

EMERGENCY SERVICES

Asset Profile: Emergency Services

Marin’s Bay communities are susceptible to earthquakes, tsunamis, fires, and more. Sea level rise could create additional hazardous conditions and impede emergency response. In fact, the primary vulnerability in the emergency services sector is continued safe and timely access to people in need. In addition to this, several service providers could face additional threats from sea level rise.

Sheriff

The primary issue with the Sherriff would likely be access to places in need of services during storms. In addition, the Marine Patrol keeps Rescue Boat 1 moored at Richardson Bay Marina, at 100 Gate 6 Road, Sausalito. Rescue Boat 2 on a trailer at Loch Lomond Marina in San Rafael. These facilities are on the water and are thus vulnerable to storm damage at any given time. Loch Lomond Marina main jetty wall could be overtopped by tidal flooding by near-term scenario 1. Interior portions of the marina may be less vulnerable than the model estimates due to recent construction elevating the site. Richardson Bay Marin is vulnerable to tidal flooding on the jetties, or pathways to the boat slips, by near-term scenario 1 and is nearly entire compromised by long-term scenario 5.

Fire Protection & Emergency Medical

Fire protection districts can provide a variety of services including ambulance, rescue and first aid, land clearing, fire prevention ordinances, and public education. Losing vehicular access is the main vulnerability for all of the fire districts in the area. Several fire stations could experience direct impacts: Station 54 in San Rafael, Tiburon, Station 13 in Corte Madera, and Station 2 in Novato could be vulnerable to sea level rise and storms. Fire Station 54 in San Rafael is on Castro Street in the Canal Neighborhood, the most diverse, disadvantaged, and severely impacted neighborhood in the study area. Southern Marin Fire Protection maintains a boat at the Pelican Yacht Harbor in Sausalito. This facility could expect tidal flooding reach the parking lot by long-term scenario 5.

IMPACTS AT-A-GLANCE: SCENARIO 6

Tens of thousands of residents, millions of visitors	
Corte Madera Fire Station 13 San Rafael Fire Station 54 Novato Fire Station 2 Tiburon Fire Station CHP headquarters Two rescue boats Emergency Access Routes Hydrants Emergency water Supplies	Property Owners Office of Emergency Services Fire Departments County Sheriff CHP Municipal Police EMT providers



San Rafael Fire Station No. 54 is vulnerable. Credit: SRFD



Rescue Boat Liberty. Southern Marin Fire District. Credit: SMFD

EMERGENCY SERVICES

Storm surges in scenario 6 almost reach Southern Marin Fire District Headquarters and station 14 in Corte Madera. Stations 52 and 55 in San Rafael could also face access issues. Finally, disruptions in water supply and corroding of reserve tanks could compromise fire service. This is primarily a concern in the northern half of the study area where NMWD has reserve emergency water tanks.

Local Police

Very few facilities are impacted directly. However, the Central Marin Police Authority building, serving San Anselmo, Corte Madera and Larkspur could become an island as the lands around it flood in the long-term. Flooding south of the station on Doherty Drive, in Larkspur, is already an issue during high tides and storms. The increased saltwater on roads around the station could lead to faster corrosion of the patrol SUVs. The Sausalito Police Department's two boats, Marine 1, berthed at Schoonmaker Marina, and Marine 2, berthed at the US Army Corps of Engineer's dock in Sausalito could also be vulnerable to storms damage and access to the boats could be difficult if tides are too high. If the marina facilities float systems are not adequately elevated to handle higher tides, the boats could be held under water.

California High Patrol (CHP)

Other than access issues, the Marin CHP Headquarters on San Clemente Drive in Corte Madera could face flooding impacts as early as scenario 3 in the medium-term. The building itself already experiences subsidence of the fill below. When the site starts to see regular flooding, patrol cars may see increased corrosion from exposure to saltwater. The property also has fuel tanks at-grade and two stormwater pumps that could become burdened. The auto shop with lift equipment, computer electronic systems, evidence room, and reports and sensitive paper data would be impacted if flood waters reach into the facility.

Emergency Shelters

Several schools and churches double as emergency shelters because they have capacity to house many people, offer refrigeration for medications, and have backup generators. The facilities that could be vulnerable under these scenarios include:

- Bahia Vista Elementary School, San Rafael,

- Army Corps of Engineers Bay Model Visitor's Center, Sausalito,
- Belvedere City Community Center,
- Corte Madera Community Center,
- Henry Hall Middle School, Larkspur,
- Kent Middle School, Kentfield (storm surge only),
- Mill Valley Middle School,
- MLK Gym Sausalito Parks and Recreation, Marin City (storm surge only),
- Neil Cummins Elementary School, Corte Madera,
- Pickleweed Park Facilities, San Rafael,
- St. Andrews Presbyterian Church, Marin City (storm surge only),
- Strawberry Point Elem School,
- Strawberry Recreation Center (storm surge only),
- Tamalpais High School, Mill Valley (access only),
- Westminster Presbyterian Church, Strawberry,
- Belvedere City Hall, and
- Tiburon Town Hall.

Other

Lastly, the emergency fuels reserves at Larkspur Landing are also vulnerable to sea level rise. Some of this fuel is used for day to day operations; however, the majority of the fuel is the North Bay emergency reserve. If high enough tides overtop the berm and get trapped in the fuel farm containment area, where two tanks store nearly 400,000 gallons of diesel fuel the saltwater could accelerate corrosion. Not only is this region wide resource threatened, the bay could be contaminated with fuel and other chemicals. Finally, for all of these services, if these public servants are unable to access their job sites, they would not be able to perform their duties in times of need and could leave communities at a loss.

Table 45 lists some of the potentially vulnerable emergency service assets related assets in the study area. This list measures onset and tidal MHHW. And the maps on the following pages highlight where vulnerable emergency facilities exist. The areas in the call out circles enable the reader the see areas that are difficult to see on the large scale map. The circles do not indicate that these areas are more vulnerable than others along the shoreline.

EMERGENCY SERVICES

Several facilities may only be impacted during scenario 6, indicating that they could experience storm surge flooding. These assets include:

- Belvedere Community Center
- Southern Marin Fire Station, Sausalito
- St. Andrews Presbyterian Church, Marin City
- Strawberry Point Elementary School
- Strawberry Recreation Center
- Corte Madera Fire Station 13
- Novato Fire Protection Administrative Services, and
- Kent Middle School, Kentfield.

Table 45. Example Emergency Service Assets Ranked by Onset and Flooding at MHHW

Location	Asset	Near-term	Medium-term	Long-term
		Scenario 1	Scenario 3	Scenario 5
San Rafael	Fire Station No. 54	1'6"	2'7"	6'7"
San Rafael	Bahia Vista Elementary School	8"	2'3"	4'8"
Corte Madera	Neil Cummins Elementary School		2'5"	6'6"
San Rafael	Pickleweed Community Center		1'2"	3'
Tiburon	Fire Station		1'	2'6"
Larkspur	Henry Hall Middle School,		6"	1'2"
Novato	Fire Station 62		5"	1'
Mill Valley	Mill Valley Rec Center			3'10"
Waldo Point	Sheriff Water Rescue		Moored in Richardson Bay	
Sausalito	Rescue Boat		Moored in Richardson Bay	
Corte Madera	Recreation Center			Access Issues
San Rafael	Fire Station No. 52			Access Issue
San Rafael	Fire Station No. 55			Access Issue

Source: MarinMap, OCOF Exposure and Flood Depth data, Asset Manager Interviews



EMERGENCY SERVICES

Map 41: Northern Study Area Vulnerable Emergency Service Assets

Vulnerable Assets

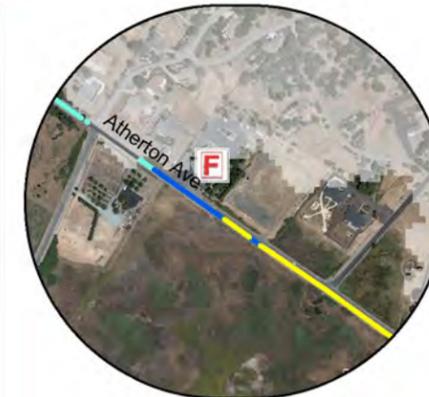
F Fire Station

Vulnerable Arterials & Highways

- @ Scen. 1: 10" Sea Level Rise (SLR)
- @ Scen. 2: 10"SLR+Storm Surge
- @ Scen. 3: 20"SLR
- @ Scen. 4: 20"SLR+Storm Surge
- @ Scen. 5: 60"SLR
- @ Scen. 6: 60"SLR+Storm Surge

Location Indicators

- Unincorporated
- Municipality
- Road
- Bay
- ~ Inland Extent: Sea Level @ 60"+100-year Storm



1: Atherton Avenue @ Olive St.

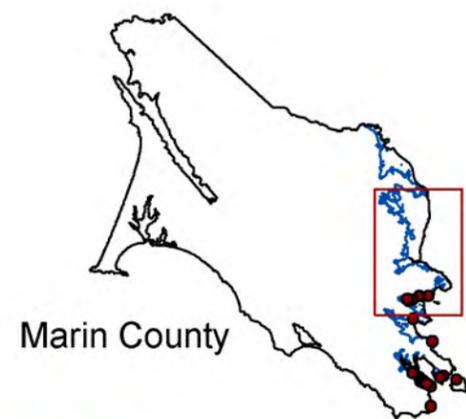


2: U.S. Hwy. 101 @ Rowland Blvd.



3: N. San Pedro Rd.

Disclaimer: Vulnerability Assessment maps, tables, etc. can be used as a resource to help identify potential hazardous areas and vulnerable assets. Marin County, and data providers here in, make no warranties of the accuracy or completeness of maps and data. Maps are representational and subject to future revision. Local site conditions must be examined. Commercial use is prohibited.



Date: 4/1/2017



EMERGENCY SERVICES

Map 42: Southern Study Area Vulnerable Emergency Service Assets

Vulnerable Assets

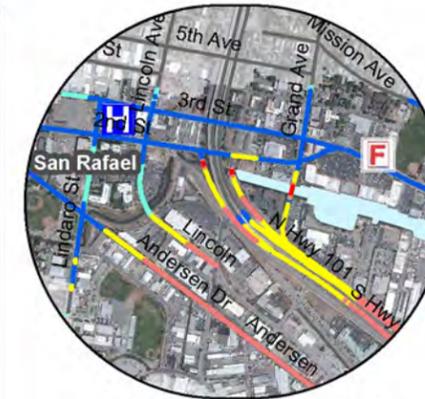
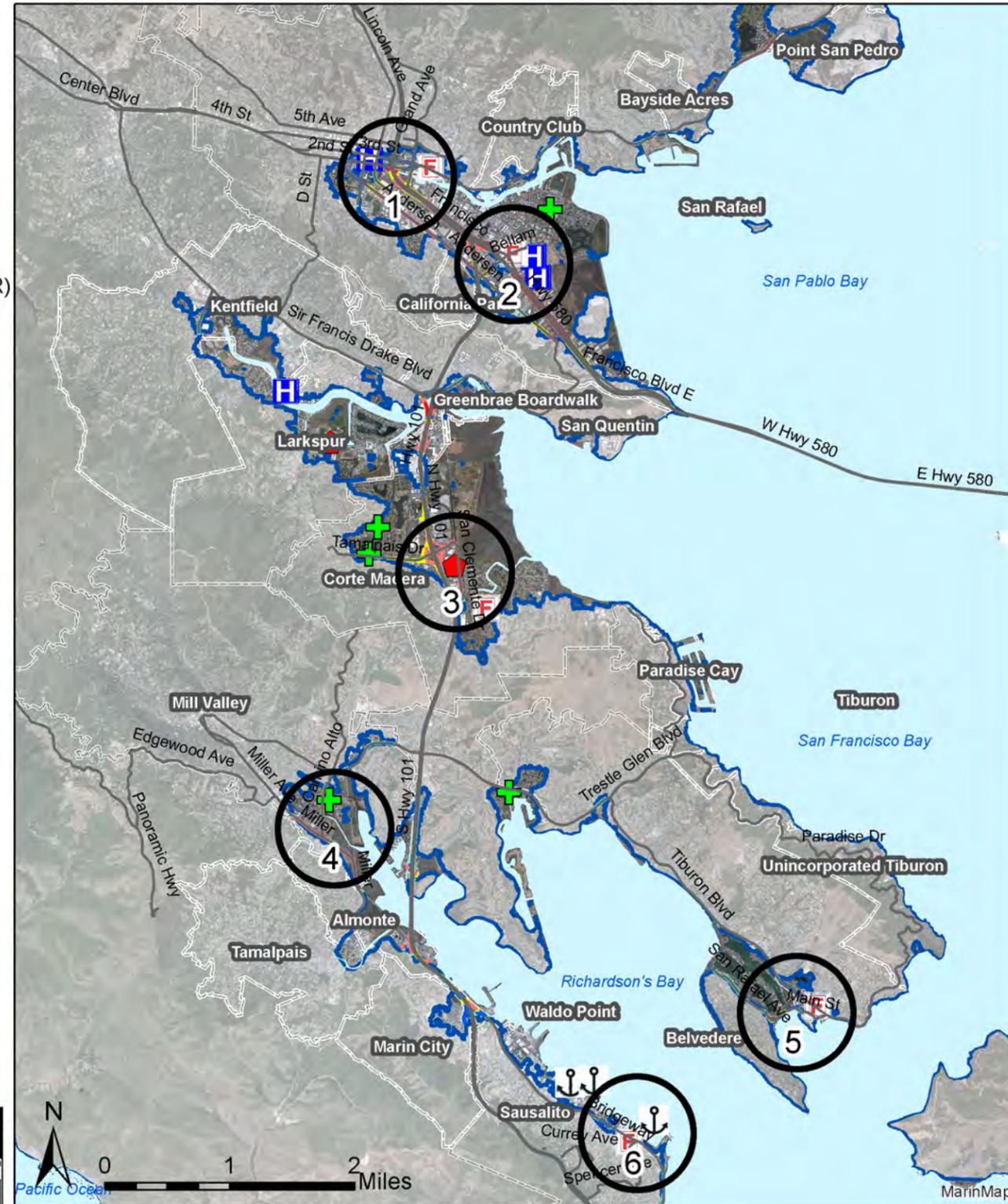
- Fire Station
- Emergency Shelter
- Law Enforcement
- Medical Facility
- Marina

Vulnerable Arterials & Highways

- @ Scen. 1: 10" Sea Level Rise (SLR)
- @ Scen. 2: 10"SLR+Storm Surge
- @ Scen. 3: 20"SLR
- @ Scen. 4: 20"SLR+Storm Surge
- @ Scen. 5: 60"SLR
- @ Scen. 6: 60"SLR+Storm Surge

Location Indicators

- Unincorporated
- Municipality
- Road
- Bay
- Inland Extent: Sea Level @ 60"+100-year Storm



1: Central San Rafael



2: Canal Area



3: San Clemente Dr.



4: Miller Ave. @ Camino Alto



5: Belvedere/
Downtown Tiburon



6: Pelican Yacht Harbor

Disclaimer: Vulnerability Assessment maps, tables, etc. can be used as a resource to help identify potential hazardous areas and vulnerable assets. Marin County, and data providers here in, make no warranties of the accuracy or completeness of maps and data. Maps are representational and subject to future revision. Local site conditions must be examined. Commercial use is prohibited.



Date: 2/15/2017



EMERGENCY SERVICES

Other Considerations

Economic

Lack of emergency services or access for emergency services could lead to injury or death, which could result in costly medical expenses, death related expenses and cause financial complications for dependents of the victims.

Environmental

Lack of fire services or access could prevent adequate protection of homes or entire communities. Wildfire may be able to consume greater acreages if local and fire roads are compromised. If the emergency fuel tanks are compromised due to sea level rise or storms, the bay could become contaminated as well.

Social Equity

Losing public emergency services could impact all residents of and visitors to the potentially flooded areas. However, certain demographic factors may increase an individual's vulnerability in the face of an emergency. The Association of Bay Area Governments identifies several indicators that reduce a community's ability to prepare for, respond to, and recover from major disasters. These include:

- Low educational attainment
- Transit dependence (persons without vehicles)
- Non-English speakers
- Young children and aging adults
- Significant housing cost burden
- Household income
- Home ownership.⁸⁰

Loss or compromised emergency services could be more devastating to communities with higher populations that fall into these demographic categories, such as Marin City or the Canal neighborhoods in San Rafael. In fact, the Castro Street Fire Station that serves the neighborhood could flood tidally itself in the near-term, and access from the next closest fire stations could be blocked entirely at high tide in the medium-term, compounding this area vulnerability.

Management

Protecting emergency services will require coordination amongst federal, state, county and local agencies. Sea level rise planning efforts should collaborate with Local Hazard Mitigation Plans and the Office of Emergency Services to ensure emergency response systems and amenities are planned with the consideration of sea level rise.

The Marin County Sheriff's Department established the Office of Emergency Services (OES) to coordinate efforts to develop disaster-resistant communities and to educate residents on emergency preparedness. In the event of a major emergency or disaster, the OES has established a fully functional centralized Emergency Operations Center (EOC). The County maintains an [Emergency Operations Plan](#) to provide preparation and agency response to disasters that threaten the health or property of residents and businesses. Simultaneously, the plan recognizes that in the first 72 hours following a major event, community members must be self-sufficient.

In addition, the Marin County Local Hazard Mitigation Plan (LHMP) was developed to meet the requirements of the Disaster Mitigation Act of 2000 and maintain eligibility for certain FEMA hazard mitigation programs. Strategies focus on safety and protection during earthquakes, fires, floods, and other disasters with high priority mitigation projects identified. The LHMP is currently being updated with an effort to reflect the full scope of hazard issues including climate change impacts.

Relevant programs of the Marin Countywide Plan and local general plans include: maintain effective communication systems, maintain adequate response resources, distribute public information, conduct disaster awareness efforts, promote community involvement, locate emergency facilities appropriately, promote agency emergency planning, and develop evacuation plans.

⁸⁰ Bay Conservation and Development Commission and Association of Bay Area Governments. *Creating Safe Growth Strategies for the San Francisco Bay Area*. 2015