



# 8 | Study Limitations

## 8.0 Introduction

Although the technical approach of the Tribal Water Study was based on the best science and information available, as with all studies, there were limitations related to timeframes and resource constraints. The detail at which results are reported or the depth to which analyses were performed was also limited by the availability of data and the capability of existing models. However, these limitations present opportunities for additional research and development to improve available data, which may be pursued by Partnership Tribes and other interested parties as follow-up to or independent of the Tribal Water Study.

### 8.1 Ability to Assess Current Tribal Water Use

The availability of data related to current water use varies among the Partnership Tribes. For Partnership Tribes in the Lower Basin, Reclamation relied on recent annual records of diversions, returns and consumptive use data compiled in the annual *Colorado River Accounting and Water Use Reports: Arizona, California, and Nevada* (Reclamation, 2017). In the Upper Basin, water use is accounted for by each state. In some states, Indian water use accounting is conducted by BIA, particularly on federal Indian irrigation projects. Without a coordinated administration system, water use data are sometimes inconsistent or even nonexistent, particularly on tributaries, which often lack adequate stream gaging. This meant the Upper Basin Partnership Tribes had to rely on multiple sources for their water use data, including internal technical assessments used to develop consumptive use estimates.

The remoteness of some of the Partnership Tribes' reservations and the complexity of their water systems are two other factors that greatly affected the quality of the water use data. Most water administration still relies heavily on in-person site visits to record measurements and ensure the calibration of measurement devices. It is often not possible to visit remote sites with the frequency desired, leading to data that can still provide a reliable record of use, but lacks detail. For the purposes of the Tribal Water Study, each Partnership Tribe assessed its available data with input from local water managers and utility operators to determine current water use with as much accuracy as circumstances would allow. Because of the differences in the availability and reliability of use data, some Partnership Tribes chose to represent current water use by averaging use over a recent 5-year period. For others, a single recent representative year was selected. Although this methodology does not provide a lengthy historical record of tribal water use, it nonetheless is a good snapshot of recent water use, by sector, for each Partnership Tribe and advances the understanding of tribal water use in the Basin.

### 8.2 Ability to Assess Future Tribal Water Development and Effects on Colorado River Water Availability

The Partnership Tribes intend to make full use of their federal Indian reserved water rights (most of which are senior priority water rights) and have, or are in the process of, developing and implementing tribal water development plans. One of the objectives of the Tribal Water Study

was to project future tribal water development and use through the year 2060 in order to provide other water users in the Basin with a better understanding of and more certainty about the future availability of Colorado River water with the full development of federal Indian reserved water rights. However, the ability to assess the effects on Colorado River water availability from the future development of tribal water was limited by the spatial resolution of Reclamation's Colorado River Simulation System (CRSS)<sup>1</sup>, as discussed more thoroughly in *Chapter 6 – Assessment of System Effects Resulting from Development of Tribal Water*. The information provided by the Partnership Tribes accounted for water use on a much finer spatial resolution than is currently represented in CRSS. Therefore, the locations of tribal diversions within CRSS are estimated. This effort may provide an opportunity for future refinement of CRSS, and, as noted above, post-Study efforts to improve understanding of the specific areas of the Basin likely to experience those effects.

In addition, in the Upper Basin, Reclamation's CRSS model does not simulate the complex individual state water rights administration systems that would be needed to model shortages to individual water rights holders. In order to address whether the Partnership Tribes' unused federal Indian reserved water rights are used by other water users, CRSS would need to have water accounting abilities. CRSS is not a water accounting model, and therefore is not able to track senior priority federal Indian reserved water rights of the Partnership Tribes and their use on a per-user basis. Consequently, the ability to identify effects on a per-user basis was limited and results for the Upper Basin are reported at a sub-basin level. In the Lower Basin, CRSS does track shortages to individual water rights holders. However, uncertainties exist regarding its ability to accurately model operations at Lake Powell and Lake Mead if Lake Mead reaches elevation 1,025 feet, triggering consultation regarding water deliveries per the *Record of Decision for Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead* (DOI, 2007). Given this uncertainty, and to maintain a commensurate level of detail with reporting in the Upper Basin, impacts to users in the Lower Basin are reported at a Lower Basin level in this report.

Despite these limitations, the assessment of future tribal water development provides a plausible indicator of the effect of tribal water use on the water supply of the Colorado River. The assessment provides a useful advancement of Colorado River System knowledge for future planning efforts and for consideration when addressing future Colorado River water challenges.

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<sup>1</sup> CRSS was the primary modeling tool used in the Tribal Water Study. It simulates the operation of the major Colorado River System reservoirs on a monthly time step and provides information regarding the projected state of the System in terms of output variables.