

# Collaboration: Sea-level Marin Adaptation Response Team (C-SMART)



Caden at the Beach September 2013. Credit: Rendel



Community Development Agency  
3501 Civic Center Drive, Rm. 308  
San Rafael, CA 94903  
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[www.marinslr.org](http://www.marinslr.org)

**Workshops #5 – Next Steps**  
**Point Reyes Station and Stinson Beach**  
**6/8 and 6/14/17**

# Workshop overview

- Welcome/Introductions
- Presentation
  - C-SMART Process
  - Adaptation Report
  - Next Steps
- Q and A
- Participant Passport : Next Steps



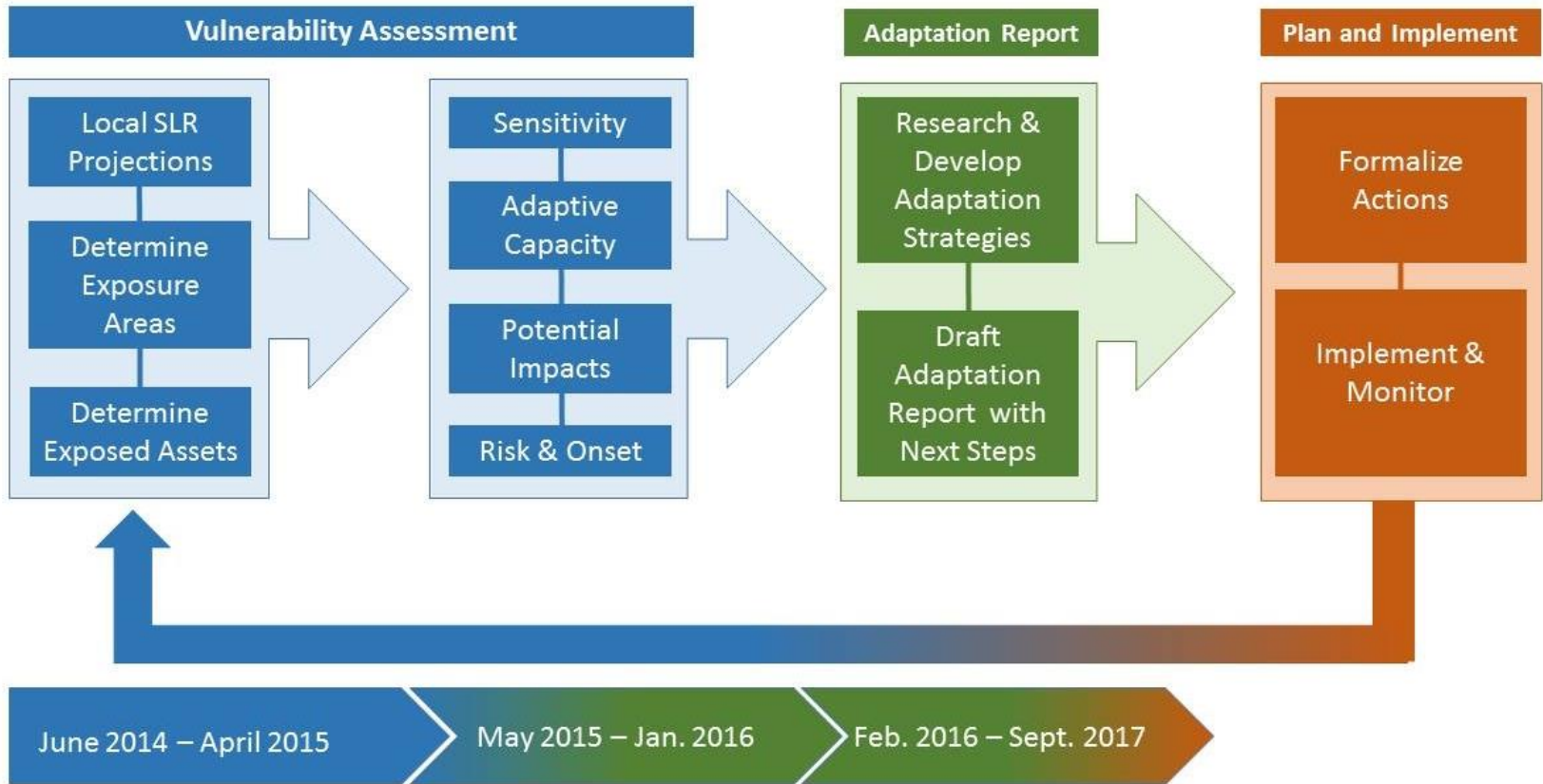




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# C-SMART

(Collaboration Sea Level Marin Adaptation Response Team)



6/23 – Public Comments due

8/1 – Board of Supervisors Workshop

9/26 – Final Report to Board of Supervisors



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# Public Workshops!

## 1. KICKOFF

JULY 2014  
POINT REYES NATIONAL SEASHORE

## 2. VULNERABILITY ASSESSMENT

OCTOBER 2014  
INVERNESS, STINSON BEACH AND  
TOMALES

## 3. GAME OF FLOODS

MAY AND JUNE 2015,  
POINT REYES STN. AND STINSON BEACH

## 4. ADAPTATION POLLING

NOVEMBER 2015, STINSON BEACH

## 5. NEXT STEPS

JUNE 2017  
POINT REYES STN. AND STINSON BEACH



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What could  
**MARIN SEA LEVEL RISE**  
mean to you?

**JOIN US!**  
Thursday, July 10, 2014  
6:30 PM to 8:00 PM  
Red Barn Classroom  
Point Reyes National Seashore  
1 Bear Valley Road  
Nicasio, CA 95956

Collaboration:  
Sea-level Marin  
Adaptation  
Response Team  
(C-SMART)  
welcomes **YOUR**  
participation!

- Learn about C-SMART
- See areas that could be impacted in the future
- Understand future public involvement opportunities
- Get questions answered

FOR MORE INFORMATION, AND OPPORTUNITIES TO PARTICIPATE:  
[WWW.MARINSLR.ORG](http://WWW.MARINSLR.ORG)



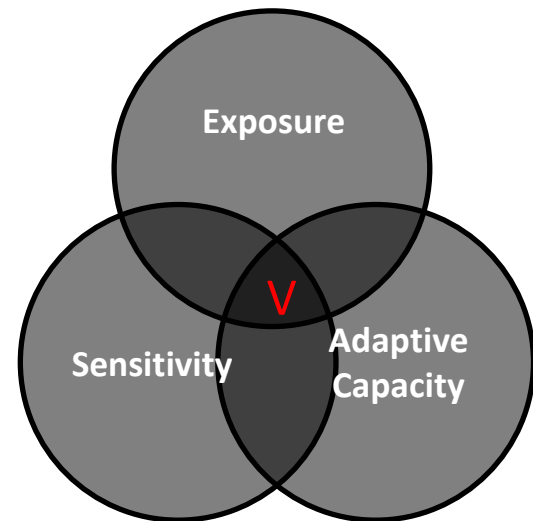


# Marin Ocean Coast Sea Level Rise Vulnerability Assessment

Collaboration: Sea-Level Marin Adaptation Response Team  
Marin County Community Development Agency  
September 2015 | Marin County, CA | marinslr.org

## Five Scenarios:

- 10'' + ANNUAL STORM
- 10'' + 20 YEAR STORM
- 20'' + 20 YEAR STORM
- 3'3'' + 100 YEAR STORM
- 6'7'' + 100 YEAR STORM



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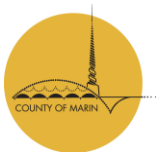
# Key Findings

NEAR-TERM

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## Assets vulnerable at 10 in. of sea level rise + storms are:

- Muir Beach intertidal rocky habitat
- Stinson Beach
  - Underground on-site wastewater treatment systems
  - Water distribution pipes
  - Calles and Patios buildings and streets including fire station no. 2 and tsunami evacuation routes
- Shoreline Highway between Stinson Beach & Bolinas, @ Green Bridge, & @ Walker Creek
- Bolinas
  - Beaches & inter-tidal rocky habitat
  - Bluff side, beach front, and downtown buildings and streets



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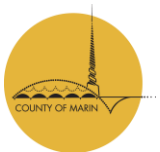
# Key Findings

MEDIUM-TERM

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Assets vulnerable at 20 in. of sea level rise + storm are:

- Muir Beach and Dillon Beach bluff top buildings
- East Shore and Inverness beaches, septic systems, and buildings on the shores of Tomales Bay.
- East Shore wells near Tomales Bay
- Point Ryes to Inverness water pipe beneath Shoreline Hwy. and Sir Francis Drake Blvd.
- Recreation facilities at Dillon Beach Resort and Lawson's Landing.
- Bridges on Middle Rd. and Valley Ford Lincoln School Rd.



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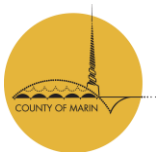
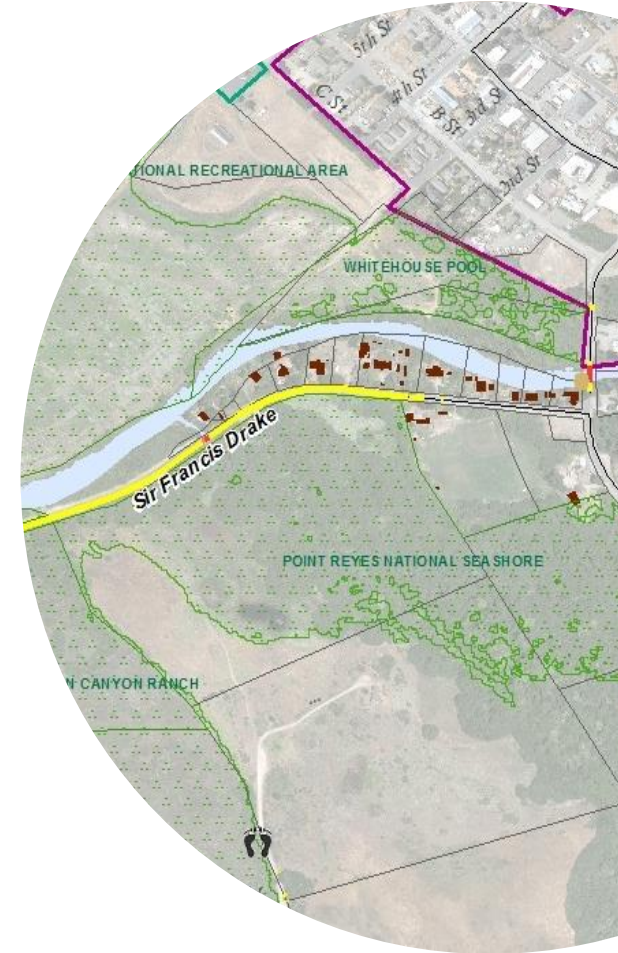
# Key Findings

LONG-TERM

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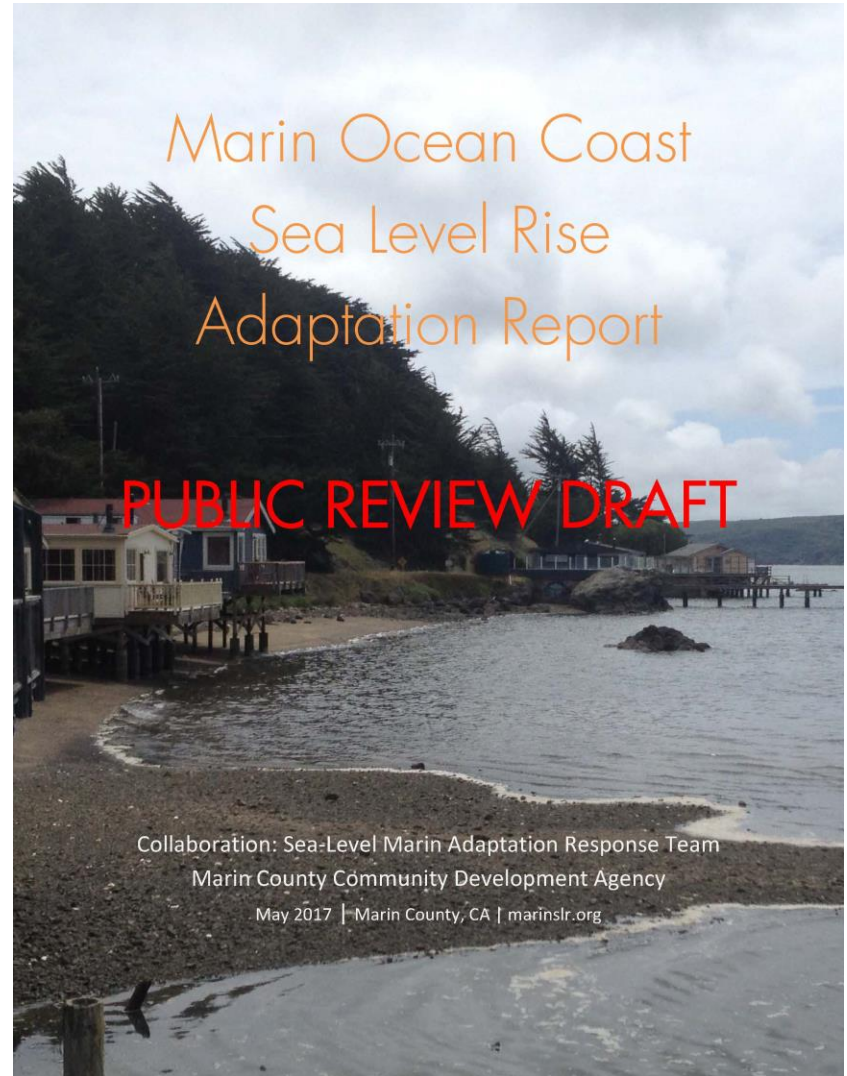
Assets vulnerable at 40 in. & 80 in. of sea level rise +100-year storm are:

- Bolinas
  - The primary access road Olema-Bolinas Road
  - Further into downtown, including the historic district.
  - BPUD sewage lift station.
- Shoreline Hwy.in Pt. Reyes Station and East Shore, and Sir Francis Drake Blvd. in Inverness.



# Adaptation Report

- Informational document compiling adaptation options proposed to date
- Next steps to carry forward potential options
- Non-regulatory, not-a-plan
- Available
  - online ([marinslr.org](http://marinslr.org))
  - West Marin libraries
  - at this meeting



# Adaptation Report Sections

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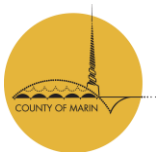
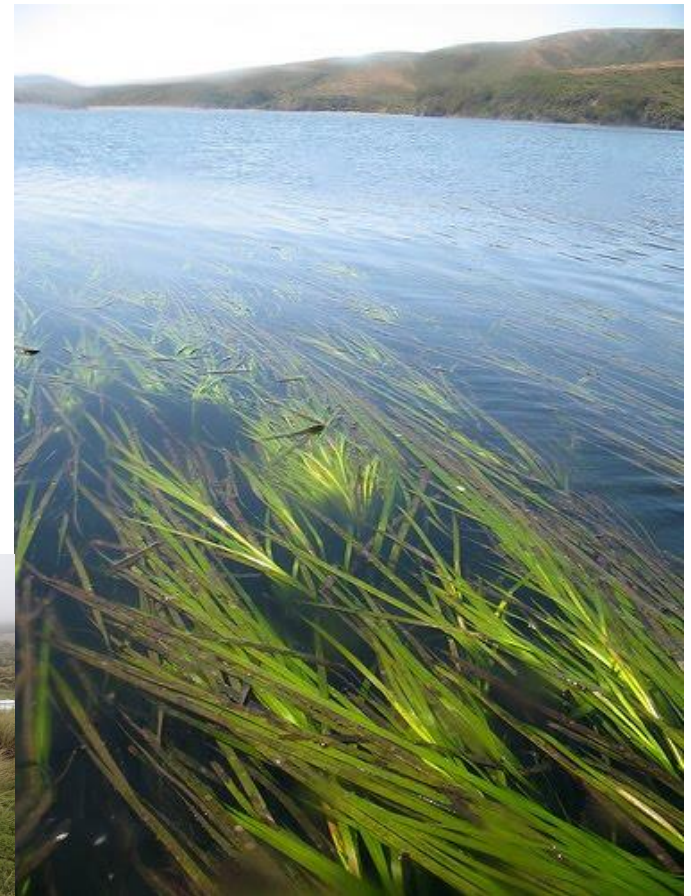
- Introduction
- C-SMART Participants
- Adaptation Framework
- Governance
- **Asset Adaptation**
  - Parcels & Buildings
  - Transportation
  - Utilities
  - Working Lands
  - Natural Resources
  - Recreation
  - Emergency Services
  - Historic & Archeological
- **Community Alternatives**
  - Muir Beach
  - Stinson Beach
  - Bolinas
  - Inverness
  - Point Reyes Station
  - East Shore
  - Dillon Beach
- Conclusion
  - **Next Steps**
  - Lessons Learned





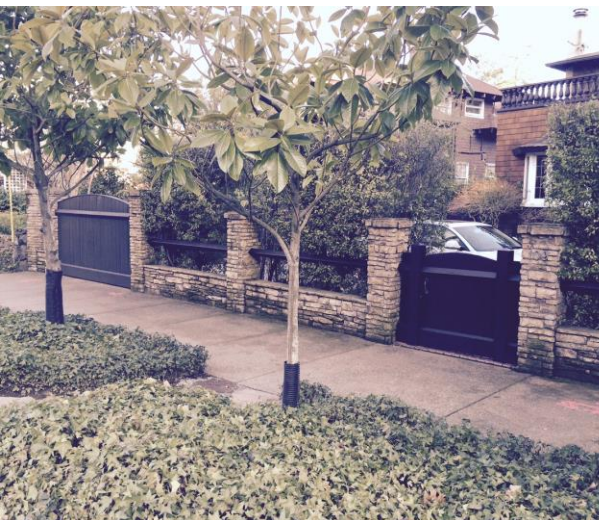
# All Assets

- Green Infrastructure Feasibility
- Community Resiliency Programs



# Parcels and Buildings

- LCP Environmental Hazards policies – safe development
- 3 feet additional elevation
- innovative designs  
(wet/dry floodproofing, flood gates, drainage improvements, and amphibiation)





# Parcels and Buildings

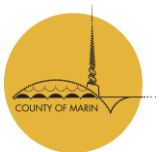
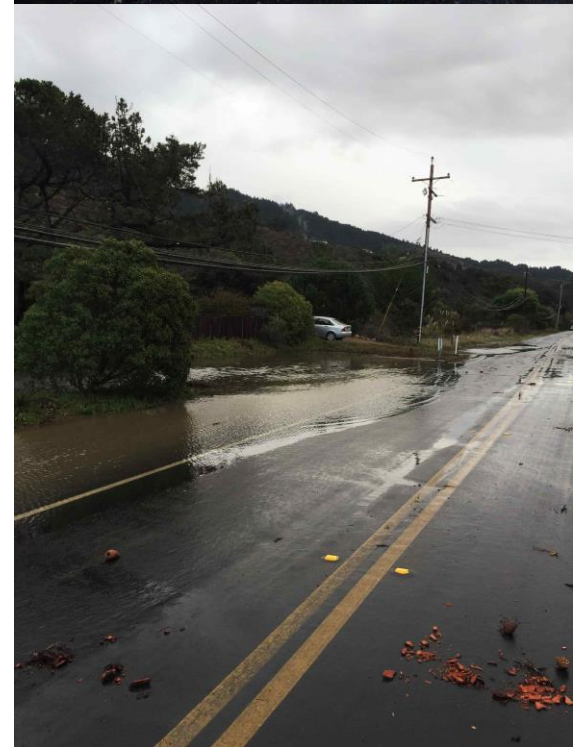
- “Homeowner’s Guide to Preparing for Sea Level Rise”
- Map regulatory boundaries (e.g., FEMA, CCC jurisdiction, Categorical Exclusion)
- Finished floor Inventory
- Explore programs to relocate existing vulnerable development





# Transportation

- Shoreline Highway and county roads as part of the Regional Transportation Plan
- Further Assess Eastshore Bulkheads
- 3 feet SLR for Capital Improvement Projects
- Flooding triggers for road adaptation
- Post-disaster recovery
- Road Closure Signage



# Utilities

- Adapt utilities, retrofit OWTS
- 3 feet SLR
- Investigate groundwater levels with local utility districts
- Explore share public wastewater treatment systems



# Working Lands

- Maintain/adapt coastal armoring, or replace with natural protection
- Work with agricultural interests





# Natural Resources

- SLR Educational programs through public partnerships
- Consider climate change impacts monitoring program
- Cliff stabilization with native vegetation and possible relocation
- Nature-based adaptation for eelgrass habitat



# Natural Resources

- Consider nature-based adaptation for tidal marsh habitat
  - space for marsh transgression
  - Sediment augmentation
  - Minimize invasive species
- Nature-based adaptation for beach/dune habitat
  - Space for upland migration
  - Restore and enhance coastal dunes
  - Walkways and signage
  - Identify sediment sources



# Natural Resources

- Explore natural alternatives to armoring that create sloped, transitional habitat
- In case of road realignment allow for natural expansion of habitats



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# Recreation

- Flooding awareness through signs and social media
- Adapt recreation facilities. Acquire new parklands



# Emergency Services

- Partner with Local Hazard Mitigation Plan
- Adapt vulnerable emergency facilities
- Additional emergency response teams and resources
- Alternate evacuation routes



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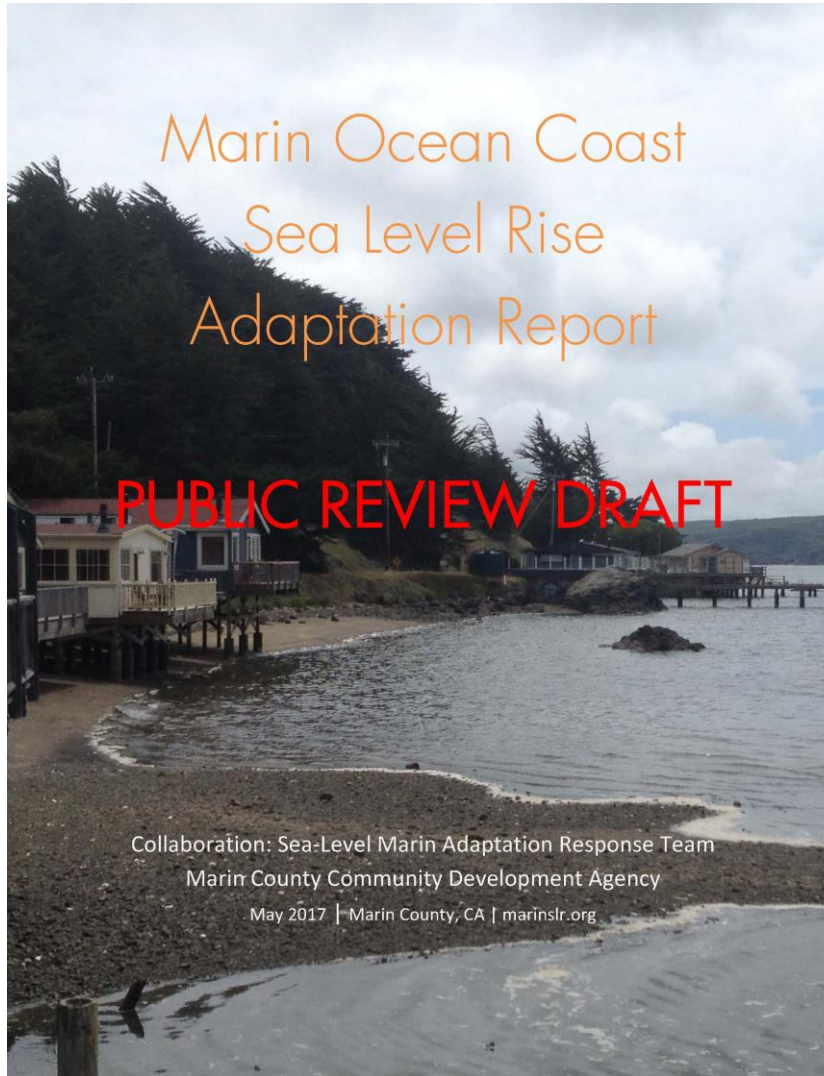
# Historic and Archaeological Resources

- Consider the impacts on historic/archaeological sites
- Coordinate with Federated Indians of Granton Rancheria
- Update 1981 Historic Study





QUESTIONS?



QUESTIONS?



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# THE GAME OF FLOODS

## Your Island

START

Sea levels are rising worldwide as warming oceans expand and melt glaciers and ice sheets. Stronger storms coupled with rising seas can significantly damage—even destroy—property, infrastructure, public facilities, natural habitats, and other resources we depend on. Adaptation planning is essential to help communities and individuals develop a sea level rise plan using the strategies in game pieces.

1. To begin, each player needs the sea level rise scenario sheet and the game board. Read the rules of the game and the sea level rise scenario sheet. The highest roll goes first. If tie occur, the tied players must re-roll. Players take turns in clockwise order.

2. In turn, each player selects an asset to accommodate, defend, or retreat from. No need to duplicate assets. Use the worksheet provided to record your choice, costs, and pros and cons. Next, in turn, each player places and states aloud their preferred adaptation strategies or around the island. Conflicting strategies are allowed.

3. Consider the following factors to inform the proposal: (1) Costs/benefits, (2) Private property impacts, (3) Environmental impacts, (4) Equity/social justice/economic, (5) Others. Use your worksheet to take notes.

Sea Level Rise 2050 Scenario Key

**RED AREA** = Permanent Sea Level Rise Flooding  
**ORANGE AREA** = Temporary Sea Level Rise Flooding  
**YELLOW AREA** = Temporary 100-Year Storm Flooding



- Evacuation Route
- Storm Shelter
- Gas Station
- Sewage Lift Station
- Electrical Sub Station
- Marina
- Mammal Habitat
- Seabird Colony
- Aquaculture
- Ranch
- Agriculture
- Sheriff
- Grocery
- Public Well
- Home
- Water
- Roadway
- Beach
- School Site
- Restaurant
- Boat Launch
- Parking
- Library
- Historic Church
- Hospital
- Fire Station
- Post Office

### LEGEND

**Managed Retreat**

- Retreat
- Post-storm prohibitions
- Move here
- Stricter land use zoning

**Accommodate Water**

- Elevate Buildings
- Floodable Buildings
- Elevate/New Road

**Hard Engineering**

- Revetment/Seawall
- Traditional Levee
- Tide Gate
- Wall & Pump Station

**Soft Engineering**

- Horizontal Levee
- Wetland/shoreline vegetation
- Offshore Structure
- Beach Maintenance

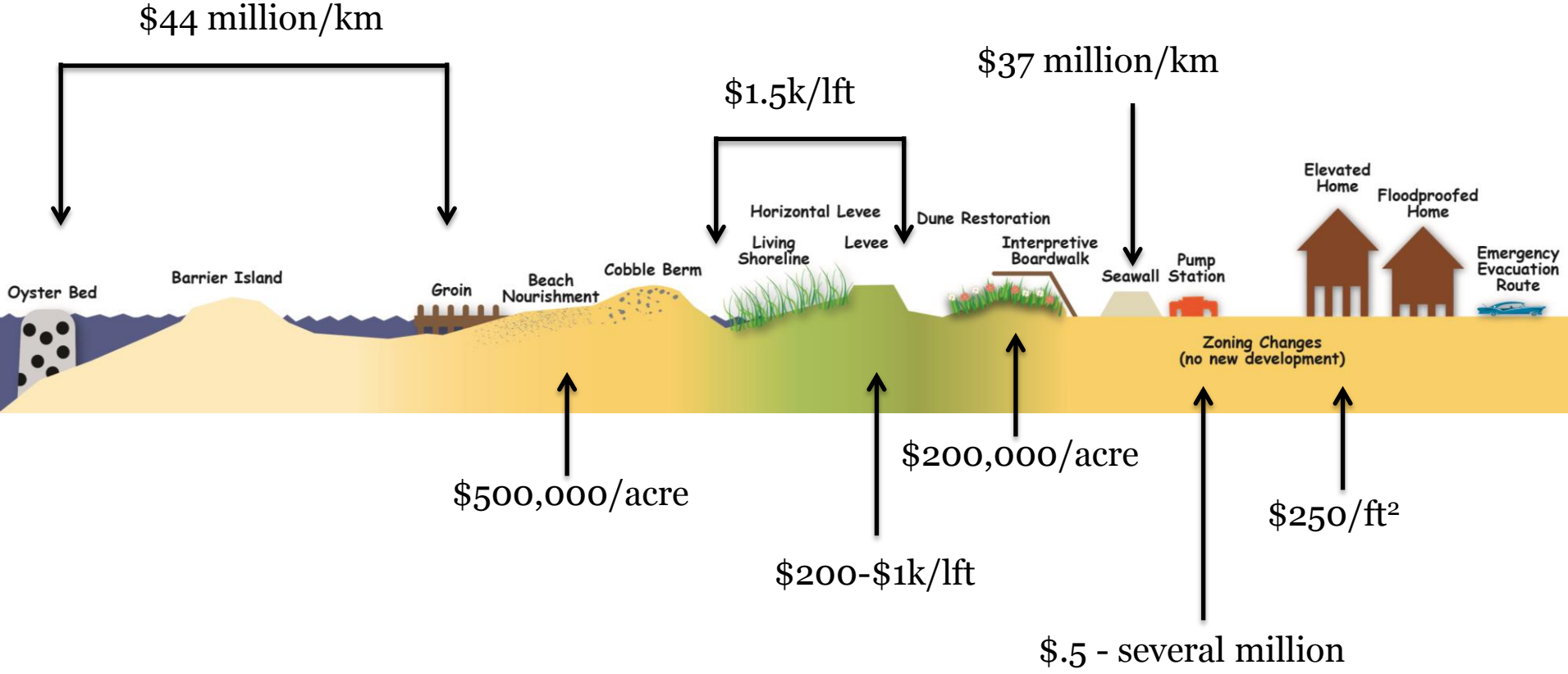
### GAME PIECES

- You've CONQUERED Marin Island
  - Now time for the REAL Game of Floods
  - And YOU are writing the rules!
- 
- There is no GET OUT OF JAIL FREE
  - However, YOUR involvement can help ensure everyone is a winner!





# Community Options?



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## Collaboration: Sea-level Marin Adaptation Response Team Summer 2017 Public Workshops

THUR. 6/08

6:30 to 8:30 pm

Point Reyes Station Dance Palace

WED. 6/14

6:30 to 8:30 pm

Stinson Beach Community Center

# 5 Ws • 1 H

## WELCOME!

Thank you for attending this workshop, the fifth in a series hosted by the Marin County Community Development Agency as part of the Collaboration Sea Level Marin Adaptation Response Team (C-SMART). Previous workshops have focused on identifying vulnerable assets and possible adaptation strategies. This information can be found in the Vulnerability Assessment and Draft Adaptation Report at [marinSLR.org](http://marinSLR.org)

While previous passports and surveys have focused on the *where* and *what* of adaptation, this passport seeks to understand the *how*. The County Board of Supervisors (BOS) C-SMART workshop is scheduled for 8/1/17 to discuss next steps and in advance we want to hear from YOU on prioritization. While no financial resources are currently secured, the Community Development Agency remains committed to addressing Sea Level Rise adaptation through existing staff time and will be developing work programs for the next phases. Your input will be used to inform the County staff recommendations for the BOS workshop. The workshop will also provide an opportunity for local residents to articulate the needs they see for continued sea level rise adaptation.

The following are taken from the public review draft Adaptation Report next steps. These next steps are not focused on the physical adaptation measures, but rather institutional changes that could be made to support a framework for continued adaptation planning. The existing Vulnerability Assessment and Adaptation Report will be used as a basis for discussion through many of these next steps. Currently these are draft concepts that have not been vetted with Marin County elected officials.



Staff will collect completed passports at this meeting. If more time is desired, the passport can be sent to Alex Westhoff no later than 6/23 (email: [awesthoff@marincounty.org](mailto:awesthoff@marincounty.org), mailing address and fax number below). Passport questions will also be posted on online through 6/23.

**WHY** are the seas rising?

**WHERE** will SLR occur?

**WHEN** could impacts occur?

**WHO** manages the assets?

**WHAT** strategies are available?

**HOW** will we address this challenge?

# Site Scale Improvements



- Develop a “**Homeowner’s Guide to Preparing for Sea Level Rise**” to help property owners navigate regulatory system and funding opportunities to elevate or otherwise retrofit homes to accommodate sea level rise and storms. Topics could cover:
  - County permitting process
  - Coastal Permit Development requirements
  - Agency Compliance (FEMA, California Coastal Commission, etc.)
  - Potential estimated building elevation increase
- Develop and distribute technical information and guidance on **home retrofitting options** which could include elevation, wet/dry floodproofing, flood gates, drainage improvements, amphibiation, etc.





# Community Scale Planning



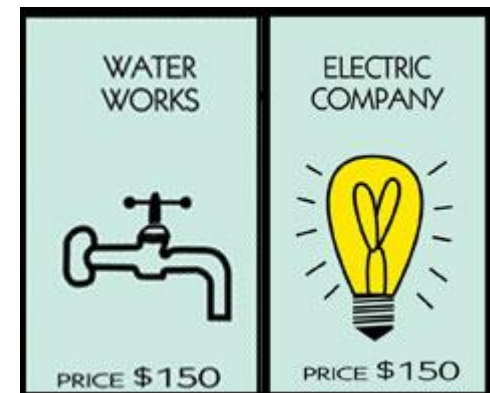
- Develop a **subcommittee** with Marin County BOS representation and community/local agency representatives to prioritize next steps
- Initiate **Community Plans for Adapting To Coastal Hazards** (Community PATCHs) in conjunction with community members and asset managers for smaller scale infrastructure planning
  - Identify subarea boundaries for prioritization
  - Develop planning timeframes around flooding
  - Evaluate adaptation alternatives in more detail



# Community Scale Planning (cont.)



- Consider sea level rise in **capital improvement projects** (roads, utilities, armoring, etc.) including both incremental repairs and maintenance, and new projects. Develop financing matrix
- Evaluate **land use planning, zoning and legal adaptation measures** which could include height limits, construction standards, post-storm prohibitions, and more to integrate into the Local Coastal Plan Implementation Program
- Consider Adaptation Report options in the **Marin Countywide Plan** update as a basis for developing Plan policies and programs



# Continued Partnerships



- Develop an **interagency sea level rise task force** with Board of Supervisors representation, as well as representatives from agencies who oversee West Marin assets (transportation, utilities, public lands, natural resources, etc.). Participants could include:
  - Caltrans, MTC and TAM
  - National Park Service/Golden Gate National Recreation Area/CA Department of Parks and Recreation/Marin County Parks
  - PG&E and local service providers
- Continue with the Sonoma/Marin County Sediment Management Working Group on the **Regional Sediment Management Plan** to
  - restore and maintain beaches;
  - reduce shoreline erosion and coastal storm damages; and
  - sustain recreation, tourism, public safety and access





# Public Education



- Establish a **citizen's science monitoring program** for community members to gather data on West Marin's impacts from sea level rise
- Continue to pursue funding and partnerships to formalize a sea level rise **public education** program for high school students



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# Other Ideas?



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# Instructions



- 1) Break into table based on community, though each participant should fill out passport. Work independently if desired, or discuss ideas with neighbors.
- 2) Spanning all categories, rank each of the next steps with **High (H)**, **Medium (M)**, or **Low (L)**. This ranking is based on your view of the option's relative importance as a next step for the county to pursue with existing staff time. C-SMART Staff are available to answer any questions.
- 3) If you have ideas for other next steps, please provide in the space provided. These can also be given a H, M, or L ranking.
- 4) Please comment in the space below chosen options (or use back pages for more room) to further qualify/explain your ranking.
- 5) Please hand to staff member when complete!







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## Complete Passport:

- Tonight
- Online by 6/23

[marinSLR.org](http://marinSLR.org)

Help spread the word and  
invite other West Marin  
residents to fill out!

# MARINSLR.ORG



Caden at the Beach September 2013. Credit: Rendel



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