

Santa Barbara-Ventura Regional SLR & Coastal Impacts Planning Workshop

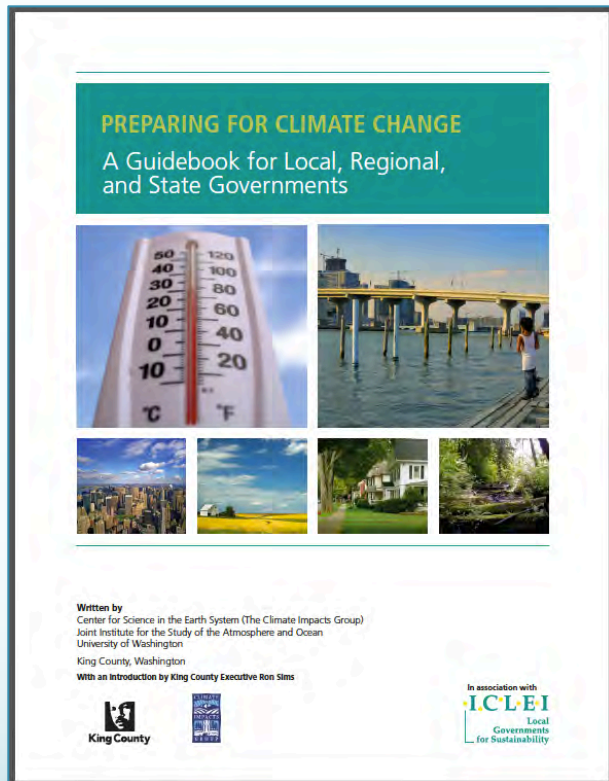
Vulnerability Assessments: Process & Lessons Learned from the Field

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Alyssa Newton Mann & Phyllis Grifman

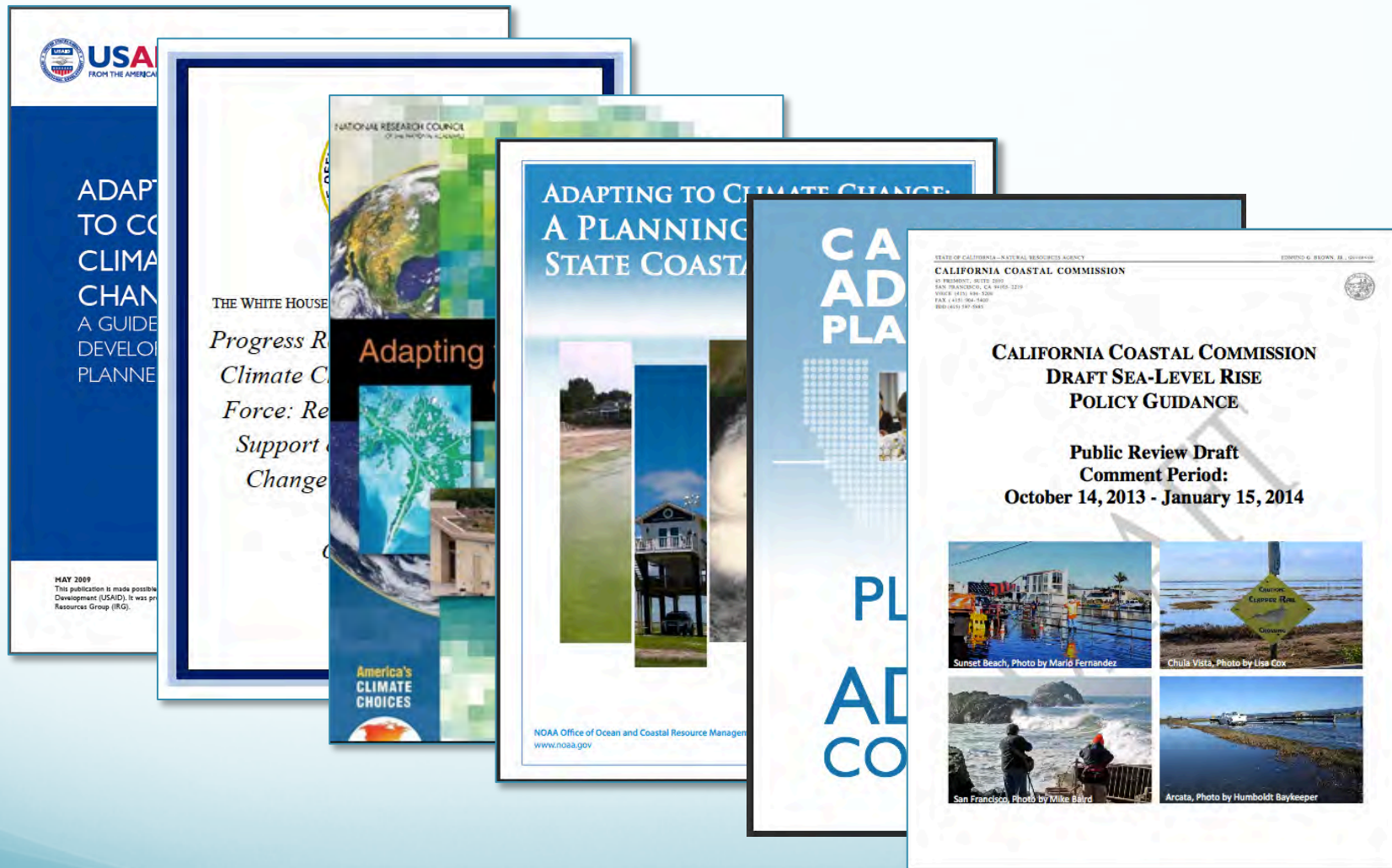
April 14, 2015 | Carpinteria City Council Chambers

The First Guidebook on Adaptation Planning

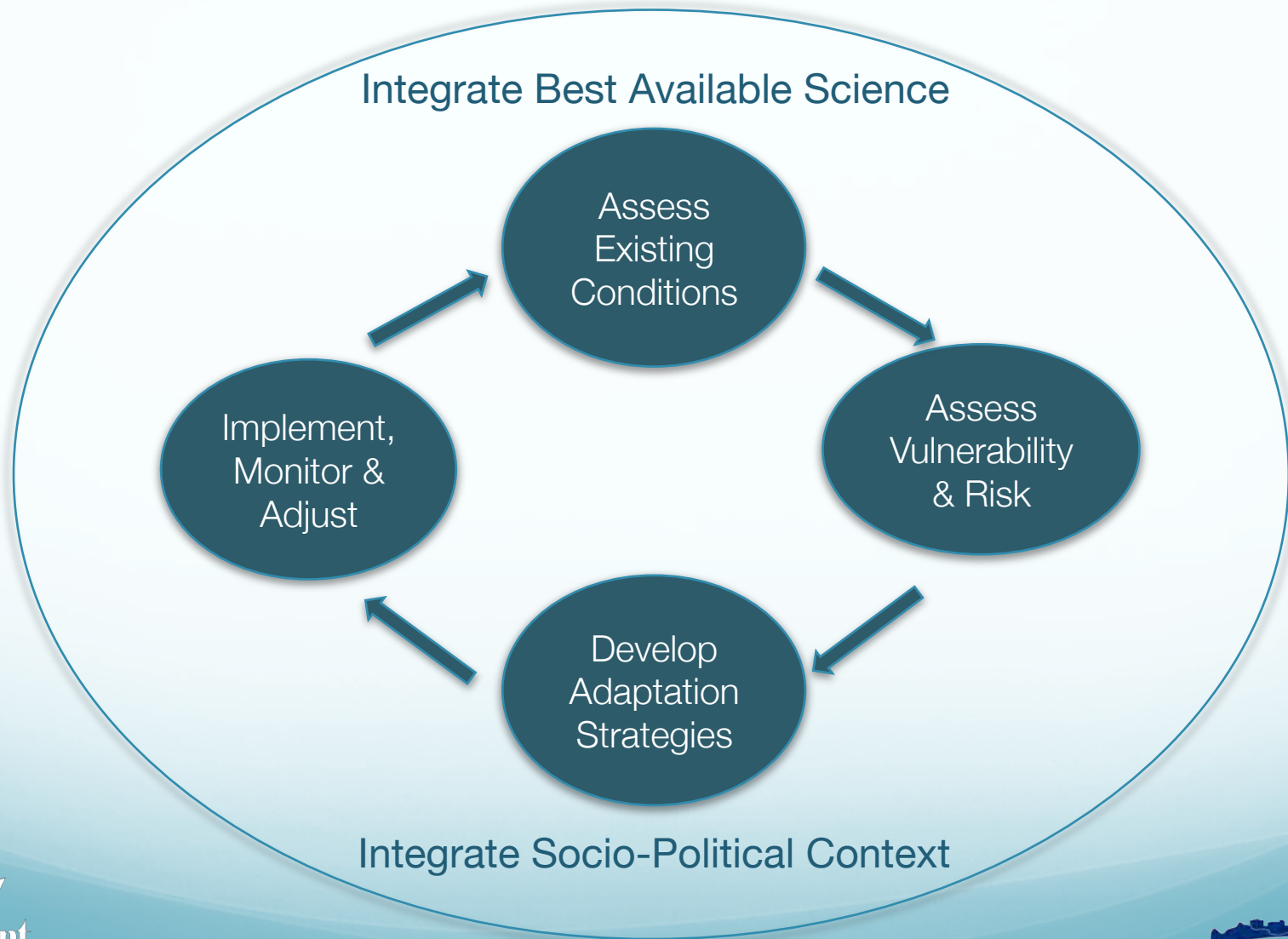


- *Preparing for Climate Change: A Guidebook for Local, Regional & State Governments (2007)*
 - King County, WA,
 - Climate Impacts Group, University of Washington
 - ICLEI
- Outlined initial concepts:
 - Stakeholder engagement
 - Vulnerability & Risk Assessments
 - Adaptation Strategies
 - Implementation & Monitoring

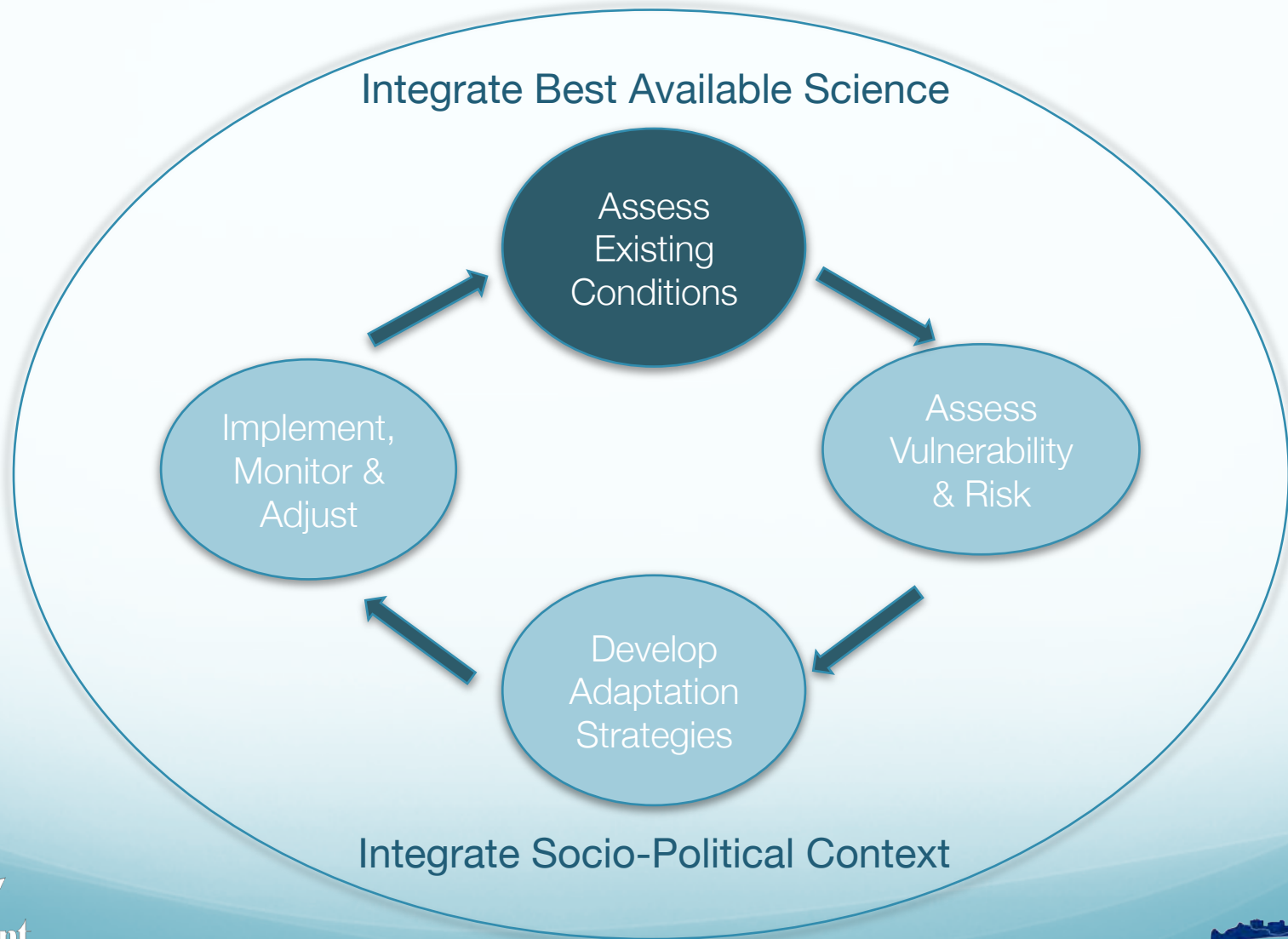
Many followed...



“Adaptive” Adaptation Planning



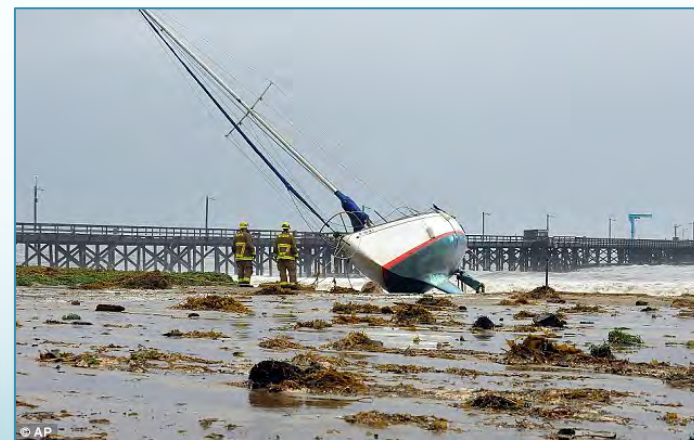
“Adaptive” Adaptation Planning



Assessing Existing Conditions

“Today’s storm is tomorrow’s high tide”

- What we experience today = what we may experience with SLR & coastal change
- Understanding current vulnerabilities may help prioritize where to focus first



Assessing Existing Conditions

- Important for engaging key stakeholders
- Draws on internal knowledge; can be done in-house
- Great tool for getting buy-in & building political will



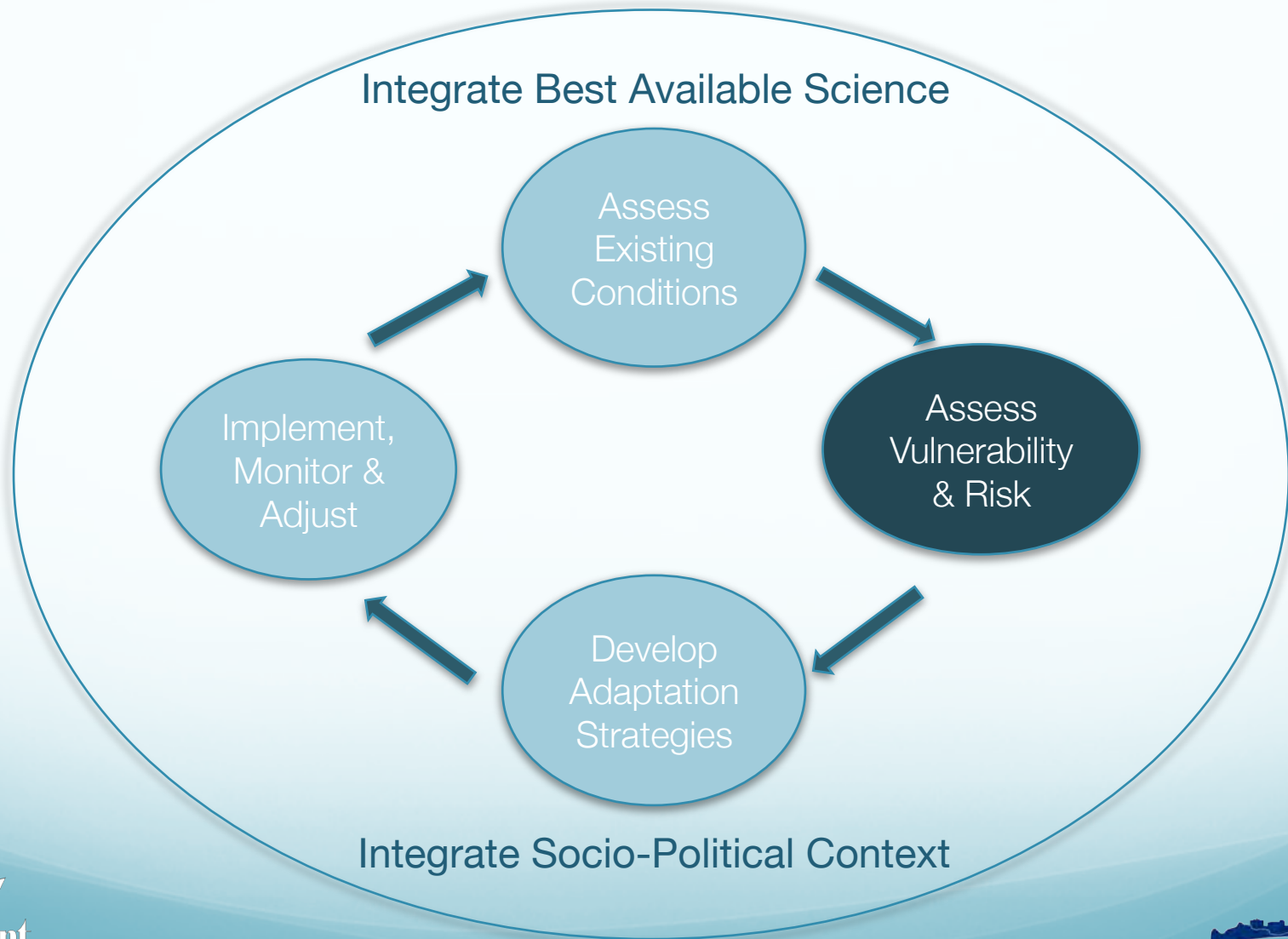
Stakeholder Engagement



Political Leaders
City Councils
Sustainability Depts
Wastewater Treatment
Emergency Managers
Private Industry
Consultants
Public Utilities
Public Works
Harbor Depts
Planning Depts
Park Managers

NGOs
Academia
Educators
State Agencies
Federal Agencies
MPOs, JPAs, COGs
Museums, Aquariums
Community Organizations
Professional Associations
Regional Organizations
Neighborhood Councils
Social Justice Organizations

“Adaptive” Adaptation Planning



Climate Change Vulnerability

The degree to which a system is exposed to, susceptible to, and/or unable to cope with, the adverse effects of climate change.



Physical
Vulnerability



Social
Vulnerability



Economic
Vulnerability



Ecological
Vulnerability

Physical Vulnerability

- Generally focused on assets and resources
 - Buildings, roads, critical infrastructure
- What gets wet, by when, for how long



Social Vulnerability

- Who among us are the most vulnerable
 - Social Vulnerability (SoVi) Index (Cutter et al. 2003)
 - Examine census-level data
 - Age, race, income, poverty level, single-parent home
 - Own/rent
 - Linguistic isolation
 - Education
 - Physical/mental disabilities



- Upcoming webinar by Susi Moser, PhD – Summer 2015

Economic Vulnerability

- Damage loss estimates
- Business interruption/loss
- Impacts to tourism industry
- Disruption of goods movement
- Impacts to tax base
- Cost of action vs. inaction



- Upcoming webinar by Jeroen Aerts, PhD – Late Spring 2015

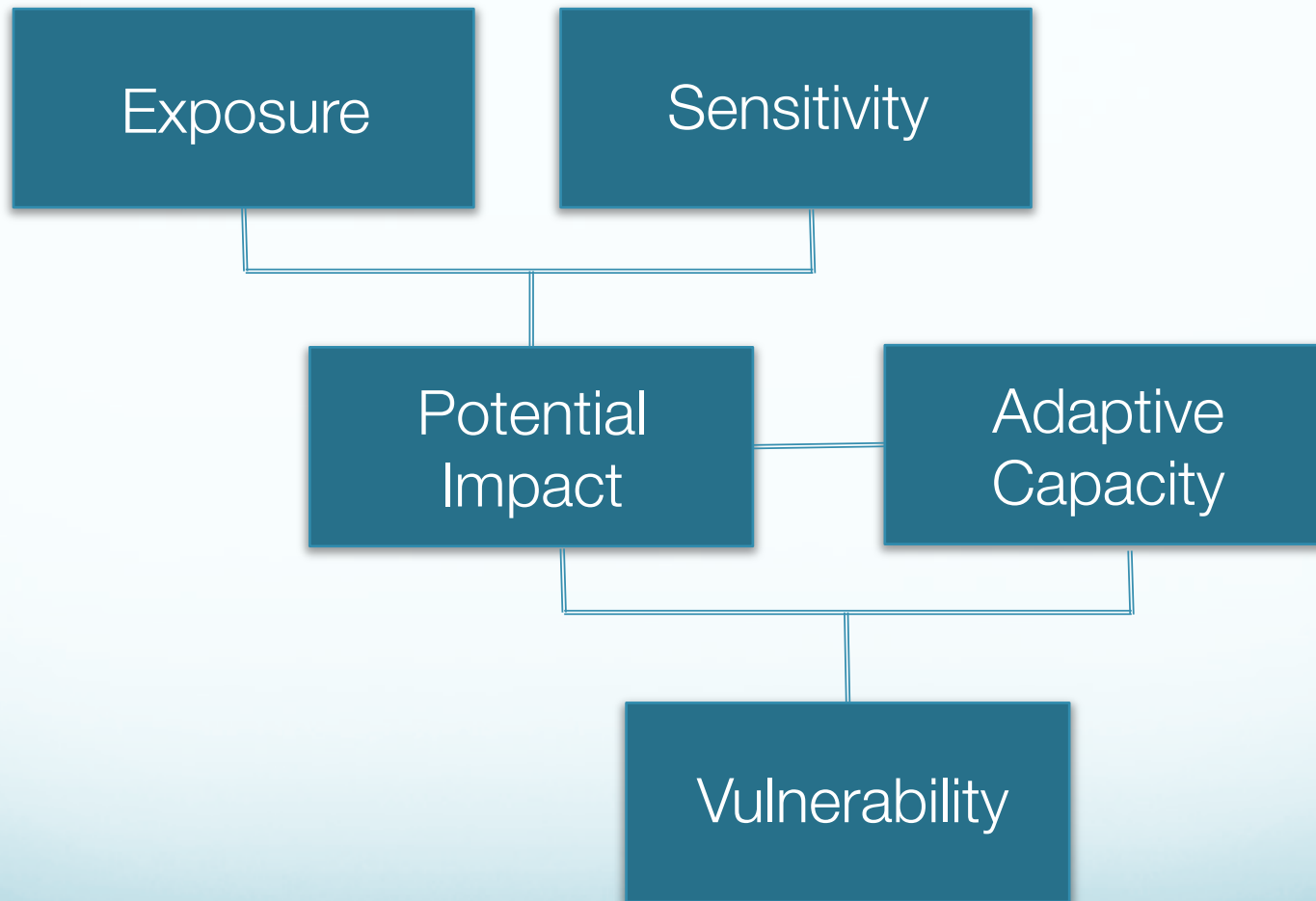
Ecological Vulnerability

- How will SLR impact:
 - Land, coastal, marine species
 - Ecosystem function
 - Shifts in species distributions
- The human side of nature
 - Impacts to ecosystem services we depend on
 - How best to conserve or restore



Considerations for Assessing Vulnerability

(adapted from NOAA, National Wildlife Federation, ICLEI)



Considerations for Assessing Vulnerability

(adapted from NOAA, National Wildlife Federation, ICLEI)

Exposure

The nature and degree to which a system experiences a stress or a hazard.

Sensitivity

The degree to which exposed assets, resources and communities would be impaired by climate impacts (e.g. sea level rise)

Adaptive Capacity

The ability of a system to make adjustments in response to a climate impact to minimize damages, maintain its primary functions, take advantage of opportunities and cope with consequences.

Exposure

The nature and degree to which a system experiences a stress or a hazard.

- What climate impacts will the asset come in contact with?
- Where is the asset located with respect to the impact?



Sensitivity

The degree to which exposed assets, resources and communities would be impaired by climate impacts (e.g. sea level rise)

Cabrillo Aquarium & Beach



- How much will the asset be affected if/when it comes in contact with the impact?
- Is the asset already under stress?

Sensitivity

The degree to which exposed assets, resources and communities would be impaired by climate impacts (e.g. sea level rise)

Cabrillo Aquarium & Beach



- Beach, Aquarium & Rec Center have high sensitivity to:
 - Storm-related flooding
 - Daily tidal flooding
 - Erosion
 - Interaction w/groundwater

Adaptive Capacity

The ability of a system to make adjustments in response to a climate impact to minimize damages, maintain its primary functions, take advantage of opportunities and cope with consequences.



- Does the asset have intrinsic qualities that allows it to cope with the hazard?
- Can extrinsic assets be quickly deployed to allow the asset to cope with the hazard?

Adaptive Capacity

The ability of a system to make adjustments in response to a climate impact to minimize damages, maintain its primary functions, take advantage of opportunities and cope with consequences.



- Aquarium LOW adaptive capacity
 - Could NOT function if partially impaired
 - Parking lot/road would limit visitor access

Adaptive Capacity

The ability of a system to make adjustments in response to a climate impact to minimize damages, maintain its primary functions, take advantage of opportunities and cope with consequences.



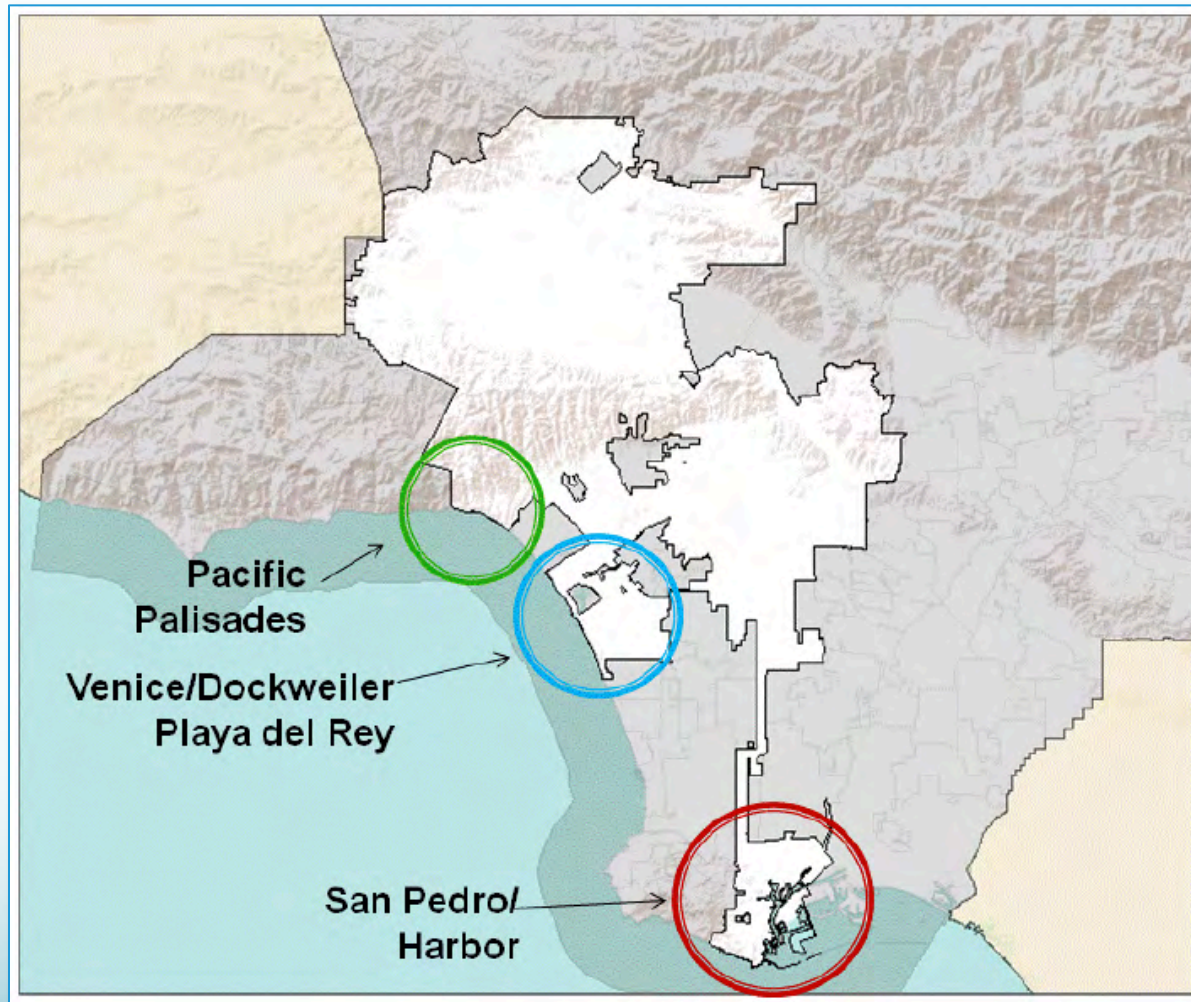
- Beach MEDIUM adaptive capacity
 - Could function if partially impaired
 - If floods at high tides, can use at low tides

Exposure, Sensitivity, Adaptive Capacity – Oh My!

- Don't get stuck on the jargon
 - Sensitivity/Adaptive Capacity are easily confused
 - Qualitative, not quantitative
 - Good for starting the discussion
- Generally people focus on exposure while looking at maps and adaptive capacity falls out of the discussion

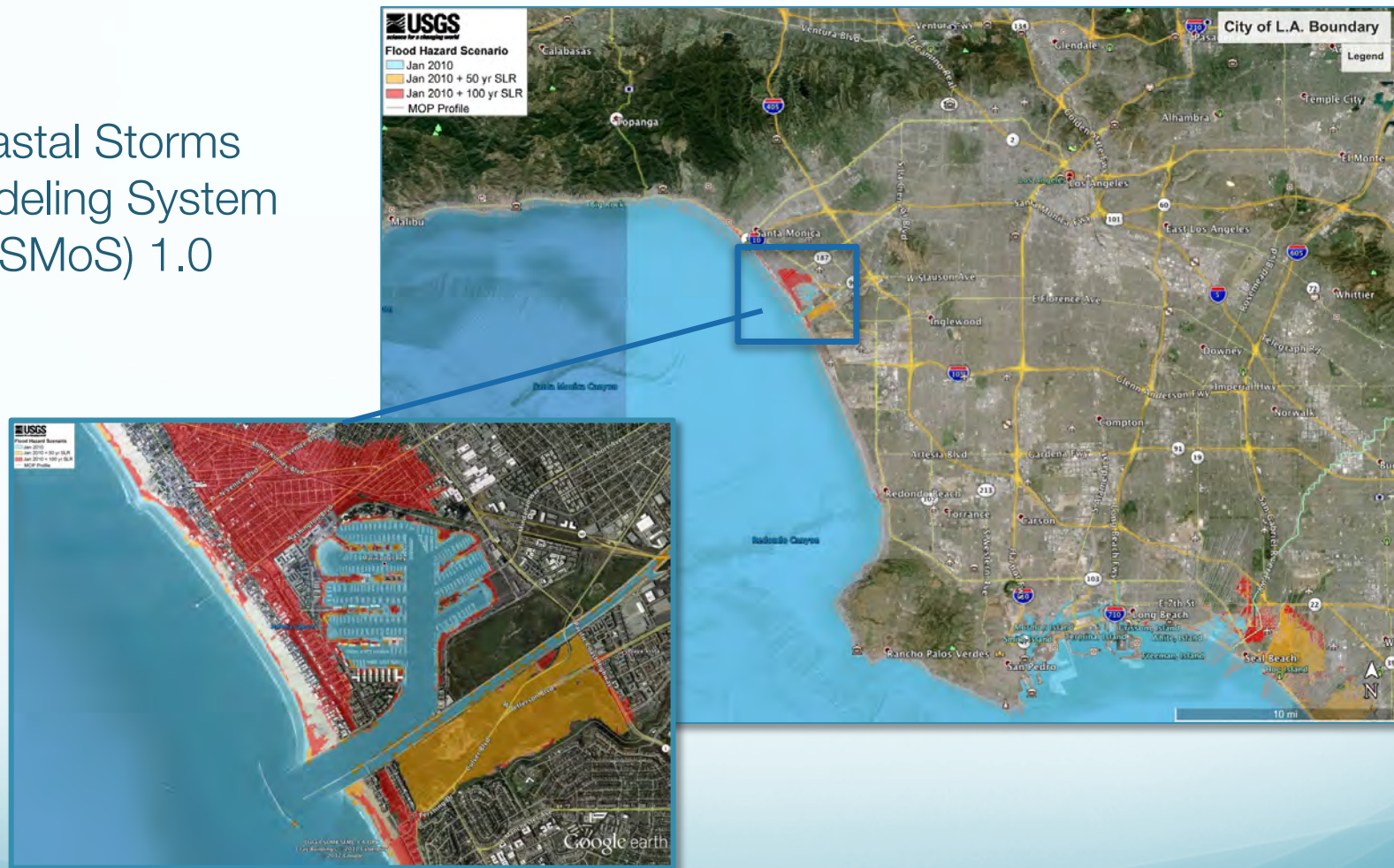


AdaptLA: SLR Vulnerability Assessment for City of L.A.

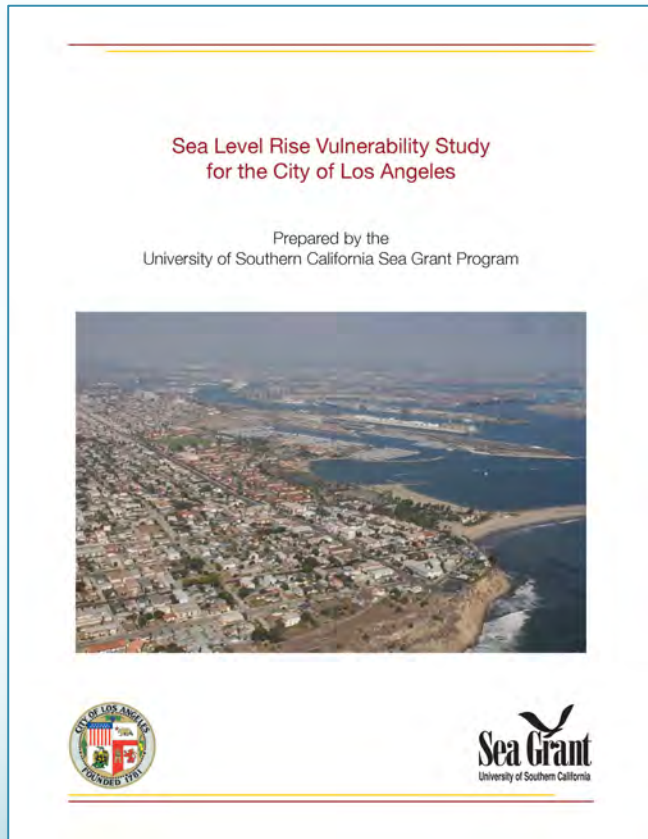


AdaptLA: SLR Vulnerability Assessment for City of L.A.

Coastal Storms
Modeling System
(CoSMoS) 1.0



AdaptLA: SLR Vulnerability Assessment for City of L.A.



- Coastal & Shoreline Overview
 - TerraCosta Consulting - Ron Flick, Ph.D.
- Physical Vulnerability
 - ICLEI – Brian Holland
- Social Vulnerability
 - Susi Moser, Ph.D. & Julia Ekstrom, Ph.D.
- Economic Vulnerability
 - USC – Dan Wei, Ph.D. & Sam Chatterjee Ph.D.
- Ecological Vulnerability
 - Study by Santa Monica Bay Restoration Commission

Physical Vulnerability Findings

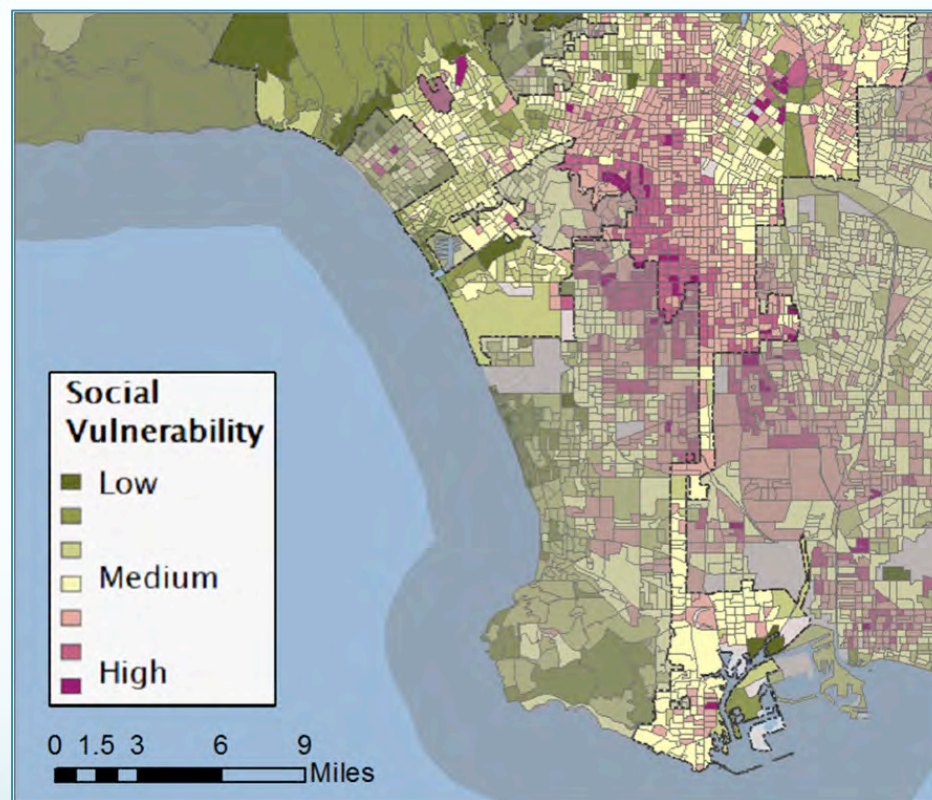
- Roads and water systems (wastewater, stormwater, potable water) vulnerable
- Museum and cultural centers highly vulnerable
- Parks and open space less vulnerable
- Port and energy facilities – low vulnerability



Photo: Phyllis Grifman

Social Vulnerability Findings

- Venice, low-lying San Pedro and Wilmington highest vulnerability
- Lower per capita income & education, linguistic isolation, larger proportion of renters



Economic Vulnerability Findings

- Tripling of economic losses with 1.4 m SLR
- Minimal business interruption losses because primary building loss is residential
- Conservative estimate



Guidance for Moving Forward

- Document vulnerable populations – helps first responders
- Communications need to include alternative outreach efforts/information materials
 - Other languages (especially Spanish)
 - Don't require literacy or computer access
- Beaches are L.A.'s best defense
 - Maintain beaches and study shoreline change in the future
 - Invest in beach width/cliff retreat monitoring
 - Need for shoreline change information

Lots of great case studies out there...

- Bay Area
 - Adapting to Rising Tides (ART)
 - Our Coast, Our Future (OCOOF)
- San Diego Region
 - San Diego Bay Adaptation Plan
 - Climate Understanding & Resilience in the River Valley (CURRV)
 - Imperial Beach Sea Level Rise & Coastal Flooding Project
- Central California Region
 - TNC Coastal Resilience – Ventura & Santa Barbara
 - Coastal Ecosystem Vulnerability Assessment (CEVA)
 - Goleta Slough Vulnerability Assessment
 - Adapt Monterey Bay

Lessons Learned

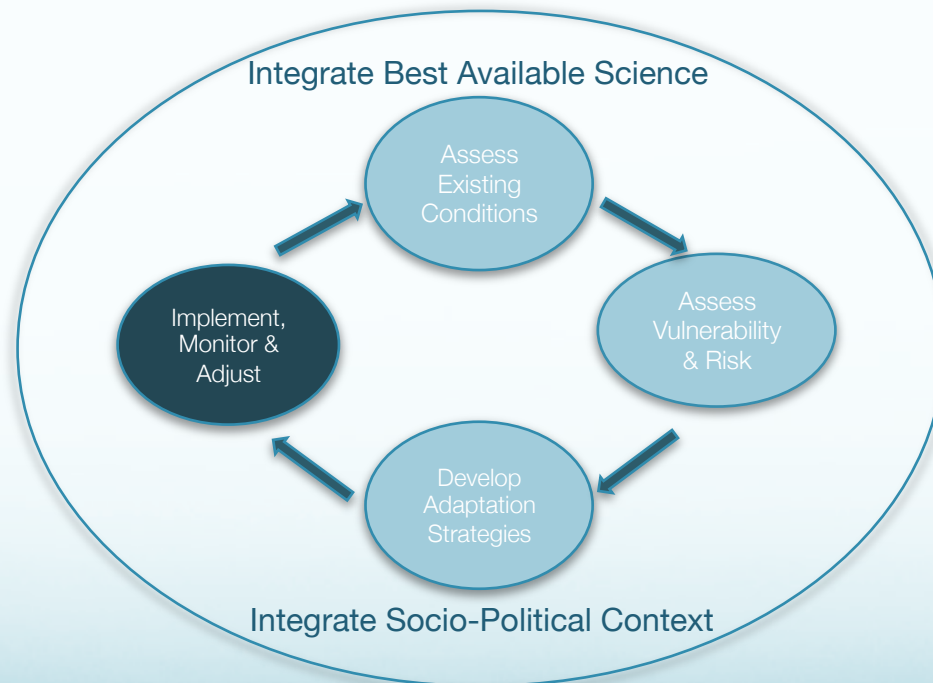
- Need to engage the right people to get the information you need, while also getting support from leadership
 - Communicate early and often!
 - Need engagement across all levels - start to finish
 - Identify and engage sector leaders who can serve as ambassadors/advocates
- Don't get hung up the jargon (e.g. adaptive capacity, sensitivity etc.)
 - Qualitative, not quantitative

Lessons Learned

- Avoid sectoral silos
 - Try to have cross-sectoral meetings - allows for cross-sectoral discussions
- Most assets/resources need to be considered in a regional context
 - Engage broad stakeholder group to get inter-jurisdictional information, support and collaboration

Lessons Learned

- The fear of not having THE BEST information
 - “Adaptive” adaptation planning (stay tuned for Alyssa...)



Learn from others

- Talk to other communities / boundary organizations / consultants etc.
- TNC's California Coastal Resilience Network

California Coastal Resilience Network:

A compilation of lessons learned from local experience for stakeholder engagement, sea level rise and coastal flood modeling, decision support tools, and economic analysis in coastal climate change adaptation in California

Questions?



Photo: Phyllis Grifman