Capitola City Council

Agenda Report

Meeting: October 24, 2024

From: Police Department

Subject: Coastal Flooding Resource Guide

Recommended Action: Receive a report from the Police Department regarding winter weather planning and a coastal flood resource guide.

Background: Capitola is dedicated to actively preparing for winter weather events, working closely with our regional partners. Staff collaborates with the Santa Cruz County Office of Response, Recovery, and Resilience (OR3) and the National Oceanic and Atmospheric Administration (NOAA) for disaster preparedness and weather forecasting. The Police Department also works with the Central Fire District and Santa Cruz County Sheriff's Office depending on the nature of the event.

In anticipation of the 2024-25 winter season, staff will receive a weather report from NOAA that provides insights into the anticipated intensity of the 24-25 winter season. Although weather patterns involve many variables, winter storms can be expected from October through March. Each weather system brings varying levels of precipitation, impacting Soquel Creek and the neighboring downtown area of Soquel and ultimately Capitola Village and lower Riverview Drive.

To assess the potential for coastal flooding, staff evaluates the sequence and severity of several factors when determining public notices and evaluations. Capitola Village and sections of Riverview are particularly vulnerable when large wave events coincide with high tides and significant water runoff (rain runoff and creek levels).

Discussion: Each year, the City prepares for the upcoming winter by cleaning and evaluating storm drain infrastructure and emergency preparedness. This report aims to provide historical insight into previous storms and highlight key indicators for making decisions about flooding concerns and evacuations.

Prior experience has shown that any combination of tide/surge/swell/creek flow that exceeds levels will cause flooding to the upper 100-200 block of Riverview. Any significant wave event directed at Capitola will likely send waves/surges over the seawall and potentially flood the lower Capitola Village. Upon flooding, the Village is equipped with large sump pumps that assist with removing the water from the low-lying areas of the Village (Lawn Way/Monterey Avenue). Any power outage or pump failure/blockage will add to the flooding impacts and closures.

The following are key factors that must be considered when considering the flooding impacts and evacuation preparation.

Tides - Coastal areas in California, including Capitola, experience two high-tide and two low-tide events every 24 hours and 50 minutes. The winter season can also bring higher high tides, known as "king tides," due to the gravitational pull of the moon and the sun being more pronounced. These tides, typically occurring between November and February, lead to periods of higher water levels along the coast. The official king tide dates for Santa Cruz County are November 15-17 and December 13-15, with ocean waters shifting 8 feet for each tidal swing. Additionally, while not meeting the "king tide" definition, the high tides between January 10-14 will also be monitored.

Storm Surge - The Pacific Ocean experiences increased storm surge activity due to powerful storms and intense low-pressure systems from the Pacific Ocean. These surges are characterized by the rising of sea levels driven by strong winds and atmospheric pressure changes associated with winter storms. In the Pacific Ocean, storm surges can lead to significant coastal impacts, including flooding, erosion, and damage to coastal infrastructure. High tides, especially king tides, can exacerbate the effects of storm surges, making coastal areas more vulnerable to inundation and increasing the overall risk to communities along the shore. This metric must be used to evaluate the actual wave heights from the ground swell/surf.

Swell/Surf - Winter swell refers to large ocean waves generated by powerful storms in the Pacific Ocean during the winter months. These storms, often fueled by strong winds and low-pressure systems, transfer energy to the water, creating long-period swells that can travel great distances. Winter swells tend to be larger and more intense due to the increased frequency and strength of storms during this season.

In wave forecasting, the term "second period" refers to the interval between successive wave crests passing a fixed point, measured in seconds. It is also known as the "wave period" or "wave interval." This measurement is crucial for understanding wave energy and behavior. Longer wave periods, typically associated with swells generated by distant storms, indicate waves that have traveled long distances and carry more energy. Shorter wave periods are often associated with locally generated wind waves, which tend to be choppier and less powerful.

As a rule, anything less than 15-second period swells will not have enough energy alone to cause immediate concern. Anything greater than a 17-second interval with 18 feet of wave height should be evaluated for localized impacts. Underwater topography is another consideration as it relates to the swell's energy.

Bathymetry – This is the study and mapping of the underwater topography of the ocean floors. Monterey Bay supports a rich biodiversity, and the ocean floor plays a critical role in forecasting our winter weather events. One of the most prominent features for us is the deep-water Monterey Submarine Canyon that starts near the shore at Moss Landing and extends offshore. Also of note, Monterey Bay has a relatively narrow continental shelf that descends into the canyon which reaches depths of 11,800 feet. Long-period swells (>17 seconds) effectively wrap around the underwater contours, due to the depth of energy. The shorter period swells (< 15 seconds) do not. The floor of the sea plays a role depending on the energy from the swell.

Soquel Creek Flow Rate – Soquel Creek is a southward flowing creek that begins in the Santa Cruz Mountains and enters Monterey Bay from Capitola Beach, spanning 16 miles. During the summer months, a lagoon is formed by Public Works staff to cap the Creek before it reaches the ocean, with a flume that fluctuates at moderate levels of 10-15 cubic feet per second (CFS). As the seasonal weather approaches, the lagoon is breached, allowing Soquel Creek to run freely. The City has flow rate and height monitors on Soquel Creek. When the lagoon is breached, staff begins to monitor the flow rates starting at 1000 CFS. When levels rise to 1,500-2,000 CFS, staff will monitor the Stockton Avenue Bridge for water levels and debris. During past winter events, staff has monitored levels reaching 8,000 CFS without adverse effect, however other conditions were favorable (i.e. tide was low and peak swell were not contributing factors).

Key Indicators:

- Storm Surge – greater than > 1'
- Tides – greater than > 5.5'
- Swell/surf – greater than > 18' @17 seconds from WSW (250 degrees) to WNW (290 degrees)
- Soquel Creek levels 1000 CFS (Begin Monitoring)

Pre-Storm Event Preparations

Before a large wave event, staff will undertake several actions to mitigate potential flooding and damage:

Prepare Emergency Response Resources:

- The City of Capitola will designate a staff member as the county representative responsible for closely monitoring weather forecasts and alerts from NOAA and regional partners, including the Santa Cruz County Office of Response, Recovery, and Resilience (OR3).
- Pre-position sandbags, barricades, and signage in areas vulnerable to flooding, like Riverview and Capitola Village.
- Make sand and sandbag materials available at City Hall and the Police Department.
- Confirm that emergency vehicles and personnel are ready for potential road closures, rescues, and evacuation operations.
- Verify communication protocols with the Central Fire District, Police Department, and Santa Cruz County Sheriff's Office.

Conduct Infrastructure Inspections:

- The Public Works Department will inspect storm drains, seawalls, and sump pumps to ensure they are operational and free of blockages.
- Test backup generators for sump pumps to ensure power redundancy during potential outages.
- Inspect barriers and floodgates in flood-prone areas such as Lawn Way and Monterey Avenue.

Issue Public Warnings and Guidance:

- Send early warnings to residents and business owners in Capitola Village and Riverview using email and social media (Nixel, Facebook, Instagram), and encourage sign-up for **CruzAware**, the recommended non-emergency alert and warning system for all Santa Cruz County residents and visitors.
- Deploy message board trailer with pertinent information and closures.

Coordinate Business Preparedness:

- Inform Capitola BIA and homeowners associations of potential flooding and advise them to secure goods, cover doorways with sandbags, and prepare for early closures if necessary.
- Ensure businesses have a clear plan for emergency exits and communication.

During a Severe Weather Event

During an extreme weather event, the City of Capitola will activate a coordinated response to manage impacts:

Activate Emergency Operations Center (EOC):

- Activate Capitola's EOC to centralize decision-making and coordination with key agencies such as NOAA, OR3, the Fire District, and the Sheriff's Office. Depending on the scope of the incident will dictate the size and involvement of the EOC.

Monitor Real-Time Conditions:

- Continuously monitor storm surges, swell heights (e.g., waves over 18 feet with 17-second intervals), tide levels, and Soquel Creek flow rates to predict peak flooding times.
- Coordinate closely with NOAA and local sensors for accurate data.

Deploy Emergency Flood Protection:

- Position sandbags, barricades, and temporary flood barriers in high-risk areas, particularly low-lying sections of Capitola Village (e.g., Lawn Way) and the 100-300 blocks of Riverview Drive.

Manage Public Access:

- Close off high-risk roads and beaches, providing clear detour routes for the public and ensuring emergency access.
- Implement mandatory evacuations if necessary, focusing on areas with extreme flooding risks like the upper blocks of Riverview and lower Capitola Village.

Ensure Continuous Public Communication:

- Consistent messaging in alignment with our regional partners to provide regular updates to the public through emergency alert systems, social media, and local news outlets about wave heights, flood impacts, evacuation routes, power outages, and road closures.
- Encourage residents to avoid flooded areas and follow official guidance.

Deploy and Maintain Sump Pumps:

- Ensure that sump pumps are functioning properly in flooded areas of Capitola Village.
- Quickly deploy backup generators to maintain pump operations in the event of power outages.

Respond to Emergencies:

- Deploy police and fire for rescues in flooded or high-risk zones.
- Monitor and assist with any road accidents or stranded individuals due to high water levels or road closures.

Summary:

While Capitola relies on weather experts, advanced forecasting tools, and monitoring equipment, it is important to recognize that these storms remain highly dynamic that can have very localized impacts and can shift in intensity. Consequently, our response plans are flexible, allowing for adjustments in real-time as conditions evolve. The City's messaging and public notifications are aligned with our local partners, ensuring timely and consistent communication. By working closely with agencies like NOAA, OR3, and regional first responders (Central Fire Department, CHP, and Santa Cruz County Sheriff's Department), we strive to provide the public with accurate and actionable information, allowing residents and businesses ample time to prepare for these unpredictable weather events.

Fiscal Impact: None

Attachments:

1. Coastal Flood Resource Guide

Report Prepared By: Andrew Dally, Chief of Police

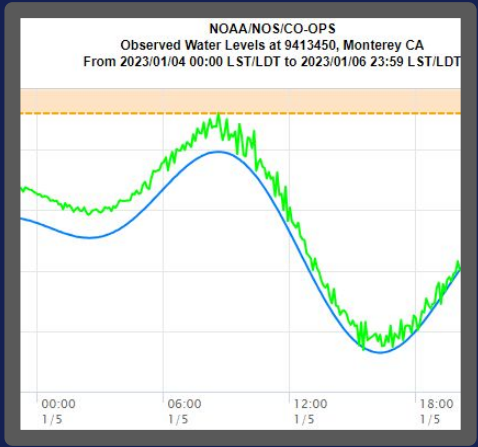
Reviewed By: Julia Gautho, City Clerk

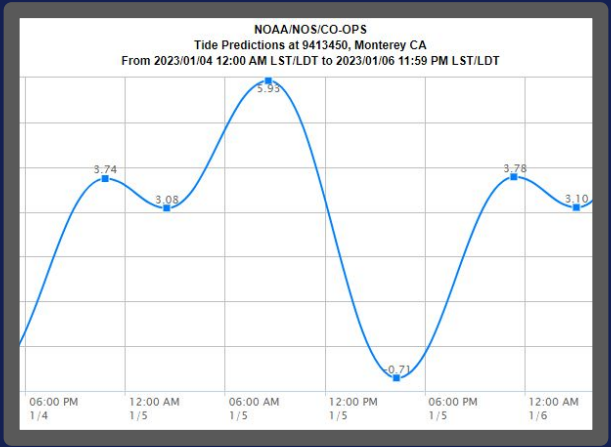
Approved By: Jamie Goldstein, City Manager

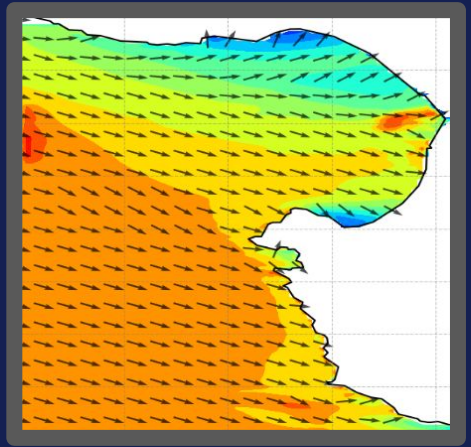
City of Capitola

Coastal Flood Resource Guide

Rules of Thumb Guidance







Storm Surge

Storm Surge > 1’

Coastal Inundation Dashboard

Tides

Predicted Tides > 5.5’

Monterey Tidal Station

Swell / Surf

> 18’ @ 17” from WSW to WNW (250° - 290°)

NDBC / NCEP

Guidance solely based on 5Jan & 28Dec 2023 MLLW data and is meant as conservative rules of thumb. Developed by Brian Garcia NWS MTR.

Swell Window for Coastal Flooding in Capitola

Role Players

Swell Period

Less than ~15 second period and swell will not have enough energy to surge. Minimum period for impacts 17 seconds.

Bathymetry

Long period swell effectively wraps around underwater contours, due to depth of energy. Short period does not. Deepwater canyons allow long period swell a path towards the coast. Thus, 290° is in play, while < 250° is out.