Formation of California's Salton Sea in 1905–07 was not "accidental"

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ABSTRACT—It is widely thought that the Salton Sea was created accidentally in 1905–07 because of engineering negligence in the diversion of Colorado River water for agricultural use in California's Imperial Valley. This is a misconception. Scientific data and historical records establish that formation of the Salton Sea was not accidental. The lake formed during 1905–07 in the same manner that numerous other large Salton Basin lakes did for at least tens of thousands of years from the Late Pleistocene through the late 19th century: as a result of the lower Colorado River's natural hydrodynamic regime, floodplain morphodynamics, and established avulsion style in combination with changes in streamflow attributable to regional hydroclimate. A large body of scientific and historical evidence indicates the 1905–07 Colorado River flooding into the Salton Basin and the creation of a large lake there would have occurred regardless of man-made modifications to the river's natural levee and distributary channels. In fact, the flooding would likely have been even worse in the absence of human intervention.

Introduction—the creation flood

For over 100 years it has been widely accepted that the Salton Sea, California's largest lake, was created accidentally in 1905–07 within an otherwise desiccated desert basin (e.g., Nijhuis, 2000; Barringer, 2014) as the result of engineering negligence by the California Development Company (CDC) as it struggled to keep irrigation water flowing from the lower Colorado River into the fledgling agricultural community of the Imperial Valley within the Salton Basin (Figure 1). The first diversion point for moving Colorado River water into the Imperial Valley ("Heading No. 1" on Figure 2) was constructed beginning in 1900 about 500 m north of the US–Mexico border. The opening from the lower Colorado River into the company's diversion canal was cut out of the river's natural western levee at an oblique angle, and flow into the main course of the canal was controlled by a wooden headgate placed a few hundred feet from the river bank down the canal (Grunsky, 1907). Below the headgate the canal connected to one of the Colorado River's natural delta distributary channels, the Alamo River, which was then dry. Diversion of water began in June 1901, and soon the river's heavy load of silt began to repeatedly obstruct the headgate and canal. As a consequence, water shortages in the Imperial Valley agricultural area began occurring in 1902 and continued through 1903 and into 1904, putting tremendous pressure on the CDC to fix the problems.

Eventually, in the fall of 1904, the company resorted to making two unprotected cuts into the river's natural levee farther south in an attempt to achieve reliable diversion of river water into the canal and onward into the Imperial



Figure 1. Overview map. (1) Colorado River; (2) Gila River; (3) Yuma, AZ; (4) approximate path of the modern, controlled Colorado River's channel through the lower delta (where the channel is mostly dry today); (5) lower delta region below the crest; (6) Imperial Valley in the Salton Basin; (7) Salton Sea.