

MEMORANDUM

December 1, 2025

TO: Delta Independent Science Board (DISB)
Via email: disb@deltacouncil.ca.gov

FROM: Gilbert Cosio, River Delta Consulting

SUBJECT: Comments to the 10/10/25 Draft “Science to Inform Management of Subsidized Lands in the Sacramento-San Joaquin Delta”

DISB:

Thank you for the opportunity to comment on the 10/10/2025 draft of “Science to Inform Management of Subsidized Lands in the Sacramento-San Joaquin Delta”. I’m limiting my comments to pages 1-22 which summarize the background, findings and recommendations.

GENERAL COMMENT

In general, the document does not clearly define where subsidence has occurred, and where it is continuing. In fact, there are a number of confusing numbers. On page 19, in the last paragraph on the page, it is suggested that the Delta has 750,000 acres of former tidal wetlands. On page 22, it is stated that the Delta was the largest estuary on the west coast of North America, occupying 420,000 acres. At the bottom of page 22, it is noted that 247,000 acres are deeply subsided (-10 to -30-feet below sea level). The exact number is not that critical, but I believe that many people think that the entire Delta (approximately 750,000 acres) is subsiding, or has subsided. The actual number and location of the acreage of concern should be investigated further.

In reality, much of the Delta is above the tidal range and may have never been in a state of subsidence. Attached is a 1976 organic isopach map of the Delta. It was produced by DWR using nearly 1000 borings along levees which were developed as part of the 1956 Delta Salinity Barrier Study. We have found during the many geotechnical studies that have been performed that this map is very accurate in describing the depth of peat on which levees were built. Note that much of the Delta is not colored, indicating that no peat has ever existed.

From my experience, it is apparent that the area noted as consisting of 0-10 feet of peat is no longer experiencing subsidence. We have compared the land elevations from LiDAR surveys of 2007 and 2017 and the contour of -10-feet NGVD very much matches the -10-foot contour from

the 1980 photo revised USGS quadrangle maps. I understand a LiDAR survey has recently been completed, so it will be interesting to compare the new survey elevations to prior surveys. This comparison should indicate the areas of priority to halt subsidence.

SPECIFIC COMMENTS

Page 3, Second paragraph

The paper cites varying levels of future sea level rise. Do these match the data used by the Delta Stewardship Council in its vulnerability report and adaptation plan? If so, would it be beneficial to describe the effect of these sea level ranges on the Delta, and the flood levels when increased flow due to climate change are included?

Page 3, Third paragraph

Describing subsidence within 500-feet of levees as the area potentially affecting levees is appreciated. This area has been known as the Zone of Influence in reports such as CALFED Record of Decision. Many studies do not clearly explain that subsidence outside of this zone of influence does not have a structural effect on levees.

Page 6, First paragraph under the Heading Subsided Land Management and Research

Another form of land management that should be considered is construction of toe berms along levees. In addition to stabilizing levees, toe berms cap the peat dirt and prevent it from oxidation.

Page 9, First paragraph under the Recommendations heading

This paragraph lists additional research that is needed in the future to better understand subsidence and its management. In particular, the paragraph discusses primary and secondary consolidation and organic soil density. These parameters are very important if anyone assumes levee stabilization by subsidence reversal. First, it will help better define the time frame needed to develop soil weight and soil strength that could stabilize levees. Toe berms are a very effective way to stabilize levees, but they involve mineral soil fill that weighs an average of 110 pounds per cubic foot (pcf). By comparison, dry peat weighs about 8 pcf, and saturated it is about 70 pcf. As you might imagine, it would take a very thick layer of peat to replicate a toe berm. Generating this amount will take many, many years.

Page 18, First full paragraph

Care should be taken when using Deverel et al, 2015 as a reference. In reviewing this document in 2015, I noted that much of the acres changing to non-farmable between 1984 and 2012 were mischaracterized since the land was taken out of production not because of subsidence and seepage, but was taken out of production due to other events, most of these events were manmade. Attached is a letter I drafted in September 2015 to the editor of the San Francisco Estuary and Watershed Science explaining that I have personal knowledge of wetlands appearing as non-farmable wetlands that were not made into a wetland due to subsidence. The general actions that turned property into wetlands included habitat development, levee breach blowout ponds and scour, and borrow pits for levee material. In one case, the Isleton sewer ponds are listed as non-farmable due to subsidence.

Page 22, Under the Section Background, Second paragraph

The first sentence of this paragraph describes the 1880's as the beginning of agricultural interests draining the wetland islands of the Delta for agriculture to feed humans. In John Thompson's 1957 PhD dissertation, he describes levee construction picking up in the 1850's (The Settlement Geography of the Sacramento-San Joaquin Delta, California). In fact, Union Island and Grand

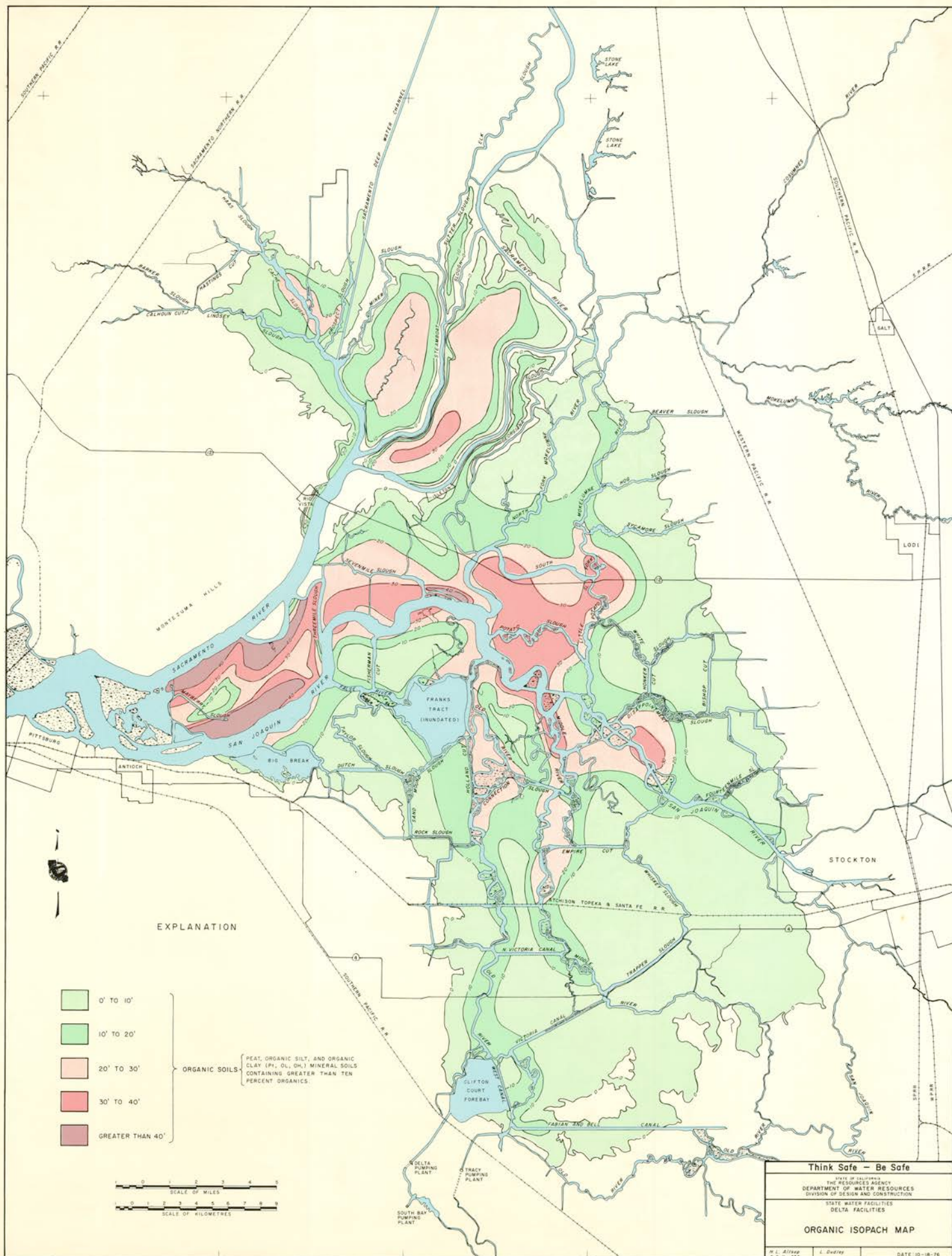
Island became reclamation districts in the early 1860's. The development of the clamshell dredge in the 1880's made it much easier to build levees, so maybe that is where the confusion arises.

Thanks again for the opportunity to provide these comments. If you have any questions, or would like additional information, please send me an email at gcosio@river-deltaconsulting.com, or call me at (916) 761-1282.

Thank you,

A handwritten signature in black ink, appearing to read 'Gilbert Cosio, Jr.', with a stylized flourish at the end.

Gilbert Cosio, Jr.





Water Resources ♦ Flood Control ♦ Water Rights

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September 4, 2015

Via email: snluoma@ucdavis.edu

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Subject: Comments concerning the paper "Evolution of Arability and Land Use, Sacramento-San Joaquin Delta, California"

Dear Dr. Luoma:

Provided below are comments on the above paper published in the July 2015 edition of your journal (Volume 3, Issue 2, 2015). The paper estimates the increase in acreage of wet, non-farmable, and marginally farmable (WNMF) land between 1984 and 2012. The authors then hypothesize that this increase is due to subsidence of organic soils, and the subsequent seepage through the exposed substrate. The paper then estimates the increased acreage of WNMF into the future. The paper also indicates that a similar phenomenon causes land use to change from production farming to grazing.

Our firm has been involved with Delta islands for over 40 years. I personally have been involved for 32 years. Currently we are the engineer for 31 Delta reclamation districts. In the role of District Engineer, we provide services in the areas of flood control, drainage and irrigation. Most of our work is in the central and north Delta, and since we assist with drainage, we are well aware of the issues of farming on ground where seepage could be an issue.

Based on our experience and knowledge of the farm ground within the reclamation districts we represent, we have found that most of the current WNMF acreage cited in this paper is not the result of subsidence and seepage. The attached map, an excerpt from the paper, shows the reason the properties shown are not farmed. There are a number of reasons each of these properties are not farmed, which are summarized in the following general categories.

Scour – When a levee breaches and floods an island, in most cases the force of the water flowing onto the island scours away farm ground. In some cases this scour is large enough to render restoration of the property infeasible. What then remains is a lake surrounded by riparian forest and scrub shrub habitat.

Habitat – This category is indicated on the map for properties that have been deliberately developed into habitat areas. This category includes private habitat development, habitat developed as part of state and federal easement purchases, and mitigation areas. These areas were not developed into habitat due to the inability to farm; in fact, the properties neighboring these properties continue to be very productive. For instance, a property on Empire Tract is surrounded by walnuts, blueberries, alfalfa, and row crops.

Borrow – Delta levees have been significantly upgraded the past 25 years, and especially the last nine years since passage of Propositions 84 and 1E. The least expensive source of levee material is that which is located on the island. Therefore borrow pits have been developed on many islands to supply the needs of levee rehabilitation projects. Most of the time material is excavated below the water table, and the property develops into a lake surrounded by riparian habitat.

Other – This category includes a number of other reasons ground is no longer farmed. Included in this category are things such as the City of Isleton sewer ponds; the Grand Island Corps of Engineers dredge disposal area; Prospect Island, which the landowners have never fully reclaimed since it flooded in 1995; and historic lakebeds that have never been farmed.

The attached map shows the WNMF ground we are aware of that is not farmed for one of the above four categorized reasons. A little investigation into the remaining WNMF ground would yield additional ground not farmed for reasons other than seepage.

The paper also cites seepage as the reason some farm ground has shifted use from field crops to pasture. We also think this assumption should be further investigated. In our experience, the shift most likely occurred due to water quality and the buildup of salts in the soils. For instance, most of the Sherman Island property was purchased by the state due to the inability to maintain water quality as agreed in the state contract with the North Delta Water Agency (NDWA). The state was faced with having to build the “overland facilities” as defined in the NDWA contract. It was cheaper for the state to purchase land than construct the overland facilities. Once enough property on Sherman Island was purchased, a petition was filed to move the NDWA contract compliance point from Emmaton up to Threemile Slough, thus alleviating the state commitment to provide suitable-quality water to Sherman Island. One last comment on pasture land: the paper indicates pasture land on Empire Tract has increased between 1976 and 2007. I have spent a lot of time on Empire Tract since 1984 and there is no pasture land on Empire Tract.

To summarize, the paper should have spent more time investigating the properties in question before applying its theory.

Thank you for the opportunity to provide these comments. If you have any questions, please call me at (916) 456-4400, or email me at cosio@mbkengineers.com.

Sincerely,
MBK ENGINEERS

A handwritten signature in blue ink, appearing to read 'Gilbert Cosio Jr.', with a stylized flourish at the end.

Gilbert Cosio Jr.

GC/jw

2526/DR SAMUEL LUOMA 09-04-2015

cc: (via email)

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Metropolitan Water District
c/o Mr. Randall Neudeck
U.S. Department of Agriculture
Dr. Steve Deverel, HydroFocus
Ms. Sandra Bachard, Tetra Tech
Mr. Randy Fiorini, Delta Stewardship Council
Ms. Cindy Messer, Delta Stewardship Council
Mr. Campbell Ingram, Delta Conservancy
Mr. Erik Vink, Delta Protection Commission
Ms. Leslie Gallagher, California Central Valley Flood Protection Board

