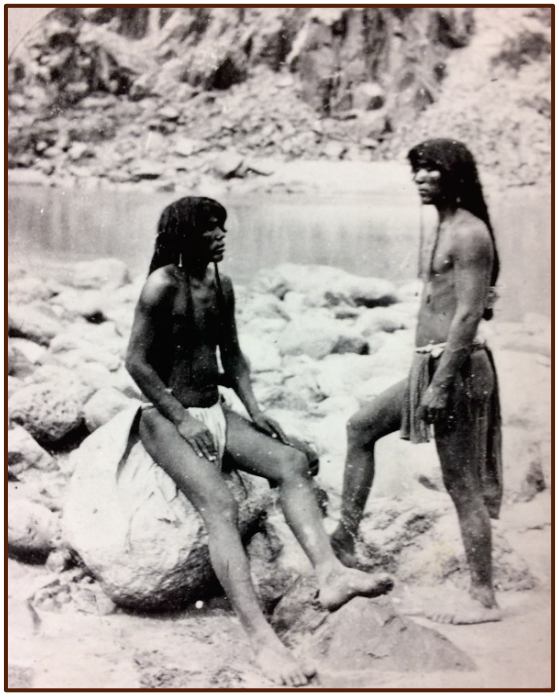
5.8 Colorado River Indian Tribes

5.8.1 Introduction

The Colorado River Indian Reservation (Reservation) was established by the Act of March 3, 1865 (13 Stat. 559), setting aside lands for "Indians of the Colorado River and its tributaries." This broad, inclusive language contemplated situating numerous tribes in a single location, as was the practice of Congress at that time. The lands were originally occupied by the Mohave people ("Aha Makhav" - The Water People) which, when the Spanish arrived in the territory in the 16th Century, were the largest concentration of people in the American Southwest. Modern archaeological interpretations indicate the Mohave have lived along the Colorado River for a period in excess of 12,000 years.

The lands of the Reservation were originally occupied by two tribes, first the Mohave and later the Chemehuevi, who have inhabited the area on either side of the Colorado River for millennia. In the 1940s, and 1950s, families from two additional tribes, the Hopi and Navajo, were relocated to the Reservation, with the promise of plots of land to farm. Often, these families also received a 'home' to live in on their 10-acre parcel, consisting of a one-room bungalow salvaged from the former War Relocation Authority's Poston Camps I – III, the largest Japanese internment camp in Arizona during the World War II era.



Panambona and Mitiwara at Colorado River shoreline. Mohave Tribe. Date: 1871. *Source: Smithsonian Institution, Bureau of American Ethnology; Photographer: Timothy H. O'Sullivan, taken during Colorado River Expedition of 1871, under Lt. George M. Wheeler.*

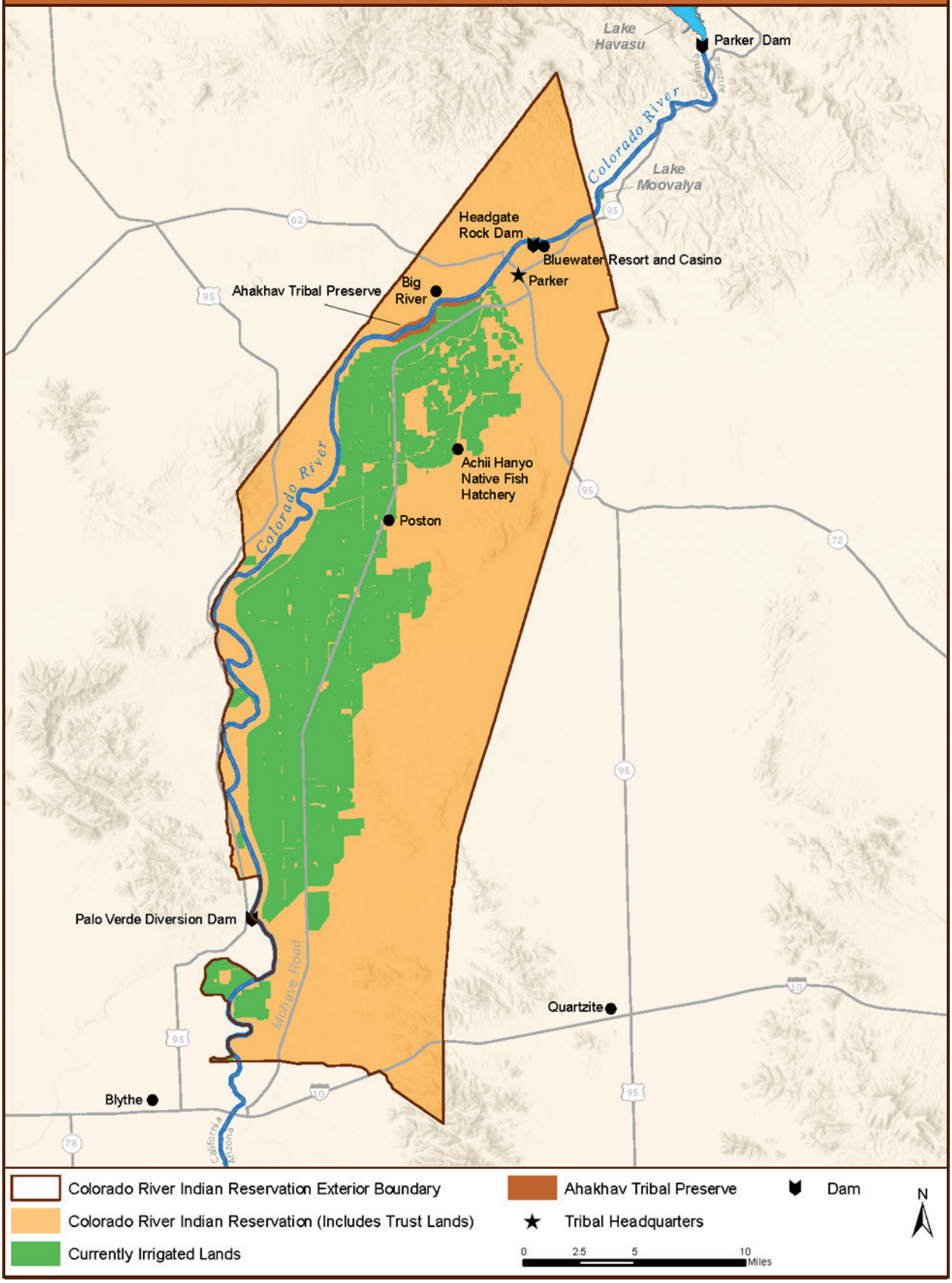
Located approximately 155 miles west of Phoenix, Arizona, the Reservation is 56 miles from north to south along the Colorado River with land in both Arizona and California. The Reservation includes approximately 300,000 acres of land, with the river serving as the life-sustaining cultural and economic focal point of the community.

The Reservation consists of 353 square miles of land in Arizona (La Paz County) and 66.7 square miles in California (San Bernardino and Riverside Counties). The Reservation includes over 113 miles of shoreline along the Colorado River.

The Colorado River Indian Tribes (CRIT or Tribes) include four distinct tribes - the Mohave, Chemehuevi, Hopi, and Navajo. There are currently about 4,277 Tribal members, and that number is increasing steadily. CRIT's water use planning takes this growth rate into account. The primary community on the Reservation is Parker, Arizona, which is located on a combination of land leased from the Tribes and land that is owned in fee. There are other, smaller communities within the reservation, including Poston, located 15 miles south of Parker.

Figure 5.8-A presents a general location map with Reservation boundaries, communities, and other important features.

FIGURE 5.8-A
Colorado River Indian Tribes Reservation Map



See the Disclaimer and Introduction to Chapter 5.0.

5.8.2 Physical Setting

5.8.2.1 Watersheds

The Colorado River enters the Reservation at its northern boundary and flows toward the south. The reaches of the river affecting the CRIT are regulated by Parker Dam, Headgate Rock Dam, and Palo Verde Diversion Dam and by levees constructed and maintained by Reclamation. Additionally, the river banks have been stabilized to protect them from erosion at many critical locations.

5.8.2.2 Hydrogeology

The Reservation is located on part of the floodplain of the Colorado River in an area of undifferentiated alluvial sediments and sedimentary rocks of Quaternary age that include floodplain deposits and fanglomerate deposits derived from the surrounding mountains. Numerous domestic and irrigation wells can be found throughout the area.

Primary Irrigation Canal - Colorado River Indian Reservation Irrigation Project
Source: Colorado River Indian Tribes - Photo by: Maria de Los Angeles Guzman, Water Resources

5.8.2.3 Climate

The reservation is located where the Sonoran Desert meets the Mojave Desert. Wintertime highs are generally in the upper 60s to lower 70s (°F). Lows during the winter are between 40 °F and 50 °F. Highs in June, July, August, and September run in the 100 °F to 110 °F range, and days over 115 °F or even 120 °F are not rare.

The average annual precipitation is approximately 5.1 inches at Parker, Arizona, and 3.8 inches toward the southern end of the Reservation, near Blythe, California, with winter rains forming about 50 percent of the annual total precipitation. Winter rains are generally gentle, prolonged, and occur over a wide area. Sporadic, intense summer 'monsoon' rains occur from July through September.

5.8.3 Historical Use and Cultural Importance of Water

The Mohave people have been practicing floodplain and irrigated agriculture for over 4,000 years along the Colorado River. Early irrigation practices followed the River's natural flood-cycle patterns, planting as the spring floodwaters receded. Later developments included hand-dug ditches and canals to divert water onto cultivated upland fields. The Tribes grew (and still grow) food and utility crops such as corn, mesquite, squash, and beans, as well as native trees for cultural uses.

Irrigation ditch-cleaning machinery in operation, Colorado River Indian Reservation. Date: Unknown (approximately 1940 -1945).
Source: Colorado River Indian Tribes - Library Archives

Beginning in the 1870s, development of what has become the Colorado River Irrigation Project (CRIP) began. Authorized for construction in 1867, the CRIP was the first irrigation project built by the BIA. The CRIP currently serves 79,350 acres in Arizona. Recent agriculture trends have resulted in increased production of commercial crops such as alfalfa, cotton, soy, wheat and other vegetable commodities. Tribal members work their own assigned lands, or may lease their land. CRIT leases land to private and commercial farming enterprises. The Tribes also operates a large commercial farming enterprise known as CRIT Farms, managing 12,000 to 15,000 acres on average, with revenues benefiting the community at large.

As described in more detail below, the majority of CRIT water is now used in the irrigation of approximately 80,000 acres of Reservation farmland in Arizona and California. CRIT rotates several thousand acres into and out of production each year as good land stewardship dictates, and is actively developing new farmland on reservation lands in both Arizona and California.

Today, the relationship of the Mohave people to the land, water and environment is celebrated through song and ceremony. For thousands of years before the United States came into existence, ancestors of the Colorado River Indian Tribes left their footprints on the trails beside the Colorado River. Along the extensive system of trails beside the river, and at locations now inundated by the river, villages and significant cultural and gathering sites are evident, marked by petroglyphs and geoglyphs. The location, purpose and names of these sites are united through clan songs, language, and stories that express, communicate, and preserve their spirituality, cultural knowledge and history.

5.8.4 Colorado River Indian Tribes Water Supply

CRIT possesses present perfected federal Indian reserved water rights from the Colorado River mainstem pursuant to the decree in *Arizona v. California,* 547 U.S. 150 (2006) (commonly referred to as the 2006 Consolidated Decree). The amounts, priority dates, and states where the reserved water rights are perfected are presented in Table 5.8-A.

TABLE 5.8-A
Colorado River Indian Tribes Colorado River Decreed Water Right

Reservation	State	Diversion Water Right (AFY)[1]	Net Acres	Priority Within State	Priority Date
Colorado River Indian Reservation	Arizona	358,400	53,768	1	Mar. 3, 1865
		252,016	37,808	1	Nov. 22, 1873
		51,986	7,799	1	Nov. 16, 1874
	Subtotal	***662,402***			
	California	10,745	1,612	1	Nov. 22, 1873
		40,241	6,037	1	Nov. 16, 1874
		5,860	879	1	May 15, 1876
	Subtotal	***56,846***			
Total		**719,248**	**107,903**		

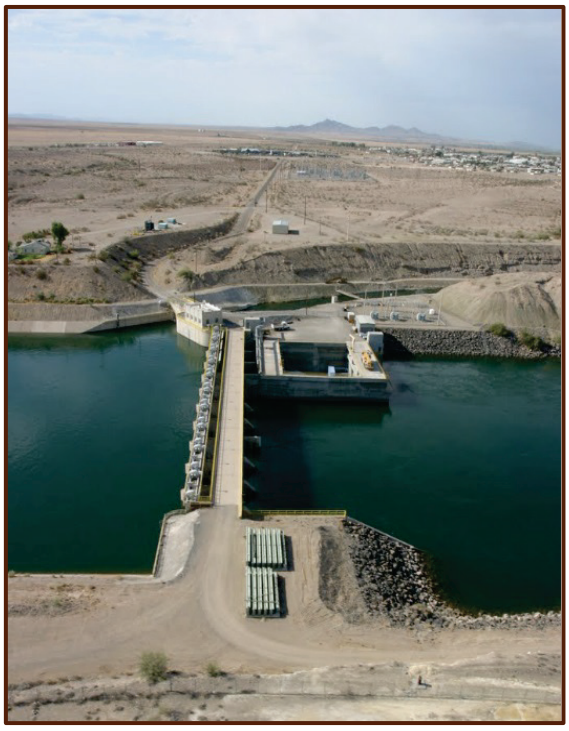
[1] Source: Consolidated Decree of March 27, 2006. The quantity of water in each instance is measured by (i) diversions or (ii) consumptive use required for irrigation of the respective acreage and for satisfaction of related uses, whichever of (i) or (ii) is less.

5.8.5 Current Water Use and Operations

CRIT has a strong farming and agricultural industry, including growing alfalfa, grains, cotton, seed crops, grasses, guayule, and melons. In recent years the Tribal economy has diversified into several additional areas. Sand and gravel production, real estate development, and retail stores have all become part of the Tribes' economic development activities. Over the past two decades, CRIT has focused greater attention on fostering tourism by opening the BlueWater Resort and Casino in Parker, Arizona which attracts both cultural and recreational visitors to the area.

5.8.5.1 Irrigated Agriculture and Livestock Water Use Category

As noted previously, CRIT has a strong farming and agricultural industry. With approximately 80,000 acres already developed for cultivation, and another 30,000 acres available for additional development, CRIT is able to utilize its water resources in a variety of ways to meet the challenges and opportunities that lie ahead for the Colorado River Basin (Basin).



Headgate Rock Dam - forms Lake Moovalya, houses 18MW hydro powerplant, and serves as an entry gate to the Colorado River Irrigation Project.
Source: Colorado River Indian Tribes - Photo by: Maria de Los Angeles Guzman, Water Resources

Agriculture is predominately flood irrigated, with water supplied through an extensive canal system. In June 1942, the construction of Headgate Rock Dam and powerplant on the Colorado River created Lake Moovalya and allowed for gravity diversion from the river on-demand. Water from this diversion runs through an irrigation system that feeds the many farms on the Arizona side of the reservation.

CRIT presently utilizes the majority of its available water supply in agricultural production. As irrigation practices become more efficient, CRIT's capacity to put additional lands into production is improving, as is the overall efficiency of water use on the Reservation.

Individual ranchers, farmers, and area 4-H clubs raise small herds of livestock – predominantly sheep, but also cattle and horses. The aggregate water usage by livestock on the Reservation is estimated to be less than ten acre-feet per year (AFY).

Blue water into green fields - Colorado River Irrigation Project Canal feeding some of the 85,000 acres of developed farmland.
Source: Colorado River Indian Tribes - Photo by: Maria de Los Angeles Guzman, Water Resources

Table 5.8-B presents agricultural diversions for the period from 2009-2013. The diversion data incorporates Reclamation's annual Water Accounting Reports for calendar years 2009 through 2013 (Reclamation, 2016) and was supplemented with water use information provided by the Tribes for the purpose of the Tribal Water Study.

TABLE 5.8-B
Colorado River Indian Tribes Irrigated Agriculture and Livestock Diversions (2009 – 2013)

Diversions by State	Year (AF)				
	2009	2010	2011	2012	2013
Arizona	636,657	631,097	642,077	635,087	607,437
California	3,896	3,896	3,896	3,896	3,896
Total	**640,553**	**634,993**	**645,973**	**638,983**	**611,333**

5.8.5.2 Domestic, Commercial, Municipal, and Industrial Water Use Category

The Tribes operates a wastewater treatment facility, known as Joint Venture, in partnership with the Town of Parker, Arizona. This facility serves the majority of the commercial, industrial, municipal and residential customers on the Colorado River Indian Reservation. The Joint Venture facility uses 725,000 gallons of water daily in its 'pass-through' treatment process. Total annual inflow/outflow is about 812 acre-feet (AF) of water which is returned to the Colorado River.

Colorado River Sand & Rock is a major enterprise of CRIT that was established in October 1998. It supplies concrete ready mix, asphalt, sand, construction aggregate, and gravel products to customers in Arizona and California.

Parker, Arizona, Big River and Earp, California
Source: Colorado River Indian Tribes - Photo by: Maria de Los Angeles Guzman, Water Resources

Another major commercial water user on the Reservation is the Evoqua Water Technologies facility – a carbon filter re-processing plant which utilizes an average of 3.75 million gallons of water per month in its operations. The annual total equals about 132 AF of consumptive use.

Table 5.8-C presents municipal and industrial diversions for the period from 2009 through 2013. The diversion data incorporates Reclamation's annual Water Accounting Reports for the periods of 2009 through 2013 (Reclamation, 2016), which was supplemented with sector use information provided by the Tribes for the purpose of this Study.

TABLE 5.8-C
Colorado River Indian Tribes Domestic, Commercial, Municipal, and Industrial Diversions (2009 – 2013)

Diversions by State	Year (AF)				
	2009	2010	2011	2012	2013
Arizona	11,390	10,874	7,697	7,392	7,526
California	1,160	1,096	503	1,084	1,013
Total	**12,550**	**11,970**	**8,200**	**8,476**	**8,539**

5.8.5.3 Environmental, Cultural, and Recreational Water Use Category

The Mohave people adhere to the wisdom of their Creator, as passed down by their elders through the oral tradition, advising them to maintain a relationship with the Creator by taking care of the land, the water, and the environment "because it takes care of you." The Tribes incorporate that sense of balance in their use of water so people, plants, and animals all have enough to live well, for generations to come.

As part of this approach, the Tribes have set aside significant areas of land in Arizona, such as the Bosque area toward the southern end of the Reservation, and the Ahakhav Tribal Preserve both for cultural resource purposes as well as to address conservation measures. The Tribes also participate in the Lower Colorado River Multi-Species Conservation Program (MSCP) in various ways, for example, by creating backwaters and habitat facilities such as the Achii Hanyo Native Fish Hatchery, to support populations of native and endangered species of plants, birds and fish. Table 5.8-D describes the amount of water diverted to support these efforts.

The Ahakhav Tribal Preserve was established in 1995, and currently uses approximately 1,325 AFY of water. The facility consists of 1,253 acres of wilderness area, about 250 acres of aquatic habitat, and a 3.5-acre park. The Preserve is centered along a reconstructed Colorado River backwater, which offers a variety of activities, including fishing, canoeing, birding, and swimming. The Preserve also features a 4.6-mile-long fitness trail, as well as a playground, landscaped picnic facility, and a spur trail planted with native mesquite, cottonwood and willow. The Preserve provides recreational and learning opportunities to the surrounding community and many visitors, and also serves as a nursery operation and a re-vegetated area for endangered and threatened plants and animals native to the Lower Basin. The Preserve provides a location for ongoing study of methods of re-vegetation and restoration that are then used throughout the Reservation and other locations that could benefit from the research.

The Bosque area serves as a native tree preserve and gathering site for traditional Tribal practices. In particular it is populated by extensive stands of mesquite trees which are spiritually, culturally and environmentally significant to the Mohave. This area is supported by a water table fed, in part, by agricultural tailwater from the southern end of the CRIP. After passing through the Bosque, much of that water reenters the Colorado River as direct and indirect return flow.

In cooperation with the U.S. Fish and Wildlife Service, the Tribes helped develop the Achii Hanyo Native Fish Hatchery (in the Mohave language, “Achii Hanyo” translates as “Fish Lake”) on reservation lands in Arizona. Baseline water use at Achii Hanyo is 208.6 AFY, and the facility purchases excess water from the CRIP of up to 100 AFY, depending on certain conditions. The facility serves as a rearing site for two native fish species – the razorback sucker (*Xyrauchen texanus*) and bonytail chub (*Gila elegans*) – which are both endemic to the Basin, and both are presently listed as endangered. Federal, State, and Tribal resource managers are working along the length of the lower Colorado River to conserve and facilitate the recovery of both native fishes. Propagation of both species in hatcheries produces fish to help re-establish natural populations. Achii Hanyo consists of sixty ponds, creating approximately 100 acres of rearing area. Its tailwater feeds wetlands to the south, before returning to the Colorado River system.

The Colorado River is the Reservation's greatest recreational asset and most scenic attraction. Facilities for swimmers, boaters and water skiers are located along the 113 miles of shoreline within the Reservation boundaries. Lake Moovalya, formed behind Headgate Rock Dam, provides a desirable location for camping, water skiing and fishing. The BlueWater Resort and Casino is located beside the River, just upstream from Headgate Rock Dam.

Bulldozer pushes boulder into breach, closing last remaining channel creating Lake Moovalya behind Headgate Rock Dam. Date: 11/08/1940.
Source: Colorado River Indian Tribes Library Archives

TABLE 5.8-D
Colorado River Indian Tribes Environmental, Cultural, and Recreational Water Use Diversions (2009 – 2013)

Diversions by State	Year (AF)				
	2009	2010	2011	2012	2013
Arizona	1,534	1,534	1,534	1,534	1,534

5.8.5.4 Reservoirs

Two reservoirs on the Reservation create headwater lakes for diversion intakes into two large irrigation systems – the CRIP and the Palo Verde Irrigation District's system – at the southwestern edge of the Reservation.

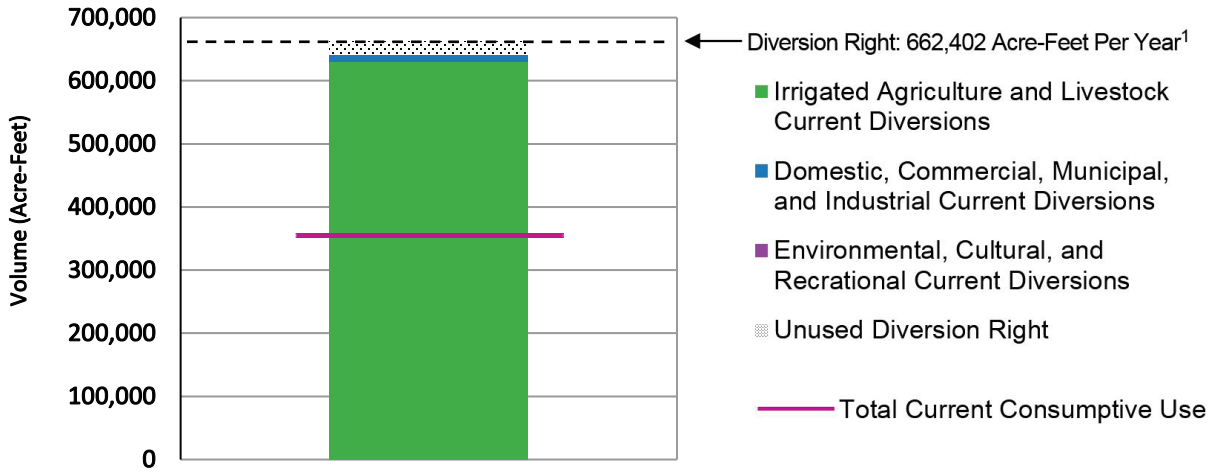
5.8.5.5 Water Use Efficiency and Conservation

The operation and maintenance of the CRIP – including system efficiency improvements, such as machinery upgrades, measurement tools, and modernization efforts – is managed by the BIA. Supervisory Control and Data Acquisition (SCADA) measurement/control systems are being installed throughout the irrigation project to improve operational efficiency.

5.8.5.7 Summary of Current Water Use

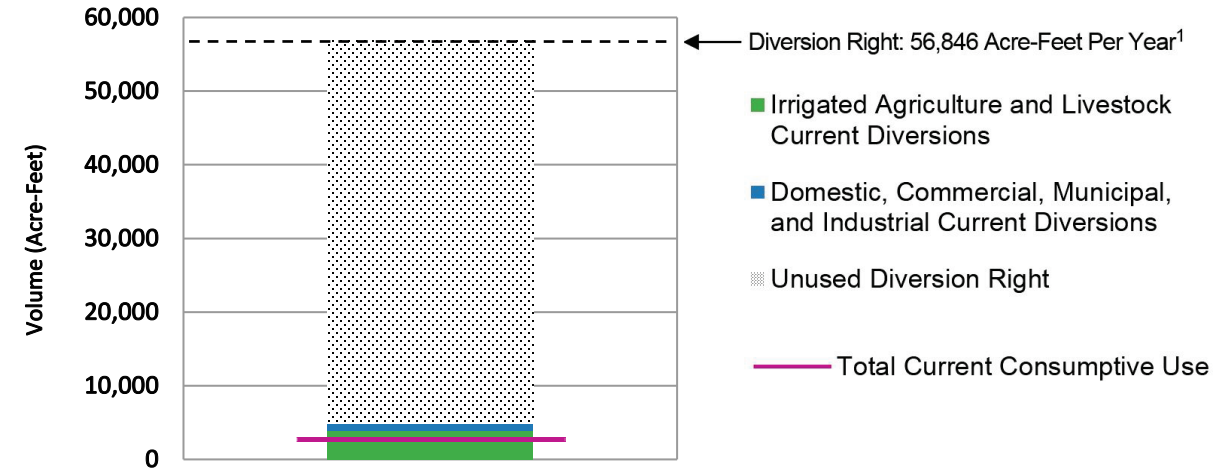
The Tribe's average annual water use for the period from 2009 through 2013 in Arizona is presented in Figure 5.8-B, for California in Figure 5.8-C, and the Tribe's average annual water use in both states is in Table 5.8-E. The average annual water use for the 2009 through 2013 period incorporates Reclamation's annual Water Accounting Report data (Reclamation, 2017), which was supplemented with water use information provided by the Tribes for the purpose of the Tribal Water Study. Therefore, comparisons between this report and the Water Accounting Reports will reflect those additional tribal data inputs. Consumptive use amounts were estimated using either efficiency factors in Reclamation's Water Accounting Report or standard engineering efficiencies.

FIGURE 5.8-B
Colorado River Indian Tribes Current Average Annual Water Use in Arizona (2009 – 2013)



[1] Source: Consolidated Decree of March 27, 2006. The quantity of water is measured by (i) annual diversions not to exceed 662,402 acre-feet or (ii) the quantity of mainstream Colorado River water necessary to supply the consumptive use required for the irrigation of 99,375 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less.

FIGURE 5.8-C
Colorado River Indian Tribes Current Average Annual Water Use in California (2009 – 2013)



[1] Source: Consolidated Decree of March 27, 2006. The quantity of water is measured by (i) annual diversions not to exceed 56,846 acre-feet or (ii) the quantity of mainstream Colorado River water necessary to supply the consumptive use required for the irrigation of 8,528 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less.

TABLE 5.8-E
Colorado River Indian Tribes Current Average Annual Water Use by State (2009 – 2013)

State	Water Use Category	Diversion (AFY)	Estimated Current Consumptive Use (AFY)
Arizona	AG	630,471	348,598
	DCMI	8,976	4,963
	ENV	1,534	848
	State Subtotal	***640,981***	***354,409***
California	AG	3,896	2,154
	DCMI	971	534
	State Subtotal	***4,867***	***2,688***
Total		**645,848**	**357,097**

AG – Irrigated Agriculture and Livestock
DCMI – Domestic, Commercial, Municipal, and Industrial
ENV – Environmental, Cultural, and Recreational

5.8.6 Tribal Water Use Challenges

Aging Infrastructure

The CRIP was constructed over the course of many decades, beginning in the 1870s. The northern sections are older, and thus suffer more from both design limitations and simple aging problems. Unlined canals, deteriorating gates and turnouts, and imperfect alignments to the terrain all translate into inefficiencies that are not as evident in modern, well-designed, and properly maintained irrigation systems. The high cost to repair infrastructure, including lining canals, reconstructing gates and turnouts, and realigning reaches of the system, limit the Tribes' ability to realize the full potential value of its water.

Diversion Dam, Headgate Rock area.
Source: Colorado River Indian Tribes Library Archives

High Cost of Additional and Replacement Infrastructure

The CRIP now delivers nearly all of the Tribes' Arizona apportionment of Colorado River water onto presently farmed acreage. However, it does so inefficiently. The Tribes, therefore, face the challenge of identifying critical inefficiencies to determine the most cost-effective solution to improve long-term economic return for its water. Key questions are whether to repair inefficient sectors of the system, add to the system, or to install more water-efficient delivery systems on portions of the land now served by the CRIP. None of these options are simple, or inexpensive.

The Parker Valley, where the majority of CRIT's irrigable Arizona lands are located, is large, relatively flat, and would allow for significant additional cropland development. The CRIP design could likewise accommodate significant expansion as well. However, the costs associated with expansion of the system to develop more acreage is also significant, and prohibitive under present market conditions.

Unlined section of Main Canal - example of older construction methods and area of potential improvement.
Source: Photo by: Maria de Los Angeles Guzman, Water Resources

Flood-irrigation systems are inherently inefficient, with expected but significant losses to return flow, tailwater spill, and evaporation; however, if well-operated, those inefficiencies are manageable. Further complicating the matter, the CRIP suffers from additional inefficiencies due to outdated design characteristics, failing infrastructure, and operational shortfalls.

Lack of Infrastructure on the California Side of the Reservation

CRIT is allocated 56,846 AFY of water to serve its irrigable acreage in the state of California. CRIT utilizes approximately 10 percent of that amount at present, leaving 50,000 AFY of water in the river. CRIT's unused water is utilized by a junior contract holder without benefit to the Tribes. The Tribes' challenge is to put that as yet unused water to work for the benefit of its membership as soon as practicable. The high cost of land development is a hurdle that must be overcome, but the value of the lost water, even at the artificially low agricultural rates presently controlling the marketplace, has reached a level sufficient to make that investment a prudent one.

Limited Marketing Opportunities

As noted previously, CRIT's water allocation was adjudicated in the line of cases known as *Arizona v. California*, which describes the quantity of water CRIT may divert from the Colorado River as follows:

> *(i) 719,248 acre-feet of diversions from the mainstream or (ii) the quantity of mainstream water necessary to supply the consumptive use required for irrigation of 107,903 acres and for the satisfaction of related uses, whichever of (i) or (ii) is less[.]*

The Court quantified the federal Indian reserved water right based on the practicably irrigable acreage on the Reservation and expressly stated that the uses by the Tribes are not limited to agriculture. The transfer of water for use off-reservation is not addressed by the Court.

Outdated Pricing Models

The CRIP, though large and productive, nonetheless suffers from significant operational and maintenance shortfalls. Some of the needed repairs are the result of extended use and

maintenance that has been deferred, due to a lack of both financial and human capital. O&M charges for water delivery at the CRIP are below market rates charged at all similar irrigation projects. This chronic underfunding has profound implications for the Tribes' financial future.

Shortage of Skilled Personnel

The Reservation is located in a rural area of Arizona and California. In addition to the challenges the BIA faces in attracting and keeping skilled personnel to operate and maintain the CRIP, the Tribes also have a limited workforce to draw from. Lack of trained individuals with the skills unique to irrigation system management results in reduced operational oversight, slower response to maintenance needs, and lower system efficiency.

5.8.7 Projected Future Water Development

CRIT's future water development was assessed by first examining the location, quantity and type of current water use and then, by applying the Tribal Water Study's scenario planning process, envisioning a range of plausible future water development outcomes.

The Tribal Water Study's scenarios and associated themes are listed below. Detailed descriptions of these scenarios (storylines) were created to consider a wide range of possible water development outcomes. For additional information, including the scenario storylines, see *Chapter 4 – Methodology for Assessing Current Tribal Water Use and Projected Future Water Development*.

- **Current Water Development Trends (Scenario A):** Current trends in on-reservation water development, governance, funding, and resolution of tribal claims remain the same.
- **Slow Water Development Trends (Scenario B):** Decreases flexibility in governance of tribal water, levels of funding, and resolution of tribal claims slow tribal economic development. This results in a decline in the standard of living and delays resolution of tribal claims.
- **Rapid Water Development Trends (Scenarios C1 and C2):** Increased flexibility in governance of tribal water allows innovative water development opportunities and increased funding availability leads to more rapid tribal economic development. This results in an increase in the standard of living, thereby contributing to the fulfilment of the purpose of the reservation as a homeland and supporting the future needs of tribal communities. Scenario C1 considers partial resolution of claims and/or implementation of decreed or settled rights; and Scenario C2 considers complete resolution of claims and implementation of decreed or settled rights.

CRIT contemplated its future water development through 2060 by reviewing its current water use estimates and reflecting upon how these might change under the four scenarios. During this process, the Tribes considered such elements as the scenario conditions described in the storylines, current or future planned projects, anticipated changes in water use by category, the extent and condition of existing water infrastructure and the need, as well as the cost, for new infrastructure to support water development. CRIT contemplated future development in the four water use categories: Irrigated Agriculture and Livestock Water Use (AG); Domestic, Commercial, Municipal, and Industrial Water Use (DCMI); Environmental, Cultural, and Recreational Water Use (ENV); and Transfers, Leases, and Exchanges (TRAN).

From this examination, CRIT extrapolated likely future use if current trends (Scenario A) continued through 2060 and prepared a quantified water development schedules for its reserved water rights in both Arizona and California. Subsequently, CRIT used this same approach to prepare future water development schedules reflective of how the other scenario storylines (Scenarios B, C1, and C2) could affect its future water development. The documentation for each development schedule is presented in the following sections.

5.8.7.1 Future Water Development Schedules

The assumptions used to prepare each water development schedule are described below. The schedules are presented graphically for Arizona in Figure 5.8-D and numerically in Table 5.8-F. Water development schedules for California are presented graphically in Figure 5.8-E and numerically in Table 5.8-G.

Arizona

Current Water Development Trends (Scenario A)

Scenario A assumes that current trends in on-Reservation water development, governance, funding, and resolution of tribal claims remain the same. In Arizona, CRIT is currently diverting nearly all of its reserved water right for agricultural purposes (630,471 AFY). Under Scenario A, the Tribes assumed that this agricultural use would continue; however, efficiency would increase to 70 percent by 2040 and 75 percent by 2060, increasing consumptive use. DCMI use and efficiency, as well as ENV water use, would remain constant through 2060. There would be no TRAN water use under Scenario A.

Slow Water Development Trends (Scenario B)

Decreases in flexibility in governance of tribal water, levels of funding, and the resolution of tribal claims could slow tribal economic development in Scenario B. Under this scenario, CRIT assumed that agricultural diversions would not change as they are currently maximized, but efficiency would decrease to 50 percent by 2060 because irrigation system maintenance and improvements would not be completed. This would slightly decrease consumptive use through 2060. DCMI diversions would not change; however, efficiency would decrease to 50 percent by 2060. There would be no change in ENV use through 2060 and no TRAN use.

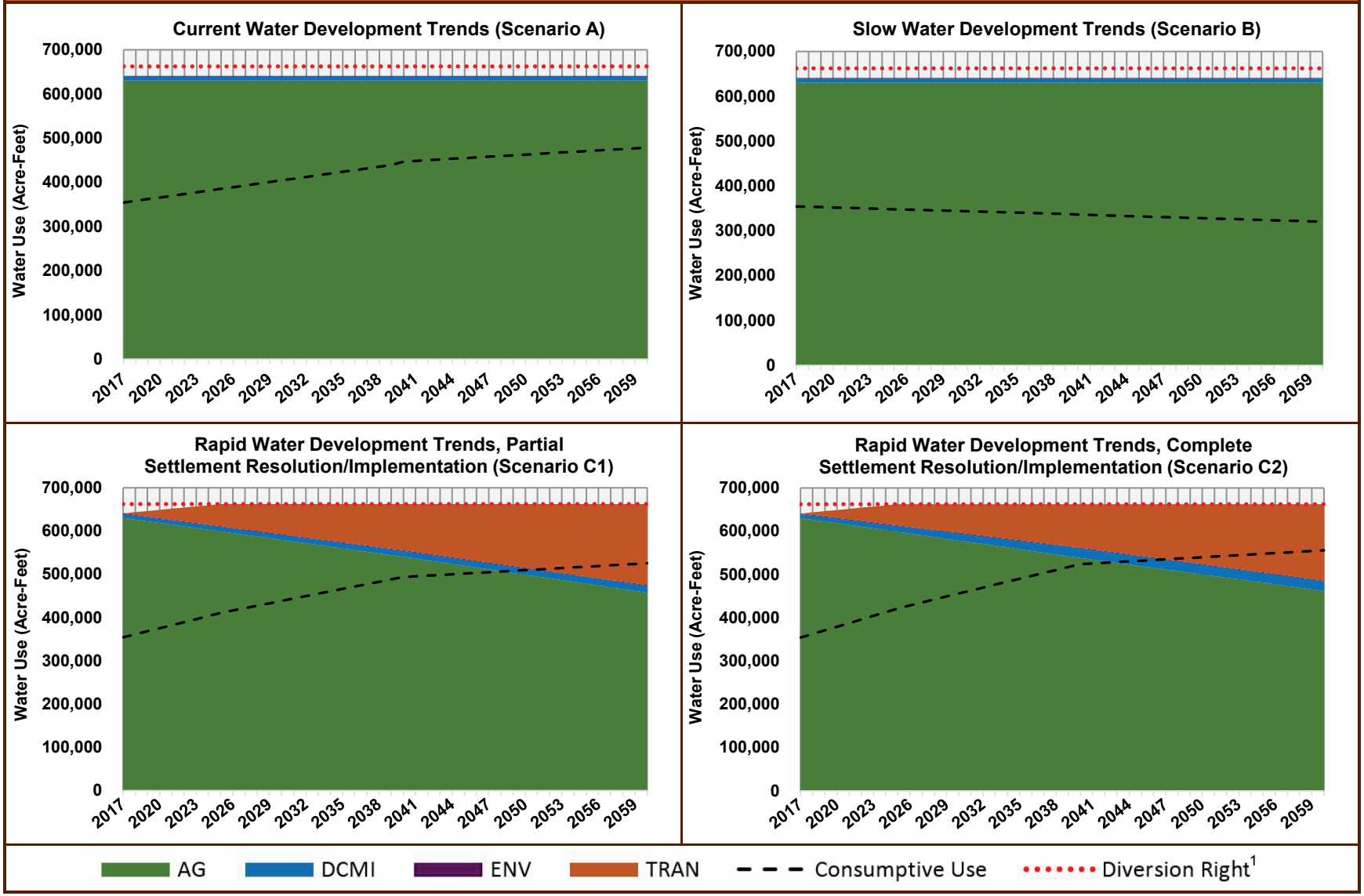
Rapid Water Development Trends, Partial Settlement Resolution/Implementation (Scenario C1)

Under Scenario C1, a partial resolution of the claims and/or implementation of decreed or settled rights leads to increased flexibility in governance of tribal water allowing innovative water development opportunities, and increased funding availability leads to tribal economic development. Under Scenario C1, CRIT assumed that agriculture would remain the largest water user and efficiency would increase to 75 percent by 2040 and 80 percent by 2060, increasing consumptive use. Agricultural diversions would gradually decrease through 2060 as DCMI use and TRAN increase. DCMI diversions would increase 150 percent by 2040 and 175 percent by 2060, also contributing to an increased consumptive use. CRIT assumed that 150,000 AFY would be transferred off the Reservation by 2060. There would be no change in ENV use.

Rapid Water Development Trends, Complete Settlement Resolution/Implementation (Scenario C2)

Scenario C2 builds on Scenario C1 by considering a complete resolution of claims and implementation of decreed or settled rights, which further increases water development opportunities. Under this scenario, CRIT assumed that agriculture would continue to be the largest water user and efficiency would increase to 80 percent by 2040 and 85 percent by 2060, again increasing consumptive use. As in Scenario C1, DCMI diversions would increase 150 percent by 2040 and 175 percent by 2060. There may be an increase in small and medium sized enterprises and perhaps energy companies. CRIT assumed that 150,000 AFY would be transferred off the Reservation by 2060. There would be no change in ENV use.

FIGURE 5.8-D
Colorado River Indian Tribes Projected Future Water Development in Arizona (Scenarios A, B, C1, and C2)



[1] The Colorado River Indian Tribes' diversion right in Arizona is 662,402 AFY.

California

Current Water Development Trends (Scenario A)

Scenario A assumes that current trends in on-Reservation water development, governance, funding, and resolution of tribal claims remain the same. In California, CRIT is currently diverting approximately 3,896 AFY for agricultural purposes. Under Scenario A, CRIT would divert its full reserved water right of 56,846 AFY by 2040 to irrigate an additional 4,700 acres for agriculture. Agricultural efficiency would increase to 70 percent by 2040 and remain at 70 percent until 2060. DCMI diversions would increase 15 percent by 2040 and an additional 10 percent by 2060. CRIT assumed that in the future, housing in California would be occupied more permanently than it is now. There would be no ENV or TRAN water use through 2060.

Slow Water Development Trends (Scenario B)

Decreases in flexibility in governance of tribal water, levels of funding, and the resolution of tribal claims could slow tribal economic development in Scenario B. Under this scenario, CRIT assumes that there would be no change from current water use.

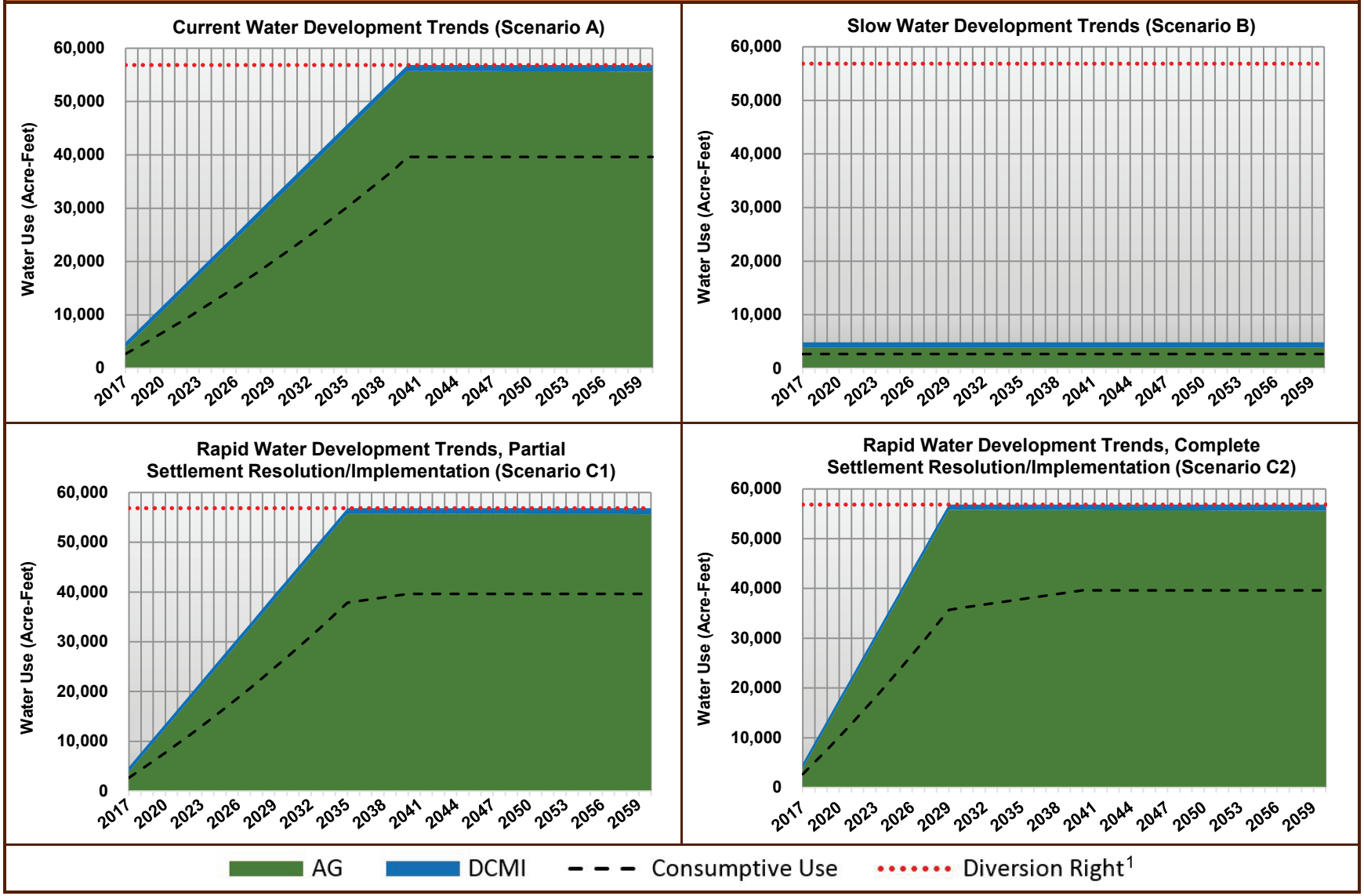
Rapid Water Development Trends, Partial Settlement Resolution/Implementation (Scenario C1)

Under Scenario C1, a partial resolution of the claims and/or implementation of decreed or settled rights leads to increased flexibility in governance of tribal water allowing innovative water development opportunities, and increased funding availability leads to tribal economic development. Under Scenario C1, CRIT would divert its full reserved water right of 56,846 AFY by 2035 to irrigate additional acreage faster than under Scenario A. Agricultural efficiency would increase to 70 percent by 2040 and remain at 70 percent until 2060. As in Scenario A, DCMI diversions would increase 15 percent by 2040 and an additional 10 percent by 2060. There would be no ENV or TRAN water use through 2060.

Rapid Water Development Trends, Complete Settlement Resolution/Implementation (Scenario C2)

Scenario C2 builds on Scenario C1 by considering a complete resolution of claims and implementation of decreed or settled rights, which further increases water development opportunities. Under this scenario, CRIT contemplated an even faster rate of agricultural development and would divert its full reserved water right of 56,846 AFY by 2029. All other water uses would be similar to Scenario C1.

FIGURE 5.8-E
Colorado River Indian Tribes Projected Future Water Development in California (Scenarios A, B, C1, and C2)



[1] The Colorado River Indian Tribes' diversion right in California is 56,846 AFY.

5.8.7.2 Summary of Projected Future Water Development

CRIT's current water use and projected future water development under the Tribal Water Study's water development scenarios, and modeled for analysis purposes, is presented for Arizona in Table 5.8-F and for California in Table 5.8-G.

TABLE 5.8-F
Summary of Colorado River Indian Tribes Current Water Use and Projected Future Water Development in Arizona[1]

Water Use Timeframe and Category		Scenario A (AFY)		Scenario B (AFY)		Scenario C1 (AFY)		Scenario C2 (AFY)	
		Diversion	Consumptive Use	Diversion	Consumptive Use	Diversion	Consumptive Use	Diversion	Consumptive Use
Current Use	*AG*	630,471	348,598	630,471	348,598	630,471	348,598	630,471	348,598
	DCMI	8,976	4,963	8,976	4,963	8,976	4,963	8,976	4,963
	ENV	1,534	848	1,534	848	1,534	848	1,534	848
	TRAN	0	0	0	0	0	0	0	0
	Total	**640,981**	**354,409**	**640,981**	**354,409**	**640,981**	**354,409**	**640,981**	**354,409**
Use at 2040	*AG*	630,471	441,330	630,471	330,753	540,427	405,320	538,241	430,593
	DCMI	8,976	4,963	8,976	4,709	13,464	7,405	22,336	12,285
	ENV	1,534	848	1,534	848	1,534	848	1,534	848
	TRAN	0	0	0	0	106,977	80,233	100,291	80,233
	Total	**640,981**	**447,141**	**640,981**	**336,310**	**662,402**	**493,806**	**662,402**	**523,959**
Use at 2060	*AG*	630,471	472,853	630,471	315,236	457,660	366,128	462,061	392,752
	DCMI	8,976	4,963	8,976	4,488	15,708	8,639	22,336	12,285
	ENV	1,534	848	1,534	848	1,534	848	1,534	848
	TRAN	0	0	0	0	187,500	150,000	176,471	150,000
	Total	**640,981**	**478,664**	**640,981**	**320,572**	**662,402**	**525,615**	**662,402**	**555,885**

[1] The Colorado River Indian Tribes' diversion right in Arizona is 662,402 AFY.

TABLE 5.8-G
Summary of Colorado River Indian Tribes Current Water Use and Projected Future Water Development in California[1]

Water Use Timeframe and Category		Scenario A (AFY)		Scenario B (AFY)		Scenario C1 (AFY)		Scenario C2 (AFY)	
		Diversion	Consumptive Use	Diversion	Consumptive Use	Diversion	Consumptive Use	Diversion	Consumptive Use
Current Use	*AG*	3,896	2,154	3,896	2,154	3,896	2,154	3,896	2,154
	DCMI	971	534	971	534	971	534	971	534
	ENV	0	0	0	0	0	0	0	0
	TRAN	0	0	0	0	0	0	0	0
	Total	**4,867**	**2,688**	**4,867**	**2,688**	**4,867**	**2,688**	**4,867**	**2,688**
Use at 2040	*AG*	55,729	39,010	3,896	2,154	55,729	39,010	55,729	39, 010
	DCMI	1,117	614	971	534	1,117	614	1,117	614
	ENV	0	0	0	0	0	0	0	0
	TRAN	0	0	0	0	0	0	0	0
	Total	**56,846**	**39,624**	**4,867**	**2,688**	**56,846**	**39,624**	**56,846**	**39,624**
Use at 2060	*AG*	55,617	38,932	3,896	2,154	55,617	38,932	55,617	38,932
	DCMI	1,229	676	971	534	1,229	676	1,229	676
	ENV	0	0	0	0	0	0	0	0
	TRAN	0	0	0	0	0	0	0	0
	Total	**56,846**	**39,608**	**4,867**	**2,688**	**56,846**	**39,608**	**56,846**	**39,608**

[1] The Colorado River Indian Tribes' diversion right in California is 56,846 AFY.