



## INFORMATION ITEM

### Delta Levees Investment Strategy Risk Reduction Analysis

#### Summary

Delta Stewardship Council (Council) staff will present the results of their risk reduction analysis developed using data from the Department of Water Resources (DWR) 2020-2023 Delta Levees Investment Strategy (DLIS) report. Council staff used the report's content to update existing risk assessments using the DLIS Decision Support Tool (DST). Over time, DWR's annual reports will allow the Council and the public to see how investments in Delta levees are reducing risks to State interests.

#### Background

##### Delta and Suisun Marsh Levees

The Sacramento-San Joaquin Delta (Delta) is home to more than 500,000 people and is comprised of approximately 1,300 square miles of low-lying, flood-prone lands bound by 1,100 miles of levees.

The Suisun Marsh, located immediately downstream from the Delta and north of Grizzly Bay, includes about 230 miles of levees that reduce flood risk and help manage flows for wetlands. About 80 miles of these levees protect Delta water quality and terrestrial and aquatic habitat of statewide importance.

Levees in the Delta and Suisun Marsh reduce flood risk to people, property, water supply, the Delta ecosystem, and infrastructure of statewide importance. However, levee failure can cause catastrophic flooding, and can potentially cause injury or loss of life, disrupt water supplies, and possibly damage property, infrastructure, and environmental resources of importance to the entire State.

##### Delta Reform Act Requirements and Authority

Pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009 (Wat. Code, § 85000 et seq.; Delta Reform Act), the Council has developed an enforceable, comprehensive, long-term management plan for the Delta (Wat. Code, § 85300.).

The Delta Plan contains regulatory policies, codified in California Code of Regulations, title 23, section 5001 et seq. The Delta Reform Act requires that the Delta Plan attempt to reduce risks to people, property, and State interests in the Delta by promoting effective emergency preparedness, appropriate land uses, and strategic levee investments (Wat. Code, § 85305, subd. (a.)), as well as recommend priorities for State investment in levee operation, maintenance, and improvements in the Delta, including both project levees, which are a part of the State Plan of Flood Control, and nonproject levees, which are not a part of the State Plan of Flood Control (Wat. Code, § 85306.).

### Regulatory Background

Following an extensive, 10-year engagement, policy development, and Administrative Procedure Act (Gov. Code, § 11340 et seq.) process, the Council completed a rulemaking for updated regulatory policy **RR P1** (Cal. Code Regs., tit. 23, § 5012.), which took effect on January 1, 2024.

Using a risk analysis methodology, DLIS establishes a three-tiered priority list of islands and tracts – **Very-High Priority**, **High Priority**, and **Other Priority** – for discretionary State investments in levee improvements for Delta islands and tracts. The priorities generally address the relationship between the flood risk of each island or tract, and the State interests present on that island or tract.

The DLIS regulation directs DWR to make State investments first on the Very-High Priority islands or tracts, then to fund levee improvements on High Priority islands or tracts; after those projects have been fully funded, then projects at Other Priority islands or tracts may be funded. DLIS specifies that levee operations and maintenance are a priority for all Delta islands and tracts.

### Reporting Requirements

The DLIS regulation requires DWR to annually submit to the Council a written report documenting its funding decisions that includes:

- 1) A description of all discretionary State funding for levees awarded by DWR, during the reporting year, including both of the following:
  - a. Levee improvement.

- b. Levee operation and maintenance.
- 2) A list of each levee improvement project proposal submitted to DWR for funding, regardless of whether DWR awarded funding to the project.
  - 3) A list of the improvement projects awarded funding, the funding level awarded, the local cost share, and the applicable priority of the island or tract.
  - 4) A description, for each awarded project, of changes, when completed, to levee geometry, the specific locations of those changes, and expected changes in the level of flood protection provided or standard achieved.
  - 5) A summary of DWR's rationale for levee improvement project proposals submitted but not awarded funding during the reporting year.
  - 6) A summary of all previous DWR-funded levee improvement project activities completed during the reporting year and location of those activities.

In advance of the effective date of the regulation, DWR staff presented a report covering the period 2020-2023 to the Council at the December 14, 2023, Council Meeting.

### Summary of Analysis

Using information provided in DWR's report and estimated levee heights based on the reported levee standard the project achieved, Council staff updated the levee fragility curves - engineering estimates of the probability that a levee will fail at a given water surface elevation - for islands and tracts with completed levee improvement projects within the reporting years. Projects that were authorized but not completed within the reporting years were excluded from this analysis and will be included in future year analyses once the projects are completed. Council staff used the updated fragility curves and the DST to estimate if the completed projects reduced the chances of flooding and how the improved levees change risk to state interests on the islands.

The results of this analysis are documented in the Report *DLIS Risk Reduction Analysis - Reporting Years 2020-2023* (Attachment 2). Over time, DWR's annual

reports will allow the Council and the public to see how investments in Delta levees reduce risk to State interests.

DWR's most recent report documented four completed levee improvement projects located on:

- Bethel Island
- Sherman Island
- Terminous Tract
- Dutch Slough

Council staff used the DST to compute the estimated change in flood risk to all of the following:

- People
- Property
- Water supply
- Landside habitat
- Prime farmland
- State highways

All of the completed projects occurred on DLIS Very-High Priority islands or tracts. A summary of the analysis can be found in Attachment 1.

## Summary of Results

### *Sherman Island*

The metrics the DST uses to assess risk showed little change to the estimated flood risk on Sherman Island as a result of the project. The DST uses overtopping to calculate risk. The project didn't increase the levee height; however, it widened the levee and improved its stability, which reduces the chance of levee failure before overtopping. It also established a wide base that can support future levee raises. Sherman Island is critical to water quality, the Delta ecosystem, and State transportation corridors. Sherman Island continues to need investment to bring this island's flood risk down to the 200-year level of protection for islands and tracts critical for water supply, a standard adopted by the Council.

### *Bethel Island*

Bethel Island's levees are crucial for protecting the island's residents, agriculture, water quality, and natural habitats from flood risks. This project reduced risk to State interests, improved emergency response with a new levee crown road for emergency vehicles, and enhanced waterside habitat. Bethel Island continues to need investment to bring this island's flood risk down to the 200-year level of protection for islands and tracts critical for water supply, a standard adopted by the Council.

### *Dutch Slough*

The Dutch Slough Tidal Marsh Restoration Project is a significant effort to restore tidal marshes within the Delta. This work is part of the ongoing process to reintroduce natural tidal flows to the area, improving habitat conditions for fish species at risk and contributing to the ecological health of the Delta. A critical component of the project is the new flood control levee constructed at the southern end of the property, which provides essential flood protection to residential development located just south of the levee.

To create tidal habitat, the Dutch Slough project degraded existing levees and constructed new ones. Dutch Slough is considered a Very-High Priority island because the habitat it can provide is critical to meet the State's restoration goals. The project changed the landscape so substantially that a before-and-after comparison of risk would not be meaningful, or possible. Consequently, the DST was not used to evaluate the flood risk reduction benefits of this project.

### *Terminous Tract*

Terminous Tract saw the largest measurable reduction in risk from flooding from the completed project. The project was able to provide a significant and efficient risk reduction by improving a significant deficiency in the levee system. The probability of levee failure was reduced by 12.5%, resulting in a decline in estimated annual damages by 20%, as well as reducing risk to prime agriculture. Continued investment is required to bring this island's flood risk down.

### *Overall Conclusions*

Excluding Dutch Slough, the State spent approximately \$12.5 million on the discretionary levee investment projects considered in this report. Reclamation

Districts estimate it will cost an additional \$1.28 billion to improve the Delta levee system to the State's Bulletin 192-82 levee standard. Thus, both the investments and the risk reductions achieved represent a small portion of the ongoing levee improvement needs. It remains important for the Council to continue to advocate for strategic funding of Delta levee improvements in a manner that reduces risk and protects State interests.

## Today's Meeting

At today's meeting, Council Staff will present the analysis of estimated flood risk reductions achieved through DWR's discretionary levee improvement investments over the period 2020-2023.

## Fiscal Information

Not applicable.

## List of Attachments

*Attachment 1: Summary Table*

*Attachment 2: DLIS Risk Reduction Analysis – Reporting Years 2020-2023*

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