Adapting to Rising Tides Bay Area
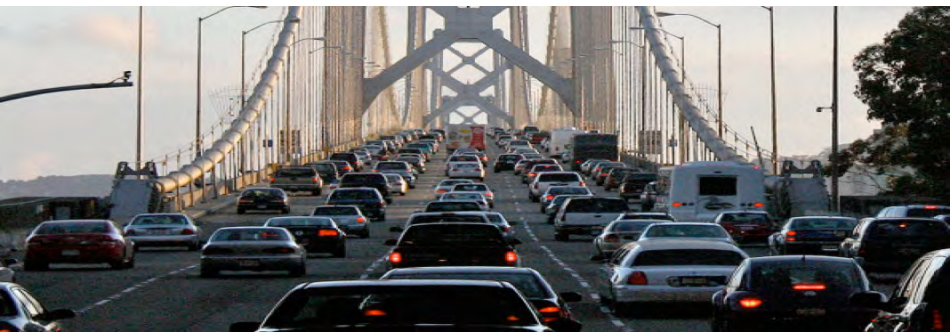
Regional Working Group Meeting #3
Novato City Hall
February 14, 2018

Project Partners

- Agency staff
  - Caltrans (funder, along with BATA)
  - MTC (grant recipient)
  - BARC (project manager)
  - BCDC ART team

- Consultant team
  - AECOM
  - Natural Capital

- Stakeholders
  - Regional Working Group – 12 meetings
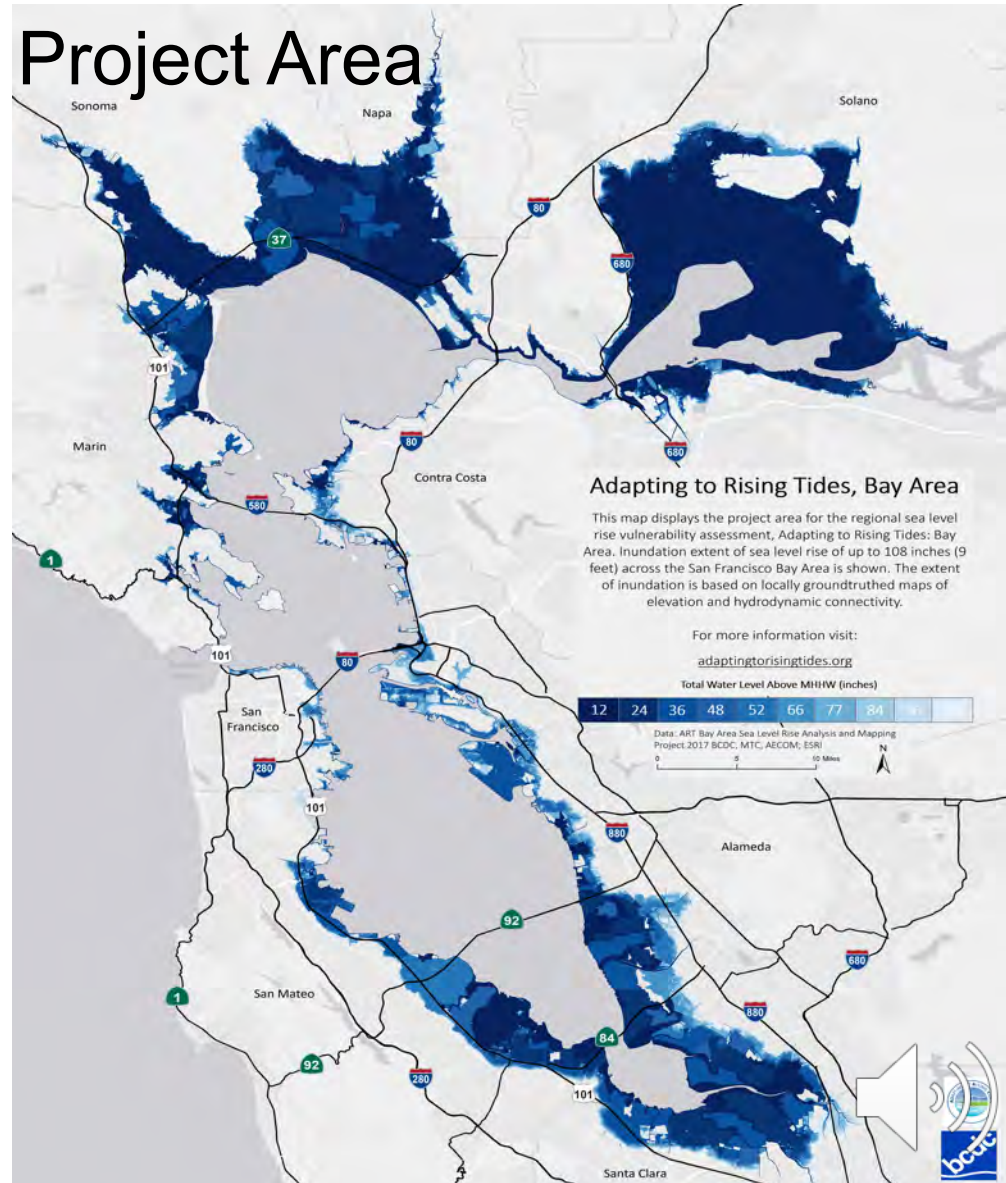 - Public – 7+ meetings and other outreach

Project Objective

Conduct regional-scale analysis to understand sea level rise impacts on:

– Functioning regional transportation network linking people, jobs, services

– Our most vulnerable residents

– Other critical infrastructure

– ecological systems

Project Area

Adapting to Rising Tides, Bay Area

This map displays the project area for the regional sea level rise vulnerability assessment, Adapting to Rising Tides: Bay Area. Inundation extent of sea level rise of up to 108 inches (9 feet) across the San Francisco Bay Area is shown. The extent of inundation is based on locally groundtruthed maps of elevation and hydrodynamic connectivity.

For more information visit:
adaptingtorisingtides.org

Total Water Level Above MHHW (inches)

| 12 | 24 | 36 | 48 | 52 | 66 | 77 | 84 |

Data: ART Bay Area Sea Level Rise Analysis and Mapping Project 2017 BCDC; MTC; AECOM; ESRI

Focus Areas

Transportation infrastructure

Priority Development Areas (PDAs)

Disadvantaged Communities

Priority Conservation Areas (PCAs)

Leverage completed/ongoing projects

- Previous ART projects
- Marin BayWAVE
- Sea Change San Mateo
- San Francisco SLR Action Plan
- Silicon Valley 2.0
- Coastal Conservancy's Climate Programs
- Baylands Ecosystem Habitat Goals Update

RESILIENT

BAY AREA CHALLENGE **BY**

DESIGN

Plan BayArea 2040

FINAL
Adopted July 26, 2017

METROPOLITAN TRANSPORTATION COMMISSION

ASSOCIATION OF BAY AREA GOVERNMENTS

Project Goals

- Complete comprehensive regional-scale vulnerability assessment

  - *Drawing connections, illustrating system dynamics*

- Establish framework for ongoing regional-scale adaptation planning

  - *Place where local plans come together*

- Increase public participation and local capacity to engage in planning and implementation over long term

  - *Crafting lasting solutions requires local knowledge*

Project Purpose

New systems in place to:

o Increase the resilience of the Bay Area's **transportation network**

o Preserve and restore healthy and vibrant **ecological systems** which are necessary for the health and safety of the region's natural and human communities

o Improve the safety and sustainability of our **communities**, particularly our most vulnerable and disadvantaged communities

Project Timeline

Project Initiation – Fall 2017

Project Scoping – Fall/Winter 2017 ← **RWG 1**

Conduct Assessment – Fall/Spring 2017-18 ← **RWG 2 and 3**

Determine Assessment Outcomes – Summer/Fall 2018

Transition to Adaptation – Fall 2018

Develop Adaptation Responses – Fall/Winter 2018-19

Finalize Indicators and Framework – Winter/Spring 2019

Evaluate and Prioritize Adaptation Responses and Identify Opportunities for Implementation – Spring/Summer 2019

Working Group Meeting   Individual or small group meetings   Public meetings

RWG Meeting #1 Recap

- ✓ We described and discussed the project goals, team and scope

- ✓ We described and confirmed regional working group roles and responsibilities

- ✓ We asked RWG members at both meetings who is missing and to help us fill any gaps in issues or assets and in the analysis and approach

- ✓ We had a poster session intended to provide information on assets to be evaluated and approach and we heard it was not long enough

- ✓ Engaged in an exercise to help us draft resilience goals

RWG Meeting #2 Recap

- ✓ We discussed the draft resilience goals and received feedback. You will see the revisions today!

- ✓ We discussed our draft public participation plan

- ✓ We discussed the ART method for mapping current and future flood exposure

- ✓ We described, in general terms, how the vulnerability assessment would be conducted and gave examples of our research questions

- ✓ We did an exercise that explored the underlying causes and components of vulnerability, including relationships and dependencies among different assets
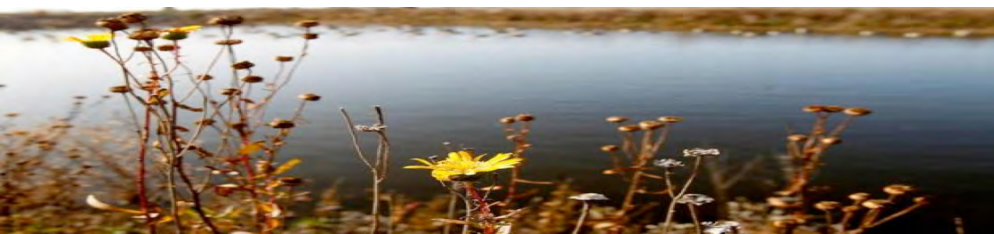
Objectives

- Build better understanding of the purpose of ART Bay Area
- Share the revised Resilience Goals for the project
- Discuss methods for asset-level and system-level assessments
- Share preliminary findings
- Discuss next steps

Agenda

1:00	Project background, RWG 3 Objectives and Agenda
1:15	Presentation and Discussion: Resilience Goals
1:30	Update on Public participation plan
1:40	Presentations & discussions: Transportation and PCA networks
2:30	Break
2:45	Presentations $ discussions : PDAs & vulnerable communities
3:35	Assessment Discussion - Report Out
3:50	Wrap-up and Next Steps

Purpose of Project Resilience Goals

Project resilience goals help guide the project

o Provide overall guidance, drive desired outcomes, and provide a touch point for decision-making

o Opportunity for Working Group to help define the project scope

o Use to develop action evaluation criteria

o Bring us back to all four frames of sustainability

o Iterative - evaluate midway and change if appropriate

Preamble

Economy
- ....
- ....

Environment
- ....
- ....

Governance
- ....
- ....

Society & Equity
- ....
- ....

Resilience Goals development

1. RWG 1 – Identified important functions and values

2. Staff drafted initial goals

3. RWG 2 – Discussed draft Resilience Goals

4. RWG feedback via online survey

5. Staff refined goals based on feedback

6. RWG 3 – present "final" goals

Resilience Goals: Preamble

Summary of feedback on the Preamble:

o Clarify the balance of local- and regional- scale analyses

o Some goals are so sweeping that they are not really an ART goal but rather a societal goal

Preamble

Economy
- ……..
- ……..

Environment
- ……..
- ……..

Governance
- ……..
- ………

Society & Equity
- …….
- ……..

Resilience Goals: Economy

Summary of feedback:

- Emphasize the diversity of economic values (e.g, include ecosystem services)

- Specify focusing new development in resilient areas

- Call out transportation modes that are diverse, low-carbon, redundant, and linked to the network

Preamble

➡ Economy
- ……..
- ……..

Environment
- ……..
- ……..

Governance
- ……..
- ……..

Society & Equity
- ……..
- ……..

Resilience Goals: Environment

Summary of feedback:

o Recognize and call out a broader suite of habitats, ecosystem functions, and potential impacts

o Recognize need for restoration and sediment management

o Specify *low carbon* forms of energy and transport, emphasize the role of the project to reduce GHG emissions

Preamble

Economy
- ……..
- ……..

➤ Environment
- ……..
- ……..

Governance
- ……..
- ……..

Society & Equity
- …….
- ……..

Summary of feedback:

- o Recognize broader range of diverse potential partners, organizing tools, and decision-making structures
- o Include funding and accountability in list of governance challenges
- o Call out coordination with locally-driven projects

Preamble

Economy
- ....
- ....

Environment
- ....
- ....

→ Governance
- ....
- ....

Society & Equity
- ....
- ....

Resilience Goals: Society & Equity

Summary of feedback:

o Emphasize empowerment of communities through capacity building, political power, and control in decision-making

o Include avoidance of displacement

Preamble

Economy
- ....
- ....

Environment
- ....
- ....

Governance
- ....
- ....

Society & Equity
- ....
- ....

Resilience Goals: Next Steps

- Please send any last feedback to carey.batha@bcdc.ca.gov

- We'll ask for input at first public participation meeting

- We will revisit the Resilience Goals as a group in later stages of the project

  - Selecting the key planning issues to focus on during the adaptation strategy development phase
  - Developing criteria to evaluate possible adaptation approaches
  - We will revise the goals again if necessary

Public Engagement Goals

1. **Expand public participation**
   - Create transparent, and accessible engagement process
   - Provide multiple ways to engage

2. Built network of **community partners**

3. Be mindful of existing processes

4. Invest in efforts that create **long-term capacity**

- Work with key partners to identify CBOs and ensure broad engagement of Bay Area communities

- Work with communities to co-design engagement approaches

- Provide several opportunities to participate online, in person, and within own communities:
  - ✓ Existing Community Meetings
  - ✓ Resilient by Design
  - ✓ Online CoUrbanize platform

CoUrbanize Launch

Link: **courb.co/bayres**

ART Bay Area

Help us plan for sea level rise! Where are your favorite spots to spend time - and how should they be protected?"

CoUrbanize Features

📄 **New Update**

Update #1

Welcome to the ART Bay Area project!

Thank you for visiting the ART Bay Area page. We're using this platform to gather your feedback on how to make our region more resilient to flooding and sea level rise.

Click the Follow button to receive email updates and drop pins on the interactive map to share your ideas with us.

Posted on Feb 5, 2018

💬 Comment   ↪ Share

Get Project Updates

Want to stay in the loop? Subscribe to em... updates about the project here.

✔ Following

Subscribe for Updates

Track project progress

Connect with other community members

Share feedback and experiences as a Bay Area resident

Angel Island Immigration Station

Fort McDowell

Chris Choo
Feb 12, 2018

The Tiburon waterfront is accessible by boat, via multi-use pathway, or by car. It is full of history and is right on the bay's edge. I've enjoyed walking the path (from Blackie's Pasture) or sailing to the public dock to enjoy lunch at Sam's.

👍 SUPPORTED   1 SUPPORTER   ⚑ FLAG

Reply...

📋 **Evaluate and prioritize**

Spring 2019 - Summer 2019

Project team evaluates and prioritizes adaptation responses and identifies opportunities for implementation.

We want to hear from you!

April 2019

Public engagement opportunity.

Regional Working Group #10

March 2019

We want to hear from you!

February 2019

Public engagement opportunity.

📋 **Finalize framework**

Winter 2019 - Spring 2019

Project team finalizes indicators and framework

Regional Working Group #9

January 2019

ART Bay Area Project

Transportation Infrastructure

Priority Development Areas (PDAs)

Vulnerable Communities

Priority Conservation Areas (PCAs)

# Transportation Infrastructure

Transportation Infrastructure

- Critical to regional, state, and national economy

- Continued strain as population grows

- Investment in capacity to meet growing demand

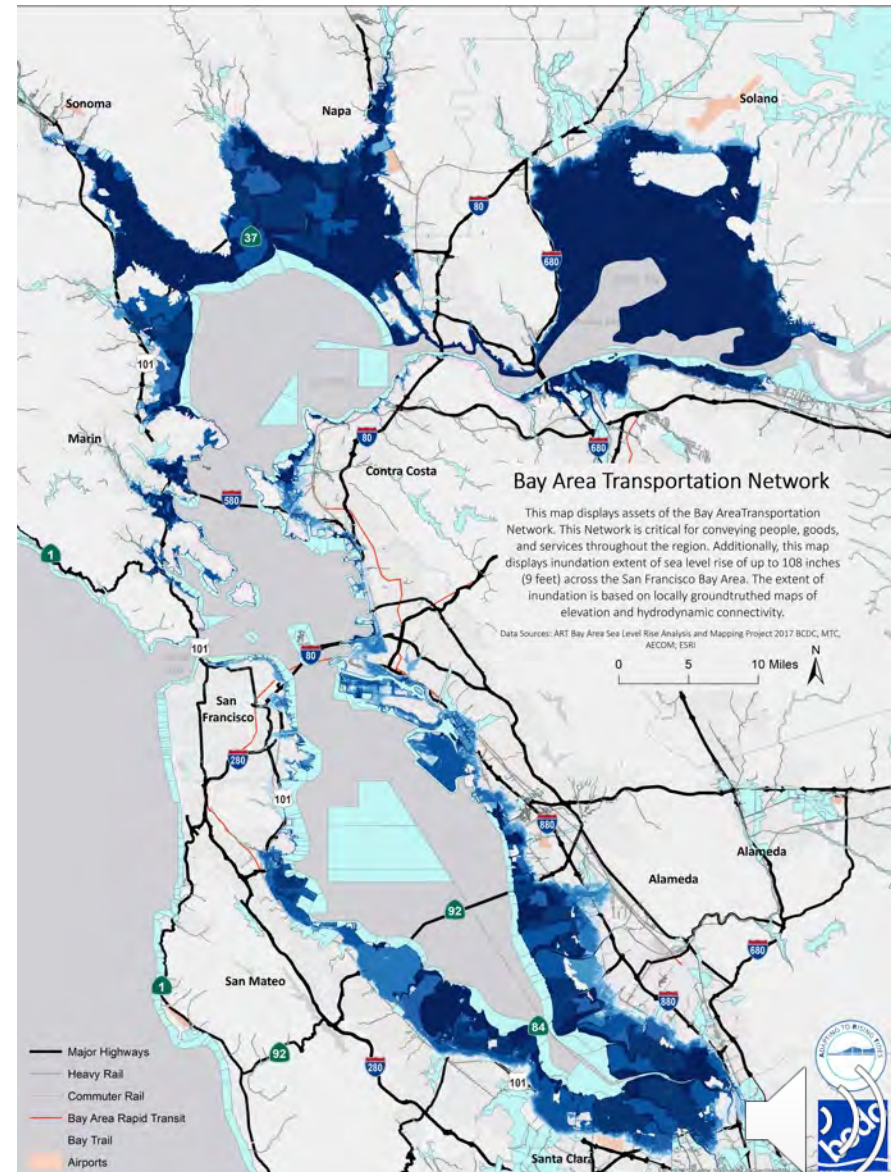- Located along shoreline, serve as de facto protection

Asset Categories

- Major highways
- Bridges and Toll Plazas
- Airports
- Seaports
- Passenger Rail
- Heavy rail
- Ferry Service
- Bus Service
- San Francisco Bay Trail

Transportation Exposure
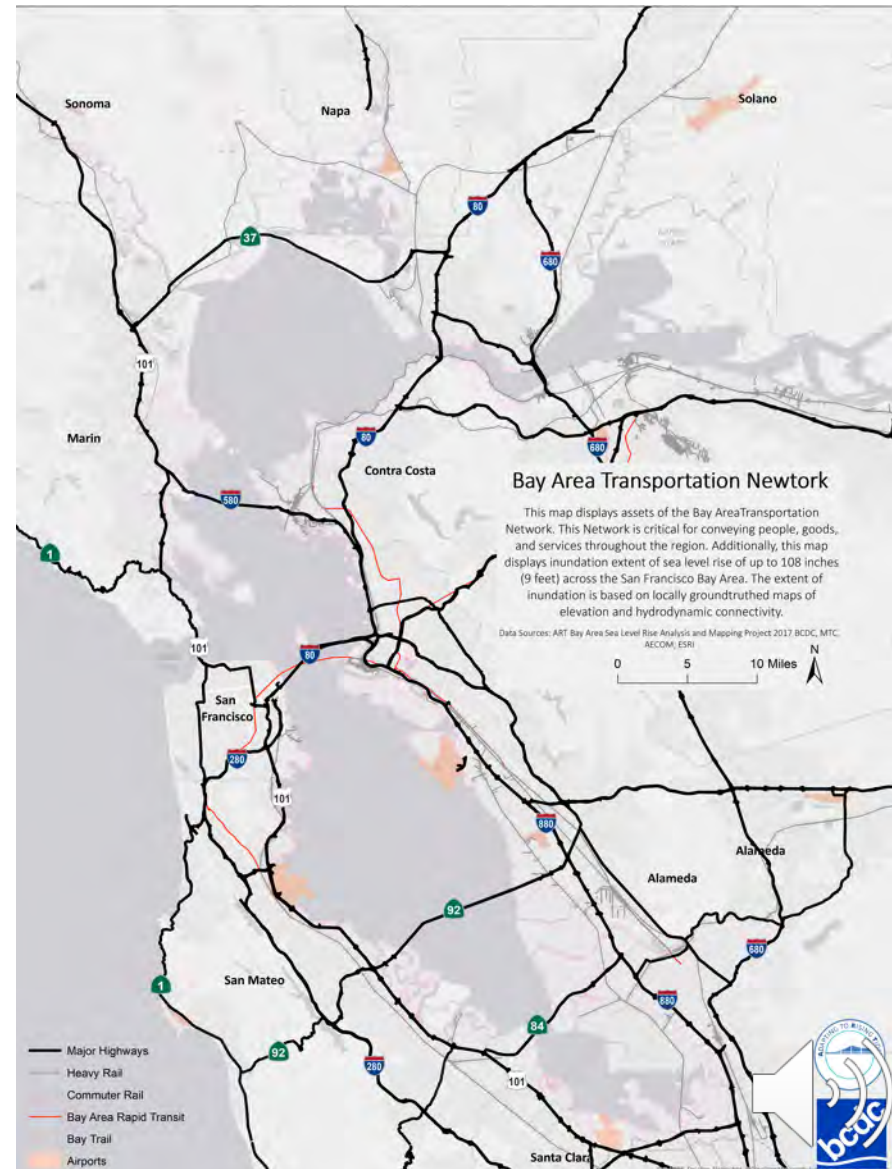
- Already seeing impacts and vulnerable to higher levels of flooding

- Exposure analysis helped us conduct our first level of prioritization

- Identified assets exposed to 12", 24", FEMA 100-year flood zone, and SF 100-year Precipitation event

Bay Area Transportation Network

This map displays assets of the Bay Area Transportation Network. This Network is critical for conveying people, goods, and services throughout the region. Additionally, this map displays inundation extent of sea level rise of up to 108 inches (9 feet) across the San Francisco Bay Area. The extent of inundation is based on locally groundtruthed maps of elevation and hydrodynamic connectivity.

Data Sources: ART Bay Area Sea Level Rise Analysis and Mapping Project 2017 BCDC, MTC, AECOM, ESRI

0   5   10 Miles

Major Highways
Heavy Rail
Commuter Rail
Bay Area Rapid Transit
Bay Trail
Airports

For each transportation category, we narrowed the number of individual assets (stations, terminals, etc.) assessed through apply one of two (or sometimes both) filtering methods:

Regional Criticality

- Existing Functional Classifications

- Network connections

- Sole Access/Lack of redundancy

- Lifeline/Emergency function

- High ridership/volume

Representative

- Existing Functional Classifications

- Network connections

- Sole Access/Lack of redundancy

- Lifeline/Emergency function

- Service for disadvantaged communities

- High ridership/volume

- Similar physical characteristics

- Information availability

We use vulnerability of critical components to understand impacts to network function.
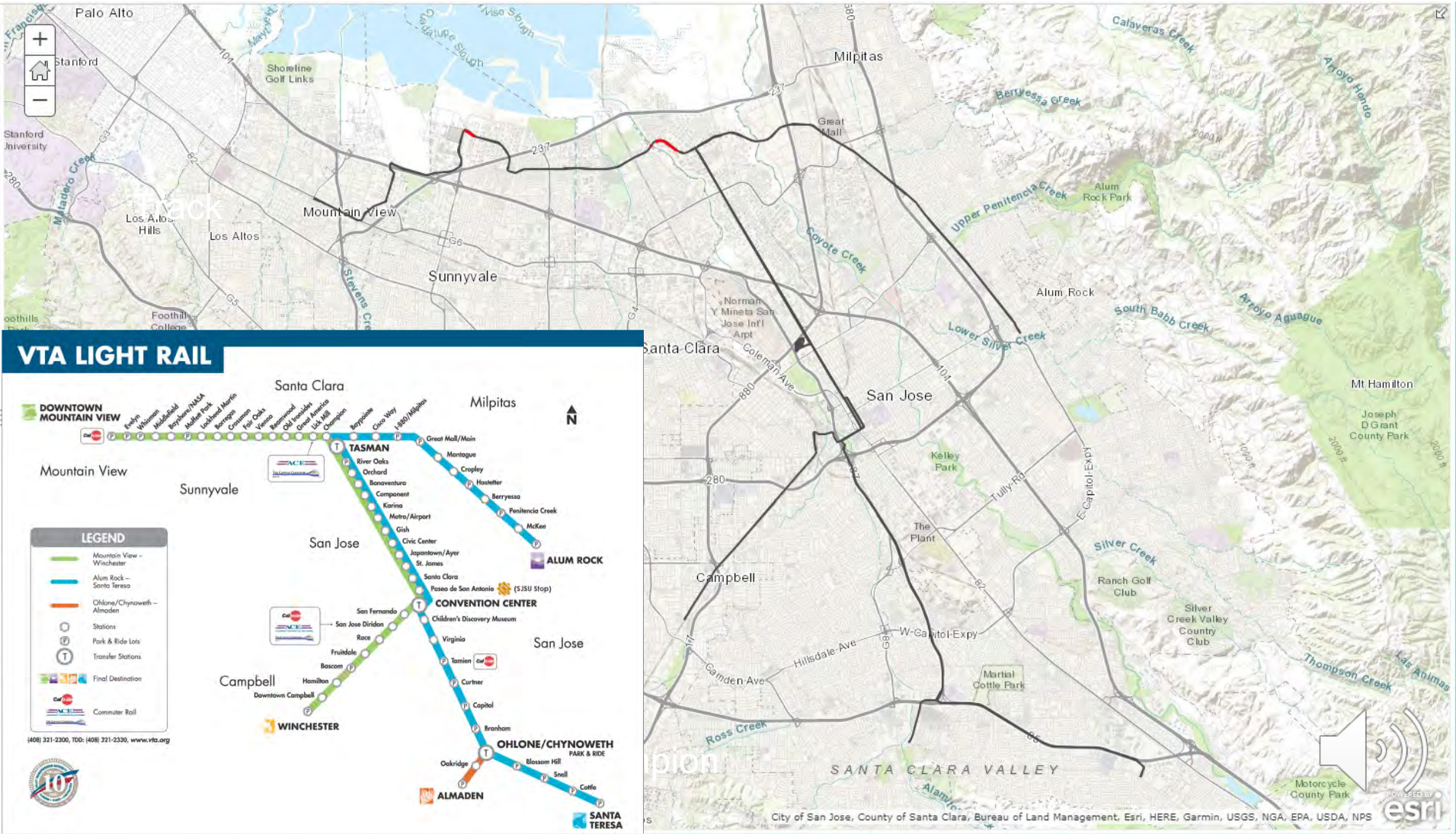
Network Function

System Analysis

Critical Component Vulnerability

Exposure
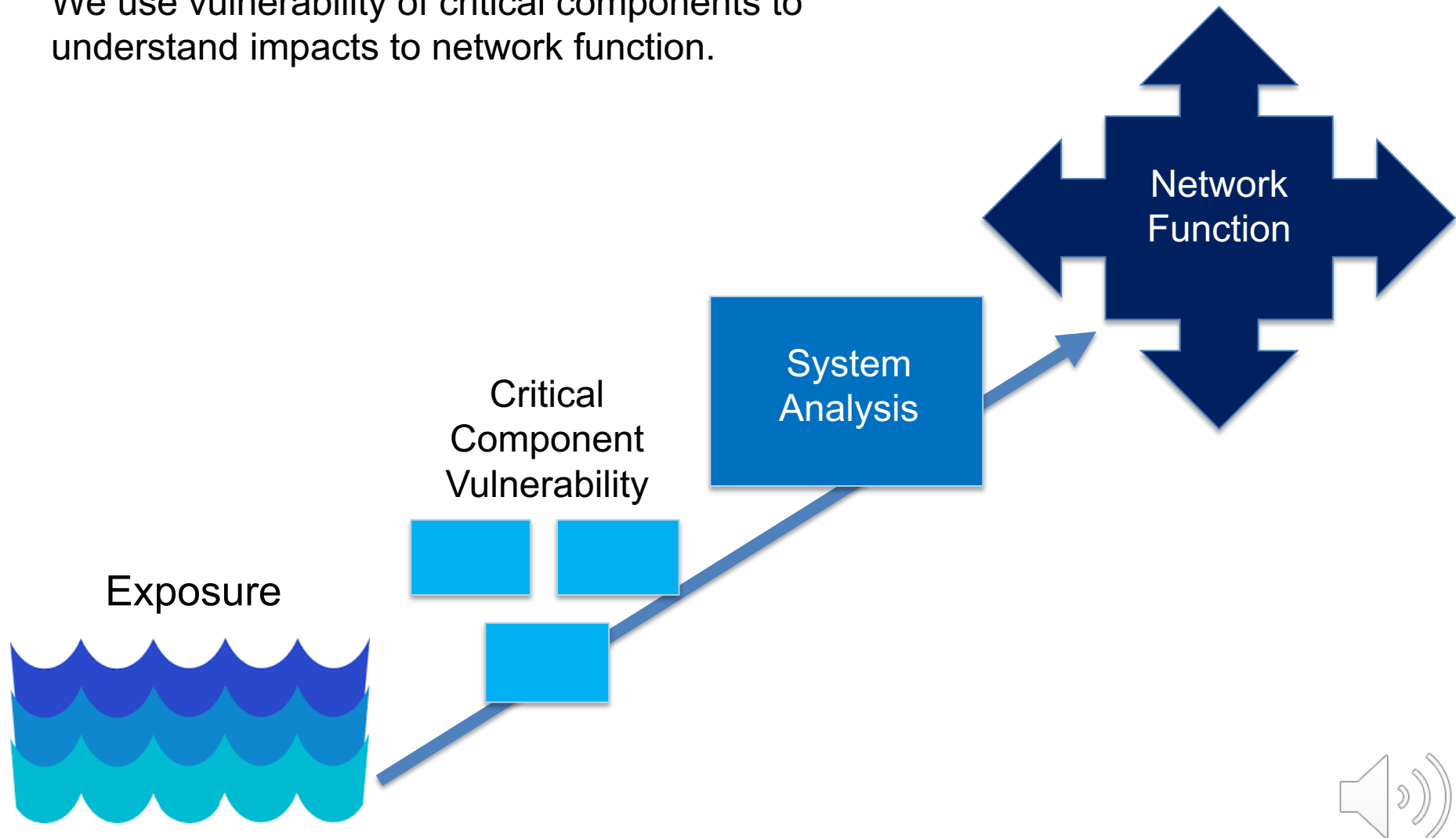
<u>Passenger Rail example</u>: Valley Transportation Authority
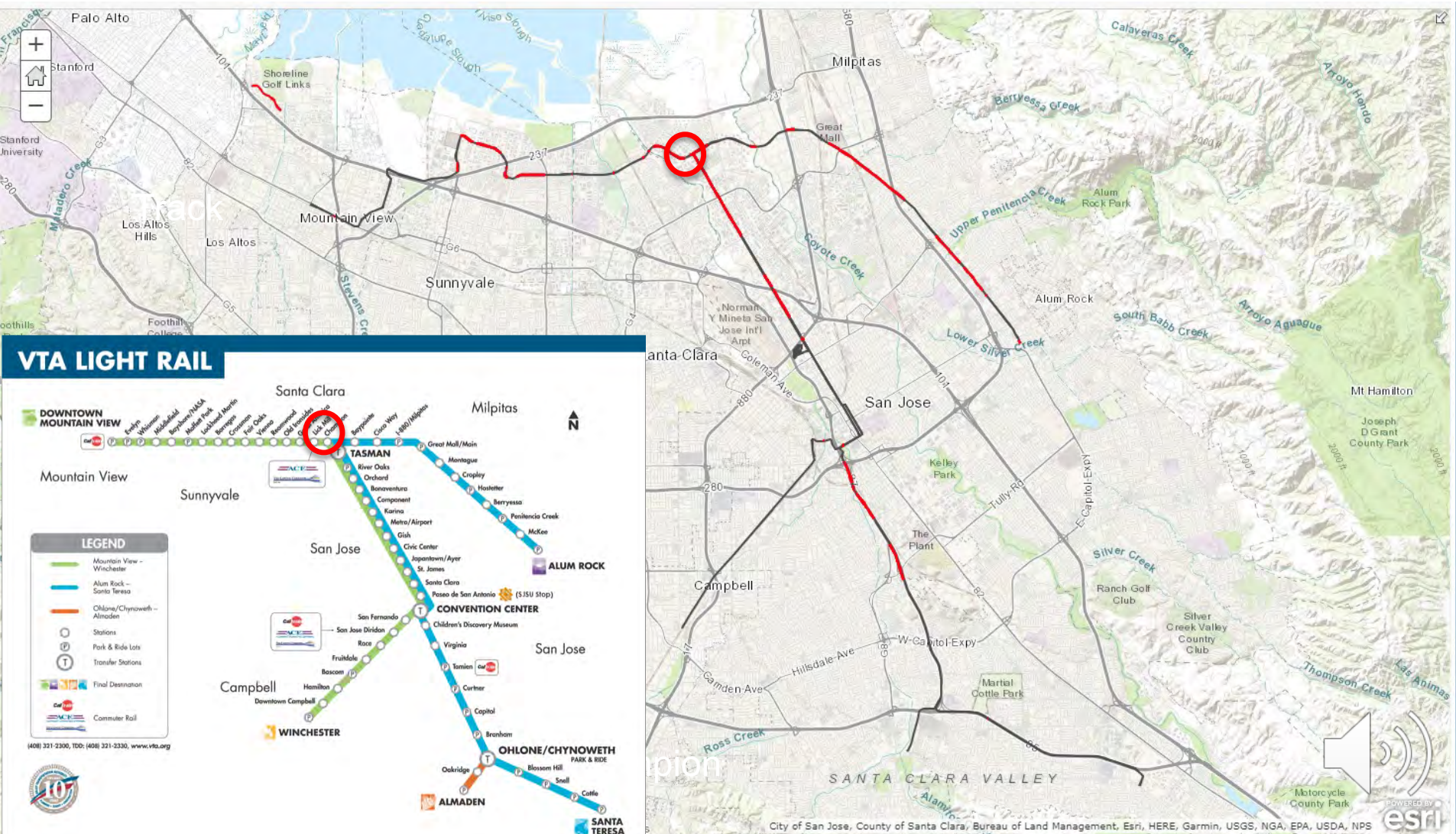
Passenger Rail example: Exposed to 24" of sea level rise

Passenger Rail example: Exposed to FEMA's 100 year flood zone
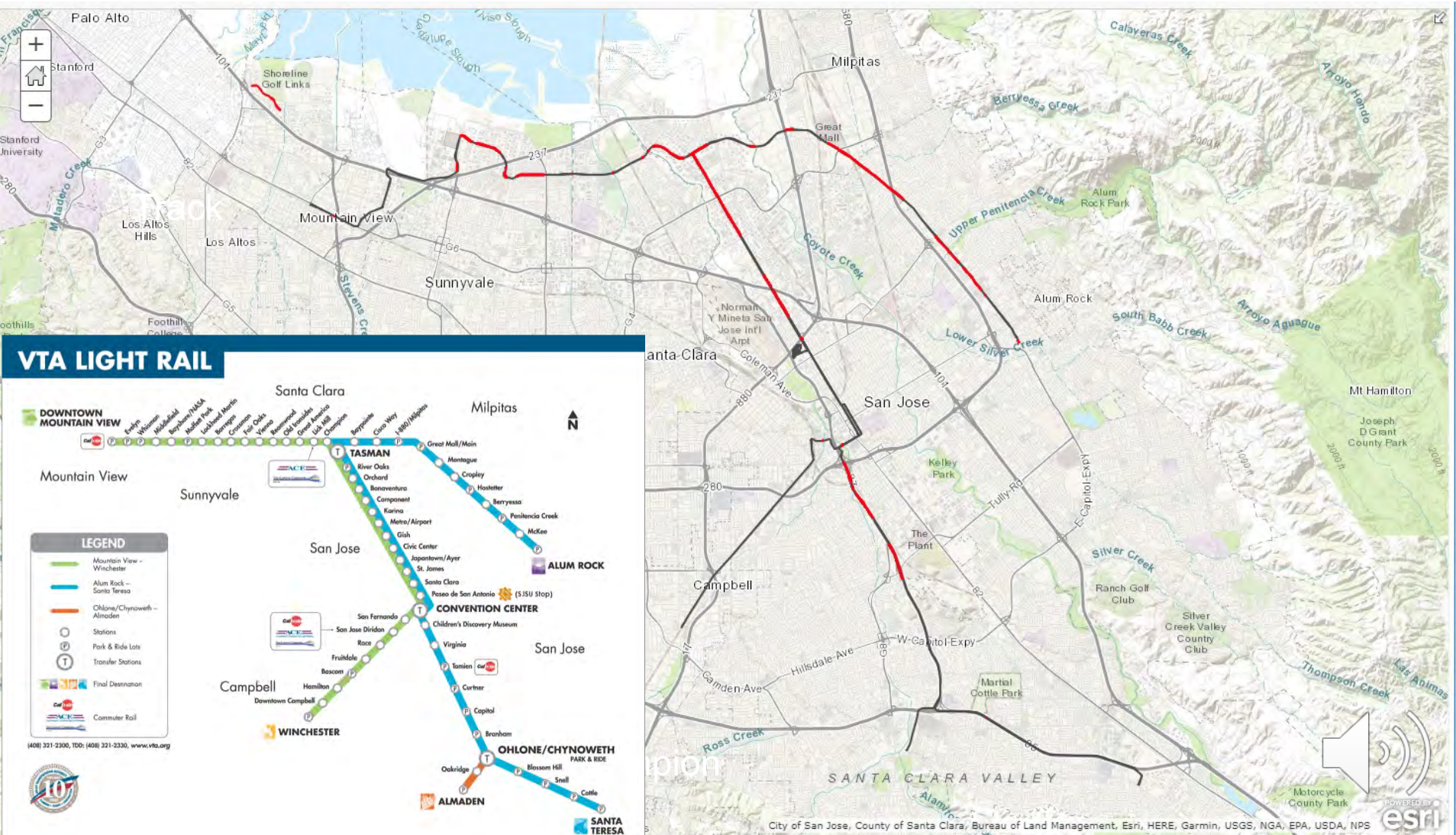
Passenger Rail example: Champion station is also exposed to flooding

Passenger Rail

Critical Components

Track

Facilities

Stations

Passenger Rail

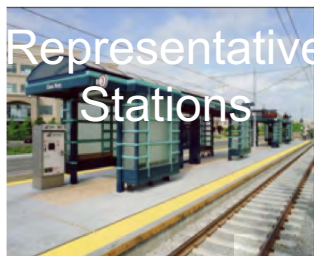**Critical Components**

Track

Facilities

Stations

Representative Asset

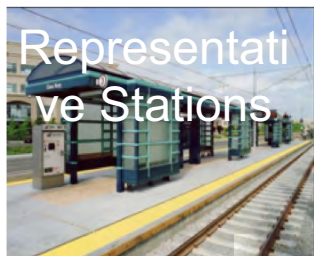Champion

Passenger Rail

Critical Components

System Assessment

Track

Facilities

Representative Stations

Passenger Rail

Critical Components

Track

Facilities

Representative Stations

System Assessment

VTA LIGHT RAIL

Network Function
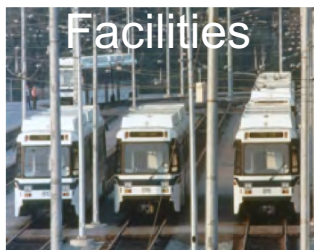
Assessment Methodology
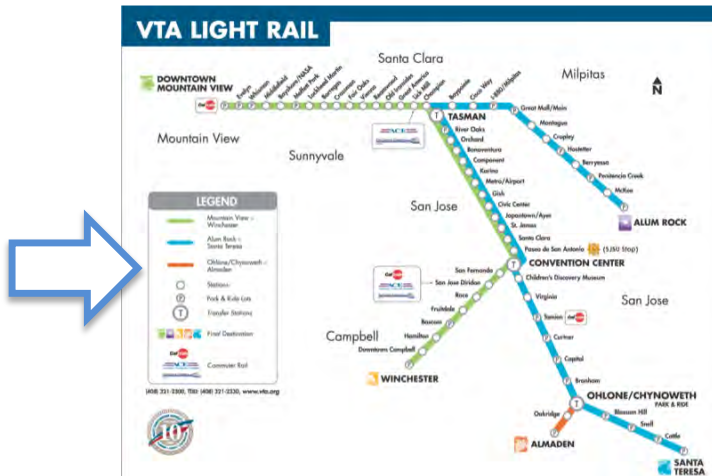
Airport example

Critical Components

System Assessment

Network Function

Runways

Control Towers
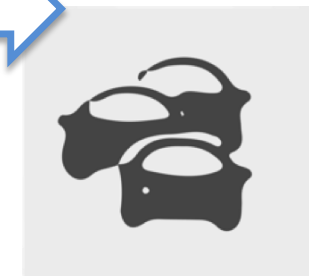
Facilities

- Does our assessment approach make sense?

- Is the rationale for choosing assets appropriate?

- Are our chosen assets appropriate? Are we missing anything?

- Are there any missing critical components with an asset that you think we should be sure to capture?

ART Bay Area Project

Transportation Infrastructure

Priority Development Areas (PDAs)

Vulnerable Communities

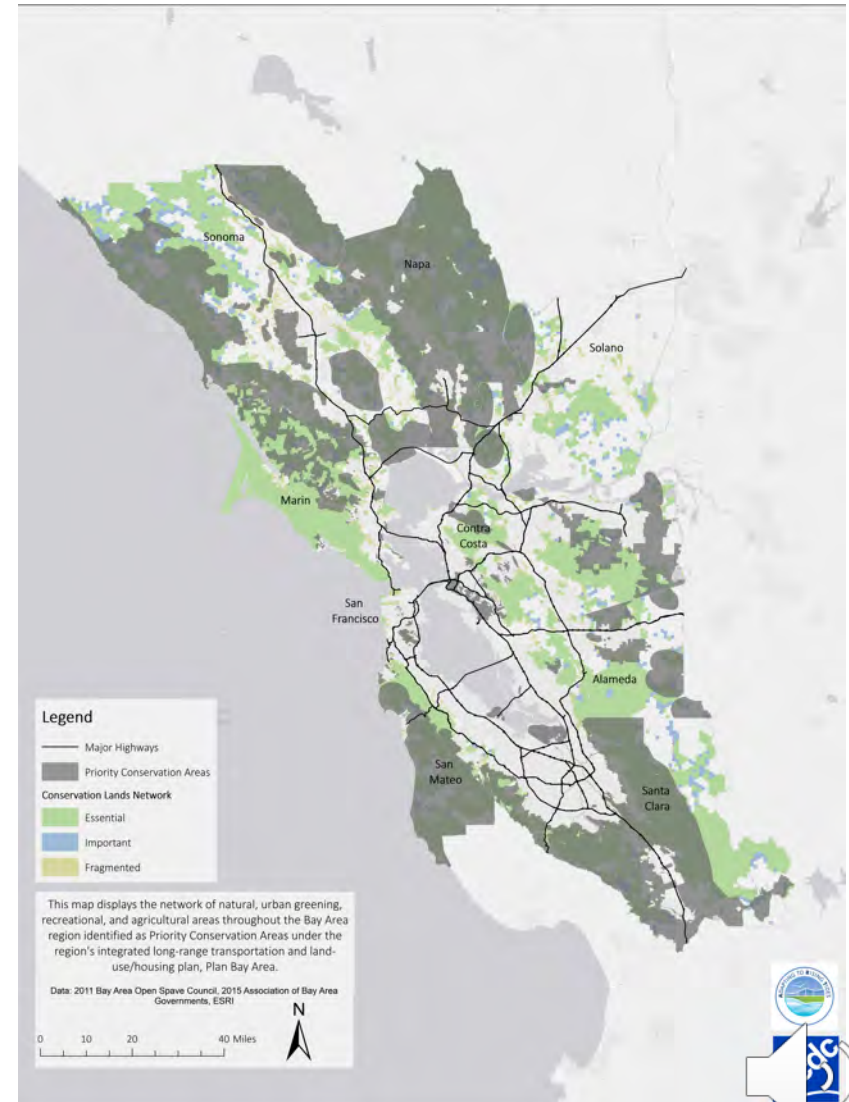Priority Conservation Areas (PCAs)

- **PCA Program Review**

- **Inclusion of other natural lands**

- **Assessment Methodology**
  - Regional Assessment
  - Individual PCA Vulnerability Assessment

Asset Description + Justification

- The Bay Area's open spaces provide regionally significant natural resource, scenic, recreational, agricultural, and ecological values and ecosystem functions.

- The PCA program was initiated in 2007 to identify Bay Area open spaces providing these values that are in need of protection.

- Objectives:

  - Serve as a framework for directing future regional funding to support the vitality of the region's natural systems, rural economy, and human health.

Legend
- Major Highways
- Priority Conservation Areas

Conservation Lands Network
- Essential
- Important
- Fragmented

This map displays the network of natural, urban greening, recreational, and agricultural areas throughout the Bay Area region identified as Priority Conservation Areas under the region's integrated long-range transportation and land-use/housing plan, Plan Bay Area.

Data: 2011 Bay Area Open Space Council, 2015 Association of Bay Area Governments, ESRI

0   10   20   40 Miles
N

Asset List

Priority Conservation Areas Network (165):

- *Natural Landscapes* – examples include Tiburon Ridge Lands, Petaluma Watershed South Portion, Menlo Park and East Palo Alto Baylands.

- *Agricultural Lands* – Napa County Agricultural Lands and Watersheds, Suisun Valley, Sonoma County Coastal Agricultural Area.

- *Urban Greening* – East Bay Greenway, Hercules Waterfront.

- *Regional Recreation* – Bay Trail, Russian River Access.

Natural Areas outside of PCA network:
- Ecosystem services provided evaluated through Natural Capital Project collaboration

Coyote Hills, Natural Area, City of Fremont

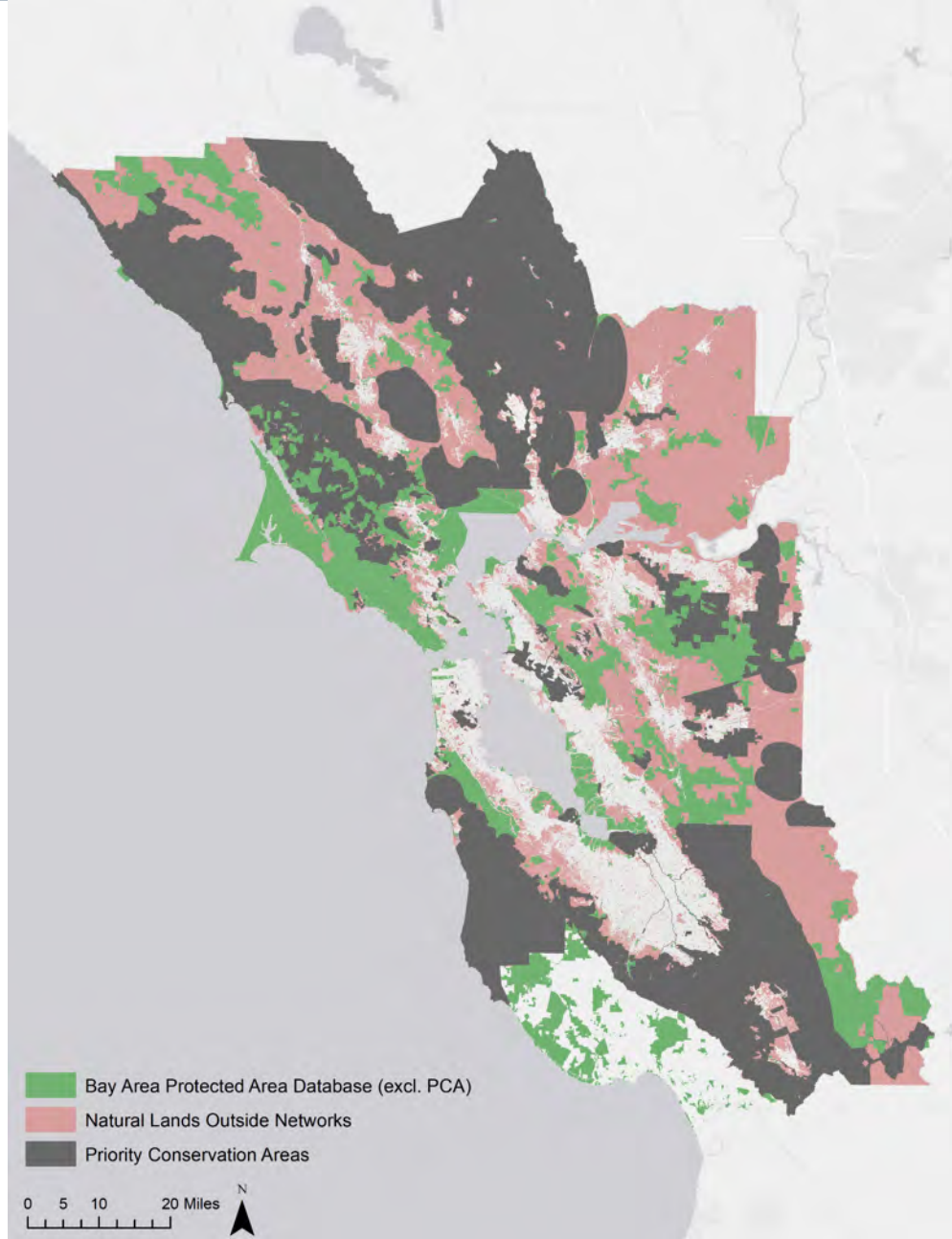Ohlone Greenway, Urban Greening, City of El Cerrito

Coastal Agriculture, Agricultural Lands, Sonoma County Agricultural Preservation and Open Space District

California Coastal Trail, Regional Recreation, San Mateo County, on behalf of the State Coastal Conservancy

Bay Area Protected Area Database (excl. PCA)

Natural Lands Outside Networks

Priority Conservation Areas

0   5   10   20 Miles

N

- What benefits is the PCA network currently providing, and how are they distributed? How do these benefits compare to those in natural areas outside the PCA network?

- Where will current and future flooding impact the benefits provided by the PCA network? Where will current and future flooding impact the benefits provided by the region's natural areas?

- How will these impacts change incrementally with increasing amounts of flooding? Are there tipping points?
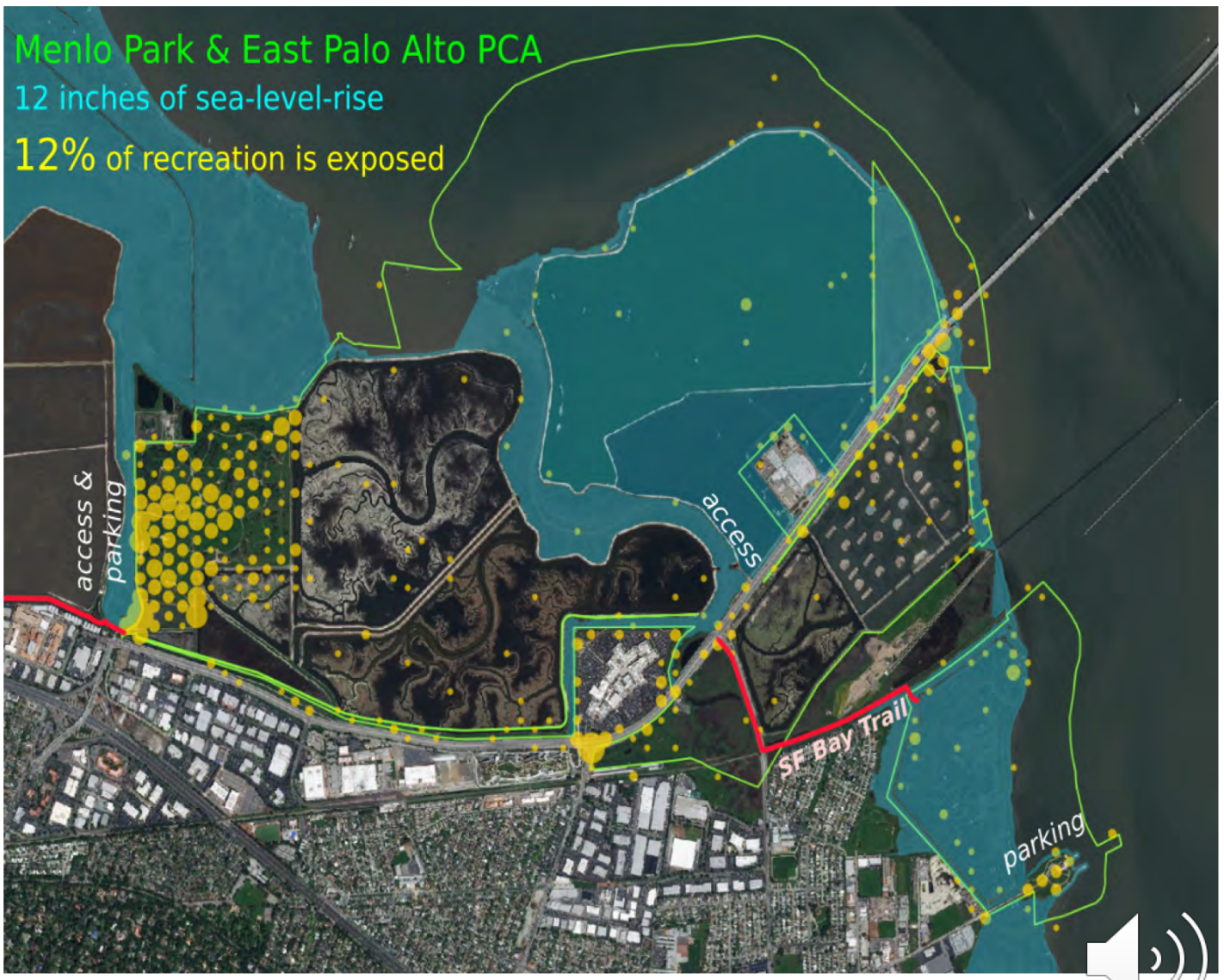
ABAG Benefit/Co-benefit	Associated PCA Designation	Metric 1	Metric 2	Etc.
Terrestrial Ecosystems	NL			
Aquatic Ecosystems	NL			
Water Supply and Quality	NL, AL, UG, RR			
Climate and Resilience	NL, AL, UG, RR			
Compact Growth	NL, AL, RR			
Recreation	NL, AL, UG, RR			
Agricultural Resources	AL			
Agricultural Economy	AL			
Wildlife Habitat	AL, UG, RR			
Community Health	UG, RR			

Geotagged photos shared on social media reveal spatial patterns of recreation (yellow dots).

Some recreation sites become exposed to flooding under sea-level-rise scenarios.

Menlo Park & East Palo Alto PCA
12 inches of sea-level-rise
12% of recreation is exposed

access & parking

access

SF Bay Trail

parking

natural capital PROJECT

Stanford WOODS INSTITUTE for the ENVIRONMENT

Wood et al. 2013, Keeler et al. 2015, Sessions et al. 2016

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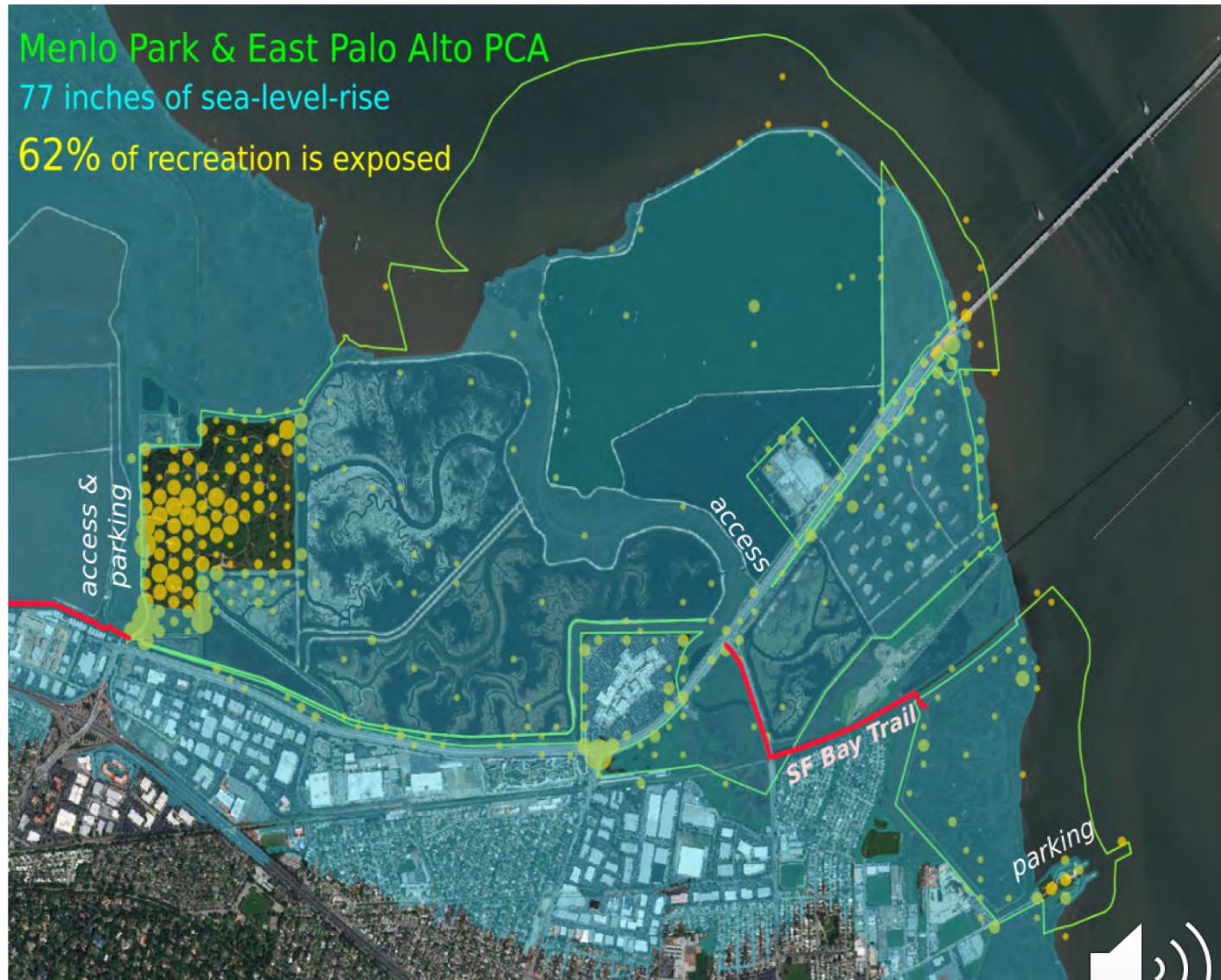

Menlo Park & East Palo Alto PCA
77 inches of sea-level-rise
62% of recreation is exposed

access & parking

access

SF Bay Trail

parking

Wood et al. 2013, Keeler et al. 2015, Sessions et al. 2016

natural capital PROJECT

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1. Quantifying recreation to understand vulnerability of PCA network to SLR

Example results for 10 out of 165 PCAs

**% of currently visited area inundated**

Category	
≤ 10%	
11-50%	
51-90%	
> 90%	
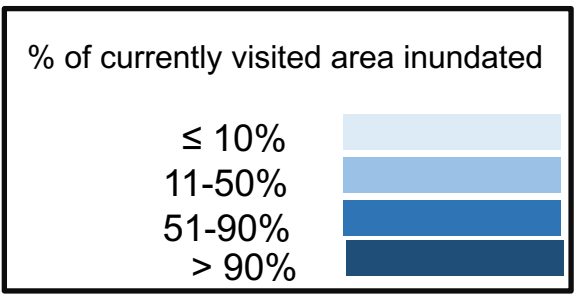
	Loss of recreation area with Sea-Level Rise (% currently visited area inundated)									
	12" TWL	24" TWL	36" TWL	48" TWL	52" TWL	66" TWL	77" TWL	84" TWL	96" TWL	108" TWL
Central Marin Bayfront, Madera Bay Park										
Santa Clara Baylands										
Bothin Waterfront										
Oakland Priority Estuaries										
East Bay Greenway										
San Francisco Bay Trail (Alameda sections)										
San Francisco Bay Trail (San Mateo sections)										
Potential Oakland Gateway Area										
Menlo Park and East Palo Alto Baylands										
Petaluma Watershed Southeastern Portion										

Early and severe effects

Tipping points

Steady incremental impacts

Reaching Stasis

FEMA 100-year Flood Zone
FEMA 500-year Flood Zone
Priority Conservation Areas

Data: ART Bay Area Sea Level Rise Analysis and Mapping Project 2017 BCDC, MTC,
AECOM; FEMA 2017; Bay Area Open Space Council 2011; Association of Bay Area
Governments 2015; ESRI

0   10   20   40 Miles   N

- Determine PCAs to receive detailed, individual assessments base upon:

  - Exposure

  - Distribution among 9 counties

  - Distribution among PCA types
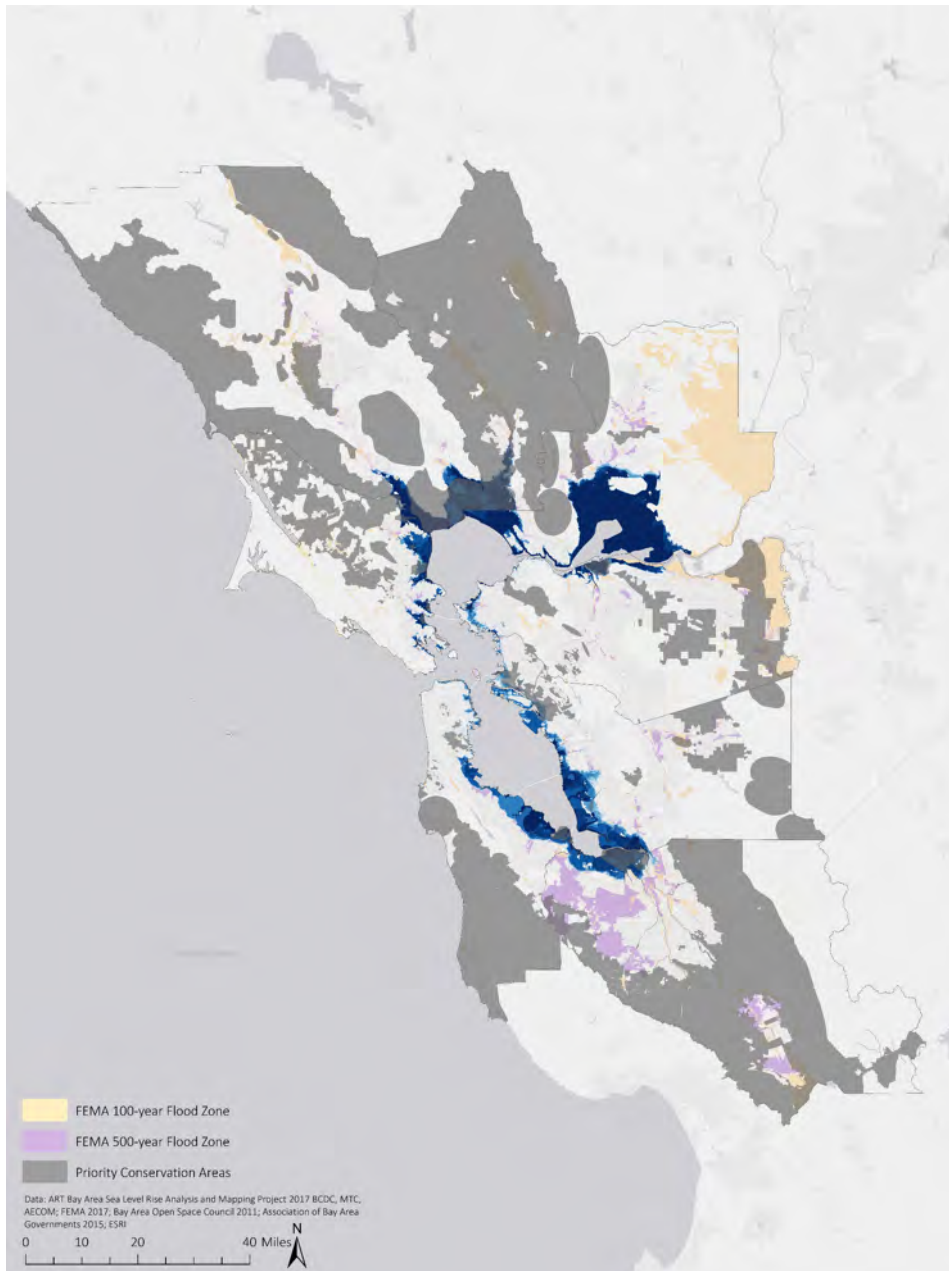
2. Narrowing Exposure Results

Final Distribution by County (%)

Final Distribution by Designation (%)
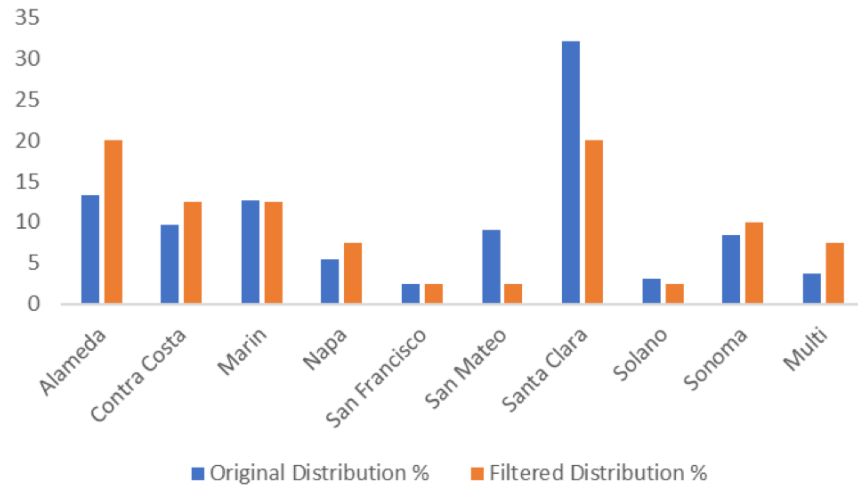
- Determine PCAs to receive detailed, individual assessments base upon:

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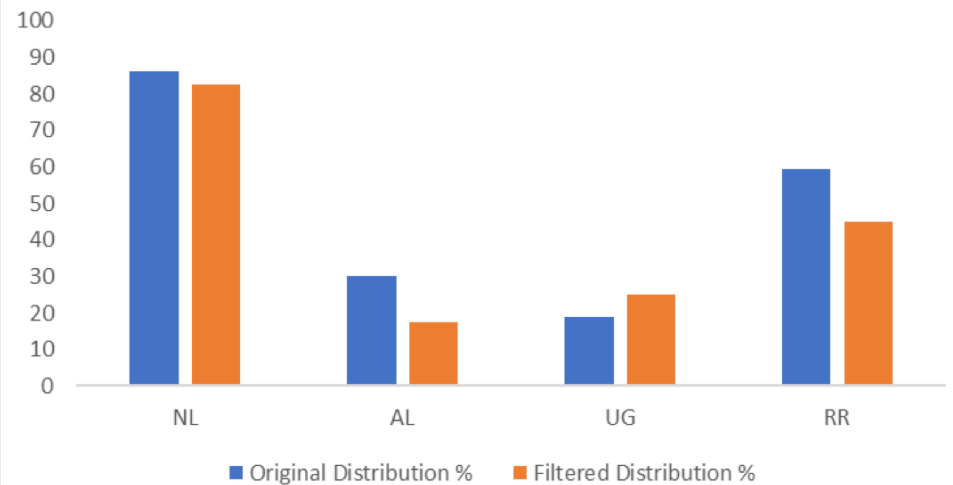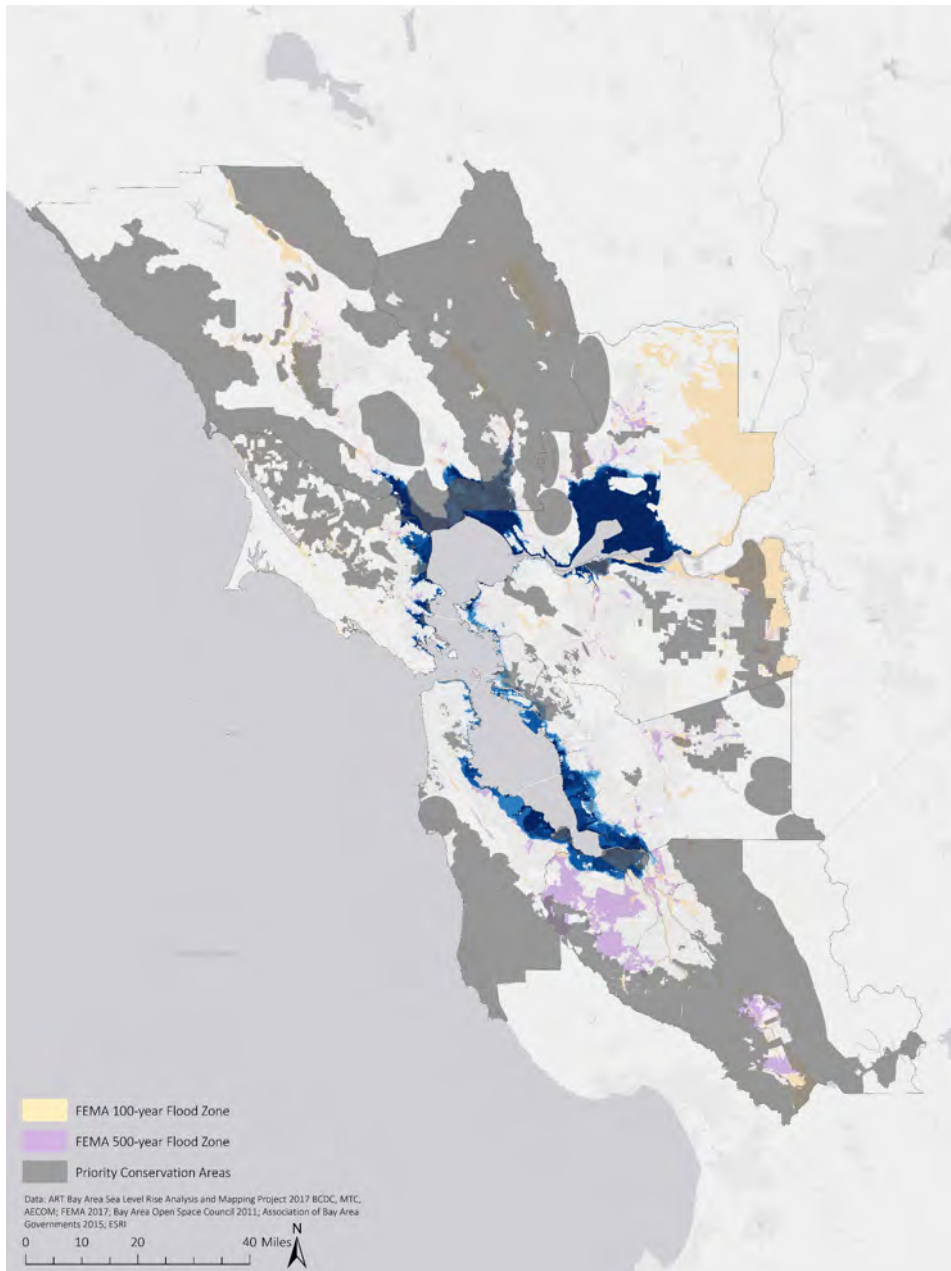   - Distribution among 9 counties

    - Distribution among PCA types

    - Systems assessment to assess key contributors to PCA Program goals and objectives

FEMA 100-year Flood Zone

FEMA 500-year Flood Zone

Priority Conservation Areas

Data: ART Bay Area Sea Level Rise Analysis and Mapping Project 2017 BCDC, MTC, AECOM; FEMA 2017; Bay Area Open Space Council 2011; Association of Bay Area Governments 2015; ESRI

0   10   20   40 Miles   N

Average Habitat Value (CLN)   Average Acres of Prime Farmland (FMMP)

Data: ART Bay Area Sea Level Rise Analysis and Mapping Project 2017 BCDC, MTC,
AECOM; FEMA 2017; Bay Area Open Space Council 2011; Association of Bay Area
Governments 2015; ESRI
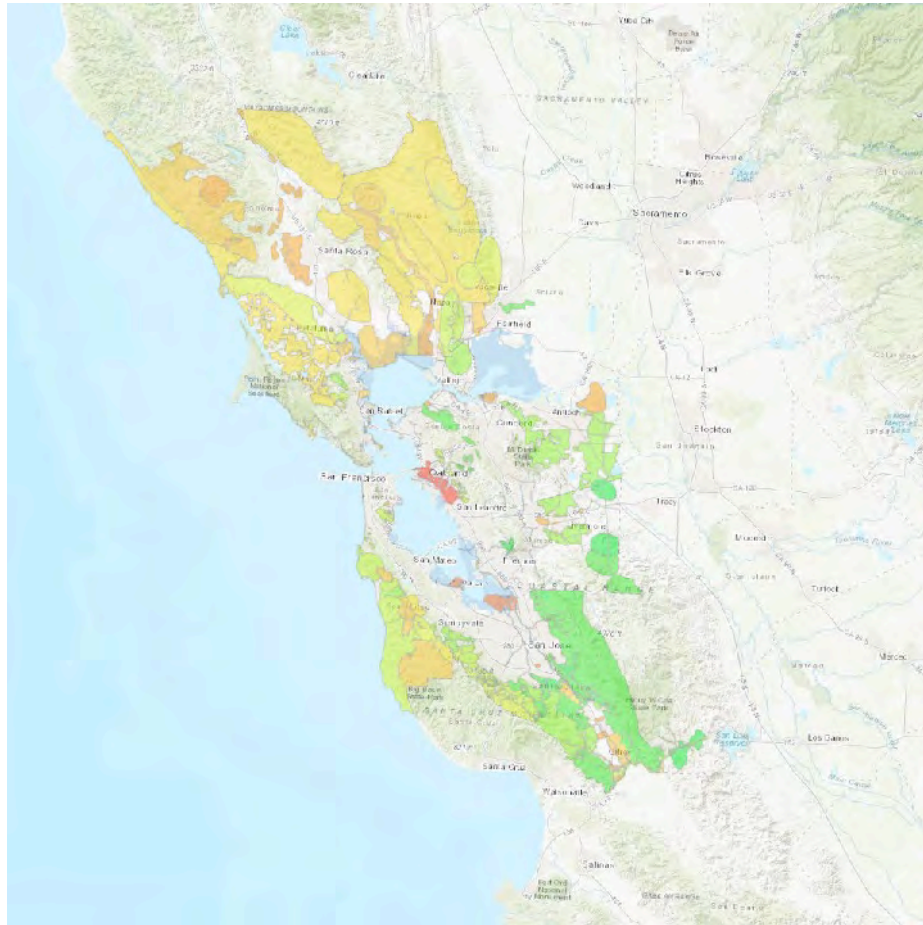
FEMA 100-year Flood Zone
FEMA 500-year Flood Zone
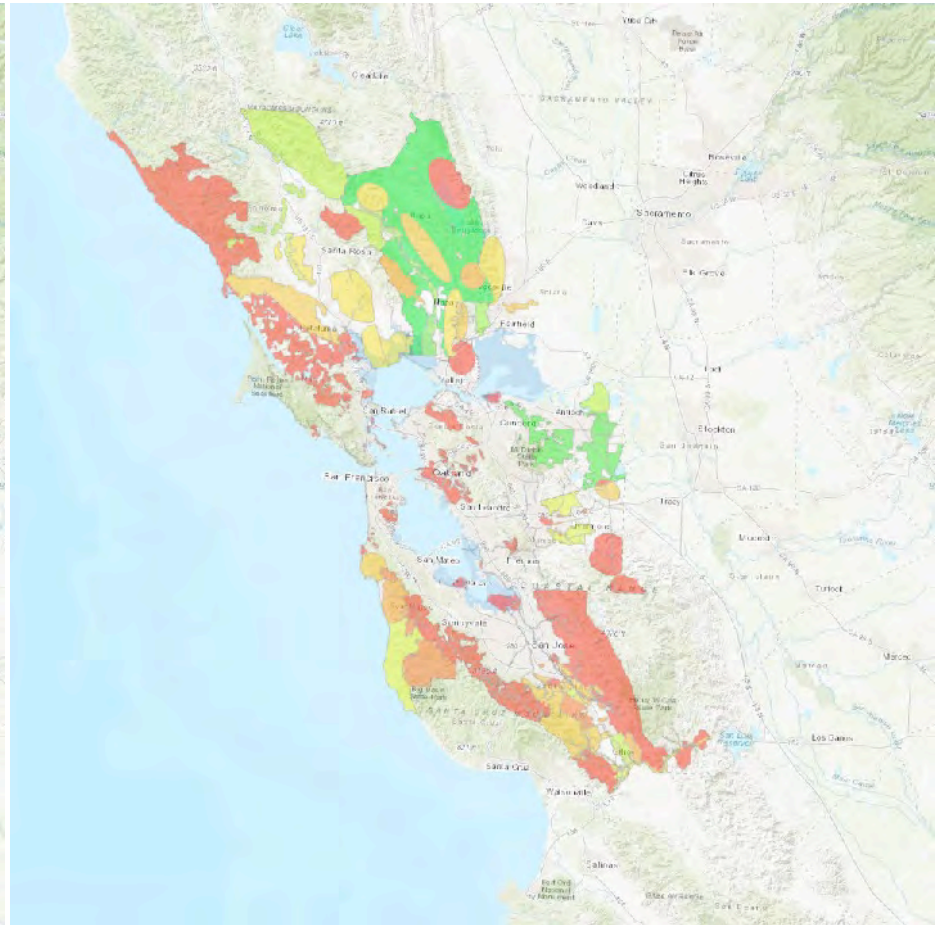Priority Conservation Areas

- Determine PCAs to receive detailed, individual assessments base upon:

  - Exposure

  - Distribution among 9 counties

  - Distribution among PCA types

  - Systems assessment to assess key contributors to PCA Program goals and objectives

  - Geographically specific visitation impacts of SLR *within* PCAs
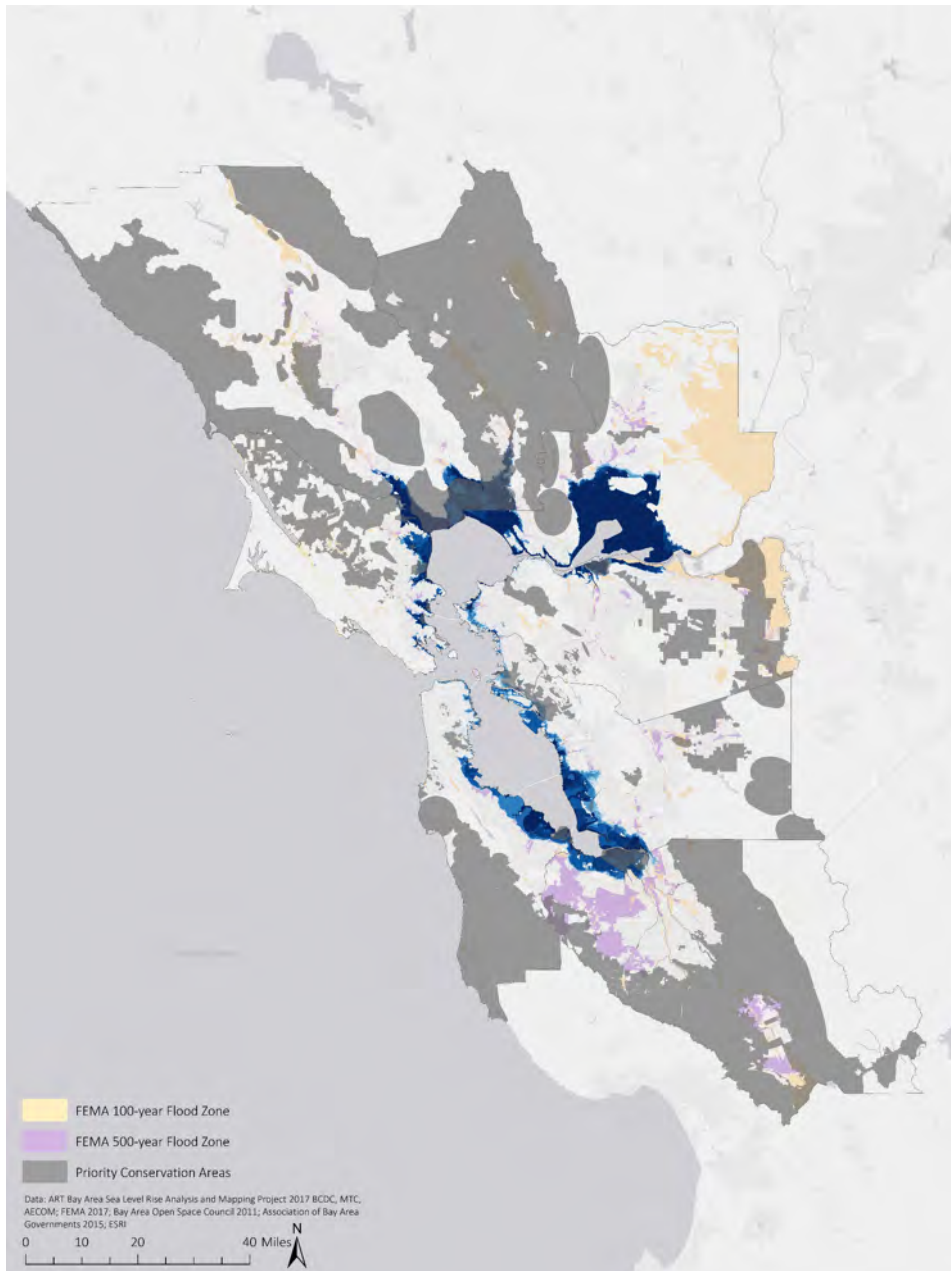
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SF Bay Trail

parking

natural capital PROJECT

Stanford WOODS INSTITUTE for the ENVIRONMENT

Wood et al. 2013, Keeler et al. 2015, Sessions et al. 2016

FEMA 100-year Flood Zone
FEMA 500-year Flood Zone
Priority Conservation Areas

Data: ART Bay Area Sea Level Rise Analysis and Mapping Project 2017 BCDC, MTC, AECOM; FEMA 2017; Bay Area Open Space Council 2011; Association of Bay Area Governments 2015; ESRI

0   10   20   40 Miles   N

- Determine PCAs to receive detailed, individual assessments base upon:

  - Exposure

  - Distribution among 9 counties

  - Distribution among PCA types

  - Systems assessment to assess key contributors to PCA Program goals and objectives

  - Detail spatial visitation impacts of SLR

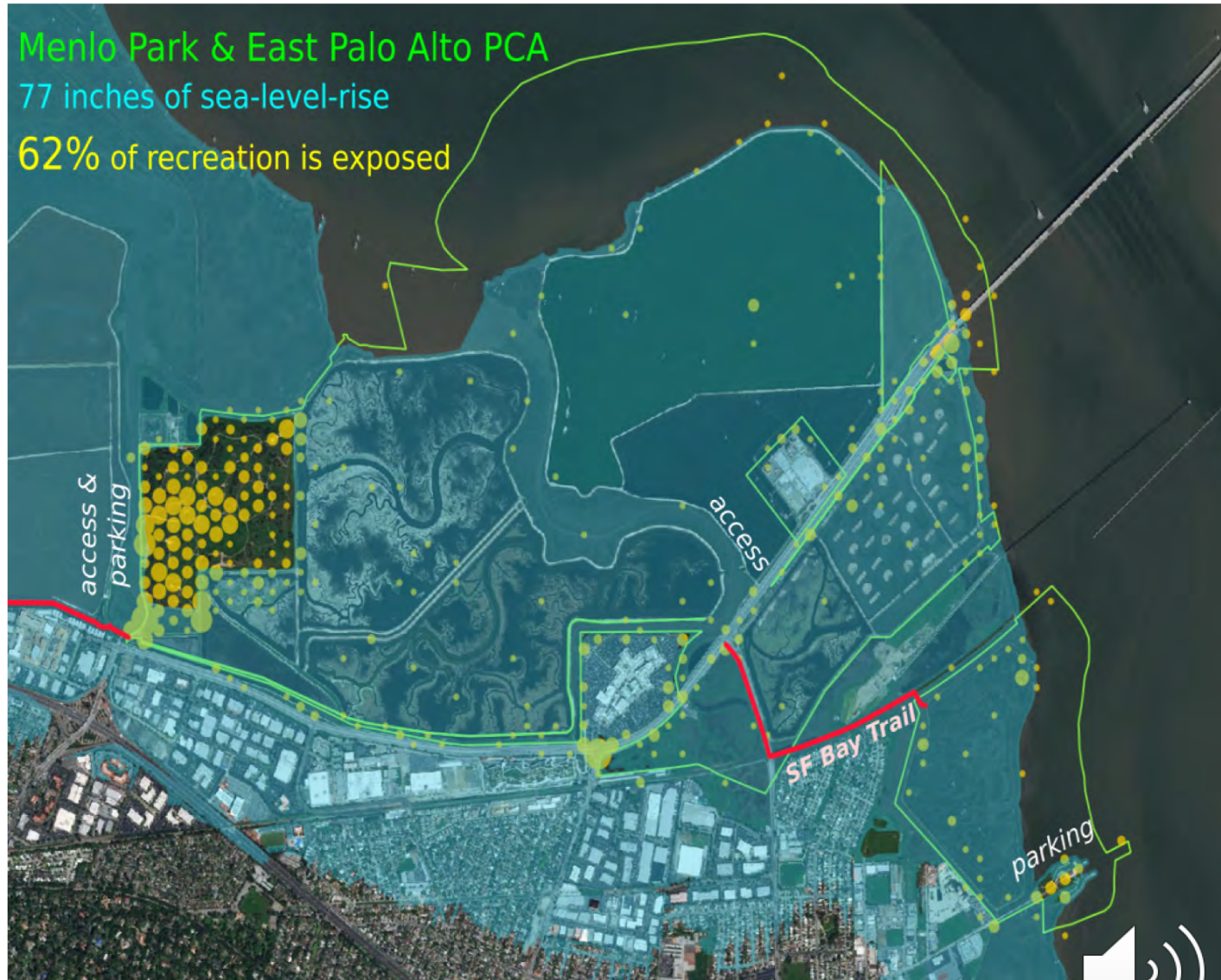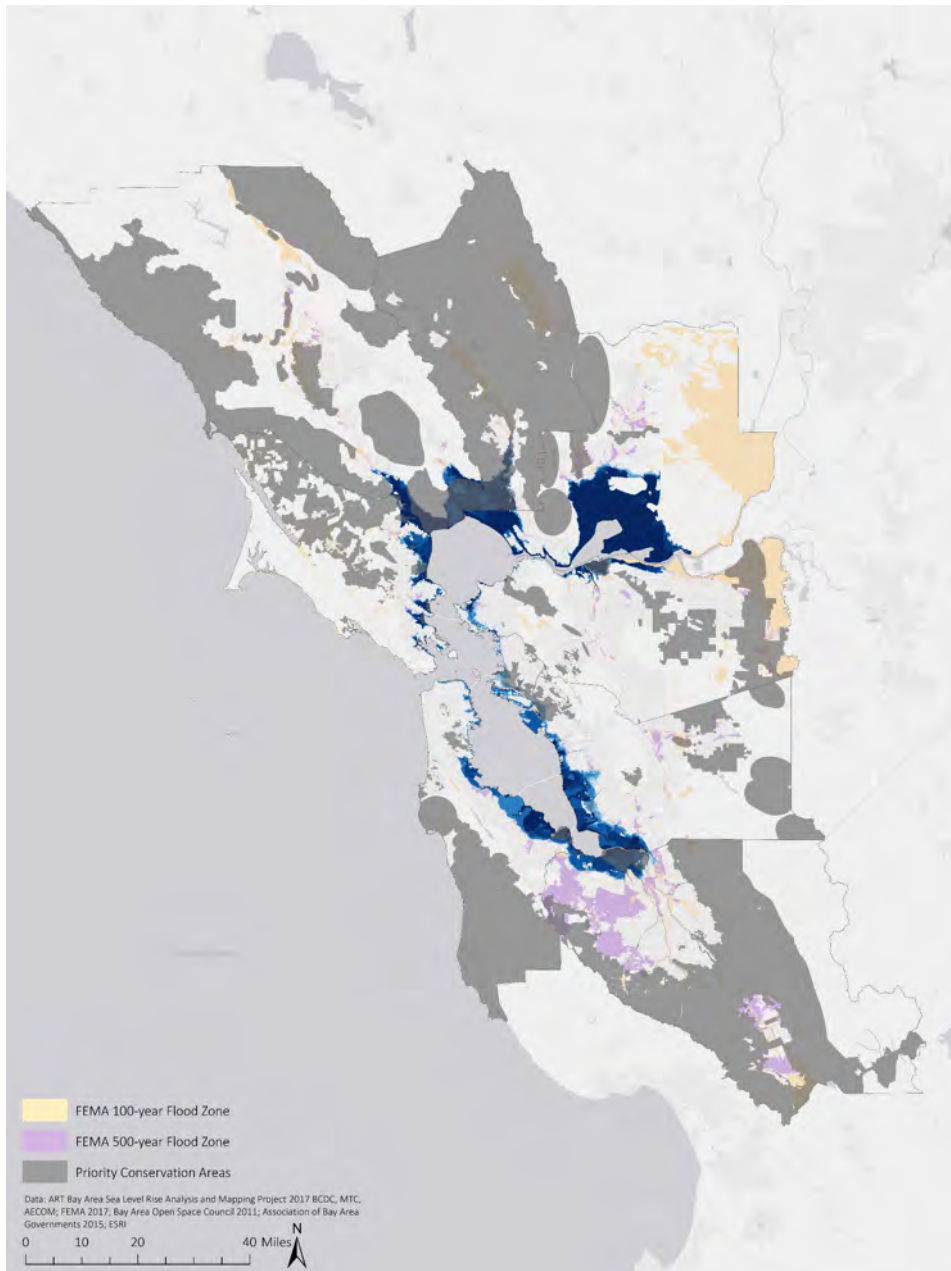 - *Incorporate stakeholder input*

- Use ART Vulnerability Assessment to assess the ~39 PCAs to uncover local and regional importance and vulnerabilities

- Point Edith PCA includes contaminated land once part of MOTCO Naval Weapons Station (and memorial)

- Menlo Park and East Palo Alto PCA fronts PG&E substation, Facebook campus, Hwy 84 & Dumbarton Bridge touchdown, Hetch Hetchy pipeline

- Central Marin Bayfront PCA contains low-lying, original remnant tidal marsh with multiple endangered and protected species

Bothin Waterfront PCA, Marin County Parks

Napa River Trail, BayTrail.org

Upper Pajaro Agriculture, Santa Clara Valley Open Space Authority

<u>Governance</u> questions identify challenges with management, regulatory authority, or funding options for adapting to impacts.

<u>Example:</u> **Oakland Urban Greening PCA**

- 9 Oakland urban areas, overlapping with multiple other uses and plans (PDAs, PCAs, regional transportation assets)

- Park deficits, food deserts, old industrial lands, high particulate levels, urban heat islands.
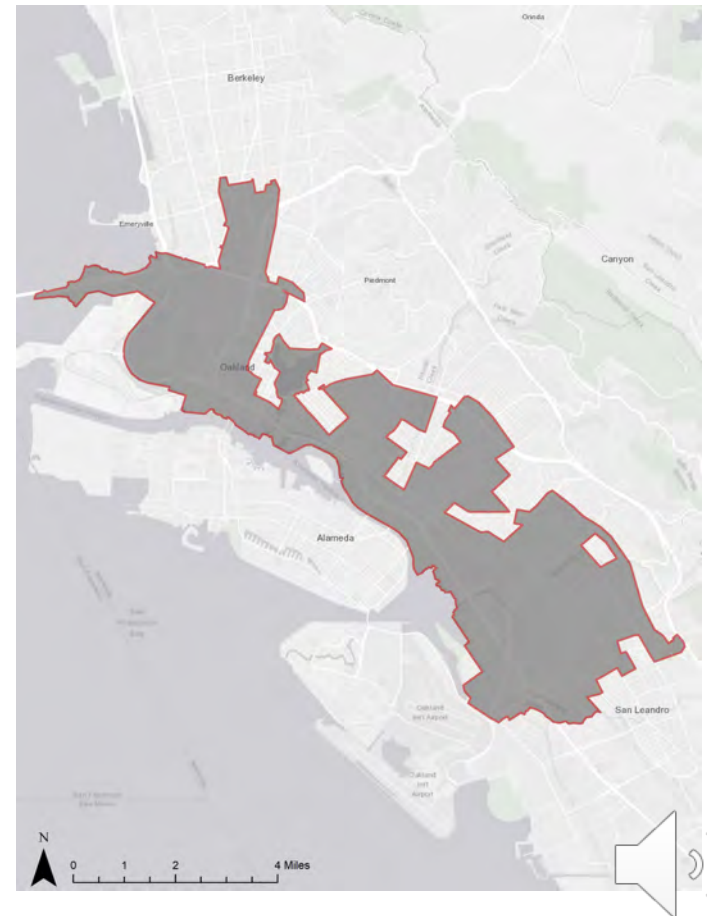
Functional questions consider the function of the assets and their relationship to or dependence on other assets.

<u>Example:</u> **San Francisco**

Bay Trail PCA

- Connects over 300 miles of trail as a network through 47 cities and crossing 7 toll bridges.

- Several sections are important commuting corridors, provide Bay access to underserved communities and populations.

BayTrail.org

BayTrail.org

<u>Consequences</u> questions informs how climate change may impact society and equity, the economy and environment.

<u>Example:</u> **Potential Oakland Gateway Area**

- Shutdown of the I-80 Bay Bridge due to flooding would significantly curtail the movement of goods and people across the region

- At higher water levels, flooding through the PCA could begin to impact West Oakland community, including local roads and emergency response services (Oakland Fire Station No. 3)

Photo by Heather Dennis

- Incorporate stakeholder input to finalize list of PCAs to individually assess and begin development of profile sheets

- Continue individual PCA vulnerability assessments

- Continue collaboration with the Natural Capital project team to complete the regional scale assessment

1. Are the four regional PCA assessment questions valuable to answer as a region? Is there any other dataset/value that we are missing?

1. *What benefits is the PCA network currently providing, and how are they distributed? How do these benefits compare to those in natural areas outside the PCA network?*

2. *Where will current and future flooding impact the benefits provided by the PCA network? Where will current and future flooding impact the benefits provided by the region's natural areas?*

3. *How will these impacts change incrementally with increasing amounts of flooding? Are there tipping points?*

2. Does the methodology for choosing individual PCAs to assess make sense? Is anything missing?

Priority Development Areas

Transportation infrastructure

Priority Development Areas (PDAs)

Disadvantaged Communities

Priority Conservation Areas (PCAs)

What are PDAs?

- PDAs are areas suitable for investment, new homes, and growth.

- To become a PDA, an area must be:

  1. Existing community
  2. Near transit
  3. Zoned for growth
  4. Nominated by the local government

188 PDAs in the bay region:

PDAs and PCAs

Priority Development Areas
Priority Conservation Areas

0   10   20   40 Miles
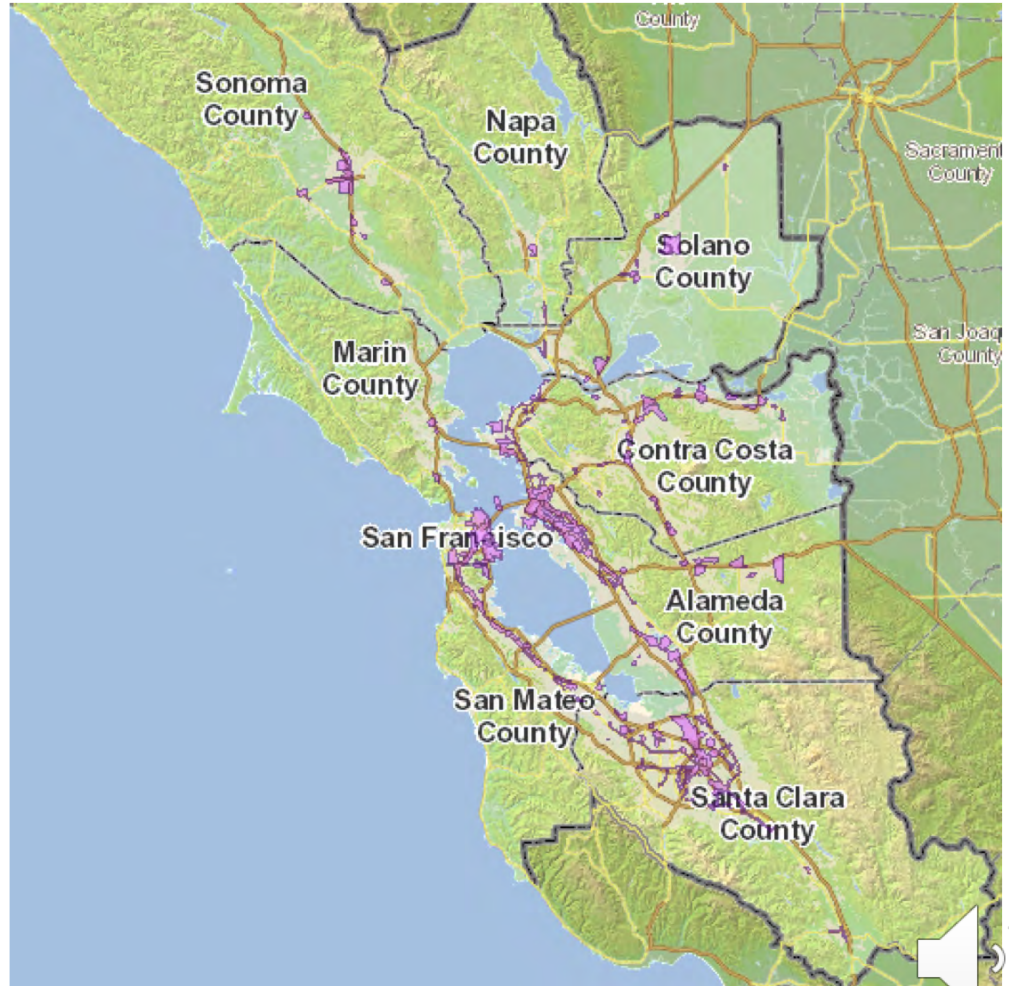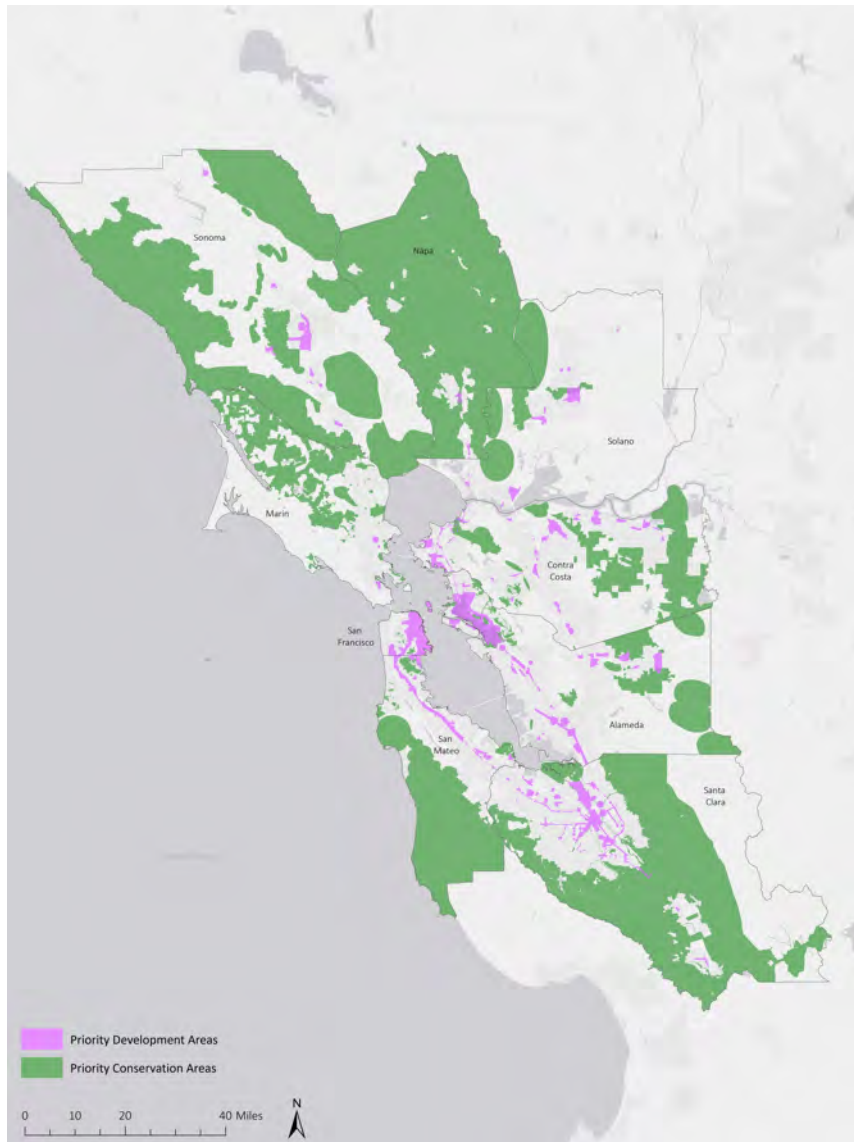
- Significance of PDA/PCA designation
  – PDA Planning Grant and Technical Assistance Program
  – Placemaking Initiative
  – One Bay Area Grant (OBAG)
  – East Bay Corridors Initiative, Resilience Program
  – Entitlement Efficiency working group

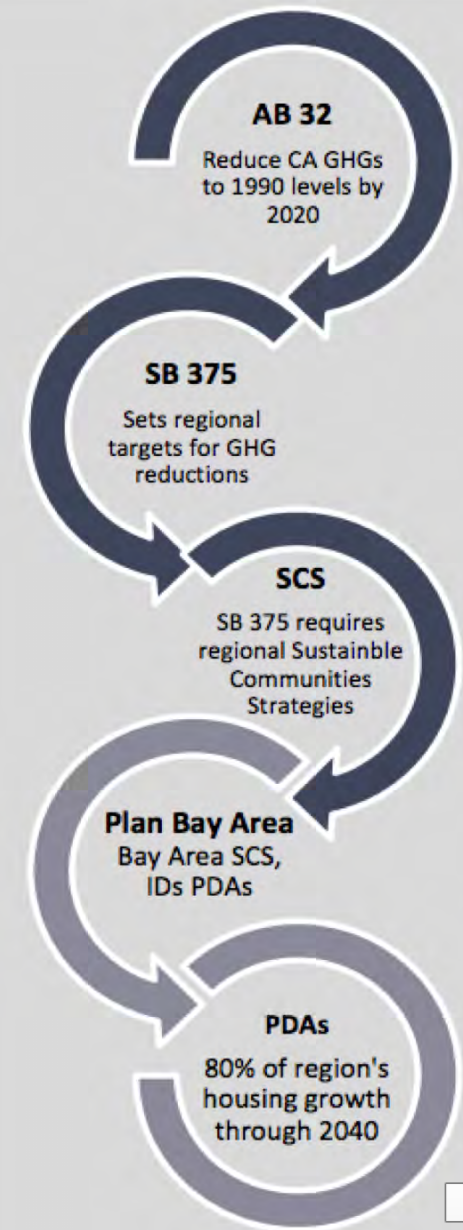# The role of PDAs

- Plan Bay Area projects that by 2040, we'll see:
  - 2 million new people
  - 1 million new jobs
  - 660,000 housing units
- 78% of new housing and 62% of new jobs will occur within PDAs through 2040
- PDAs help reduce emissions by aligning people with jobs and transit

Figure 1   PDAs Links to State Law

AB 32
Reduce CA GHGs to 1990 levels by 2020

SB 375
Sets regional targets for GHG reductions

SCS
SB 375 requires regional Sustainable Communities Strategies

Plan Bay Area
Bay Area SCS, IDs PDAs

PDAs
80% of region's housing growth through 2040

State statutes   Regional plans

PDAs and Resiliency

- To date, regional studies have examined
  - Capacity of each PDA to accommodate housing and population targets
  - Policy solutions
  - Individual PDA vulnerability to sea level rise
- However, no **region-wide** study has looked at the vulnerability of PDAs to rising sea level

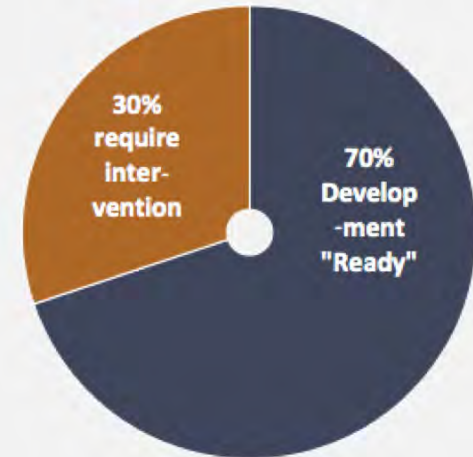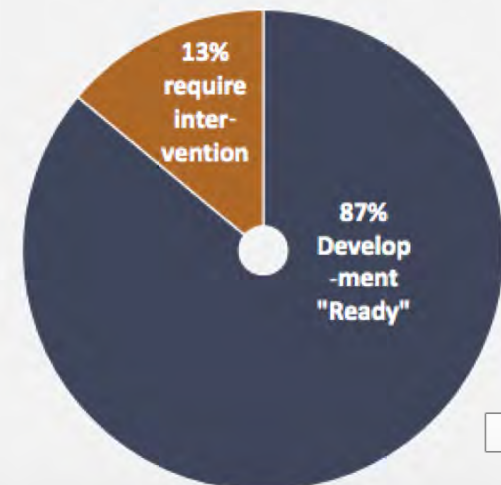**Figure 4** **Housing Development Readiness of PDA Sample (Baseline Scenario)**

30% require inter-vention

70% Develop-ment "Ready"

Figure 5 **Housing Development Readiness of PDA Sample (Amended Scenario)**

13% require inter-vention

87% Develop-ment "Ready"

Two assessment approaches

Assess the system of PDAs

- Understand distribution of SLR impacts to the PDA network
  - Across PDA types
  - Geographically
  - With incremental SLR

- Understand SLR impacts to key PDA characteristics
  - Housing growth potential
  - Job growth potential
  - Affordable housing
  - Transit that serves the PDA
  - Greenhouse gas emissions

Assess individual PDAs

- Select individual PDAs to assess that are
  - Are most exposed
  - Are representative of the network
  - Are important for reaching targets for emission reduction and population/job/housing growth
  - Contain vulnerable communities
  - Have regionally critical industry, infrastructure, or public facilities
  - Have public or emergency services that serve a larger area
  - Contain contaminated sites
  - Contain significant affordable housing or fragile housing
- Assess using ART assessment methods
- Characterize regional implications of impacts

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PDA exposure to rising sea level

(24" TWL)

Priority Development Areas

0   4.5   9   18 Miles   N
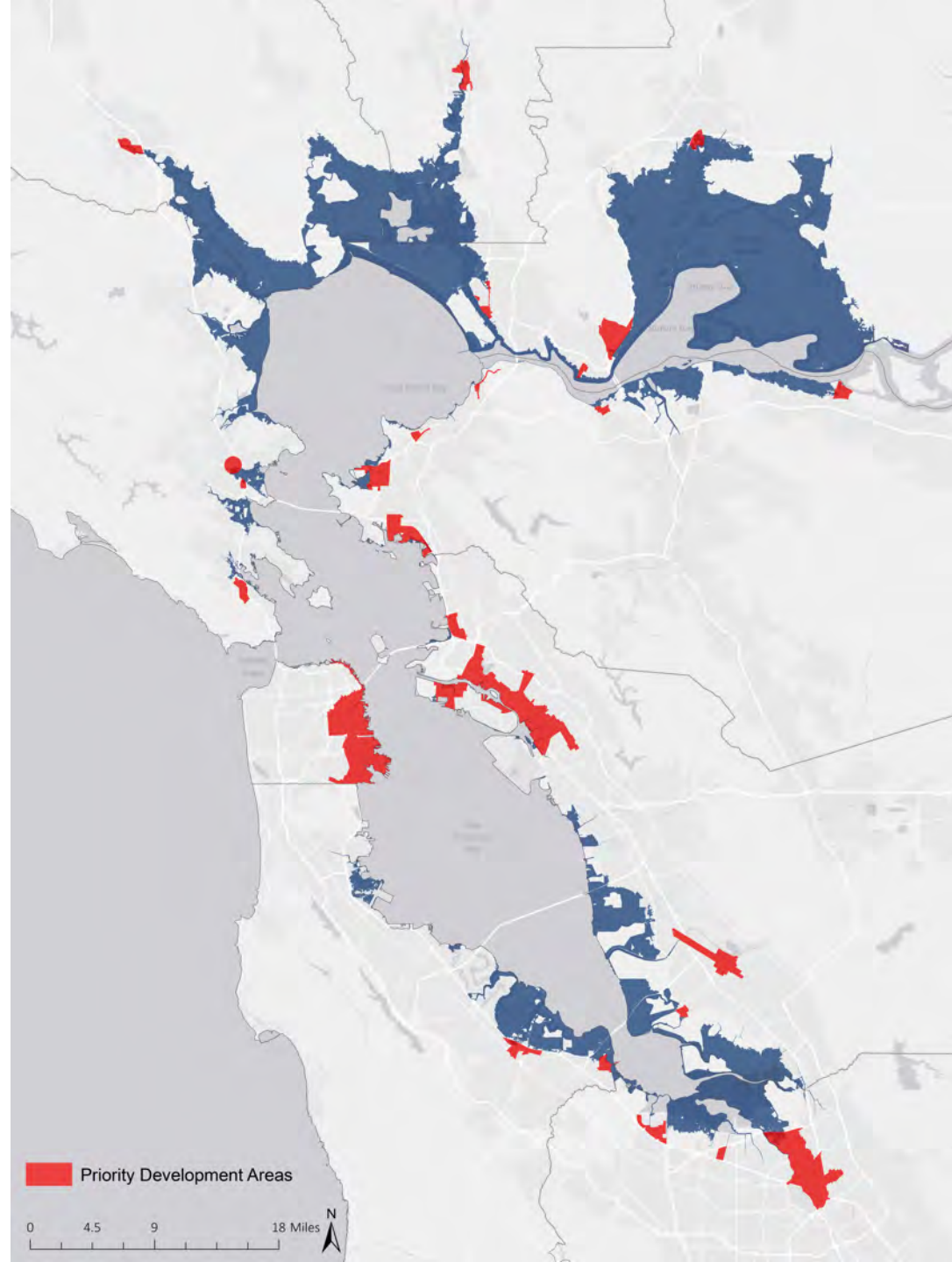
Number of PDAs exposed

Acres PDAs exposed

Geographic distribution of exposed PDAs

Distribution of PDAs exposed to 24" of sea level rise

Exposed **Not Exposed**

PDAs exposed at various TWLs

PDA Exposure by Designation to 24" TWL

Two assessment approaches

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- Assess using ART assessment methods
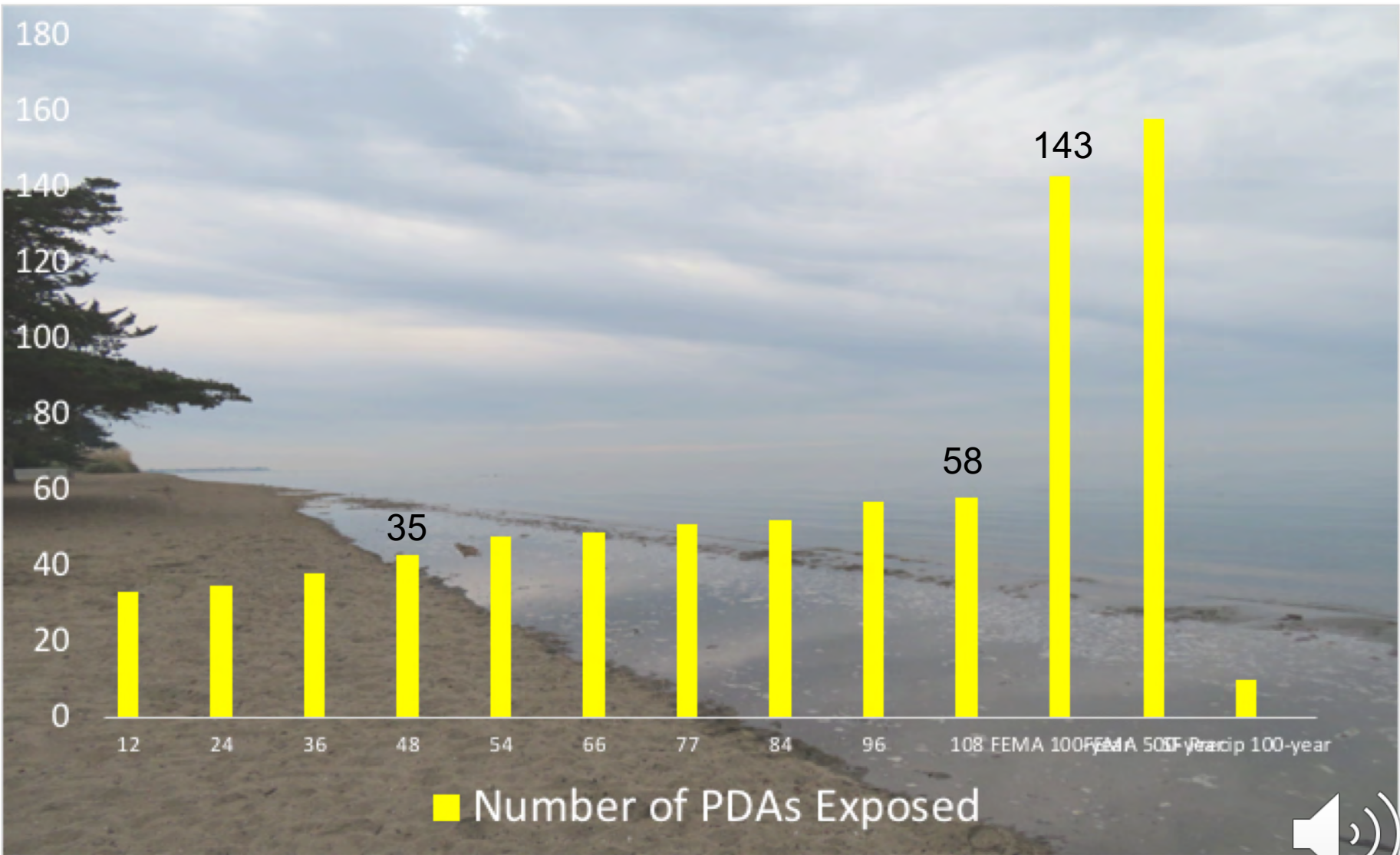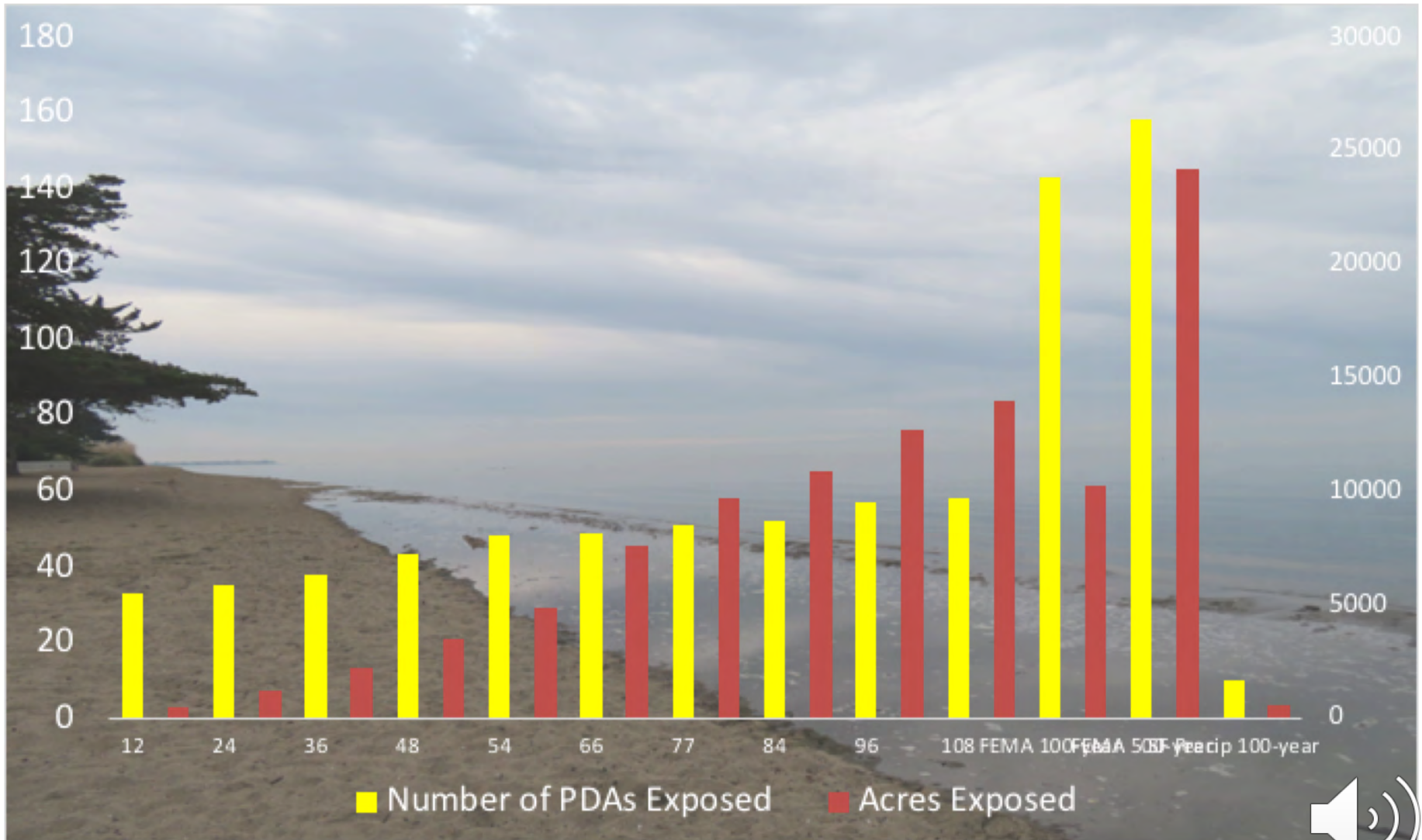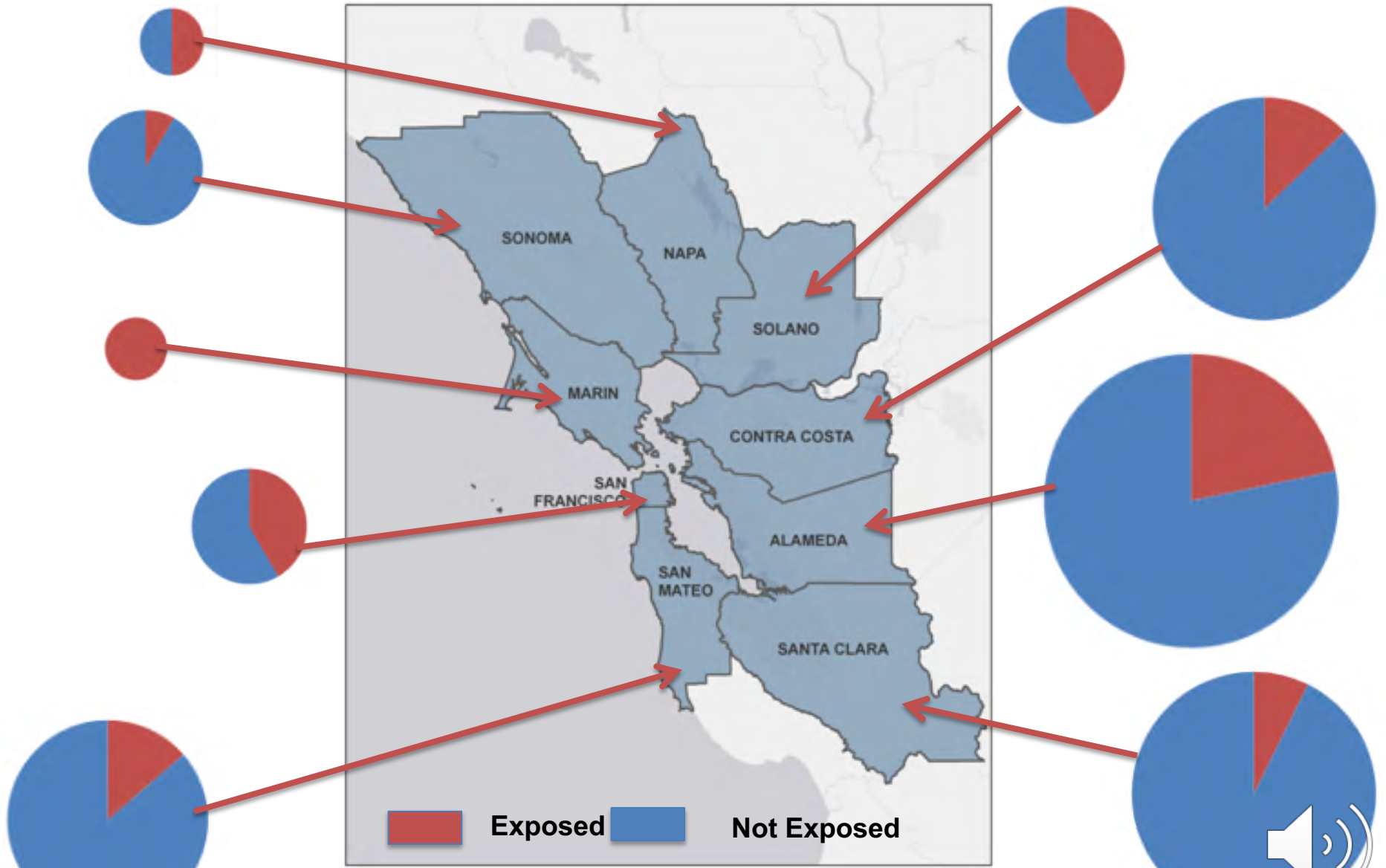- Characterize regional implications of impacts

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  - Have public or emergency services that serve a larger area
  - Contain contaminated sites
  - Contain significant affordable housing or fragile housing
- Assess using ART assessment methods
- Characterize regional implications of impacts

- Completing individual PDA assessments
  - Use assessment questionnaire, based on ART Framework
  - Conduct research, interviews, and outreach to answer the questions
  - Characterize regional implications of local impacts

Tabletop discussion questions

1. **System assessment**: What else should we analyze to understand how SLR could impact important characteristics and/or functions of the PDA network as a whole?

2. **Individual PDA assessments**: What other factors should we use to select individual PDAs to asses? What characteristics are valuable on an individual PDA scale?

3. **Other designations**: If this project could look at other development areas besides PDAs, what areas and/or designations should those be?

4. **Program questions**: What other research questions should we ask to better understand how rising sea level should be considered and/or addressed within the PDA program?

ART Bay Area Project

Transportation infrastructure
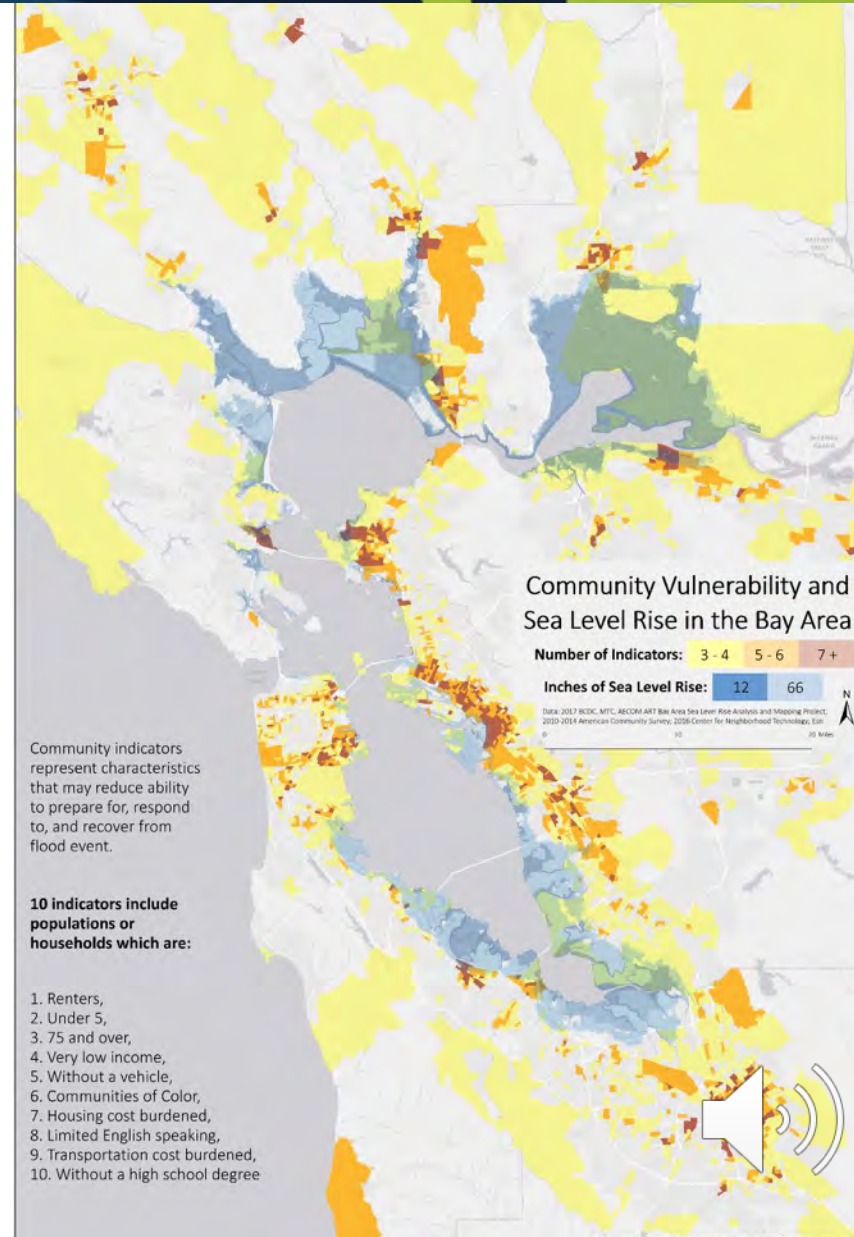
Priority Development Areas (PDAs)

Vulnerable Communities

Priority Conservation Areas (PCAs)

Vulnerable Communities

- Updated data
- Cross-references other tools
- Incorporated feedback from exercise at last working group meeting

Characteristic	Details/Notes
Community control, access to decision making	Existing adaptive capacity
	Fair media coverage
	Social cohesion/capacity
Contaminated sites	Pressures to build on contaminated sites
	Mobilization of contaminants
Educational and employment opportunities	Local jobs in adaptation, mitigation, disaster response
Health	Protection from potential hazards, i.e. sewage
	Access to services
Housing	Preventing displacement
	Home ownership opportunities
	Protection of low low income housing
Interconnected systems result in widespread impacts	Connections of water – wastewater, wells, aquifers
Parks and open space	Access to recreation
	Placement of parks on contaminated sites prevents development from occuring
	State parks a regional asset
Social and environmental justice	
Transportation	Community access to services
	Emergency response, including fleet storage

Community Vulnerability and Sea Level Rise in the Bay Area

Number of Indicators: 3 - 4 5 - 6 7 +
Inches of Sea Level Rise: 12 66

Community indicators represent characteristics that may reduce ability to prepare for, respond to, and recover from flood event.

10 indicators include populations or households which are:

1. Renters,
2. Under 5,
3. 75 and over,
4. Very low income,
5. Without a vehicle,
6. Communities of Color,
7. Housing cost burdened,
8. Limited English speaking,
9. Transportation cost burdened,
10. Without a high school degree

Block Group Population Map

Community Exposure Methodology
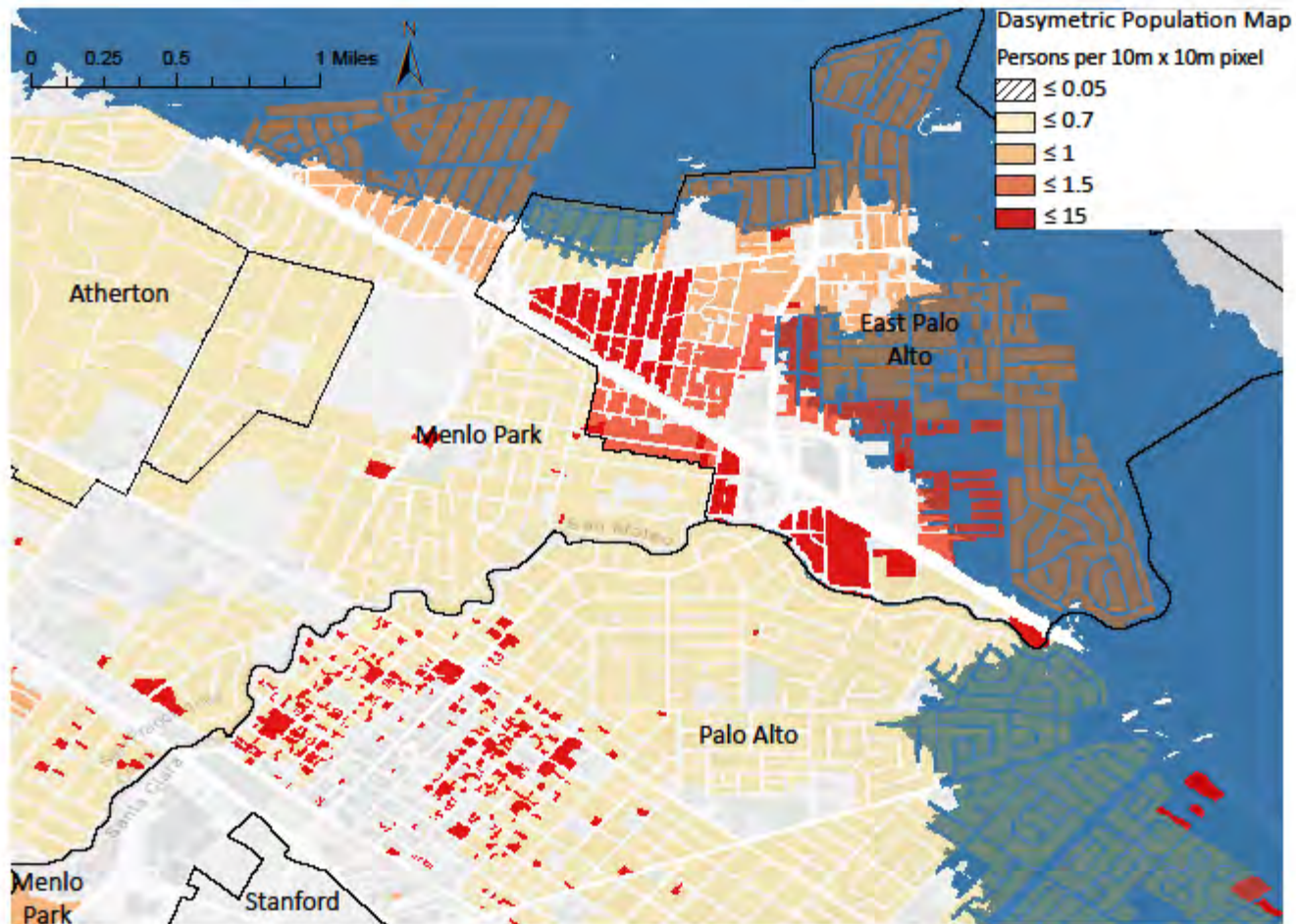
Community Exposure Methodology
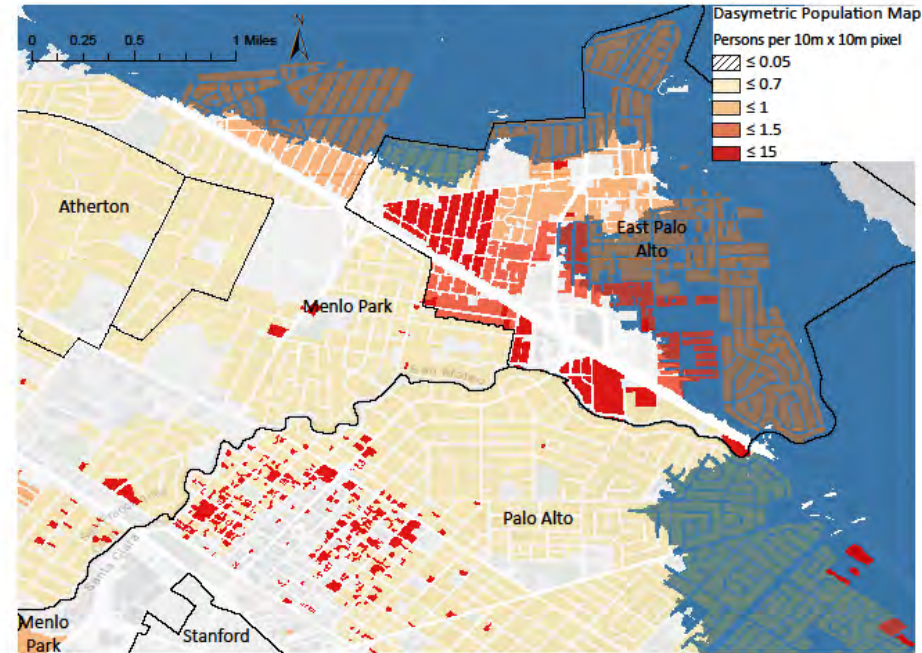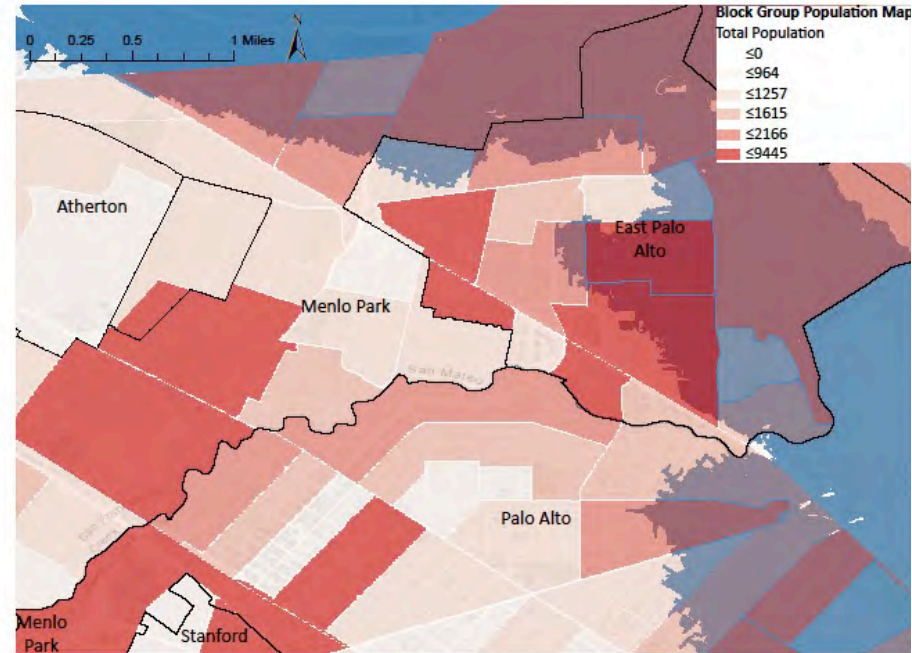
Vulnerable Communities Regional Screening

10 communities identified through following criteria:

1) Socioeconomic characteristics that may increase vulnerability to hazards; populations or households that are:
Renters
Under 5
75 and over
People of Color
Very low income
Without a vehicle
People with disability
Single parent families
Limited English proficiency
Without a high school degree
Severely housing-cost burdened

+
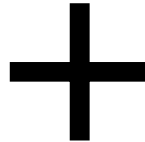
2) Communities containing block groups exposed to 36" increased total water level

Vulnerable Communities Regional Screening

Supplemental criteria:

3) Presence of contaminated sites
Solid waste disposal and solid waste landfills (CalRecycle)
Superfund sites (EPA)
Cleanup sites (reported activities to DTSC)
Groundwater threats (reported activities to Water Board)

Cleanup Sites by Type
- Corrective Action; School Cleanup; Voluntary Cleanup
- Evaluation; Historical; Military Evaluation
- Federal Superfund; State Response
- Solid Waste Disposal Sites
- Major Roads
- Superfund Sites
- Hazardous Waste Storage Facilities
- Solid Waste Landfills

Sea Level Rise

Total Water Level Equivalent to:
- MHHW + 52" SLR
- 12" SLR + 100-Year Storm
- 24" SLR + 10-Year Storm

Total Water Level Equivalent to:
- MHHW + 66" SLR
- 24" SLR + 100-Year Storm
- 36" SLR + 25-Year Storm

0   2.5   5   10 Miles

This map displays areas potentially inundated by flooding and sea level rise (SLR) at Mean Higher High Water (MHHW), the higher of the two daily tides. The extent of inundation is based on locally groundtruthed maps of elevation and hydrodynamic connectivity. It also shows cleanup sites, solid waste sites, and hazardous waste storage facility locations. Facility location data is from CalEnviroScreen 3.0 and is for discussion purposes only.

Site data source: CalEnviroScreen 3.0.
Sea level rise source: ART Bay Area Sea Level Rise
Analysis and Mapping Project 2017; BCDC, MTC, AECOM

Supplemental criteria: contaminated sites

Cleanup Sites by Type
- ○ Corrective Action; School Cleanup; Voluntary Cleanup
- ● Evaluation; Historical; Military Evaluation
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0   1.25   2.5   5 Miles

This map displays areas potentially inundated by flooding and sea level rise (SLR) at Mean Higher High Water (MHHW), the higher of the two daily tides. The extent of inundation is based on locally groundtruthed maps of elevation and hydrodynamic connectivity. It also shows cleanup sites, solid waste sites, and hazardous waste storage facility locations. Facility location data is from CalEnviroScreen 3.0 and is for discussion purposes only.

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Vulnerable Communities Regional Screening

Supplemental criteria:

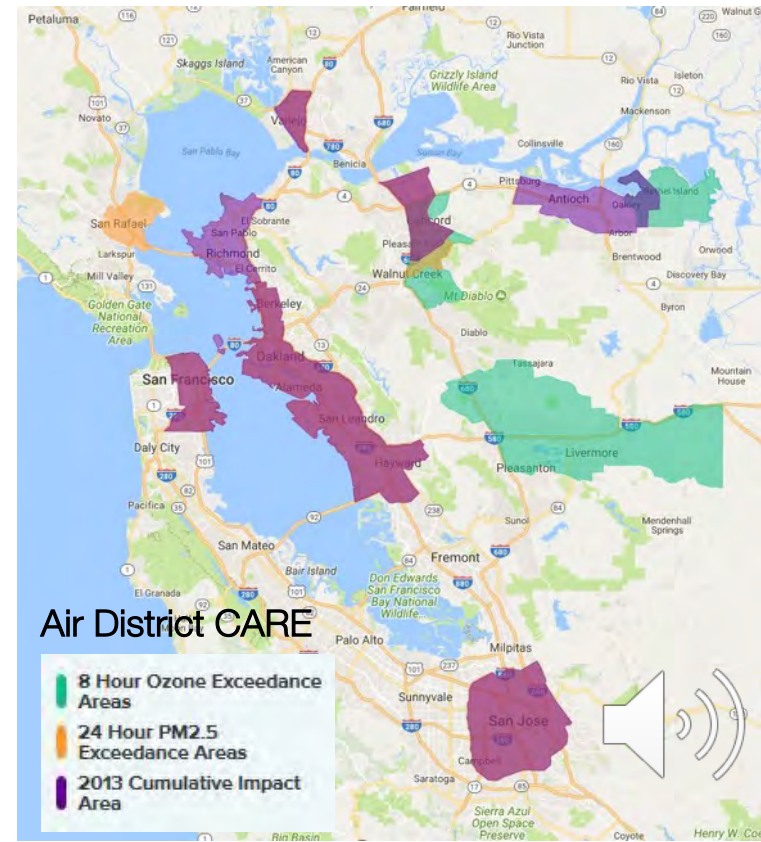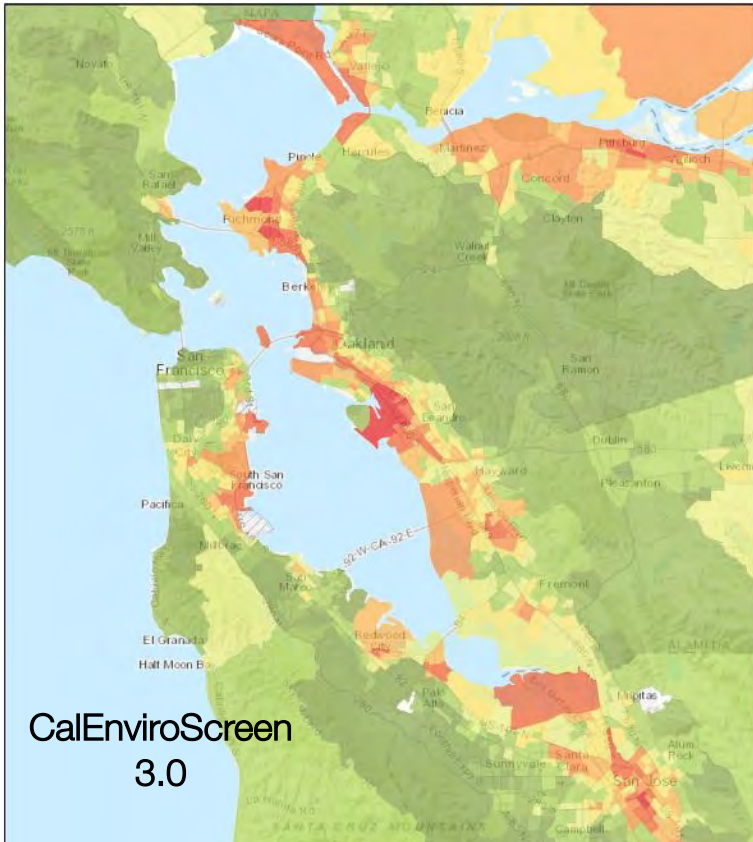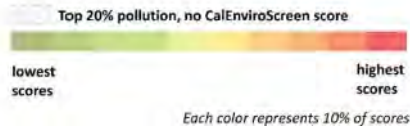| **4) Identified in complementary vulnerability screening criteria** |
| --- |
| Metropolitan Transportation Commission Communities of Concern (CoCs) |
| Air District Community Air Risk Evaluation (CARE) Program |
| Dept. Water Resources Disadvantaged Communities (DAC) |
| CalEPA CalEnviroScreen |
| UC Berkeley Displacement Vulnerability Index |

Top 20% pollution, no CalEnviroScreen score

lowest scores — highest scores

Each color represents 10% of scores

CalEnviroScreen 3.0

Air District CARE

8 Hour Ozone Exceedance Areas

24 Hour PM2.5 Exceedance Areas

2013 Cumulative Impact Area

Vulnerable Communities Case Studies

Next Steps: Moving beyond data

- Information not available/quantifiable by data, i.e. active community groups, historical context

- Qualify the data, i.e. in my community, rates of disability are higher

- Supplement data, i.e. in my community, this is a location where subsidized affordable housing is located

Vulnerable Communities Case Studies

Discussion Questions:

- Is there regionally-available data that should be included in the screening criteria?

- What questions help to understand community vulnerabilities not captured by data?

- Are there communities missing? Additional groups to work with? Additional studies?

Tabletop Discussion Report Out

- Share interesting conversations from the discussion questions!

- Will the proposed methods balance a regional analysis with place-based analyses?

- Did we miss anything major?
  - What elements or subjects should be incorporated into the methods?
  - Should any particular assets be pulled back into the list of specific assets to assess?

ART Bay Area Regional Working Group Meeting #4

- Send us your feedback on our Assessment Questionnaires

- Please participate in the CoUrbanize platform

- We'll be reaching out for asset owner, manager, or topical expert meetings for input on assessments

- Next meetings: Regional meeting series
  - April 2018 – East Bay
  - May 2018 – South Bay
  - June 2018 – North Bay