



North Non-Urban Levee Evaluations Project

Chico North and South Non-Urban Study Area Summary

The California Department of Water Resources (DWR) Division of Flood Management conducted a levee evaluations program to assess the existing conditions of levees in California's Central Valley from 2008 to 2015. The Urban Levee Evaluations (ULE) Project addressed approximately 350 miles of Project¹ and non-Project² levees protecting populations of 10,000 people or more. The Non-Urban Levee Evaluations (NULE) Project addresses 1,200 miles of Project levees and 275 miles of non-Project levees protecting populations of fewer than 10,000 people. NULE levees received a non-urban level of evaluation in two phases. Phase 1 included a paper study of all these levees. Phase 2 included field investigation and analyses of levees protecting populations greater than 1,000 people. Non-Project levees were considered appurtenant and are included under NULE when these levees protect part of a basin partially protected by Project levees, or when non-Project levees may impact the performance of Project levees.

The primary objective of the NULE Phase 2 project was the evaluation of levees to identify deficiencies and determine screening-level costs for conceptual remedial alternatives. This was accomplished by performing a screening level geotechnical evaluation, supplemented by targeted exploration, laboratory testing, and analyses. The water surface elevation (WSE) used for analyses was the 1955/57 design WSE. The levees were divided into reaches/sub-reaches for evaluation. For reaches/sub-reaches not meeting geotechnical criteria, conceptual remedial alternatives and screening-level cost estimates were prepared.

Study Area

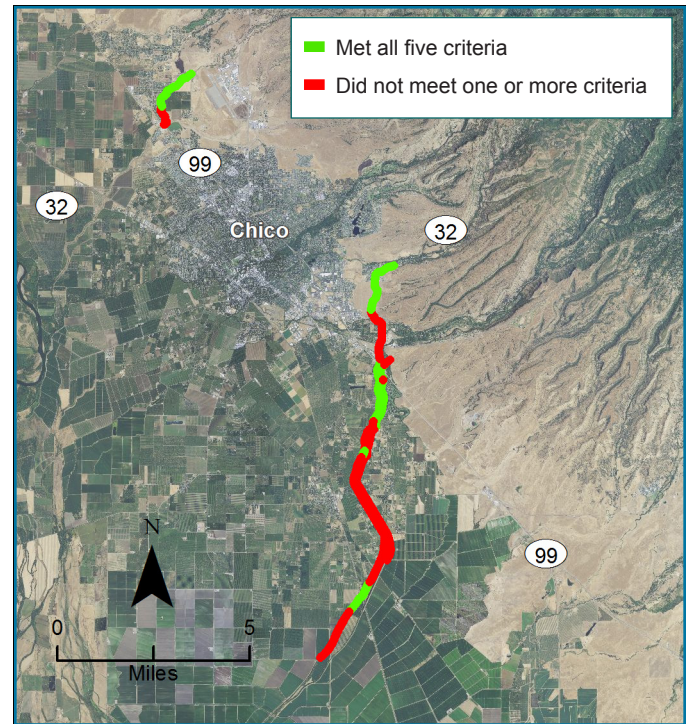
The Chico North and South Study Area levees are located in Butte County, California and include levees on the right bank of Butte Creek, on the right bank of Little Chico Creek-Butte Creek Diversion Channel, on the left bank of Butte Creek, and on the right bank of Mud Creek. There are a total of 19.3 miles of levee within the study area. These levees were divided into fifteen reaches for screening-level analyses.

Analyses

Levees in each reach were analyzed for five static NULE criteria at the 1955/57 WSE: freeboard, through seepage, underseepage, landside slope stability, and waterside slope stability. Erosion was assessed by evaluation of past performance and a subjective assessment of erosion risk. No seismic analyses were performed.

Results

For the Chico North and Study Area, approximately 6.2 miles of levee met all static NULE criteria at the 1955/57 WSE. The reaches that did not meet static NULE criteria were further evaluated to identify conceptual remedial alternatives. The dimensions of these alternatives were verified by analyses, and then a screening-level Class 4 cost estimate was prepared for planning purposes. The chart below summarizes the findings of the existing condition static assessments.

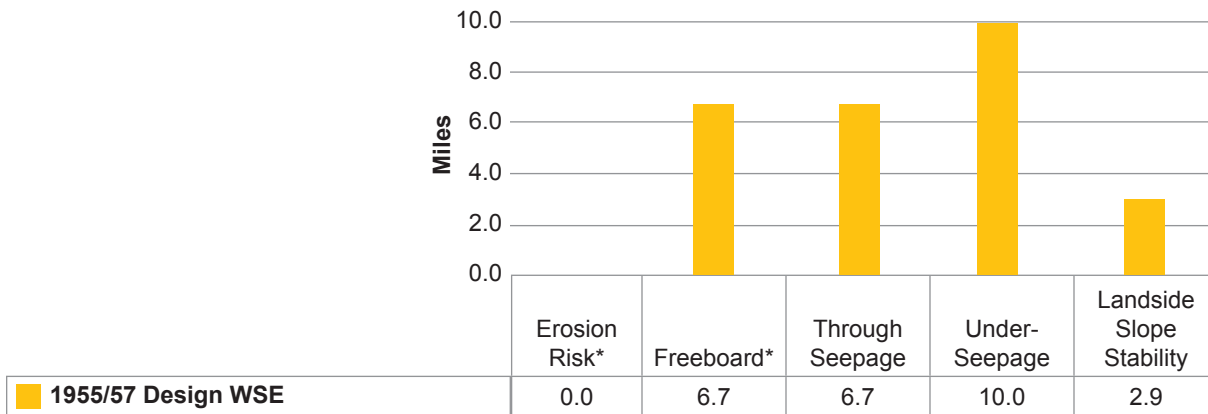


Chico North and South Levees

Footnotes:

- 1 Project Levee – A levee or flood wall that is a facility of the State Plan of Flood Control as defined in *Public Resources Code Section 5096.805*.
- 2 Non-Project Levee – A levee or flood wall that is not a project levee as defined above.

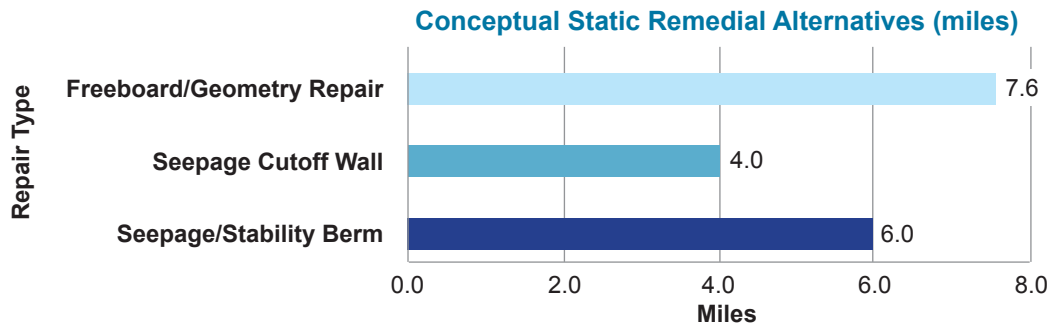
Total Miles of Levee That Do Not Meet Static NULE Criteria



* Erosion and freeboard deficiencies were identified as portions of reaches where criteria were not met.

Conceptual Remediation

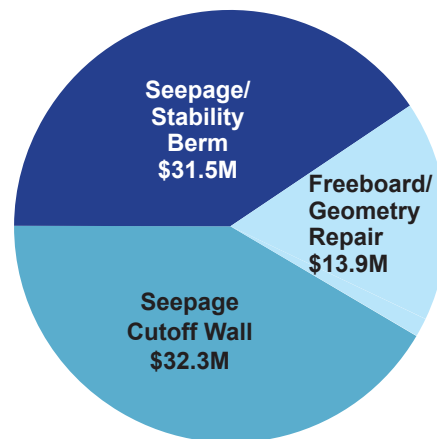
Typical conceptual static remedial alternatives in the Chico North and South Study Area consist of installing seepage/stability berms and installing cutoff walls along the centerline of the levees to address seepage and stability deficiencies and localized freeboard repair to address levee height deficiencies. The total length of each type of repair in the study area, which may remediate multiple deficiencies, is depicted in the graph below.



Costs

Screening-level Class 4 cost estimates were prepared on a 2013 basis³. Class 4 estimates are not design-level cost estimates. However, they do include construction cost and owners' "soft" costs, such as permitting, legal, environmental mitigation, and contingency. The total estimated costs of conceptual static remedial alternatives for all reaches in the study area that do not meet NULE criteria are shown in the pie chart on the right.

Total Remediation Costs (\$77.7 Million)



Note: Where other remedial alternatives were applied, costs to restore design geometry were calculated.

References:

Geotechnical Overview Report Volume 1, Existing Conditions – Chico North and South Study Area, Non-Urban Levee Evaluations Project. URS, August 2014.
Geotechnical Overview Report Volume 2, Remedial Alternatives – Chico North and South Study Area, Non-Urban Levee Evaluations Project. URS, November 2014.

Footnotes:

³ 2013 Basis – Industry construction cost derived from 2008 data with a 4 percent escalation included per year.

Reference sources for this document are available at <http://www.dwr-lep.com/ath>
 For further general DWR information or to obtain copies of DWR publications, please contact DWR Public Affairs (916) 651-7512 or <http://www.water.ca.gov/publicaffairs.cfm/>

