

Appendix 6A
Methodology for Conducting San Juan
Sub-basin Historical Shortage Analysis



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The following methodology was used to estimate shortages under current and full tribal entitlement depletions in the San Juan sub-basin in Colorado for the Tribal Water Study. The State of Colorado’s water resources planning model StateMod, developed as part of the Colorado Decision Support System, was used to represent the current water uses and water rights in Colorado (Colorado Water Conservation Board, 2017). StateMod is a water allocation model which determines availability of water to individual user demands and projects based on hydrology, water rights, and operational rules and practices.

StateMod’s “historical” San Juan model data set, representing historical diversions and uses for the 1909 through 2013 hydrologic period, has been calibrated to confirm that the model adequately represents Colorado water administration, project operations, and water use practices. StateMod’s “baseline” data set represents current uses and water rights as if they had been in place for the full 1909 through 2013 hydrologic study period. Current Southern Ute Indian Tribe and Ute Mountain Ute Tribe water uses are represented in the baseline model data based on their actual diversion location, irrigation water requirements, and water rights. Depletions and shortages are an output from the model simulation. Current depletions and shortages for both tribal and non-tribal water users were reported from the model output for the representative hydrologic years 2008 and 2012. The calibrated historical model, baseline model inputs, and results are presented in the San Juan/Dolores River Basin Water Resources Planning Model User’s Manual, July 2016.

A “full tribal use” model was developed for the Tribal Water Study that included increased demands representing full use of the Southern Ute Indian Tribe’s and Ute Mountain Ute Tribe’s reserved water rights, with limitations based on their Consent Decrees. The non-tribal water demands were not changed from the baseline data set. Current depletions and shortages for both tribal and non-tribal water users were reported from the model output for the representative hydrologic years 2008 and 2012. Water uses under the Animas-La Plata Project are not represented in StateMod. These uses were added for the purposes of the Tribal Water Study analysis and full tribal depletion entitlements were assumed to be always met.