

**Appendix 4B
Potential Ranges of
Key Influencing Factor Outcomes**



Appendix 4B – Potential Ranges of Key Influencing Factor Outcomes

(Finalized June 2016)

A full range of potential future outcomes for each key influencing factor is presented in Table 4B-A.

TABLE 4B-A Key Factors Influencing Future Tribal Water Development					
Influencing Factor Categories	TWS Critical Uncertainties Identified in Survey	Affected Water Use Category ¹	Description of Influencing Factors if Current Trends Continues	Plausible Low End of Range	Plausible High End of Range
Demographic	Changes in non-Indian populations adjacent to reservations [2]	AG: No DCMI: Yes (Lower Basin focus) ENV: Yes (Lower Basin focus) TRAN: No	DCMI: Steady growth along river corridors and gradual increase in demands for tribal water.	DCMI: No or slow growth in off-reservation population would leave demand steady.	DCMI: Rapid growth increasing demand, contamination, and environmental impact.
Land Use and Natural Systems	Changes in agricultural irrigation practices [4] <i>Description: This factor could include changes in the irrigation of agricultural lands by the adoption of new methods or technologies to improve the efficiency of irrigation systems when using water.</i>	AG: Yes (Lower Basin focus) DCMI: No ENV: Yes (Lower Basin focus) TRAN: Yes (Lower Basin focus)	AG: Current trend is for slow adoption of new irrigation methods or technologies, which may improve efficiencies.	AG: No change in AG irrigation practices.	AG: Aggressive adoption of more efficient methods or technologies leading to increased productivity and potentially making water available for additional uses.
	Changes in water quality (including those that are physical, biological, and chemical in nature) [6]	All	Slow deterioration of water quality throughout the Basin from contamination leading to more regulation of drinking water and increasing treatment costs and impacts to ecosystems.	Rapid deterioration of water quality throughout the Basin from concentrated contamination leading to more regulation of drinking water and increasing treatment costs and impacts to ecosystems.	Improved water quality throughout the Basin possibly increasing efficiencies and reducing treatment costs and impacts to ecosystems.

¹ AG – Irrigated Agriculture and Livestock; DCMI – Domestic, Commercial, Municipal, and Industrial; ENV – Environmental, Cultural, and Recreational; TRAN – Transfers, Leases, and Exchanges

TABLE 4B-A Key Factors Influencing Future Tribal Water Development					
Influencing Factor Categories	TWS Critical Uncertainties Identified in Survey	Affected Water Use Category ¹	Description of Influencing Factors if Current Trends Continues	Plausible Low End of Range	Plausible High End of Range
Infrastructure Development	<p>Changes in tribal financial resources available to expand Tribal housing and related infrastructure [9a]</p> <p><i>Description: This factor could include changes in Tribal housing and related municipal and domestic water delivery infrastructure serving users such as tribal members, schools, community centers, parks, etc.</i></p>	<p>AG: No DCMI: Yes ENV: No TRAN: No</p>	<p>DCMI: Tribes maintain current funding levels. Tribes maintain current tribal housing trends – development of tribal homelands increases gradually over time.</p>	<p>DCMI: Tribal funding stops. Development of tribal homelands decreases over time leading to an increase in multi-family housing and/or more families moving off reservation for housing.</p>	<p>DCMI: Tribal funding increases. More housing projects funded. Rate of tribal water development increases as tribal homelands develop to provide more tribal housing and allowing an increased standard of living and higher per capita water use.</p>
	<p>Changes in federal financial resources available to expand Tribal housing and related infrastructure [9b]</p> <p><i>Description: This factor could include changes in Tribal housing and related municipal and domestic water delivery infrastructure serving users such as tribal members, schools, community centers, parks, etc.</i></p>	<p>AG: No DCMI: Yes ENV: No TRAN: No</p>	<p>DCMI: Federal financial resources continue to decline. Development of tribal homelands continues to decline and families move off reservation for housing.</p>	<p>DCMI: Federal funding stops. Development of tribal homelands declines at a faster rate leading to an increase in multi-family housing and/or more families moving off reservation for housing.</p>	<p>DCMI: Increase in federal funds. More housing projects funded. Rate of tribal water development increases as tribal homelands develop to provide more tribal housing and allowing an increased standard of living and higher per capita water use.</p>
	<p>Changes in tribal financial resources available to operate and maintain existing water delivery systems and storage for irrigation purposes (includes repairing, rehabilitation, and replacing agricultural and storage infrastructure) [10a]</p> <p><i>Description: This factor could include influences such as the ability of the tribe to operate, maintain and improve on- and off-reservation irrigation and related water delivery systems, including storage facilities.</i></p>	<p>AG: Yes DCMI: No ENV: No TRAN: No</p>	<p>AG: Tribes maintain current funding levels for OMR. Tribes maintain current water use trends.</p>	<p>AG: Tribal funding decreases. Efficiencies and productivity decrease as systems decline.</p>	<p>AG: Tribal funding increases leading to increased efficiencies and productivity.</p>

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Influencing Factor Categories	TWS Critical Uncertainties Identified in Survey	Affected Water Use Category ¹	Description of Influencing Factors if Current Trends Continues	Plausible Low End of Range	Plausible High End of Range
Infrastructure Development	<p>Changes in federal financial resources available to operate and maintain existing water delivery systems and storage for irrigation purposes (includes repairing, rehabilitating, and replacing agricultural and storage infrastructure) [10b]</p> <p><i>Description: This factor could include influences such as the ability of the tribe to operate, maintain and improve on-and off reservation irrigation and related water delivery systems, including storage facilities.</i></p>	<p>AG: Yes DCMI: No ENV: No TRAN: No</p>	<p>AG: Federal funding levels continue to decline leading to a gradual deterioration of irrigation systems and efficiency.</p>	<p>AG: Federal funding stops leading to a deterioration of irrigation systems and a decrease in efficiency of water use leading to a potential decline in crop production.</p>	<p>AG: Federal funding increases and irrigation systems become more efficient leading to improved crop production.</p>
	<p>Changes in tribal financial resources available to construct new water delivery systems and storage for irrigation purposes [11a]</p> <p><i>Description: This factor could include influences such as the ability of the tribe to construct new on- and off-reservation irrigation and related water delivery systems including storage facilities</i></p>	<p>AG: Yes DCMI: No ENV: No TRAN: No</p>	<p>AG: Tribes maintain current funding levels for new construction. Tribes maintain current water use trends.</p>	<p>AG: Tribal funding decreases or remains at \$0. New construction activities remain stagnant or decline.</p>	<p>AG: Tribal funding increases leading to an increase in new construction activities, increase water use and crop production.</p>
	<p>Changes in federal financial resources available to construct new water delivery systems and storage for irrigation purposes [11b]</p> <p><i>Description: This factor could include influences such as the ability of the tribe to construct new on- and off-reservation irrigation and related water delivery systems including storage facilities</i></p>	<p>AG: Yes DCMI: No ENV: No TRAN: No</p>	<p>AG: Federal funding levels continue to decline leading to stagnant development.</p>	<p>AG: Federal funding stops leading to no new development.</p>	<p>AG: Federal funding levels increase leading to an increase in new construction activities, increase water use and crop production leading to robust development.</p>

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Influencing Factor Categories	TWS Critical Uncertainties Identified in Survey	Affected Water Use Category ¹	Description of Influencing Factors if Current Trends Continues	Plausible Low End of Range	Plausible High End of Range
Infrastructure Development	<p>Changes in tribal financial resources available to operate and maintain existing water delivery systems and storage for domestic and municipal purposes (includes repairing, rehabilitating, and replacing delivery, distribution, and storage infrastructure) [12a]</p> <p><i>Description: This factor could include influences such as the ability of the tribe to operate, maintain and improve on-and off reservation domestic and municipal delivery systems, including storage facilities.</i></p>	<p>AG: No DCMI: Yes ENV: No TRAN: No</p>	<p>DCMI: Tribes maintain current funding levels. Current tribal water development trends maintained.</p>	<p>DCMI: Tribes' funding decreases or remains at \$0. Deliveries decrease over time as systems deteriorate, emergency situations increase, reliance on private wells increases and per capita water use decreases.</p>	<p>DCMI: Tribes' funding increases. Deliveries increase and systems improve over time leading to higher per capita water use.</p>
	<p>Changes in tribal financial resources available to construct new water delivery systems and storage for domestic and municipal purposes [13a]</p> <p><i>Description: This factor could include influences such as the ability of the tribe to construct new domestic and municipal delivery systems, including storage facilities.</i></p>	<p>AG: No DCMI: Yes (Upper Basin focus) ENV: No TRAN: No</p>	<p>DCMI: Tribes maintain current funding levels. Current rate of tribal infrastructure projects and water development maintained.</p>	<p>DCMI: Reduction in tribal financial resources or remain at \$0; unable to fund water infrastructure projects. Reduced availability to safe and accessible water leading to decreased per capita water use, decreased standard of living, slower economic growth, and increased poverty.</p>	<p>DCMI: Increase in tribal financial resources; more water infrastructure projects funded. Rate of tribal water development increases leading to higher per capita water use, increased standard of living, higher economic growth, and decreased poverty.</p>
	<p>Changes in federal financial resources available to construct new water delivery systems and storage for domestic and municipal purposes [13b]</p> <p><i>Description: This factor could include influences such as the ability of the tribe to construct new domestic and municipal delivery systems, including storage facilities.</i></p>	<p>1) AG: No 2) DCMI: Yes (Lower Basin focus) 3) ENV: No 4) TRAN: No</p>	<p>2) DCMI: Federal financial resources continue to decline. Tribal water development trends continue to decline.</p>	<p>2) DCMI: Federal financial resources are stopped; unable to fund water infrastructure projects. Reduced availability to safe and accessible water leading to decreased per capita water use, decreased standard of living, slower economic growth, and increased poverty.</p>	<p>2) DCMI: Increase in federal financial resources; more water infrastructure projects funded. Rate of tribal water development increases leading to higher per capita water use, increased standard of living, higher economic growth, and decreased poverty.</p>

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Economic Development	Changes in water needs to support tribal economic development (e.g. eco and cultural tourism, commercial and business centers, etc.) [15]	1) AG: Yes 2) DCMI: Yes (varied by tribe) 3) ENV: Yes 4) TRAN: No	1) AG: 2) DCMI: 3) ENV: Current water needs maintained – economic development trend slightly up leading to a slow increase in per capita water use, standard of living, economic growth.	1) AG: 2) DCMI: 3) ENV: Current water needs maintained – economic development trend slightly up leading to a slow increase in per capita water use, standard of living, economic growth.	1) AG: 2) DCMI: 3) ENV: Rate of water development increases leading to higher water use, increased standard of living, higher economic growth, and decreased poverty.
Governance	Changes in tribal water availability and use due to the resolution and settlement of tribal water rights claims [19] <i>Description: This factor could include changes in the time it takes to complete Indian water settlements and in tribal member support for these settlements and water development plans.</i>	All (Upper Basin focus)	Current rate of progress in resolution and settlement of tribal water claims continues.	Decrease in rate of resolution and settlement of water right claims leaving tribes with uncertainty as to their ability to fully develop tribal economies.	Increase in rate of resolution and settlement of tribal water rights claims leaving tribes with more certainty as to their ability to fully develop tribal economies and improved system-wide understanding of delivery risks.
	Changes in the laws, policies, and/or regulations to provide increased flexibility to tribes to use tribal water [20] <i>Description: This factor could include changes to provide for increased use of water banking, water marketing, leasing, etc. and changes that further support and facilitate use of tribal water to support tribal economic development.</i>	All	Gradual increase in flexibility; current water development trends maintained.	Decreased flexibility in existing policies and regulations limits off-reservation use of tribal water leading to increased on-reservation tribal water use.	Increased flexibility in existing policies and regulations leads to innovative uses and increased off-reservation development of tribal water throughout Basin.

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Governance	<p>Changes in federal, state, and/or regional water administration practices [21]</p> <p><i>Description: This factor could include changes in the accounting of tribal water in the Colorado River System, and tracking and ensuring deliveries during all hydrologic conditions, and changes in the ability to ensure water is delivered to a specific entity or location.</i></p>	All (Upper Basin focus)	Current trends in administration of water use varies from stringent to minimal leading to challenges in coordinating administration among federal, state and tribal users and increased uncertainty and conflict.	Severe decrease in administration of water use leading to uncertainty in tribal water rights and increase in conflicts.	<p>Upper Basin: Increase in cooperation and coordination in state and tribal water administration leads to less conflict and certainty in tribal water rights.</p> <p>Lower Basin: Increase in cooperation and coordination in federal and tribal water administration leads to less conflict and certainty in tribal water rights.</p>
	<p>Changes in tribal expertise and resources available for tribal water use planning [22]</p> <p><i>Description: This factor could include changes in tribal economic and other resources for tribal water resources planning and management, changes in Congressional appropriations to support water use development and planning, and changes in cooperative efforts with State and regional non-Indian water development planning.</i></p>	All	Gradual increase in tribal expertise - gradual increase in tribal water planning and development.	Loss of tribal expertise; loss of federal funding to support tribal water resources planning - gradual decrease in tribal water planning and development.	More tribal expertise for water resources planning and management leads to faster increase in tribal water planning and development.
	<p>Changes in the understanding of tribal reserved water rights by Federal, State, other governmental agencies and the public at large (e.g. external education) [23]</p>	All	Current understanding is maintained leads to restricted water development.	Decreased understanding of tribal water rights leads to litigation and increased conflict.	Increased understanding of tribal reserved water rights leads to increased flexibility in Basin water development and use.