

Technical Memorandum

To: Jeff Twitchell

From: Chris Ferrari

Date: August 5, 2019

Re: East Walnut Grove Delta Legacy Community - Water Surface Elevation Differences between 2016 FEMA BFE Values and CVFED Hydraulic Model Values with Delta Cross Channel Gates Opened or Closed

The purpose of this technical memorandum (TM) is to provide the 100-year water surface elevation results from the Central Valley Flood Evaluation and Delineation (CVFED) hydraulic models and the Sacramento County North Delta hydraulic model for the waterways bordering East Walnut Grove. The bordering waterways are the Lower Sacramento River, Georgiana Slough, Snodgrass Slough, and the Delta Cross Channel. The computed water surface elevations were compared to the USACE 1957 design profiles/flows and the effective 2016 Federal Emergency Management Agency (FEMA) Base Flood Elevations (BFEs) in both National Geodetic Vertical Datum (NGVD) 1929 and National American Vertical Datum (NAVD) 1988 datum.

Figure 1 presents the hydraulic model cross sections and stationing corresponding to the profile summary tables provided herein. Also circled on Figure 1 are the existing Delta Cross Channel Gates located north and upstream of East Walnut Grove. When the subject gates are opened and operated by the United States Bureau of Reclamation (USBR) they allow flows from the Sacramento River to enter the Delta Cross Channel and flow southeasterly into the North Fork of the Mokelumne River and eventually towards the South Delta pumps near Tracy. The USBR Delta Cross Channel Gates are normally operational and open during lower-flow seasonal conditions (late spring through early fall) and are normally closed during high-flow seasonal conditions, particularly when flows in the Sacramento River near Locke are greater than 20,000 to 25,000 cfs. To model high flow and high-water stage conditions in the North Delta the CVFED hydraulic model was deployed by GEI assuming the Delta Cross Channel Gates separating the Sacramento River from the Delta Cross Canal were closed, therefore, no flows were diverted from the Sacramento River in the Cross Channel.

Consistent with the State Water Resources Control Board (SWRCB) Decision 1641 (March 2000) and the California Department of Water Resources (DWR) Delta Flood Emergency Management Plan – Supplement A (October 2018) the Delta Cross Channel Gates normally remain closed during the typical flood season from November 1st through May 20th every year and any time the flows in the Sacramento River at Locke are greater than 20,000 to 25,000 cfs.

Tables 1, 2, 3 and 4 included herein present the comparison between the CVFED and the 2016 FEMA BFEs. Note the FEMA BFEs (88 datum) are approximately 2.0 to 2.4 feet lower in the Sacramento River and Georgiana Slough downstream of the Delta Cross Channel compared to the CVFED model results, but the FEMA BFEs are approximately 3.3 to 3.7 ft. higher in the Delta Cross Channel compared to the CVFED models. Therefore, it appears the FEMA BFE results are assuming the Delta Cross Channel Gates are open and flows from the Sacramento River are diverted into the Delta Cross Canal. Unfortunately the FEMA Flood Insurance Study (FIS) information does not provide any documentation how the results were developed.

The FEMA FIS documentation has been requested by GEI to determine how the BFEs were developed. In the interim, Sacramento County may want to contact FEMA to further evaluate peak flood stages in Snodgrass Slough with the Delta Cross Channel Gates normally closed during the peak flood season of November 1st through May 20th and anytime when the flows in the Sacramento River at Locke are greater than 20,000 to 25,000 cfs.

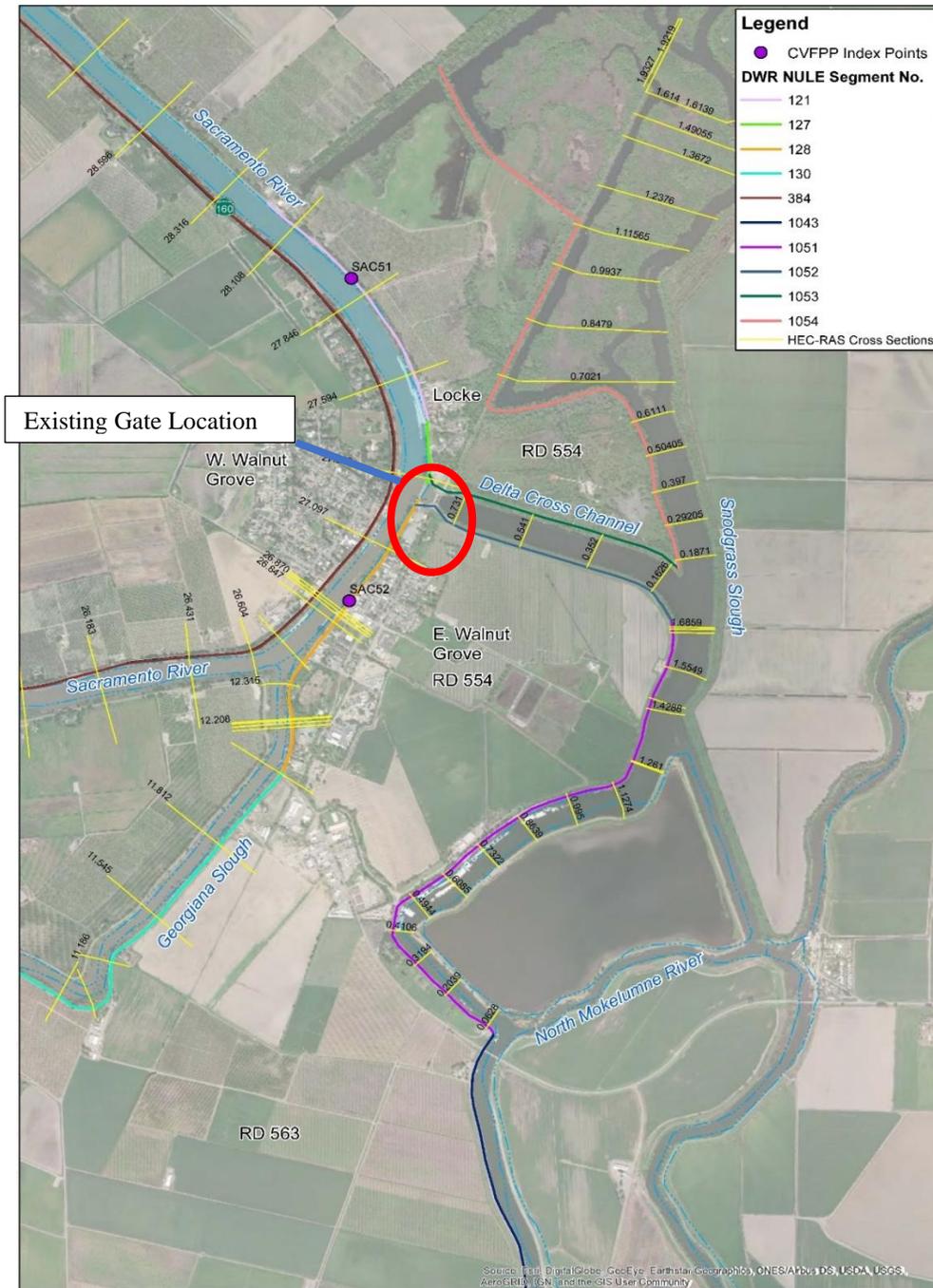


Figure 1: East Walnut Grove CVFED Cross-Section & NULE Reach Map

Table 1:
2016 FEMA FIS vs. Current CVFED Model WSE – Sacramento River at East Walnut Grove
(from Delta Cross Channel to Georgiana Slough)

Sacramento River Stations	2016 FEMA FIS: 100-yr WSE		DWR CVFED 100-yr WSE	1957 Design WSE	
	mile	ft, NGVD 29	ft, NAVD 88	ft, NAVD 88	
SAC_R06_27.097		13.57	16.00	18.22	16.77
SAC_R06_26.888		13.57	16.00	18.30	16.63
SAC_R06_26.879		13.57	16.00	18.34	16.62
SAC_R06_26.87		13.57	16.00	18.32	16.61
SAC_R06_26.847		13.57	16.00	18.26	16.60
SAC_R06_26.712		13.57	16.00	18.11	16.60

Table 2:
2016 FEMA FIS vs. Current CVFED Model WSE – Georgiana Slough at East Walnut Grove
(Sacramento River at Walnut Grove to 1.2 miles downstream, btwn Tyler and Upper Andrus)

Georgiana Slough River Station	2016 FEMA FIS: 100-yr WSE		DWR CVFED 100-yr WSE	1957 Design WSE	
	mile	ft, NGVD 29	ft, NAVD 88	ft, NAVD 88	
GEO_R01_12.315		13.57	16.00	18.07	16.89
GEO_R01_12.211		13.48	15.91	18.05	16.84
GEO_R01_12.208		13.39	15.82	18.06	16.84
GEO_R01_12.198		13.30	15.73	18.03	16.83
GEO_R01_12.187		13.21	15.64	18.02	16.83
GEO_R01_12.07		13.12	15.55	17.93	16.76
GEO_R01_11.812		13.02	15.45	17.77	16.61
GEO_R01_11.545		12.93	15.36	17.63	16.46
GEO_R01_11.348		12.84	15.27	17.63	16.35
GEO_R01_11.249		12.75	15.18	17.60	16.29

Table 3:

2016 FEMA FIS vs. Current CVFED Model WSE – Snodgrass Slough at East Walnut Grove
(from Delta Cross Channel to North Fork Mokelumne River)

Snodgrass River Station	2016 FEMA FIS: 100-yr WSE		DWR CVFED 100-yr WSE	1957 Design WSE	
	mile	ft, NGVD 29	ft, NAVD 88	ft, NAVD 88	
SNOG_R2_1.6859		14.57	17.00	13.44	N/A – (Non-Project Levee)
SNOG_R2_1.6804		14.57	17.00	13.44	N/A – (Non-Project Levee)
SNOG_R2_1.6701		14.57	17.00	13.43	N/A – (Non-Project Levee)
SNOG_R2_1.5549		14.57	17.00	13.41	N/A – (Non-Project Levee)
SNOG_R2_1.4515		14.57	17.00	13.33	N/A – (Non-Project Levee)
SNOG_R2_1.4288		14.57	17.00	13.33	N/A – (Non-Project Levee)
SNOG_R1_1.265		14.57	17.00	13.33	N/A – (Non-Project Levee)
SNOG_R1_1.261		14.57	17.00	13.32	N/A – (Non-Project Levee)
SNOG_R1_1.1274		14.57	17.00	13.31	N/A – (Non-Project Levee)
SNOG_R1_0.995		14.57	17.00	13.25	N/A – (Non-Project Levee)
SNOG_R1_0.8639		14.24	16.67	13.20	N/A – (Non-Project Levee)
SNOG_R1_0.7322		13.90	16.33	13.16	N/A – (Non-Project Levee)
SNOG_R1_0.6085		13.57	16.00	13.09	N/A – (Non-Project Levee)
SNOG_R1_0.4944		13.24	15.67	13.06	N/A – (Non-Project Levee)
SNOG_R1_0.4106		12.90	15.33	12.97	N/A – (Non-Project Levee)
SNOG_R1_0.3194		12.57	15.00	12.86	N/A – (Non-Project Levee)
SNOG_R1_0.2039		12.07	14.50	12.78	N/A – (Non-Project Levee)
SNOG_R1_0.0628		11.57	14.00	12.72	N/A – (Non-Project Levee)

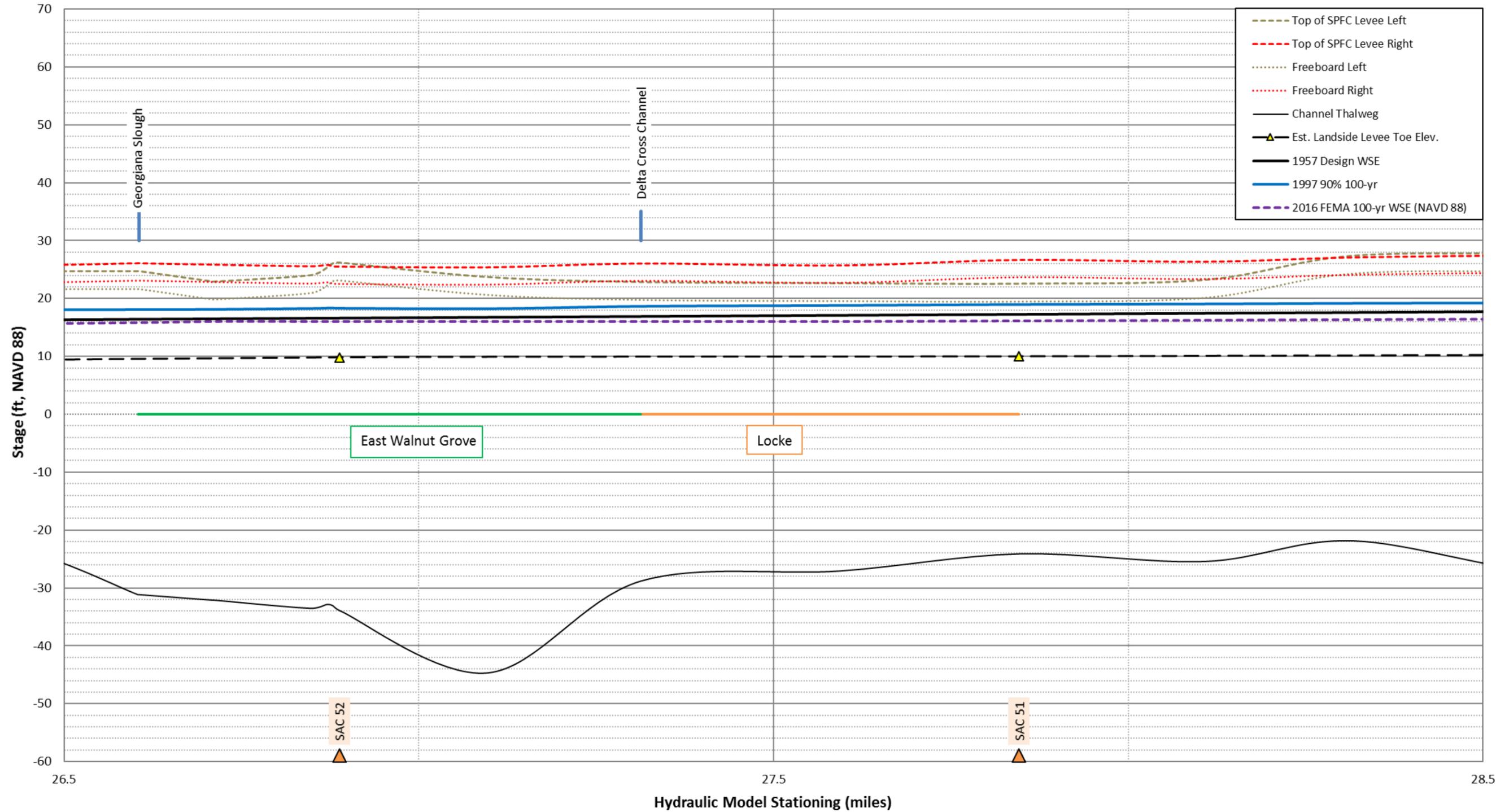
Table 4:

2016 FEMA FIS vs. Current CVFED Model WSE – Delta Cross Channel at East Walnut Grove
(from Sacramento River Cross Channel Gates to Snodgrass Slough)

Delta Cross River Station	2016 FEMA FIS: 100-yr WSE		DWR CVFED 100-yr WSE	1957 Design WSE	
	mile	ft, NGVD 29	ft, NAVD 88	ft, NAVD 88	
DCC_0.731		14.57	17.00	13.44	N/A – (Non-Project Levee)
DCC_0.541		14.57	17.00	13.44	N/A – (Non-Project Levee)
DCC_0.352		14.57	17.00	13.44	N/A – (Non-Project Levee)
DCC_0.1626		14.57	17.00	13.44	N/A – (Non-Project Levee)

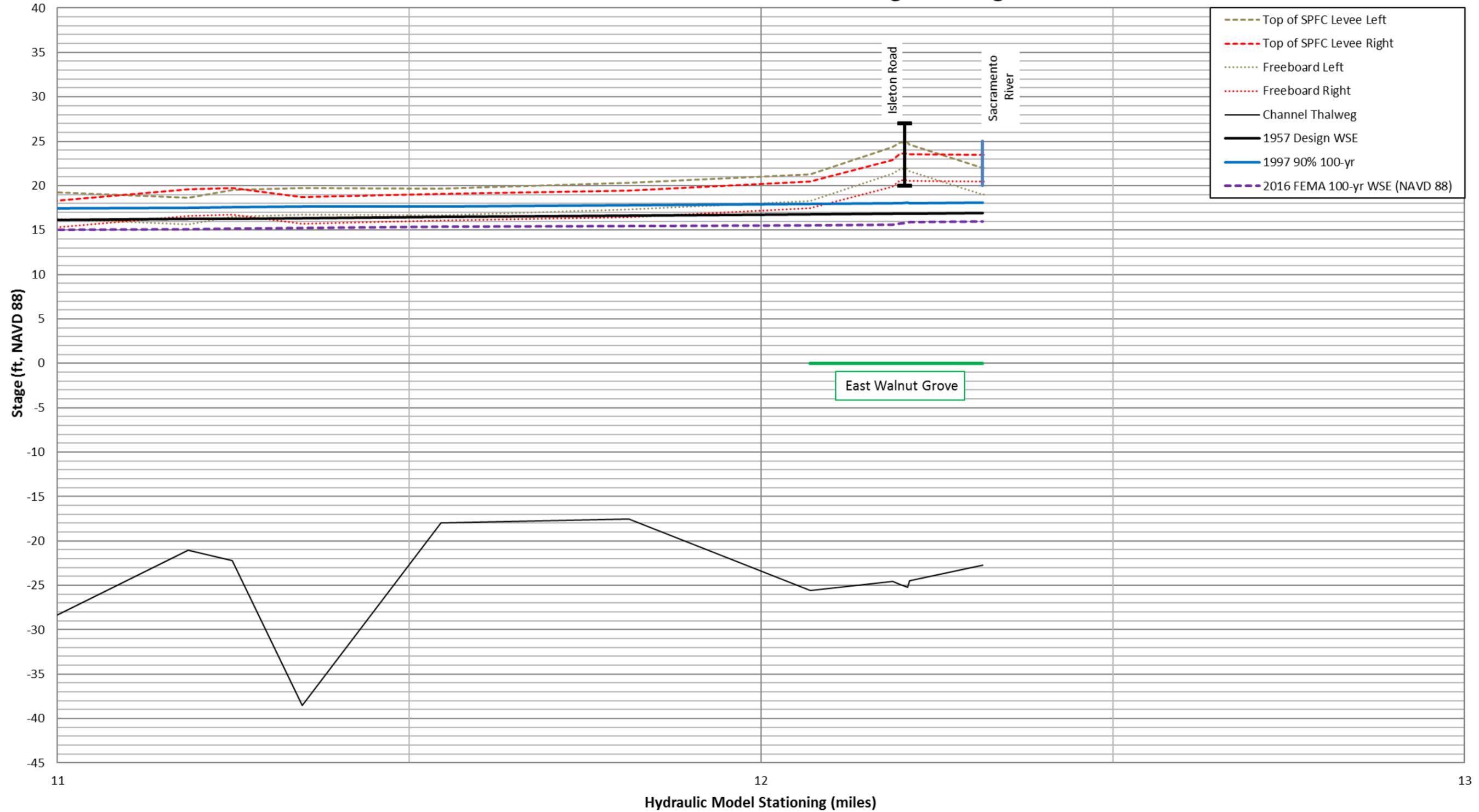
June 2019

Sacramento County Delta Legacy Small Communities East Walnut Grove - Lower Sacramento River



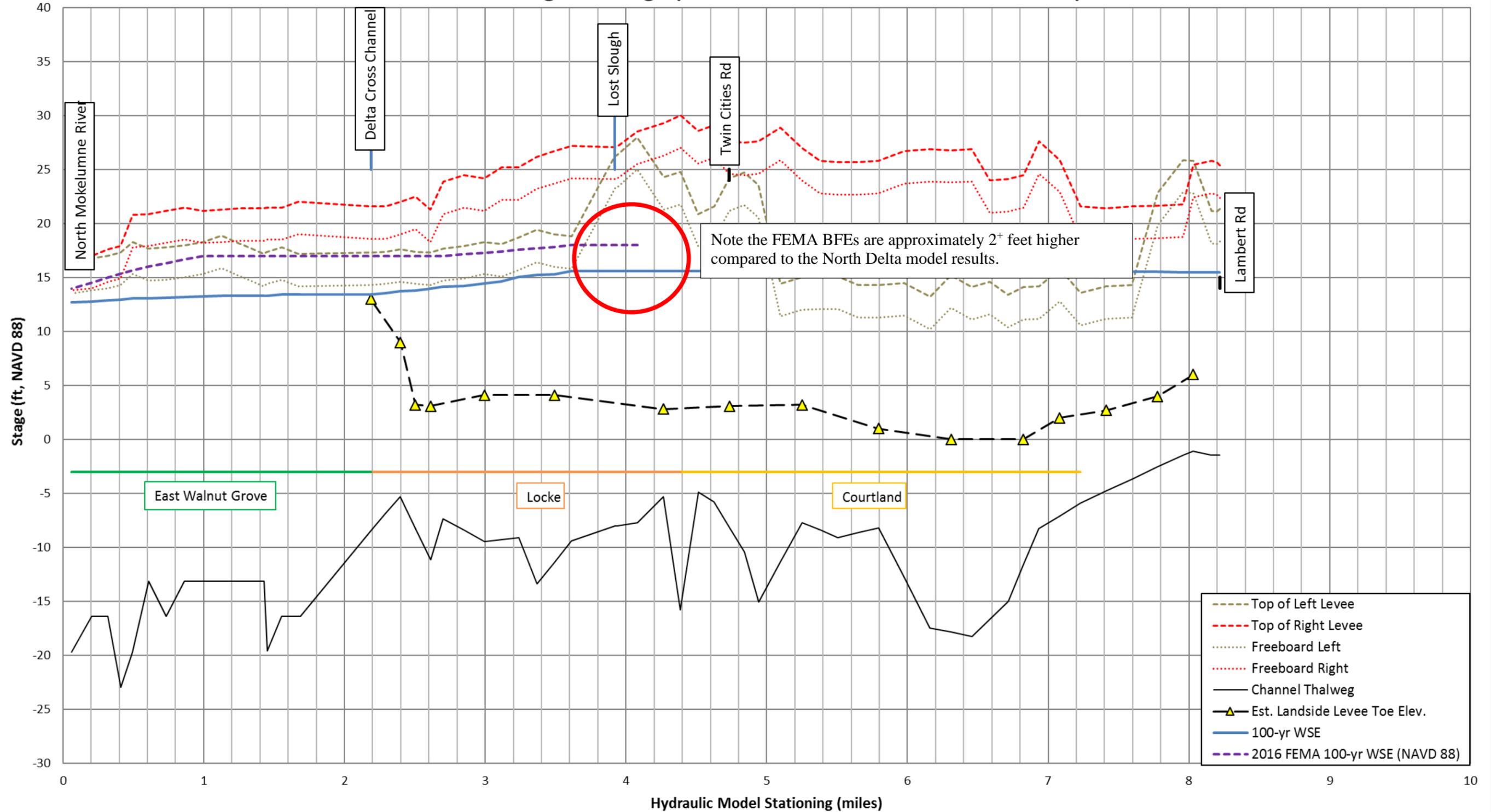
June 2019

Sacramento County Delta Legacy Small Communities East Walnut Grove - Georgiana Slough



June 2019

Sacramento County
 Delta Legacy Small Communities
 Snodgrass Slough (Lambert Rd to North Mokelumne River)



June 2019

Sacramento County
Delta Legacy Small Communities
East Walnut Grove - Delta Cross Channel

