A CLIMATE RESILIENT STATE TRANSPORTATION DEPARTMENT

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Storms, Flooding & Sea Level Defense Conference

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Caltrans

CALIFORNIA

- 3 of the 10 largest cities in the US
- An estimated 40 million residents
- 2 of the top 10 cities in the US for GDP
- 3 of the Top 10 Ports in the US, including the 2 largest (Long Beach and Los Angeles)
- 51,000 lane miles of state highways

What We Are Doing at Caltrans

Pathway to Resiliency

District Vulnerability Assessment Reports

- Project climate Impacts on state highways and transportation assets
- Develop GIS Map and Data base

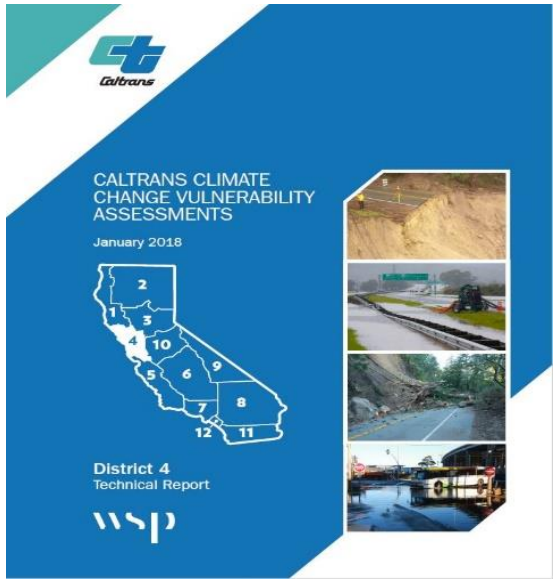
Climate Adaptation Strategies Reports

- Prioritize assets at risk
- Develop adaptation strategies
- Integrate into Caltrans business practices

All 12 Caltrans Districts Will Receive:

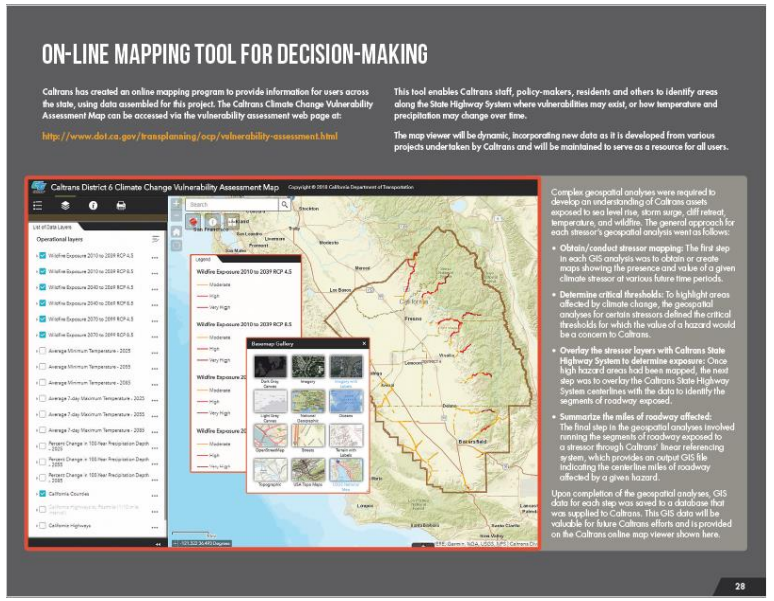
Summary Report

- Overview of the natural environment and transportation infrastructure
- Description of the interaction of the transportation system and identified stressors



Technical Report

- Background on data used to develop reports
- Vulnerability assessment methodology



On-line viewer Tool

- Posted online, the tool allows users to toggle stressors on and off to visualize locations of the stressors

SEA LEVEL RISE INUNDATION

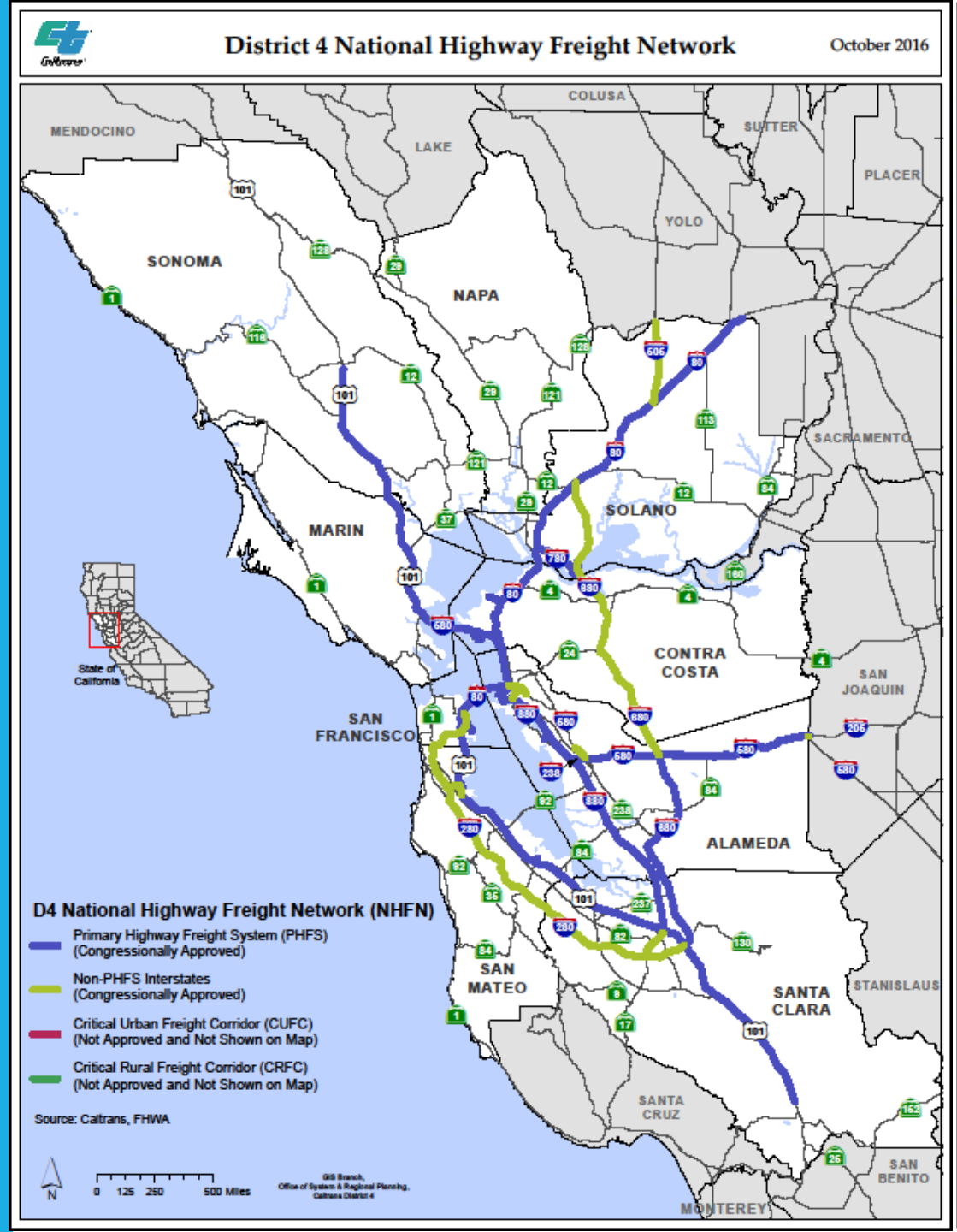
Impacts to State Highway System by Sea Level Rise Increment

- 1.64 Ft (0.50 M)
- 3.28 Ft (1.00 M)
- 5.74 Ft (1.75 M)

Sea Level Rise Increments

- 1.64 Ft (0.50 M)
- 3.28 Ft (1.00 M)
- 5.74 Ft (1.75 M)

Sea level rise data are from the US Geological Survey, Coastal Storm Modeling System (CoSMoS). See Our Coast, Our Future and the USGS CoSMoS webpage for more information on the model.


District 4 National Highway Freight Network
October 2016
MENDOCINO
LAKE
COLUSA
SUTTER
PLACER
YOLO
SONOMA
NAPA
SACRAMENTO
MARIN
SOLANO
CONTRA COSTA
SAN JOAQUIN
SAN FRANCISCO
ALAMEDA
SAN MATEO
SANTA CLARA
STANISLAUS
SANTA CRUZ
SAN BENITO
MONTEREY
State of California
D4 National Highway Freight Network (NHFN)
Primary Highway Freight System (PHFS) (Congressionally Approved)
Non-PHFS Interstates (Congressionally Approved)
Critical Urban Freight Corridor (CUFC) (Not Approved and Not Shown on Map)
Critical Rural Freight Corridor (CRFC) (Not Approved and Not Shown on Map)
Source: Caltrans, FHWA
N
0 125 250 500 Miles
GIS Branch, Office of System & Regional Planning, Caltrans District 4

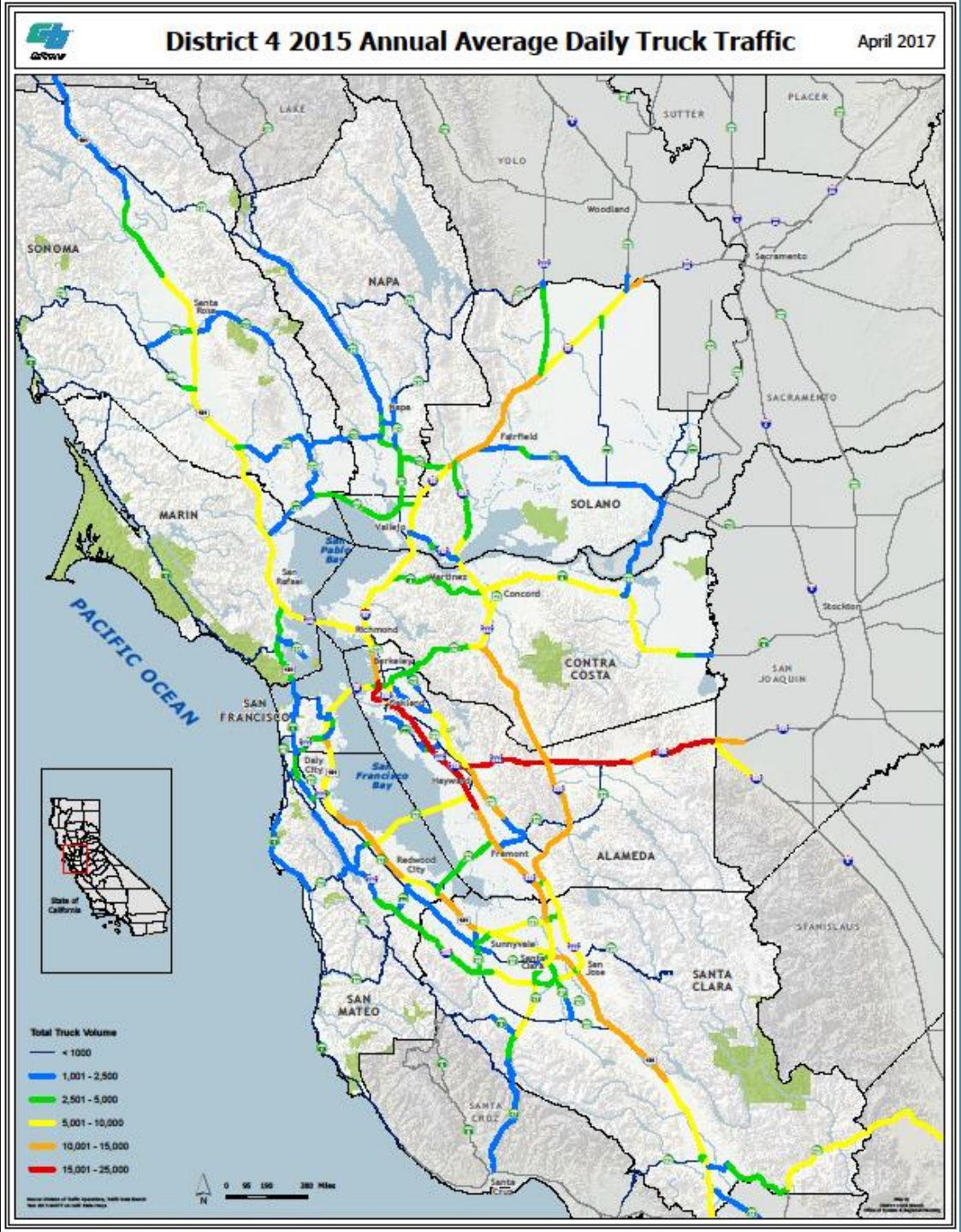

District 4 2015 Annual Average Daily Truck Traffic
April 2017
LAKE
SUTTER
PLACER
YOLO
Woodland
SONOMA
NAPA
Sacramento
SACRAMENTO
Fairfield
MARIN
SOLANO
Vallejo
PACIFIC OCEAN
Martinez
Concord
Richmond
Berkeley
Oakland
CONTRA COSTA
Stockton
SAN JOAQUIN
SAN FRANCISCO
Daly City
Hayward
Fremont
ALAMEDA
Redwood City
Sunnyvale
San Jose
SANTA CLARA
SAN MATEO
STANISLAUS
SANTA CRUZ
State of California
Total Truck Volume
< 1000
1,001 - 2,500
2,501 - 5,000
5,001 - 10,000
10,001 - 15,000
15,001 - 25,000
N

Fig. 11

BRIDGES IN COASTAL AREAS AND SEA LEVEL RISE

Climate change can impact infrastructure in multiple ways. Bridges in coastal areas, for example, can be directly impacted by rising sea levels and storm surge effects. Today's bridges were designed and built for current tidal and surge conditions, so increasing water levels may increase the risk to these facilities in the future.

Some bridge vulnerabilities include:

1. Rising groundwater table inundating supports that were not built for saturated soil conditions, leading to erosion of soils and loss of stability.
2. Higher sea levels exerting greater forces on the bridge during normal tidal processes, increasing scour effects on bridge structure elements.
3. Higher water levels causing higher, more forceful, storm surges which could cause scour on bridge substructure elements.
4. Bridge approaches (where the roadway transitions to the bridge deck) becoming exposed to surge forces and sustaining damage from storms.
5. Surge and wave effects loosening or damaging portions of the bridge and requiring securing, re-attaching, or replacing of bridge parts.
6. Bridge use becoming limited due to the loss or damage of a roadway or minor bridges near the bridge approaches.

Most bridges are built with added safety factors during design so these concerns may not be realized—but they should be factored into decision-making to ensure that all Caltrans bridges can withstand conditions that will change over time.

Fig. 12

STORM SURGE EXAMPLE

Source: National Oceanic and Atmospheric Administration

Climate Action Report Project

Follows on the Climate Change Vulnerability Assessments

1	**Greenhouse Gas Emissions & Mitigations Report**	Updates the 2013 report on the carbon footprint of Caltrans operations. New report will add a discussion of GHG emissions from users of the SHS
2	**Climate Change Adaptation Recommendations & Strategy Report**	An in-depth look at Caltrans policies & procedures to identify changes to help Caltrans adapt the agency to climate stressors
3	**District-level Adaptation Assessment and Strategy Reports**	Uses a weighted scoring system to prioritize projects within each district in terms of the climate-related threats & the consequences of inaction

Thank you!

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