Public Workshop #3

Sea Level Rise Vulnerability Assessment

Funded in part by CCC Grant LCP-14-09

Introducing the Team:

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KEARNS & WEST

Hosted by the Department of City Planning and funded in part by the California Coastal Commission, Grant LCP-14-09

CALIFORNIA COASTAL COMMISSION

Purpose of Today's Workshop:

Share vulnerability assessment conclusions

Provide opportunities for the community to ask questions and get answers

Today's Workshop Format

Presentation

- Vulnerability Assessment- What it is, how it was conducted, and its conclusions
- Examples of adaptation concepts

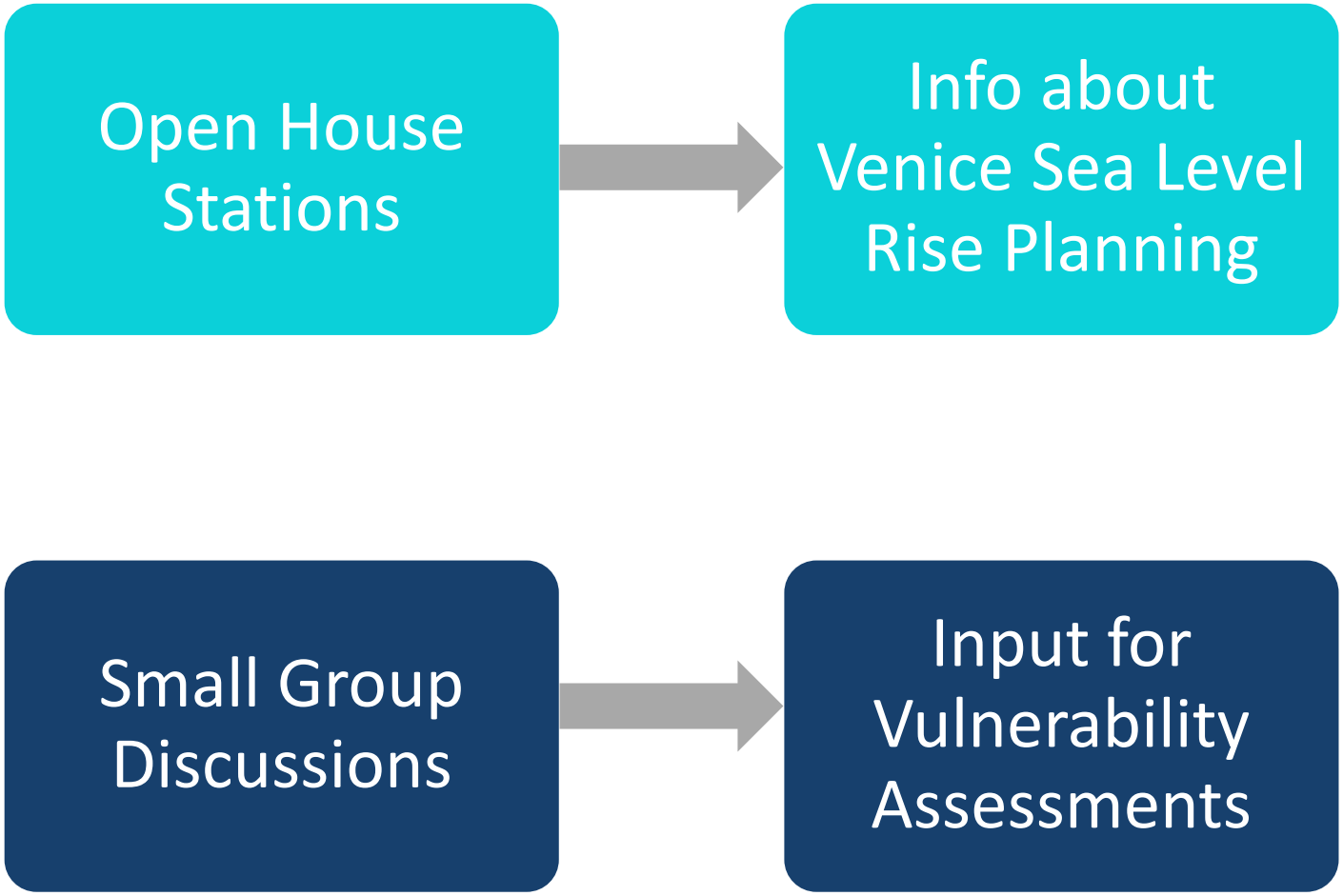
Round Robin Discussions

- Infrastructure and Civic Assets
- Property Assets
- Coastal Amenities, Cultural, and Ecological Assets

Wrap Up

- Information on how to stay involved

November 2017 Workshop Recap



November 2017 Workshop Recap

Major Input Themes

- Canal Hazards and Beach Area Hazards
- Community Involvement
- Flooding
- Habitat in the Beach and Canal Areas
- Infrastructure
- Protect Housing
- Venice Community and Historic Character

Environmental Justice in the Coastal Act

AB 2616 (Burke, 2016)

Section 30604 (h) – When acting on a coastal development permit, the issuing agency, or the commission on appeal, may consider environmental justice or the equitable distribution of environmental benefits throughout the state.

Section 30108.3 – "Environmental justice" means the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.

Social Vulnerability & Environmental Justice

Social Vulnerability

- Socio-economic implications of sea level rise hazards & adaptation strategies

Environmental Justice

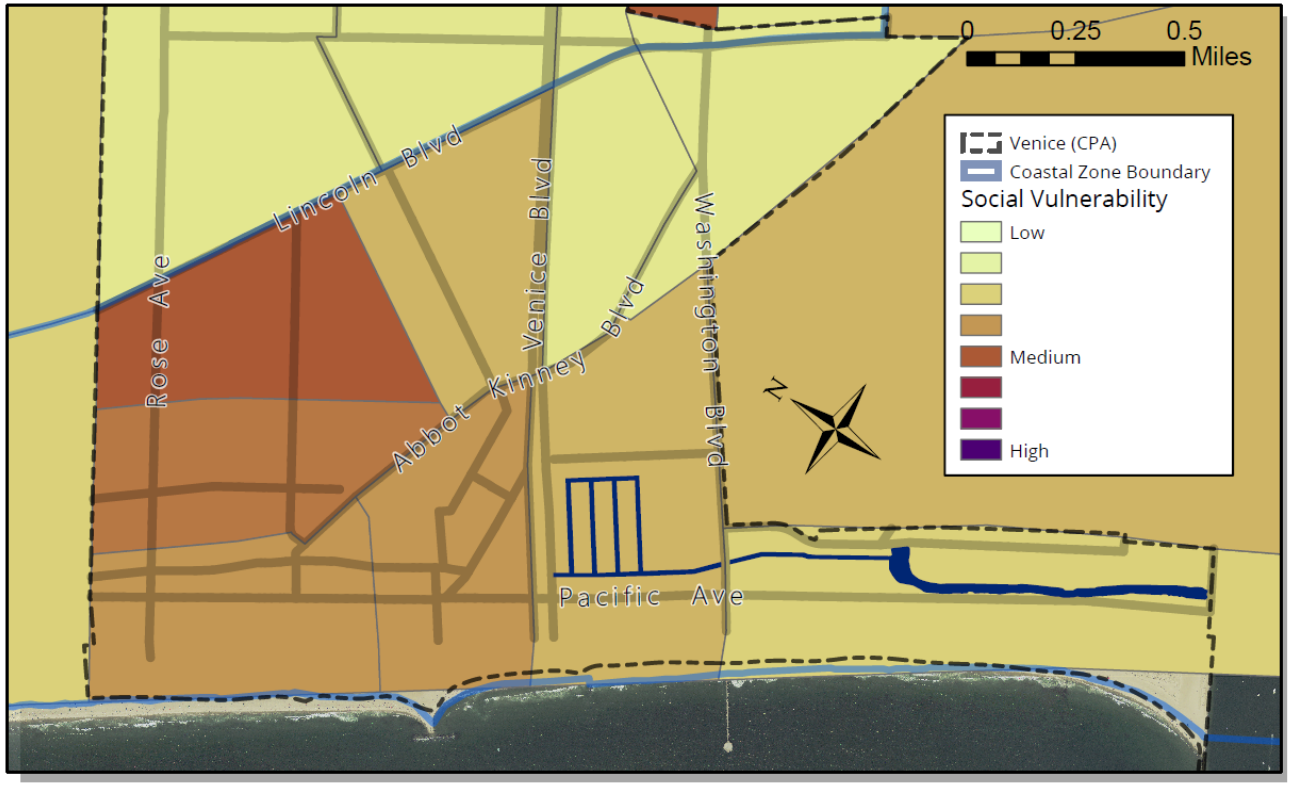
- AB 2616 amended Coastal Act (2016)
- Fair treatment of people of all races, cultures, and incomes
- Equitable distribution of environmental benefits

All asset vulnerabilities & adaptation options have socio-economic implications

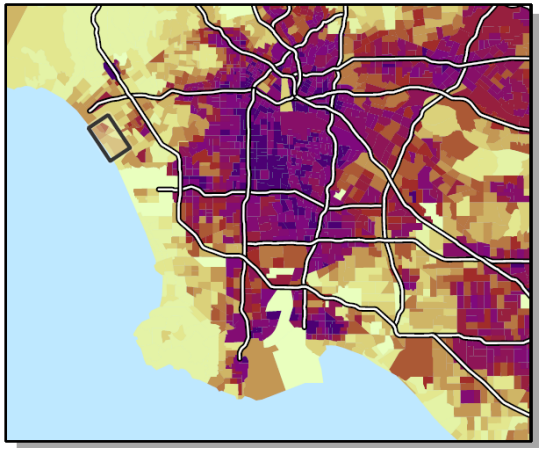
Social Vulnerability Index

2016 Social Vulnerability Index (SVI) based on census data

- 32 variables: education, housing, income, demography, etc..



SVI data from Agency for Toxic Substances & Disease Registry



SVI indicates socially vulnerable areas have lower physical exposure to SLR hazards.

But, SLR hazards could impact services & resources they depend on.

Guiding Questions for Planning Process

- How do the dynamic issues of gentrification, rent displacement and population growth affect Venice's vulnerability to sea level rise?

- How might tide gate failure, flood insurance, storm-related coastal flooding or other sea level rise issues affect displacement or community makeup?

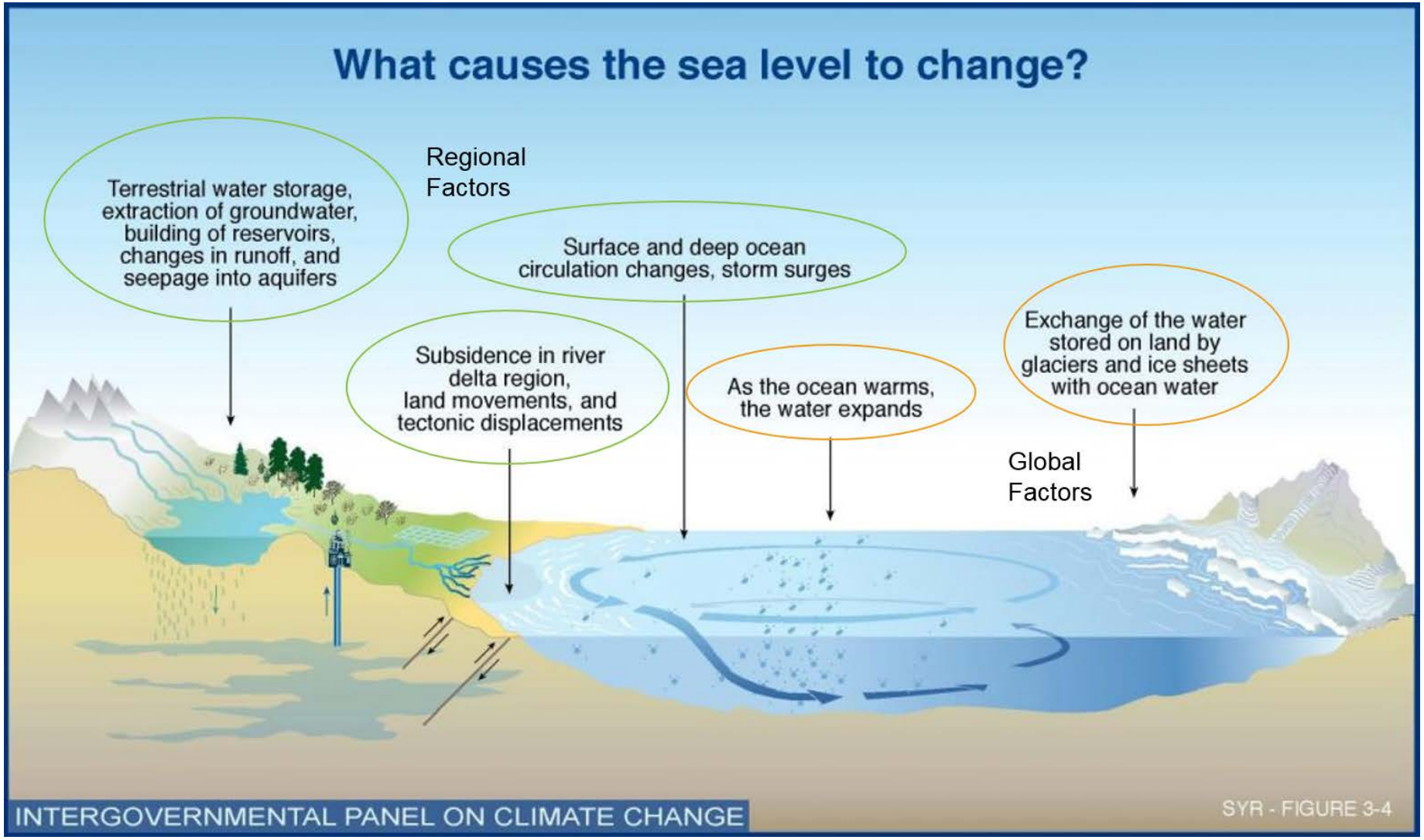
- How will vulnerable populations be impacted by hazards (coastal & inland)?
  - Public safety, mobility, resiliency, etc.

- How will adaptation strategies affect vulnerable populations?

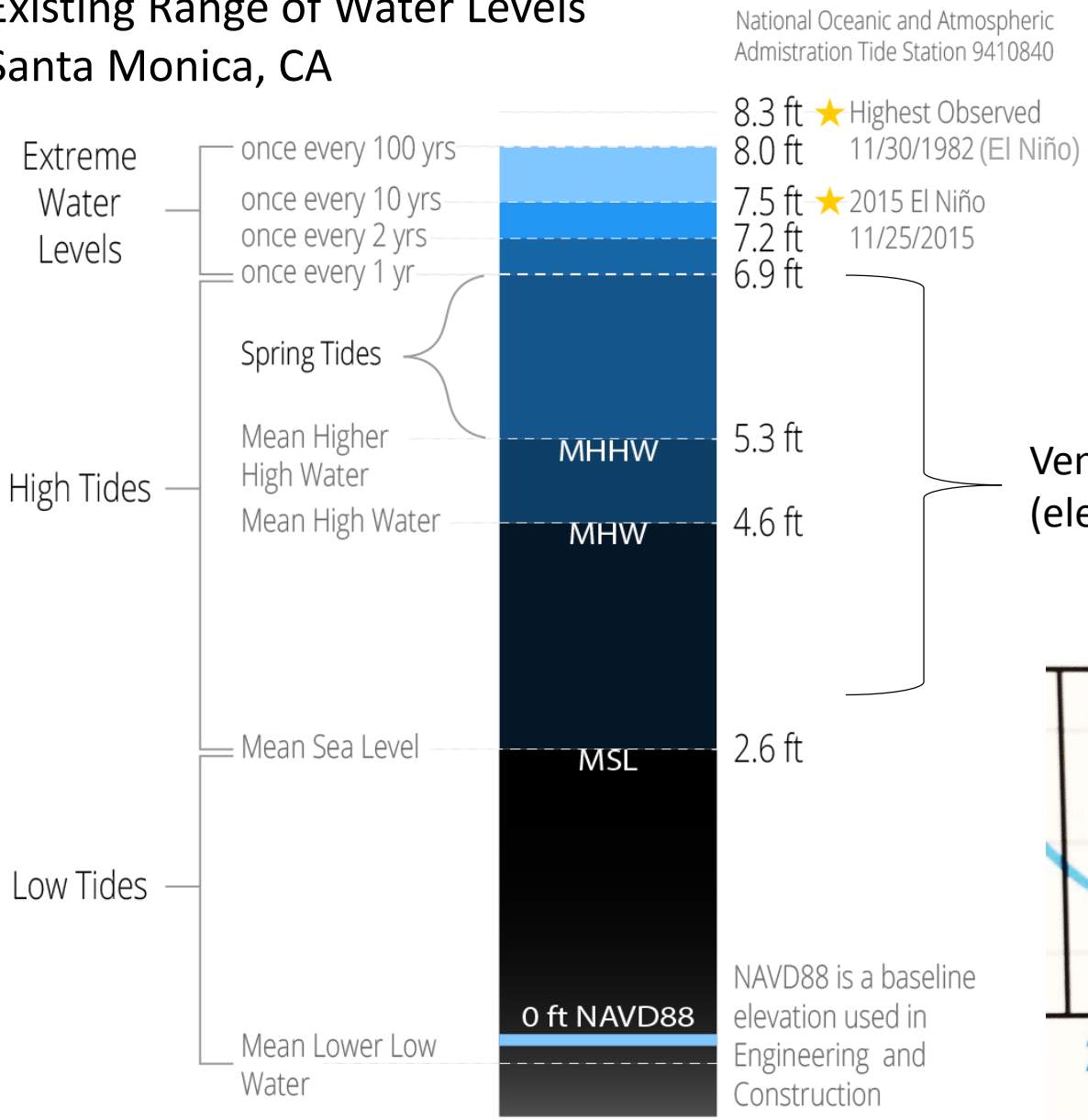
Presentation Topics:

- Sea Level Rise & Projections

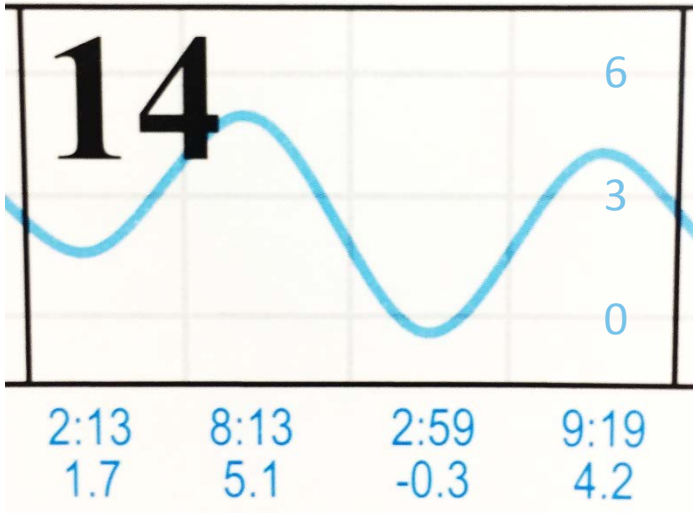
- Vulnerability Assessment
  - What is it?
  - Methodology
  - Asset/Resource evaluations


What causes the sea level to change?
Terrestrial water storage, extraction of groundwater, building of reservoirs, changes in runoff, and seepage into aquifers
Regional Factors
Surface and deep ocean circulation changes, storm surges
Subsidence in river delta region, land movements, and tectonic displacements
As the ocean warms, the water expands
Exchange of the water stored on land by glaciers and ice sheets with ocean water
Global Factors
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
SYR - FIGURE 3-4

Existing Range of Water Levels
Santa Monica, CA



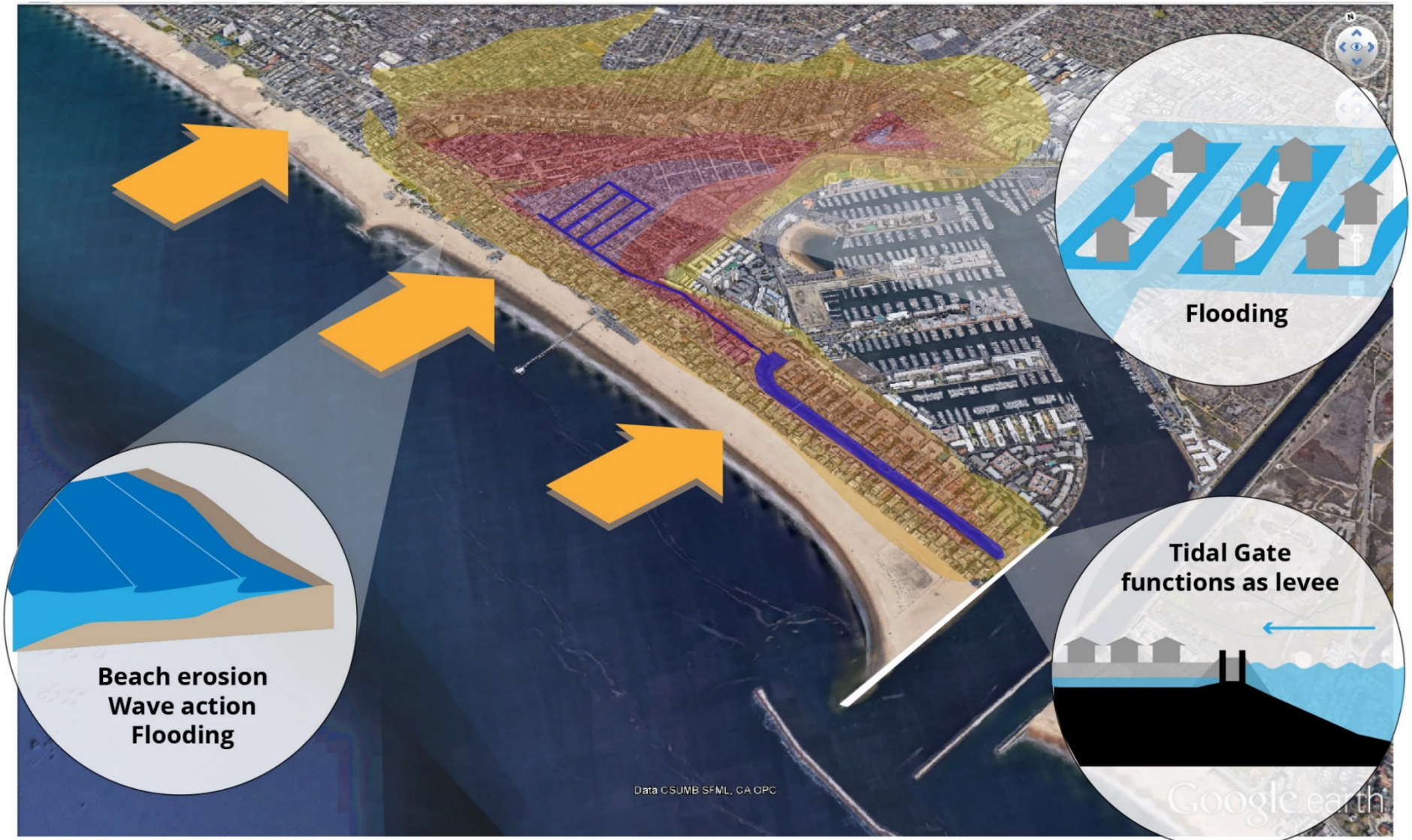
Venice Canals / Southeast Venice (elevation ranges from 3 - 7 ft)



Sea Level Rise Projections Vary Greatly, The most recent State guidance suggests:

Sea level Rise *(above 1991-2009 baseline)*	When would it occur?
6.6 feet (200 cm)	2090 - 2150+
4.9 feet (150 cm)	2080 - 2150+
3.3 feet (100 cm)	2060 - 2100+
1.6 feet (50 cm)	2040 - 2080
0 feet	Today

Venice Sea Level Rise Hazards Summary Diagram



Coastal Storm Hazards


Victor Decolongon/Getty Images


1983 El Niño

CoSMoS 3.0 (Phase 2) used to represent coastal hazards (erosion wave runup & flooding) from an extreme event combined with multiple sea level rise scenarios

http://www.treasurenet.com/forums/general-discussion/82454-photo-trip-el-nino-january-1983-santa-monica-venice-beaches.html

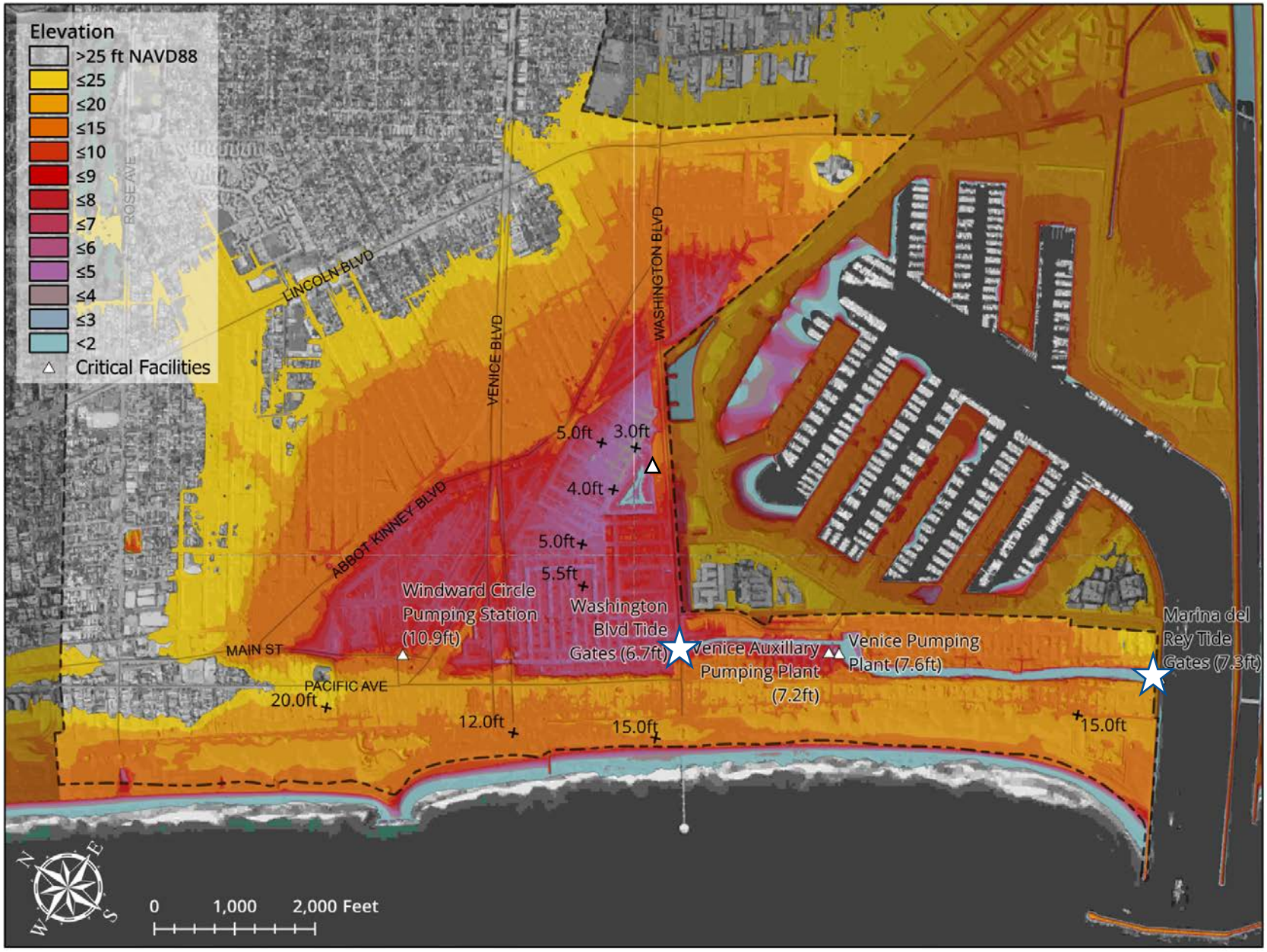
Inland Flood Hazards

Inland flood potential mapping considers a tide gate malfunction during a monthly high water level (6.5 feet), consistent with ESA's approach to assessing low-lying areas in the AdaptLA study.

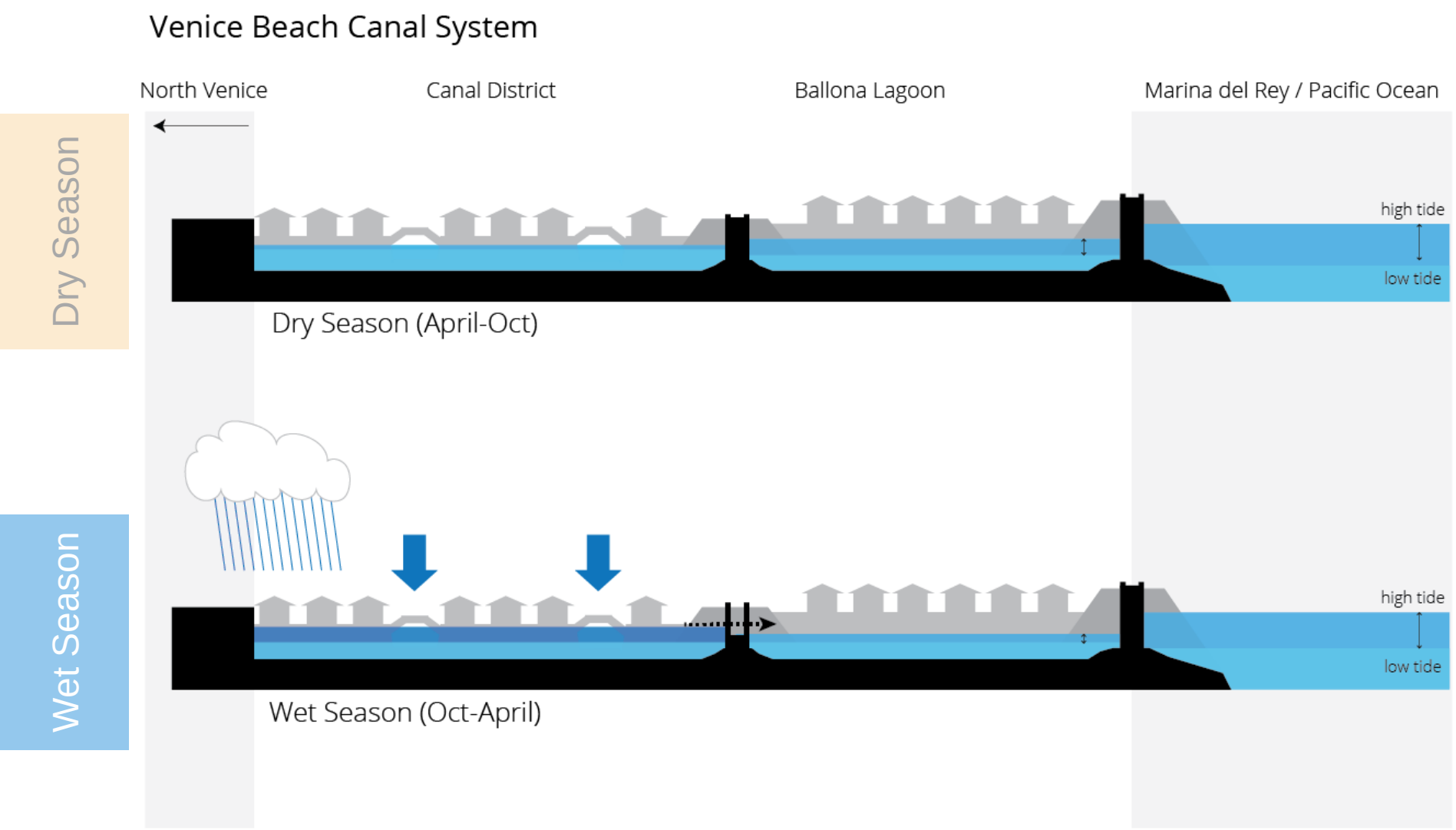

1983 Flooding in Venice Beach (Fred Barthel)

Multiple potential flood sources:

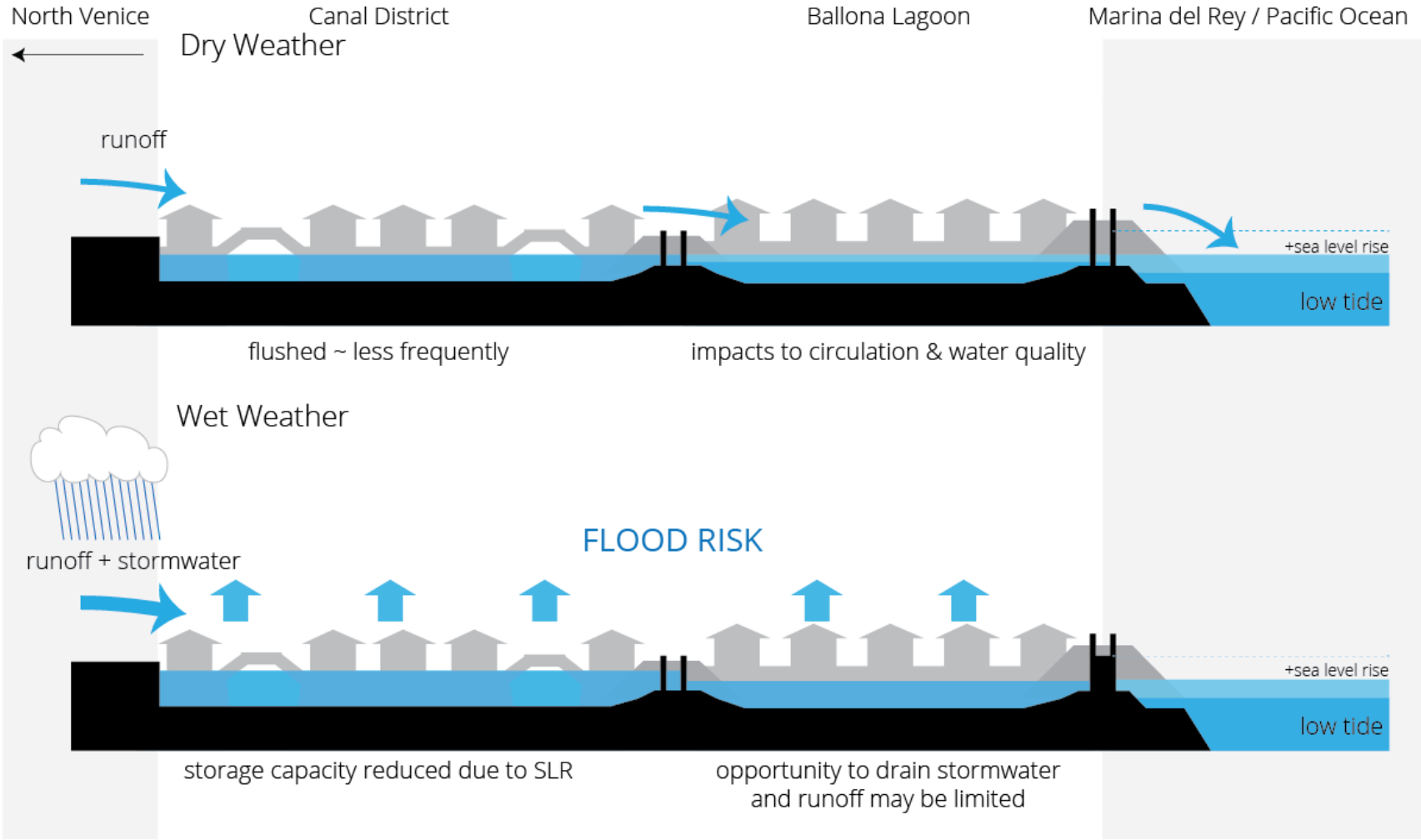
- Tidal flooding (tide gate malfunction)
- Extreme rainfall event coincides with high tide
- Coastal flooding (wave overtopping)


Elevation
>25 ft NAVD88
≤25
≤20
≤15
≤10
≤9
≤8
≤7
≤6
≤5
≤4
≤3
<2
Critical Facilities
Lower
Higher
ROSE AVE
LINCOLN BLVD
VENICE BLVD
WASHINGTON BLVD
ABBOT KINNEY BLVD
MAIN ST
PACIFIC AVE
5.0ft
3.0ft
4.0ft
5.0ft
5.5ft
20.0ft
12.0ft
15.0ft
15.0ft
Windward Circle Pumping Station (10.9ft)
Washington Blvd Tide Gates (6.7ft)
Venice Auxillary Pumping Plant (7.2ft)
Venice Pumping Plant (7.6ft)
Marina del Rey Tide Gates (7.3ft)
0
1,000
2,000 Feet

Dual Tide Gate System



Sea Level Rise Impacts



Vulnerability Assessment – What is this?

The Vulnerability Assessment identifies the **physical exposure** to resources and assesses vulnerability by looking at the **sensitivity** and **adaptive capacity** of each resource.

The Vulnerability Assessment informs the Local Coastal Plan Update by determining **potential consequences** and **sea level rise thresholds** for the Venice Community.

The Local Coastal Plan Update will include **adaptation strategies** to help mitigate potential consequences.

Vulnerability Assessment Methodology

1) Establish inventory of coastal resources

communities, property, habitat, infrastructure

2) Assess physical exposure to sea level rise

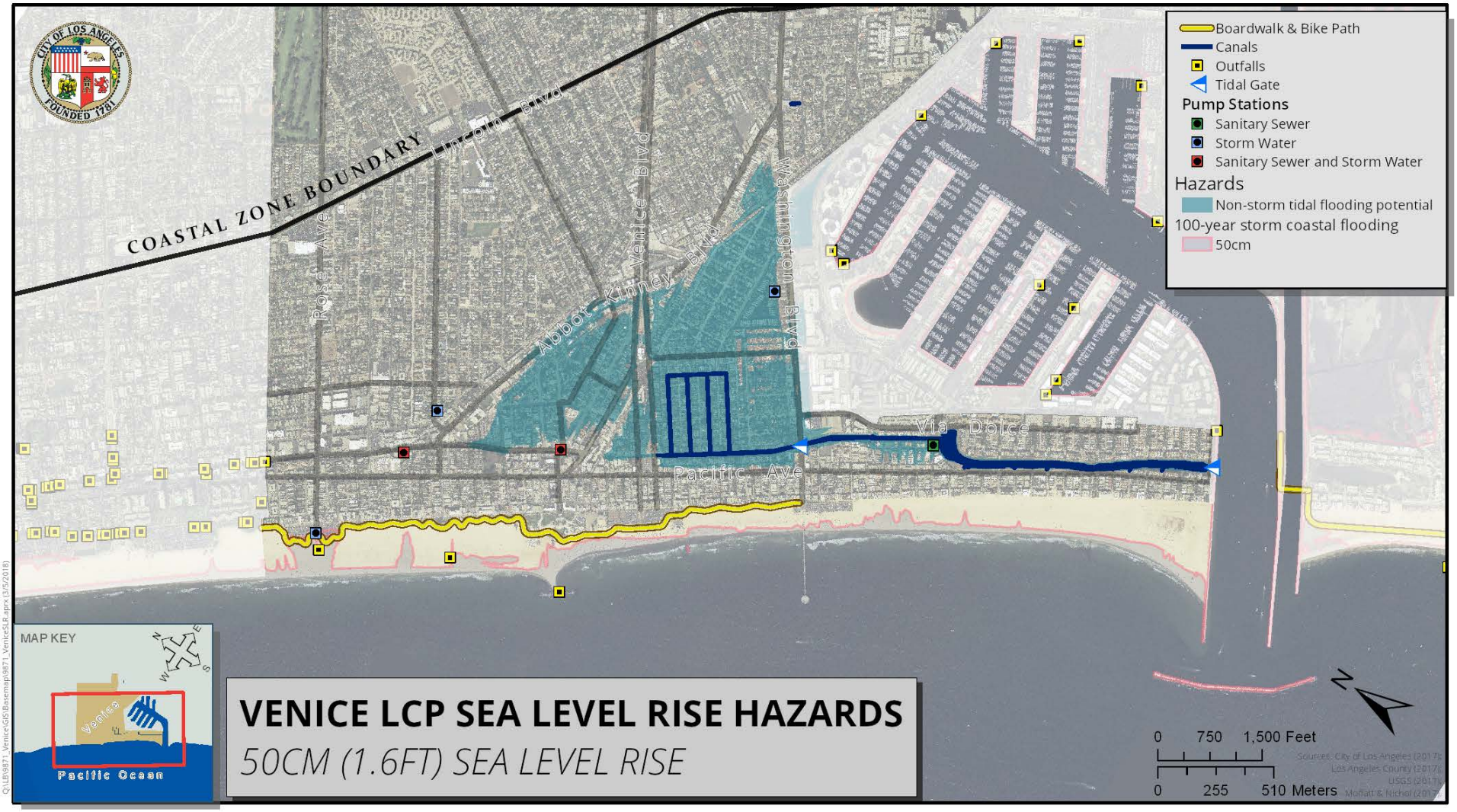
sea level rise + coastal hazards

3) Analyze Vulnerability

exposure / sensitivity / adaptive capacity

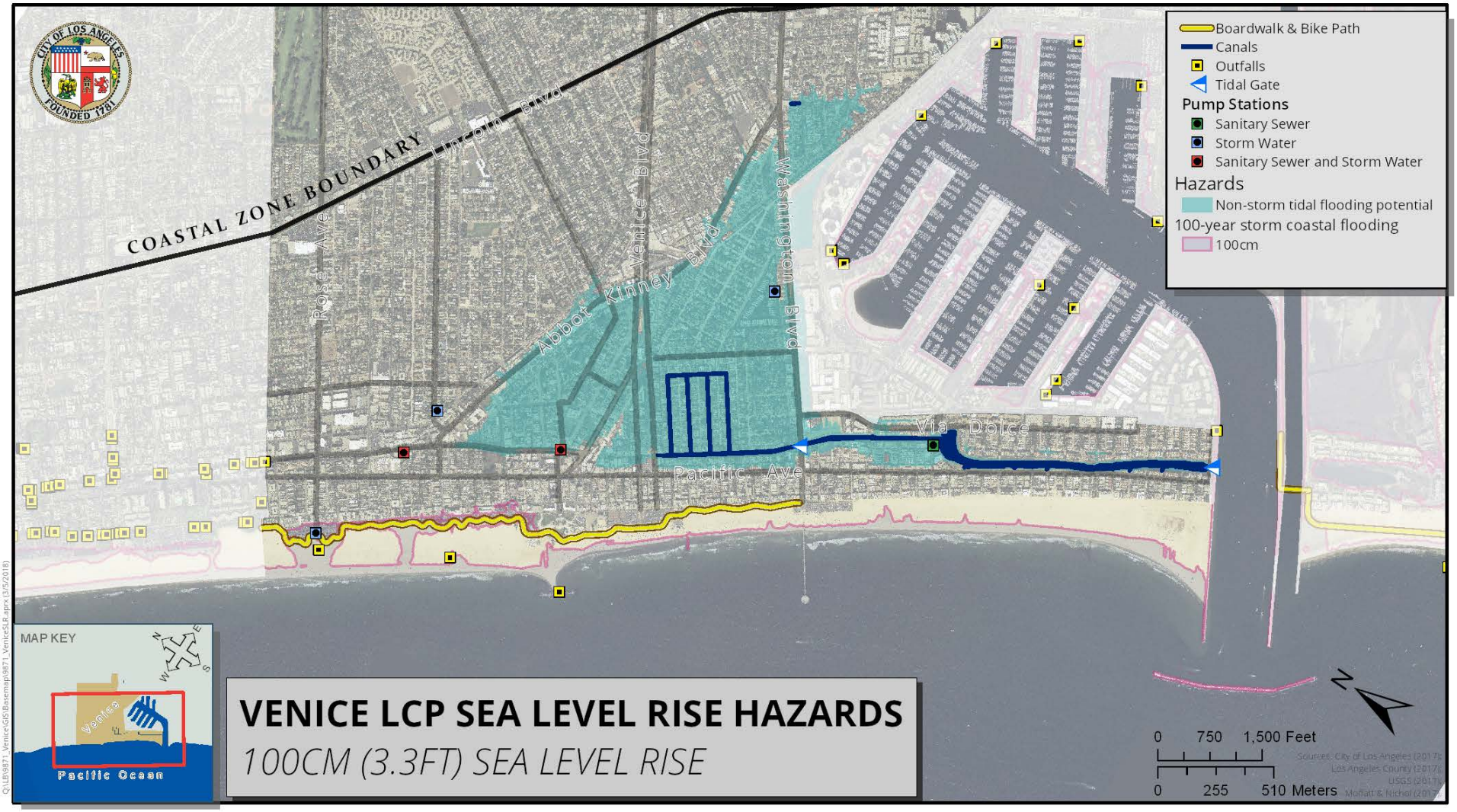
Current Sea Level +0.0 ft

Inland flood potential in Venice Canals and low-lying areas (Southeast Venice)



+1.6 ft (2040-2080)

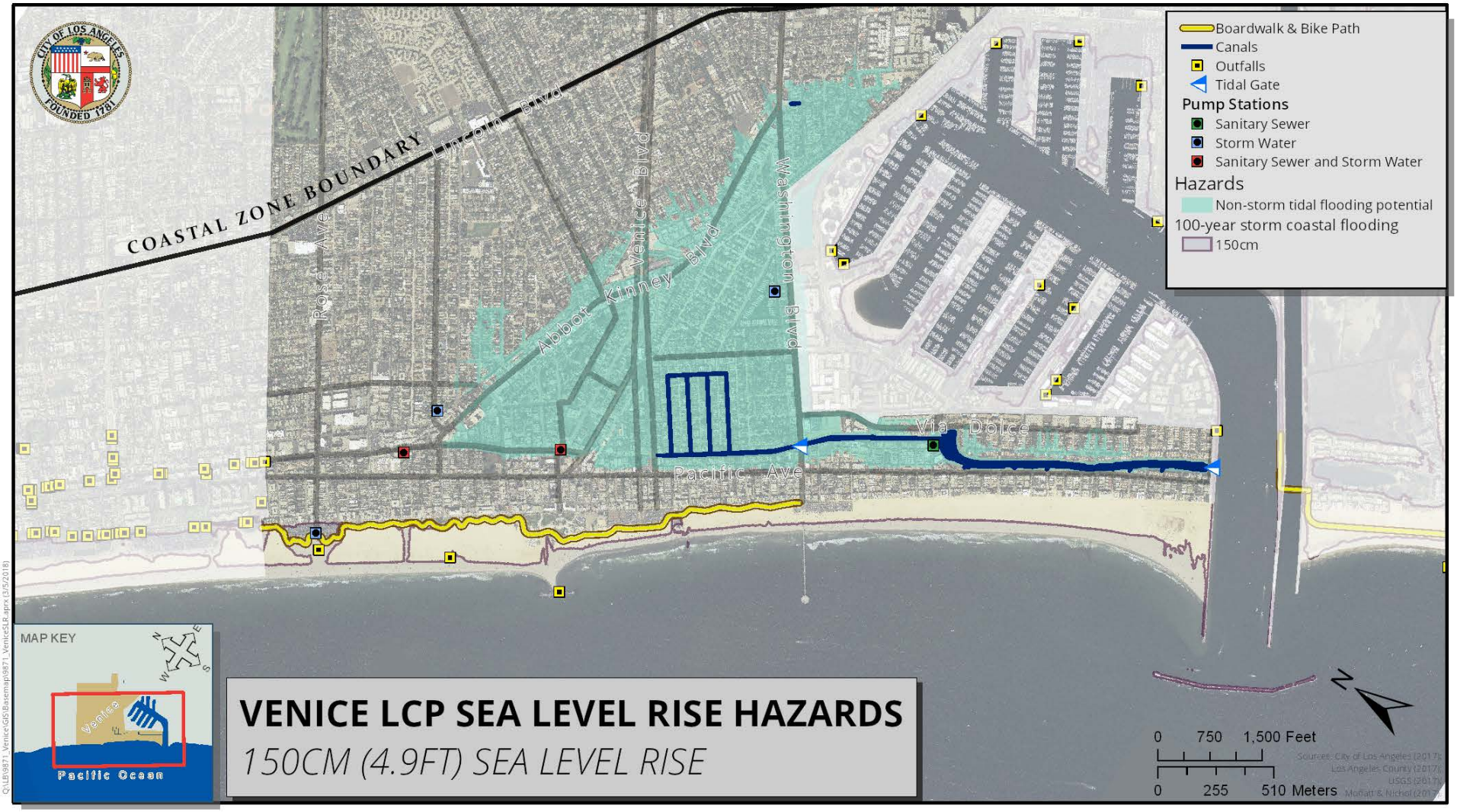
Inland flood potential expands north across Venice Blvd into North Venice



+3.3 ft (2060 to 2100+)

Inland flood potential expands along Abbot Kinney Blvd / into Oxford Triangle

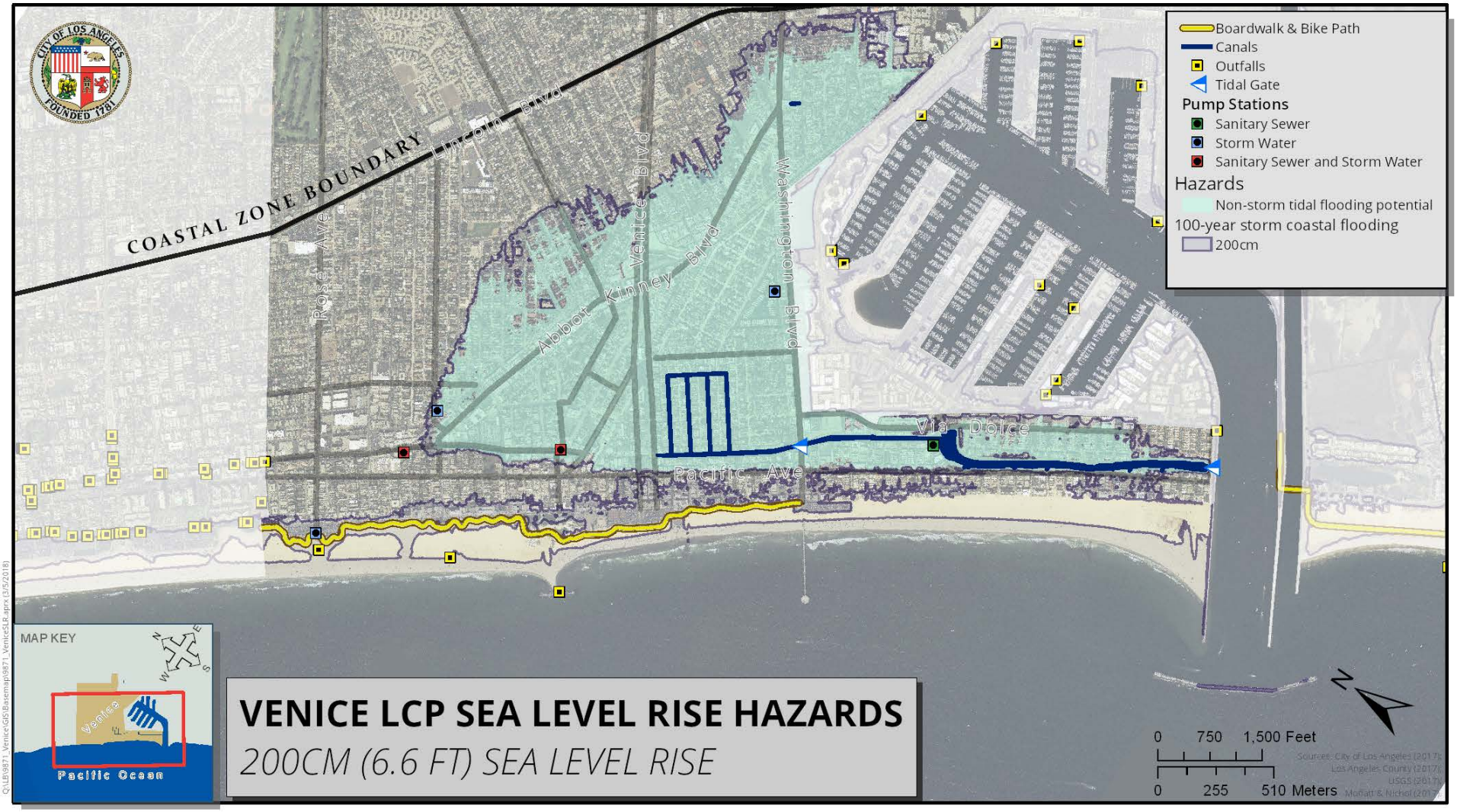
Coastal flooding of Boardwalk and Venice Rec. Center during extreme event



+4.9 ft (2080 to 2150+)

Inland flood potential expands across Abbot Kinney Blvd & Oxford Triangle

Coastal erosion & flooding threaten lifeguard HQ and Venice Rec. Center



+6.6 ft (2090 to 2150+)

Inland flooding extends into Oakwood and Milwood communities

Coastal flooding expands to inland area (for any storm)

Infrastructure

Assets evaluated:

- Tide gates
- Wastewater
- Stormwater
- Transportation
- Utilities (water & power)
- Coastal protection

Stormwater Pump Plants

Critical for flood protection.

Service areas and pump stations could flood with +1.6 ft SLR during tide gate failure.

Maintenance issues exacerbated by SLR affects on beach outfalls.

Tide Gates

Critical for flood protection.

Prevent flooding at high tides / drain stormwater during low tides

Tide gate operations sensitive to SLR

VPP/ VAPP

Critical wastewater facility / large service area

Venice Pumping Plant at risk to flooding from tide gate failure +1.6 ft SLR

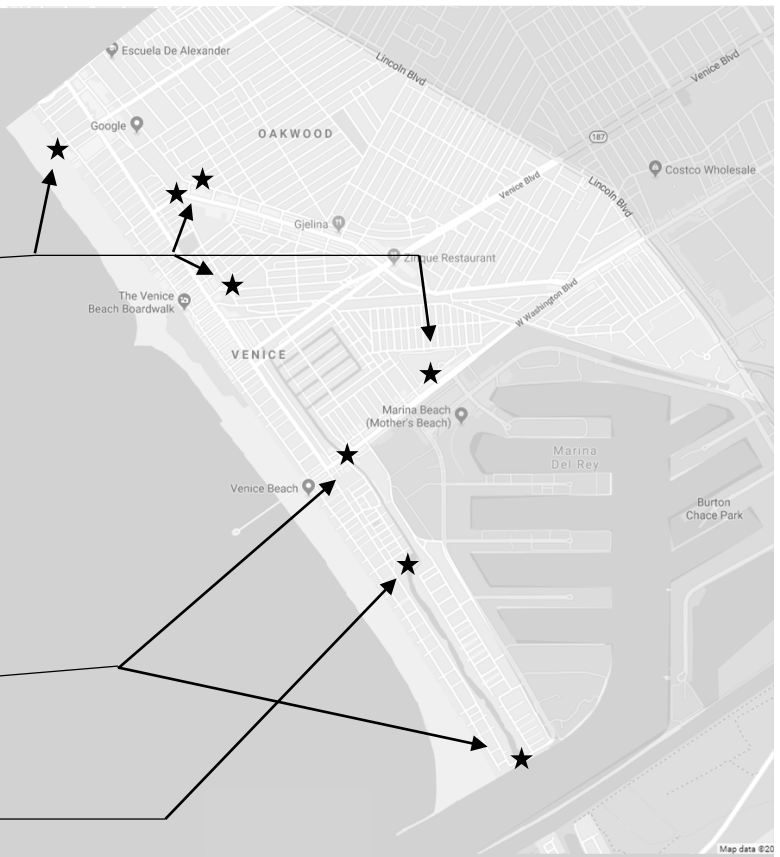
Transportation

Length streets flooded:

8+ miles (no SLR)

35+ miles (+6.6 ft SLR)

~6 miles of bikeways could be flooded.



Exposure: High exposure for infrastructure within inland low lying areas

Sensitivity: physical vs functional

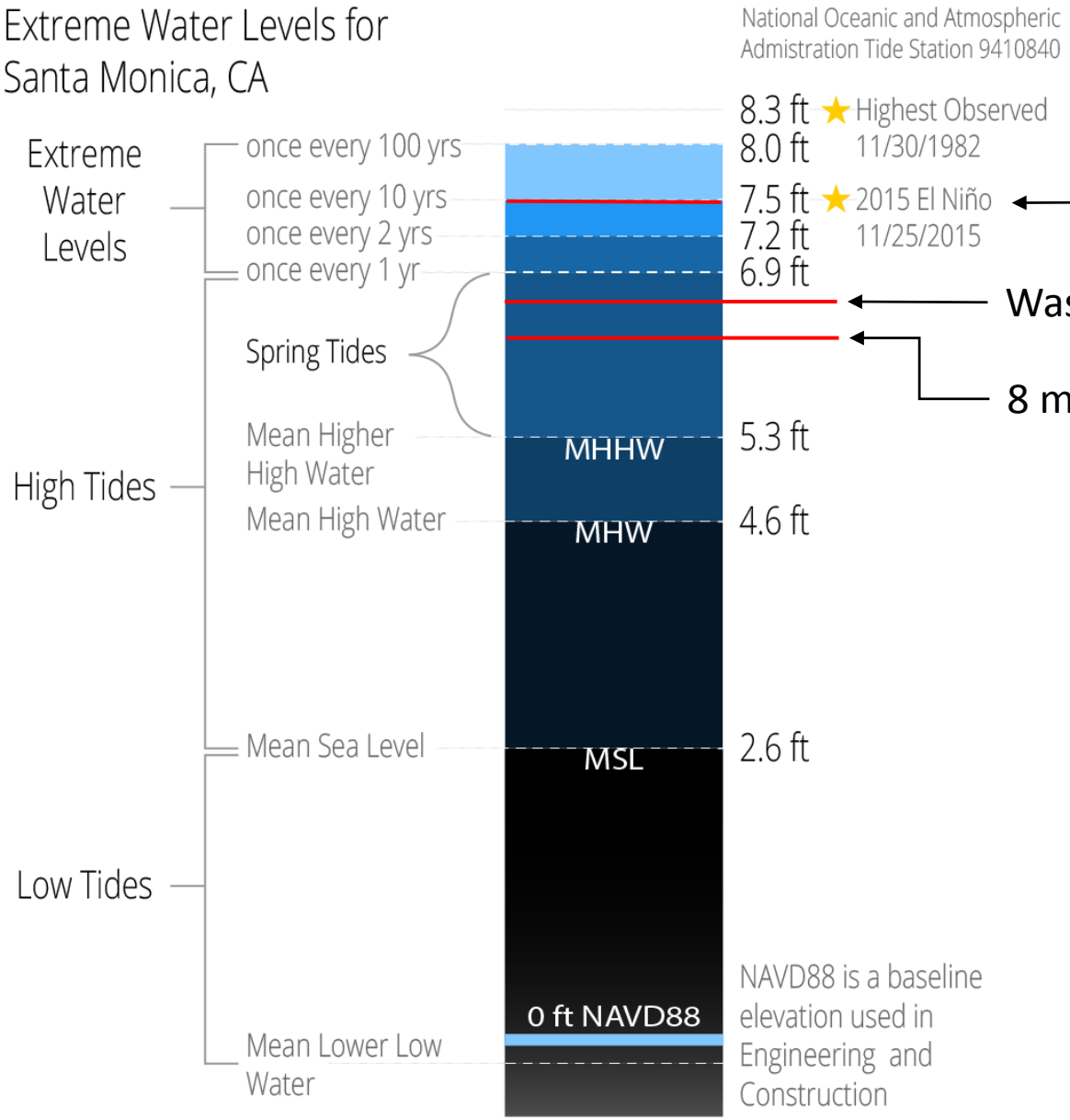
- Physical – damage resulting from flooding, erosion or wave impact
  Example: Coastal protection sensitive to physical damage, leads to functional impact
- Functional – service or operation provided by asset is impaired
  Example: Tide gates – function/operation highly sensitive to SLR

Adaptive Capacity: limited / improvements needed to build in added capacity

Adaptation Strategies:

- Pump station to service Canals area? Flood protection vs Habitat trade off
- Improve redundancy & resiliency

Extreme Water Levels for Santa Monica, CA



Exposure
- High for inland low-lying areas - flood potential exists today
- Lower for coastal storm flooding / 6.6 ft SLR (2090 – 2100+)

Sensitivity
- Highly sensitive to flooding / cost of damage / disruption to community

Adaptive capacity
- Temporary flood proofing (sand bags/elevate valuables): flooding <1 ft deep
- Limited adaptive capacity for flooding > 1 ft

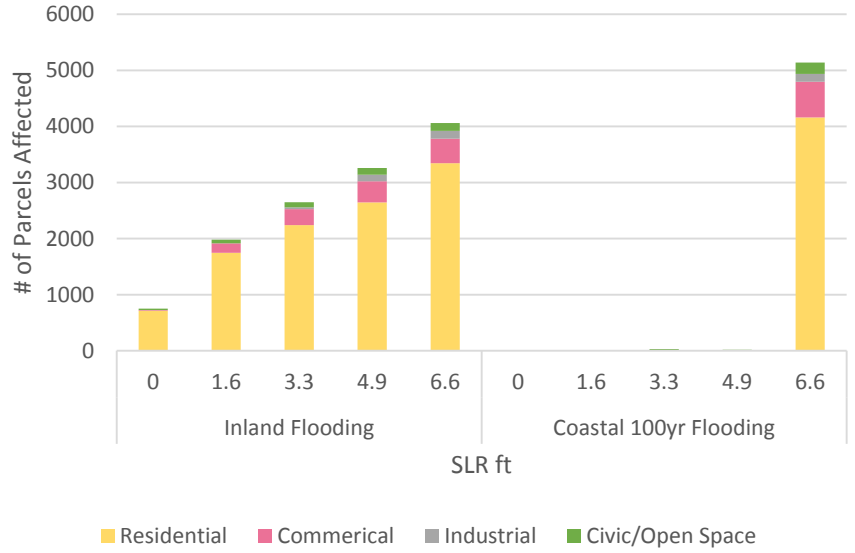
Adaptation Strategies:
- Infrastructure upgrades
- Raise finish floors
- Emergency plan
- Resiliency

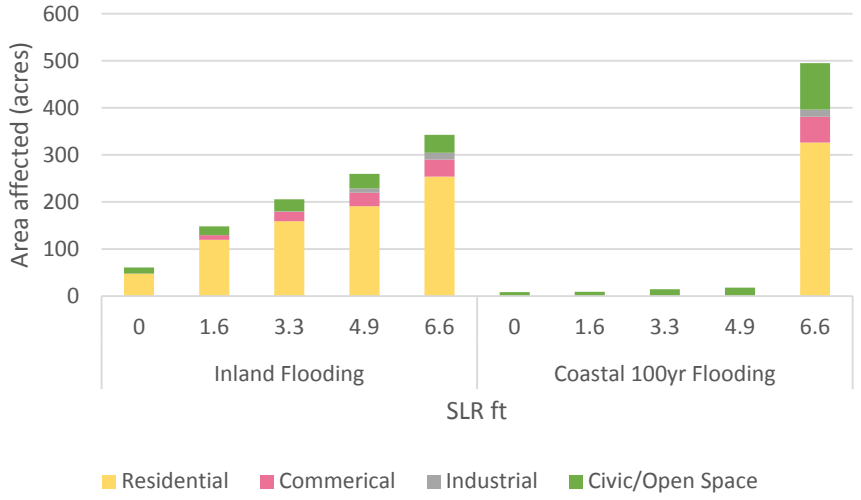
Property

Summary

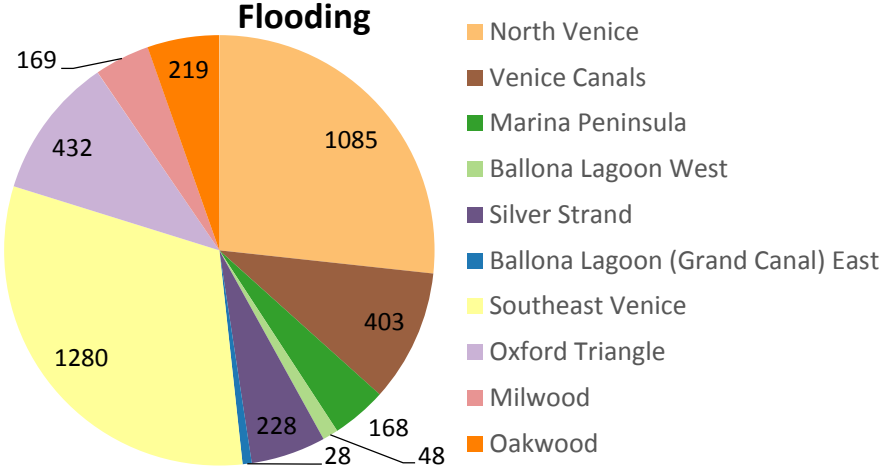
Description

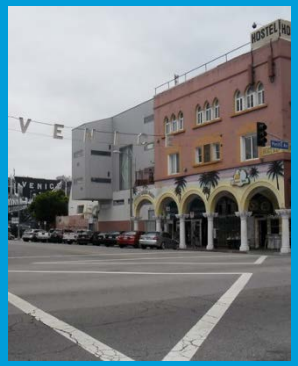
Parcel Analysis





of Parcels Affected for +6.6 feet Inland Flooding





Cultural

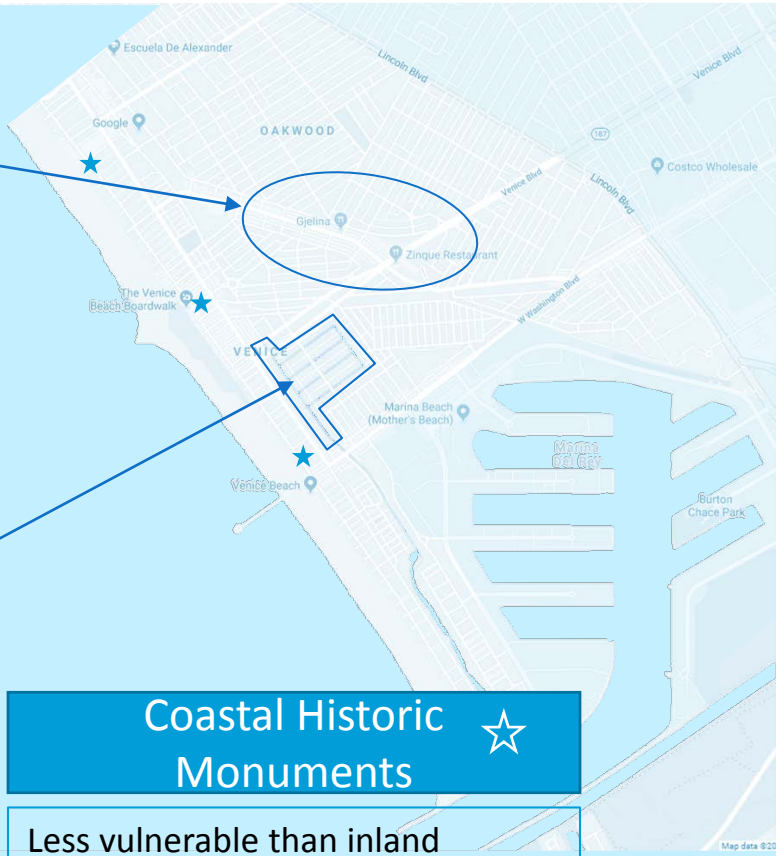
Assets evaluated:

- Venice Canal Historic District
- Kinney-Tabor House
- Venice Branch Library
- Venice Division Police Station
- Sturdevant Bungalow
- Venice City Hall
- Venice of America House
- *Venice West Café*
- *Warren Wilson Beach House*
- *Venice Arcades*

Abbot-Kinney & Venice Blvd Historic Monuments

Monuments such as Venice of America House could be flooded with tide gate failure and +1.6 ft SLR

Others within potential flood zone with higher SLR increments



Venice Canals Historic District

Potential for flooding today if tide gates were to fail.

Tide gate operations may raise average water level in the district changing aesthetic quality.

Water quality impacts from reduced flushing.

Coastal Historic Monuments ☆

Less vulnerable than inland monuments

Venice West Café borders modeled 100yr flood of CoSMoS +3.3 ft SLR (2060 – 2100+)

Potential for temporary flooding of first floors during 100-year coastal storm +6.6 ft SLR (2090 – 2100+)

Exposure
- High for Canals district & resources near Abbot Kinney & Venice Blvd
- Lower for coastal storm flooding / 3.3 ft SLR (2060 – 2100+)

Sensitivity
- Highly sensitive to flooding / cost of damage / restoration

Adaptive capacity
- Temporary flood proofing (sand bags/elevate valuables): flooding <1 ft deep
- Limited options to preserve historic character

Cultural

Adaptation Strategies:
- Infrastructure upgrades (Protect)
- Flood proofing
- Resiliency

Assets evaluated:

- Bus Lines
- Parking Lots
- Lifeguard HQ & Towers
- Low-Lying Schools:
  - Coeur d'Alene
  - Westminster
  - Westside Global Awareness Magnet
- LAPD Venice Substaton
- LA Fire Station #63

Civic

Lifeguard HQ

Beach often narrowest in front of Lifeguard HQ

Damaged in ‘82-83 storms

Increased potential for wave and storm related damage with SLR

Low-lying Elementary Schools

Tide gate failure could flood portions of Westminster and Westside Global Magnet elementary schools.

Fire and Police Stations

With +4.9 ft SLR, Fire Station 63 could have reduced access due to flooding from tide gate failure

Access to LAPD Substation at Venice Beach could be impacted by 6.6ft 100 yr storm.

Bus lines / Parking

Several bus lines including Metro 33/733 could be temporarily interrupted by flooding from tide gate failure

City and County parking lots at risk of temporary flooding with +1.6 ft SLR

Civic

Exposure
- High exposure to inland flooding for parking lots, bus lines, and Westminster Elementary
- Sustained coastal or inland flooding could affect service areas.

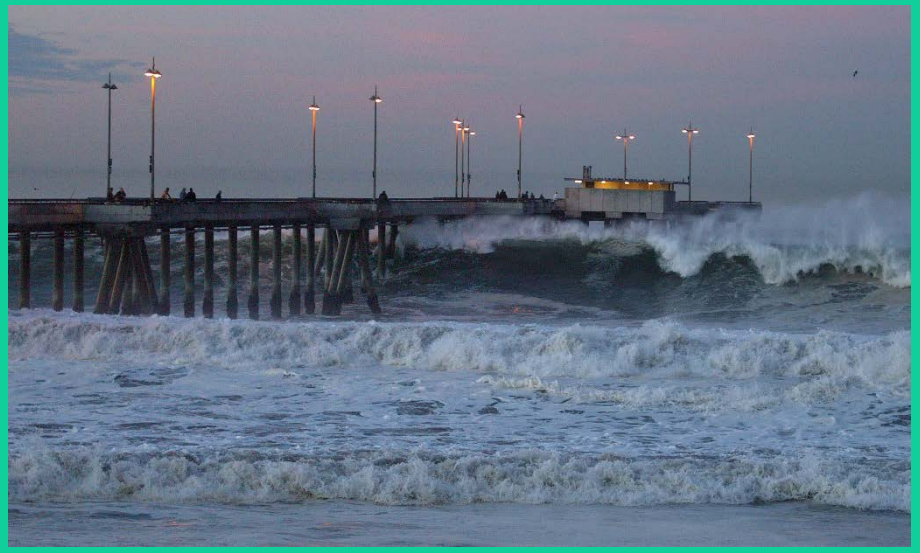
Sensitivity
- Emergency services highly sensitive to loss of access
- Schools considered highly sensitive resource

Adaptive capacity
- Lifeguard towers highly mobile
- Civic centers such as schools have limited resources to adapt

Adaptation Strategies:
- Emergency planning
- Infrastructure upgrades (Protect)
- Relocation

Assets evaluated:

- Venice Beach Recreation Center
- Oakwood Recreation Center
- Venice Beach Boardwalk
- Venice Fishing Pier
- Beach Recreation



Coastal Amenities

Venice Boardwalk

Boardwalk could temporarily flood during 100yr storm +3.3ft

Potential for storm-related damages.

Impacts to tourism economy, vendors and retailers

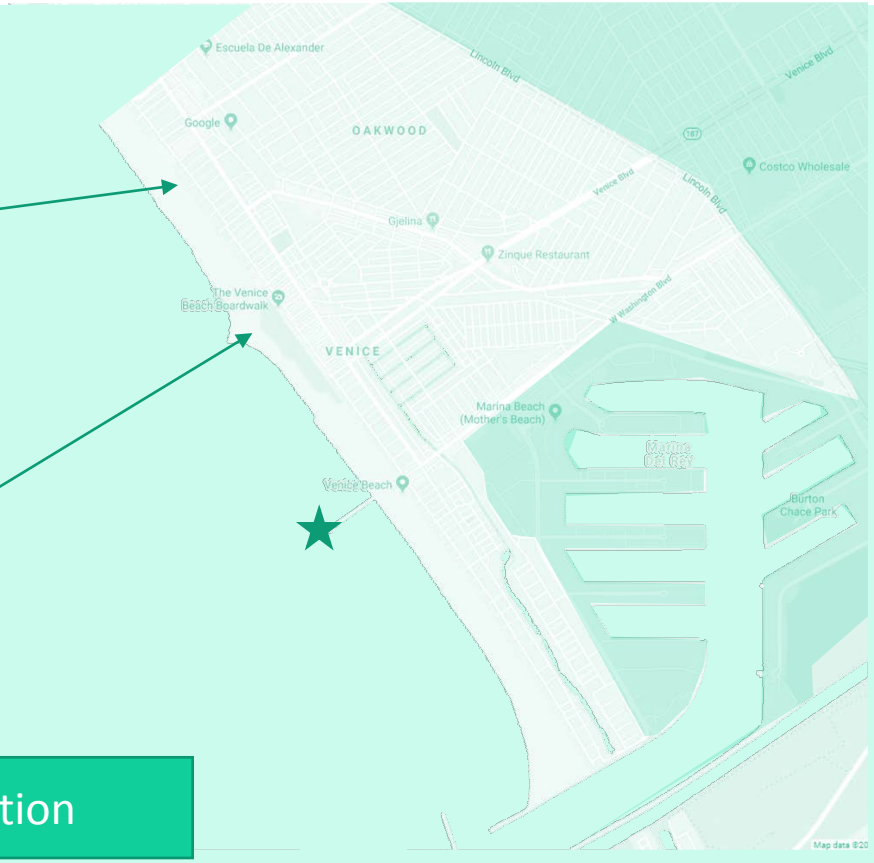
Venice Recreation Center

Low-lying portions of recreation center could flood during 100yr storm +3.3 ft SLR (2060 – 2100+)

Reduced effect of breakwater could alter beach width & shoreline configuration

Venice Fishing Pier ☆

Pier damaged by storms in the 80s SLR increases potential damage from large wave events



Beach Recreation

Erosion of beach due to SLR could have major economic impacts on tourism & visitor serving commercial industries

SLR increases potential loss of beaches & amenities during large storms

Coastal Amenities

Exposure

- Beachfront amenities could experiences damage from extreme storms (>3.3ft+ of sea level rise / 2060 - 2100)
- Beach Recreation could be affected by erosion of 50ft (short term) to 300ft (long term)

Sensitivity

- Beach recreation sensitive to storm frequency and chronic erosion
- Recreation Centers important resource for Venice and LA Region, therefore sensitive to loss of capacity or damage

Adaptive capacity

- Repairs and nourishment may be expensive but can restore full functionality

Adaptation Strategies:

- Resiliency
- Living Shoreline
- Relocation

Assets evaluated:

- Sandy Beach Habitat
- Ballona Lagoon Marsh Preserve
- Canals Habitat Area
- Coastal Rocky Nesting Habitat

Ecological

Sandy Beach Habitat

Beach erosion could range from 0 - 100 ft with +1.6ft and 100-350 ft with +6.6 ft.

Includes protected species (Snowy Plover, Least Tern, Grunion)

Ballona Lagoon Marsh Preserve

Sensitive to changes in salinity from tide gate operations

Vulnerable to “coastal squeeze”

Loss of vital intertidal habitat

Canals Ecological Sensitive Habitat

Less intertidal habitat than Ballona Lagoon, relatively more mudflat

Potential effects on Water Quality from reduced flushing

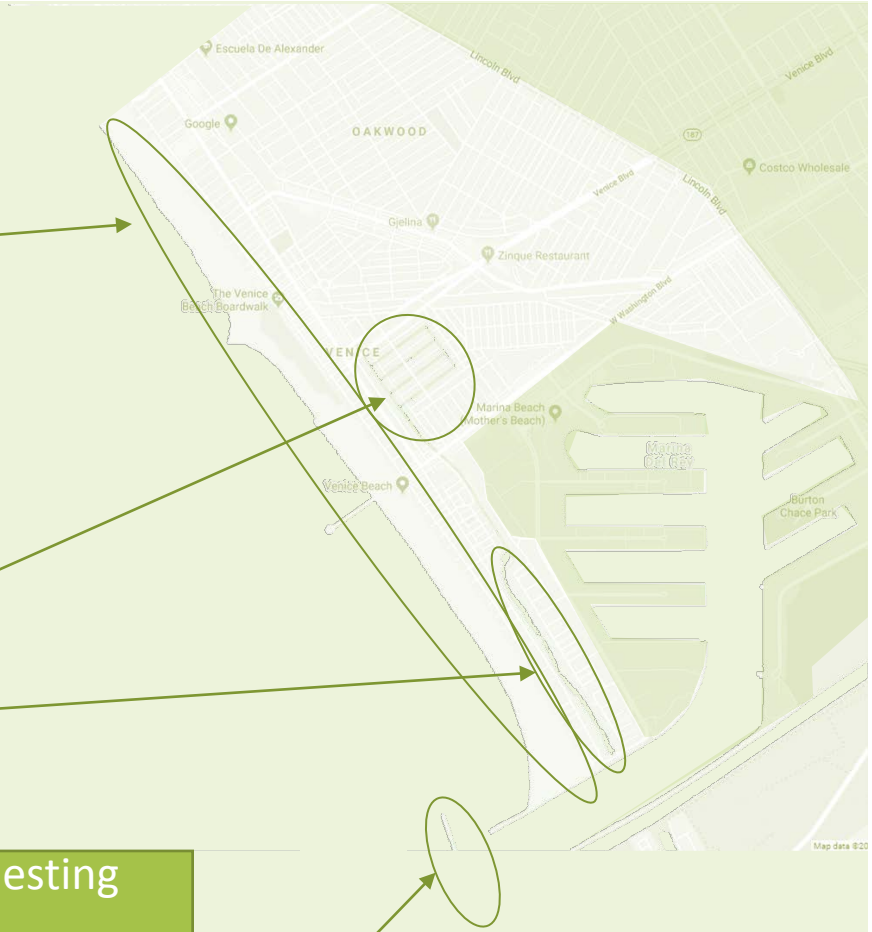
Increase in subtidal habitat

Coastal Rocky Nesting Habitat

Recovering CA Brown Pelican Nesting Area (CNDBB)

Loss of habitat with SLR

Potential for relocation to Marina jetties



Exposure
- Erosion of 50 feet (short term) to 300 feet (long term) of beach
- Water quality and tidal flow of canals likely affected by tide gates

Sensitivity
- Endangered Species such CA Snowy Plover at critically low habitat for nesting
- Plant species within canals area limited migration area causing loss of habitat (Coastal Squeeze)

Adaptive capacity
- Habitat can be restored
- Large beach allows for increase in future restored/protected habitat

Ecological

Adaptation Strategies:
- Restoration
- Relocation of protected beach areas

Discussion Groups

1. Find the table corresponding to the number on your nametag

2. The facilitator will guide the discussion and take notes, and the project team member will answer questions

3. A new facilitator and subject matter expert will rotate to your table until your group has discussed all three topics

Infrastructure and Civic Assets	Property Assets	Coastal Amenities, Cultural and Ecological Assets

Tips for Productive Discussions

- Let one person speak at a time
- Help to make sure everyone gets equal time to give input
- Keep your input concise so others have time to participate
- Actively listen to others and seek to understand their perspectives
- Offer ideas to address questions and concerns raised by others