

Adapting to Rising Tides

Working together to increase the resilience of Bay Area communities to current and future flooding



San Francisco Bay Conservation
and Development Commission

www.adaptingtorisingtides.org

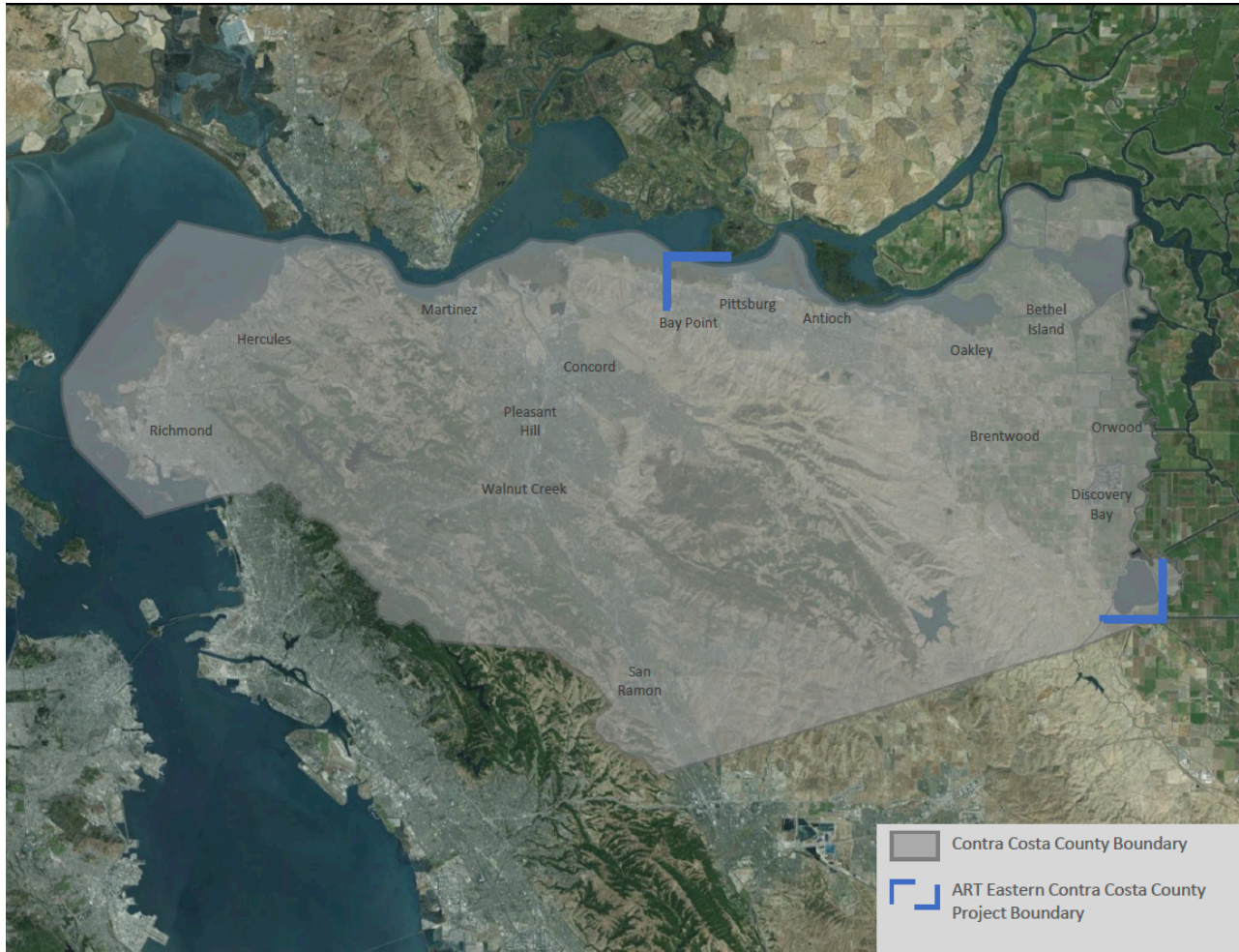
Outline

- Project Area and Rationale
- Goals and Objectives
- Project Team
 - Roles and Responsibilities
 - Working Group Formation
- Project Timeline
- Project Resilience Goals



Project Area

The shoreline from Bay Point to Clifton Court including areas potentially exposed to current and future coastal flooding from rising sea levels, and the current 1% annual chance (100-yr) flood

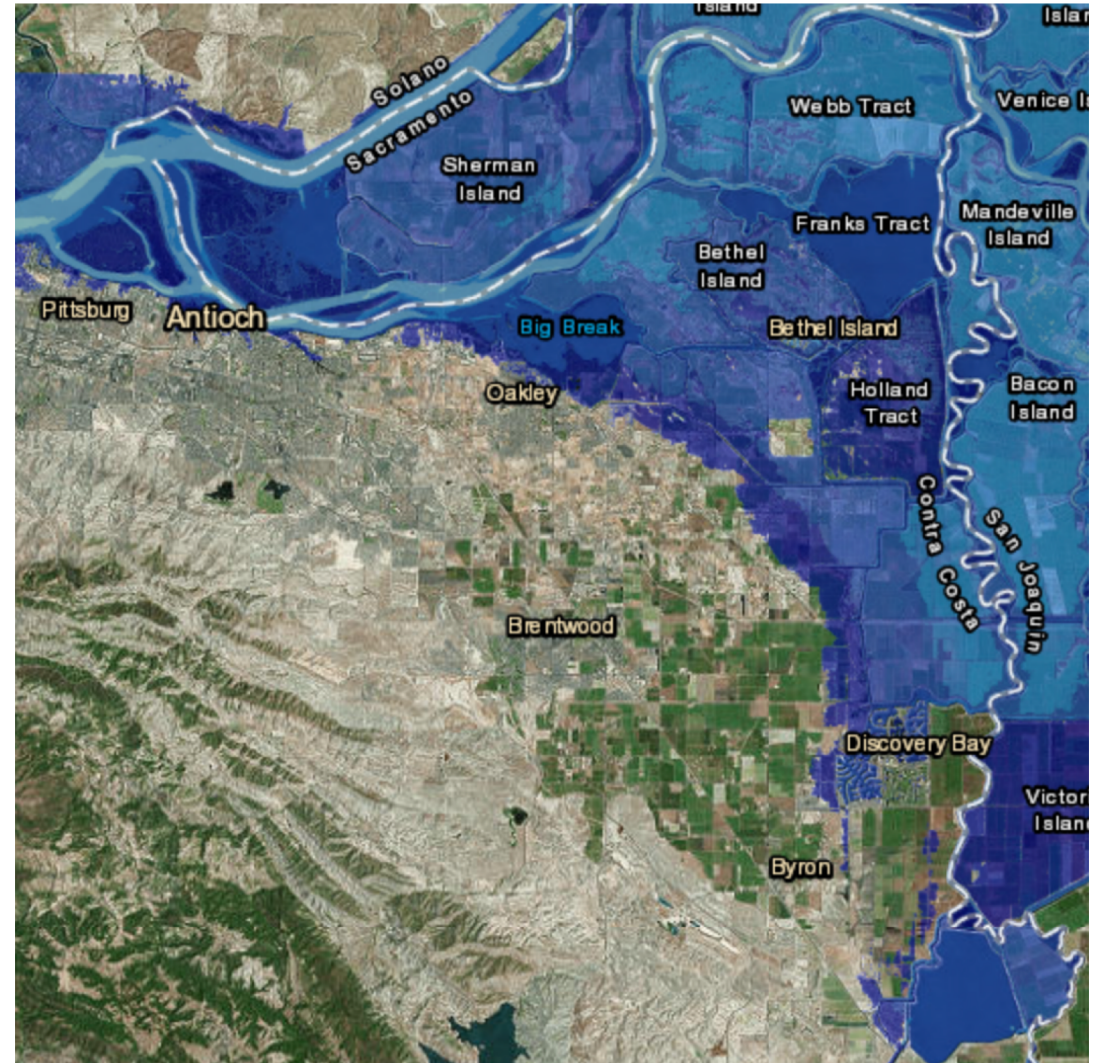


Current and Future Risk

Current FEMA 100 Year Flood Zone



Flooding from 1.41 Meters SLR and 100 year Flood

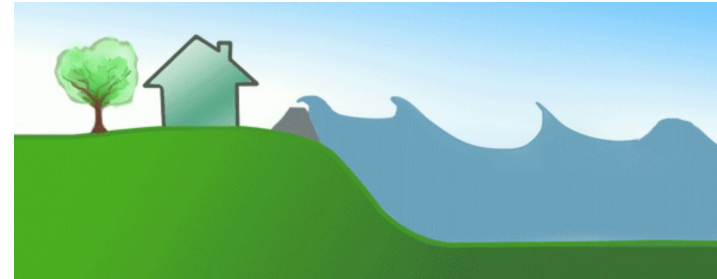


Sea Level Rise Projections

		Probabilistic Projections (in feet) (based on Kopp et al. 2014)				H++ scenario (Sweet et al. 2017) *Single scenario	
		MEDIAN	LIKELY RANGE	1-IN-20 CHANCE	1-IN-200 CHANCE		
		50% probability sea-level rise meets or exceeds...	66% probability sea-level rise is between...	5% probability sea-level rise meets or exceeds...	0.5% probability sea-level rise meets or exceeds...		
				Low Risk Aversion		Medium - High Risk Aversion	Extreme Risk Aversion
High emissions	2030	0.4	0.3 - 0.5	0.6	0.8	1.0	
	2040	0.6	0.5 - 0.8	1.0	1.3	1.8	
	2050	0.9	0.6 - 1.1	1.4	1.9	2.7	
Low emissions	2060	1.0	0.6 - 1.3	1.6	2.4		
High emissions	2060	1.1	0.8 - 1.5	1.8	2.6	3.9	
Low emissions	2070	1.1	0.8 - 1.5	1.9	3.1		
High emissions	2070	1.4	1.0 - 1.9	2.4	3.5	5.2	
Low emissions	2080	1.3	0.9 - 1.8	2.3	3.9		
High emissions	2080	1.7	1.2 - 2.4	3.0	4.5	6.6	
Low emissions	2090	1.4	1.0 - 2.1	2.8	4.7		
High emissions	2090	2.1	1.4 - 2.9	3.6	5.6	8.3	
Low emissions	2100	1.6	1.0 - 2.4	3.2	5.7		
High emissions	2100	2.5	1.6 - 3.4	4.4	6.9	10.2	
Low emissions	2110*	1.7	1.2 - 2.5	3.4	6.3		
High emissions	2110*	2.6	1.9 - 3.5	4.5	7.3	11.9	
Low emissions	2120	1.9	1.2 - 2.8	3.9	7.4		
High emissions	2120	3	2.2 - 4.1	5.2	8.6	14.2	
Low emissions	2130	2.1	1.3 - 3.1	4.4	8.5		
High emissions	2130	3.3	2.4 - 4.6	6.0	10.0	16.6	
Low emissions	2140	2.2	1.3 - 3.4	4.9	9.7		
High emissions	2140	3.7	2.6 - 5.2	6.8	11.4	19.1	
Low emissions	2150	2.4	1.3 - 3.8	5.5	11.0		
High emissions	2150	4.1	2.8 - 5.8	5.7	13.0	21.9	

Impacts from Sea Level Rise

- More frequent flooding of existing flood-prone areas
- More extensive, longer-duration flooding
- Shoreline erosion & water overwhelming shoreline protection
- Joint riverine and coastal flooding
- Elevated groundwater & increased salinity intrusion
- Permanent inundation of areas not currently exposed



ART in Eastern Contra Costa

Expected Outcomes

- Modeling and mapping of current and future flooding
- Assessments of multiple assets at the **sector, system, individual asset and component scale**
- **Consequences** of the failure or disruption of the asset systems assessed
- Adaptation responses that include **specific actions, actors, possible funding sources**
- Strong **collaboration** among **working group** members throughout the area
- Approach to integrate findings into existing and future county and city plans (e.g. **LHMPs, Safety Elements, Northern Waterfront Initiative**)
- Pathways for **implementing adaptation actions**



Sectors and Assets



Community Characteristics

Individual, household, neighborhood demographics

Residential Housing

Single and multi-family, senior, dependent housing

Community Facilities and Services

Public health infrastructure

Emergency facilities and services

Community facilities

Waste collection and transfer stations

Industrial Land Uses

Industrial land uses (zoning or assessor's data)

Contaminated Lands

Hazardous Materials Sites

Landfills (closed and open)

Parks and Recreation Facilities

Shoreline parks

Bay trail and water trail

Marinas

Fishing piers

Water Management

Water supply

Wastewater

Flood management

Levees

Stormwater infrastructure

Delta Intake Structures

Transportation

Passenger and freight rail

Local, state and interstate roads

Seaport (Port of Richmond)

Marine oil terminals

Energy and Fuel Supply

Pipelines

Power generation

Power distribution (substations)

Open Space and Natural Areas

Agricultural Lands

Tidal Marshes

Wildlife Refuges

Assessment Approach

The core of an ART assessment: sector-specific assessment questions:

- Questions are organized based on the types of vulnerabilities and consequences often observed
- The questions can be answered for all assets at different asset scales, or for representative assets

ART Assessment Questions: Natural Areas	
Asset name:	
FUNCTIONAL VULNERABILITIES describe asset relationships with or dependence on other assets.	
Questions	Answers (include data sources)
1. Is the asset part of a network such that damage to other of tidal or managed marshes or ponds in the landscape would affect the asset's ability to function?	
2. If the asset is disrupted or damaged, what redundant assets exist that could help maintain the functions normally provided by the asset?	
3. What external services, such as power, roads, clean water, and safe food supplies, does the asset rely on? What is the relationship between the asset manager and the organizations that provide these external services? If these external services were interrupted, are there back up supplies ready and in place, and how long would they last?	
4. Does the asset provide recreational access or opportunities that are unique or limited in the area and/or region, e.g., access for persons with limited mobility, interpretive programs, access to the Bay, etc.? Could these functions be easily replaced in other areas?	
5. Does the asset provide or protect habitat for threatened or endangered species? Is this habitat scarce in the region? Could this habitat be established in other areas?	

Assessment Approach

The next step is to enhance and validate the assessment findings:

- Use the soon to be completed modeling to conduct exposure analysis and refine list of assets
- Obtain input (reports, data, maps) from working group members, topical experts, and those with local knowledge
- Ask working group members and others to review preliminary assessment answers and exposure analysis



- ✓ Individual meetings
- ✓ Small group meetings
- ✓ Phone interviews
- ✓ Email
- ✓ Field visits

Roles & Responsibilities



- **Project Team:** leads and manages the project, engages the working group, completes work products
- **Working Group:** actively participates in the project, attends project meetings, provides local data and knowledge, communicates project to their own stakeholders to bring additional expertise and perspectives to the project
- **Other Stakeholders:** a wide range of organizations and individuals with interests and perspectives that can provide feedback on project components and outcomes

Project Working Group

- **County Agencies:** Conservation and Development, Flood Control, Public Works, Health Services, Mosquito and Vector Control Office of Emergency Services
- **Cities:** Planning and Public Works
- **Special Districts:** Water, Wastewater, Parks, Resource Conservation
- **Regional, State and Federal Agencies:** ABAG, MTC, Delta Agencies, Federal Resource Agencies, Transportation agencies
- **Private Entities and Non-Governmental Organizations:** Power, rail, industrial alliances and councils, community based organizations



Project Timeline

Project Initiation – Winter 2018

Project Scoping – Spring 2018

Conduct Assessment – Spring/Summer 2018



Determine Assessment Outcomes – Fall 2018



Transition to Adaptation – Fall 2018



Develop Adaptation Responses – Winter 2018/19



Evaluate and Select Adaptation Responses +
Opportunities for Implementation – Spring 2019



Working Group Meeting



Individual or small group meetings

Engagement Exercise



Project Resilience Goals

Project resilience goals help guide the project

- Resilience goals help clearly define the desired project outcomes and lay a foundation for future decisions
- Setting resilience goals early ensures transparency, and that all understand desired outcomes at the outset
- A strong set of resilience goals reflect all four frames of sustainability

The ART resilience goal, developed with input from the Subregional Working Group, is to:

Increase the preparedness and resilience of Bay Area communities to sea level rise and storm events while protecting critical ecosystem and community services.

SOCIETY & EQUITY

Effects on communities and services on which they rely, with specific attention to disproportionate impacts due to existing inequalities.

ECONOMY

Economic values that may be affected such as costs of physical/infrastructure damages or lost revenues during periods of recovery.

ENVIRONMENT

Environmental values that may be affected, including ecosystem functions and services, and species biodiversity.

GOVERNANCE

Factors such as organizational structure, ownership, management responsibilities, jurisdiction, mandates, and mechanisms of participation that affect vulnerability and risk.

Project Resilience Goals

Functions and Values Mapping: Engagement Exercise

Goal: identify the functions and values within the project area that are important to consider when assessing current and future flooding

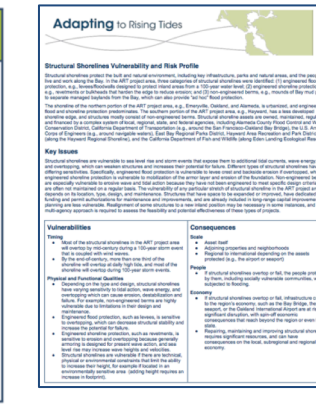
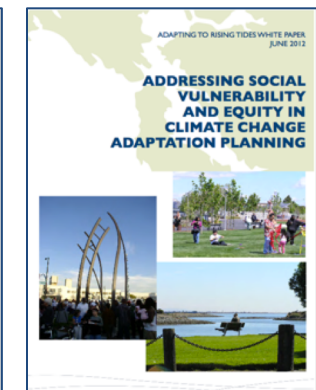
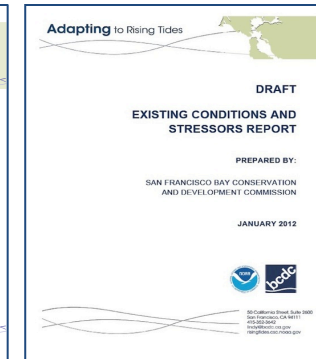
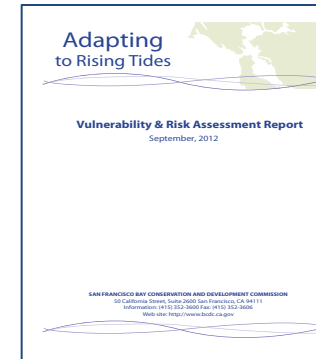


Draft resilience goals for the project

- Maintain neighborhood function by preserving access to roads and transit, goods & services, safe & affordable housing, and outdoor recreation opportunities.
- Maintain the function of the airport as a regionally significant passenger, cargo and employment hub.
- Build resilience in all phases of the disaster lifecycle - from mitigation & preparedness to response & recovery - by protecting critical community facilities, supporting community awareness, ensuring assistance through mutual aid agreements, and building capacity for an effective recovery.
- Preserve environmental quality by protecting endangered species, ensuring good water quality, and providing appropriate wildlife habitat.
- Protect local and regional economy by preserving major employment centers, airport services, regionally significant transportation and local infrastructure investments.

Previous ART Project Outcomes

- Issue papers
- Reports on existing conditions, vulnerability and risk, and adaptation responses
- Sector-specific communication materials, e.g., profile sheets
- Adaptation responses for all vulnerabilities identified
- Capacity building at local, regional, state and federal levels
- Website with tools and reports
- Mapping and online flood explorer tool



Mandates and Funding

- **Executive Order B-30-15**
- **State Sea Level Rise Guidance**
- **AB 2800**
- **SB379**
- **SB264**
- **Plan Bay Area**
- **Proposition 68**
- **Prop 1**
- **Others?**



Existing Plans and Efforts

- **Local Hazard Mitigation Plan**
- **General Plans**
- **Northern Waterfront Economic Development Initiative**
- **Eastern Contra Costa Integrated Water Resource Plan**
- **Storm Water Resource Plans**
- **Others?**



Engagement Exercise



Identifying Applicable Products

Goals:

1. Identify the plans, tools, and resources you currently use
2. Understand the formats (factsheets, reports, tools, websites) that are best for integrating new information and requirements into your work
3. Discuss the information and products that would help integrate sea level rise into future efforts
4. Identify who needs to be involved in the process and explore opportunities to work collaboratively
5. Identify current challenges to address current and future flooding including potential data gaps



Survey



Please take the next 10 minutes to read through the following questions and answer them to the best of your ability on the additional worksheet provided. This information will be used by the ART team to better understand the types of materials you are currently using and to guide how this project's outcomes can be most suited to your needs.

- What plans or products do you currently use? (Please include names, dates, etc.)
- What form of information is easiest and most applicable for you to use? (e.g. factsheets, reports, websites, other)
- How do you work across sectors? Who do you work with?
- Who would you like to work with (especially on climate adaptation issues) but currently don't? Why not?
- What challenges do you face in addressing current and future flooding? Is there data you are missing or need?

Small Group Discussion



Bringing together the Engagement Activity on “Functions and Values” and the “Individual Written Responses”, we are now going to review a map of the Eastern Contra Costa area and identify a few key areas that contain many of the uses and values that were identified earlier today. Please find a table that contains the “cluster” you’d like to further discuss:

- What information is needed to understand the vulnerability of the “cluster” of uses and values in this area?
- Who needs to be involved to address potential vulnerabilities?
- What plans exist that relate to this area?
- What products from this project would help you address these potential issues?

Report Back

- Are we missing key partners in this area?
- What products or forms of information did you identify as essential?



Thank You!



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