

Aquatic Park

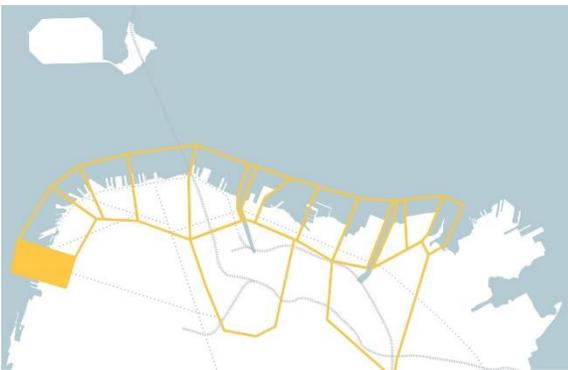
Subarea 1-1



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SHORELINE TYPE:	SEISMIC RISK ¹ :	FLOOD RISK ² :	
Armored & Beach: Rip rap revetment and beach backed by concrete seawall and mixed use trail.	Shoreline Instability: Not Assessed	Tipping Point Elevation:	66" above high tide
	Liquefaction Risk: Not Assessed	Coastal Flood Events	Timing
	Shoreline Structure Vulnerability: Not Assessed		
Subsurface Profile: NOT ASSESSED - likely non-engineered fill, interspersed sands and mud, shallow rock at Fort Mason	Unique Conditions: Unique and vulnerable Muni Pier (90+ year old), beach and soft edge	100-yr Flood + 24" SLR	2047 - 2064
		High tide + 66" SLR	Not Assessed

SUBAREA DESCRIPTION



The Aquatic Park subarea covers many historic and recreational attractions and is primarily within the jurisdiction of the National Park Service as part of the San Francisco Maritime National Historic Park. The subarea includes Hyde Street Pier with its historic vessels, the Maritime Museum, and Aquatic Park Pier (also known as Municipal Pier). Popular outdoor areas include Aquatic Park Cove that is heavily used for swimming and Fort Mason, a part of the Golden Gate National Recreation Area (GGNRA). Combining San Francisco's maritime heritage with open space, Aquatic Park is part of creating a sustainable waterfront to serve generations to come.

The subarea shoreline is mostly engineered (i.e., hardened with shoreline protection structures), but the western limits between Aquatic Park Pier and Fort Mason is a natural rocky bluff at higher shoreline elevations. The breakwater wall supporting Aquatic Park Pier that surrounds Aquatic Park Cove and Fisherman's Wharf provides shelter from wave hazards.

Flooding would initially occur at the eastern edge of this subarea adjacent to the Subarea 1-2 boundary near Hyde Street Pier. Flooding will occur as water levels exceed the lower-lying shoreline at the Dolphin Club and South End Rowing Club, but

¹ Evaluation of seismic risk in this area is based on engineering judgement and will require further analysis of seismic vulnerability.

² The timing of coastal flood events that will cause significant flooding in this subarea is provided as a range of dates based on the sea level rise projection scenarios provided by the California Ocean Protection Council (OPC) per the Likely and 1-in-200 chance of occurrence projections.

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will remain localized near the existing shoreline until higher water levels overtop broad stretches of seawall and inundate the Aquatic Park Cove promenade (Bay Trail). Due to the higher landward topography in this subarea, coastal flood risk in the residential neighborhoods is not expected.

COMMUNITY IDENTIFIED PRIORITIES:

Places

- Aquatic Park
- Municipal Fishing Pier
- Hyde Street Pier
- Dolphin Club
- South End Rowing Club

Since 2017, the Port has connected with tens of thousands of community members through the Waterfront Resilience Program. Public feedback collected about Aquatic Park underscores the importance of outdoor space and recreational activities, from swimming and rowing to walking and jogging. Views are also a community value. Further feedback highlights additional community priorities, including opportunities to protect and maintain historic and cultural resources and public transit.

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FIRST FLOODING OF ASSETS

The chart below describes the vulnerability of specific assets within the Aquatic Park subarea to flooding. These assets will be exposed to coastal flooding when the water level in the Bay reaches a certain height above the current high tide. The heights at which each asset is exposed to flooding is indicated with the shaded cells in the table. Over time and due to sea level rise these water levels can occur due to large storm events such as a 100 year flood of daily high tides. For example, the small boat launch at Aquatic Park Cove is exposed to flooding when the water rises 48 inches above current high tide, which could occur due to a 100 year flood with 3 ft. of sea level rise or as during daily high tide with 5.5 ft. of sea level rise.

● High Tide ○ 100 Year Flood ■ Shaded cells indicate the water levels at which assets are exposed to flood

SEA LEVEL RISE		WATER LEVEL ABOVE CURRENT HIGH TIDE										
		0"	12"	24"	36"	48"	52"	66"	77"	84"	96"	108"
Today		●				○						
1 ft. SLR			●				○					
3 ft. SLR					●				○			
5.5 ft. SLR								●				○
Historic and Cultural												
	Hyde Street Pier (NHR)							■	■	■	■	■
	-	-										
Disaster Response												
	Emergency Fire Water Supply Pump Station 2							■	■	■	■	■
	-	-										
Open Space and Ecology												
	Aquatic Park Cove	N/A (Flooding not quantified for overwater or in-water assets)										
	Bay Trail							■	■	■	■	■
	Dolphin Rowing Club				■	■	■	■	■	■	■	■
	Fort Mason National Recreation Area											>
	Russian Hill Open Space											>
	San Francisco Maritime National Historic Park							■	■	■	■	■
	South End Rowing Club				■	■	■	■	■	■	■	■
Maritime												
	Municipal Fishing Pier									■	■	■

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	Small Boat Launch												
	-	-											
Transportation													
	Hyde Street Cable Car Turnaround												>
	-	-											
Utilities													
	North Beach Tunnel	N/A (Buried assets are not directly impacted by flooding)											
	-												
Critical Facilities													
	Galileo High School												>
	-	-											

FINDINGS



According to the National Park Service, Muni Pier, which was built in 1929 to create a protected cove where City residents could swim and recreate, is now a threatened landmark in need of major repair. Although built strong, decades of standing against winter storms and pounding waves have significantly weakened this 1400-foot walkway over San Francisco Bay. The pier remains open for fishing and strolling, but unless preserved it will one day close.



Aquatic Park reaches a critical Tipping Point with 66 inches of sea level rise, or 24 inches of sea level rise combined with a 100-year coastal flood event.

In this situation, overtopping would:

- Occur over a broad stretch of the shoreline, including a portion of the seawall along the Aquatic Park Cove shoreline. This overtopping would result in inundation of the San Francisco Bay Trail, a waterfront walking and cycling path around the entire bay that runs through all nine counties, and the Aquatic Park promenade.
- Also occur near Black Point resulting in inundation of the San Francisco Bay Trail.
- Cause inundation of Jefferson Street from the floodwaters combining from the Aquatic Park and Fisherman’s Wharf subareas.

Flooding would initially occur (50-year storm with 0” SLR) at the eastern edge of this subarea adjacent to the Subarea 1-2 boundary near Hyde Street Pier. Flooding will occur as water levels exceed the lower-lying shoreline at the Dolphin Club and South End Rowing Club, but will remain localized near the existing shoreline until higher water levels overtop broad stretches

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of seawall and inundate the Aquatic Park Cove promenade (Bay Trail). Due to the higher landward topography in this subarea, coastal flood risk in the residential neighborhoods is not expected.

One fire suction connection (elevation 7.1 ft NAVD88) is anticipated to be inundated in today's 1-year flood event, and this disruption may impede fire truck access. In the event of a natural disaster, Aquatic Park is important to San Francisco's Emergency Firefighting Water System, which can be quickly accessed to draw water directly from the bay and pump it into the fire water distribution system to be used at high-pressure at fire hydrants throughout the city. Connections to the Emergency Firefighting Water System (EFWS) in Aquatic Park include Pump Station No. 2.

Important utilities located and operated in Aquatic Park include the North Point Tunnel. Constructed in 1982, the tunnel has a diameter greater than 60 inches. It connects combined wastewater between the Marina and Jackson transport / storage boxes. Overhead and buried electric power infrastructure, buried natural gas supply line infrastructure, and several telecommunication cell sites (e.g. cells on top of buildings or small cell towers on streetlights) are located in Aquatic Park.

Transit within the Aquatic Park Subarea is outside of the H++ vulnerability zone. The Hyde Street Cable Car Turnaround is at an elevation above 108".

The Dolphin Rowing Club is projected to be vulnerable to flooding in a 100-year storm with 7 inches of SLR, and Hyde Street Pier is projected to be vulnerable to flooding in a 100-year storm with 25 inches of SLR. Included within the Hyde Street Pier area is the emergency fuel dock, historic vessels including the USS Pampanito, a decommissioned World War II era submarine, and the Balclutha, a 19th-century cargo ship. The pier is also located behind a breakwater wall that if overtopped could expose the city shoreline to high wave activity. Access to this pier will also be blocked by inundation of the surrounding streets.

[Future planning efforts in this area by the National Parks Service.](#)



FUTURE POTENTIAL MEASURES UNDER CONSIDERATION IN THIS SUBAREA:

FLOOD MEASURES:

Physical Infrastructure		Ecological Infrastructure	
 Floodwalls	 Levees	 Ecological Marine Structures	 Ecological Features
 Seawalls	 Breakwaters	 Aquatic Habitat	 Ecological Shorelines
 Raised Marine Structures	 Building Adaptations		
 Tide Gates	 Deployables		

FLOOD AND SEISMIC MEASURES:

Policy and Emergency Preparedness			
 Policies and Zoning	 Emergency Preparedness		