



## CCRS Perspectives:

# Maps Matter: A few suggested changes to the Colorado River basin base map

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Reclamation's landmark report, *Colorado River Basin Water Supply and Demand Study*, released in December 2012, included a base map (Figure 1) that's been reproduced in many papers and used as an image in countless presentations during the past decade. This map clearly delineated the watershed boundary in the United States and the metropolitan and agricultural areas outside of the watershed that are served by the Colorado River in the U.S. The map is clear, easy to read, and depicts many of the key features of the infrastructure by which the Colorado River is managed. It is no wonder that it is so widely used.

Maps are reflections of our understanding of social and political interactions. Because reality is infinitely complex, any map is unavoidably a simplification of the Earth's surface, and each cartographer must decide what to include and what not to include. The implications of the need to simplify reality and the need to make decisions about what information to depict on a map has been discussed in an abundant literature including Jeremy Black's book *Maps and Politics*, published in 1997. Denis Wood included a chapter 'Every Map Shows This ... But Not That' in his book *The Power of Maps*, published in 1992.

The growing interest in bi-national sharing of the Colorado River inspired Reclamation to revise its watershed map a few years ago to depict parts of the watershed in Mexico (Figure 2). In 2011, Michael Cohen provided a more inclusive revision of this map that fully depicted the former delta of the Colorado River, and this map was included in Cohen's report *Municipal Deliveries of Colorado River Basin Water* published by the Pacific Institute.

Figure 1. (Top) Map of the Colorado River watershed, as depicted by Reclamation (2012).

Figure 2. (Bottom) Revised map of the Colorado River watershed that includes part of the watershed in Mexico, as depicted by Reclamation.





We endorse Cohen’s suggestion to more inclusively depict the area of the former Colorado River delta, and we suggest that the base map be revised to depict important out-of-basin urban service areas in Mexico. These changes in the base map (Figure 3) have the potential to inspire us to think more broadly about the past, present, and future of the river.

The Aqueduct Rio Colorado-Tijuana delivers ~90% of the water supply of Mexico’s second largest city – Tijuana –

as well as the city of Tecate, the community of Playas de Rosarita, and nearby areas. These areas should be added to the base map.

We also suggest that the entire area of the former Colorado River delta be delineated, because the land surface, the sediments, and the water of these areas were, are, and will

Figure 3. Revised map of the Colorado River watershed, proposed by the Center for Colorado River Studies.





always be part of the Colorado River. Today, the delta area has been extensively confined in levees and is completely dewatered in much of its extent. Much of the former delta is now the rich and productive agricultural areas of the Yuma, Imperial, Coachella, and Mexicali Valleys. Despite the transformation of these areas into a region of immense agricultural productivity, the U. S. and Mexico and their partner stakeholders are committed to creating and maintaining new, ecologically useful delta ecosystems that can be sustainably maintained under modern hydrologic conditions. Depicting the full extent of the delta would remind us of what the delta once was, and identify the entire region where modern environmental mitigation might occur.

There might be uncertainty or disagreement about how to define the area of the former delta, especially since the extent of levee confinement and land leveling is large. An objective source to define the geography of the former

delta is Godfrey Sykes' definitive book, *The Colorado Delta*, jointly published in 1937 by the Carnegie Institution of Washington and the American Geographical Society of New York. Plate I of this book, labeled *Map of the Colorado Delta region in 1933* (Figure 4), traces the outline of the "approximate limit of the alluvial basin." The city of Mexicali, the 18<sup>th</sup> largest city in Mexico, is within the boundaries of the former delta, and thus should *not* be shown as an out-of-basin service area on reference maps.

This map is the definitive rendering of the full extent of the delta. The publishers described the purpose of Plate I:

*The map, which was compiled by the American Geographical Society, is intended to bring to the fore the alluvial basin of the Colorado Delta as a physical unit, regardless of its political division between two countries.*

Sykes (1937) described the extent of the delta:

*The Colorado Delta ... is an area of approximately 3,325 square miles, of which the predominant surface constituent is the detrital matters transported there by the waters of the Colorado. ... though somewhat irregular in outline, it takes the general form of a widely extended letter T with a broad short stem. The full spread of the two arms of the figure is nearly 200 miles, and its height, in a direction perpendicular to this major dimension, approximately 70 miles.*

*The "stem" constitutes the receiving bay and contains, almost axially, the crest of the flattened deltaic semi-cone and the present termination of the true channel of the Colorado. The right-hand, or northwesterly, arm of the T extends, with generally downward grades, to a level of about minus 275 feet in the bottom of the Salton depression, rising thence again approximately to sea level at the extremity of the arm (here known as the Coachella Valley) and the limit of the alluvial area. The left-hand, or southeasterly, arm is very irregular in outline and tripartite in form, extending down both shores of the Gulf of California and embracing another basin (the Macuata, or Laguna Salada, Basin) which also drops to slightly below sea level at its deepest point. Although physiographically a true portion of the deltaic area, this 'bolson,' or interior basin, is partially separated from it by the long "peninsula" formed by the Cocopa Mountains, by the volcanic outlier of the Cerro Prieto, and by their common encircling fringe of bajadas, or piedmont slopes*

*... its marginal line is at nearly all points quite discernible.*

Although restoration of the delta to its condition in the late 1800s is impossible, it is useful to consider the entire watershed when considering the dual challenges of distributing a declining water supply to the many users of the river and in considering how to mitigate, rehabilitate, and restore lost ecosystems. Inclusion of key service areas sustained by the Colorado River in Mexico reminds us of the importance of this water supply to the citizens of both countries.

[Access digital version of map with proposed revisions.](#)

Figure 4. *Map of the Colorado Delta as depicted by Sykes (1937).*

