Redesign/construction of Gila River Diversions using Rosgen-style Cross Vane Diversions to Improve Efficiency and Maintain Instream Flows on the Gila River

Tier 2 Application Submitted to NMISC by Gila Conservation Coalition

Contact information: Allyson Siwik, Executive Director
575.538.8078; allysonsiwik@gmail.com

1. If the proposal would extend the water supply through conservation, or increase the supply through development of new water,

This project is for a water utilization alternative that proposes to design, engineer, and construct Rosgen-style rock vane diversion structures on all three of the existing ditches in the Gila Valley. This would address several problems, including continual maintenance of the Gila Valley diversion dams, inaccessibility of water during higher flows on the Gila River and annual drying of the river which affects native fauna and flora. A Rosgen-style rock vane diversion could provide a more stable diversion point than the existing push-up earthen dams and could allow access to irrigation water much earlier in the year and at other high flow periods. A properly designed diversion could also withstand floods, divert water at any flow level, return sediment to the river in a more natural and functional manner and allow for persistence and passage of native fish. This project presents an opportunity for find a win-win solution for irrigators and the environment.

a. Describe the location and verify the ownership of and legal access to lands related to the proposal. [0 to 30 points]

The ditch heads for all three ditches (Upper Gila Ditch, Fort West Ditch and Gila Farm Ditch) are located in the Cliff-Gila Valley on property owned by The Nature Conservancy. The Ditch Associations have an easement to access the diversions for maintenance.

b. Identify the source of the water to be put to use. [0 to10 points]

Existing water rights in the Gila-San Francisco Basin, specifically surface water rights on the Gila River in the Cliff-Gila Valley owned by Freeport-McMoRan, The Nature Conservancy and other private landowners.

c. Describe and quantify whether and how the proposal would extend the water supply through conservation, or increase the supply through development of new water in the Southwest Planning Region. [4 points for each 10 AF up to 500 points]

This project would deliver water to irrigators more efficiently and provide for more base flow in the main channel of the river, enhancing the ecological integrity of the riparian zone. Until a project design is conducted, it is impossible to quantify the amount of water conserved through this project and potential positive and negative impacts.

d. Demonstrate how the proposal would meet AWSA and CUFA requirements

This project is for a **WATER UTILIZATION ALTERNATIVE** as described under the Section 212(i) of the AWSA. Because it does not require an exchange with the Central Arizona Project, this project would not be subject to CUFA requirements.

2. Describe the proposal and its technical viability.

a. Include any (or reference publically-available) technical and engineering studies completed and demonstrate how these studies support the proposal. [up to 20 points]

No studies have been completed for this project. The ISC-funded Miller Engineering to do a preliminary design for a Rosgen-style diversion in the Cliff-Gila Valley. The work order was cancelled due to funding issues. However, the Natural Resource Conservation Service *Stream Restoration Design National Engineering Handbook* Chapter 11 discusses Rosgen geomorphic channel design with a number of examples of cross vanes and W-Weir structures from a number of projects. [1]

b. Include any (or reference publicly-available) hydrologic, ecologic, or geotechnical studies completed and demonstrate how information included in these studies specifically supports or detracts from the proposal.

Chapter 11 of the Natural Resource Conservation Service *Stream Restoration Design National Engineering Handbook* discusses Rosgen geomorphic channel design with a number of examples of cross vanes and W-Weir structures from a number of projects with hydrologic information for the types of structures contemplated in this proposal. [2] This chapter covers all phases of project development from planning to structure design, to implementation and follow-up monitoring and maintenance.

3. Quantify estimated costs.

[1] Natural Resource Conservation Service *Stream Restoration Design National Engineering Handbook* pp.11-58 – 11-75 http://www.aces.edu/waterquality/streams/Fact%20Sheets/Rosgen%20NRCS%20full%20document.pdf
[2] Natural Resource Conservation Service *Stream Restoration Design National Engineering Handbook* pp.11-58 – 11-75 http://www.aces.edu/waterquality/streams/Fact%20Sheets/Rosgen%20NRCS%20full%20document.pdf

a. Quantify the proposal's estimated costs, including planning, design, and/or construction, and administration or oversight. [up to 10 points]

Planning - $150,000
Engineering - $300,000
Implementation - $1,500,000
Monitoring - $75,000
Operation & Maintenance - $30,000

Total = $2,055,000

b. If applicable, quantify the proposed project's on-going administrative, operational, and maintenance costs. [up to 10 points]

We propose $75,000 to cover expenses for monitoring the effectiveness of the diversion structures and identifying any problems with the structures that would need to be rectified through routine maintenance. Operation & Maintenance costs are estimated at $30,000 over the life of the project, recognizing that annual ditch dues cover routine maintenance of the diversions and ditches.

c. Describe environmental compliance activities, and quantify the costs for environmental mitigation and restoration related to the proposal. [up to 10 points]

This project would incur costs associated with environmental compliance activities that would cover the following impacts: stream bank erosion, water quality, recreational use, impacts to flows on the project diversion and other downstream diversions, any impacts to other water users, groundwater impacts, and environmental impacts to Gila ecology. The Gila Conservation Coalition is opposed to activities that would adversely affect the quality and integrity of the Gila riparian zone and would therefore want a full assessment of potential impacts from this project in order to weight the benefits and costs of redesigning the diversion. It is unclear at this point the range of potential environmental impacts since design work has not been completed.

d. Quantify the AWSA funding sought for the proposal and for the pendency of the proposed activity's or project's duration. [up to 10 points]

$2,055,000 minus 30% for cost share = **$1,428,500**

4. If proposal impacts, beneficially or adversely, the environment of the Southwest Planning Region, the Gila River, its tributaries or associated riparian corridors, use the best available science to:

a. Describe and quantify how the proposal might impact the project site and environment, particularly state and federally-listed species. [up to 10 points]

The Gila Conservation Coalition is very concerned about preservation of the Gila environment and would want a full assessment of the potential environmental impacts of redesigned diversions on the Gila River system. Assessment of environmental impacts would be required by state and federal law in order for this project to be permitted.

The potential impacts both positive and negative could include the following: stream bank erosion, water quality, recreational use, impacts to flows on the project diversion and other downstream diversions, any impacts to other water users, groundwater impacts, and environmental impacts to Gila ecology including impacts to threatened and endangered species.

b. Describe and quantify the proposal's efforts to mitigate possible adverse impacts on the environment, particularly riparian areas and state and federally-listed species in the Gila Basin and at the specific location of the proposal. [up to 10 points]

The Gila Conservation Coalition is very concerned about preservation of the Gila environment, riparian areas, and impacts to state and federally listed species and would want a full assessment of the potential environmental impacts of redesigned diversions on the Gila River system. Indeed this would be required as part of compliance with state and federal environmental laws. Depending upon the environmental costs and benefits to be assessed once the design phase is complete, it will be apparent if the project can move forward and be permitted. Mitigation measures could be implemented as deemed necessary.

c. Describe and quantify how the proposal may benefit the environment, particularly riparian areas and state and federally-listed species in the Gila Basin and at the specific location of the proposal. [up to 10 points]

One of the primary advantages to this kind of diversion is that it is designed specifically to retain base flow in the river sufficient to meet the needs of native species while providing a more stable water supply for irrigation. This design would also eliminate the need for regular disturbance of the flood plain which now takes place every time the push-up diversion dams require rebuilding or maintenance. This activity has water quality and other impacts. A fish passage would also be built in to the design to address native fish movement up and down stream. Often times this style of diversion is designed in concert with a more comprehensive riparian/watershed restoration plan which can enhance long-term water availability, species viability and riparian/watershed health. It would be prudent to consider this kind of comprehensive restoration plan as it would not only address agricultural and native species needs but could also address additional issues in the Gila Valley, such as flood risks to private land owners and risk to the Highway 211 bridge which crosses the Gila River.

d. List any environmental statutes, rules, or regulations that may apply to the proposal, and demonstrate how the proposal implementation will comply with such laws, rules or regulations. [up to 10 points]

The project would need to comply with all state and federal environmental and other laws as applicable covering impacts to land use, floodplains, wetlands, cultural resources, biological resources, Endangered Species Act, water quality, environmental justice, air quality, noise and hazardous materials, and others as necessary.

5. Describe any economic or cost analysis information and data for the proposal:

a. Quantify estimated economic benefits including environmental, recreation, value of water itself, value of the water to the regional economy, increased economic growth, protection against loss of jobs, agriculture, ranching, local economic sustainability or growth, or other. [up to 10 points]

The true economic value of water includes: (1) the utility's operation and maintenance costs; (2) the costs to procure and develop additional water supplies to meet growing demands; and (3) the social and environmental "opportunity costs" of losing other benefits of the water in order to develop and consume the water (e.g., ecological and recreation values of river basins, local/community economies, values of river flows for diluting pollutants, etc.). Failing to integrate all of these social and environmental costs into a water rate structure is equivalent to subsidizing the cost of water. Furthermore, if the retail price of water is lower than its value, customers have an incentive to use too much of it."[3]

Because the quantity of water conserved for this project cannot be estimated without a project design, we cannot estimate the costs saved of providing irrigation water or costs averted by the project. However, if additional water were developed through a Gila River diversion project, the potential economic costs range from **$12.4 million in lost tourism dollars to $218 million in the loss of free-flowing river values.**[4] Another way to phrase this is that by improving the irrigation diversions to provide water to irrigators while also maintaining instream flows, we can maintain economic benefits of a healthy Gila River ecosystem that can be valued at $12.4 million to $218 million. It should be noted that this is an incomplete accounting of the opportunity costs of the water if it were developed through a diversion. These numbers are the most readily accessible for economic costs due to potential ecological impacts from a diversion and do not include other cost categories such as water quality impacts, quality of life impacts, aesthetics, property values, and impacts to domestic wells and agriculture.

b. Quantify estimated costs including planning, design, and/or construction, environmental compliance, operation, maintenance, repair, and administrative costs or other. [10]

See 3.a above:

3 Western Resource Advocates, Water Rate Structures in New Mexico: How New Mexico Cities Compare Using This Important Water Use Efficiency Tool, February 2006, p. 5

4 Rice, Jennie & Ernie Nemie *The Potential Economic Costs of a Gila River Diversion Meeting Future Water Supply Needs in Silver City and the Central Mining District* ECONorthwest June 2005 pp. 5-1- 5-12 http://www.gilaconservation.org/PDF/EcoNW%20Study/Gila%20River%20Final%20rpt.pdf

Planning - $150,000
Engineering - $300,000
Implementation - $1,500,000
Monitoring - $75,000
Operation & Maintenance - $30,000

Total = $2,055,000

c. Identify the source of local contributions and demonstrate the commitment and ability to pay any local cost-share for project proposal, including any applicable exchange costs [1 point for every % of project cost to be borne by local sponsor up to 50 points]

Federal and state funds are available for acequias and ditches through such programs as EQIP, Water Projects Fund, among others. A cost share requirement (30%) could be required.

Given that this project does not involve an exchange for CAP water, the project would not be responsible for any exchange costs.

6. [120] Describe how the proposal addresses the needs of a particular group or groups or interests on the issues of

a. Historic uses, traditions, cultures, and customs. [up to 10 points]

Construction of this diversion will ensure that irrigators will be able to access the water that they hold the rights to in a more stable manner and for a longer portion of the year without risking impacts to native species and any attendant regulatory pressures potentially arising from future species protection. Native flora and fauna would receive the water needed to thrive during times when the Gila River has traditionally been dried up to maintain water flow to the irrigation ditches. The diversion points would be designed specifically to maintain a base flow during low flow periods and would allow for diversion of additional irrigation water if available.

b. Current and future demands for water in the Southwest Planning Region. [up to 20 points]

This project would meet a current and future water demands by allowing irrigators in the Gila Valley to access water earlier in the spring when the existing push-up diversion dams are traditionally washed out. This would provide a more stable and predictable flow of water for agricultural purposes. It would also provide water for native flora and fauna (including some that are on the Endangered Species List) during the driest parts of the year when the entire flow of the river is diverted in order to get water into the irrigation ditches.

c.Flood control [up to 20 points]

Redesign of the diversions could provide for more stable structures, thus reducing the amount of maintenance required from flood damage. Currently, native vegetation is removed for a reach of several hundred feet when the earthen push-up dams are built. The native vegetation that grows as a result of construction of Rosgen-style diversion structures can help mitigate the impacts of floods.

d. Fire protection, prevention, or suppression. [up to 20 points]

Water in the ditches is a resource for the local volunteer fire department to fight fires. Maintaining a more reliable source of water in the ditches aids in fire fighting efforts.

e. Recreation. [up to 20 points]

To the extent that redesigned diversion structures can deliver water to irrigators more efficiently, enhance the ecological values of the riparian zone, and preclude the need to build a costly diversion project on the Gila River, recreation in the Gila Basin will benefit. The value of tourism benefits as a result of NOT building a diversion structure is $12.4 million.

f. Environmental protection and/or enhancement. [up to 20 points]

One of the primary advantages to this kind of diversion is that it is designed specifically to retain base flow in the river sufficient to meet the needs of native species while providing a more stable water supply for irrigation. This design would also eliminate the need for regular disturbance of the flood plain which now takes place every time the push-up diversion dams require rebuilding or maintenance. A fish passage would also be built in to the design to address native fish movement up and down stream. Often times this style of diversion is designed in concert with a more comprehensive riparian/watershed restoration plan which can enhance long-term water availability, species viability and riparian/watershed health. It would be prudent to consider this kind of comprehensive restoration plan as it would not only address agricultural and native species needs but could also address additional issues in the Gila Valley, such as flood risks to private land owners and risk to the Highway 211 bridge which crosses the Gila River.

g. Any others. [up to 10 points]

Water conservation through redesign of irrigation diversions can extend the life of existing water supplies and preclude the need to build a costly diversion project on the Gila River. **Taxpayers around the state and water users can benefit tremendously** from getting water needs met at low cost.

Water conservation through a project such as this can help **sustain our quality of life** in southwestern New Mexico. Quality of life influences household location decisions. If the region's environmental amenities are negatively affected by a diversion, then economic growth could be affected due to fewer households and businesses locating in the area. This project could preclude the need for a Gila River diversion project and thus maintain these quality of life values for the region.

7. [40] List those supporting the application, including federal, state, and local government entities; Indian nations, tribes or pueblos; irrigation or conservation districts; non-profit organizations; and other entities. Provide letters or resolutions of support for the

application. [up to 40 points]

Although we have no letters of support, the Gila Basin Irrigation Commission and The Nature Conservancy have expressed interest in exploring efficiency improvements of the existing ditches. In fact as a result of this interest, the ISC hired Miller Engineering to begin looking at the potential for Rosgen-style diversions to address problems with the current diversion configurations. However, this work order was cancelled due to funding issues.

8. [30] Describe whether the proposal would benefit one or more than one of the counties in the Southwest New Mexico Planning Region – Catron, Grant, Hidalgo, and/or Luna Counties. [10 points/county up to 40 points]

This project is initially contemplated for irrigation ditches in the Cliff-Gila Valley, located in Grant County. However, if successful, these types of structures could be used for ditches along the Gila and San Francisco rivers and tributaries in Catron and Hidalgo counties also.

9. [50] Describe whether the proposal would support economic growth or benefit one or more than one of the following interests in the Southwest New Mexico Planning Region – agricultural, ranching, municipal, recreational, or other (specify). [10 points/interest up to 50 points]

This project would support the local economy in that it can supply irrigation water at lower cost relative to a Gila River diversion, freeing up valuable resources for expenditure in other parts of the economy. Assuming a diversion were constructed rather than improving the irrigation diversions through Rosgen-style structures and that the region's environmental amenities would be negatively affected by a large-scale Gila River diversion, economic growth in the region could be negatively affected due to fewer new households and businesses locating in the area to take advantage of quality of life amenities.

According to the Southwest New Mexico Regional Water Plan, "growth of the residential, municipal and commercial sectors in Grant County will most likely be driven by increased tourism and in-migration of residents seeking quality of life, including retirees." The plan goes on to observe that increased tourism is currently shifting and will continue to shift commercial development toward services for visitors to the area, and that businesses that serve county residents will continue to locate in the Silver City area.[5]

Implementation of this project would allow the ecological values of the Gila River to be maintained providing recreation, tourism and quality of life benefits. A recent Economic Research Service study finds that tourism and recreational development in rural areas leads to increases in local employment, income, and wage levels, and improvements in social conditions, such as poverty, education and health.[6] **Thus pursuing water conservation programs to meet future water needs rather than a**

[5] DBSA, Appendix E4, pp. 9, 12

[6] Whitener, L. "Policy Options for a Changing Rural America," Amber Waves, April 2005.

diversion project can contribute to economic growth, recreation and tourism[7], job growth and quality of life benefits in addition to the economic values presented above.

This proposal would benefit the following interests in the SWNM Water Planning Region:

Agricultural – This project can provide a more stable diversion point than the existing push-up earthen dams reducing operation and maintenance costs and could allow access to irrigation water much earlier in the year and at other high flow periods. A properly designed diversion could also withstand floods and divert water at any flow level.

Ranching – This project can provide a more stable diversion point than the existing push-up earthen dams reducing operation and maintenance costs and could allow access to irrigation water much earlier in the year and at other high flow periods. A properly designed diversion could also withstand floods and divert water at any flow level.

Recreational – By improving the irrigation diversions to provide water to irrigators while also maintaining instream flows as opposed to developing a major Gila River diversion, we can maintain a healthy Gila River ecosystem and therefore maintain recreational opportunities. Recreation has a direct connection to tourism dollars brought in to the local economy.

Other – Taxpayers –By improving the irrigation diversions to provide water to irrigators rather than developing a high cost diversion project, federal and state taxpayers would benefit since they wouldn't have to subsidize an unnecessary and expensive water development project.

Other – Future Generations – By improving the irrigation diversions to provide water to irrigators rather than developing a high cost diversion project, a healthy Gila River ecosystem can be preserved for future generations, an "interest" that the present generation has the responsibility to plan and provide for.

Other – Scientific Community - By improving the irrigation diversions to provide water to irrigators rather than developing a high cost diversion project, a healthy Gila River ecosystem can be preserved as a reference point for scientists when studying functioning of healthy rivers. Since the Gila River in New Mexico is one of the last free-flowing rivers in the Southwest, a benchmark is needed for scientific understanding in order to conduct future river restoration activities.

[7] To put potential tourism benefits in context, tourism contributed $48 million to the economy of Grant County in 2002 according to the NM Department of Tourism.