

INCORPORATING COMMUNITY GOALS INTO WATER INFRASTRUCTURE DECISION: MAKING A DIFFERENCE

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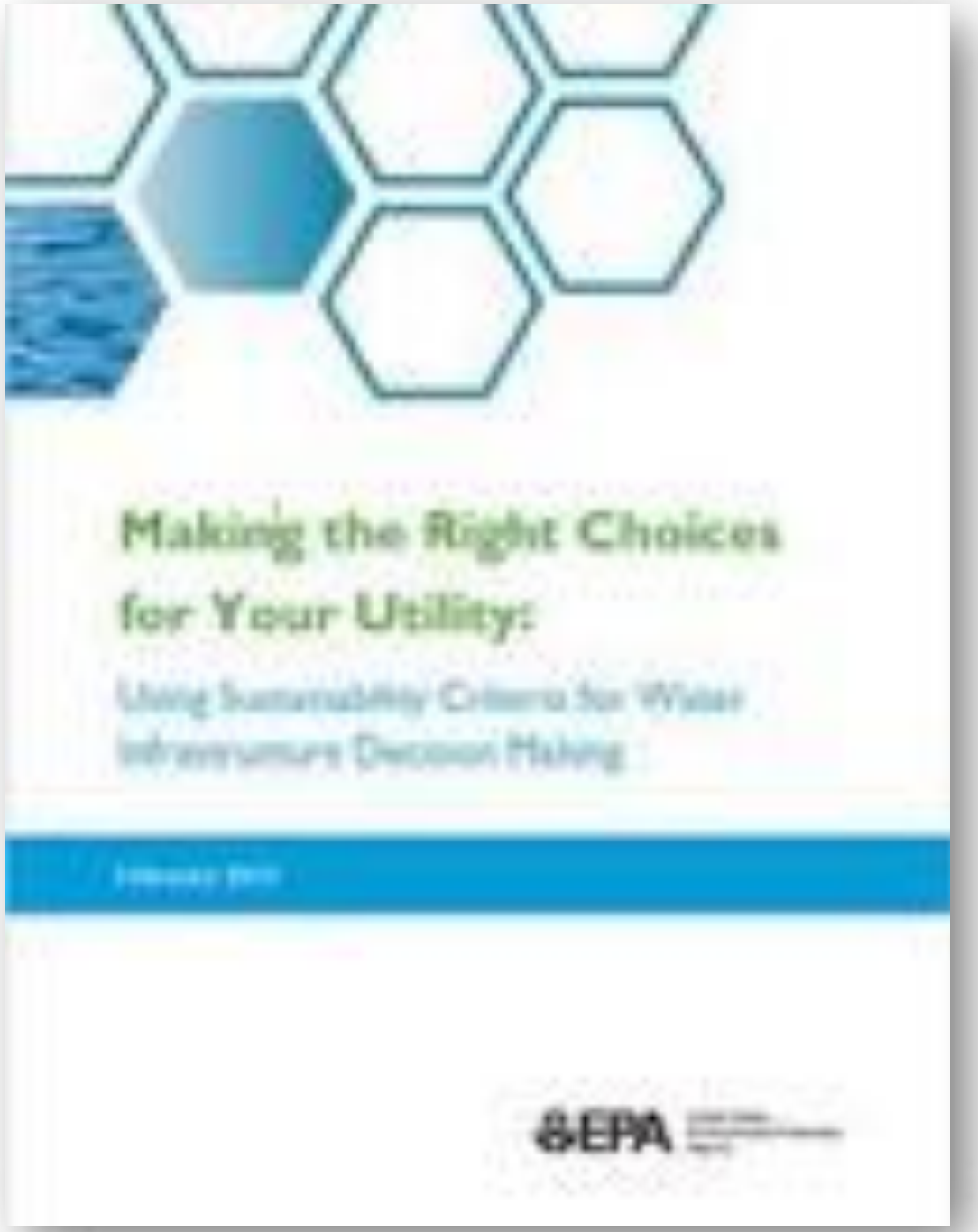


MAKING THE RIGHT CHOICES FOR YOUR UTILITY

Using Sustainability Criteria for Water Infrastructure Decision Making

WHY WE DID THIS PROJECT

- Test our guide with a utility in the “real world”
- Bring stakeholders into the Alternatives Analysis in a meaningful way at the begging of the process
- Add value to utility decision makers
- Identify opportunities to work with other utilities

COMMUNITY CHARACTERISTICS

Jurisdictions:

- City of Camden
- City of Gloucester
- Camden County

CCMUA: a county-wide public wastewater utility.

Wastewater System

Residents Served	510,00
Lines	125 mi.
Plant Capacity	58 mgd

Receiving Water: Delaware River

Revenues: ~$100 Million/Annually

Average number of Combined Sewer Overflows Annually: 70

LTCP Required to be in place by 2020

THE WORK GROUP:

- Camden County Municipal Utilities Authority (CCMUA)
- EPA Office of Wastewater Management (OWM)
- Camden SMART Team:
  - City of Camden
  - Cooper's Ferry Partnership
  - Rutgers
  - New Jersey Tree Foundation
  - New Jersey Department of Environmental Protection

CORE ELEMENTS OF CONVENTIONAL ALTERNATIVES ANALYSIS

Determine Goals and Objectives

Utility

Refine Goals to Metric Level

Scale Metrics

Evaluate Alternatives

Determine the Best Alternative

AUGMENTED ALTERNATIVES ANALYSIS

1-2 — Determine Goals and Objectives

Utility

Community

MODIFIED

3 — Rank the Importance of Goals

NEW

4-5 — Refine Goals to Metric Level

6 — Scale Metrics

7 — Evaluate Alternatives

8 — Review Results with Community

NEW

9 — Determine the Best Alternative

10 — Clearly Communicate Decision and Process to Community

NEW

AUGMENTED ALTERNATIVES ANALYSIS

- Explicitly incorporates community values into the decision-making process
- Creates an equal playing field for the consideration of additional criteria
- Allows utilities to effectively engage community stakeholders in the discussion

ALTERNATIVES ANALYSIS: STEPS AT A GLANCE

Step 1: Goals

Step 2: Objectives

Step 3: Rank Goals

Step 4: Criteria

Step 5: Metrics

Step 6: Scaling

Step 7: Evaluate

Step 8: Compare Alternatives

CAMDEN CASE STUDY

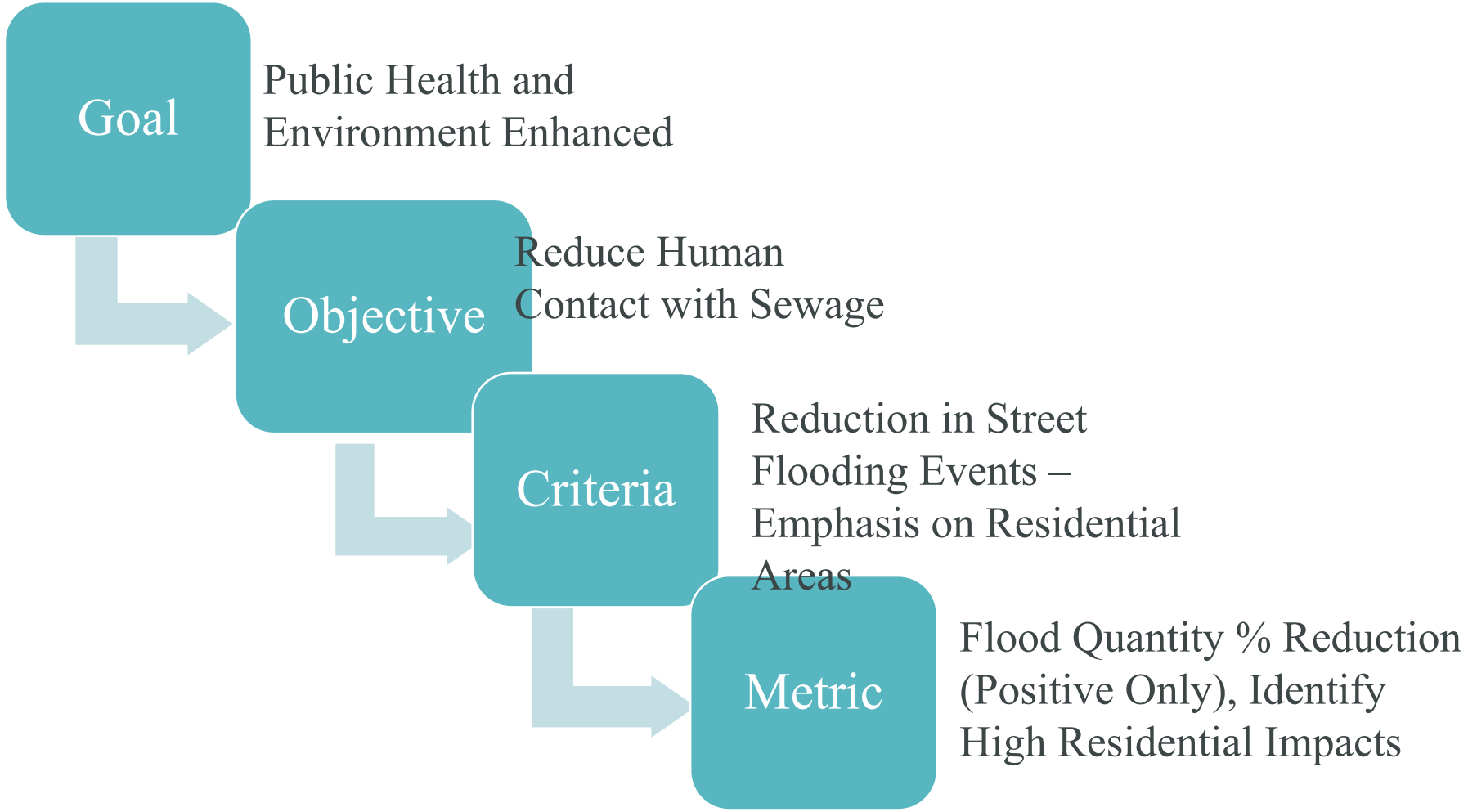
STEP 1: GOALS AGREED UPON BY THE WORK GROUP

- Enhance Public Health and Environment
- Meet or Exceed Permit Requirements (Water Quality Protected)
- Enhance System Climate Resiliency
- Produce Economic and Neighborhood Benefits
- Optimize Existing Public Resources
- Increase Public Understanding and Support for Combined Sewer Overflow (CSO) Solutions

STEP 3: RANKING IMPORTANCE OF GOALS

- Enhance Public Health and Environment = 10
- Meet or Exceed Permit Requirements (Water Quality Protected) = 9
- Enhance System Climate Resiliency = 8
- Produce Economic and Neighborhood Benefits = 8
- Optimize Existing Public Resources = 7
- Increase Public Understanding and Support for Combined Sewer Overflow (CSO) Solutions = 6

STEPS 4-5: REFINING THE GOALS TO METRIC LEVEL



STEP 6: SCALING THE METRICS

Objective 1.A.: Reduce human contact with sewage

Criteria 1.A.i: Reduction in street flooding events – emphasis on residential areas

Metric 1.A.i.a: flood quantity % reduction (positive only), discern high residential area impacts

Scoring	-5	-4	-3	-2	-1	0	1	2	3	4	5
						Alternative has no impact on the flood quantity	Alternative reduces flood quantity by 10% annually	Alternative reduces flood quantity by 20% annually	Alternative reduces flood quantity by 30% annually	Alternative reduces flood quantity by 40% annually	Alternative reduces flood quantity by 50% annually

IDENTIFYING INFRASTRUCTURE ALTERNATIVES

- **Alternative A:** All Grey
  (0% Impervious Reduction)

- **Alternative B:** Moderate Green
  (10% Impervious Reduction)

- **Alternative C:** Heavy Green
  (35% Impervious Reduction)

C-32 'SEWERSHED-LEVEL ALTERNATIVES' COMPARISON

Criteria	Weighted Score		
	Alternative A (All Grey)	Alternative B (Moderate Green)	Alternative C (Heavy Green)
1.A.i – Reduction in Flooding Events	0	10	30
1.B.i. - Reduction in CSO Discharge Volume	40	40	40
2.A.i – Annual System-Wide CSO Volume Capture	45	45	45
4.A.i – Flexibility in siting project	8	8	8
4.A.ii – Flexibility in timing of implementation of project	32	24	16
4.A.iii – Flexibility in phasing implementation of alternatives	24	24	24
4.B.i. – Green Space	0	8	8
4.B.ii – Reduction in heat island effect	0	8	8
4.B.iii. – Reduction in underdeveloped/vacant properties	-	-	-
5.A.i – Cost Effectiveness	14	-7	-21
6.A.i – Visibility to citizens and opportunity to present educational materials	6	18	30
TOTAL	**169**	**178**	**188**

MESSAGE TO YOU

- **More Than Theoretical:** The Camden case study demonstrates that the *Making the Right Choices for Your Utility: Using Sustainability Criteria for Water Infrastructure Decision Making* guidance can work in a real-life context and that the process is replicable.
- **Stakeholders Bought In:** We were able to involve them in a meaningful and substantive way throughout the process—based on their values
- **Strengthens Existing Processes:** Does not seek to replace, but rather augment and strengthen, existing alternatives analysis methodology.
- **Entirely Feasible for Other Communities:** Not overly resource intensive and can add real value
- **BUT. . . . . The right culture at the utility and in the community is critical**

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https://www.epa.gov/sustainable-water-infrastructure



SUPPLEMENTARY MATERIALS

C-32 ALTERNATIVE A: ALL GREY *(0% IMPERVIOUS REDUCTION VIA GSI)*

Criteria	Score	Weight	Weighted Score
1.A.i – Reduction in Flooding Events	0	10	0
1.B.i. - Reduction in CSO Discharge Volume	4	10	40
2.A.i – Annual System-Wide CSO Volume Capture	5	9	45
4.A.i – Flexibility in siting projects	1	8	8
4.A.ii – Flexibility in timing of implementation of projects	4	8	32
4.A.iii – Flexibility in phasing implementation of projects	3	8	24
4.B.i. – Green Space	0	8	0
4.B.ii – Reduction in heat island effect	0	8	0
4.B.iii. – Reduction in underdeveloped/vacant properties	TBD	7	-
5.A.i – Cost Effectiveness	2	7	14
6.A.i – Visibility to citizens and opportunity to present educational materials	1	6	6
TOTAL	**169**		

C-32 ALTERNATIVE B: MODERATE GREEN *(10% IMPERVIOUS AREA REDUCTION VIA GSI)*

Criteria	Score	Weight	Weighted Score
1.A.i – Reduction in Flooding Events	3	10	10
1.B.i. - Reduction in CSO Discharge Volume	4	10	40
2.A.i – Annual System-Wide CSO Volume Capture	5	9	45
4.A.i – Flexibility in siting projects	1	8	8
4.A.ii – Flexibility in timing of implementation of projects	3	8	24
4.A.iii – Flexibility in phasing implementation of projects	3	8	24
4.B.i. – Green Space	1	8	8
4.B.ii – Reduction in heat island effect	1	8	8
4.B.iii. – Reduction in underdeveloped/vacant properties	TBD	7	-
5.A.i – Cost Effectiveness	-1	7	-7
6.A.i – Visibility to citizens and opportunity to present educational materials	5	6	18
TOTAL	**178**		

C-11 ALTERNATIVE B: ALL GREEN *(12% IMPERVIOUS AREA REDUCTION VIA GSI)*

Criteria	Score	Weight	Weighted Score
1.A.i – Reduction in Flooding Events	0	10	0
1.B.i. - Reduction in CSO Discharge Volume	1	10	10
2.A.i – Annual System-Wide CSO Volume Capture	2	9	18
4.A.i – Flexibility in siting project	1	8	8
4.A.ii – Flexibility in timing of implementation of project	5	8	40
4.A.iii – Flexibility in phasing implementation of alternatives	3	8	24
4.B.i. – Green Space	1	8	8
4.B.ii – Reduction in heat island effect	1	8	8
4.B.iii. – Reduction in underdeveloped/vacant properties	5	7	35
5.A.i – Cost Effectiveness	-2	7	-14
6.A.i – Visibility to citizens and opportunity to present educational materials	5	6	30
TOTAL	**167**		

SCORING TABLE EXCERPT

5.A.i Cost effectiveness	5.A.i.a Least present worth cost (for this exercise)
5.A.ii Wastewater (and stormwater) costs <2% of Median Household Income upon full implementation of LTCP	5.A.ii.a Annual wastewater and stormwater costs for a typical residential user as a percentage of Camden MHI
5.B.i Source reduction volume	5.B.i.a Million gallons of flow removed (Positive only)
5.C.i Increase in annual collection sewer rehab or replacement	5.C.i.a Length of rehab/replacement (Positive only)
5.C.ii Improved maintenance of infrastructure	5.C.ii.a Percent of pipe inch-miles and catch basins cleaned annually (after current initial 3 year remedial program) [note - check WEF, APWA, etc. best practices for values]
6.A.i Visibility to citizens and opportunity to present educational materials (design, construction, operation)	6.A.i.a H, M, L ranking for visibility and opportunity
6.B.i Multi-use nature of infrastructure and degree of access (operation)	6.B.i.a H, M, L ranking for multi-use and accessibility

One Water LA

Creating Sustainable Water Future

By connecting the dots, drops, and hearts

LA DWP

environment LA SANITATION
CITY OF LOS ANGELES

LA's Water Challenges

90% of L.A. water supplies impacted by climate change, environmental and legal issues

- Drought
- Increasing population
- Aging infrastructure
- More stringent regulations
- Limited funding
- Dependence on imported water
- Climate Change

The Solution

INNOVATION

COLLABORATION

INTEGRATION

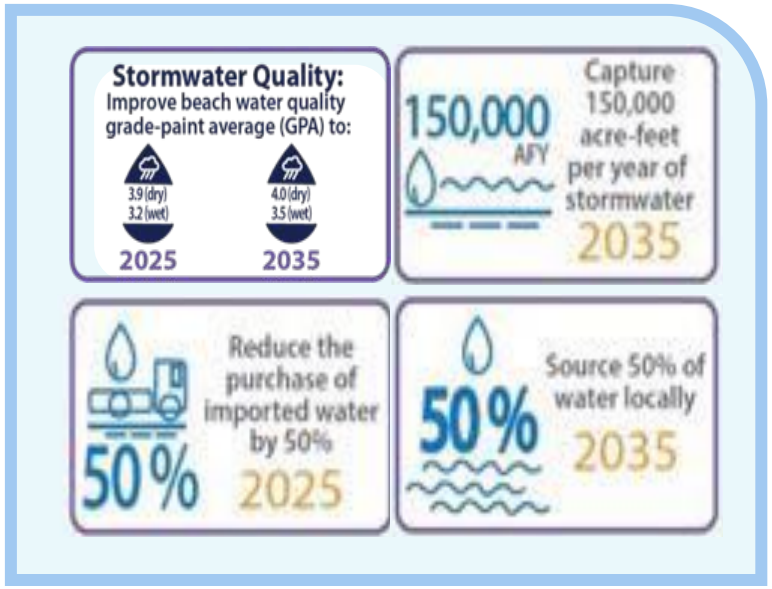
One Water LA

Connecting the dots, drops and hearts

Transforming our Relationship with Water

- **For every $1 Million in Water Quality investments, there is up to $22 Million in added benefits or avoided costs.**

Sustainable City pLAn Targets:



One Water LA Vision

Collaborative approach to develop an integrated framework for managing the City's watersheds, water resources, and water facilities in an **environmentally**, **economically**, and **socially** beneficial manner.

Integration

Conserve

Reduce demand and make supply last longer

Reuse

Non-Potable

Potable

Capture

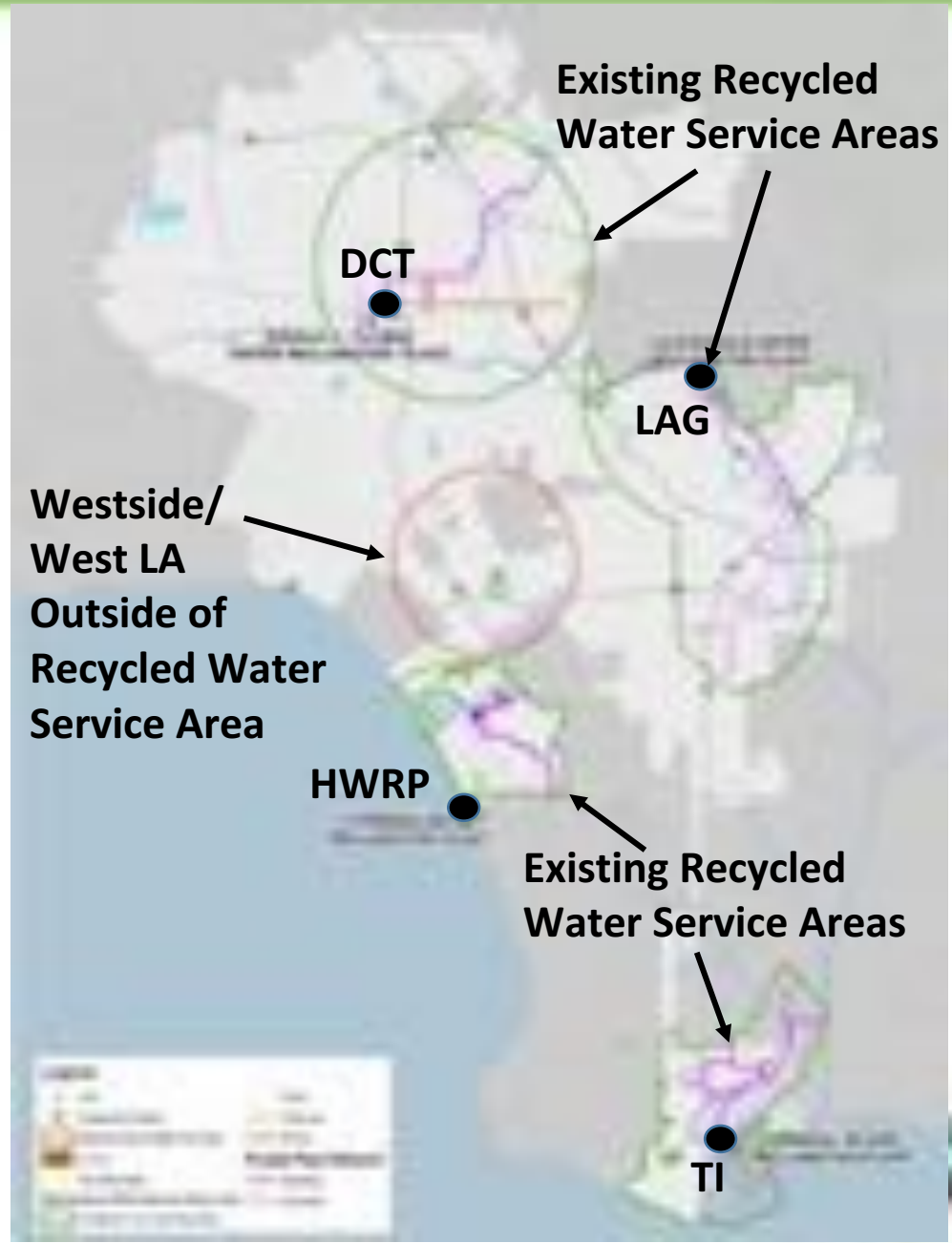
Centralized

Distributed

Innovation

Creative Water Management:

- Maximize recycled water production and use from existing water reclamation plants (WRPs)
- Augment sewer flows with runoff to increase water recycling
- Reconfigure sewer alignment(s) to increase flows to WRPs
- New strategically located City-owned satellite water reclamation plant(s)



Water Balance Tool

- **First-ever flow balance of LA's entire Water Cycle**
- Collaborative data effort of multiple departments
- **Annual flow projections from 2015 to 2040**
- Normal, wet, and dry year hydrology

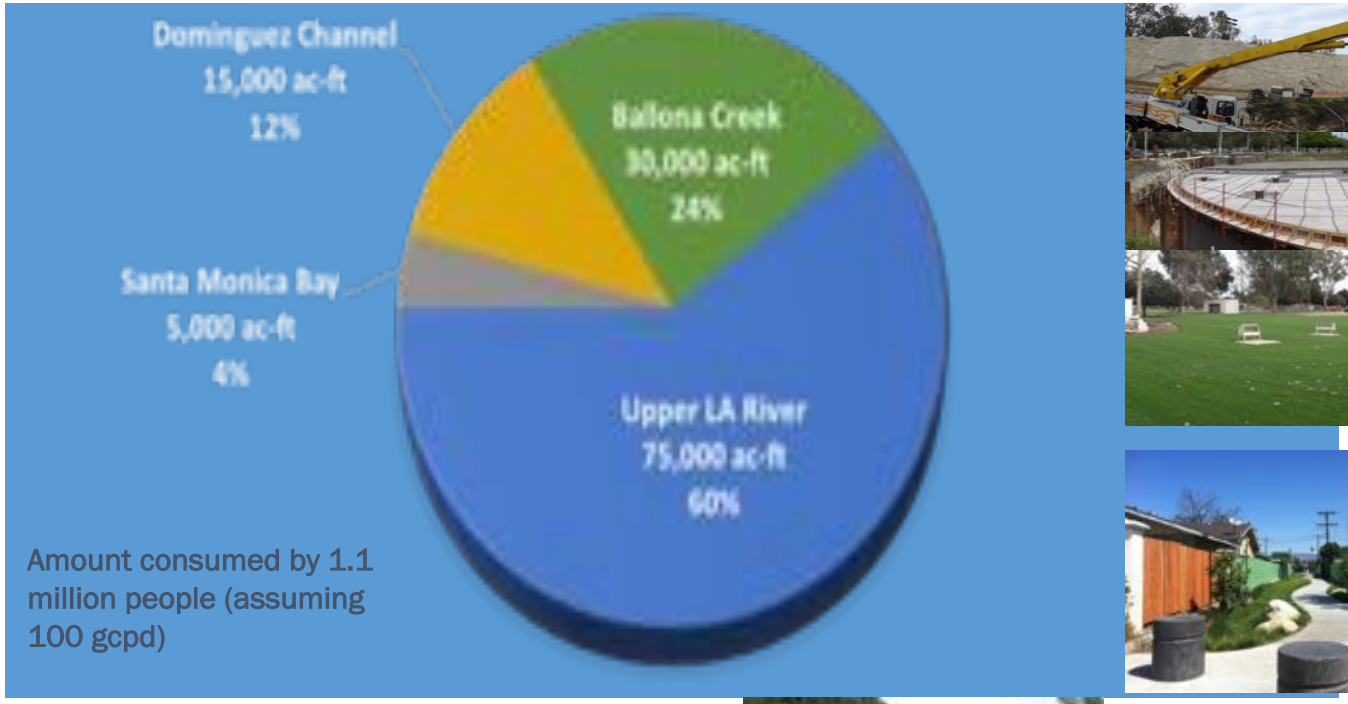
Innovation

Preparing for the future by evaluating <u>all</u> strategies on the table

Evaluation process identifies the most beneficial strategies including projects & programs to achieve long-term goals.

Stormwater Capture

Enhanced Watershed Management Plans (EWMPs)
4 watersheds, 30 Agencies, 300 stakeholders



Low Impact Development

Cisterns - Lowe's

Porous Pavement – Rio del Los Angeles State Park (aka: Taylor Yard)

Planter Boxes - Versailles Luxury Apartments Oxford St, Los Angeles

Infiltration - Costco

Bioretention - Sam's Club Parking Lot

Parkway Swale 11th St & Hope St

Rory Shaw Wetlands Park – *A collaborative project led by LA County in collaboration with City of LA and other partners*

- Project area: 46 acres
- Upstream drainage area: 929 acres
- Expected water capture and use: 900 ac-ft

Garvanza Park Rainwater Capture & Use Project

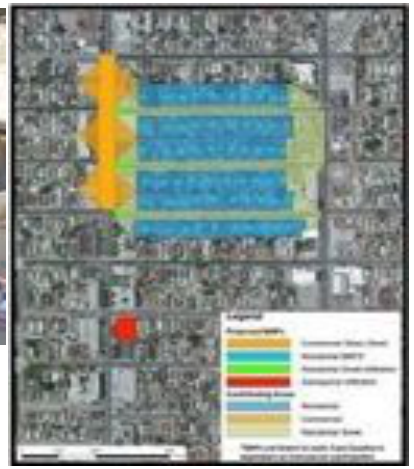
North East Trees

South Los Angeles Wetlands Park

36

Avalon Green Alley Project

Broadway Neighborhood Greenway



Elmer Paseo Alley Greenway

Before

After

38

Inclusion


Steering Committee
Advisory Group
Ad Hoc Technical Experts
One Water LA Team
Focused Meetings
Special Topic Groups
Stakeholder Workshops

Stakeholder Representation

- 500+ Stakeholders including over 200 Organizations
- Dedicated website for info & sign ups

www.OneWaterLA.org

Inclusion

THE TRUST FOR PUBLIC LAND

URBAN SEMILLAS
CULTIVATING COMMUNITIES. BUILDING CAPACITY.

LABT Los Angeles Beautification Team

North East Trees
NON-PROFIT URBAN FORESTRY

LOS ANGELES TRADE-TECH LATTC A Community College
Training. Transfer. Tradition. Trade Tech.

LOS ANGELES CONSERVATION CORPS
Transforming Youth. Enhancing Communities.

Council for Watershed Health

WATER FOUNDATION

The RIVER PROJECT

Pacoima Beautiful

TREEPEOPLE

Stakeholder Meetings

Special Topic Groups

Outreach Events

Schools and Academia

COMMUNITY CONSERVATION SOLUTIONS
Solving Problems where People and Nature Intersect

One Water LA

One Water is a collaboration of people throughout LA working together to change the way we think about and manage water

Additional Information:

www.lacity.org

www.lacitysan.org

www.onewaterla.org

NOAA'S SEA LEVEL RISE VIEWER

Data Visualization for Coastal Flooding and Risk at the National Level

Melissa Rosa
West Coast Geospatial Specialist
NOAA Office for Coastal Management
New Partners for Smart Growth Conference 2018

Digital Coast

- **Approach:** Bring the geospatial and coastal management communities together
- **Outcome:** A constituent-driven, integrated, enabling platform supporting coastal resource management that is used


version 3.0.0!!

Digital Coast Data Access

Data Registry

Data Access Viewer

Customized Sea Level Rise Viewers

Connect with the Digital Coast

https://coast.noaa.gov/DigitalCoast

https://coast.noaa.gov/slr/


Digital.Coast@noaa.gov


melissa.rosa@noaa.gov


http://www.facebook.com/NOAADigitalCoast


@NOAADigCoast

Adapting to Rising Tides

A regional program that uses findings, processes, tools and relationships built by ART and its partners to lead and support efforts that increase the resilience of San Francisco Bay Area communities to sea level rise and storm events

ADAPTING TO RISING TIDES

bcdc

Making San Francisco Bay Better

San Francisco Bay Conservation and Development Commission

www.adaptingtorisingtides.org

What is Adapting to Rising Tides?

ART Contra Costa Project

A Bay Area Program that:

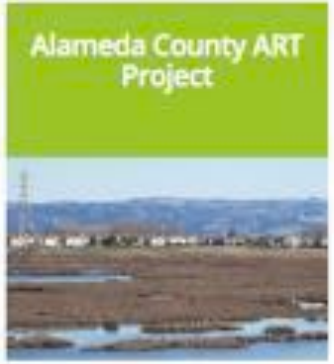
- Develops, leverages and identifies best available data, information and research
- Builds and supports partnerships with agencies and organizations
- Identifies challenging issues or regional priorities that need further assessment
- Helps local agencies, businesses, and other partners understand and address their own vulnerabilities
- Based on assistance, non-regulatory

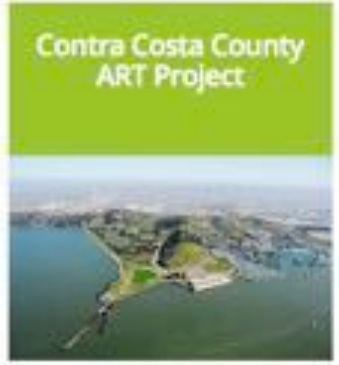
ART Projects

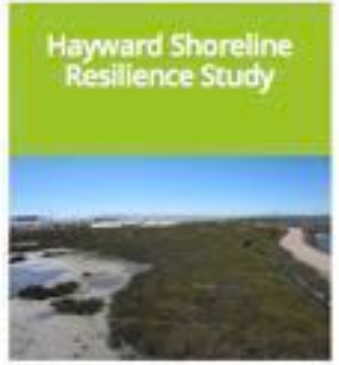
ART Contra Costa Project

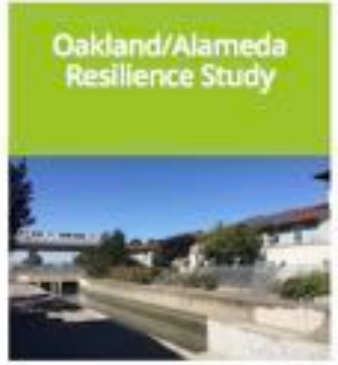
Regional

Local

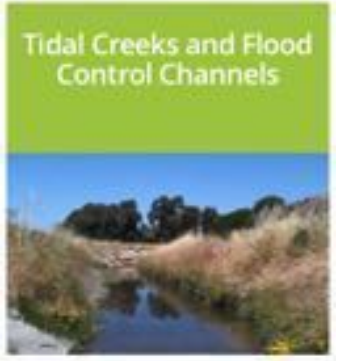


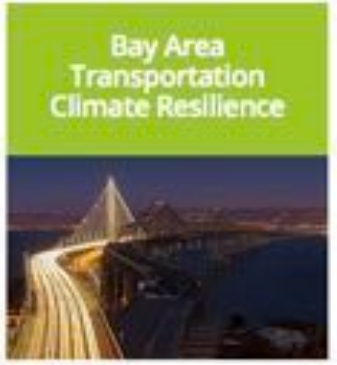


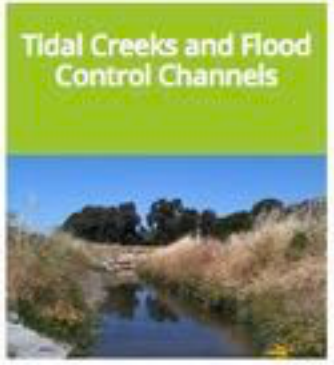


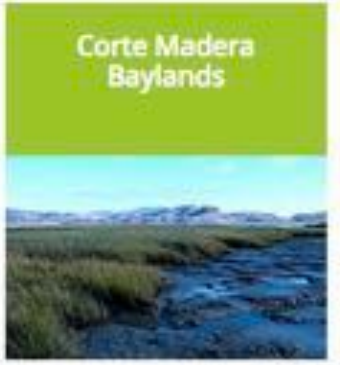


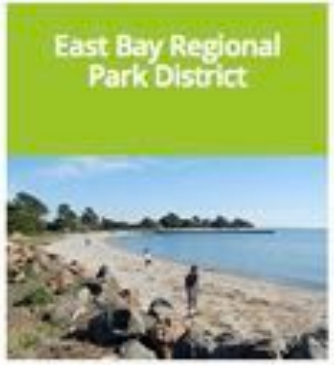
Sector







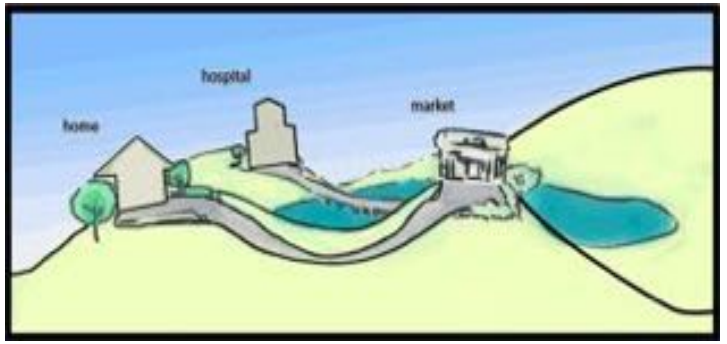


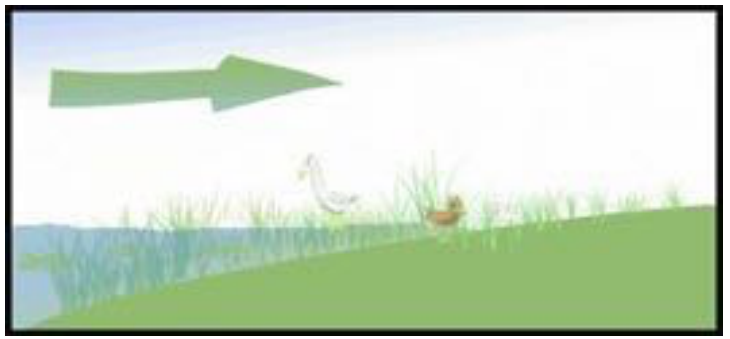


ART Flooding Impacts and Scenarios

Impacts from coastal and/or riverine flood events including:

- More frequent flooding of existing flood-prone areas
- Flooding in areas that are not currently at risk
- Elevated groundwater and increased salinity intrusion
- Permanent inundation along the shoreline, in particular tidal wetland systems
- Shoreline erosion and overtopping
- Tidal creek and channel flooding



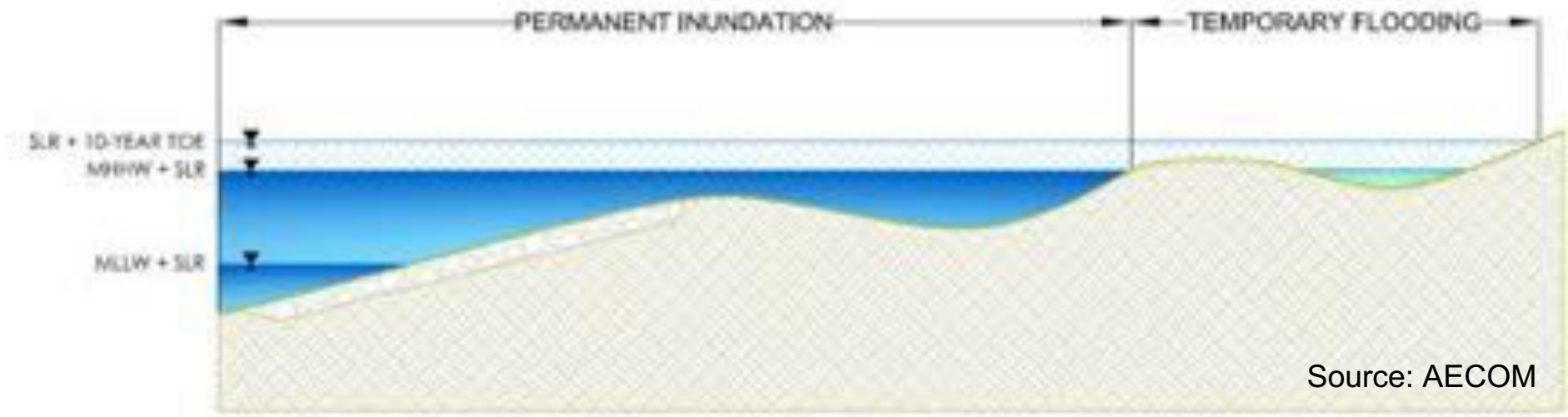


ART Regional Sea Level Rise Maps

- Uniform mapping for all 9 counties including 10 total water level scenarios for inundation, low-lying disconnected areas, and shoreline overtopping
- An effective planning tool to:
  - Communicate temporary and permanent flooding
  - Identify low spots on the shoreline that can lead to inland flooding
- Stakeholder reviewed and validated
- High resolution topographic data (1 meter DEM)
- Water levels from the SF Bay Coastal Study

ART's One Map = Many Futures

- Uses an equivalent water level approach to reduce the number of maps needed to understand flooding
- Communicates that areas that may be *permanently inundated* will first be *temporarily flooded*
- Provides information that allows local jurisdictions and agencies to develop thresholds for action



Source: AECOM

ART's One Map = Many Futures

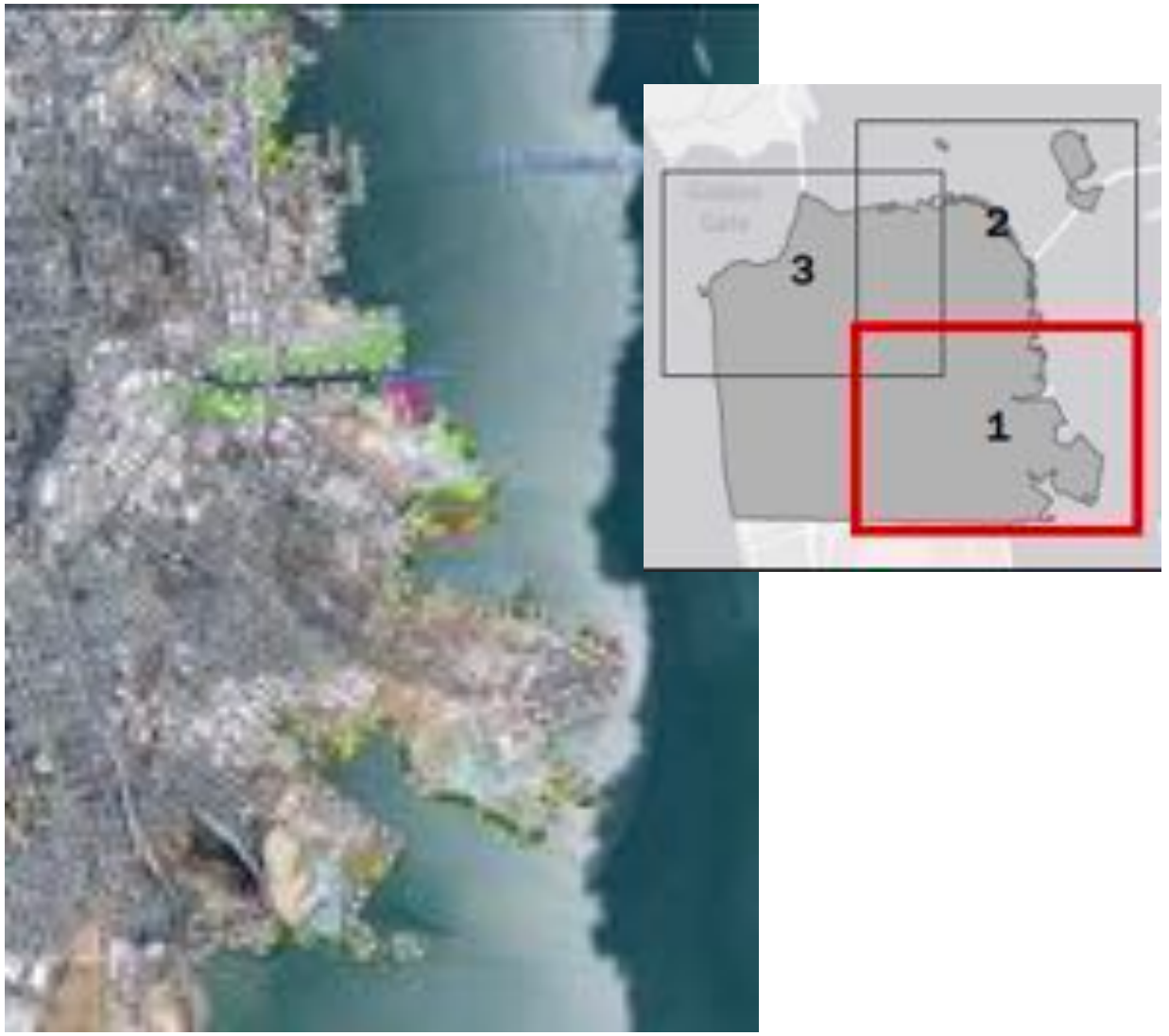
This single map depicts:

High tide permanent inundation from 36" SLR

or

Temporary flooding from:

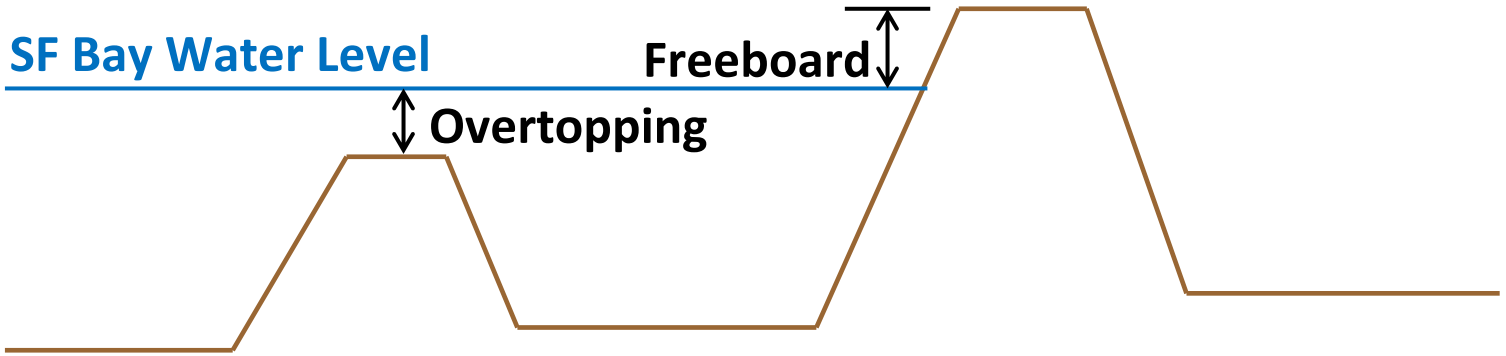
- 2-year storm surge with 18" SLR
- 5-year storm surge with 12" SLR
- Today's 50-year extreme tide



SLR Inundation & Overtopping -36"

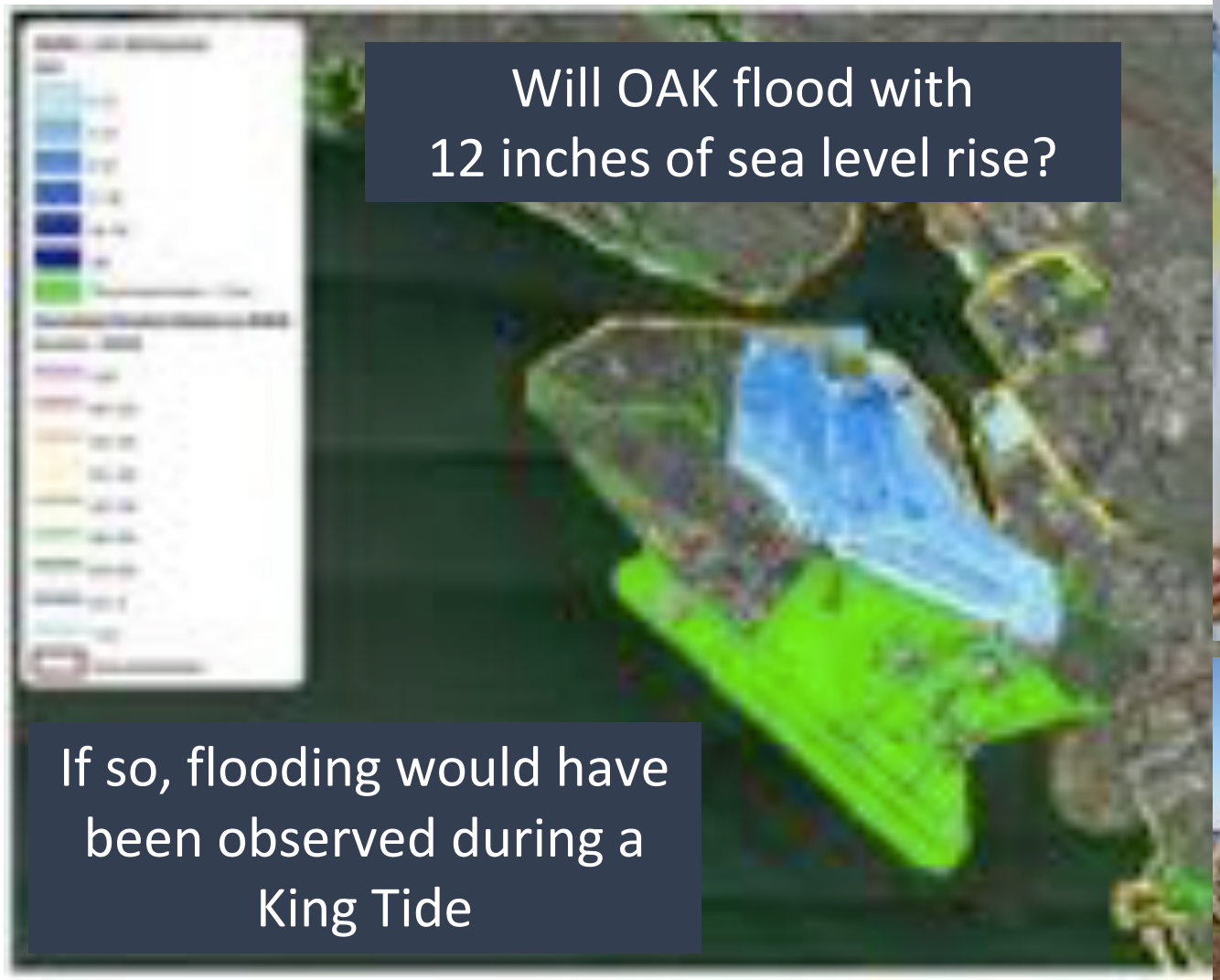
ART Shoreline Overtopping Analysis

Identifies shoreline locations that may be too low, which helps prioritize where further study or immediate actions may be necessary



ART Shoreline Overtopping Analysis

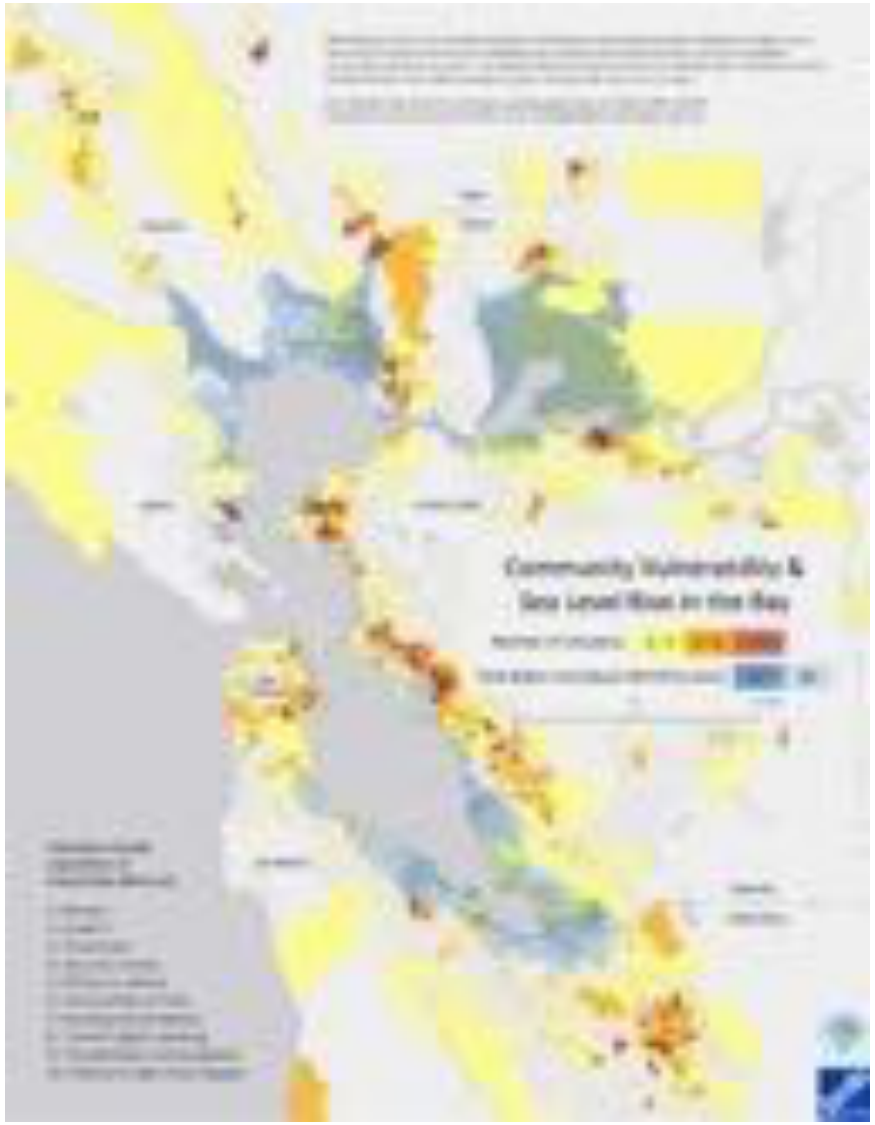
Stakeholder Input is Key!



Will OAK flood with
12 inches of sea level rise?

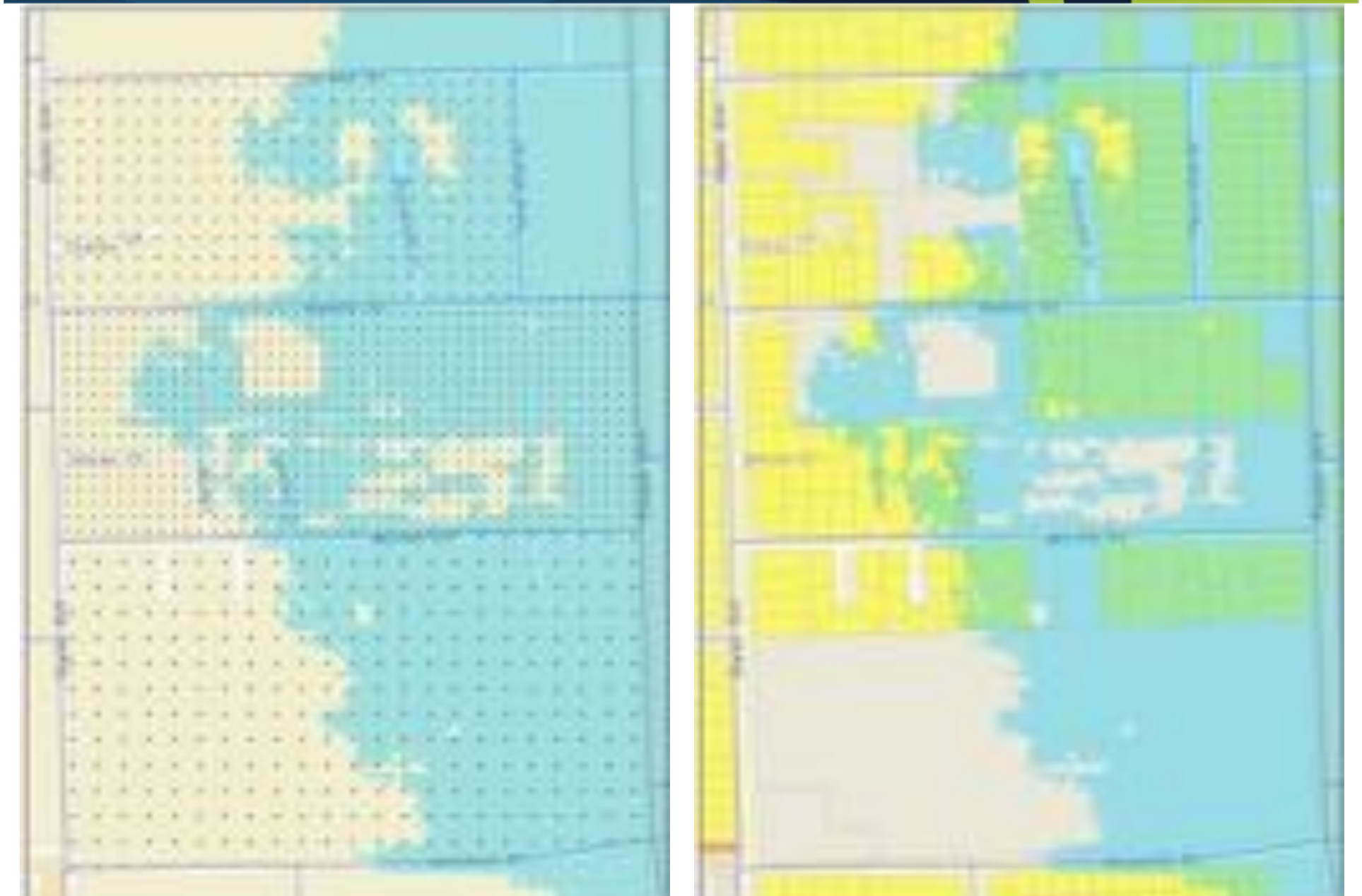
If so, flooding would have been observed during a King Tide

When to use the data?



- Support robust, local-scale vulnerability assessments in San Francisco Bay
- Support development of both near-term and long-term adaptation strategies for San Francisco Bay
- Regional scale vulnerability assessments in San Francisco Bay

ART/NOAA Dasymetric Population Map



Story Map and Interactive Viewer

Coming July 2018!

Story Map and Interactive Viewer

Audience:

- ART working group members
- Press
- Regional, state agency partners
- General public (e.g., student groups)
- Elected officials and their staff

Goals:

- Educated users about SLR and flood risk, Describe appropriate uses for the maps
- Enable users to explore and interact with the maps
- Allow data download for technical users

Story Map and Interactive Viewer

Coming July 2018!

Adapting to Rising Tides