater Management Coalition (SCNMSMC)

HATCH NEW MEXICO CHILE CAPITAL OF THE WORLD

City of Anthony New Mexico — Est. July 1, 2010 —

Doña Ana & Caballo Soil and Water Conservation Districts

Sierra Soil & Water Conservation District

SIERRA COUNTY NEW MEXICO flood commission

DONA ANA COUNTY NEW MEXICO flood commission

EBID ELEPHANT BUTTE IRRIGATION DISTRICT

South Central New Mexico Stormwater Management Coalition

March 9, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

RE: Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande

Dear Mr. Franklin,

On behalf of the South Central Stormwater Management Coalition (Stormwater Coalition), I am writing to state our strong support and commitment of partnership for the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled ***Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande.*** We commit to being a partner in this Phase I restoration project, as our members and collaborators are indicating in their individual commitment letters. This project will figure prominently in several of our monthly meetings, were we will solicit further stakeholder input, broadly disseminate the results of this project, and apply the gained information for watershed restoration planning throughout the Hatch and Mesilla Valley region.

With the increasing occurrences of drought, the entire health of the watershed dries and diminishes, and increases the occurrence of catastrophic flooding, which results in erosion and scouring of watershed vegetation. It has become key to this group's strategy to develop solutions that manage the stormwater supplies that arrive in fewer and increasingly intense monsoonal bursts. These high energy flood events transport significant amounts of bacterial contaminants and the sediment that harbors it. Recognizing that stormwater does not respect political boundaries, it has become apparent that the needs of the region would best be served by a regional watershed management approach. Several local agencies that manage stormwater as part of their responsibilities have joined the South Central New Mexico Stormwater Management Coalition to sharing of information and ideas, collaborate with our local stakeholders, coordinated planning, consolidation of funding requests, and sharing of staff resources. We have been actively seeking to restore the watersheds in this region, and chose the Rincon Arroyo as our priority watershed over four years ago. We highly value the opportunity to implement this Phase I project. We are also actively pursuing an application to the USDA Natural Resources Conservation Service (NRCS) proposal for the remaining Rincon Arroyo watershed. This Phase I will give us the ability to quantify the results and estimate the extent of restoration required for the watershed.

South Central New Mexico Stormwater Management Coalition

Across Doña Ana and Sierra counties there are 2,400 square miles of watershed stretching from the Black Range northwest of the Caballo Dam, south to the NM-TX state line. For 800 square miles, or one-third of the area, there is no existing infrastructure to manage stormwater. This results in severe erosion, flooding, and large quantities of sediment and debris being dumped on residences, farm fields, highways, and streets during severe weather. For our group, the goals of mitigating nutrient transport go hand in hand with mitigating the high energy of our flashy storms.

Sincerely,

John D. Gwynne, P.E., CFM
Chair, Stormwater Coalition
Director, Doña Ana County
Flood Commission

Doña Ana County
OFFICE OF THE
FLOOD COMMISSIONER
Phone: (575) 525-5558
Fax: (575) 525-5567

Character Counts III

FLOOD COMMISSIONER
Kenneth Gutierrez
DIRECTOR
John Gwynne, P.E, CFM

March 10, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

RE: Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande

Dear Mr. Franklin,

On behalf of the Doña Ana County Flood Commission, I am writing to state our strong support and commitment of partnership for the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled ***Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande.***

We support the proposal to implement this stakeholder-driven Phase I watershed restoration in the Rincon Arroyo watershed. As the proposal outlines, this priority watershed will set the standards for the restoration of the remaining Hatch and Mesilla Valleys. The project proposed here will provide key information to facilitate the restoration of the entirety of the Rincon Arroyo watershed (134 sq. miles), currently anticipated to continue with the USDA Natural Resources Conservation Service (NRCS).

The Doña Ana County Flood Commission (DACFC) commits to joining the Steering Committee, and contributing the time assessing, guiding, and facilitating the educational opportunities of this project as a match. The time anticipated on the project is 54 hours total in steering committee meetings, project review, education, and discussion in Stormwater Coalition meetings, at a rate of 54 at $78.39/hr, for a value of $4,233.06.

The DACFC is engaging in this project as the sponsor of the approach of small-scale flood control measures across the watersheds in this region, with a particular focus on this watershed and the anticipated extensive project to address the entire Rincon Arroyo watershed with the NRCS. The DACFC thus commits to (see application guide section 3.105, p.21, and NPS Appendix F, section 9) continue operating and maintaining the management measures and practices that result in the mitigation of hydrologic energy, flooding, and sediment and NPS transport for their expected lifespans.

The DACFC commits to contributing high resolution aerial photography and LiDAR that meets the USGS QL2 standard for the 134 square mile Rincon Arroyo watershed. The DACFC has been developing a comprehensive collection of data sets using aerial photography and LiDAR since 2004. Each data set provides a snapshot of this area that will be compared to other data sets to see erosional changes that will be tied to hydrologic events of different energies. We can also evaluate migrating arroyos and flow paths, and changes in vegetation density. We have gauge data for the watershed outlet and have completed hydrologic modeling calibrated to that data for 2008-2013, the data from this project will be analyzed in comparison to those events to establish robust correlations between hydrologic energy, erosion, and E. coli NPS transport. The value of this data is $55 per square mile for the years that we have gauge data (2010, 2014, and 2018) for a total of $21,450.00.

Sincerely,

John D. Gwynne, P.E., CFM
Director Doña Ana County Flood Commission

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Las Cruces District Office
1800 Marquess Street
Las Cruces, New Mexico 88005
www.blm.gov/new-mexico

IN REPLY REFER TO:
7000 (LLNML03220)

March 10, 2020

New Mexico Environment Department
Surface Water Quality, Attn: Abraham Franklin
Harold Runnels Building
1190 St. Francis Drive
PO Box 5469
Santa Fe, NM 87502

RE: Rincon Arroyo Watershed Stabilization Project to Reduce E. coli Non Point Source (NPS) to the Rio Grande

Dear Mr. Franklin,

On behalf of the Bureau of Land Management, Las Cruces District Office (BLM LCDO), I am writing to state our strong support and commitment of partnership for the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande. As the land owner, to support this stakeholder-driven Phase I watershed restoration in the Rincon Arroyo watershed, we commit to i) participating in the steering committee to guide, review, and assess the project's efficacy and applicability to BLM's public watershed lands and compatibility with our management requirements, and ii) working with the team to complete the site specific analysis and clearances as required by NEPA and Bureau policy. We will work collaboratively toward the planned implementation goal of prior the 2021 monsoon season, with an approximate start date between April 15th and May 15th, 2021. The LCDO has begun a Programmatic Environmental Assessment NEPA process on the Rincon Arroyo watershed in anticipation of restoration efforts through various funding sources, with the NRCS small watershed program being a large focus. We anticipate the Programmatic Environmental Assessment for the larger Rincon Watershed Stabilization Strategy to be complete early in 2021, and this will facilitate site specific NEPA requirements in this project area.

The northern end of the Chihuahuan desert in southern New Mexico has experienced significant drought events over the last several years, which has diminished the soil moisture and support to vegetation in our uplands. We value our collaboration with the stakeholder-driven watershed restoration efforts of the Stormwater Coalition to address the issues resulting from growing aridity in the entirety of the Hatch and Mesilla Valley. The value of implementing this watershed restoration in this Phase I project will be to address nutrient (and sediment) transport in an arroyo

through supporting revegetation by slowing, spreading, and infiltrating the runoff, which in this arroyo is relatively frequently experienced for this watershed. Additionally, this implementation will provide key information on actual results that will inform restoration approaches throughout the remainder of the Rincon Arroyo watershed.

If you have any question or concerns, please contact Jack Barnitz at (575) 525-4310.

Sincerely,

Bill Childress
District Manager

King Engineering
& Associates Inc.

5044 Moon Shadow Place
Las Cruces NM 88001

575 · 571 · 8166
jpking@kingengr.com

10 March 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

RE: *Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande*

Dear Mr. Franklin,

On behalf of the King Engineering & Associates, Inc., I strongly support the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande. I also commit to in-kind cost sharing for the project, as detailed in the budget for this work below.

BUDGET CATEGORIES	$/Unit and Unit	Qnty		TOTAL COST	CWA 319 Funds	MATCH, In-Kind
Hydrologic dynamics supervision and assessment ***(20 hours match)***	$ 75.00/hr	120	hrs	$ 9,000.00	$ 7,500.00	$ 1,500.00

My contribution to this stakeholder-driven Phase I watershed restoration in the Rincon Arroyo watershed will be to advise on the hydrologic modeling in the project and to provide assessment of the assumptions, conceptual model, parameterization, calibration, outputs, and interpretation of results. We will also work with Dr. Geoffrey Smith to assess the relationship between episodic arroyo flow and the occurrence of E. coli in the runoff.

I am uniquely qualified for these project activities. I have a long history of involvement in watershed management issues in south-central New Mexico. I have been on the faculty at New Mexico State University for thirty years as a Civil/Agricultural Engineer. My research includes several projects focusing on the hydrologic and hydraulic modeling of the surface water-groundwater processes of the Rio Grande. This work includes a study with Dr. Geoffrey Smith on the occurrence and sources of E. coli in the Rio Grande, funded by the Paso del Norte Watershed Council.

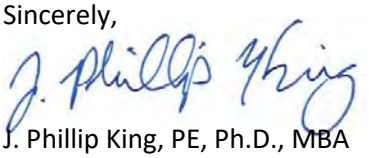
I served as chair of the Board of Directors of the Doña Ana Soil and Water Conservation District and the Governor's designee to the NM Soil and Water Conservation Commission for two governors, roles in

which I collaborated extensively with the South-Central New Mexico Stormwater Management Coalition.

For more than 25 years, I have been a consultant for Elephant Butte Irrigation District (EBID), and my work has given me unique perspective into the hydrology, hydraulics, institutional, and cultural environment of the Rio Grande.

I look forward to bringing my expertise, experience, and network to bear on this critical topic for southern New Mexico and arid land watersheds all over the world – watershed stabilization.

Sincerely,



J. Phillip King, PE, Ph.D., MBA
Principal Engineer

King Engineering
575 · 571 · 8166, jpking@kingengr.net
www.kingengr.net

AGRIMEX

10432 Manzanillo, NE, Albuquerque, NM 87111
Phone & Fax: 505-275-8826
E-Mail: AGRIMEX@RT66.com

March 9, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

RE: Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande

Dear Mr. Franklin,

On behalf of AGRIMEX, I am writing to state our support and commitment of partnership for the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled ***Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande.*** To support this Phase I watershed restoration in the Rincon Arroyo watershed, I am committing AGRIMEX resources to the planning, design and installation of conservation measures on the watershed area as outlined in the estimated budget shown below:

Restoration planning, design and installation	$ 80.04	80	hrs	$ 6,403.20
Travel - 3 trips from Alb - 552 miles	$ 0.575	1656	miles	$ 952.20
Mileage - 5 roundtrips of 80 miles each trip	$ 0.575	400	miles	$ 230.00
4 nights per diem (lodging)	$ 96.000	4	nights	$ 384.00
7 days per diem (M&IE - $41.25 1st & last day of travel, $55 others)	$ 330.000	1	rate	$ 330.00
			Total->	**$ 8,299.40**

I have over 55 years of experience, including 34 years with the USDA- Natural Resources Conservation Service in New Mexico, installing upper watershed treatment measures to reduce erosion and increase vegetation on arid watersheds, similar to the proposed treatment on the Rincon Watershed Area. AGRIMEX is looking forward to assisting the sponsors of this project which will hopefully serve as a catalyst for the renovation of the entire Rincon Watershed.

Sincerely,

C. Caruso

Charles M. Caruso, P.E.
Project Manager

Chris Canavan
Blue Heron Enterprises LLC
2357 W. Union Ave
Las Cruces, NM 88005

March 11, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

RE: Rincon Arroyo Watershed Stabilization Project to Reduce *E. coli* NPS to the Rio Grande

Dear Mr. Franklin,

I am writing to state my strong support and commitment of partnership for the project entitled ***Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande.*** I retired from NMED after serving as the Southern New Mexico Team Lead for the Watershed Protection Section of the Surface Water Quality Bureau. During my time with NMED I worked with many of the stakeholders involved in this project including the BLM, the Elephant Butte Irrigation District, the Doña Ana Flood Commission, WRRI, the South Central New Mexico Stormwater Management Coalition and the Paso del Norte Watershed Council (PdNWC). I was also the NMED project officer working with the Paso del Norte Watershed Council to develop *The Paso del Norte Watershed Based Plan - Mitigation Measures to Reduce Bacterial Pollution in the Rio Grande*. Just prior to my retirement, planning began to improve conditions in the greater Rincon Arroyo watershed which began as a cooperative effort on the part all the above listed stakeholders except the PdNWC. This proposed project is a culmination of those efforts.

The Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande represents a collaboration of stakeholders in alignment with the stakeholder driven process at the heart of the 319 program. This group brings the capacity, commitment and technical expertise to implement sound restoration policy for this project and the larger LRG watershed. Although this is a small project in a very large watershed, it represents a "sparkplug" effort that will demonstrate the efficacy of management measures to reduce *E. coli* loading to the Rio Grande by improving water capture and infiltration and reduce sheet flow and flashy runoff. It is anticipated the success of this project will lead to wider ranging efforts throughout the watershed to implement *E. coli* mitigation measures. It is only through efforts as proposed by ***The Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande*** project that *E. coli* mitigation efforts can be successful in the LRG on a larger scale.

My commitment to the project goes to the extent that I offer my technical expertise to work 100 hours @ a rate of $80.04/hr, with 80% match (total $6,403.20) and 20% compensation (total $1,600.80). Compensation will be requested only for those hours required for document writing primarily as it concerns 404 permit application and will not exceed 20 hours.

Sincerely,

Christopher M. Canavan
Watershed Specialist, BHE

Elephant Butte Irrigation District
Of New Mexico

530 South Melendres
Las Cruces, NM 88005-2826

Telephone
(575) 526-6671
Fax (575) 523-9666
Dispatch Fax (575) 526-8391
Warehouse Fax (575) 526-1530
Engineering Fax (575) 541-5716

www.ebid-nm.org

Staff Members
Gary L. Esslinger, Treasurer/Manager
Leo Barrett, Maintenance Project Director
Gail Norvell, Finance Director
James Narvaez, Irrigation System Director
Delyce Maciel, HR/Safety Director
Erek Fuchs, Groundwater Resource Director
Zack Libbin, P.E., District Engineer
Patrick Lopez, SCADA Systems Director

Board of Directors
Michael McNamee, Vice-President
Gregory Daviet, Secretary
Jerry Franzoy
James Salopek
Robert Sloan
Joe Paul Lack
Sam Salopek
Steve Lyles
Keith Deputy

March 9, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

Subject: Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande

Dear Mr. Franklin,

On behalf of the Elephant Butte Irrigation District (EBID), I am writing to express our support and commitment of partnership for the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled *Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande.*

We support the proposal to implement this stakeholder-driven Phase I watershed restoration in the Rincon Arroyo watershed. As the proposal outlines, this priority watershed will set the standards for the restoration of the remaining Hatch and Mesilla Valleys. The project proposed here will provide key information to facilitate the restoration of the entirety of the Rincon Arroyo watershed (134 sq. miles), currently anticipated to continue with the USDA Natural Resources Conservation Service (NRCS).

EBID commits to joining the Steering Committee, and contributing the time assessing, guiding, and facilitating the educational opportunities of this project as a match. 54 hours of EBID staff time is anticipated on the project in the form of steering committee meetings, project review, education, and discussion in South Central New Mexico Stormwater Management Coalition (Stormwater Coalition) meetings. EBID will have at least two employees present, one at a rate of $25/hr and another at $58/hr for a total value of $4,482. Since Chuck Caruso will be guiding the installation particularly in the first week, we also commit to one of our key employees joining this effort for that week, at a rate of $25/hr, at a value of $960. The EBID is also engaging in this proposed project as a founding member of the Stormwater Coalition pursuing approaches of small-scale flood control measures across the watersheds in this region, with a particular focus on this watershed and the anticipated extensive project to address the entire Rincon Arroyo watershed with the NRCS.

EBID faces many water quality issues due to this and other wild arroyos which contribute excessive sediment and E. coli to the Rio Grande. EBID values this Phase I project proposal to addressing these issues. EBID would like to emphasize the importance of this project in quantifying the effects of the hydrologic events and the benefits of the proposed small-scale flood control measures.

If you have any other questions or concerns, please feel free to contact me at 575-526-6671 x1 or gesslinger@ebid-nm.org.

Sincerely,

Gary Esslinger
Treasurer – Manager

March 10, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

RE: Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande

Dear Mr. Franklin,

On behalf of the Paso del Norte Watershed Council (PdNWC), I am writing to state our support for the Watershed Project Implementation application to the New Mexico Environment Department for the Project entitled ***Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande.***

The Paso del Norte Watershed Council (PdNWC) is pleased to support the South Central New Mexico Stormwater Coalition and the New Mexico Water Resources Research Institute, et al. in their effort to carry out the Project, entitled Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande. The PdNWC consists of the following:

- Executive Committee of the PdNWC (currently 14 members)
- Environmental Committee (at least five other Council members) – currently Chaired by Gill Sorg (Council of City of Las Cruces) with support from appropriate governmental and non-governmental groups per the PdNWC Strategic Plan
- Technical Committee (at least four other Council members) – currently Chaired by Zack Libbin (EBID) with support from appropriate governmental and non-governmental groups per the PdNWC Strategic Plan

Paso del Norte Watershed Council
Texas A&M AgriLife Research Center
1380 A&M Circle
El Paso, TX 79927-5020

Website: www.pdnwc.org

As a supporting organization to this endeavor, the PdNWC or Council commits to providing the following toward the project; per the PdNWC Strategic Plan, www.pdnwc.org:

- PdNWC Executive Committee: Review of the Project items associated with the PdNWC watershed protection plan (WPP). This could involve future meeting attendance and WPP associated review items
- Environmental Committee (as needed): Outreach to other watershed stakeholders and appropriate Project activities
- Council (PdNWC) Officers' Coordination with Project Coordinator; providing direction, feedback, and assistance as recommended

These should result in a healthier ecosystem that supports livestock, wildlife, plants, and a few owners of the lands in the designated watershed.

The PdNWC supports this proposal to implement the stakeholder-driven Phase I watershed restoration of the Rincon Arroyo watershed. As the proposal outlines, this priority watershed should set the standards for the restoration of the remaining Hatch and Mesilla Valleys of the Lower Rio Grande basin in New Mexico. The Project proposed should provide key information to facilitate the restoration of the entirety of the Rincon Arroyo watershed (134 sq miles), which is currently anticipated to continue within the USDA Natural Resources Conservation Service (NRCS) operations for years to come.

Sincerely,

Conrad G. Keyes, Jr.
Chair, PdNWC

Nancy J Castle/Castle Ranch
5275 Rockhound Rd SE
Deming, NM 88030

March 9, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 87502

RE: Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande

Dear Mr. Franklin,

On behalf of the Castle family, which holds the Palma Park lease/allotment for this Phase I site, I am writing to state our strong support for the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled ***Rincon Arroyo Watershed Stabilization Project to Reduce E. coli NPS to the Rio Grande.***

I recently attended a meeting of the South Central New Mexico Stormwater Management Coalition (SCNMSMC) in Rincon, New Mexico. I came away with an understanding of the issues that need to be addressed regarding runoffs leading to erosion, flooding and the eco system of the Rio Grande.

Having read through the proposed Phase I watershed restoration in the Rincon Arroyo watershed, I support the implementation of this project and its location. While the area is rocky, slowing down the run off will not only stop the sludge from entering the Rincon Arroyo, it will also rebuild the soil in the area, allowing the moisture to penetrate, bringing new growth in native grasses.

I believe this proposed site to be a good starting point in setting the standards for the restoration of the watershed not only for the Hatch Valley but also into the Mesilla Valleys. Information gathered here will be beneficial to the entirety of the Rincon Arroyo watershed, consisting of 134 sq miles, currently anticipate to continue with the USDA Natural Resources Conservation Service (NRCS).

Sincerely,

Nancy J Castle

Nancy J Castle
Ranch/Allotment holder

Caballo Soil and Water Conservation District

PO Box 145 • Garfield, NM 87936 • Phone and Fax 575-267-0516

March 5, 2020

Attn: Abraham Franklin
Program Manager, Watershed Protection Section
New Mexico Environment Department
Surface Water Quality Bureau
PO Box 5469
Santa Fe, NM 8750

RE: Rincon Arroyo Watershed Stabilization Project to Reduce E.coli NPS to the Rio Grande

Dear Mr. Franklin,
On behalf of the Caballo Soil and Water Conservation District, I am writing to state our strong support and commitment of partnership for the Watershed Project Implementation application to the New Mexico Environment Department for the project entitled ***Rincon Arroyo Watershed Stabilization Project to Reduce E.coli NPS to the Rio Grande.***

We support the proposal to implement this stakeholders-driven Phase I watershed restoration in the Rincon Arroyo Watershed. As the proposal outlines, this priority watershed will set the standard for the restoration of the remaining Hatch and Mesilla Valleys. The project proposal here will provide key information facilitate the restoration of the entirety of the Rincon Arroyo Watershed (134 sq. miles), currently anticipated to continue with the USDA Natural Resources Conservation Service (NRCS).

With the majority of Rincon Arroyo being within the boundaries of the Caballo Soil and Water Conservation District, the District is in support of this project. The Caballo Soil and Water Conservation District strives to promote water quality, soil health, erosion control and to conserve our natural resources for the utilization of our future generations. All of which will be addressed in this project. The value of the information that will be gathered through this project will be beneficial to all partnership partners for future projects.

Sincerely,
Harvey Morrow by Susan Davis

Harvey Morrow, Chairman - Caballo SWCD