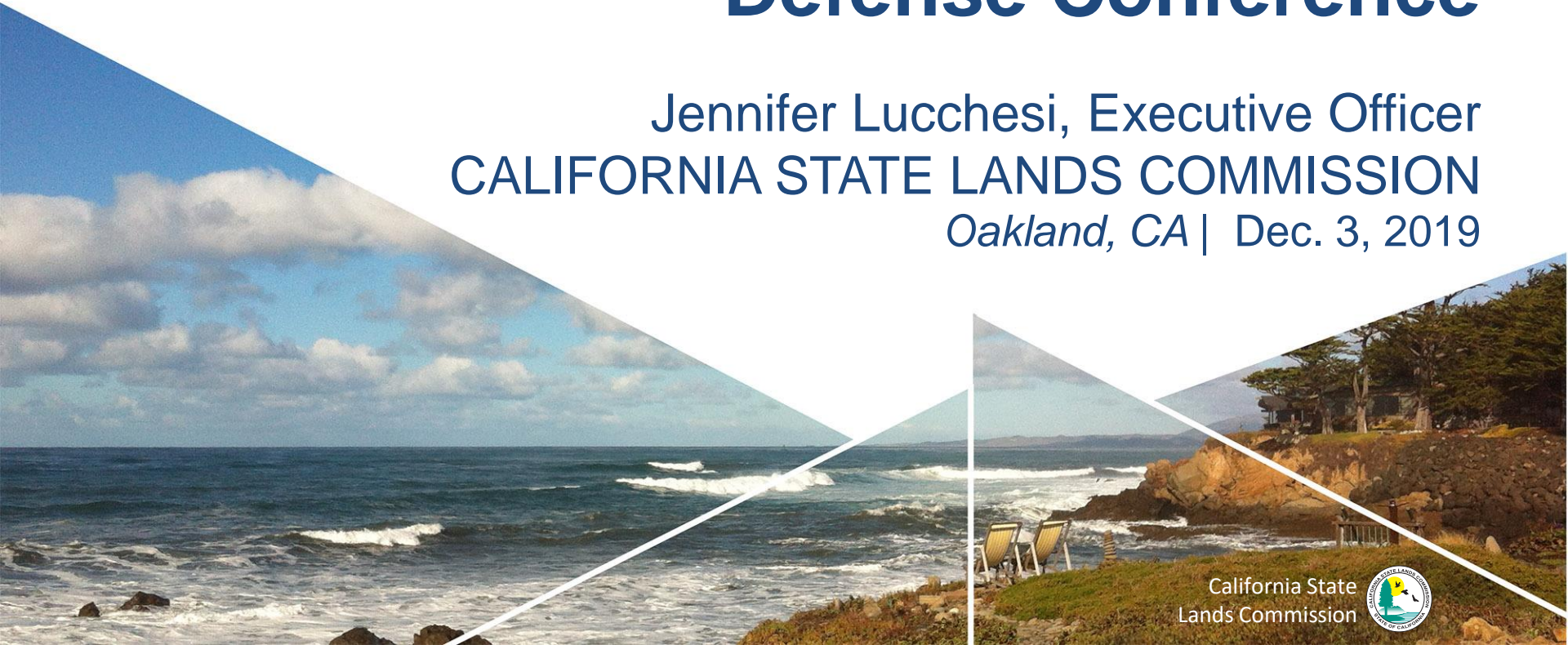




Storms, Flooding & Sea Level Defense Conference

Jennifer Lucchesi, Executive Officer
CALIFORNIA STATE LANDS COMMISSION
Oakland, CA | Dec. 3, 2019



California State
Lands Commission



Our Jurisdiction is Rooted in the Public Trust Doctrine

The State Lands Commission is the trustee of the State's Public Trust lands and resources



Sea-Level Rise Threatens Public Trust Resources

Risks



Infrastructure Vulnerability

Increased Storm Frequency

Santa Cruz, CA



Flooding

Impacts

Our Ports provide vital services and resources. Sea-level rise will impact infrastructure and present economic challenges

Strategic Planning: Our 5-Year Vision

Strategy 1.4:
Incorporate strategies to address climate change and sea-level rise

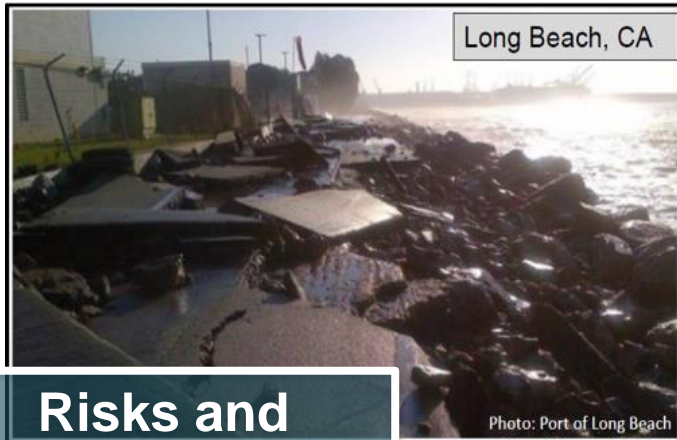
Strategy 3.1:
Foster, Improve, and enhance relationships

Strategy 3.2:
Maximize coordination and collaboration

Our Strategic Plan serves as a roadmap for how our agency will respond to present and future challenges

Proactive Planning: AB 691 (Muratsuchi, 2013)

A comprehensive state-wide summary of:



**Risks and
Vulnerabilities**

AND



**Adaptation
Options**

 **Thank you!**



2050
sea level

2030
sea level

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Supplemental Information



Assembly Bill 691, 2013

Assembly Bill No. 691

CHAPTER 592

An act to add Section 6311.5 to the Public Resources Code, relating to state lands.

[Approved by Governor October 5, 2013. Filed with
Secretary of State October 5, 2013.]

LEGISLATIVE COUNSEL'S DIGEST

AB 691, Muratsuchi. State lands: granted trust lands: sea level rise.

Existing law vests with the State Lands Commission control over specified state lands, including tidelands and submerged lands. Existing law grants to various local entities the right, title, and interest of the state in and to certain tidelands and submerged lands in trust generally for purposes of commerce, navigation, and fisheries, and for other public trust purposes.

This bill would provide that addressing the impacts of sea level rise for all of its legislatively granted public trust lands shall be among the management priorities of a local trustee, as defined. The bill would require a local trustee whose gross public trust revenues average over \$250,000 annually between January 1, 2009, and January 1, 2014, to prepare and submit to the commission, no later than July 1, 2019, except as provided, an assessment of how it proposes to address sea level rise. The bill would permit, but not require, a local trustee whose gross public trust revenues are \$250,000 or less to prepare and submit to the commission an assessment. The bill would require a local trustee to consider and use relevant information from specified reports on sea level rise in preparing the assessment and would permit a trustee that has already completed an assessment on the impacts of sea level rise to submit that assessment to the commission. The bill would require that the commission make those assessments available to the public on its Internet Web site, and send electronic copies to certain other public entities.

By adding to the duties of local agencies that are local trustees of granted public trust lands, this bill would impose a state-mandated local program.

The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

The people of the State of California do enact as follows:

SECTION 1. The Legislature finds and declares all of the following:



AB 691 Criteria

1. Assessment of impacts of sea-level rise

- Inventory vulnerable natural and built resources and facilities
- Consider impacts and recommendations described in the current State Sea Level Rise Policy
Guidance: http://www.opc.ca.gov/webmaster/ftp/pdf/agenda_items/20180314/Item3_Exhibit-A_OPC_SLR_Guidance-rd3.pdf
- Consider impacts of storms and extreme events
- Consider changing shorelines
- Consider trends in relative local sea level
- Consider impacts to public trust resources and values, including but not limited to public access, commerce, recreation, coastal habitats, and navigability
- Prioritize vulnerabilities to be addressed

2. Maps of 2030, 2050, and 2100 impacts

- FEMA flood hazard maps can be accepted, if projected timeframe is appropriate
- Refer to online mapping tool resources if the trustee does not have in-house resources needed to complete

3. Estimate of financial costs of sea-level rise

- Replacement or repair costs of resources and facilities that could be impacted by sea-level rise and climate change processes
- Non-market values, including recreation and ecosystem services, of public trust resources that could be impacted by climate change and sea-level rise processes
 - See Center for the Blue Economy library or Duke Marine Ecosystem Services Partnership
- Consider costs of 2030, 2050, and 2100 high sea-level rise projection with a 100-year storm
- Include anticipated costs of adaptation/mitigation measures, and potential benefits of such strategies and structures

4. Description of how trustee proposes to protect and preserve resources and structures that would be impacted by sea-level rise

- Describe proposed mitigation/adaptation measures, and how vulnerabilities will be addressed
- Describe timeframe of implementation of such measures
- Describe plans to monitor impacts of sea-level rise and climate change, as well as effectiveness of mitigation/adaptation measures
- Describe any regional partnerships the trustee is party to or intending to form that would address sea-level rise and climate change vulnerability or increase resiliency

Grantees subject to AB691

City of Alameda

City of Avalon

City of Benicia

City of Berkeley

City of Carpinteria

City of Crescent City

City of Emeryville

City of Eureka

City of Long Beach

- City of Long Beach

- Port of Long Beach

City of Monterey

City of Morro Bay

City of Newport Beach

City of Oceanside

City of Redondo Beach

City of Redwood City

- **City of San Diego**
- **City of Santa Barbara**
- **City of Santa Cruz**
- **City of Santa Monica**
- **City of Sausalito**
- **Crescent City Harbor District**
- **Humboldt Bay Harbor Recreation and Conservation District**
- **Moss Landing Harbor District**
- **Orange County**
 - **Newport Bay**
 - **Dana Point Harbor**
- **Port of Los Angeles**
- **Port of Oakland**
- **Port of San Francisco**
- **Port San Luis Harbor District**
- **San Diego Unified Port District**
- **San Mateo County**
- **San Mateo County Harbor District**
- **Santa Cruz Port District**

AB691 Criteria #1: Assessment of Sea-Level Rise Impacts

1. Inventory Assets

2. Consider Sea-Level Rise Impacts

- Local Conditions and Trends
- Extreme Weather Events
- Changing shorelines
- Public Trust resources

3. Prioritize Assets

 Airports <ul style="list-style-type: none">• Inundation, flooding, impaired function	 Natural Areas <ul style="list-style-type: none">• Loss of beaches, loss of public access, transformation
 Community Land Use, Services, and Facilities <ul style="list-style-type: none">• Inundation, flooding, impaired function	 Parks and Recreational Areas <ul style="list-style-type: none">• Loss of beaches, community space, public access
 Contaminated Lands <ul style="list-style-type: none">• Leaking storage tanks, increase in non-point source pollution and saltwater intrusion	 Seaports <ul style="list-style-type: none">• Inundation, flooding, impaired function
 Energy Infrastructure, Pipelines, and Telecommunications <ul style="list-style-type: none">• Inundation, flooding, impaired function, salt water intrusion	 Structured Shorelines <ul style="list-style-type: none">• Damage from extreme waves, impaired function
 Ground Transportation <ul style="list-style-type: none">• Inundation, flooding, impaired function	 Flood Control and Stormwater <ul style="list-style-type: none">• Impaired function, salt water intrusion
 Hazardous Materials <ul style="list-style-type: none">• Leaking storage tanks, increase in non-point source pollution, saltwater intrusion	 Water and Wastewater Systems <ul style="list-style-type: none">• Inundation, flooding, impaired function, salt water intrusion

www.adaptingtorisingtides.org

Example of Criteria #1

Assessment of sea-level rise impacts

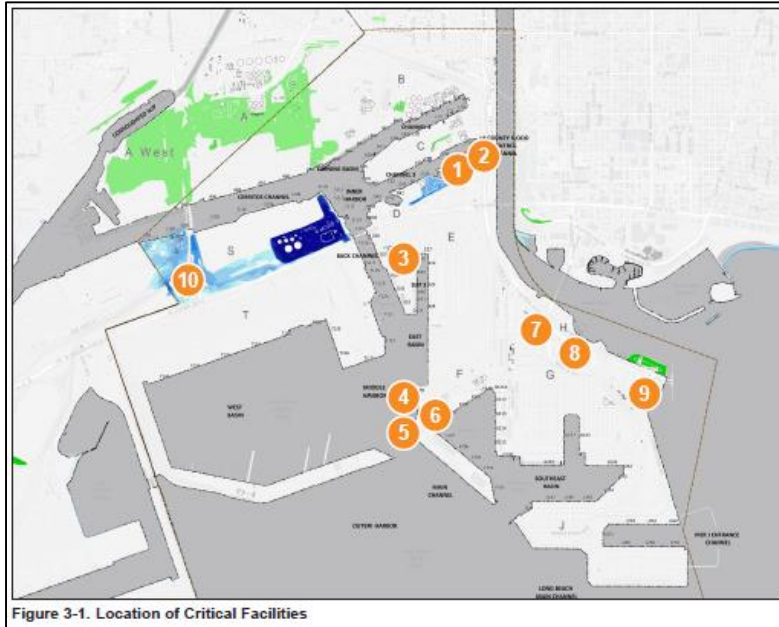


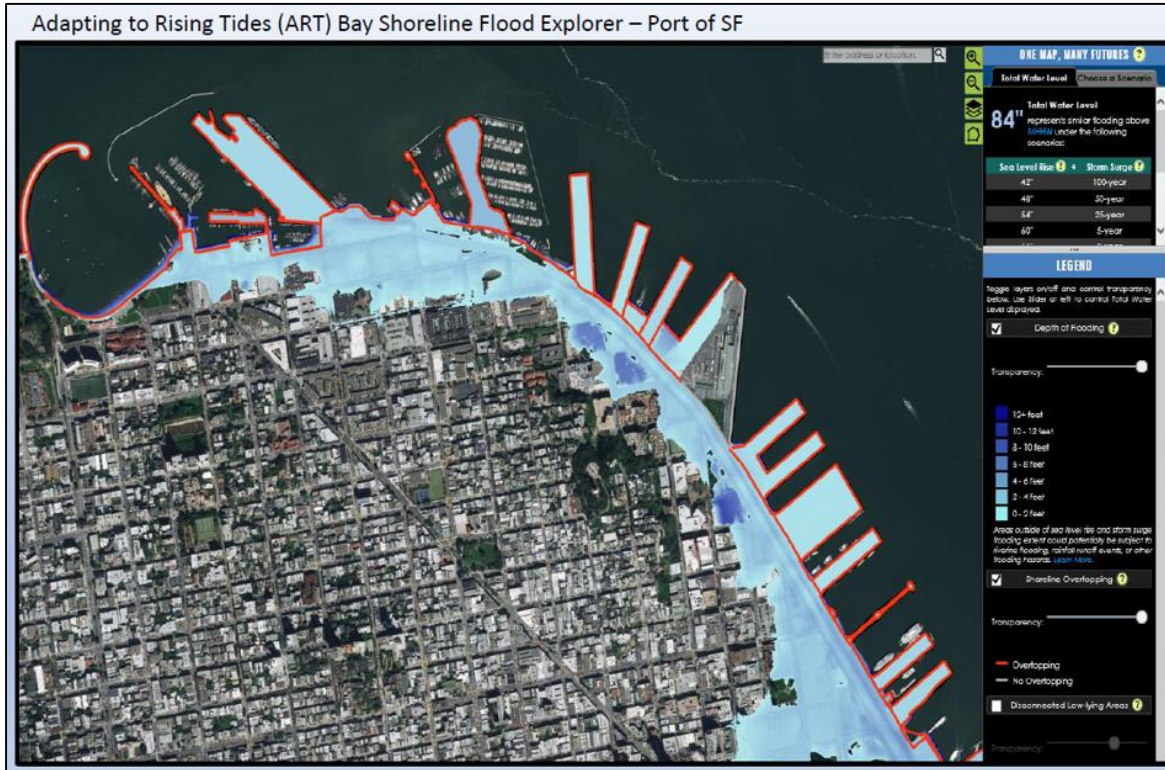
Figure 3-1. Location of Critical Facilities

Table 3-4. Key for Critical Facilities Map

Ref #	Pier	Description	Company/Agency
1	Pier D	Mooring of tug boats and barges	Foss Maritime
2	Pier D	Fireboat Station #20 (Temporary fireboat dock and fire station)	Long Beach Fire Department
3	Pier D	Storage Warehouse (Police department and bridge contractors use area for storage of fire trucks and important equipment.)	Port of Long Beach
4	Pier F	Fireboat Station #15	Long Beach Fire Department
5	Pier F	Operation of pilotage business	Jacobsen Pilot Service, Inc.
6	Pier F	Security Command and Control Center Building	Port of Long Beach Security Command and Control Center
7	Pier G	Port Administration Building (Building is slated for demolition in late 2015 / early 2016.)	Port of Long Beach
8	Pier G	Port Maintenance Facility (Construction and Operation Trailers)	Port of Long Beach
9	Pier H	Fireboat Station #8 (on land)	Long Beach Fire Department
10	Pier S	Fire Station #24	Long Beach Fire Department

Asset Map and Descriptions – Port of Long Beach

AB691 Criteria #2: Maps of 2030, 2050, 2100 Impacts

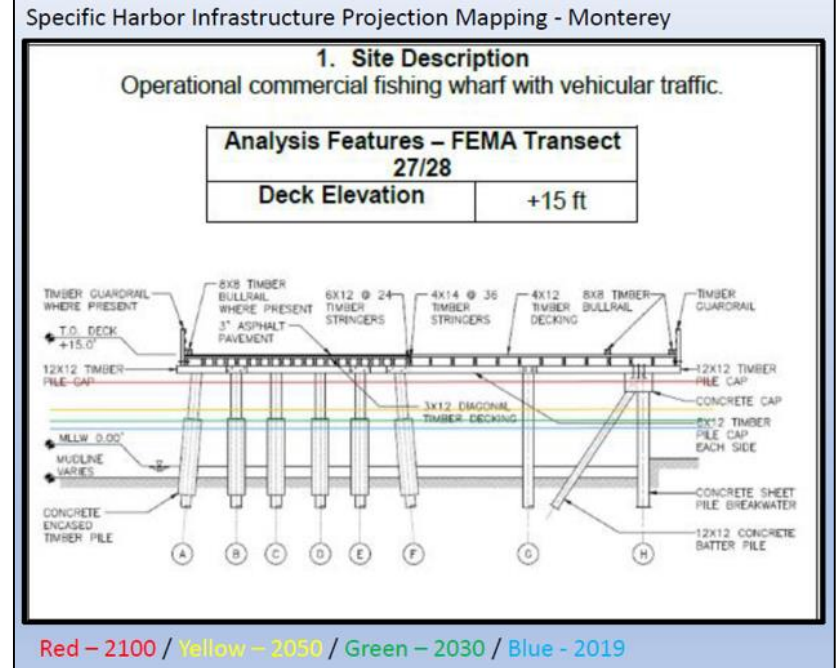
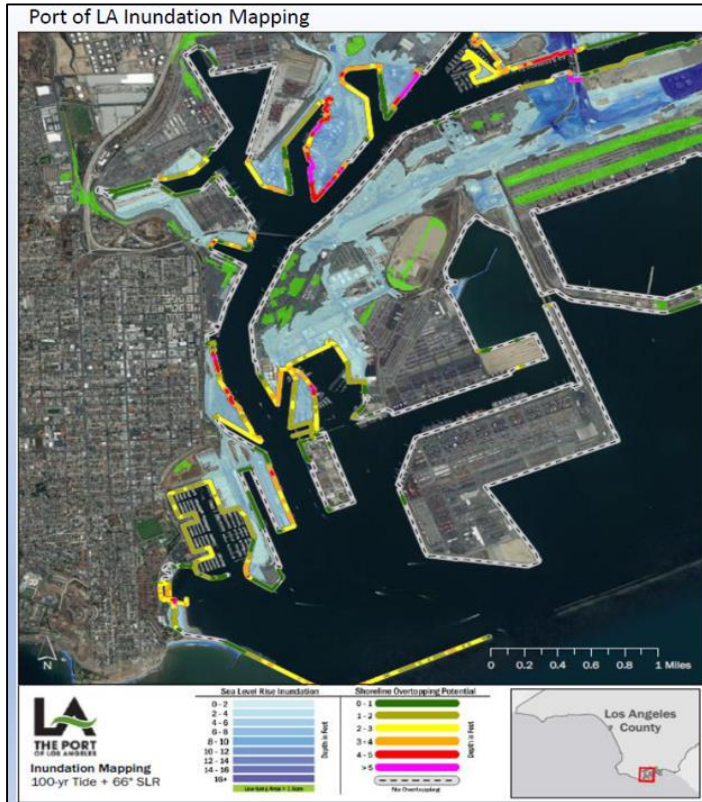


Sea-Level Rise Viewers

- NOAA Sea-Level Rise Viewer <https://coast.noaa.gov/slr/>
- Surging Seas Risk Finder <https://riskfinder.climatecentral.org/>
- Our Coast Our Future <http://data.pointblue.org/apps/cof/cms/>
- Adapting to Rising Tides (SF Bay) <https://explorer.adaptingtorisingtides.org/explorer>
- And more...

Examples of Criteria #2

Maps from the Port of LA and Monterey Harbor



AB691 Criteria #3: Estimate Financial Costs of Sea-Level Rise

Port of San Diego Natural Resource Valuation

SLR	Acres	Low Estimate (\$/yr)	High Estimate (\$/yr)
Eelgrass			
Baseline	915	\$11,339,205	\$11,456,219
0.8 feet	983	\$12,178,846	\$12,304,524
1.6 feet	1,016	\$12,593,963	\$12,723,924
2.5 feet	979	\$12,137,569	\$12,262,821
4.9 feet	668	\$8,279,930	\$8,365,374
Salt Marsh			
Baseline	81	\$676,091	\$809,447
0.8 feet	76	\$632,848	\$757,675
1.6 feet	74	\$620,939	\$743,417
2.5 feet	75	\$627,548	\$751,330
4.9 feet	78	\$653,392	\$782,272
Beach/Dune			
Baseline	13	\$41,459	\$41,836
0.8 feet	13	\$39,002	\$39,356
1.6 feet	12	\$35,616	\$35,939
2.5 feet	11	\$32,919	\$33,218
4.9 feet	9	\$26,559	\$26,800
Uplands			
Baseline	97	\$228,100	\$228,100
0.8 feet	90	\$211,871	\$211,871
1.6 feet	82	\$193,262	\$193,262
2.5 feet	73	\$172,781	\$172,781
4.9 feet	51	\$119,404	\$119,404
Whole System			
Baseline	1,107	\$28,029,798	\$48,946,184
0.8 feet	1,161	\$29,419,821	\$51,373,470
1.6 feet	1,184	\$30,003,952	\$52,393,492
2.5 feet	1,139	\$28,848,345	\$50,375,547
4.9 feet	806	\$20,414,163	\$35,647,614

1. Replacement or repair costs of assets and facilities.
2. Non-market values of ecosystem services and public trust resources
3. Costs of 2030, 2050, and 2100 with a 100-year storm event
4. Anticipated costs of adaptation and mitigation measures, and potential benefits of such strategies and structures

Example of Criteria #3

Estimate the Financial Cost of Sea-Level Rise

*AB-691 State Public Trust Lands Sea Level Rise Assessment
City of Monterey, California*

FINAL May 2019

Table ES-2: Summary of Market and Non-Market Valuation

Economic Loss Type	2030	2060	2100^a
Market Valuation			
Revenue loss to City Government, within Tidelands	\$1,030,808	\$2,061,760	\$34,105,989
Revenue loss to City Government, outside of Tidelands	\$519,000	\$784,000	\$26,542,000
Total Revenue Loss to City Government	\$1,549,808	\$2,845,760	\$60,647,989
Trickle-down economic loss in City	\$13,266,000	\$20,940,000	\$484,626,000
Market Valuation Total	\$14,815,808	\$23,785,760	\$545,273,989
Non-Market Valuation (beach loss)	\$185,000	\$1,021,000	\$1,558,000

^a Includes the five-year extended loss for impacts to wharves in the 2100 scenario.



AB691 Criteria #4: Description of how trustee proposes to protect/preserve resources and structures

Strategies:

- No Intervention
- Protect
- Accommodate
- Retreat



Examples of Criteria #4:

Description of how trustee proposes to protect & preserve resources and structures

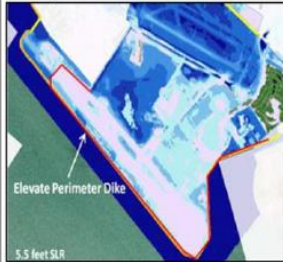
Port of Oakland Adaptation Strategy

A.1 Shoreline along the southwest side of the Oakland Airport South Field

Strategy Type



Following the South Field Perimeter Dike Improvement Project, raise the crest of dike design *incrementally over time* to maintain FEMA + 1 foot of freeboard flood protection.



Initial Exposure

- Extreme Storm Flooding: 100-year storm tide +2 feet (Year 2050); however, the full length of the dike is not overtopped until 5.5 feet of SLR.
- Daily Tidal Inundation: MHHW + 5.5 feet (Year 2100)

Assets Protected

- South Field facilities
- South Field Runway
- T1 and T2 Mechanical Buildings
- South Field access roads

Strategy Cost

- Protect to 5.5 feet of SLR = Very High

Potential Collaborators

- Federal Aviation Administration

Tiger Dam – Short Term Protection Option Port of Long Beach



Moving Forward

- **Statewide cumulative evaluation study**
 - Vulnerability and adaptation report
 - Financial cost estimate synthesis
- **Recommendations to the State to support local adaptation and implementation efforts**
 - Collaboration with federal, state, and local agencies

AB 691 – Proactively Planning for Sea-Level Rise Impacts



Assessing Sea-Level Rise Impacts

To assess sea-level rise impacts to granted lands, first inventory vulnerable natural and built resources and facilities. Then, consider the impacts of sea-level rise itself and other dynamic coastal processes and climatic events that are projected to be exacerbated by sea-level rise such as coastal erosion, storms, and high tides on the vulnerable assets identified. The following resources and tools are available for assistance:

- ▼ [Guidance](#)
- ▼ [Planning Document Examples](#)



Estimating the financial costs of sea-level rise

Considering the financial costs associated with the impacts of sea-level rise will facilitate successful adaptation planning and the protection of Public Trust lands and resources. When estimating costs, replacement or repair of existing facilities may be a factor, as well as the quantification of non-market asset values such as recreation and ecosystem services. Costs may be projected across the same time scales as sea-level rise (e.g., 2030, 2050, and 2100). In addition to a tally of losses, the cost of adaptation and mitigation strategies should be estimated, along with the potential economic benefits of those strategies. The following resources and tools are available to assist you:

- ▶ [Duke University Marine Ecosystem Services Partnership](#)
- ▶ [Economic Impacts of Climate Adaptation Strategies for Southern Monterey Bay](#)
- ▶ [MIS National Ocean Economics Program](#)
- ▶ [What Will Adaptation Cost? An Economic Framework for Coastal Community Infrastructure](#)



Protecting Public Trust resources impacted by sea-level rise

As Public Land Trustees, granted lands partners ensure the protection of Public Trust resources and values. Please describe in your assessment how proposed sea-level rise adaptation and mitigation strategies will address the coastal asset vulnerabilities identified and the time frame for implementation of such measures. Include any plans to monitor the impacts of sea-level rise and the effectiveness of implemented adaptation and mitigation strategies.

- ▶ [Public Trust Resources](#)

<https://www.slc.ca.gov/ab691/>