

**Grant Application**

**Water Marketing Strategy for the  
Colorado River Indian Reservation**



*Submitted to:*



U.S. DEPARTMENT OF THE INTERIOR  
Bureau of Reclamation  
Financial Assistance Support Section  
Denver, Colorado  
Attn: Ms. Julie J. Hendricks

***WaterSMART: Water Marketing Strategy Grants for Fiscal Year 2019  
Funding Opportunity Announcement No. BOR-DO-19-F006***

**July 31, 2019**

*Submitted by:*

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# 1 TECHNICAL PROPOSAL AND EVALUATION CRITERIA

**Date:** July 31, 2019  
**Applicant:** Colorado River Indian Tribes  
**Address:** Parker, La Paz County, AZ

## 1.1 Executive Summary

The Colorado River Indian Tribes (CRIT) is pleased to submit this proposal to the United States Bureau of Reclamation WaterSMART Water Marketing Strategy grants program. The CRIT Tribal Council believes that the betterment of the tribal community includes full consideration of water utilization both on and off Reservation, including taking advantage of favorable leasing opportunities for their water rights. The proposed project is located on the Colorado River Indian Reservation in Arizona and California. Because CRIT water rights are apportioned across two states, each represents a separate potential water market. This project’s goal is to develop and articulate a water marketing strategy for CRIT for the purposes of wisely and effectively utilizing the Tribes’ resources while increasing water supply reliability regionally in a manner that benefits willing participants through voluntary agreements. Expected results of this project are (1) a water marketing strategy document serving as guidance for CRIT Tribal Council in proceeding with off-Reservation water agreements, and (2) developed relationships with potential water partners in both Arizona and California. Total costs of the proposed project are estimated to be \$395,140. The proposed project is expected to be completed within 24 months of notice to proceed. The proposal is submitted for consideration under Funding Group I.

## 1.2 Project Title and Location

This proposed project is titled: “A Water Marketing Strategy for the Colorado River Indian Reservation”, and it is located entirely on the Colorado River Indian Reservation. The Colorado River Indian Tribes are a federally recognized Indian Tribe. The Colorado River Irrigation Project (CRIP) is located in La Paz County, Arizona. The Project latitude is 33°56’N and longitude is 114°26’W. The current Project service area is approximately 80,000 acres (125 square miles). The map presented in Figure 1 shows an overview of the Reservation and the CRIP area as well as its geographic location on the Colorado River in southwest Arizona / southeast California.

## 1.3 Background Data

The Colorado River Indian Reservation was established March 3, 1865 by the Federal Government for the Indian Tribes of the Colorado River and its tributaries. The collective Colorado River Indians Tribes include the Mohave, whose aboriginal territory includes the Reservation lands along the River; the Chemehuevi, who were displaced when Parker Dam was constructed; and, Navajo and Hopi who were relocated to the Reservation.

The Colorado River Indian Reservation lies entirely within the Lower Colorado River Valley (LCRV) which is the largest, hottest, and driest subdivision of the Sonora and Mohave Deserts (University of Arizona, 2008). The Reservation encompasses a total of 432 square miles (1,119 square kilometers), the majority of which is in the Parker Valley of Arizona (Colorado River Indian Reservation, 2009). The Colorado River runs through the Reservation delineating its Arizona and California land areas. Most of the Reservation is in western La Paz County in Arizona. The remainder of the Reservation lie in southeastern San Bernardino County and northeastern Riverside County, California.







### 1.3.1 Hydrology

The Colorado River is a significant and, in general, the only source of water for the Reservation providing for agriculture in an arid environment as well as for recreation and tourism (University of Arizona, 2008). The Reservation is located in an area characterized as an arid climate with hot, dry summers, and mild winters. Table 1 presents a summary of weather data for the period 1996-2015 collected at the Arizona Meteorological Network (AZMET) climate station at Parker, Arizona (Parker No. 1). Maximum air temperature averages around 105 °F in July and August, with winter minimum air temperatures averaging around 36-37 °F. Total annual grass reference evapotranspiration (*ET<sub>o</sub>*) is estimated at 77.89 inches per year. Total annual precipitation is very low, averaging 3.12 inches per year.

Historically, and currently, surface water diversions from the Colorado River make up the primary source of irrigation water supply for the Reservation. Reclamation prepares annual water accounting reports to provide final records of diversions of water from the mainstream of the Colorado River, return flows to the mainstream, and the consumptive use of such water within the Lower Colorado River Basin States of Arizona, California, and Nevada.

**Table 1. Mean Monthly and Annual Average Weather Data and Grass Reference Evapotranspiration, 1996-2015, for the Colorado River Indian Reservation (source: AZMET, <http://ag.arizona.edu/AZMET/08.htm>).**

	Max. Temp. (°F)	Min. Temp. (°F)	Precipitation (inches)	Relative Humidity (%)	Wind Speed (mph)	Solar Radiation (Langleys)	ET <sub>o</sub> (inches)
<b>Jan</b>	68.46	37.12	0.48	52.40	4.93	289.49	3.04
<b>Feb</b>	71.43	40.52	0.57	53.05	5.26	369.62	3.51
<b>Mar</b>	79.22	45.24	0.29	45.71	5.81	509.94	5.86
<b>Apr</b>	84.56	51.07	0.08	39.41	6.85	622.46	7.64
<b>May</b>	94.47	59.76	0.06	35.30	6.67	692.26	9.68
<b>Jun</b>	101.32	66.12	0.01	34.27	6.46	717.75	10.37
<b>Jul</b>	104.79	74.53	0.23	42.46	6.01	640.49	10.17
<b>Aug</b>	104.73	74.35	0.31	45.19	5.50	592.97	9.17
<b>Sep</b>	100.44	67.31	0.37	46.32	4.63	521.65	7.10
<b>Oct</b>	88.94	54.21	0.22	44.76	4.71	419.67	5.38
<b>Nov</b>	76.58	43.08	0.23	48.31	4.31	313.74	3.35
<b>Dec</b>	66.42	35.90	0.27	54.17	4.76	263.55	2.64
<b>Annual</b>	86.78	54.10	3.12	45.11	5.49	496.13	77.89

Diversions for Colorado River Indian Reservation are reported for both Arizona and California in the USBR decree accounting reports (<https://www.usbr.gov/lc/region/g4000/wtracct.html>). Diversions to Reservation land served by the Colorado River Irrigation Project (CRIP) are made at Headgate Rock Dam and are measured using the US Geological Survey (USGS) gage: 09428500 Colorado River Indian Reservation Main Canal near Parker, Arizona. Other diversions to Reservation lands in Arizona not served by CRIP are also reported for decree accounting purposes. Return flows of water to the mainstream of the Colorado River are categorized as





measured and unmeasured. Measured returns have historically been recorded at multiple spill and wasteway gaging stations operated by the USGS.

There currently is only nominal use of groundwater and wells to supply water for irrigation on the Reservation. The Reservation is situated within the Parker Basin of western Arizona. Groundwater in the floodplain alluvial deposits is hydraulically connected to the River. Shallow groundwater in the floodplain generally reflects the chemical characteristics of Colorado River water (Metzger, Loeltz, & Irelan, 1973). Groundwater development in the basin is small as a consequence of the availability of surface water for irrigation and the low population in the basin. The ADWR estimated that less than 4,000 acre-feet were withdrawn in 1985 (ADWR, 2006). Current groundwater use in the basin is generally not reported and/or records are unavailable.

### 1.3.2 Water Rights

The Colorado River Indian Tribes have Colorado River water rights decreed by the United States Supreme Court in the series of cases known as *Arizona v. California*, culminating with the most recent Consolidated Decree, 547 U.S. 150 (2006). CRIT’s Colorado River water rights are the lesser of: 719,248 acre-feet of diversions from the mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 107,903 acres of land and satisfaction of related uses. The rights are “present perfected rights” meaning they are considered to be in existence prior to the effective date of the Boulder Canyon Project Act, and that with respect to Federal reserved water rights they are rights to use of water on Federal reserved lands under Federal law whether or not the water has been applied to beneficial use.

The Reservation land is divided between the states of Arizona and California, and the water rights are accounted for by diversion and consumptive use amounts in the two states. Priority dates are associated with the dates that CRIT land was reserved under Executive Order. The Arizona and California apportionments, land areas, and associated priority dates are summarized in Table 2 below. CRIT has the right to divert the lesser of 662,402 acre-feet of water from the mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 99,375 acres of land and satisfaction of related uses in Arizona; and, the right to divert the lesser of 56,846 acre-feet of water from the mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 8,528 acres of land and satisfaction of related uses in California. A unit diversion quantity of 6.67 ac-ft/ac applies in both states.

**Table 2. Summary of CRIT Colorado River Water Rights. Source: Arizona v. California (2006).**

State	Annual Diversion (ac-ft)	Area (ac)	Priority Date
Arizona	358,400	53,768	Mar. 3, 1865
Arizona	252,016	37,808	Nov. 22, 1873
Arizona	51,986	7,799	Nov. 16, 1874
<b>Arizona Total</b>	<b>662,402</b>	<b>99,375</b>	
California	10,745	1,612	Nov. 22, 1873
California	40,241	6,037	Nov. 16, 1876
California	5,860	879	May 15, 1876
<b>California Total</b>	<b>56,846</b>	<b>8,528</b>	
<b>CRIT Total</b>	<b>719,248</b>	<b>107,903</b>	





### 1.3.3 Current and Projected Water Uses

#### *Colorado River Irrigation Project (CRIP)*

The primary economic activity on the Reservation has traditionally been dominated by irrigated agriculture. The main crops produced are alfalfa, wheat and other small grains, cotton, Bermuda grass hay, Sudan, and miscellaneous vegetable and other crops (onions, garlic, broccoli, potato, flowers). The Colorado River Irrigation Project (CRIP) was initiated under the 1867 Appropriations Act, which included funding for the construction of canals from the Colorado River to serve the Indians on the Reservation. Major expansion was completed in the 1940's to supply irrigation water to the Japanese internment camp on the Reservation at Poston. This included construction of Headgate Rock Dam in 1942. CRIP is a federal irrigation project governed by 25 USC §381 et seq and 25 CFR Part 171 and is operated by the U.S. Department of Interior Bureau of Indian Affairs (BIA) for the benefit of the Colorado River Indian Tribes. CRIP serves approximately 80,000 acres of land that are assessed an annual fee for irrigation system O&M.

Approximately 232 miles of supply canals, which consist of the Main Canal, laterals, sublaterals, and sub-sublaterals, are used to convey water under primarily gravity flow conditions from Headgate Rock Dam to CRIP farms (BIA, 2002). Of the 232 miles of supply canals, 90 miles are concrete-lined, and 142 miles are unlined earthen channels. The CRIP Main Canal is 18 miles long, 15 miles of which are concrete-lined. There are eight principal lateral canal offtakes from the Main Canal (19R, 19L, 27R, 27L, 42L, 46R, 73 and 90), not including smaller laterals, which are considered to reflect the function of lower order "sublateral" canals. Lateral canals comprise a total of 65 miles of channel, 36 miles of which are concrete-lined. In addition, there are 149 miles of lower order supply canals, of which 39 miles are concrete-lined. There are six principal drains in the CRIP with additional feeder drains and wasteway ditches, comprising a total of 133 miles of drainage channels (BIA, 2002). There are no storage facilities on the CRIP (See Figure 1).

#### *Agricultural Water Use*

NRCE (2016) performed an annual water balance at the irrigation project level to estimate overall irrigation efficiencies and to estimate operational water losses on the CRIP. The extent to which such losses are avoidable and recoverable represents a gross quantification of the potential volume of water that may be conserved. The period of study was 1996-2015. Measured diversions of water from the mainstream of the Colorado River into the CRIP Main Canal represent total inflows. Surface return flows to the mainstream are measured at four USGS gages. Diversions from and total return flows to the Colorado River showed a slightly increasing trend over the period. See Figure 2. Return flows tend to follow the same trend as diversions suggesting the annual return flow volumes are responsive to diversion volumes. Consumptive use is computed as diversions minus return flows. The ratio of consumptive use to diversions, a measure of Project irrigation efficiency, shows a generally decreasing trend over the period studied, especially for the latter part of the period (2007-2015).

Estimated consumptive use is noted to decrease over the study period ranging from 296,935 AFY to 425,492 AFY. The estimated consumptive use by this approach lumps crop consumptive use together with open water evaporation losses and water use by phreatophytes and other riparian vegetation that are occurring on the CRIP. Thus, it should be noted that the overall Project





efficiency estimates using this approach will be biased to the high side, since typically the Project agricultural water use efficiency would be computed using only agricultural crop consumptive use.

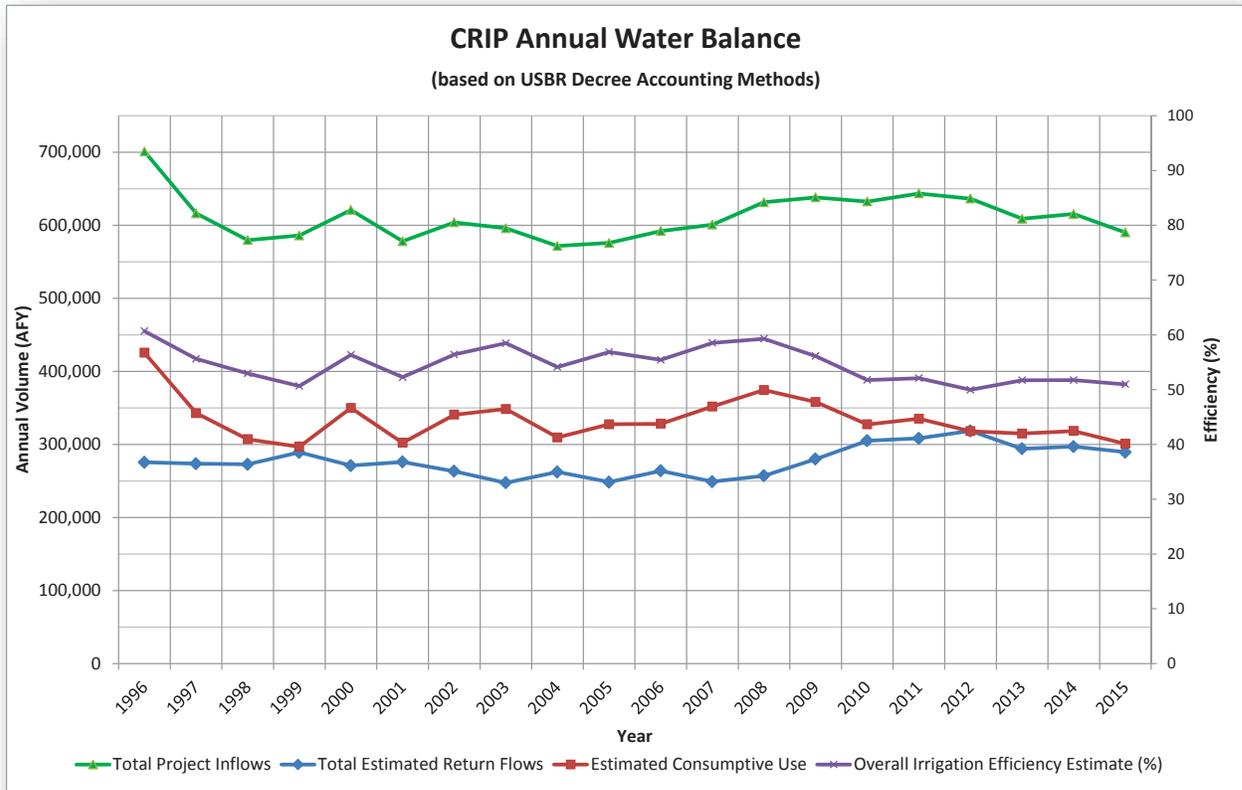


Figure 2. Water balance components and estimated project efficiency based on USBR Decree Accounting methodology for estimated consumptive use.

Past Relationship with USBR

CRIT coordinates regularly with the USBR Yuma Area Office on matters related to maintenance activities in the reach of the Colorado River that passes through the Reservation. These include planning and implementation of projects to improve backwaters and side channels along the reach, removal of alluvial wash sediment outflow fans, etc.

CRIT has and is currently participating in the Pilot Program established by Reclamation and four municipal entities in July 2014 to fund the creation of Colorado River system water through voluntary water conservation. See Table 3 below.

CRIT has worked closely with Reclamation as part of the Ten Tribes Partnership to complete the Colorado River Basin Ten Tribes Partnership Tribal Water Study in October 2018.





Table 3. Summary of CRIT Pilot System Conservation Implementation Agreements (SCIA) with USBR.

Project	Description	Date
No. 16-XX-30-W0606	Water conservation through a reduction of consumptive use on the CRIP by fallowing of 1,591 acres of irrigated cropland for the period October 1, 2016 – September 30, 2018	September 14, 2016
No. 18-XX-30-W0634	Water conservation through a reduction of consumptive use on the CRIP by fallowing of 1,884 acres of irrigated cropland for the period October 1, 2018 – September 30, 2019	September 14, 2018
No. 19-XX-30-W0647	Water conservation through a reduction of consumptive use on the CRIP by fallowing of 3,705 acres of irrigated cropland for the period January 1, 2019 – December 31, 2019	February 25, 2019
ADWR	Arizona Drought Contingency Plan, 150,000 acre-feet of conserved water to remain in Lake Mead as system conservation over three years, 2020-2022	June 27, 2019

### 1.4 Project Description and Milestones

#### 1.4.1 Problem Statement and Justification for Need

**Problem Statement**

*The Colorado River Indian Tribes (CRIT) have long recognized the value of effective use of their water rights on the Reservation. The CRIT Tribal Council believes that the betterment of the Tribes requires full consideration of water utilization both on and off Reservation, including taking advantage of favorable leasing opportunities for their water rights. Decision-making by the Tribal Council is best accomplished through development of water marketing strategies to expand water markets and water marketing activities among willing participants.*

The goal of this project is to develop and articulate a water marketing strategy for CRIT for the purposes of wisely and effectively utilizing the Tribes’ resources while increasing water supply reliability regionally in a manner that benefits willing participants through voluntary agreements. CRIT has actively engaged in several water conservation and lease agreements, as well as discussions with several large entities interested in developing long-term lease arrangements with CRIT. The CRIT Tribal Council has been forthright and welcoming of these discussions, participated in workshops and technical sessions, entertained and analyzed proposals from prospective partners, held learning sessions for tribal members, and provided feedback to prospective partners on CRIT’s perspectives and goals in achieving agreements. Although the CRIT Tribal Council has participated in many elements of water marketing, they also believe that development of a comprehensive water marketing strategy will help the Tribes in a focused effort to both expand and utilize an effective marketing of their water rights.

The preparation of a water marketing strategy consists of a series of activities consistent with the required program components of the FOA. They include Outreach and Partnership Building, Scoping and Planning Activities, and Development of a Water Strategy Document. As demonstrated in detail below, CRIT has been involved in various aspects of each of these components over the years, and the funding anticipated in this FOA, when combined with Tribal





and in-kind support, will allow CRIT to continue in its efforts to lead to a comprehensive water strategy document.

#### 1.4.2 Project Component 1. Outreach and Partnership Building

Water is not traditionally traded in the marketplace, and the leasing (temporary transfer) of water from one entity to another is a relatively recent occurrence. In many locations in the West, water right leases are becoming more common as a means of water supply management. It is also generally encouraged by economists since such agreements can be beneficial to both parties in the transaction and result in an efficient, highest value use of water. Nevertheless, because water right markets are not fully developed, formulating and establishing arrangements requires explicit outreach efforts to potential lessees, as well as educating and obtaining support from potentially affected stakeholders (including tribal members and existing water users).

This subtask has three elements. The first is conducting outreach to potential buyers and other interested parties who may be interested in acquiring water on a short-term, medium-length, or long-term lease basis, may seek opportunities for drought relief assurance, or seek partnerships in conservation efforts. This requires the efforts of an experienced water broker along with a transactions specialist team. Working with the CRIT Tribal Council, the water broker will identify and contact entities that may potentially be interested in future water rights transactions. This includes mid-sized and large municipalities, water districts and associations, and the Central Arizona Groundwater Replenishment District, as well as conservation groups, Arizona Department of Water Resources, and the Bureau of Reclamation. CRIT already has experience in discussions with several large entities; this subtask will enhance and expand upon this effort within a comprehensive planning structure. CRIT is in process of identifying and interviewing among several possible candidates for a consultant water broker.

The second subtask element is conducting stakeholder and potential partner workshops. CRIT Tribal Council has already sponsored several tribal workshops to inform and develop support among tribal members for various off-Reservation conservation leases and agreements involving use of its water rights, and for approval to engage in discussions with potential partners. This support is exemplified by a recent tribal referendum that garnered 64 percent approval for continued pursuit of agreements.

This subtask element would provide funding for additional stakeholder meetings and workshops. Additional tribal workshops will be necessary as the strategy document is developed. In addition, existing water users in the CRIP will be targeted for workshops to assist them in understanding how the water marketing strategy will affect them, and provide them an opportunity to provide input on and suggestions to CRIT on their water marketing strategy. Finally, the subtask will fund meetings and workshops with both leadership and stakeholders among potential partners. They provide an opportunity for CRIT to articulate their goals in developing agreements, types of agreements they may provide (e.g., short- or long-term leases, drought relief, etc.), timing and operational descriptions, functions, and limits or restrictions.

The third subtask element is the inclusion of funding for making the strategy document available for public review, including conducting public meetings and workshops specifically on the water marketing strategy plan as presented in draft document. These hearings and workshops, conducted on the Reservation for both tribal members, water users, and the general public; and off the





Reservation in the location of potential partners; provides an opportunity for stakeholders and the broader community to understand and provide additional feedback on the proposed plan by CRIT.

### 1.4.3 Project Component 2. Scoping and Planning Activities

The purpose of this subtask is to conduct studies to explore the potential to develop an expanded or enhanced water market and to conduct water marketing activities. In general terms, this includes conducting economic studies of water demand and the transaction cost of marketing water, researching water marketing methods such as formation of auctions or other approaches, analyzing and resolving legal issues associated with marketing, conducting technical studies of water rights including consumptive use and return flows available for marketing, analyzing impacts of water markets, conducting hydrologic and engineering studies of infrastructure requirements for implementing transactions, and analysis of decision mechanisms in support of marketing activities. Subtask elements are discussed in detail below.

#### *Economic Studies*

CRIT operates in two separate water market environments, one for each of Arizona and California. A long-time economic consultant for CRIT has been keeping track of and analyzing comparable market transactions in Arizona, as part of an ongoing effort to provide information to the CRIT tribal council about the nature and types of transactions taking place, the market value of transactions, and components of demand (e.g., drought contingency, one-time or short-term leases, conservation, long-term storage credits, and secured long-term leases). He has also provided financial and economic analyses of several proposed and completed transactions involving drought contingency, system conservation with Reclamation, and long-term leases.

Less specific information is currently available or has been compiled associated with the California water market beyond a database of transactions. As CRIT works to formulate and expand its California market, detailed demand information will be needed.

Funding in this FOA will be used to provide additional information on the water demand market in Arizona. Funding will also be used to assess the demand for water in the Southern California market that is potentially serviceable by CRIT.

#### *Research of Water Marketing Approaches*

Establishing water markets that are effective and efficient, while simultaneously remaining beneficial to the CRIT tribal community is a goal of its water marketing strategy. Various approaches are available to structure a water market, including opening channels of communication with potential partners, and offering water at a set price. CRIT tribal council is particularly interested in exploring the incorporation of auctions as a means of price setting and expanding market opportunities. Funding in this element will be used to conduct a broader study of water marketing approaches, including auctions. The research would be led by the economic consultant, with assistance from the legal support members.

#### *Analysis of Legal Issues*

CRIT is a federally recognized tribe with reserved water rights in two states. Leases and other uses of tribal water off the Reservation is subject to compliance with state and federal laws.





Existing agreements with CRIT have all been established and maintained in strict compliance with the law. Expansion of water marketing in Arizona, and the establishment of a market within California, will necessitate additional legal research to ensure that future agreements can be made seamlessly and in continued compliance with existing laws. (CRIT has no plans to transfer water across state boundaries, which is currently prohibited by federal regulation.)

### *Quantifying Available Water Supply*

As noted above in 1.3.2, CRIT has the right to divert the lesser of 662,402 acre-feet of water from the Colorado River mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 99,375 acres of land and satisfaction of related uses in Arizona; and, the right to divert the lesser of 56,846 acre-feet of water from the mainstream, or, the quantity of mainstream water needed to supply the consumptive use required for irrigation of 8,528 acres of land and satisfaction of related uses in California. Within Arizona, CRIP serves approximately 80,000 acres of land that are assessed an annual fee for irrigation system O&M, with estimated consumptive use over the period of 1996-2015 ranging from 296,935 AFY to 425,492 AFY. The California portion of the Reservation does not have extensive irrigation. Irrigated crop production on Reservation lands in California is currently limited to about 1,130 acres of land (NRCE and CE, 2016). CRIT is currently expanding agricultural land and irrigation on a small, incremental scale.

With that backdrop, continued investigations are necessary into consumptive use, return flows, and irrigation efficiencies resulting in available water supply for marketing. CRIT recently obtained a WaterSMART grant to modernize the existing Supervisory Control and Data Acquisition (SCADA) System on the CRIP to result in enhanced irrigation water control and management. Expected results of this project include more accurate accounting of water diversions, distribution and usage, improved water delivery service to water users, water savings, and overall better water management and sustainability.

CRIT's long-time engineering and hydrology consultants, NRCE, will lead studies to determine available water supply, including diversions, consumptive use, return flows, irrigation efficiencies, and related topics. The economist will assist in evaluating cropping patterns and the economic feasibility of efficiency measures and methods in order to forecast projected water availability under different structural and non-structural conservation initiatives.

### *Analysis of Impacts of Water Market Transactions*

Water right transactions that take place off the Reservation may result in economic, community, and environmental impacts. In making decisions regarding CRIT's participation in System Conservation Implementation Agreements, the CRIT tribal council has considered economic and environmental impacts on existing water users and the tribal community. The council recognizes that a broader water marketing strategy will involve analysis of economic, social, and environmental impacts, and that these analyses should be shared with tribal members and other stakeholders. The consulting economist will lead the team effort, which may include tribal environmental staff and additional environmental consultants as necessary.





### *Hydrologic and Engineering Studies of Infrastructure Requirements*

The CRIT and its engineering consultant, NRCE, maintain a considerable amount of information regarding the infrastructure of the CRIP. Existing system conservation and drought contingency agreements rely upon the water management apparatus and infrastructure of the Bureau of Reclamation on Parker Dam and upstream in terms of holding back conserved water. In addition, the Central Arizona Project is the significant transport feature for utilizing agreements with potential partners within Arizona. In California, existing transfer facilities could be utilized for future transactions, but would require coordination and hydrologic modeling in order to fully understand operational feasibility. Funding in this element would allow for such integrative hydrologic studies in both Arizona and California.

### *Decision Support Studies*

Because the market for water is not fully transparent in either Arizona or California, there is a need for a large amount of analytical data on existing and past transactions that includes hydrologic, economic, price, cost, temporal, and logistical components. Such data can be utilized in a decision support framework to assist the CRIT tribal council in determining whether potential agreements are feasible and satisfy tribal goals. As noted above, some of this information has been compiled to date by CRIT's economic consultant. Funding in this element will provide the means for additional research, data collection, and further developing the decision support framework. This includes determination of appropriate pricing as well as analyzing with a comparison of alternative uses of water on the Reservation.

#### **1.4.4 Project Component 3. Development of a Water Marketing Strategy Document**

A significant product from this FOA is a Water Marketing Strategy document, prepared by CRIT. The final document will describe the proposed approach to be utilized by CRIT to expand its water marketing activities based on the results of the outreach, and the scoping and planning activities that are performed as described above in Project Components 1 and 2. The draft strategy document will be prepared in part simultaneous to the activities in Project Components 1 and 2, with the remainder prepared upon completion of those activities, utilizing their outcomes.

There are four required elements of the strategy document. They include an Implementation Plan, a Legal Framework, Monitoring, and Stakeholder Support and Input. The Implementation Plan is the largest element, and will contain a description of how the water market will operate; management and administrative structure ensuring long-term sustainability; details of water rights, potential participants, and transfer infrastructure; discussion of issues needing to be resolved before implementation; and decision support framework description. The Legal Framework provides context for how tribal reserved water rights and transactions will adhere to state and federal laws within both Arizona and California, as well as discussion of existing compacts and rules that will govern the transactions initiated by CRIT. The section on Monitoring will address how physical transfers will be measured and confirmed, including the prevention of harm to other water users. Finally, the element on Stakeholder Support and Input will include a description of how public outreach and feedback solicitation of the draft strategy document was accomplished. It will also include a description of who was involved and how comments were addressed and, if appropriate, incorporated.





The draft water marketing strategy document will include the first three required elements, and will be submitted to Reclamation for review. A simultaneous process will seek public, tribal member, partner, and stakeholder input on the draft strategy document. Upon completion of the review process, CRIT and its consultants will revise the strategy document, including the fourth element. The completed strategy document will be included as an attachment to a separate, final project report.

## 1.5 Evaluation Criteria

### 1.5.1 Evaluation Criterion A – Water Marketing Benefits

*Explain whether the water market/water marketing strategy project will address a specific water supply shortfall and describe the extent of benefits to different sectors, including agricultural, municipal/industrial, tribal and environmental sectors.*

CRIT is uniquely situated in two states, Arizona and California, both of which experience chronic and persistent drought and limited water supply relative to large and increasing demand for water. The primary drivers of demand for water are municipalities that experience above average population growth, with projections of continued steady growth in the future. According to the Arizona Department of Water Resources, water from the Colorado River through the Central Arizona Project provides about a third of the water supply currently utilized by the Active Management Areas that encompass the vast majority of Arizona’s residents (ADWR, 2019). Furthermore, the Central Arizona Groundwater Replenishment District (CAGRDR) “projected that its total annual replenishment obligation ...would rise to 86,900 acre-feet by 2034 ... [and] that the replenishment obligation in 100 years will total approximately 113,000 acre-feet per year” (CAGRDR, 2019). Significant reliance by Arizona on the Colorado River is indisputable, and as a potential source of new supply in the future. The CRIT Tribal Council sees a role for its water rights in this limited water supply environment.

Arizona and much of the Southwest has recently experienced years of persistent drought. As indicated above in Table 3, CRIT has voluntarily participated in the System Conservation Program offerings by the Bureau of Reclamation, which included purposeful fallowing of irrigation project land with the conserved water remaining in storage in Lake Mead “to help mitigate the impacts of the on-going, historic drought.” An initial two-year offering was followed by two more one-year agreements between CRIT and Reclamation.

CRIT has openly expressed a desire to assist with drought planning and mitigation and has negotiated a key agreement with the State of Arizona to provide 150,000 acre-feet of conserved water to remain in Lake Mead as system conservation over three years, 2020-2022, as part of Arizona’s Drought Contingency Plan (AZ DCP). This action along with other components of the Arizona DCP increase the water supply reliability to the State of Arizona and the Lower Colorado River Basin. At the same time, CRIT Tribal Council strongly desires to maintain an agricultural economy on the Reservation, keeping current irrigated acreages in production. The key to this requires the implementation of multiple water conservation interventions to increase efficiencies and reduce losses. The fundamental base for this is the modernization of water control and measurement on the CRIP.





The Colorado River supplies southern California with 4.4 million-acre feet (MAF) annually for agricultural and urban uses, with approximately 3.85 MAF used for agriculture in Imperial and Riverside Counties. The remaining portion (600,000 to 800,000 AF) serves urban purposes in the service area of the Metropolitan Water District (MWD). MWD and its member agencies serve nearly 20 million residents. Over the years, MWD has consistently developed a water portfolio that includes acquiring water from a variety of local and imported sources, in order to protect its secure supply in the future. This includes continued reliance on water supply from the Colorado River, participation in conservation programs to reduce losses, and engage in transfer and exchange programs (MWD IRP, 2015). In addition, MWD faces potential reductions in future supply from the State Water Project related to the Bay-Delta Water Quality Control Plan effort. CRIT sees an opportunity to serve this supply void.

*Explain how and to what extent the proposed water market/water marketing strategy activities will improve water supply reliability in general in the area upon implementation of the strategy.*

CRIT's proposed marketing strategy will have a significant role in both reducing the likelihood of conflicts over water, and for increasing resiliency to drought. By engaging in discussions and forming agreements on a large scale, CRIT can provide potential partners with a trusted partner in addressing looming and extensive supply reliability problems, and by demonstrating a willingness to provide stopgap insurance for periods of drought. The CRIT's recent history with both the Arizona DCP and Reclamation's call for voluntary system conservation provide examples of CRIT's support for being a regional partner in supply reliability. In addition, proposed efforts to explore innovative techniques, such as auctions, may lead to approaches that can be effective for other potential partners to adopt for their own purposes.

*Explain the extent to which the water market/water marketing strategy activities will be ready to proceed upon completion of the strategy.*

As noted above, CRIT has been involved in various discussions, proposed agreements, and completed conservation and other lease agreements during the past few years. The Tribal Council has also acknowledged that a comprehensive strategic plan for marketing is important to provide consistency and resiliency to its approach. After a two-year development period for preparing the strategic plan, CRIT will be ready to implement it immediately.

CRIT has sponsored and funded a number of studies which effectively serve as foundational work for the water marketing strategy. These studies had objectives of assessing water use efficiency, gaining an understanding of opportunities for both conserving water and improving beneficial use of CRIT's water resources, and evaluating the economic returns of various Tribal water uses, while preserving and protecting CRIT's Colorado River water rights. CRIT has expressed a desire to improve the economic return on its Colorado River water allocation as well as to improve irrigation efficiency to conserve water. CRIT is keenly aware of water shortage conditions in the Lower Colorado River Basin and is interested in making conserved water available under different mechanisms to forestall system shortages or to make water available for other system users who may be at risk of shortages are declared. Example projects include:

- *Agricultural Resource Management Plan: Phase I—Integrated Agriculture Inventory and Issues* (NRCE and CE, 2016). The primary focus of the study was to collect baseline





information and data on water supply and use on the CRIP. Information and data over the period 1996-2015 were collected and summarized—climate, soil and land resources, total cropped area, cropping patterns, sources and characterization of water supply quantity and quality, CRIP water delivery and distribution system infrastructure, water delivery operations and management, flow distribution and control, methods of water ordering, water rates and allocation, and preliminary identification of potential structural and operational issues. On-farm irrigation methods and practices were characterized. Irrigation water requirements for the crops and cropped areas of the CRIP and water balance of: (1) the CRIP inflows, return flows and consumptive use, and, (2) the Colorado River reach from below Parker dam to below Palo Verde diversion dam were performed to develop estimates of CRIP level agricultural water use efficiency.

- *Agricultural Resource Management Plan: Phase II—Efficiency Analyses and Potential Water Conservation, Colorado River Irrigation Project* (NRCE and CE, 2017b). This study addressed the conditions and operations of the CRIP and identified potential mechanisms to improve efficiency, with a goal of conserving water to allow expansion of irrigated acreage and/or make water available for alternate uses. Appraisal level estimates of costs and water savings for conveyance and farm level improvements across the CRIP were developed. Multiple system infrastructure rehabilitation needs were identified as first priority for improvements to improve system functionality. System modernization and other upgrades, including the expansion of flow measurement and SCADA operations on the CRIP, construction and automation of re-regulation reservoirs, canal lining, and drain water capture and re-use are recommended. Improvements at the on-farm level to address significant water losses and improve crop production were also highlighted.
- *Potential Fallowing of Low Return Lands on the Colorado River Indian Reservation* (NRCE and CE, 2016). This study identified project lands that could be potentially fallowed based on criteria that indicated low economic viability. The study also developed a fallowing protocol to rank lands for fallowing. Finally, an economic analysis was conducted that allowed a comparison of the opportunity cost of fallowing compared to other uses for the water, including off-Reservation leases. The analysis included a comparison of leases and lease rates from past agreements in the region.

In addition to these example studies, NRCE and CE have prepared technical memoranda and a framework for economic analysis of conserved lands for each of the system conservation agreements with the Bureau of Reclamation.

### 1.5.2 Evaluation Criterion B – Level of Stakeholder Support and Involvement

*Identify stakeholders in the planning area who have committed to be involved in the planning process.*

*Describe stakeholders in the planning area who have expressed their support for the planning process, whether or not they have committed to participate.*

The CRIT Tribal Council has engaged with a number of potential partners during the past several years, including Reclamation, Arizona Department of Water Resources, a major water provider, municipalities in Central Arizona and on the Colorado River, mining companies, developers, and the Environmental Defense Fund, among others. During the Arizona DCP process, CRIT was





recognized publicly for their cooperation with many different stakeholder interests. These existing relationships will be fostered upon completion of the plan.

In addition, CRIT has kept apprised the tribal community and CRIP water users during the entire period of developing agreements. This includes regular public meetings on the Reservation, and monthly meetings with CRIP agricultural water users.

*Is there opposition to the proposed strategy?*

CRIT is not aware of any organized opposition to the proposed strategy. Certainly, questions have arisen among tribal members as to what the Tribal Council is proposing with regard to off-Reservation leases, but these questions have been (and will continue to be) addressed at public meetings.

*Do any separate planning efforts express support for the proposed water market/water marketing activities? Or, will the proposed water marketing strategy complement other ongoing or recent planning efforts within the area?*

As noted above, CRIT has funded a number of on-Reservation studies designed to aid in determining available water supply for marketing, and for increasing potential supply through conservation efforts and other means. Through the very process of the Arizona DCP, Reclamation and Arizona Department of Water Resources have engaged with CRIT on the on-Reservation efforts to make water available for agreements. It is anticipated that CRIT can contribute to the planning efforts of those agencies to the extent that it can, and subject to a confidentiality determination of particular data by CRIT's Tribal Council.

*Please describe any relevant planning efforts, including who is undertaking these efforts and whether they support or are complemented by the proposed water marketing strategy. Explain how the proposed water marketing strategy will avoid duplication or complication of other ongoing planning efforts.*

Ongoing planning efforts are described above, and are consistent with the proposed marketing strategy. Additional engineering studies are being conducted to assist in CRIP project management, conservation improvements, hydrologic measurement, and related efforts.

*Describe what efforts that you will undertake to ensure participation by a diverse array of stakeholders in developing the water marketing strategy.*

CRIT is committed to ensuring a broad participation of stakeholders in developing the water marketing strategy. As noted above, the CRIT Tribal Council has already participated in discussions with a diverse set of stakeholders and potential partners, and regularly welcomes such engagements. This will continue into the future. As indicated in the scope of work, CRIT will enlist the assistance of a water broker and public information facilitator to prepare workshops and other forms of presentations to potential partners. In addition, it will continue to hold public meetings for tribal members and on-Reservation water users.





**1.5.3 Evaluation Criterion C – Ability to Meet Program Requirements**

*Describe how the three required project components (outreach and partnership building, scoping and planning activities, and development of a water marketing strategy) of a water marketing strategy grant will be addressed within the required timeframe. Please include an estimated project schedule that shows the stages and duration of the proposed work including major tasks, milestones, and dates.*

Table 4 provides a synopsis of the timeline of the required project components that correspond with the overall plan. Each column represents a two month period of the entire 24-month overall schedule of activities. Task 1, Outreach and Partnership Building, has ongoing elements that occur during the entire period of the study. It includes conducting introductory meetings, establishing and forming workshops, and conducting public meetings with stakeholders. In the first year, information is gathered from stakeholders in preparation of the strategy document. During the second year, outreach and workshops are focused on gaining feedback on the draft strategy document for incorporation into the final plan. However, additional outreach will also take place to potential partners.

**Table 4. Project Implementation Plan and Schedule**

Task No.	Description	Activity (by months)											
		6		12		18		24					
1	Outreach and Partnership Building	■	■	■	■	■	■	■	■	■	■	■	■
2	Scoping and Planning Activities		■	■	■	■	■	■	■	■	■	■	
3	Development of a Water Marketing Strategy				■	■							■
4	Final Report												■

Task 2, Scoping and Planning Activities, takes place beginning two months from the start of the project and continues until just prior to the final report. The planning activities are concurrent studies to include economic analyses, hydrologic and engineering studies, and decision support development. The initial focus will be the compilation of existing information in preparation of the draft strategy document, with the ongoing effort in the second year on completing the studies. Task 3, Development of a Water Marketing Strategy, contains two main segments. The first leads to a draft document based on initial planning efforts and outreach. In the early part of the second year, the draft document is provided to Reclamation and made available to stakeholders for comment and collection of feedback. The final two months are devoted to addressing comments for the final strategy document. Finally, Task 4, Final Report, is a required element of the grant which describes the study process and includes the strategy document as an attachment.





*Identify staff with appropriate technical expertise and describe their qualifications. Describe any plans to request additional technical assistance from Reclamation, or by contract.*

Ms. Angie Ingram is the Acting Director for the Water Resources Department, and will oversee the study for CRIT. CRIT will enlist the assistance of a team of long-time consultants, including Dr. Michael Taylor (water resources economist), Dr. Tom Ley (senior engineer), Ms. Margaret Vick, JSD (attorney), and will also include an experienced water broker and public information specialist.

Dr. Michael Taylor has more than 28 years of experience conducting applied economic studies. He earned an MS and Ph.D. in Agricultural and Resource Economics from Oregon State University, specializing in natural resource economics. His expertise includes economic analysis, computer modeling, and quantitative methods applied to issues related to agriculture, water and water rights, and the market value of water. He has specialized in tribal issues, and has worked with more than two dozen tribes throughout the West, including the Colorado River basin and for the CRIT. He also worked directly for and with several tribes to formulate goals and objectives for economic development and resource management, and to analyze economic development opportunities.

Dr. Tom Ley is a Senior Supervising Engineer at NRCE and is registered Professional Engineer in Colorado, Washington, Arizona, Nevada and Utah. Dr. Ley has over 35 years of experience, both domestically and internationally, in irrigation systems design and management; hydraulic design; water use evaluations; evapotranspiration modeling; agricultural hydrology and hydrologic analyses; environmental monitoring; climate analyses; water rights analyses; irrigation pumping and energy use; water quality protection and water resources engineering and management. He has conducted numerous engineering and hydrology studies for CRIT.

#### **1.5.4 Evaluation Criterion D – Department of the Interior Priorities**

The proposed project directly supports the Department of the Interior priority to support of the White House PPP initiative to utilize natural resources and to modernize U.S. infrastructure. The PPP Initiative is significantly enhanced in this proposal as a sovereign federally recognized Native American Tribe—CRIT is a strong partner in this proposal effort to modernize facilities owned and operated by the US BIA in trust and on behalf of CRIT. Furthermore, the proposed project promotes conservation stewardship for the purpose of improving the management of water resources.





## 2 PROJECT BUDGET

### 2.1 Funding Plan

The estimated total cost of the preparing a water marketing strategy document is \$395,140. CRIT requests Federal funding in the amount of \$184,250. CRIT is committed to contributing a matching amount equal to \$186,250 as a monetary contribution from the Tribe’s Funds, including \$184,250 as in-kind costs contributed by CRIT under a Professional Services Agreement with Natural Resources Consulting Engineers, Inc. (NRCE) dated May 1, 2019; plus \$24,640 in other Federal funding as in-kind cost share under a BIA Colorado River Agency PL93-638 contract with CRIT Water Resources Department for Irrigation Engineering Services. CRIT Water Resources work under the PL93-638 contract is current and on-going. No in-kind contributions or costs will be incurred before the start of the project. There is no other funding received from other Federal partners, and there are no other pending funding requests for this project. Table 5 is a summary of Federal and non-Federal funding sources for the proposed project.

**Table 5. Summary of Federal and Non-Federal Funding Sources.**

<b>Funding Sources</b>	<b>Funding Amount</b>
<b>Non-Federal Entities</b>	
1. Colorado River Indian Tribes	\$2,000.00
2. Colorado River Indian Tribes PSA with NRCE Inc. (in kind cost share contribution)	\$184,250.00
<b>Non-Federal Subtotal</b>	<b>\$186,250.00</b>
<b>Other Federal Entities</b>	
1. Other Federal Subtotal (PL93-638 contract) (in kind cost share contribution)	\$24,640.00
<b>Other Federal Subtotal</b>	<b>\$24,640.00</b>
<b>Requested Reclamation Funding</b>	<b>\$184,250.00</b>
<b>Total Project Funding</b>	<b>\$395,140.00</b>

### 2.2 Budget Proposal

Table 6 provides details of the estimated project costs in the format provided in the Funding Opportunity Announcement.





**Table 6. Details of Budget Proposal.**

Budget Item Description	Computation		Quantity Type	Total Costs (\$)
	\$/Unit	Quantity		
<b>Salaries and Wages (Labor and Overhead)</b>				
Angie Ingram, WRD Interim Director	165	96	Hours	<b>15,840.00</b>
Environmental Protection Office Staff	110	80	Hours	<b>8,800.00</b>
<b>Fringe Benefits</b>				
Angie Ingram, WRD Interim Director				
Environmental Protection Office Staff				
<b>Equipment</b>				
<b>Supplies and Materials</b>				
Public Meeting Materials and Supplies	2000	1	EA	<b>2,000.00</b>
<b>Contracts</b>				
Water Resource Economist	160	800	Hours	<b>128,000.00</b>
Agricultural Engineer/ Hydrologist	230	400	Hours	<b>92,000.00</b>
Associate Engineer	135	300	Hours	<b>40,500.00</b>
Attorney	300	120	Hours	<b>36,000.00</b>
Water Broker / Public Workshop Facilitator	180	400	Hours	<b>72,000.00</b>
(PSA dated 5/1/19)				
<b>Contingencies/Other</b>				
<b>Total Direct Costs</b>	<b>\$</b>		<b>-</b>	<b>395,140.00</b>
Indirect Costs				
<b>Total Estimated Projects Costs</b>				<b>\$395,140.00</b>

<sup>1</sup> See budget narrative for explanation of quantities and costs





## 2.3 Budget Narrative

### 2.3.1 Salaries and Wages

The Project Manager is Ms. Angie Ingram, CRIT WRD Acting Director. The Project Manager will lead and direct the CRIT WRD for the study. Additional technical staff will assist in the environmental impacts analyses as necessary.

### 2.3.2 Fringe Benefits

Fringe and overhead costs are currently not available for CRIT WRD staff. Hourly rates listed in Table 6 include estimated hourly total compensation (salary plus benefits) of CRIT WRD Staff plus overhead fixed costs such as office space, phone support, computer support, vehicle fixed cost, etc.

### 2.3.3 Contractual

NRCE and Cascade Economics are currently under contract with CRIT in a Professional Services Agreement (PSA) to provide continuing irrigation engineering and economic analysis technical support. In addition, CRIT has a PSA with Ms. Margaret Vick, JSD for legal services.

### 2.3.4 Indirect Costs

None.

### 2.3.5 Total Costs

The total cost of this project will be \$395,140.00. CRIT requests Federal funds from the WaterSMART grant program in the amount of \$184,250,000. CRIT will match this amount with a monetary contribution of \$2,000 to the project. Under CRIT's PSA with NRCE and CE, an in-kind cost share contribution of \$184,250 will be made. Under CRIT's PL93-638 contract with the BIA to provide Irrigation Engineering Services, CRIT will contribute \$24,640 as an in-kind cost share toward the project's total costs.

## 2.4 Budget Form

The completed SF-424B, Budget Information–Non-Construction Programs is attached in Appendix A.





### **3 ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE**

Not applicable.

### **4 REQUIRED PERMITS OR APPROVALS**

Not applicable.



### **6 UNIQUE IDENTIFIER**

The Colorado River Indian Tribes is currently registered in the System for Award Management (SAM), and maintains an active registration in SAM. The registration number is 074481706 / 3UHH4.

The organizational DUNS number for the Tribe is 074481706.





## APPENDIX A: SF-242B BUDGET INFORMATION FOR NON-CONSTRUCTION PROGRAMS



