

---

# CHARG

---

Coastal Hazards  
*Adaptation Resiliency*  
Group



Strategic Brief  
Q1 | 2015

*The waters of the  
San Francisco Bay  
know no boundaries.*

February 2015

*Letter of Invitation:*

*Alameda County  
Flood Control and Water  
Conservation District*

*Bay Area Joint  
Policy Committee*

*California Department  
of Water Resources*

*California State  
Coastal Conservancy*

*Contra Costa County  
Flood Control and Water  
Conservation District*

*Federal Emergency  
Management Agency*

*Marin County Flood  
Control and Water  
Conservation District*

*San Francisco Bay  
Conservation and  
Development  
Commission*

*San Francisquito Creek  
Joint Powers Authority*

*Santa Clara Valley  
Water District*

*US Army Corp  
of Engineers,  
San Francisco  
District*

CHARG (Coastal Hazards Adaptation Resiliency Group) is a newly formed collaboration of San Francisco Bay Area planners, scientists, engineers, and policy makers from local, state, and federal agencies—all sharing responsibility to protect people and property from flooding and to enhance the Bay Area's shoreline ecosystems.

**CHARG is pleased to present this Strategic Brief, which outlines our collective vision and approach to implementing regional solutions that address the impacts of sea level rise and extreme tides.** It represents—for the first time ever—a regional commitment to collaborate and prioritize regional coastal hazards mitigation solutions for the vulnerable San Francisco Bay Area.

Near-shore Bay Area properties and assets are valued in the trillions of dollars. Hundreds of thousands of people live and work in flood-prone areas around the Bay. Major critical infrastructure—airports, roads and rail, water and wastewater treatment facilities, and power and telecommunications utilities, for example—are located within flood-prone areas and will require billions of dollars of protection investment to ensure the safety and livelihood of our communities.

The waters of the San Francisco Bay know no boundaries. Efforts to control coastal flooding in one area may cause the Bay waters to flow to adjacent areas. Controlling riverine flooding in the region's rivers and creeks is an ongoing challenge, but managing the impacts of rising waters of the San Francisco Bay will require unprecedented efforts. Never before has there been a more unifying need for flood managers across all levels of government to join forces to protect the safety and welfare of the region's people, property, and rich ecology.

CHARG members recognize the immediate need to expand from single-jurisdiction to regional approaches to deal with sea level rise most effectively. Venturing into the unmapped territory of regional coastal hazards mitigation will require mutual support to inform decision-making and resource allocation.

CHARG will provide a unified voice to advance necessary partnerships, resources, and collaboration to implement solutions. Dedicated CHARG teams will formulate integrated approaches to address the complexities of coastal hazards mitigation in support of our interdependent communities.

By fostering partnerships that support collective solutions, CHARG member organizations are united in our commitment to public safety, economic vitality, healthy ecosystems, prudent surface and groundwater management, and sustainability. Our collaborative plans and projects will provide Bay Area coastal communities with greater resiliency and improved quality of life.

Regional solutions require regional participation. **We invite all interested agencies, organizations, and individuals to become familiar and involved with CHARG.** We value your input and look forward to your partnership as we work together to protect and enhance our resources and communities.

5ft



12ft



# Coastal Hazards: *the New Normal*

BECAUSE OF CHANGES in the earth's climate, sea levels are rising globally. Climate change is increasing the magnitude, frequency, and duration of extreme storm events. The rise in sea level, combined with the higher water levels caused by high tides (including king tides), storm surges, and wind-generated swells, is creating a new magnitude of coastal hazards.

The San Francisco Bay Area has extensive development—infrastructure, job centers, and communities—located in low-lying areas near the Bay. The region will be significantly impacted by sea level rise and storms. As higher seawater spreads farther inland, it can cause destructive erosion, flooding, contamination of aquifers and agricultural soils, and lost habitat for fish, birds, and plants. Millions of people live and work in areas that are currently vulnerable and will become increasingly threatened by flooding.

## Millions of people live and work in areas that are currently vulnerable.

### Sea Level Rise, Storms, and Tides

A recent study by scientists at Harvard and Rutgers indicates that sea level has been steadily rising over the past century; however, sea level rise has accelerated more dramatically in the late 20th and early 21st centuries.<sup>1</sup> While sea level rose an average of 1.2 millimeters per year from 1901–1990, recent analysis indicates that, from 1993 to 2010, sea level rose roughly 3 millimeters per year. Historic measurements at Crissy Field in San Francisco indicate a rise of about one foot from 1850 to the present.<sup>2</sup>

In the coming century, the rate of sea level rise is expected to accelerate, as higher average atmospheric temperatures cause glaciers and the polar ice caps to melt. Opinions vary on the forecasted amount of sea level rise, but there is little argument that the trend will continue.

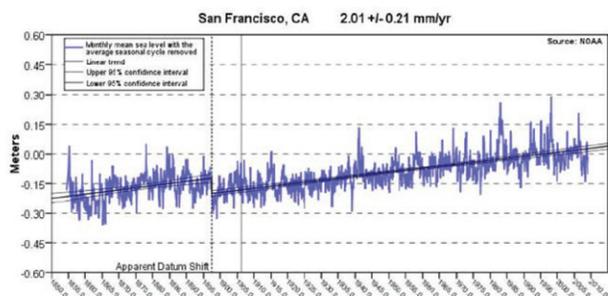
Storms cause the San Francisco Bay water levels to rise even higher. This is true of all storms, but even more so during El Niño winters, when atmospheric and oceanographic conditions in the Pacific Ocean produce particularly severe winter storms. The Pacific Ocean warms as a result of weakening trade winds that normally blow westward from South America toward Asia.

During El Niño storms, unusually long waves are generated in the western Pacific Ocean, which pass along the mouth of San Francisco Bay and cause additional warm ocean water to flow into the Bay. Water levels are typically elevated several feet along the Pacific coast and up to one foot<sup>3</sup> within the Bay. Furthermore, Pacific Ocean storms and thermal gradients produce strong winds, which generate large wind-driven waves that cause higher wave run-up onto the shore.

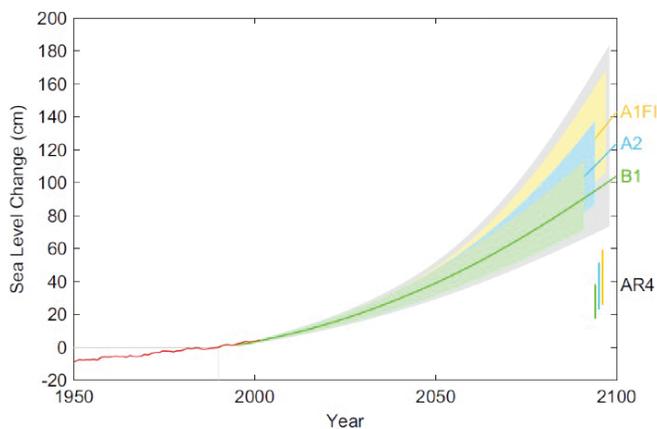
King tides are the highest tides, which occur when the gravitational influence of the moon and sun align, typically in January. In the San Francisco Bay, water levels for a king tide are about a foot higher than an average high tide. When a king tide coincides with a Pacific Ocean storm, the effects are even more pronounced.

More extreme storms may also bring heavier precipitation and cause riverine flooding. In tidally influenced waterways around the Bay, higher sea levels and storm surges will combine with riverine floodwaters to exacerbate flooding in low-lying areas.

Higher sea levels will also cause groundwater levels in near-shore areas to rise, which reduces the capacity of the ground to absorb and store precipitation. When the ground does not absorb rainwater, additional flooding will occur.



Sea level has risen about one foot in the San Francisco Bay from 1850 to the present.<sup>4</sup>



Scientists expect sea level rise to accelerate in the coming years.<sup>5</sup>

The overall result is that low-lying areas surrounding the San Francisco Bay will experience more frequent and severe flooding. Areas that are typically flood-prone will be inundated, and some areas that are currently dry will be periodically flooded. NOAA predicts that, **by 2050, a majority of U.S. coastal areas are likely to be threatened by 30 or more days of flooding each year** due to dramatically accelerating impacts from sea level rise.<sup>6</sup>

### Current Bay Area Flood Management

Historically, large swaths of the San Francisco Bay Area have experienced periodic riverine flooding in the creeks and rivers that flow into the Bay. To further the development of the Bay Area and enable residences and businesses to be built and protected, flood control districts or agencies were established in the nine Bay Area counties and within many Bay Area cities.

The threats from riverine flooding have been managed by individual agencies on a watershed or watercourse basis, with a focus on riverine flooding. For the most part, major watersheds are contained within a single county or city. Each flood control district, agency, or department has responsibility for managing flooding within its own jurisdictional boundaries.

Some organizations and agencies have developed a broad view of the Bay Area's vulnerability to the adverse impacts

Potential negative impacts caused by sea level rise in the Bay area...will be felt locally, regionally, statewide, and even nationally and internationally.

of climate change. Certain organizations have already incorporated consideration of sea level rise and extreme tides into their capital improvement plans. Until the formation of CHARG, though, there have been few opportunities for individual organizations to come together to address these new coastal hazards.

Californians, hoping to avert a flooding catastrophe similar to the devastation caused by levee failures in New Orleans after Hurricane Katrina, approved a \$5.1 billion bond (Proposition 1E) in 2007. The funding has been directed primarily toward flood control system repairs and improvements in California's Central Valley. Many consider the threats to California's vitality caused by sea level rise in the San Francisco Bay Area to be as significant as those currently being addressed in the Central Valley.

---

1. John A. Church and Neil J. White, "Sea-Level Rise from the Late 19th to the Early 21st Century," *Springerlink.com*, <http://link.springer.com/content/pdf/10.1007%2Fs10712-011-9119-1.pdf>, (Published 30 March 2011).

2. NOAA *Tides and Currents*, "Mean Sea Level Trend 9414290 San Francisco, California," [http://tidesandcurrents.noaa.gov/sltrends/sltrends\\_station.shtml?stnid=9414290](http://tidesandcurrents.noaa.gov/sltrends/sltrends_station.shtml?stnid=9414290), (Revised October 15, 2013, accessed January 22, 2015), (ibid.,4).

3. USGS, "El Nino Sea-Level Rise Wreaks Havoc in California's San Francisco Bay Region," <http://pubs.usgs.gov/fs/1999/fs175-99/> (Revised May 9, 2005, accessed January 22, 2015).

4. NOAA *Tides and Currents*, op. cit.,2.

5. Martin Vermeer and Stefan Rahmstorf, "Global sea level linked to global temperature," *Proceedings of the National Academy of Sciences of the United States of America*, vol. 106 no. 51, <http://www.pnas.org/content/106/51/21527.full>, (Published December 7, 2009).

6. William V. Sweet and Joseph Park, "From the extreme to the mean: Acceleration and tipping points of coast inundation from sea level rise," *Earth's Future*, <http://onlinelibrary.wiley.com/enhanced/doi/10.1002/2014EF000272/>, (Published December 18, 2014, accessed January 26, 2015).



# Adaptation: *Why CHARG and Why Now*

CHARG, or Coastal Hazards Adaptation Resiliency Group, is a forum at which local, regional, state, and federal scientists, engineers, planners, and policy makers can develop a common understanding about regional coastal hazards issues. These experts are uniquely qualified to explore solutions and advocate for changes needed to implement those solutions.

## **New Paradigm: Sea Level Rise as Unifier**

The threats posed by sea level rise and extreme storm events are now changing the way flood control agencies look at flood risk management within their near-shore areas. Traditional methods to divert coastal floodwaters are expensive and only marginally feasible. Obtaining permits to build protective infrastructure is costly and takes decades.

The San Francisco Bay waters know no jurisdictional or topographic boundaries. Individual projects designed to protect individual localities (building shoreline levees, for example) may cause flooding in adjacent areas, and low-lying areas will continue to flood regularly. Sea level

rise and extreme tides affect the entire Bay Area. An individual-jurisdiction approach is no longer a viable means by which regional coastal hazards can be addressed.

Potential negative impacts caused by sea level rise in the Bay Area—such as threats to public safety, disruptions to commerce, lost wages and lower productivity, degraded drinking water quality, decreased property values, and loss of critical tidal habitat—will be felt locally, regionally, statewide, and even nationally and internationally.

### The Time is Now

**There has never been a more urgent need for flood management agencies to join forces to protect the safety and welfare of the region's people, property, and ecosystem.** Regardless of issues associated with sea level rise, much of the Bay Area's flood control infrastructure is already nearing the end of its useful service life and will need major repair, upgrade, or replacement. Now is the time to invest the expertise and resources necessary to prevent flood disasters and reduce the impacts of coastal flooding.

The scale of these impacts necessitates a regional approach to address property ownership, create mechanisms for agencies to respond across jurisdictions, and permit strategies that will address the infrastructure challenges that span beyond capital improvement programs.

History has repeatedly shown that investing in proactive measures and infrastructure in preparation for extreme events is much more effective than responding to the damage caused by extreme conditions in the future. Delaying action could cost the public billions more, and could cause grave consequences including loss of life and livelihood, and damage to ecosystems.

A unified, representative voice is essential to advocate for funding and resources toward preparedness solutions. Success in the uncharted realm of coastal hazards mitigation will require mutual support to inform appropriate decision-making, strategies, and resource allocation.

Although challenging, regional solutions may be more cost effective than the sum of each locality's individual efforts. One of many valuable-yet-painful lessons learned from the levee failures in New Orleans after Hurricane Katrina is that a systems approach is the only responsible way to address regional flood risk.

Prioritizing our regional response to sea level rise and coastal hazards will be critical in wisely using limited resources to provide large-scale, region-wide solutions.

### How CHARG was Inspired

Alameda County has the most San Francisco Bay shoreline of all the nine Bay Area counties. The Alameda Creek watershed is the third largest watershed draining into the San Francisco Bay (after the Sacramento and San Joaquin rivers), covering about 700 square miles. Over the past five years, leaders from the Alameda County Flood Control & Water Conservation District (ACFCD) have been developing an integrated water management solution for Alameda Creek and Eden Landing, ACFCD's portion of the South Bay Salt Pond Restoration Project, in addition to participating in the Adapting to Rising Tides project. During these deliberations, the ACFCD recognized that regional collaboration was necessary to address the coastal hazards caused by sea level rise and extreme tides.

In January 2014, ACFCD staff initiated discussions with Federal Emergency Management Agency (FEMA) Region IX staff to recommend convening a group to address San Francisco Bay coastal hazards, and offered seed money to support the group's administration.



### Participating Agencies

**A grand total of 114 entities** across local, state and federal governments currently participate in CHARG.

**A total of 70 local entities**, including public works departments, flood management districts, water supply districts, Offices of Emergency Services among others—are active in CHARG.

Numbers on the figure, above, indicate how many local entities in each county are members of CHARG. In addition to the 70 local entities, there are **8 regional entities** whose jurisdictions encompass multiple counties and cities within the San Francisco Bay Area, **19 state and federal agencies**, and **17 non-governmental organizations** that currently participate in CHARG.

A steering committee was formed and met in early May 2014 to establish a structure for the group and formulate preliminary goals. A larger stakeholder group met in mid-May 2014. More than 50 people from 30 different agencies attended the first stakeholder meeting.

Since those first meetings, the steering committee has met five times in 2014, and the stakeholder group twice to refine CHARG's vision and goals, discuss governance, and provide a forum to present and discuss San Francisco Bay regional coastal hazards mitigation and resiliency issues.

### CHARG Members: the Implementers

There are many groups in the Bay Area that address climate change adaptation, sea level rise, sustainability, and other overlapping issues. **CHARG is unique in that it is comprised of agencies and organizations that are responsible for implementing solutions to address coastal hazards.**

CHARG's constituents represent many Bay Area cities, all nine Bay area counties, and regional, state, and federal agencies. Each member organization is responsible for protecting public safety, health, and welfare through planning, building, and maintaining infrastructure and enhancing and maintaining the natural environment.

*A full list of CHARG steering committee members and stakeholder agencies is presented in Appendix A.*

After reviewing the missions and goals of most of the other groups addressing climate change, the steering committee has concluded that CHARG is a unique, valuable, and much-needed cross-jurisdictional forum. CHARG will enable its members to pool resources, inform regulatory policy, and speak with authority to advance the solutions-based conversation about coastal resiliency issues.

*CHARG envisions a future in which all properties, assets, and people that live, work or travel through low-lying areas adjacent to the Bay are safe from coastal hazards.*

# 3

## Resiliency Group: CHARG Vision, Goals, and Governance



Coastal flooding in the Alviso neighborhood,  
San Jose, California, 1984.

RESILIENCY MEANS THE ABILITY of a community and its natural environment to bounce back—or return to its natural state—after extreme events such as coastal storms and flooding that cause damage. The ability of a community to bounce back is influenced by many things. **Community investments to improve resiliency will ultimately pay off by lessening the potential for widespread catastrophic damage, and will be reflected in the reduced cost of damage and repair after a natural disaster.**

CHARG will work collectively to increase the resiliency of San Francisco Bay Area communities by adopting a regional approach to address coastal hazards, and to reduce the long-term risk to human life and property from flooding and other hazards caused by sea level rise and extreme tides.

# Vision for the Future

---

THE STEERING COMMITTEE drafted the following vision statement for CHARG and obtained endorsement from the larger stakeholder group. The CHARG vision statement describes what CHARG, as a regional group, hopes to accomplish in the mid- and long-term future.

*Collaborate across all levels of government and align resources to implement integrated, multi-benefit coastal hazards solutions to mitigate risk and improve and protect quality of life and property along the San Francisco Bay*

## The Vision Statement Reflects Three Key Concepts:

- ① The challenges associated with implementing mitigative measures and improving resiliency are so immense, and so complex, that no single entity can reasonably attempt to address them. Only a multi-jurisdictional and multi-level collaboration will have the capacity to implement the changes needed to meet these challenges.
- ② Solutions to reduce the risks associated with coastal hazards must satisfy multiple goals and offer multiple benefits. Property adjacent to the San Francisco Bay serves in many capacities: industry, housing, transportation, recreation, open space, and habitat. Coastal hazard mitigation projects or programs need to provide flood protection that addresses the variety of constituents at risk.
- ③ Quality of life can be defined in many ways; public safety, economic vitality, and sustainability are just a few examples. CHARG envisions a future in which all properties, assets, and people that live, work or travel through low-lying areas adjacent to the Bay are safe from coastal hazards. CHARG further envisions that its work results in communities and natural areas with greater resiliency, providing solutions that enable communities to recover more quickly from extreme conditions.

## CHARG Goals

CHARG stakeholders met on September 25, 2014, to brainstorm the following initial goals and objectives for CHARG (in no particular order), recognizing that they will be modified over time as conditions and situations change, and as CHARG begins addressing the volume of issues associated with coastal hazards mitigation. The goals outlined below will be accomplished in any number of ways by CHARG stakeholders, with CHARG acting as the integrator of ideas and actions.

### GOAL 1

***Improve regional coordination among federal, state, and local agencies, non-governmental organizations, and private entities to address coastal hazards adaptation.***

#### Objectives:

**1A:** Serve as a forum and structure by which different organizations can work together to facilitate networking, relationship-building, and information exchange within the larger group and through sub-regional and issues-based working groups.

**1B:** Serve as a single entity representing stakeholders in collaborating and integrating with other climate adaptation and sea level rise groups and initiatives.

### GOAL 2

***Identify and work together to solve regional coastal hazards and flood management issues.***

#### Objectives:

**2A:** Establish a regional, systems approach to mitigating coastal hazards.

**2B:** Help local entities coordinate their respective local coastal projects for the greater good of local, sub-regional, and regional coastal hazards adaptation objectives.

**2C:** Increase opportunities for multi-benefit solutions that address, for example, recreation, ecosystem, and educational opportunities.

**2D:** Develop local, subregional, and regional strategies, and advocate for streamlined permitting for coastal hazards mitigation and flood control projects.

**2E:** Facilitate the leveraging of resources and the provision of mutual support across organizations to address new management challenges that arise.

**2F:** Facilitate the creation of public-private partnerships to protect and sustain the region's coastal assets and economic strength.

*The founders of CHARG envision a highly collaborative organizational structure that is led jointly by a group of interested and involved members.*

### **GOAL 3**

***Exchange ideas and expertise, and transfer technical knowledge.***

#### **Objective**

**3A:** Serve as a preeminent regional resource to advocate for improved analytic and modeling tools (including hydrologic models, vulnerability assessments, economic forecasting, and other methodologies in support of coastal hazards mitigation.

**3B:** Serve as a preeminent regional resource to establish regional baseline standards (such as future sea level elevation predictions, common mapping platforms, and data sets) that can be used in coastal hazards analyses.

### **GOAL 4**

***Provide a unified voice in support of needed regional policies.***

#### **Objective**

**4A:** Create strategies by which policies addressing region-wide coastal hazards can be developed and enacted.

**4B:** Serve as a conduit of information and expertise to inform and influence the development of state and federal policies and procedures addressing climate change.

**4C:** Actively participate in regional policy development and engage San Francisco Bay Area's elected officials at the local, state, and federal level to enact and support region-wide policy.

**4D:** Prepare and disseminate draft templates and/or common language that CHARG members can use to influence their respective local ordinances and policies pertaining to coastal hazards mitigation.

### **GOAL 5**

***Develop financing and funding strategies.***

#### **Objective**

**5A:** Develop a process by which all pertinent external funding and financing mechanisms (local, state, federal, and private) can be tracked, and information disseminated to CHARG stakeholders.

**5B:** Facilitate a forum to help local entities develop collaborative strategies for single regional projects (or groups of projects of regional significance), so that such projects are more competitive for funding.

**5C:** Develop financing mechanisms (such as taxes or bonds) and models to fund projects or programs of regional significance.

### **GOAL 6**

***Move public education forward.***

#### **Objective**

**6A:** Draw on best practices in risk communications to develop unified talking points and messaging on coastal hazards and risks in the coastal zone.

**6B:** Implement a public education campaign to provide opportunities for the public to influence decision-making.

## CHARG Organizational Structure

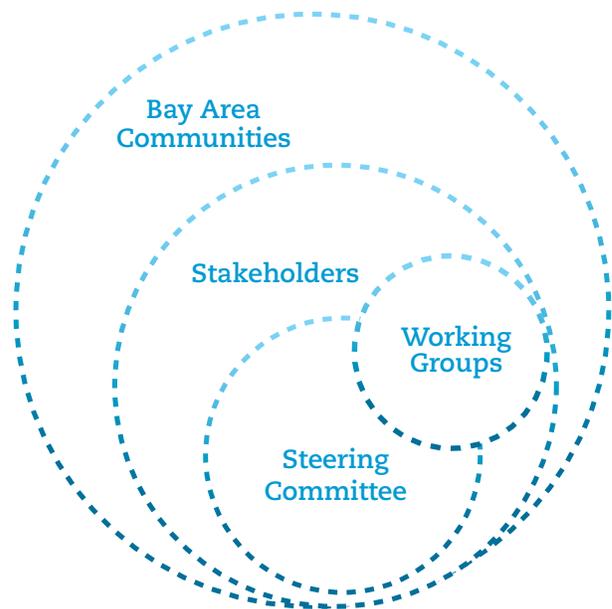
The founders of CHARG envision a highly collaborative organizational structure that is led jointly by a group of interested and involved members. CHARG's organizational structure will likely evolve as the group moves forward toward achieving its goals. The foundation of governance will be a Letter of Intent, signed by all interested members of CHARG.

**FACILITATION AND LEADERSHIP:** ACFCDC is currently taking a lead in funding the CHARG administrative functions, with support from FEMA. Administrative functions include scheduling, convening, and facilitating meetings; preparing and distributing agendas and meeting minutes; and maintaining a webpage. CHARG leadership will likely rotate among key partners in the future.

**STEERING COMMITTEE:** The strategic direction of CHARG is established by the CHARG steering committee. Members of the steering committee represent local, state, regional, and federal public agencies with direct interest in coastal hazards mitigation. Together, they guide the prioritization and implementation of CHARG's goals.

**STAKEHOLDERS AND WORKING GROUPS:** The larger group of CHARG stakeholders also represent local, state, regional, and federal public agencies with

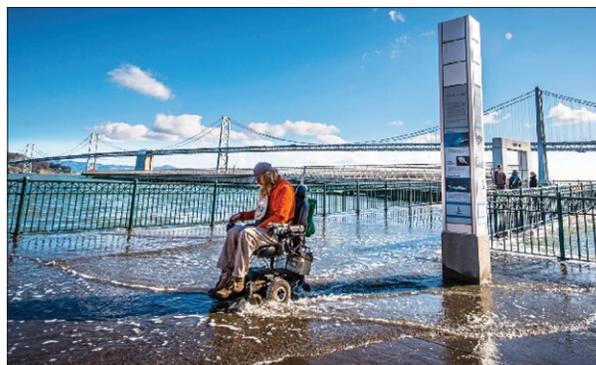
a direct interest in coastal hazards mitigation. A number of working groups will be convened from the larger stakeholder group to address CHARG's implementation priorities. The working groups will be self-selected on a volunteer basis.



*The agencies of the San Francisco Bay region **need to unite** in applying for regional flood-related funding at the state and federal level.*

## 4

## Near-Term Implementation Priorities



THE GOALS OUTLINED in Chapter 3 are far-reaching and comprehensive. The CHARG steering committee has identified **seven focus areas** that it believes are of **highest priority in 2015**. The steering committee will help establish, charter, and support working groups to take on each of these priority tasks, as outlined below.

It is the steering committee's intent that the working groups develop actionable strategies and implementation plans in alignment with the goals described in Chapter 3. The working groups will then garner resources and help facilitate the implementation of the respective plans.

# CHARG is taking a Region-Focused Approach

## Reconnaissance

Examine current shoreline conditions and potential impacts of sea level rise and extreme tides to Bay Area communities, and consider how local conditions relate to the regional San Francisco Bay shoreline hydrodynamics.

## Education

Educate stakeholders and communities about coastal hazard risks and vulnerabilities by disseminating pertinent information.

## Guidelines

Develop regionally agreed-upon guidelines and parameters to support policy strategies.

## Implementation

Develop comprehensive strategies and tactics to address the many challenges associated with mitigating risk caused by coastal hazards.

## Operations

Create an organizational structure supporting multi-level, cross-jurisdictional collaboration to identify and allocate resources toward interrelated, regional solutions.

## Networking

Work collaboratively to address critical issues associated with coastal hazards for the entire San Francisco Bay Area.

## Focus Area 1:

*Reconnaissance – Gather and Share Information about Existing Coastal Hazards Mitigation Projects*

### **BACKGROUND:**

Many public works agencies have flood control-related capital improvement programs in place. Many projects in these capital improvement programs are within areas that may be susceptible to coastal hazards caused by sea level rise and extreme tides.

These agencies have heretofore worked independently in implementing their capital improvement programs. Until issues of sea level rise became apparent, agencies around the San Francisco Bay did not necessarily have compelling reasons to collaborate or coordinate with each other.

### **ISSUES:**

With sea level rise as a unifying issue, it will become advantageous and even necessary to view coastal hazards mitigation around the San Francisco Bay from a systems perspective. Information sharing about projects will become increasingly important as the region looks toward regional solutions.

In reviewing projects around the Bay relative to future coastal hazards, it may become apparent that projects currently in the planning and implementation phase are not adequate or appropriate within the context of a regional solution. The purpose of this focus area is to develop a common platform on which information about individual projects is shared amongst the larger community.

### **CHARGE:**

In alignment with **GOAL 2, Objective 2B**, gather information on projects within the San Francisco Bay coastal areas that are currently being planned or implemented. Create maps and associated data sheets to help stakeholders visualize how these projects may relate to each other and to regional coastal hazards issues.

## Focus Area 2:

### *Reconnaissance – Evaluate Baseline Hydrodynamic Models*

#### **BACKGROUND:**

Hydrodynamic models are the primary analytical tool by which the water levels caused by sea level rise and extreme tides can be estimated relative to shoreline properties and communities. From those water levels, inundation maps can be developed and potential impacts identified.

There are currently several concurrent efforts to develop hydrologic models of the San Francisco Bay, including FEMA's two-dimensional flood model, NOAA's/USGS's Our Coast Our Future model, and others. Each model serves its own purpose and may use different analytical techniques, input assumptions, and data sets.

#### **ISSUES:**

Although the various existing models may yield similar results, there can often be confusion about how to proceed with different models that may produce different results. To effectively advance toward a regional solution to Bay Area coastal hazards and flood management issues, a single model should be adopted. The model results will help inform a strategy to manage risks region-wide and prioritize resource allocation.

Having a single regional model will also help build public confidence on the technological baseline, and will demonstrate that the San Francisco Bay region stands united in credibility and approach. The model results will be included in public education messaging about the risks coastal hazards pose to Bay Area communities, residents, and businesses.

#### **CHARGE:**

In alignment with **GOAL 3, Objective 3A**, investigate, evaluate, and/or develop a common hydrologic tool or model to be used as a common platform for regional solutions. With that model, develop standards, guidance, and best practices for future hydrologic evaluations.

## Focus Area 3:

### *Education – Create a Public Outreach Toolkit*

#### **BACKGROUND:**

In general, CHARG members are well respected in their communities and serve as trusted sources of pertinent information. Additionally, many CHARG members belong to and share in and communications networks protocols by which this information can be disseminated.

Public outreach toolkits contain ready-to-use informational tools (for example, web page content, fact sheets, talking points, presentations, and instructions for use) that are vetted by the entire group, and can be readily adopted and shared by individual members.

#### **ISSUES:**

The topics of climate change and sea level rise are a regular part of the media news stream. Because the topic is relatively new, the demand for pertinent and accurate information about coastal hazards in the San Francisco Bay region is apparent. CHARG members are uniquely qualified to fill an important role in articulating the need for coastal hazards mitigation.

To effectively implement CHARG goals, a groundswell of public support will be needed to influence decisions about agency funding of priority projects, programs and policies. One of the first steps in engaging the public is to increase awareness about the issues.

#### **CHARGE:**

In alignment with **GOAL 6, Objective 6B**, create a toolkit of engaging informational materials about coastal hazards, sea level rise, extreme tides, vulnerability, and risk to communities around the San Francisco Bay.

## Focus Area 4:

### *Guidelines – Develop a Policy Strategy*

#### **BACKGROUND:**

Many CHARG members perform policy advocacy to help achieve their own respective missions. For CHARG initiatives, policy strategy will consist of working with individual policymakers and policymaking bodies, providing a strong unified voice, to gain support for mitigating the risks associated with sea level rise and extreme tides.

One purpose of CHARG's policy strategy will be to garner financial support through funding bills or budget requests. CHARG will likely lead efforts to manifest changes in local or regional policies, ordinances, and regulations to help streamline project implementation.

#### **ISSUES:**

There are many competing interests vying for limited resources. To effectively mitigate risk and improve and protect quality of life and property along the San Francisco Bay, CHARG and its members will need powerful legislative support and alignment at the federal, state, and local levels.

Often, legislative change is the only solution for complex and intransigent issues, like many that CHARG is addressing. Informed legislative strategy will provide leverage and focus to the issues surrounding coastal hazards, and will create its own positive publicity.

#### **CHARGE:**

In alignment with **GOAL 4, Objective 4A**, develop a legislative and policy strategy to bring greater awareness to the issues of sea level rise in the San Francisco Bay Area; streamline permitting of projects that will help mitigate coastal hazards; and attract funding (in conjunction with Focus Area 5) for regional coastal hazard solutions.

## Focus Area 5:

### *Operations – Identify Funding Mechanisms*

#### **BACKGROUND:**

A number of federal, state, local, non-profit, and private organizations fund programs and projects that help to mitigate the risks associated with flooding —along with associated benefits like recreation and habitat enhancement. Each funding source carries its own unique stipulations and criteria, typically related to riverine flooding. Many CHARG members have qualified individually for these funding sources for their respective projects.

#### **ISSUES:**

Because sea level rise and coastal hazards mitigation is a relatively new paradigm, funding sources and criteria may not be aligned with current needs. The agencies of the San Francisco Bay region need to unite in applying for regional flood-related funding at the state and federal level.

Several important facets now must come into alignment: estimating the magnitude of regional funding needs (including coalescing local issues into regional solutions); adjusting the qualifying criteria for existing funding sources to reflect coastal hazards; identifying new regional funding mechanisms; and developing a cogent business case for greater federal state, local, and private investment in interrelated and regional solutions.

#### **CHARGE:**

In alignment with **GOAL 5, Objective 5A**, identify funding mechanisms that can be brought to bear on regional coastal hazards solutions. Evaluate funding requirements and develop conceptual strategies (in conjunction with Focus Area 4) by which CHARG can facilitate regional solutions to attract funding.

## Focus Area 6:

### *Operations – Ensure CHARG Sustainability*

#### **BACKGROUND:**

Every group seeking to affect positive change needs a champion or dedicated group of leaders who will support and facilitate the implementation of the group's goals. The group also needs mechanisms in place – such as agreements, funding, metrics, and tools – to ensure the long-term sustainability of the group's functioning, in order to continue to protect coastal infrastructure.

The seed money to convene CHARG was provided by ACFCO. As work begins on priority tasks, and as other CHARG activities ramp up, additional facilitation and support will be needed.

#### **ISSUES:**

CHARG's long-term sustainability is contingent on the group's success in addressing meaningful problems and providing results-driven data in solving regional challenges. As implementers of regional solutions, CHARG members will need to see measurable achievement of the group goals.

Another measure of success involves CHARG members' perception that the group itself is engaging and valuable. To this end, sustainability will be predicated on fostering an environment in which CHARG members can efficiently function for the greater good of the group.

#### **CHARGE:**

In alignment with **GOAL 1, Objective 1A**, develop and implement a strategy to manage CHARG projects and objectives in a manner that engages stakeholders, facilitates moving the priorities forward, measures efficacy, and ensures long-term sustainability of the group.

## Focus Area 7:

### *Networking – Continue the Dialogue About Issues and Implementation*

#### **BACKGROUND:**

As of this writing, CHARG has facilitated three stakeholder gatherings (May 15, 2014; September 25, 2014; and February 19, 2015) to assess stakeholders' interest in participating in CHARG, and to gather feedback about the group's vision and goals. The CHARG steering committee has met seven times (May 8, 2014; June 12, 2014; August 14, 2014; September 3, 2014; September 8, 2014; October 30, 2014; and January 15, 2015).

The general consensus, based on stakeholder and steering committee members' feedback, is that CHARG has the potential to be a valuable forum to share information and work toward regional solutions.

#### **ISSUES:**

Ongoing and meaningful dialogue will be mission-critical to implementing initiatives addressing significant projected risks that face CHARG stakeholders. The goals, objectives, and focus areas described in this Strategic Brief will only be realized by ongoing, united efforts by many people and organizations.

#### **CHARGE:**

In alignment with **GOAL 1, Objective 1A**, continue to plan, host, and facilitate a variety of forums (meetings, conference calls, website, and other communications vehicles) by which stakeholders can continue to work toward regional coastal hazards mitigation goals.



# Appendix A:

## CURRENT CHARG STAKEHOLDERS

### Federal and State

California Department of Fish and Wildlife  
 California Department of Water Resources  
 California Regional Water Quality Control Board  
 California State Coastal Conservancy  
 California State Parks  
 Caltrans  
 Delta Stewardship Council  
 Federal Emergency Management Agency  
 Gulf of the Farallones National Marine Sanctuary  
 National Oceanic and Atmospheric Administration  
 National Park Service  
 San Francisco Bay Conservation and Development Commission  
 San Francisco Bay Regional Water Quality Control Board  
 State of California Ocean Protection Council  
 United States Army Corps of Engineers  
 United States Fish and Wildlife Service  
 United States Geological Survey  
 United States National Park Service  
 University of California, Berkeley  
 University of California, Davis

### Regional

Association of Bay Area Governments  
 Bay Area Clean Water Agencies  
 Bay Area Joint Policy Committee  
 Bay Area Water Supply and Conservation Agency  
 East Bay Dischargers Authority  
 East Bay Regional Park District  
 Metropolitan Transportation Commission

**Alameda County**

Alameda County Flood Control and Water Conservation District  
 Alameda County Transportation Commission  
 Alameda County Water District  
 City of Alameda  
 City of Berkeley  
 City of Emeryville  
 City of Fremont  
 City of Hayward  
 City of Livermore  
 City of Newark  
 City of Oakland  
 City of San Leandro  
 City of Union City  
 County of Alameda  
 Oro Loma Sanitary District  
 Port of Oakland  
 Union Sanitary District  
 Zone 7 Water Agency

**Contra Costa County**

City of Antioch  
 City of Concord  
 City of Martinez  
 City of Oakley  
 City of Pittsburg  
 City of Richmond  
 City of San Pablo  
 City of San Ramon  
 Contra Costa County Flood Control and Water Conservation District  
 Contra Costa Transportation Authority  
 Contra Costa Water District  
 County of Contra Costa

**Marin County**

City of Belvedere  
 City of Larkspur  
 City of Mill Valley  
 City of Novato  
 City of San Rafael  
 City of Sausalito  
 City of Tiburon  
 County of Marin  
 Marin County Flood Control and Water Conservation District  
 Town of Corte Madera

**Napa County**

City of Napa  
 County of Napa  
 Napa County Flood Control and Water Conservation District

**San Francisco County**

City and County of San Francisco  
 Port of San Francisco  
 San Francisco Public Utilities Commission

**San Mateo County**

City of Daly City  
 City of Foster City  
 City of Menlo Park  
 City of Millbrae  
 City of Redwood City  
 City of San Mateo  
 City of South San Francisco  
 County of San Mateo  
 San Francisquito Creek Joint Powers Authority

**Santa Clara County**

City of Milpitas  
 City of Mountain View  
 City of Palo Alto

City of San Jose  
 City of Santa Clara  
 City of Sunnyvale  
 Santa Clara Valley Water District  
 County of Santa Clara

#### **Solano County**

City of Benicia  
 City of Fairfield  
 City of Vallejo  
 County of Solano  
 Vallejo Sanitation and Flood Control District

#### **Sonoma County**

County of Sonoma  
 Sonoma County Regional Climate Protection Authority  
 Sonoma County Water Agency

#### **Non-Governmental Organizations**

Bay Area Center for Regional Disaster Resilience  
 Bay Area Council  
 Bay Area Ecological Climate Change Consortium  
 Bay Area Flood Protection Agencies Association  
 Bay Localize  
 Bay Planning Coalition  
 Climate Readiness Institute  
 Local Government Commission  
 Pacific Institute  
 Point Blue Conservation Science  
 San Francisco Bay Joint Venture  
 San Francisco Estuary Institute  
 San Francisco Planning and Urban Research  
 Save the Bay  
 Silicon Valley Joint Venture  
 Silicon Valley Leadership Group  
 The Bay Institute and Aquarium of the Bay  
 Urban Land Institute Resiliency Forum

#### **CURRENT STEERING COMMITTEE MEMBERS**

**Hank Ackerman**, *Alameda County Flood Control and  
 Water Conservation District*

**John Bourgeois**, *California State Coastal Conservancy*

**Allison Brooks**, *Bay Area Joint Policy Committee*

**Norma Camacho**, *Santa Clara Valley Water District*

**Craig Conner**, *United States Army Corps of Engineers*

**Paul Detjens**, *Contra Costa County Flood Control and  
 Water Conservation District*

**Matt Gerhart**, *California State Coastal Conservancy*

**Joe LaClair**, *San Francisco Bay Conservation and  
 Development Commission*

**Liang Lee**, *Santa Clara Valley Water District*

**Maria Lorenzo-Lee**, *California Department of Water Resources*

**Roger Leventhal**, *Marin County Flood Control and Water  
 Conservation District*

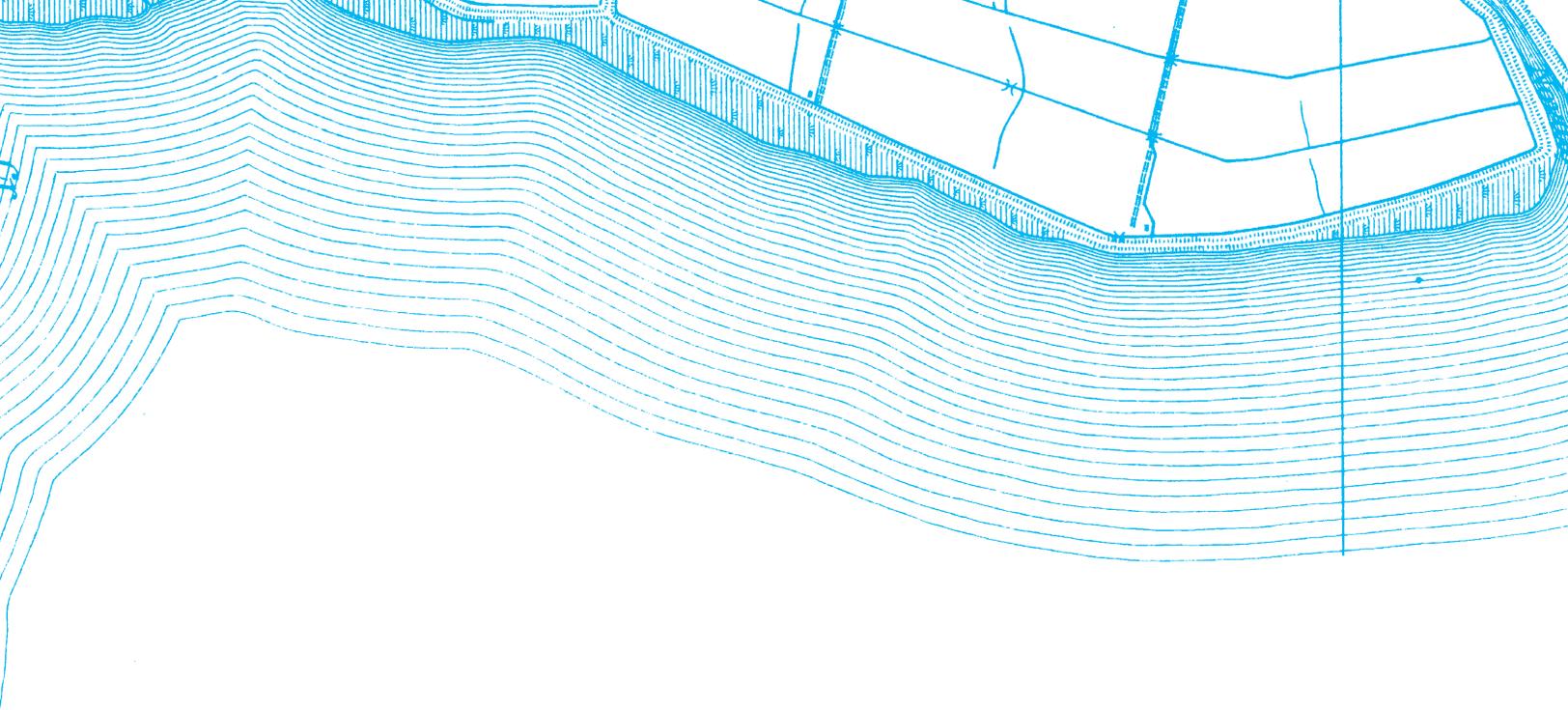
**Lindy Lowe**, *San Francisco Bay Conservation and  
 Development Commission*

**Len Materman**, *San Francisquito Creek Joint Powers Authority*

**Rohin Saleh**, *Alameda County Flood Control and Water  
 Conservation District*

**Eric Simmons**, *Federal Emergency Management Agency*

**Terri Wegener**, *California Department of Water Resources*



## **CHARG Vision:**

*Collaborate across all levels of government and align resources to implement integrated, multi-benefit coastal hazards solutions to mitigate risk and improve and protect quality of life and property along the San Francisco Bay*

