



Collaboration: Sea Level Marin Adaptation Response Team Phase II

2018-2020 Scope of Work

Background

Climate experts estimate that by 2100, sea level could rise by up to 70 inches, though recent projections from the Ocean Protection Council include an end-of-the-century projection of 10 feet. Furthermore the frequency, intensity and flood-effects of storms are anticipated to increase. A 2008 Governor's Executive Order states: "California must begin now to adapt and build our resiliency to coming climate changes through a thoughtful and sensible approach with local, regional, state and federal governments using the best available science."¹ To understand potential impacts of West Marin's coastal hazards and prepare for a more resilient future, the Community Development Agency launched Collaboration: Sea Level Marin Adaptation Response Team (C-SMART) in June 2014.

Work Completed

Grant funding from the Ocean Protection Council and California Coastal Commission, matched by Marin County staff time supported two major phase I deliverables: *Marin Ocean Coast Sea Level Rise Vulnerability Assessment* and *Marin Ocean Coast Sea Level Rise Adaptation Report*.

The draft *Vulnerability Assessment* was presented to the Board of Supervisors on November 17, 2015 and identified vulnerabilities of different asset types (parcels and buildings, transportation, utilities, working lands, natural resources, recreation, emergency services, and historic and archaeological resources) and community-scale vulnerabilities for Muir Beach, Stinson Beach, Bolinas, Inverness, East Shore, Point Reyes Station, and Dillon Beach. In summary, the document concluded that around 1,300 parcels, 1,100 buildings, 20 miles of roads, 1,800 acres of wetlands, and numerous other assets could be exposed to sea level rise and storms by 2100.

Since the *Vulnerability Assessment* completion, Community Development Agency staff have worked with local residents and a variety of agencies and technical experts on developing adaptation strategies. The *Marin Ocean Coast Sea Level Rise Adaptation Report* is the result of that effort. The *Adaptation Report* is not a plan, but rather an informational document compiling adaptation options proposed to set the foundation for continued planning in West Marin.

The *Adaptation Report* is broken into sections addressing the same eight asset types and seven West Marin communities as the *Vulnerability Assessment*. The Report's objective is not to facilitate new development in vulnerable areas, but present options for increasing community resiliency in the face of increased sea level rise and coastal storms. Identifying adaptation solutions that will be most

¹ California Governor's Executive Order #S-13-08. November 2008.

appropriate in each location will require continued collaboration with stakeholders and technical experts, as part of an ongoing adaptive management approach.

As discussed in the report, possible adaptation approaches include protecting existing homes, businesses and other assets through building elevation, floodproofing, and nature-based strategies in the near to medium term. Community-wide solutions such as elevating/armoring roads are discussed for the near- to long-term, depending on location. The draft *Adaptation Report* was presented to the Board of Supervisors on August 1, 2017. Both the final *Vulnerability Assessment* and *Adaptation Report* are being brought back to the Board of Supervisors for acceptance on February 27, 2018.

To solicit stakeholder input on next steps, staff circulated the *West Marin Sea Level Rise Adaptation Plan Passport* at June 2017 public workshops and online. The *Passport* was a survey to gauge community interest on possible next steps and asked residents to rank these options based on how they feel the County should prioritize West Marin adaptation work moving forward. 83 responses provided staff with valuable insight to inform this work program.

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1) Stinson Beach Plan for Adapting to Coastal Hazards

Stinson Beach is among West Marin's most vulnerable communities, with nearly 700 homes potentially exposed to SLR and storms by the end of the century. As an asset of natural, recreational, cultural and economic importance, the Beach attracted two-thirds of a million visitors in 2015 and it is projected that these numbers could reach or exceed 1 million annual visitors over the next 50 years (AECOM, West Visitor Needs Assessment, August 2017). Rising sea levels threaten Stinson Beach's Calles and Patios neighborhood and Seadrift from both the Pacific Ocean Coast to the west and Bolinas Lagoon/Easkoot Creek to the east. King tide flooding is currently prevalent during winter months and a long history of disasters have caused losses to life and/or property including major storm events in 1922, 1956, 1978 and 1982.

A recommendation of the *Adaptation Report* is focused community scale planning, through a framework called a Community Plan for Adapting to Coastal Hazards (PATCH). While the *Adaptation Report* presents a number of options for increasing the resiliency of various assets, a Stinson Beach PATCH would present alternative approaches to adaptation that could be phased and fit together to produce the best long term response to rising waters. As discussed below, the PATCH will include feasibility studies for various adaptation alternatives, that could set a foundation for engineering studies for the preferred alternatives.

Strategies outlined in the *Adaptation Report*, include elevation of homes, elevation and armoring of roads, and dune restoration. Site scale strategies such as home elevation could be implemented by property owners in the near term. Depending on the extent of home elevation, such efforts could collectively be very expensive, and community scale alternatives such as road elevation, dune restoration and others also merit consideration.

Community engagement will be central to the PATCH process, building upon CDA's long history of robust public outreach. Representatives from homeowners groups will be included on the Technical Advisory Committee, and public workshops will be held to discuss challenges and potential solutions. CDA staff will also be available to meet with other stakeholder groups upon request.

Two distinct but related efforts will dovetail with one another for a Community PATCH. A Feasibility Study will assess potential nature based strategies for Marin's Outer Coast, while structural adaptation alternatives for the Calles and Patios homes and roads will be explored which could include road elevation, home elevation, armoring and more.

i. **Planning Engagement Group**

This may include representatives from CDA, Marin County Department of Public Works, project consultants, Stinson Beach homeowners associations, Stinson Beach County Water District, Golden Gate National Recreation Area, and others. The Technical Advisory Committee (TAC) would support public outreach, advise on scope(s) of work, and review draft deliverables.

a) Convene Planning Engagement Group (PEG)

Deliverable: Roster of Technical Working Group members, and Letters of Commitment from Group members.

Necessary Resources: Existing County staff time involvement

b) Kick off meeting with Technical Working Group to share work plan.

Deliverable: Meeting

Necessary Resources: Existing County staff time, possible venue rental fee

- c) Review draft scope and deliverables (Vulnerability Memo, Stinson Beach Dune Restoration Feasibility Study, Adaptation Alternatives Impacts Matrix, Funding Memo, Stinson Beach Plan for Adapting to Coastal Hazards.

Deliverables: TAC comments on draft scope and deliverables

ii. **Vulnerabilities and Trigger Points**

- a) Using information gathered in the *Vulnerability Assessment*, develop a detailed narrative of asset vulnerabilities under near-, medium-, and long-term scenarios. Further expand on information gathered in the *Vulnerability Assessment* to develop a narrative of homes, utilities, and road vulnerabilities including discussion on the frequency and duration of temporary flooding, and the extent and onset of permanent inundation. The narrative would clearly state assumptions about the level or sea level rise used in designing the projections.

Deliverable: Memo with maps of Stinson Beach vulnerabilities

Necessary Resources: Existing County staff time, GIS software and existing datasets including elevation, and CoSMoS sea level rise

- b) Support PEG in hosting a public kick-off workshop to explain vulnerabilities and overview next steps in the PATCH planning process. Survey public to determine ‘trigger points,’ (the duration/frequency/intensity that flooding become chronic (e.g., no longer nuisance/minor inconveniences)).

Deliverable: Meeting summary with survey results

Necessary Resources: Existing County staff time, social media to further circulate survey

- c) Summarize vulnerabilities and trigger-point survey results to understand the sequencing of which locations and assets merit consideration for adaptation.

Deliverable: Memo on vulnerabilities and trigger points

Necessary Resources: Existing county staff time,

iii. **Nature Based**

A *Stinson Beach Dune Restoration Feasibility Study* would be an initial step to inform a nature based strategy on Stinson Beach’s open coast. Steps include characterizing shoreline dynamics, characterizing sediment sources, alternative development and evaluation, and regulatory/policy input. Other alternatives for stabilizing the beach will also be evaluated. See Attachment 1 for more detailed scope.

Deliverable: Stinson Beach Dune Restoration Feasibility Study

Necessary Resources: Existing County staff time, consultant services totaling \$200,000

iv. **Accommodation and Protection : Homes and Infrastructure**

- a) Develop a Feasibility Study for hard engineering and elevation alternatives which could include elevation of vulnerable homes, elevation of Calle del Arroyo and local roads, and coastal armoring. Approximately five alternatives would be assessed with cost estimates. Environmental impacts, social impacts, regulatory constraints, effectiveness, and necessary resources would be discussed. The Department of Public Work’s *Stinson*

Beach Watershed Program Flood Study and Alternatives Assessment will be further considered in terms of cost estimates for the elevation of Calle del Arroyo.

Develop matrix with evaluation criteria to inform a preferred alternative with maximum public benefits and minimum costs. Consultant expertise can help structure this matrix.
Deliverable: Memo outlining adaptation alternatives with impacts matrix

b) Funding Memo

Based on literature review and case study research, a funding memo should outline funding sources for the different alternatives, as well as community based approaches such as local assessment districts, tax levy, and Geological Hazard Abatement Districts with a range of costs per parcel. Develop a timeline and process for community based approaches.

Deliverable: Funding Memo

Necessary Resources: County Staff Time

c) Share matrix and funding memo with Community members to poll on preferred alternative.

Deliverable: Public Meeting with preferred alternative survey results

Necessary Resources: County Staff Time , Consultant time

Necessary Resources: County Staff Time, Engineering Consultant Services (\$100,000)

v. Draft and Final PATCH

a) Compile deliverables from tasks i-iv into draft PATCH

Deliverable: Draft PATCH

Necessary Resources: County Staff Time

b) Share draft PATCH with PEG

Deliverable: Comments from Technical Working Group

Necessary Resources: County Staff Time

c) Finalize PATCH

Deliverable: Stinson Beach Plan for Adapting to Coastal Hazards

Necessary Resources: County Staff Time

2) East Shore Plan for Adapting to Coastal Hazards

East Shore faces vulnerabilities from Tomales Bay's rising waters. Over 150 buildings are exposed including local businesses which support West Marin's tourism economy, and waterfront homes whose owners are concerned by escalating FEMA flood insurance costs. Property owners have stated that their homes' bulkheads serve as armoring to protect Shoreline Highway, a state roadway which parallels Tomales Bay. Armoring and elevating segments of Shoreline Highway received strong support (100%) from participants of the 2015 West Marin Adaptation Poll. CDA staff have recently consulted with Caltrans staff who have offered to participate in community discussions on road adaptations necessary to maintain the continued use and function of Shoreline Highway. Thus CDA staff would like to serve as conveners in bringing community members together with Caltrans to better define the issue and necessary next steps. Such a collaboration could help position the community for future grants to further assess the bulkheads, develop adaptation alternatives for Shoreline Highway and/or elevate East Shore homes above the water.

i. Convene Planning Engagement Group

This may include staff from CDA, Marin County Department of Public Works, Caltrans, East Shore Planning Group, business representatives, and others.

Deliverable: Roster of Planning Engagement Group members, and Letters of Commitment from Group members.

Necessary Resources: Existing County staff time

ii. Local Businesses

Targeted outreach should include a small cluster of waterfront businesses along Tomales Bay. Interest of these business owners, as well as any site-specific FEMA requirements should be identified.

Deliverable: Memo outlining specific concerns and requirements for waterfront businesses.

Necessary Resources: County Staff Time

iii. Vulnerabilities

Using information gathered in the *Vulnerability Assessment*, develop a detailed narrative of asset vulnerabilities under near-, medium-, and long-term scenarios, including discussion on the frequency and duration of temporary flooding, and the extent and onset of permanent inundation.

Deliverable: Memo with maps on East Shore vulnerabilities

Necessary Resources: Existing County staff time, GIS software and existing datasets including elevation, and CoSMoS sea level rise

iv. Public Workshop

a) Trigger Points

Host a public workshop to explain vulnerabilities. Survey public to determine 'trigger points,' (the duration/frequency/intensity that flooding become chronic (e.g., no longer nuisance/minor inconveniences)). This can inform the planning horizon by determining the point that critical infrastructure such as Shoreline Highway could be adapted.

Deliverable: Meeting with survey summary

Necessary Resources: Existing County staff time, social media to further circulate survey

b) **Major Concerns**

Building off 3.1.16 East Shore Planning Group meeting, reconnect with East Shore Planning Group to reassess vulnerabilities and issues specific to East Shore homes. What are the major concerns to home elevation, and what are possible approaches to address these concerns? Information gathered can inform *The Homeowners Guide to Sea Level Rise* (Task 3).

Deliverables: Memo outlining specific concerns and possible adaptation alternatives.

Necessary Resources: Existing County staff time

v. **Funding Memo**

Based on literature review and case study research, a funding memo should outline funding sources for the different alternatives. This could include federal, state and local funding sources, as well as community based approaches such as local assessment districts and Geological Hazard Abatement Districts.

Deliverable: Funding Memo

Necessary Resources: County Staff Time

vi. **Next Steps**

Based on discussions with local residents, businesses, and the Task Force, next steps should be outlined to advance East Shore adaptation. This could include further assessments of bulkheads to determine their level of flood protection, continued engagement with Caltrans on adaptation alternative development, and funding applications (which could include application for Caltrans Senate Bill 1 Adaptation Planning Grant).

3) Homeowners Guide to SLR

CDA staff would conduct outreach to West Marin residents to help facilitate elevation/retrofitting processes required through the Marin County Local Coastal Program. A “Homeowner’s Guide to Preparing for Sea Level Rise” (*Guide*) can help property owners navigate regulatory system and funding opportunities to elevate or otherwise retrofit homes to accommodate sea level rise and storms. This effort could raise unincorporated area’s National Flood Insurance Program (NFIP) Community Rating System (CRS) points, which could reduce flood insurance premiums, this having direct financial benefit.

Sections could include:

- Maps:
 - FEMA and future sea level rise hazard zones
 - Appeal zones, beaches, wetlands, streams, ESHAs and other locations which may prohibit coastal permit exemptions
- Overview of site-scale flood mitigation strategies, including elevation, floodproofing (dry/wet), flood gates, and more. Tailor information from existing FEMA manuals to West Marin environmental conditions and building types. Strategies for adapting to other climate change impacts such as drought and wildfire will also be considered.
Information should include:
 - Cost Estimates
 - FEMA Compliance (Insurance and Mortgage Requirements). Distinctions should be made for A vs V Zones, residential vs commercial properties, and historic vs non.
 - LCP Compliance
- County permitting processes and requirements and fees

- i. Outline Guide
- ii. Identify New Research Needs for *Guide*
- iii. Conduct Research with necessary organizations (e.g., FEMA, County Staff, etc.)
- iv. Draft *Guide*
 - v. Share draft *Guide* for public comment online, and in public workshops throughout West Marin
 - vi. Finalize *Guide* with public comments
 - vii. Post *Guide* online and distribute to property owners upon request

Necessary Resources: Existing County staff time, website, public workshop venues,

To ensure a consistent and unified countywide approach, C-SMART and BayWAVE will work in tandem on these projects:

4) Adaptation Toolkit

In conjunction with BayWAVE, evaluate land use planning, zoning and legal frameworks for addressing sea level rise. Work supporting the following tasks established in the BayWAVE Phase II Work Plan will be tailored towards West Marin.

- i. Legal Requirements. Identify all legal requirements for adapting to sea level rise: federal (e.g. NFIP, ADA, Constitutional laws and common law), state (AB 379, AB 162, San Francisco Bay Plan), and local.
- ii. Marin County Adaptation Planning. Identify any existing ordinances within our own County plans as potential examples or to identify future planning needs.
- iii. Tools Review. Review model ordinances and toolkits nationwide for content, implementation potential, format, and transferability. Include in the review:
 - Ordinance and/or building code language that allows for building elevation and waterproofing;
 - Zoning overlays that include a range of adaptation strategies and triggers for implementing or abandoning a strategy;
 - Zoning strategies to limit new development, redevelopment, or post-storm redevelopment in hazard areas;
 - Rolling easements, conservation easements, TDRs and partial TDRs;
 - Fees and acquisition strategies;
 - Tax and/or other financial incentives;
 - Managed retreat strategies. Identify tools to facilitate managed retreat, where it has succeeded and where it has failed and why; and
 - Other legal adaptation measures that can be implemented in general plan updates, zoning ordinances, and ways to combine tools.

5) Draft Capital Improvement Project Guidance for the County to evaluate sea level rise in short-, medium-, and long-term scenarios.

In conjunction with BayWAVE efforts, collaborate with the Department of Public Works and Caltrans to:

- i. Provide a range of recommendations for evaluation with capital improvement projects for sea level rise. Share information needed to factor sea level rise resilience over time.

- ii. Refine adaptation fact sheets from BayWAVE Phase I as new concepts are tested and implementation measures are developed.

Deliverable: Capital improvement project guidance template

Necessary Resources: Existing County staff time

Attachment 1) Nature-Based Adaptation at Stinson Beach

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