

Appendix 4C
Tribal Water Development
Scenario Storylines



Appendix 4C – Tribal Water Development Scenario Storylines

Storyline for the Current Water Development Trends (Scenario A)

(Finalized June 2016)

THEME: *Current trends in on-Reservation water development, governance, funding, and resolution of Tribal claims remain the same.*

Demographics

Population Adjacent to Reservation (non-Tribal)

Recent decades have seen steady growth of non-Tribal populations along both the lower main stem Colorado River and tributary river corridors. Where these population centers adjoin or overlap Tribal communities, demand on Tribal water resources typically increases to service the needs of the additional residential, municipal and industrial or agricultural activity.

Despite the high current demand, certain legal, structural and social impediments prevent rapid increase of Tribal water usage by non-Tribal users. Legally, many Tribes are constrained from engaging in marketing and transfer opportunities enjoyed by other water rights holders in the Colorado River Basin.

Land Use and Natural Systems

Agricultural Irrigation Efficiencies

Current on-reservation development includes slow adoption of new irrigation methods and/or technologies, which may improve water efficiencies.

Traditional irrigation practices - ditch and turn-out ‘flood irrigation’ - remains the most common approach to large-scale agricultural enterprises on Tribal lands within the Colorado River Basin. Adoption of higher-efficiency delivery technologies (e.g., sprinkler and drip irrigation systems) may result in some additional quantities of water being made available for expansion of cropped acreage, and alternative uses.

Water Quality

Slow deterioration of water quality from contamination leads to increasing regulation of drinking water, increasing treatment costs and adverse environmental impacts. Slow deterioration of water quality may also lead to a slow decrease in agricultural productivity.

A potential limiting factor for increased development of Tribal water resources is evident in the gradual deterioration of water quality within the Colorado River Basin. The current trend shows increasing contamination of system water as it cycles through the Basin to Mexico. As supplies now fall well short of demand, little system water passes through without being utilized multiple times. No ‘flushing’ or dilution water remains in the system to offset salt and contaminant loading that occurs both naturally and as a byproduct of current municipal, industrial and agricultural practices. Drought conditions exacerbate the water quality problems faced by users throughout the system.

Infrastructure Development

Across the basin a decline in federal funding to support Tribal development is observed, leading to a higher dependency on Tribal funds to support water infrastructure development,

operation and maintenance. Tribal funding is maintained at current levels, but is not enough to offset the loss of federal funding. Current infrastructure limitations also prevent economically viable use of full apportionments in many Tribal communities.

Financial Resources Available to Expand Tribal Housing and Related Infrastructure

Tribal Funding

Tribal funding levels and housing trends are maintained continuing the gradual development of Tribal housing and related infrastructure over time. On-reservation Tribal population grows gradually, but is underserved generally, at present; thus demand exists for expanded Tribal-funded housing and related water infrastructure. Funds availability is a limiting factor in determining whether and at what rate Tribal-funded housing expands.

Federal Funding

Federal funding continues to decline, leading to a decrease in the development of Tribal housing and increasing inter-generational family housing and/or off-reservation housing. Tribes generally lack sufficient internal funds to keep pace with demand for housing. Without continued access to federal low-cost loans or grant funding, Tribal housing will slow to a rate dependent solely on Tribal economic sustainability. Water usage will remain similar to current patterns, as will existing efficiency values. Adoption of water-saving technologies is slowed.

Financial Resources Available to Operate and Maintain Existing Irrigation Infrastructure

Tribal Funding

Tribal funding is maintained for the operation, maintenance, and repair of irrigation systems and storage facilities. Water use remains similar to present patterns, and costs of system maintenance, repairs, rehabilitation and replacement increase gradually over time or are deferred altogether where the cumulative costs of maintaining the system may begin to outweigh the benefits.

Federal Funding

Federal funding continues to decline, leading to continued deterioration of irrigation systems, storage facilities, and efficiency. Water use increases over time to the extent systems remain operable, but efficiency decreases as systems age without sufficient funding for maintenance, repairs, rehabilitation and replacement.

Financial Resources Available to Construct New Irrigation Infrastructure

Tribal Funding

Tribal funding is maintained for construction of new irrigation systems and storage facilities. The ability of tribes to self-fund major irrigation infrastructure projects remains uncertain, but where possible, a gradual increase in developed water resources can be expected.

Federal Funding

Federal funding continues to decline, leading to minimal construction of new irrigation systems and storage. Tribes remain less able to develop their agricultural resources to improve the reservation economy. There may be a gradual increase in developed water resources where Tribal funds remain available to continue development.

Tribal Funds to Operate and Maintain Existing Domestic and Municipal Infrastructure

Tribal funding is maintained to operate and maintain existing Domestic, Commercial, Municipal and Industrial (DCMI) infrastructure. No increase in usage, but efficiencies possible where O&M replacements adopt and utilize newer technologies. Lack of economic

development puts pressure on existing domestic water customers to fund operation, maintenance and replacement costs.

Financial Resources Available to Construct New Domestic and Municipal Infrastructure

Tribal Funding

Tribal funding is maintained for construction of new DCMI infrastructure. There is a gradual increase in water usage - depending on rate of population growth and economic factors. There is also the potential for improved efficiencies where new technologies can be utilized.

Federal Funding

Federal funding continues to decline, leading to a decrease in DCMI water development. Water usage remains at current levels, or gradually increases as population rises, or where Tribal funding is available for DCMI development. There is a strong possibility of increased usage as systems deteriorate due to inefficiencies.

Economic Development

Economic Development

Current water needs are maintained resulting in a slight increase in economic development and eco-tourism leading to a slow increase in per capita water use, and associated with a slow increase in the standard of living, and Tribal economic growth.

Social

The cultural and spiritual values of water ranked consistently very important for all Tribes. These values also ranked consistently low on the uncertainty scale indicating highly important values that are not likely to change over time. Each Tribe and the Tribal members maintain their own relationship to water for religious, cultural and spiritual purposes. In general, Tribal societies uniformly revere water for its life-giving, life-sustaining properties. This goes beyond mere recognition of the role water plays in the physical processes of life. Further, they recognize that water is a finite resource. The cultural knowledge of the natural cycles of water relate to the Tribal identity and sense of place.

Governance

Resolution and Settlement of Tribal Water Rights Claims

Upper Basin: The current gradual rate of progress to resolve and settle Tribal water claims is maintained resulting in uncertainty towards fully developing Tribal economies. For most Tribes in the Upper Basin, full resolution and implementation of Tribal water rights involves quantification in numerous river basins, negotiations with multiple states, consultation on Endangered Species issues, and the development of new storage facilities.

Lower Basin: The water rights claims for the five Lower Basin Tribes who are members of the Ten Tribes Partnership¹ were decreed in *Arizona v. California* (2006).

Flexibility in Utilization of Tribal Water

The current limited level of flexibility in existing policies and regulations leads to a gradual increase in Tribal water use. Some tribes in the upper and lower basins may provide water for off-reservation use in accordance with settlements but not all settlements and decrees provide the same flexibility within the Colorado River Basin.

¹ Fort Mojave Indian Tribe, Chemehuevi Indian Tribe, Colorado River Indian Tribes, Quechan Tribe and Cocopah Indian Tribe.

Water Administration Practices

Current trends in the administration of water use by federal, state, and Tribal entities varies from stringent to minimal, leading to challenges in coordinated administration, contributing to uncertainty among users and increased potential for conflict.

Expertise and Available Resources for Water Planning

Tribal expertise continues to gradually increase, which leads to an associated gradual increase in Tribal water planning, funding and development.

Understanding of Tribal Reserved Water Rights

The differences in the characteristics of federal reserved Tribal water rights and state based water rights result in misunderstandings that affect the management of water and its development. Therefore, if the current limited understanding of Tribal reserved water rights is maintained, restricted Tribal water development can be expected.

Storyline for the Slow Water Development Trends (Scenario B)

(Finalized June 2016)

THEME: *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.*

Demographics

Population Adjacent to Reservation (non-Tribal)

No or slow growth in off-reservation population leads to no change in the trend of demand for Tribal water by non-Tribal users. If the present trend of brisk non-Tribal population growth adjacent to Tribal communities, and in nearby urban centers, subsides or stalls altogether, water usage patterns will likely remain unaffected, increasing very slowly. If circumstance causes that population to substantially lessen (e.g., due to environmental degradation, climate variations, regional economic slowdown), some decrease in demand, commensurate with the reduction in population would be expected.

Land Use and Natural Systems

Agricultural Irrigation Efficiencies

Decreased funding leads to a lack of investment in Tribal agricultural operations. No change is seen in irrigation methods or technologies, resulting in agricultural water demand staying the same.

Water Quality

Rapid deterioration of water quality from contamination leads to increasing regulation of drinking water, increasing treatment costs, and adverse and longer term adverse environmental impacts. Rapid deterioration of water quality leads to a rapid decrease in agricultural productivity.

Deteriorating water quality results in increased costs of regulatory compliance, requiring enhanced treatment technologies to be employed in municipal and drinking water systems, and industrial water settings. Agricultural impacts include lower crop yield, and increased water use where it becomes necessary to dilute or leach contaminants from croplands. Overall economic efficiency is substantially lower, and water use is higher, as resources otherwise available for improvements to increase irrigation efficiency are instead siphoned off to address water quality problems.

Infrastructure Development

Federal funding for water infrastructure development stops and Tribal funding declines. As a result, infrastructure development slows.

Financial Resources Available to Expand Tribal Housing and Related Infrastructure

Tribal Funding

Tribal funding declines, leading to a decrease in the development of Tribal housing and related infrastructure, resulting in an increase in intergenerational family housing and/or off-reservation housing and related infrastructure.

Federal Funding

Federal funding stops, leading to a rapid decrease in the development of Tribal housing and related infrastructure and an increase in intergenerational family housing and/or off-reservation housing and related infrastructure.

Financial Resources Available to Operate and Maintain Existing Irrigation Infrastructure

Tribal Funding

Tribal funding decreases for operation, maintenance, and repair of irrigation systems and storage facilities leading to a deterioration of irrigation systems and storage facilities, a decrease in water use efficiency and a potential decline in crop production.

Federal Funding

Federal funding stops for operation, maintenance, and repair of irrigation systems and storage facilities, leading to a deterioration of irrigation systems and storage facilities, a decrease in water use efficiency and a potential decline in crop production.

Financial Resources Available to Construct New Irrigation Infrastructure

Tribal Funding

Tribal funding decreases and/or remains at \$0.00, leading to stagnant or declining construction of new irrigation systems and storage facilities.

Federal Funding

Federal funding stops, leading to no new construction of irrigation systems and storage facilities. This further hinders the resolution and implementation of Tribal water settlements which often include large federal water projects.

Tribal Funds to Operate and Maintain Existing Domestic and Municipal Infrastructure

Tribal funding to operate and maintain existing Domestic, Commercial, Municipal and Industrial (DCMI) infrastructure decreases and/or remains at \$0.00 leading to a decrease in deliveries as systems deteriorate, an increase in emergency situations, an increase in reliance on private wells, and a decrease in per capita water use.

Financial Resources Available to Construct New Domestic and Municipal Infrastructure

Tribal Funding

Tribal funding for construction of new DCMI infrastructure decreases and/or remains at \$0.00, leading to a decrease in per capita water use, standard of living, and economic growth.

Federal Funding

Federal funding stops, leading to a decrease in the development of DCMI infrastructure projects resulting in a decrease in per capita water use, standard of living, and economic growth.

Economic Development

Economic Development

With Tribal economic development slowing as a result of decreased funding levels, little to no growth is seen in per capita water use.

Social

The cultural and spiritual values of water ranked consistently very important for all Tribes. These values also ranked consistently low on the uncertainty scale indicating highly important values that are not likely to change over time. Each Tribe and the Tribal members maintain

their own relationship to water for religious, cultural and spiritual purposes. In general, Tribal societies uniformly revere water for its life-giving, life-sustaining properties. This goes beyond mere recognition of the role water plays in the physical processes of life. Further, they recognize that water is a finite resource. The cultural knowledge of the natural cycles of water relate to the Tribal identity and sense of place.

Governance

Resolution and Settlement of Tribal Water Rights Claims

Upper Basin: Rate of resolution and settlement of water rights claims decreases, leading to uncertainty as to the ability to fully develop Tribal economies. Slow resolution of Tribal water rights claims hinders the ability to create certainty for other water users in the Basin.

Lower Basin: Full implementation of settled water rights in the Lower Basin slows where federal and Tribal funding is restricted and development opportunities remain limited under the current and policy framework.

Flexibility in Utilization of Tribal Water

Decreased flexibility in existing policies and regulations limits off-reservation use of Tribal water leading to a gradual increase in on-reservation Tribal water use.

Water Administration Practices

A decrease in coordination and cooperation among water administrators leads to uncertainty in the implementation of Tribal water rights increasing the potential for conflicts over water.

Expertise and Available Resources for Water Planning

Loss of Tribal expertise and funding to support Tribal planning leads to a gradual decrease in Tribal water planning efforts which makes it more difficult to access funding and increase development.

Understanding of Tribal Reserved Water Rights

Decreased understanding of Tribal reserved water rights leads to litigation and increased conflict and uncertainty. This is most likely when there are changes in elected and appointed officials.

Storyline for the Rapid Water Development Trends (Scenarios C1 and C2)

(Finalized June 2016)

THEME: *Increased flexibility in governance of Tribal water allows innovative water development opportunities and increased funding availability leads to 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 (C1) considers partial resolution of claims and/or implementation of decreed or settled rights; and Scenario C2 (C2) considers complete resolution of claims and implementation of decreed or settled rights.*

Demographics

Population Adjacent to Reservation (non-Tribal)

(C1) Moderate off-reservation population growth leads to increased use of Tribal water by non-Tribal users, but slower resolution of claims and settlement implementation also slows full development of Tribal water resources. As a result, the additional demand and development raises the potential for increasing contamination and adverse environmental impacts, while opportunities for Tribal economic development are missed.

(C2) Rapid off-reservation population growth leads to increased demand for Tribal water by non-Tribal users; rapid implementation of settlement rights provides broader opportunity for Tribal water development; however, because of this the potential for increasing contamination and adverse environmental impacts rises as utilization reaches maximum limits throughout the Colorado River Basin system.

Land Use and Natural Systems

Agricultural Irrigation Efficiencies

(C1) Moderate adoption of more efficient irrigation methods and/or technologies leads to moderate increase in productivity and the potential for some water to be made available for additional uses. This development will be slowed to the extent that Tribal water rights remain unsettled, and the current structure of laws and regulatory policies continues to impede access to marketing opportunities for Tribes.

(C2) Rapid water development and increased flexibility for Tribes to market water leads to the aggressive adoption of more efficient irrigation methods and/or technologies, which in turn leads to increased productivity or the potential for water to be made available for additional uses.

Water Quality

(C1) Funding, flexibility, and economic development helps Tribes begin to address water quality issues, but slower resolution of claims and settlement implementation results in Tribes not having as many resources to dedicate to water quality issues. Somewhat improved water quality leads to moderately increased efficiencies, gradual increase in agricultural productivity, a decrease in treatment costs and fewer adverse environmental impacts.

(C2) Complete resolution and/or implementation of Tribal claims results in additional funding availability, increased governance flexibility, and stronger Tribal economies. This enables Tribes to have a more direct role in managing and regulating water quality. Improved

water quality leads to increased efficiencies, gradual increase in agricultural productivity, a decrease in treatment costs and fewer adverse environmental impacts.

Infrastructure Development

(C1) Moderate funding increase from both Tribal and federal sources are available. As a result, moderate growth is seen in infrastructure development, operation and maintenance. Funding opportunities for some infrastructure types are dependent on the resolution of water claims.

(C2) Significant funding increase from both Tribal and federal sources are available. As a result, rapid growth is seen in infrastructure development, operation and maintenance which leads to an increase in the standard of living of Tribal populations and economic growth.

Financial Resources Available to Expand Tribal Housing and Related Infrastructure

Tribal Funding

(C1) Moderate increases in Tribal funding levels lead to moderate increases in housing trends providing moderate development of Tribal housing and related infrastructure over time.

(C2) Tribal funding increases rapidly which leads to rapid increase in housing resulting in development of Tribal housing and related infrastructure with an increased standard of living and higher per capita water use.

Federal Funding

(C1) Moderate increases in federal funding leads to moderate increases in housing trends providing a moderate development of Tribal housing resulting in a moderate increase in standard of living and somewhat higher per capita water use.

(C2) A significant increase in federal funding leads to rapid increases in housing trends and development of Tribal housing resulting in an increased standard of living and higher per capita water use.

Financial Resources Available to Operate and Maintain Existing Irrigation Infrastructure

Tribal Funding

(C1) Moderate increase in Tribal funding leads to moderate improvement of irrigation systems and storage facilities, and moderately improved water utilization, water efficiency and crop production.

(C2) Tribal funding rapidly increases leading to rapid improvement of irrigation systems and storage facilities. This leads to significantly improved water utilization, water efficiency and crop production.

Federal Funding

(C1) Federal funding moderately increases which leads to moderate improvement of irrigation systems and storage facilities, and moderately improved water utilization, water efficiency and crop production.

(C2) Federal funding rapidly increases which leads to rapid improvement of irrigation systems and storage facilities. This leads to significantly improved water utilization, water efficiency and crop production.

Financial Resources Available to Construct New Irrigation Infrastructure

Tribal Funding

(C1) Until claims are at least partially resolved, Tribes will likely not direct funding towards construction of new irrigation systems and storage facilities.

(C2) Tribal funding increases and the certainty provided by the full resolution of Tribal water claims leads to an increase in construction of new irrigation systems, and substantial increase in water utilization, water efficiency and crop production.

Federal Funding

(C1) Tribes will not receive federal funding for construction of new irrigation systems and storage facilities until at least partial resolution of water claims.

(C2) Federal funding increases and the certainty provided by the full resolution of Tribal water claims leads to an increase in construction of new irrigation systems and substantial increase in water utilization, water efficiency and crop production.

Tribal Funds to Operate and Maintain Existing Domestic and Municipal Infrastructure

(C1) Tribal funding to operate and maintain existing Domestic, Commercial, Municipal, and Industrial (DCMI) infrastructure moderately increases which leads to a moderate increase in deliveries and system improvements resulting in slightly higher per capita water use.

(C2) Tribal funding to operate and maintain existing DCMI infrastructure rapidly increases which leads to a rapid increase in deliveries and system improvements resulting in higher per capita water use.

Financial Resources Available to Construct New Domestic and Municipal Infrastructure

Tribal Funding

(C1) Tribal funding moderately increases which leads to a moderate increase in construction of new DCMI infrastructure and an increase in the rate of Tribal water development resulting in economic growth, higher per capita water use, increased standard of living, and decreased level of poverty.

(C2) Tribal funding rapidly increases which leads to a rapid increase in construction of new DCMI infrastructure and an increase in the rate of Tribal water development resulting in economic growth, higher per capita water use, increased standard of living, and decreased level of poverty.

Federal Funding

(C1) Federal funding moderately increases which leads to a moderate increase in development of DCMI infrastructure projects and a moderate increase in the rate of Tribal water development resulting in economic growth, slightly higher per capita water use, increased standard of living, and decreased level of poverty.

(C2) Federal funding rapidly increases which leads to a rapid increase in development of DCMI infrastructure projects and an increase in the rate of Tribal water development resulting in economic growth, higher per capita water use, increased standard of living, and decreased level of poverty.

Economic Development

Economic Development

(C1) Rate of water development moderately increases resulting in a moderate increase in the rate of economic development and eco-tourism which leads to slightly higher per capita water use, increased standard of living, and decreased level of poverty.

(C2) Rate of water development rapidly increases resulting in a rapid increase in the rate of economic development and eco-tourism which leads to higher per capita water use, increased standard of living, and decreased level of poverty.

Social

The cultural and spiritual values of water ranked consistently very important for all Tribes. These values also ranked consistently low on the uncertainty scale indicating highly important values that are not likely to change over time. Each Tribe and the Tribal members maintain their own relationship to water for religious, cultural and spiritual purposes. In general, Tribal societies uniformly revere water for its life-giving, life-sustaining properties. This goes beyond mere recognition of the role water plays in the physical processes of life. Further, they recognize that water is a finite resource. The cultural knowledge of the natural cycles of water relate to the Tribal identity and sense of place.

Governance

Resolution and Settlement of Tribal Water Rights Claims

(C1) Upper Basin: The rate of resolution and settlement of Tribal water rights claims moderately increases, providing some increase in the certainty of Tribal water supplies and opportunities for economic development as well as potential improvements in Tribal standard of living with some improved system wide understanding of Tribal delivery needs. However, the difficulty of obtaining implementation funding for Tribal water settlements prevents Tribes from realizing the full potential for economic development.

(C1) Lower Basin: Implementation of settled water rights moderately increases where federal and Tribal funding is moderately increased and development opportunities expand. However, the difficulty of obtaining implementation funding for decreed Tribal water rights prevents Tribes from realizing the full potential for economic development.

(C2) Upper Basin: The rate of resolution and settlement of Tribal water rights claims rapidly increases which leads to the ability to use Tribal water and greater certainty for the development of Tribal economies and improved system-wide understanding of Tribal delivery needs and decreases uncertainty for non-Tribal users which increases the understanding of water availability risks. Full Tribal water development results in a rapid increase in Tribal standard of living and more rapidly decreasing incidence and levels of poverty.

(C2) Lower Basin: Full implementation of settled water rights rapidly increases where federal and Tribal funding increases and development opportunities expand.

Flexibility in Utilization of Tribal Water

(C1) Increased flexibility in existing policies and regulations leads to gradual adoption of innovative development options such as water banking, water marketing, forbearance agreements and leasing which leads to increased utilization of Tribal water for off-reservation development and increased economic returns to Tribes. However, the slower resolution of Tribal claims prevents Tribes from realizing the full potential for economic growth.

(C2) The increased flexibility in existing policies and regulations leads to rapid adoption of innovative development options such as water banking, water marketing, forbearance

agreements and leasing. This increased flexibility leads to increased utilization of Tribal water for off-reservation development and increased economic returns to Tribes, while also providing options for non-Tribal users to access more reliable water supplies.

Water Administration Practices

(C1 and C2) Upper Basin: Increase in cooperation and coordination in state and Tribal water administration leads to less conflict and greater certainty in Tribal water rights and Tribal water development. Potential opportunities for innovative water development expand under these consistent and coordinated administration practices. However, varying water administration practices continue to prevent Tribes from realizing the full potential for economic development.

(C1 and C2) Lower Basin: Increase in cooperation and coordination in federal and Tribal water administration leads to less conflict and greater certainty in Tribal water rights and Tribal water development. Potential opportunities for innovative water development expand under these consistent and coordinated administration practices. However, varying water administration practices continue to prevent Tribes from realizing the full potential for economic development.

Expertise and Available Resources for Water Planning

(C1 and C2) Steady increase in Tribal expertise leads to an increase in Tribal water planning and development, providing support for the implementation of Tribal water settlements and increasing opportunities for Tribal economic growth.

Understanding of Tribal Reserved Water Rights

(C1 and C2) An increased understanding of Tribal reserved water rights leads to increased flexibility in basin water development, reduced conflict over supply and increased economic opportunities for on and off-reservation development.