

Monterey County Operational Area Tsunami Incident Response Plan

Monterey County Office of Emergency Services
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**Monterey County Operational Area
Tsunami Incident Response Plan**

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MONTEREY COUNTY OPERATIONAL AREA TSUNAMI INCIDENT RESPONSE PLAN

Tsunami Basics

One of the hazards that has the potential to affect the Monterey County coast is a tsunami. A tsunami is a “*wave or series of waves generated by an impulsive displacement of the water column (ocean, lake, and sea).*” It is *not* a tidal wave, although that term is a common misnomer for a tsunami.

Tsunamis can be generated several different ways, the most common of which is through seismic activity. A large earthquake (magnitude >7.5) that is centered offshore is capable of producing a tsunami. More specifically, a thrust-type earthquake (vertical displacement) is more likely to produce a tsunami than an earthquake from a lateral strike-slip fault, such as the San Andreas. Because of this, subduction zones, where dense oceanic crust burrows underneath less-dense continental crust, are more likely to produce a large tsunami. The Pacific coast of North America is a prime example of a subduction zone. The Cascadia Subduction Zone, off the coasts of British Columbia, Washington, Oregon, and Northern California is an area of concern for possible tsunami generation. The Aleutian Islands and Gulf of Alaska coast of Alaska are also capable of producing very large offshore earthquakes that may produce large tsunamis. The 1964 tsunami, discussed later in detail, was generated by a large earthquake offshore Alaska.

Tsunami Characteristics

Tsunamis are not simply larger versions of typically seen coastal wind waves. They are unique, and have many characteristics that separate them, both physically and visually, from normal wind waves. The period (time interval between waves) can range from 5 to 60 minutes, although usually falling between 10 and 30 minutes. The speed at which the tsunami travels is dependent on the depth of the water; on average Pacific Ocean tsunamis travel at about 480 miles per hour. However, due to the depth of the ocean, the height may only be a few feet. Therefore, vessels in open ocean may very well not even notice a passing tsunami. Scuba divers caught in the Indian Ocean tsunami of December 2004 state that they were tossed about by the tsunami under the water, yet the boat from which they dove had no knowledge of the wave. In deep water, the wavelength can be as much as 50 to 150 miles. As a tsunami reaches shallower water nearer to the coast, it has less area in which it can be dispersed. The tsunami then “bunches up”, causing the wave heights to increase dramatically close to the shore.

Visually, tsunamis differ from typical wind waves as well. A tsunami is virtually undetectable to the eye until it has nearly reached the shore. When people think of a

tsunami, many will state that they expect to see a wave similar to a wind wave but much larger, perhaps similar to the giant wind waves in Hawaii and Australia that have made those places world class surfing destinations. However, a tsunami likely will not resemble a typical wind wave. Based on video accounts and eyewitness reports of past events, a tsunami looks more like a storm surge experienced in a large hurricane than it does a wind wave. Similar to a hurricane's storm surge, a tsunami is capable of bringing in large amounts of water inland very quickly, and can inundate areas that are normally dry, even during highest tides. Tsunamis have often been described as a large wall of water moving inland. Further, the water can move very quickly, as evidenced by the Indian Ocean tsunami of 2004. City streets can become virtual whitewater rivers, with seawater rapidly moving inland uprooting trees and other vegetation while sweeping up debris, cars, people, or anything else in its path.

Another aspect of tsunamis that needs to be noted is that a tsunami generally consists of a *series* of waves, not a singular one. The number of waves can vary, but data have shown that there are usually between two and ten waves. Further, the first wave is typically not the largest one. For example, during the 2004 tsunami, the second wave was regarded as the largest one, and in the 1964 tsunami, it was the fourth wave that proved most destructive in Crescent City, CA. This can pose a serious problem, as the retreat of the first wave may falsely imply that the tsunami has “finished”, which can lead to people moving back out to the beach out of curiosity, only to be swept away by the next incoming wave. The period between waves can also vary, but generally falls between 5 and 60 minutes. This will become a major issue for public safety officials responding to a tsunami. Common questions for first responders include, “When do I pull my people out”, and “When can I send them back in?” These questions will be addressed in the individual response area annexes.

Generally speaking, there are two types of tsunamis: locally-generated tsunamis and teletsunamis (tsunamis generated from afar). In the case of locally-generated tsunamis, a large earthquake is likely to precede the wave, and can act as a natural warning. However, in this case the amount of time to respond to the event is significantly less than that of a teletsunami. The time between the earthquake that generates the tsunami and the first wave coming ashore can be as little as 10 – 20 *minutes*, certainly not enough time for a full response. Locally-generated tsunamis are described in more detail on Page 11.

Teletsunamis are also usually preceded by a large earthquake, but the areas affected are too far from the epicenter to feel it (scientific equipment from across the globe are able to measure the earthquake, but people will not feel it). In this case, a tsunami generated by a distant earthquake requires more time to reach the shore, and thus an adequate response can be initiated.

There are two natural precursors that indicate a tsunami may be approaching. The first is the aforementioned large offshore earthquake for a locally-generated tsunami. The second, and the only one for teletsunamis, is a large withdrawal of the ocean, usually well below low tide. This may not always occur, but the presence of retreating surf is a sign of impending danger. An analogy would be a slingshot; it may retract fairly slowly and

calmly, but it will return much more quickly and with more force. Or to modify a popular adage, “what goes out must come back in”.

Historical Tsunami Documentation

One of the major problems associated with tsunami planning is that the events are rare, and for Monterey County, there have been none of note in recorded history. Large tsunamis, compared to other major natural disasters, are rare. Whereas there are lots of data pertaining to hundreds of devastating earthquakes, floods, hurricanes, tropical storms, tornado outbreaks, and wildfires, there are data for only a handful of large tsunamis with which to base planning efforts. Most notably, tsunami events in 1868, 1946, 1960, 1964, 1995, and 2004 have provided the most data for emergency managers.

1868 Hawaiian tsunami

This event was one of two devastating local source tsunamis that affected the Hawaiian Islands (the other in 1975). Although not much data are available on this event, it was caused by a large offshore earthquake. The resulting tsunami destroyed several coastal villages on the Big Island, most of which were never rebuilt.

1946 Hawaiian tsunami

The 1946 tsunami that devastated Hilo originated in Alaska following a large earthquake in the Aleutian Islands. 30 foot waves were reported in Hilo, and at least 170 people were killed. There was no warning for this event, and as a result, the Pacific Tsunami Warning Center (PTWC) was founded in Ewa Beach, HI. The 1946 event was observed in California, including Monterey Bay, but no casualties were reported and damage was minimal (almost exclusively to personal vessels in the harbors).

1960 Hawaiian tsunami

The 1960 tsunami again devastated Hilo. It was originated by the largest earthquake ever recorded, a 9.6 quake that struck offshore Chile. The warning was correct in arrival time predictions, but an insufficient portion of Hilo was evacuated, on top of many people not heeding the warning. The result was 61 lives lost. This is significantly less than the 170 in 1946, and the 1960 tsunami was of greater magnitude, bringing 35 foot waves into Hilo harbor. The 1960 event was observed in California, including Monterey Bay, but no casualties were reported and damage was minimal (almost exclusively to personal vessels in the harbors).

1964 North American West Coast tsunami

The 1964 tsunami that generated in the Gulf of Alaska was the first tsunami in recent history to primarily affect the U.S. West Coast. As a result of the 9.2 earthquake, a large tsunami was generated. In Crescent City, the site most affected by the event, waves of 20-25 feet were observed, the majority of downtown was underwater, and 11 people were killed. The fact that it was the fourth wave that caused the most damage further emphasizes the fact that the first wave is likely to not be the only one, and may very well

not be the largest. Alaska, Vancouver Island in British Columbia, Washington, Oregon, and Hawaii were also affected by the tsunami to varying degrees.

Closer to home, Santa Cruz Harbor reported wave heights of 11 feet, a hydraulic dredge and a 38-foot cabin cruiser were sunk, and damage was reported to the harbor, though there was no inundation into the city. Monterey Harbor reported a wave height of 8.5 feet, though no damage was reported.

1995 Manzanillo, Mexico tsunami

This event was caused by a magnitude 8.0 earthquake that was centered offshore Jalisco and Colima states on the Pacific coast of Mexico. The quake itself caused extensive damage and was responsible for approximately 40 fatalities. The tsunami generated affected 200km of coastline and runup ranged from 1 to 5 meters. Flat areas were flooded as much as 200 meters inland. Many eyewitnesses stated seeing a large recession of the ocean, followed by a large incoming wave. Several ports were heavily damaged and there was extensive beach erosion. This event is notable to Monterey County as it occurred as a result of a large, yet smaller-than-usual earthquake for tsunami generation, and because it occurred on the Pacific coast of North America where the tectonics and topography are similar to what we have along the coast of California.

2004 Indian Ocean tsunami

By far the world's most destructive tsunami, the 2004 Indian Ocean event caused approximately 300,000 deaths in several countries, with the majority of the damage and fatalities in Indonesia. A 9.0 earthquake off the northern coast of the island of Sumatra in Indonesia generated the tsunami, which also heavily affected Thailand, Sri Lanka, and India. Being the world's first major tsunami since 1964 (after a period of relatively high tsunami frequency from 1850-1975), it brought back to the public eye a hazard that "skipped a generation". For the first time there was a lot of video evidence of a tsunami at many locations, answering a few more questions for scientists and emergency planners pertaining to visual aspects of a tsunami, along with inundation and run-up characteristics. Although most certainly a horrendous and tragic event, the 2004 tsunami prompted a much-needed revival of sorts to tsunami awareness and preparedness.

Tsunami Watches and Warnings

Tsunami watches and warnings for the North American West Coast, including Monterey County, originate from the Alaska / West Coast Tsunami Warning Center (AWCTWC) in Palmer, AK. The Pacific Tsunami Warning Center in Hawaii will not issue watches or warnings for the west coast unless the warning system in Alaska fails. This is to reduce confusion in two different warning centers issuing two separate messages, which can oftentimes contradict one another.

The AWCTWC sets forth guidelines for issuing watches and warnings. If a magnitude 7.5 or greater earthquake occurs offshore Alaska or the west coast, either a watch or a warning is immediately issued, depending on circumstances. A warning is issued if the potentially resulting tsunami would arrive onshore within 2 hours of the warning. If the

arrival time for a potential tsunami is more than 2 hours from the time of the warning, then a watch is first issued. In this case, there would be sufficient time to verify the existence or nonexistence of a tsunami by way of NOAA buoys before a warning or cancellation message was issued. For example, an 8.0 earthquake occurs in the Aleutian Islands. Monterey County would receive a tsunami watch first, and if there was verification of a tsunami, a warning would follow. If there is no wave observed, a cancellation message would follow before a warning was issued. If an 8.0 earthquake were to occur off of Cape Mendocino, Monterey County would receive a tsunami warning, even though there would be no verification of a tsunami at the time of the warning. This is due to the fact that there would not be sufficient time to first verify a wave and then order and conduct an evacuation of vulnerable areas. Once a tsunami has been confirmed, the Monterey County Operational Area Emergency Operations Center (EOC) will evaluate the situation and the Emergency Services Director, through consult with EOC Operations staff, will determine if an evacuation is to be ordered. There is a possibility that an evacuation order could lead to false alarms and fears of “crying wolf”, but public safety must be the #1 priority. In the event of a false alarm, the areas evacuated could be repopulated within approximately 4 hours, thus minimizing the negative effects of a “false alarm” evacuation.

Following are examples of a tsunami information statement, watch, and warning as issued from the AWCTWC.

Sample Tsunami Information Statement as Issued by the AWCTWC:

WEAK53 PAAQ 172044
TIBAK1

PUBLIC TSUNAMI INFORMATION STATEMENT NUMBER 1
NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
1244 PM PST SAT DEC 17 2005

...THIS MESSAGE IS FOR TEST PURPOSES TO SHOW AN EXAMPLE
WEAK53 MESSAGE...

...A STRONG EARTHQUAKE HAS OCCURRED BUT A TSUNAMI IS NOT
EXPECTED ALONG THE CALIFORNIA/ OREGON/ WASHINGTON/
BRITISH COLUMBIA OR ALASKA COASTS...

NO - REPEAT NO - TSUNAMI WARNING OR WATCH IS IN EFFECT FOR
THESE AREAS.

AT 1230 PM PACIFIC STANDARD TIME ON DECEMBER 17 AN EARTHQUAKE WITH
PRELIMINARY MAGNITUDE 6.8 OCCURRED
OFF THE COAST OF GUERRERO MEXICO.

BASED ON THE EARTHQUAKE MAGNITUDE AND HISTORIC TSUNAMI

INFORMATION A DAMAGING TSUNAMI IS NOT EXPECTED ALONG THE CALIFORNIA/ OREGON/ WASHINGTON/ BRITISH COLUMBIA AND ALASKA COASTS. SOME OF THESE AREAS MAY EXPERIENCE NON-DAMAGING SEA LEVEL CHANGES. AT COASTAL LOCATIONS WHICH HAVE EXPERIENCED STRONG GROUND SHAKING LOCAL TSUNAMIS ARE POSSIBLE DUE TO UNDERWATER LANDSLIDES.

THE PACIFIC TSUNAMI WARNING CENTER WILL ISSUE TSUNAMI BULLETINS FOR HAWAII AND OTHER AREAS OF THE PACIFIC OUTSIDE CALIFORNIA/ OREGON/ WASHINGTON/ BRITISH COLUMBIA AND ALASKA.

THIS WILL BE THE ONLY BULLETIN ISSUED FOR THIS EVENT BY THE WEST COAST AND ALASKA TSUNAMI WARNING CENTER UNLESS ADDITIONAL INFORMATION BECOMES AVAILABLE. SEE THE WEB SITE WCATWC.ARH.NOAA.GOV FOR BASIC TSUNAMI INFORMATION - SAFETY RULES AND TSUNAMI TRAVEL TIMES.

THIS IS A TEST MESSAGE. DO NOT TAKE ACTION BASED ON THIS TEST MESSAGE.
\$\$

Sample Tsunami Watch and Warning as Issued from the AWCTWC:

WEAK51 PAAQ 172041
TSUAK1

BULLETIN
PUBLIC TSUNAMI MESSAGE NUMBER 1
NWS WEST COAST/ALASKA TSUNAMI WARNING CENTER PALMER AK
1241 PM PST SAT DEC 17 2005

...THIS MESSAGE IS FOR TEST PURPOSES TO SHOW AN EXAMPLE
WEAK51 MESSAGE...

...A TEST TSUNAMI WARNING IS IN EFFECT WHICH INCLUDES THE
CALIFORNIA - OREGON - WASHINGTON - BRITISH COLUMBIA AND
ALASKA COASTAL AREAS FROM POINT ARENA CALIFORNIA TO SITKA
ALASKA...

...A TEST TSUNAMI WATCH IS IN EFFECT FOR THE CALIFORNIA COASTAL
AREAS FROM POINT CONCEPTION CALIFORNIA TO POINT ARENA
CALIFORNIA AND FOR THE ALASKA COASTAL AREAS FROM SITKA
ALASKA TO YAKUTAT ALASKA...

A TSUNAMI WARNING MEANS... ALL COASTAL RESIDENTS IN THE WARNING AREA WHO ARE NEAR THE BEACH OR IN LOW-LYING REGIONS SHOULD MOVE IMMEDIATELY INLAND TO HIGHER GROUND AND AWAY FROM ALL HARBORS AND INLETS INCLUDING THOSE SHELTERED DIRECTLY FROM THE SEA. THOSE FEELING THE EARTH SHAKE... SEEING UNUSUAL WAVE ACTION... OR THE WATER LEVEL RISING OR RECEDING MAY HAVE ONLY A FEW MINUTES BEFORE THE TSUNAMI ARRIVAL AND SHOULD EVACUATE IMMEDIATELY. HOMES AND SMALL BUILDINGS ARE NOT DESIGNED TO WITHSTAND TSUNAMI IMPACTS.

DO NOT STAY IN THESE STRUCTURES.

ALL RESIDENTS WITHIN THE WARNED AREA SHOULD BE ALERT FOR INSTRUCTIONS BROADCAST FROM THEIR LOCAL CIVIL AUTHORITIES. THIS TSUNAMI WARNING IS BASED SOLELY ON EARTHQUAKE INFORMATION - THE TSUNAMI HAS NOT YET BEEN CONFIRMED.

A TSUNAMI WATCH MEANS... ALL COASTAL RESIDENTS IN THE WATCH AREA SHOULD PREPARE FOR POSSIBLE EVACUATION. A TSUNAMI WATCH IS ISSUED TO AREAS WHICH WILL NOT BE IMPACTED BY THE TSUNAMI FOR AT LEAST TWO HOURS. WATCH AREAS WILL EITHER BE UPGRADED TO WARNING STATUS OR CANCELED.

AT 1230 PM PACIFIC STANDARD TIME ON DECEMBER 17 AN EARTHQUAKE WITH PRELIMINARY MAGNITUDE 7.5 OCCURRED 40 MILES SOUTHEAST OF PORT ALICE BRITISH COLUMBIA.

THIS EARTHQUAKE MAY HAVE GENERATED A TSUNAMI. IF A TSUNAMI HAS BEEN GENERATED THE WAVES WILL FIRST REACH TOFINO BRITISH COLUMBIA AT 127 PM PST ON DECEMBER 17.

ESTIMATED TSUNAMI ARRIVAL TIMES AND MAPS ALONG WITH SAFETY RULES AND OTHER INFORMATION CAN BE FOUND ON THE WEB SITE WCATWC.ARH.NOAA.GOV.

TSUNAMIS CAN BE DANGEROUS WAVES THAT ARE NOT SURVIVABLE. WAVE HEIGHTS ARE AMPLIFIED BY IRREGULAR SHORELINE AND ARE DIFFICULT TO PREDICT. TSUNAMIS OFTEN APPEAR AS A STRONG SURGE AND MAY BE PRECEDED BY A RECEDING WATER LEVEL. MARINERS IN WATER DEEPER THAN 600 FEET SHOULD NOT BE AFFECTED BY A TSUNAMI. WAVE HEIGHTS WILL INCREASE RAPIDLY AS WATER SHALLOWS. TSUNAMIS ARE A SERIES OF OCEAN WAVES WHICH CAN BE DANGEROUS FOR SEVERAL HOURS AFTER THE INITIAL WAVE ARRIVAL. DO NOT RETURN TO EVACUATED AREAS UNTIL AN ALL CLEAR IS GIVEN BY LOCAL CIVIL AUTHORITIES.

THE PACIFIC TSUNAMI WARNING CENTER WILL ISSUE TSUNAMI BULLETINS FOR HAWAII AND OTHER AREAS OF THE PACIFIC OUTSIDE CALIFORNIA/ OREGON/ WASHINGTON/ BRITISH COLUMBIA AND ALASKA.

ADDITIONAL BULLETINS WILL BE ISSUED HALF-HOURLY OR SOONER IF CONDITIONS WARRANT. THE TSUNAMI WARNING AND WATCH WILL REMAIN IN EFFECT UNTIL FURTHER NOTICE. FOR FURTHER INFORMATION STAY TUNED TO NOAA WEATHER RADIO... YOUR LOCAL TV OR RADIO STATIONS... OR SEE THE WEB SITE WCATWC.ARH.NOAA.GOV.

THIS IS A TEST MESSAGE. DO NOT TAKE ACTION BASED ON THIS TEST MESSAGE.

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Procedures Following a Tsunami Watch or Warning

All tsunami watches and warnings originate from the AWCTWC. The AWCTWC notifies the California State Warning Center (CSWC) in Sacramento, which in turn notifies all coastal county Public Safety Answering Points (PSAPs). The AWCTWC also notifies the National Weather Service (NWS) and Federal defense interests within Monterey County, to include the U.S. Coast Guard station in Monterey. The NWS activates the Emergency Alert System (EAS), which is the method TV and radio media use to warn the public. These warnings come across TV screens as a ticker with the watch or warning text scrolling along. The local NWS station in Monterey also tones the watch or warning message out to NOAA weather radios. The CSWC warns the coastal counties via the Dialogic system and the California Law Enforcement Teletype System (CLETS), which includes a follow-up phone call to verify receipt of the message. Dialogic is a system that sends watch and warning messages to emergency managers through cell phone, office phone, and email. The CWSC also activates the Emergency Digital Information System (EDIS), which is similar to Dialogic, but it is available to any and all agencies as well as the general public. Once the initial watch or warning is issued to the NWS and the CSWC, the other methods of notification are all done concurrently.

It is the responsibility of the Monterey County Emergency Communications Center (911 center) to notify local agencies, including all law and fire agencies, the Office of Emergency Services (OES) / Emergency Services Manager, and the Emergency Medical Services Agency (EMSA). These agencies may very well already receive the watch or warning via CLETS, EDIS, EAS, or weather radio, but the tone-out on the radios from the 911 center is all-inclusive.

It is imperative that OES be in contact with the media to ensure that the correct message is being delivered to the public to limit confusion and unnecessary panic. It must be noted that due to the quick turnaround of EAS, it is possible that the general public, through the media, may receive the watch or warning message at the same time as, or perhaps even before, emergency managers and first responders. The flowchart on the following page outlines the watch / warning protocol. When the tsunami watch or warning is cancelled, either due to the event being over or the verification of no tsunami present, a cancellation / all-clear message will be sent out. In this case, the same notification protocol will be used. Whether the message is a watch or warning will dictate initial response. Please refer to the individual response area annexes for more detailed information regarding response specifics.

It will be useful to be in contact with State OES Coastal Region and/or county OES agencies from coastal counties farther north than Monterey. Confirmation of a tsunami, to include wave height, from a community that has experienced the wave would be very beneficial. Contact with State OES or a county OES farther north along the coast could also help to lessen false alarms farther down the coast.

Locally – Generated Tsunamis / Near-Shore Events

Special consideration must be made for a locally-generated tsunami. This can occur if a large enough earthquake occurs in the Monterey Bay and produces a tsunami that could reach the shore in a matter of minutes. The San Gregorio Fault, which runs more or less parallel to the coastline, is the likeliest point of origin for a near-shore event. Although not generally considered a fault capable of producing a “mega-earthquake” (>8.0), it is capable of a large enough earthquake that could trigger an offshore landslide in a submarine canyon in the Monterey Bay. If an event such as this were to occur, any potentially resulting tsunami would reach shore in less than 30 minutes, and possibly as little as 10 minutes. Although the warning systems would trigger, there would be insufficient time for a complete response / evacuation. Therefore, it is imperative that the public know beforehand, through public education initiatives, that a large offshore earthquake may be a precursor to a tsunami. For the sake of practicality, this plan will not address response to a near-shore event, as the only “response” would be triggering the various warning systems and hoping for the best. It should be noted however that even within the realm of tsunami likelihood for Monterey County, which is relatively low, a near-shore event is even less likely to occur. The more likely scenario, though still relatively unlikely compared to other hazards, is a distant event, where there would be 1+ hours to respond to a tsunami warning.

Tsunami Warning Response Areas

Due to the topography of the Monterey County coastline, the vulnerability to a tsunami varies, quite greatly in fact, in different portions of the county. This results in differing response needs and procedures for the different areas. For the purpose of this plan, the county has been divided up into 10 response areas, based on both jurisdictional and geographic differences. These are: North County coast, City of Marina, Sand City, City of Seaside, City of Monterey, City of Pacific Grove, Pebble Beach / Del Monte Forest, City of Carmel, Carmel River Lagoon area, and Big Sur Coast. Please refer to the following pages that outline the response procedures for each of these areas. The annexes are arranged from north to south.

MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex A: NORTH MONTEREY COUNTY COAST

RESPONSE AGENCIES:

Monterey County Sheriff's Office, North County Fire Protection District, California State Parks, California Highway Patrol, Moss Landing Harbor District, Westmed

OVERVIEW:

The northern coast of Monterey County is the largest portion of the county (area-wise) in terms of areas potentially affected by a tsunami. This is due to the relatively flat topography of the area. The area is defined with the northern boundary being the Pajaro River / Santa Cruz County line and the southern boundary being the northern limits of the City of Marina. The area of concern for tsunami inundation extends farther inland than any other part of the county, presenting a unique challenge if an evacuation is ordered. Communities located within the evacuation area include: Moss Landing, Monterey Dune Company, Moss Landing Park mobile home park, and portions of the towns of Pajaro and Castroville. Also located in this region are three state parks / beaches: Zmudowski, Moss Landing, and Salinas River, as well as the Elkhorn Slough National Wildlife Refuge. Except for Castroville, the population of this area is approximately 3,000 - 4,000. Of that, approximately 1,000 live in Moss Landing, 300 in the Monterey Dune Company colony, 400 in Pajaro, and 200 in the mobile home park. The population of Castroville is approximately 8,000, but only some of the areas north and west of Highway 156 are in the "red level" (5 meter) evacuation zone. Please examine the North County map to determine which areas of Castroville are most vulnerable.

If an evacuation is ordered, the Sheriff's Office will lead the evacuation of the area. Evacuation will include clearing the beaches of all people, including swimmers and surfers, and issuing warnings via patrol car P.A. systems at the neighborhood street level. This will accompany other warnings that will come via TV and radio (Emergency Alert System- EAS). Door-to-door notifying of residents is preferred, but due to time and personnel constraints, this may not be feasible. (*Coordinate with out-of-the-evacuation-zone agencies to assist in evacuations, such as Salinas Police, Salinas Fire, and Salinas Rural Fire*). Because the time associated with a tsunami evacuation is so short, it is imperative that first responders not spend large amounts of time with one or two troublesome people who wish to not evacuate. 100% compliance in evacuation is obviously preferred, but it must also be stated that this is unlikely.

Incident Command will be established at North County Fire Protection District Station #1 at 11200 Speegle St. in Castroville.

Areas in Evacuation Zone (approximate population)

These areas are located within the zones targeted for evacuation and are less than 5 meters (approximately 17 feet) above sea level.

Moss Landing (1,000)

Monterey Dune Company condominium complex (300)

Moss Landing Park mobile home park (200)

Pajaro River area, including Town of Pajaro (400)

Elkhorn Slough area (???)

portions of Castroville N and west of Highway 156 (2,000?) *(need to view map to specifically define area as well as considering evacuating all of Castroville. All of Castroville may need to be evacuated in a large / greater than 5 meter tsunami.)*

Evacuation Routes

These routes lead to more inland areas and/or areas higher in elevation.

San Juan Rd (east from Pajaro & Watsonville)

Trafton Road (north and east from coast to County Highway G12 / Elkhorn Rd east)

Dolan Road (east from Moss Landing)

Merritt Street / Highway 183 (east and south from Castroville into Salinas)

Blackie Road (east from Castroville)

Highway 156 (east from Castroville)

Routes to Avoid

These routes may be completely inundated with water and/or lead to other areas that may be inundated.

Highway 1 (south of Dolan Road and north of Marina). Stretch of Highway 1 between Dolan Rd. and Marina should be used only to get to aforementioned evacuation routes.

Molera Road

Nashua Road

Any other road along coast, near a river or creek, or alongside Elkhorn Slough.

Any road leading into Santa Cruz County (would require crossing the Pajaro River)

Safe Areas

North Monterey County High School will be used as the staging / collection site for the North County response area. Response personnel will be staged there to provide information to evacuees as it becomes available. This will not be a full shelter operation at the onset, due to the limited response time associated with tsunami evacuation. Should the tsunami come ashore and displace evacuees for an extended period of time, full-scale shelter operations will be considered as appropriate. Red Cross personnel will be present at the evacuation center to provide information and updates, snacks and water, and will be prepared to open up a full-scale shelter operation if need be.

In the event of confusion and/or self-evacuation of people not in the evacuation zone, these well-known areas are safe and out of the evacuation zone:

Aromas
Royal Oaks
Prunedale
Salinas
Highway 101 corridor
CSUMB / Fort Ord

Routes where traffic should be controlled by CHP or Sheriff's Office

These routes should be controlled to keep people from entering the evacuation zone. However, due to staffing and time constraints, controlling all of these routes may not be possible.

Highway 1 northbound at Dolan Road (CHP)
Highway 183 northbound at Espinosa Rd. (CHP)
Highway 156 westbound at Castroville Blvd. (CHP)
Nashua Rd. north/west of Cooper Rd. (S.O.)

SPECIAL CONSIDERATIONS:

Moss Landing Harbor

The Moss Landing Harbor will receive the tsunami watch or warning through either the systems available to the public (EAS, EDIS, and/or weather radio), from county OES, or both/all. The approximate arrival time of the wave will dictate response at the Harbor. If the expected arrival time is greater than 30 minutes, it may be possible for vessels to be sent out to sea to avoid the effects of the tsunami. Vessels need to be out to the 100 fathom curve (approximately 2 miles out to sea) for safety. Should the expected arrival time of the wave be less than 30 minutes, it is not advised that boaters attempt to send

their vessels to sea. Also, boaters need to be aware of the multi-wave aspect of tsunamis. Needless to say, public safety is of greater concern than property protection.

California State Parks

California State Parks operates three parks within the North County tsunami response area- Zmudowski State Beach, Moss Landing State Beach, and Salinas River State Beach. Due to limited staffing and the time constraints associated with tsunami evacuation, it may not be possible for State Parks to respond adequately to all parks, especially considering that there are several other State Parks along the coast in Monterey County. However, State Parks units from the San Juan / Hollister area will respond to assist with the evacuations.

Special Needs Citizens

Some people in the evacuation zone may need assistance in getting out of harm's way. Pre-determination of special needs citizens, including those that would need assistance in evacuation and those that require medical equipment to be moved with them, would be very beneficial to the evacuation. This is useful not only for tsunamis, but for any potential disaster in the area, including floods that affect this part of the county so often.

Outside Agencies

Due to the scope that evacuating such a large area as the North County coast is, assistance from nearby agencies out of the tsunami hazard zone may be needed. Agencies such as Salinas Police, Salinas Fire, and Salinas Rural Fire are near the North County coast, are out of the evacuation area, and may be able to assist in evacuations. Mutual aid from Santa Cruz County is unlikely, as they will be involved in their own countywide response efforts in the event of a tsunami warning.

Private Interests / Schools In/Near Evacuation Zone

Monterey Dune Company, "Castroville Beach". (*Needs to be completely evacuated*)
Phone: (800) 553-8637

Monterey Bay Aquarium Research Institute (MBARI), Sandholdt Rd., Moss Landing
Phone: (831) 775-1700

Duke Energy – Moss Landing Power Plant (*above evacuation zone, but surrounded by it*)
Phone: (831) 633-7313

RMC Pacific Materials, Inc. Lonestar Sand Plant (Lapis Rd. #110, outside of Marina)
Phone: (831) 883-3700

Joseph Gambetta Middle School, Castroville
Phone: (831) 633-3391

(Coordinate with School District in regard to using buses to evacuate children from schools should they need to be evacuated).

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

North County Fire Protection District
Ron Stefani
Phone: (831) 455-1721
Alt. Phone: (831)

Sheriff's Office – Salinas Watch Command
Commander Tracy Brown
Phone: (831) 755-3722
Alt. Phone: (831)

California Highway Patrol
Lt. Mark Badanovich
Phone: (831) 796-2100
Alt. Phone: (831)

California State Parks
Loren Rex, Supervising State Park Ranger
Phone: (831) 649-2999
Alt. Phone: (831) 596-4023

Moss Landing Harbormaster
Linda McIntyre
Phone: (831) 633-5417
Alt. Phone: (831)

MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex B: CITY OF MARINA

RESPONSE AGENCIES:

City of Marina Department of Public Safety (Police and Fire), California State Parks, Westmed

OVERVIEW:

The City of Marina's tsunami vulnerability is very limited, especially compared to other coastal cities within the county. The City benefits from high coastal dunes that separate the main part of the city from Monterey Bay. There are also no major rivers or creeks that flow through the city. For the purpose of this annex, the City of Marina is defined as the City itself as well as Marina State Beach, which falls under California State Parks jurisdiction. This is due to the likelihood that State Parks would be unable to respond to all coastal parks within the county coupled with Marina's lower vulnerability. As of 2006, the City has no residential areas that would need to be evacuated in the event of a tsunami warning. State Parks does have one residence and office complex that are located at the entrance to the park. Future development north of the currently built-up area (*proposed Marina Station development project*) may result in having areas at risk, but as of the date of this plan, that is not the case. It must be noted that the Marina Dunes Resort may be evacuated in the event of a tsunami warning. Although above the tsunami evacuation zone, the resort could potentially experience "splash effect" should a large wave strike the nearby dunes. The same would be true for the south end of Lake Court, where a few residences are located in what is essentially a bowl just east of the dunes. For precautionary measures, these residences may be evacuated as well.

The main concern for Marina will be non-residential areas that are located within the evacuation zone. These include the Marina State Beach and several beach access points through the dunes. The beach access points are located at Lake Drive / Lake Court and two additional access points located on Dunes Drive (one at midpoint and the other at the north end / termination of point of Dunes Drive). Though these areas fall outside of the incorporated limits of the City of Marina and are the responsibility of California State Parks, the Department of Public Safety does respond to them if requested. The beaches will need to be cleared, to include swimmers and surfers, in the event of a tsunami warning. The beach access points through the dunes that lead to the beach may have to be cleared as well, although it may not be possible due to time constraints. Gates at the Marina State Beach parking lot will be closed in the event of a tsunami warning. Also, the Marina Coast Water District (MCWD) main office located at the Marina State Beach will need to be evacuated and its emergency operation plan implemented. There are no special needs facilities located in the evacuation zone of the City of Marina.

Incident Command will be established at the Marina Department of Public Safety building at 211 Hillcrest Ave. in Marina.

Areas in Evacuation Zone

These are areas located within the zones targeted for evacuation and are less than 5 meters (approximately 17 feet) above sea level.

Marina State Beach

Several beach access points through the dunes (Lake Drive / Lake Court and Dunes Dr.)

Evacuation Routes

This route leads to more inland area of higher elevation.

Reservation Rd. east from the beach to Beach Rd. or Del Monte Blvd.

Lake Drive east from trail head to Palm Ave.; Palm Ave to Del Monte Blvd.

Routes to Avoid

These routes may be completely inundated with water and/or lead to other areas that may be inundated.

Highway 1 (north of Marina and south of Dolan Rd.). The stretch of Highway 1 between Marina and Dolan Rd. should be used only to get to evacuation routes.

East on Reservation Rd. beyond East Garrison.

Any other road along the coast, or near a river or creek.

Safe Areas

In the event of confusion and self-evacuation of people not in the evacuation zone, these well-known areas are safe and out of the evacuation zone.

City of Marina east of Del Monte Blvd.

CSUMB / former Fort Ord east of Highway 1

It should be noted that if one were to drive east out of Marina along Reservation Rd. toward Salinas, the tsunami risk actually increases, as the Salinas River may experience rising water. The tsunami risk also rises greatly if one were to drive north out of Marina into unincorporated North County. It is advisable that people stay within the city limits or the CSUMB / former Fort Ord area. This should be communicated to those told to evacuate.

Routes where traffic should be controlled by Marina Department of Public Safety

These routes should be controlled to keep people from entering the evacuation zones.

North Del Monte Blvd. at Highway 1 at northern city limits (Marina DPS and CHP)
Reservation Rd. westbound at Highway 1 offramp (Marina DPS and CHP)
Reservation Rd. at Highway 1 onramp to northbound Highway 1 (Marina DPS and CHP)
Westbound on Reservation Rd. from Del Monte Blvd. (Marina DPS)
Westbound on Beach Rd. from Del Monte Blvd. (Marina DPS)

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

Marina Department of Public Safety – Police Division
Acting Police Chief Steve Belcher
Phone: (831) 884-1210
Alt. Phone: (831) 384-7575

Marina Department of Public Safety – Fire Division
Chief Harald Kelley
Phone: (831) 884-1210
Alt. Phone: (831) 384-7575

City of Marina Administration
Anthony Altfeld, City Manager
Phone: (831) 884-1278
Alt. Phone: (831)

California State Parks
Loren Rex, Supervising State Park Ranger
Phone: (831) 649-2999
Alt. Phone: (831) 596-4023

MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex C: SAND CITY

RESPONSE AGENCIES:

City of Sand City, Sand City Police Department, Monterey Fire Department, Westmed

OVERVIEW:

Sand City's tsunami vulnerability is limited, though its location is right along the Monterey Bay coast. The City benefits from high coastal dunes that separate the main part of the city from the bay. There are also no major rivers or streams that flow through the city. Homes that lie on the east side of Highway 1 are of high enough elevation that a tsunami would not inundate them. However, Sand City Police has the authority to evacuate these homes if need be. The corporate limits of Sand City define the response area within this annex.

The main concern for Sand City is its 1 ½ mile of beach frontage. Sand City Police has protocol to clear the beach and block entrance to the beach should conditions warrant. In the event of a tsunami warning, the beach will need to be evacuated, to include swimmers and surfers, and entrance to the beach will be prohibited. Also, the Monterey Regional Water Pollution Control Agency (MWRPCA) pumping plant on Bay Street may also need to be evacuated and its emergency operations plan implemented.

Evacuation Routes

Since the area of evacuation for Sand City is basically the beach, the principal evacuation routes are Tioga Ave. and Playa Ave. east into the main part of the city and into Seaside.

Safe Areas

Fremont Ave. is sufficiently far enough inland for safety from a tsunami. Those told to evacuate should know that it is not necessary to travel great distances inland to reach safety. In fact, traveling greater distances may actually create problems by adding to possible congestion and confusion.

A collection / staging area will be established at Seaside High School, which is of sufficient elevation for safety. Response personnel will be located there and will provide information to the public when it becomes available. This center will be shared with those told to evacuate from the City of Seaside. This collection / staging center will not be a Red Cross shelter operation at the onset, due to the limited response time associated with tsunami evacuation. Should the tsunami come ashore and displace evacuees for an

extended period of time, full-scale Red Cross shelter operations may be requested with a shelter manager, Red Cross shelter and registration personnel, a nurse, cots, blankets, water, meals, etc.

Areas to Avoid

Those told to evacuate need to be told not to travel south or west into downtown Seaside or into Monterey, where the tsunami vulnerability is greater. Access to Highway 1, both northbound and southbound, should be prohibited.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

Sand City Police Department
Chief J. Michael Klein
Phone: (831) 394-1451
Alt. Phone: (831) 917-6233

Monterey Fire Department
Chief Sam Mazza
Phone: (831) 646-3900

Sand City Administration
Kelly Morgan, City Administrator
Phone: (831) 394-6811
Alt. Phone: (831) 917-6229

City of Seaside Administration
Ray Corpuz, City Manager
Phone: (831) 899-6702
Alt. Phone: (831) 899-6748

MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex D: CITY OF SEASIDE

RESPONSE AGENCIES:

City of Seaside Police Department, City of Seaside Fire Department, Westmed

OVERVIEW:

The City of Seaside has a small area of tsunami vulnerability, but faces unique challenges that are associated with the response to a tsunami warning / evacuation. The major area of concern is the portion of the city along Canyon Del Rey Blvd. seaward of Hilby Ave., to include Laguna Grande Park and the City's Police Department, City Hall, and library. Also of concern are the Home Depot / Staples shopping center, Roberts Lake, the Embassy Suites and Holiday Inn Express hotels, Chili's restaurant, the Seaside Auto Mall, and the City's small beachfront. Also, the Monterey Beach Resort and adjacent beach, though located in the City of Monterey, would likely bring evacuees into Seaside via Canyon Del Rey Blvd. In the future, the Department of Defense may transfer jurisdiction of the beach area north of Ellis Rd. to the California State Parks. In that event, Seaside Fire Department will be first responder to that area as well.

There are also some residences that are located within an area that may need to be evacuated. The portion of the City bordered roughly by Broadway Ave. to the north, Hilby Ave. to the south, Del Monte Blvd. to the west and Hillsdale St. to the east is low-lying and may need to be evacuated. There are approximately 60 homes located within this zone. This area is difficult to describe in writing due to the nature of the underlying topography not conforming to road boundaries. Please refer to the evacuation map of Seaside for better detail.

Of potentially great concern is the fact that the City Police Department, City Hall, and library are all located within an area that may need to be evacuated. This could pose logistic problems for the response effort.

Because the City has large areas in both the <5 meter run-up and 5-10 meter run-up zones, a two-tiered approach to evacuation will be implemented, depending on the size of the observed wave. In the event of a tsunami warning in which greater than 2 hours is available to respond before the first wave arrives, there will be sufficient time to monitor the wave and verify its height. If the wave is observed and verified to be less than 5 meters (approximately 17 feet), only those areas located within the <5 meter "red zone" on the evacuation map will be evacuated. This will be a Level 1 evacuation. If the observed wave is verified to be greater than 5 meters, a Level 2 evacuation will be ordered, which will include the "orange zone" on the evacuation map.

A residential care home for the elderly, Monterey Bay Residential Care, is located at 555 Francis Ave. This is out of either of the two evacuation zones, but is close to the area for a Level 2 evacuation. This should be noted in case of self-evacuation or emergency response. The facility should be contacted and advised that sheltering in place is the best option.

For either a Level 1 or a Level 2 evacuation, Incident Command will be established at Oldemeyer Center, located at 986 Hilby Ave. in Seaside. City Hall and Seaside Police Department may be inundated by water.

If an evacuation is ordered, Seaside Police will lead the evacuation of the targeted areas. Evacuation will include clearing the beachfront of all people, including swimmers and surfers, and issuing warnings via patrol car public address systems or door-to-door notification. Door-to-door notification is preferred, but due to time and personnel constraints, this may not be feasible. Because the time associated with tsunami evacuation is so short, it is imperative that first responders not spend large amounts of time with one or two troublesome people who wish not to evacuate. 100% compliance in evacuation is obviously preferred, but it must also be stated that this is unlikely.

Areas in Evacuation Zone(s)

For a Level 1 Evacuation:

City of Seaside beachfront
Roberts Lake
Laguna Grande Park
Embassy Suites hotel (*first floor only - vertical evacuation is sufficient*)
Holiday Inn Express hotel (*first floor only – vertical evacuation is sufficient*)
Homes along Canyon Del Rey Blvd. seaward of Hilby Ave.
Businesses immediately adjacent to Canyon Del Rey Blvd. seaward of Hilby Ave.

For a Level 2 Evacuation:

All of the areas located within the zone for Level 1 evacuation PLUS:
City of Seaside Police Department / City Hall
City of Seaside library
Neighborhood bounded by Broadway Ave. to the north, Canyon Del Rey Blvd. to the south / west, Del Monte Blvd. to the north / west, and Hillsdale St. to the east.
(this area is difficult to define in words- please refer to the evacuation map for Seaside for clarification)
Home Depot – Staples shopping center along Canyon Del Rey Blvd.
Seaside Auto Mall

Evacuation Routes

These routes lead to more inland areas and/or areas higher in elevation.

Canyon Del Rey Blvd., Hilby Ave., Sonoma Ave., and Broadway Ave. can all be used as evacuation routes eastward. All four streets are located within the evacuation zone nearer to the coast, but are all above the evacuation zones at Fremont Blvd. and eastward.

Routes to Avoid

Sand Dunes Dr. along coast
Roberts Ave.
Del Monte Blvd. north or south
Fremont Blvd. south into City of Monterey

Safe Areas

Seaside High School will be used as the evacuation center for the Seaside response area. This will be the evacuation center for Sand City as well. Response personnel will be staged there to provide information to evacuees as it becomes available. This will not be a full Red Cross shelter operation at the onset, due to the limited response time associated with tsunami evacuation. Should the tsunami come ashore and displace evacuees for an extended period of time, full-scale shelter operations will be considered as appropriate. Red Cross personnel may be present at the evacuation center to provide information and updates, snacks and water, and will be prepared to open up a full-scale shelter operation if need be.

In the event of confusion and/or self-evacuation of people not in the evacuation zone, it should be noted that anywhere within the City of Seaside east of Fremont Blvd. is out of the evacuation zone. If people choose to not go to Seaside High School, they need to know to at least go as far inland as Fremont.

Routes where traffic should be controlled / closed by Seaside Police

Canyon Del Rey Blvd. at Highway 1 onramps (both northbound and southbound)
Fremont Blvd. at Highway 1 onramp
Del Monte Blvd. southbound past Canyon Del Rey Blvd.

Ideally, some sort of traffic control would be in place at the intersection of Del Monte and Canyon Del Rey to prevent people from getting to either Highway 1 or south on Del Monte into Monterey, where the vulnerability becomes greater.

Vertical Evacuation

The Embassy Suites and Holiday Inn Express hotels, which both lie within the Level 1 evacuation zone, have the capability of vertical evacuation. In this case, it may be most beneficial to have guests within these hotels stay above the ground floor to avoid the effects of the tsunami. This would limit the amount of people on the streets attempting to evacuate.

Del Rey Oaks

The City of Del Rey Oaks lies completely outside of the tsunami evacuation area, but lies adjacent to Canyon Del Rey and is near an area that is targeted for evacuation. Although no evacuations will be required for Del Rey Oaks, it is necessary to coordinate with Del Rey Oaks Police to ensure that the City's residents are informed as to the nature of the response and also to aid in the response if need be.

Special Needs Citizens

Some people in the evacuation zone may need assistance in getting out of harm's way. Pre-determination of special needs citizens, including those that would need assistance in evacuation and those that require medical equipment to be moved with them, would be very beneficial to the evacuation. This is useful not only for tsunami, but for any potential disaster in the area.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the situation will be monitored in the EOC and an all-clear will be issued by the Emergency Services Director. Until the all-clear message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

Seaside Police Department
Capt. Steve Cercone
Phone: (831) 394-6811
Alt. Phone: (831)

Seaside Fire Department
Capt. Roger Brown
Phone: (831) 899-6700
Alt. Phone: (831)

City of Seaside Administration
Ray Corpuz, City Manager
Phone: (831) 899-6702
Alt. Phone: (831) 899-6478

Del Rey Oaks Police Department / Administration
Chief Ron Langford
Phone: (831) 394-9333
Alt. Phone: (831) 375-8525

MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex E: CITY OF MONTEREY

RESPONSE AGENCIES:

City of Monterey Police Department, City of Monterey Fire Department, U.S. Coast Guard, Naval Postgraduate School, California State Parks, Monterey Harbor District, Westmed

OVERVIEW:

The City of Monterey faces more logistical challenges and potential problems associated with a tsunami warning and evacuation than any other city in Monterey County. This is due to both a large area that is very low-lying and a high concentration of businesses and people immediately adjacent to the coast. The City also faces the potential for inland inundation, where many homes may be affected. The areas of greatest concern are the city beaches, Del Monte Ave. west of Sloat Ave., El Estero Park and adjacent neighborhoods, Monterey Harbor, Fisherman's Wharf, and Cannery Row. Portions of Downtown Monterey, although not as low-lying as the aforementioned areas, have the potential to be inundated as well. There are also individual spots of concern, including the Monterey Beach Resort, Ocean Harbor House condominium complex, the La Playa Condominium complex, the U.S. Coast Guard Station, the Lighthouse Ave. tunnel, and the Monterey Bay Aquarium, among others.

There are many businesses located within the evacuation zone, including several hotels / motels and restaurants. The amount of people, including residents, workers, and visitors in this area can vary greatly depending on the time of day and year. The approximate number of residences located in the evacuation zone is 200, with an approximate population of 400-500. There are no special needs facilities located in the evacuation zone. However, Del Monte School and San Carlos School may need to be evacuated, depending on the size of the observed wave. An observed wave greater than 17 feet would require evacuation of both schools.

If an evacuation is ordered, the Monterey Police Department will lead the evacuation of the area. Evacuation will include clearing the beaches of all people, including swimmers, surfers, and divers. The stretch of coast from Monterey State Beach to the Monterey Bay Aquarium is oftentimes densely populated, especially during high tourist season and on weekends. There are many businesses located on Fisherman's Wharf and Cannery Row, which will both need to be completely evacuated. There will likely be confusion and possibly panic, especially considering the high percentage of non-residents located in these areas. El Estero Park north of Pearl St. will also need to be cleared of people, as well as much of the neighborhoods that are adjacent to the park on either side.

Because the time associated with tsunami evacuations is so short, it is imperative that first responders not spend large amounts of time with one or two troublesome people who wish not to evacuate. 100% compliance in evacuation is obviously preferred, but it must also be stated that this is unlikely.

Incident Command will be established at Monterey Police Department, located at 351 Madison Street in Monterey.

Areas in Evacuation Zone

Monterey Beach Resort

Ocean Harbor House condominium complex (oceanfront units only) / Del Monte Beach

La Playa condominium complex

Portion of Naval Postgraduate School immediately adjacent to Del Monte Lake

Monterey State Beach / Window-on-the-Bay

Monterey Harbor

Fisherman's Wharf

U.S. Coast Guard Station

Cannery Row

El Estero Park

Residential neighborhood bounded roughly by Del Monte Ave. to the north, Sloat Ave. to the east, 8th St. to the south, and Camino Aguajito the west.

Residential / commercial neighborhood bounded roughly by Del Monte Ave. to the north, Figueroa St. to the west, Webster St. to the south, and Camino El Estero to the east.

Downtown area bounded roughly by Del Monte Ave. to the north, Figueroa St. to the east, Pearl St. to the south, and Tyler St. to the west.

With regard to the neighborhoods defined by streets, these are not exact as described in writing. Due to the nature of the underlying topography, the evacuation zones do not perfectly correlate to streets. Please refer to the evacuation map of Monterey for better detail of the evacuation zones.

Evacuation Routes

These routes lead to more inland areas and/or areas higher in elevation.

Casa Verde Way south to Fremont St.

Sloat Ave. south to Mark Thomas Dr.

Abrego St. / Munras Ave. south to El Dorado St. / Del Monte Center

Pacific St. south to El Dorado St. / Monterey High School

Franklin St. west to Van Buren St.

Any street in New Monterey that trends uphill (Drake, Prescott, David, etc.)

Routes to Avoid

These routes may be completely inundated with water and/or lead to other areas that may be inundated or congested.

Del Monte Ave. eastbound heading into Seaside.
Camino Aguajito southbound (this road simply follows a low-lying canyon)
Camino El Estero southbound (end of street at Fremont is not out of evacuation area)
Lighthouse Ave. tunnel (may become completely flooded)
Cannery Row (only parallels evacuation zone)
Ocean View Blvd (only parallels evacuation zone)
Casa Verde Way northbound from Del Monte Ave.

Safe Areas

Monterey High School will be used as a staging / collection site for the City of Monterey. Response personnel will be staged there to provide information to evacuees as it becomes available. This will not be a full Red Cross shelter operation at the onset, due to the limited response time associated with tsunami evacuation. Should the tsunami come ashore and displace evacuees for an extended period of time, full-scale shelter operations will be considered as appropriate. Red Cross personnel will be present at the evacuation center to provide information and updates, snacks and water, and will be prepared to open up a full-scale shelter operation if need be.

In the event of confusion or self-evacuation of people not in the evacuation zone, these well-known areas and landmarks are safe and out of the tsunami hazard zone.

Monterey County Fairgrounds
Anywhere west of Pacific Ave and above Lighthouse Ave. in New Monterey
Anywhere along North Fremont St. in North Monterey
Anywhere above Lighthouse Ave. in New Monterey
Del Monte Center

Freeway access points where traffic should be controlled by Monterey Police

Highway 1 onramp off of English Ave.
Highway 1 onramp off of Hannon Ave at Del Monte Ave.
Highway 1 onramp at Casa Verde Way (northbound and southbound)
Highway 1 / Highway 68 onramp at Fremont St.
Highway 1 onramp at Munras Ave.
Highway 1 onramp at Aguajito Rd.

Because Highway 1 parallels the coast, access to Highway 1 should be controlled, if possible.

SPECIAL CONSIDERATIONS

Monterey Harbor

The Monterey Harbormaster will receive the tsunami watch or warning through the methods outlined in the first part of the plan. The approximate arrival time of the first wave will dictate response at the Harbor. If the expected arrival time is greater than 30 minutes, it may be possible for vessels to be sent out to sea to avoid the effects of the tsunami. Vessels need to be out to the 100 fathom curve (approximately 2 miles out to sea) for safety. Should the expected arrival time of the first wave be less than 30 minutes, it is not advised that boaters attempt to send their vessel out to sea. Also, boaters need to be aware of the multi-wave aspect of tsunamis. Access to the harbor will be controlled to enforce these procedures. Commercial boaters will have priority over recreational boaters in sending their vessels out to sea. The Monterey Harbormaster has a public address system that can be used to warn and notify the immediate area of the danger, as well as the policy of moving boats out to sea. Needless to say, public safety has priority over personal property protection.

United States Coast Guard Station

The Coast Guard will receive the warning either directly from the AWCTWC, from another Coast Guard station, and / or through the methods outlined earlier in the plan. Their facility is located within the evacuation zone, and will be evacuated after the warning. Coast Guard craft will be sent out to open ocean to avoid damage. Upon evacuation, Coast Guard personnel will move to the Presidio of Monterey (Defense Language Institute – DLI) for their command post. (*See Annex K, Page 56*)

Presidio of Monterey

The Presidio of Monterey lies above the areas identified as evacuation zones, and therefore evacuations at the facility will not be necessary. However, the Presidio has capabilities and resources that may be available to assist in a response to a tsunami warning. The Presidio may also be able to assist in evacuations by allowing traffic to flow through the facility to avoid the Downtown / El Estero Lake area. (*See Annex K, Page 56*)

Naval Postgraduate School

The majority of the Naval Postgraduate School (NPS) lies above areas designated for evacuation. However, the portion of campus around Del Monte Lake is low-lying and will need to be evacuated in the event of an evacuation order. Persons told to evacuate this portion of campus can seek refuge in the southern part of campus, which is above the tsunami evacuation zone elevation. Vertical evacuation may be the best choice for response at NPS. (*See Annex K, Page 56*)

Vertical Evacuation

Many facilities that are located within the evacuation zone are suitable for vertical evacuation, meaning heading to higher floors of the building as opposed to heading inland. This can be very beneficial to the evacuation process as it will significantly lessen the amount of people on foot or in a vehicle attempting to evacuate. Many hotels and businesses in the Cannery Row and Downtown areas are multi-story and can be used for vertical evacuation. Multi-story parking garages located downtown are also suitable for vertical evacuation. Since the highest expected amount of water would be less than 30 feet, in many cases the second floor is suitable, and in all cases, the third floor is suitable for vertical evacuation.

On Foot Evacuation

Because the density of the population that would need to be evacuated in Monterey is high, on-foot evacuation is preferred and would greatly ease the evacuation process. In the Cannery Row area, one would only need to walk as far uphill as Lighthouse Ave. to reach safety from the tsunami hazard. From Fisherman's Wharf or Downtown, walking west / southwest to Pacific Ave. would put one into a safe zone.

The El Estero Park area would require much more distance to be traveled to reach a safe zone, and depending on the amount of time until the wave arrives, on-foot evacuation may not be feasible.

On-foot evacuation should be the preferred method of evacuation from Fisherman's Wharf and west / north, including Cannery Row and Wave St., and would be much quicker than the inevitable congestion that would result if everyone were to drive inland or uphill. This should be communicated to people told to evacuate.

Special Needs Citizens

Some people in the evacuation zone may need assistance in getting out of harm's way. Pre-determination of special needs citizens, including those that would need assistance in evacuation and those that require medical equipment to be moved with them, would be very beneficial to the evacuation. This is useful not only for tsunami, but for any potential disaster in the area.

Canyons

Canyons are canyons for a reason- water carved them out. Canyons should be avoided as points of evacuation, regardless of how far inland they may seem. In all canyon areas, the area of inundation reaches farther inland than one would normally expect. The following areas should be avoided for evacuation:

Canyon Del Rey Blvd. seaward of Fremont Blvd.
Josselyn Canyon Rd.
Camino Aguajito canyon
Iris Canyon Rd.

Schools in Evacuation Zone

In the event of a large tsunami (greater than 5 meter / 17 foot run-up), two schools in Monterey may need to be evacuated. These are Del Monte School and San Carlos School. If the warning occurs during school hours, this will pose a serious problem.

Pacific Grove

Due to the large concentration of people likely to be in the Cannery Row / Aquarium area, coordination of evacuations with Pacific Grove will be imperative. Preferably, evacuees would move inland or uphill within the same jurisdiction, but due to possible panic, confusion, and the fact that many people will be visitors, 100% compliance with same-jurisdiction evacuation is unlikely.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

Monterey Police Department
Sgt. Phil Penko
Phone: (831) 646-3800
Alt. Phone: (831)

Monterey Fire Department
Capt. Barry Perkins
Phone: (831) 646-3906
Alt. Phone: (831) 915-6473 (cell)

Monterey Harbormaster
Steve Scheiblaue
Phone: (831) 646-3950
Alt. Phone: (831)

United States Coast Guard Station
Officer of the Day (OOD)
Phone: (831) 901-9807
Alt. Phone: (831) 901-9803

City of Monterey Administration
Fred Meurer, City Manager
Phone: (831) 646-3760
Alt. Phone: (831)

California State Parks / Monterey State Historic Park
Loren Rex, Supervising State Park Ranger
Phone: (831) 649-2999
Alt. Phone: (831) 596-4023

Pacific Grove Police Department (*for coordination of evacuations*)
Darius Engles
Phone: (831) 648-3143
Alt. Phone: (831)

Presidio of Monterey
Richard Scandrette, Plans Officer
Phone: (831) 768-7590
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Naval Postgraduate School Police Department
Ken Bench
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MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex F: CITY OF PACIFIC GROVE

RESPONSE AGENCIES:

City of Pacific Grove Police Department, City of Pacific Grove Fire Department, California State Parks, Westmed

OVERVIEW:

The City of Pacific Grove has a small area of tsunami vulnerability relative to the entire city due to the topography of the Monterey Peninsula, which rises in elevation sharply from the coast. Nonetheless, the City has several issues related to a tsunami warning and response. The main area of concern is the City's long, winding oceanfront. Although the tsunami evacuation zone only extends anywhere from only 1 to up to 4 streets inland, the majority of the area that would need to be evacuated is residential. Every house along Ocean View Blvd. would need to be evacuated in the event of a tsunami warning. There are approximately 120 buildings (approximately 10 of which are apartment complexes) along Ocean View from the Monterey city limits to Asilomar State Beach. Homes along Sunset Dr. from Asilomar State Beach to the Asilomar Conference Grounds would need to be evacuated as well. There are approximately 25 oceanfront homes along Sunset Dr before it curves inland at Asilomar. The other areas of concern are the areas near the northernmost points of the City. The area bounded by Asilomar Ave. to the west, Esplanade St. to the east, Del Monte Ave to the south, and the Pacific Ocean to the north is located within the tsunami evacuation zone. There are approximately 120 homes in this area. East of Esplanade Park, the tsunami evacuation zone extends as far inland as Balboa Ave. Finally, the homes along Mermaid Ave. east of Del Monte Ave. are in the tsunami evacuation zone. There are approximately 40 homes or apartment buildings in this area. East of Lover's Point, only the homes on Ocean View are located in the tsunami evacuation zone. The total number of homes that would need to be evacuated in the event of a tsunami warning is approximately 310, representing an approximate total population of 600-700. There are no special needs facilities located within the evacuation zone. Please refer to the tsunami evacuation map of Pacific Grove for visual detail of these evacuation areas which are difficult to describe in writing.

If an evacuation is ordered, Pacific Grove Police Department will lead the evacuation of the targeted areas. Evacuation will include clearing all beaches and beachfront parks, to include the coastal walking / bike trail, as well as swimmers, surfers, and divers. Evacuation will include door-to-door and/or police cruiser public address system usage. The amount of personnel and time to evacuate will likely dictate how the evacuation is conducted.

Incident Command will be established at Pacific Grove Police Department at 580 Pine Ave. in Pacific Grove.

Areas in Evacuation Zone

Stanford University Hopkins Marine Station / Point Cabrillo
Lovers Point Park
Perkins Park
Esplanade Park
Lucas Point
Point Pinos / Point Pinos Lighthouse
Pacific Grove Golf Links west of Asilomar Ave.
Asilomar State Beach

Residential neighborhoods as defined in previous section / visible on evacuation map.

Evacuation Routes

Due to the short distance that one would have to evacuate in Pacific Grove, there is no “evacuation route” per se, but those told to evacuate need to know to move inland and/or to higher ground. There are many roads that are sufficient, and this list is to provide examples for people unsure of which way to move.

Lighthouse Ave. east from the ocean / toward Downtown
Forest Ave. south into Downtown
Asilomar Ave. / Highway 68 east
17 Mile Drive south toward Highway 68

Routes to Avoid

These routes may be completely inundated with water or lead to other areas that may be inundated or congested.

Ocean View Blvd. (either direction)
Sunset Drive along coast
Lighthouse Ave. into City of Monterey
Central Ave. east into City of Monterey

Safe Areas

Pacific Grove High School will be used as the staging / collection site for Pacific Grove. Response personnel will be staged there to provide information to evacuees as it becomes available. This will not be a Red Cross shelter operation at the onset, due to the limited response time associated with tsunami evacuation. Should the tsunami come ashore and displace evacuees for an extended period of time, full-scale shelter operations will be considered as appropriate. Red Cross personnel will be present at the evacuation center to

provide information and updates, snacks and water, and will be prepared to open up a full-scale shelter operation if need be.

It will be very important that people know not to evacuate too far, or even out of the City limit, due to increased vulnerability as one heads east into Monterey or south into Carmel.

SPECIAL CONSIDERATIONS

Pacific Grove Ocean Rescue (PGOR)

Pacific Grove's Ocean Rescue capabilities will stay in Pacific Grove should a tsunami warning be issued. In "normal" operating conditions, PGOR may be dispatched to other jurisdictions for mutual aid. In the event of a tsunami warning, where all of coastal Monterey County is at risk, the capability will likely be needed within Pacific Grove's jurisdiction.

Asilomar State Beach / Asilomar Conference Grounds

California State Parks has jurisdiction at Asilomar. There is an emergency plan in place, which will be implemented should a tsunami warning be issued. The majority of the conference grounds are out of the evacuation zone, including the largest facilities and buildings. State Parks will be able to operate out of Asilomar during the evacuation and response.

Teleminder Notification System

Pacific Grove's Teleminder system is a warning system that notifies the public via phone when there is a potentially dangerous situation. In the event of a tsunami warning, the system will be used to inform the public that needs to evacuate as well as those that do not. The system has the capability to use GIS-derived polygons to determine who needs to receive which message.

Lovers Point Area

The Lovers Point area has the most non-residential facilities that would need to be evacuated, including 3 hotels / B&Bs, 3 restaurants, and several other businesses. This area may have a high number of visitors that are not familiar with the City.

Pacific Grove Municipal Golf Links

The portion of Pacific Grove Golf Links west of Asilomar Ave. would need to be evacuated in the event of a tsunami warning. Those told to evacuate that portion of the course could evacuate to the Golf Links' Clubhouse, which is out of the evacuation zone.

The City of Monterey

With Cannery Row and the Monterey Bay Aquarium located so close to the city boundary of Pacific Grove, the evacuation of that area in Monterey could, and likely will, have an impact on Pacific Grove. Therefore, it is imperative that the two cities are in communication in regard to evacuations. Although preferably evacuees from Monterey would move inland or uphill within that jurisdiction, that is unlikely to be the case for 100% of those told to evacuate. This is especially true considering the likelihood that a significant percentage of those people will be visitors.

American Tin Cannery Outlet Mall / Cannery Row area

The portion of Pacific Grove immediately to the west / north of Cannery Row is likely to be populated by many people, many of whom will be visitors. Special care must be taken in evacuating this area, especially when considering the City of Monterey's own response to the tsunami warning.

Pebble Beach / Del Monte Forest

In the event of a tsunami warning, Pebble Beach Community Service District will close the points of entry into the Forest and will limit access to emergency / official personnel. This may need to be communicated to those told to evacuate to avoid potential confusion.

Special Needs Citizens

Pacific Grove has a higher percentage of elderly people than other cities in Monterey County. This has to be taken into consideration when conducting evacuations. Elderly people may be less willing to evacuate their homes and/or may require assistance in doing so. Some people in the evacuation zone may need assistance in getting out of harm's way. Pre-determination of special needs citizens, including those that would need assistance in evacuation and those that require medical equipment to be moved with them, would be very beneficial to the evacuation. This is useful not only for tsunami, but for any potential disaster in the area.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

Pacific Grove Police Department
Chief Darius Engles
Phone: (831) 648-3143
Alt. Phone: (831)

Pacific Grove Fire Department
Capt. James Gunter
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Alt. Phone: (831)

City of Pacific Grove Administration
Jim Colangelo, City Manager
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Alt. Phone: (831)

California State Parks / Asilomar State Beach & Conference Grounds
Allyn Kaye
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Monterey Police Department (*for coordination of evacuation*)
Sgt. Phil Penko
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MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex G: PEBBLE BEACH / DEL MONTE FOREST

RESPONSE AGENCIES:

Monterey County Sheriff's Office, Pebble Beach Community Services District Fire Department/ CDF, Westmed

OVERVIEW:

Tsunami vulnerability at Pebble Beach / Del Monte Forest is limited by the topography of the Monterey Peninsula and the spatial nature of the residences in the area. The slope of the land rises quickly from the shore, and thus significant inland inundation is not expected. The area that is of most concern is the Forest's long, winding shoreline. Per data received from the Pebble Beach Community Services District, there are 121 buildings located within the evacuation zone, of which 75 are homes. The non-residential facilities located in the evacuation zone include a power substation and a sewage pumping station. The areas of the Forest with homes in the evacuation zone are located in the northern and southern ends of the Forest. There are no schools or special needs facilities located within the evacuation zone.

If an evacuation is ordered, the Sheriff's Office will lead the evacuation, along with assistance from Pebble Beach Security. Due to the long driveways of many homes in the evacuation zone and the distance between homes, door-to-door notifications of evacuation will likely be needed. Evacuation will include clearing all beaches of all people, including swimmers, surfers, and divers.

Incident Command will be established at Pebble Beach Community Services District's EOC.

Areas in Evacuation Zone

Identified oceanfront homes (*approximately 75 of them*)

Seal Rock Creek area

Fan Shell Beach

Cypress Point Club

Lone Cypress area / Pescadero Point

Pebble Beach

Oceanfront overlooks

Golf Courses in Evacuation Zone:

The Links at Spanish Bay
Monterey Peninsula Country Club
Cypress Point Country Club
Pebble Beach Golf Links (to include The Lodge and Beach & Tennis Club)

Evacuation Routes / Routes to Avoid

Due to the nature of the geography and topography of Pebble Beach / Del Monte Forest, there aren't specific evacuation routes per se, but those told to evacuate need to know to move inland and/or to higher elevation. There are many routes that are sufficient in this regard. It is highly advised that those told to evacuate stay within the Pebble Beach / Del Monte Forest. This is due to the fact that Pebble Beach Security will close the entry points to the Forest and will limit access to emergency and official personnel only. Also, because the tsunami vulnerability may actually increase as one exits the Forest, it is not advised that people leave the Forest at least until an all-clear message has been issued.

One specific route to avoid in evacuation is Seventeen Mile Drive, which more or less simply parallels the evacuation zone. PBCSD has authority to close off the street if need be.

Safe Areas

Robert Louis Stevenson High School and the Monterey Peninsula Country Club (MPCC) in the heart of the Forest will be used as staging / collection sites for Pebble Beach / Del Monte Forest. Response personnel will be staged there to provide information to evacuees as it becomes available. This will not be a Red Cross shelter operation due to the limited response time associated with tsunami evacuation. Should the tsunami come ashore and displace evacuees for an extended period of time, full-scale shelter operations will be considered as appropriate. Red Cross personnel will be present at the evacuation center to provide information and updates, snacks and water, and will be prepared to open up a full-scale shelter operation if need be.

Reverse 911 System

Pebble Beach CSD has the ability to notify residents of potentially dangerous situations via its Reverse 911 system. This system sends warning messages directly to residents via telephone. A pre-recorded message specific to the event is played over the system, warning people of possible problems and providing emergency information. The system can be used so that only specific homes / phones are notified based on the geography of the event. For example, if a tsunami warning were to be issued, PBCSD would trigger its Reverse 911 system, and through Geographic Information Systems, would notify those

that need to evacuate with information pertaining to the evacuation. Those outside of the evacuation areas could receive a message stating that they do not need to evacuate, but rather shelter in place. This system will aid greatly in an evacuation.

SPECIAL CONSIDERATIONS

Golf Courses

The Links at Spanish Bay, Monterey Peninsula Country Club, Cypress Point Country Club, Spyglass, and Pebble Beach Golf Links are all located within the tsunami evacuation zone. Although not the entirety of each course is located in the evacuation zone, portions of them are and for that reason they will need to be evacuated. Pebble Beach Security is to be contacted in regard to the evacuation of these golf courses. Depending on the course, those told to evacuate can be sent to the course's clubhouse or to the staging sites at Stevenson High School and MPCC.

Hotels

Although the hotels in the Forest are out of the tsunami evacuation zone, the fact that many visitors will likely be present could lead to confusion if an evacuation order is issued. Although the best plan of action is to keep visitors in the hotel, above ground floor, some may wish to evacuate out of fear or confusion. Guests leaving the hotel need to be made aware of where to go if they leave, but that staying is the safest option.

Special Needs Citizens

Pebble Beach has a high percentage of residents and visitors who are elderly. This has to be taken into consideration when conducting evacuations. Elderly people may be less willing to evacuate their homes and/or may require assistance in doing so. Some people in the evacuation zone may need assistance in getting out of harm's way. Pre-determination of special needs citizens, including those that would need assistance in evacuation and those that require medical equipment to be moved with them, would be very beneficial to the evacuation. This is useful not only for tsunami, but for any potential disaster in the area.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be

sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

Monterey County Sheriff's Office – Monterey Watch Command
Commander Ed Lorenzana
Phone: (831) 647-7675
Alt. Phone: (831)

PBCSD Fire Department / CDF Emergency Command Center
Chief George Haines
Phone: (831) 647-6222
Alt. Phone: (831) 333-2000

Pebble Beach Security
Don Tkachenko
Phone: (831) 624-8669
Alt. Phone: (831) 277-7939

Pebble Beach Company
Shawn Casey, Operations Director
Phone: (831) 277-7878
Alt. Phone: (831) 277-7939

MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex H: CITY OF CARMEL-BY-THE-SEA

RESPONSE AGENCIES:

City of Carmel Police Department, City of Carmel Fire Department, Carmel Regional Fire Ambulance, Westmed

OVERVIEW:

Tsunami vulnerability in the City of Carmel is limited to its beachfront area and the southeastern most portion of town that is near the Mission Fields / Carmel River Lagoon area.

If an evacuation is ordered, there are two areas that may need to be evacuated. The first is the Carmel City Beach and oceanfront homes along Scenic Rd. Although the oceanfront homes are above the tsunami evacuation zone, the homes could experience a “splash effect” should a tsunami strike the coast. There are approximately 100 homes along Scenic Rd. within the Carmel city limits.

The second area is near the Carmel Mission. Although this area would only need to be evacuated in the event of a tsunami greater than 5 meters / 17 feet, because it is an area that may be populated by many visitors and nearby schoolchildren, attention should be given to this part of town. Junipero Serra School / Carmel Mission is located just outside the evacuation zone, but may need to be evacuated out of precaution.

Carmel Police Department will be the lead agency in any evacuation. Evacuation will include clearing the beach of all people, to include swimmers and surfers. For evacuating the homes along Scenic Rd., notification by either door-to-door contact or police cruiser public address systems will be used to notify those in the evacuation zone. The amount of time and personnel available will likely dictate the response procedures.

Incident Command will be established at Carmel Police Department, Junipero and 4th Streets, Carmel.

Areas in Evacuation Zone

Carmel City Beach

Homes along Scenic Rd. (*approximately 100 of them*)

Carmel Mission (for a tsunami greater than 5 meters / 17 feet)

Junipero Serra School (for a tsunami greater than 5 meters / 17 feet)

Evacuation Routes

The amount of area that would need to be evacuated in Carmel is very small, and any route that leads a block or two inland from Scenic Rd. is sufficient for evacuation. This could be done just as easily on foot as it could be in a vehicle.

For those heading to Carmel High School, traffic should be directed to Ocean Ave. east from Scenic Rd. to get to the school.

Routes / Areas to Avoid

Although the tsunami vulnerability in Carmel is limited, that is not the case in the surrounding areas, particularly to the immediate south of the city limits. The Carmel River Lagoon area will likely be evacuated and people from Carmel need to know not to leave the city limits to the south. To prevent people from getting onto Highway 1 north of Carmel, traffic should be controlled and limited to emergency and official vehicles only.

Rio Rd., which parallels the Carmel River out of town, also parallels the tsunami evacuation zone, and should be avoided. The Crossroads Shopping Center / Post Office area should also be avoided. Although much farther inland than the City of Carmel, its vulnerability is greater due to the potential inundation of water up the Carmel River. People are best off staying within the City of Carmel east of Scenic Rd. or going to Carmel High School.

Safe Areas

Carmel High School will be used as the staging / collection site for the City of Carmel and the surrounding Carmel River Lagoon / Mission Fields area. Response personnel will be staged there to provide information to evacuees as it becomes available. This will not be a Red Cross shelter at the onset, due to the limited response time associated with a tsunami evacuation. Should the tsunami come ashore and displace evacuees for an extended period of time, full-scale shelter operations will be considered as appropriate. Red Cross personnel will be present at the evacuation center to provide information and updates, snacks and water, and will be prepared to open up a full-scale shelter operation if need be.

It will be very important that people know not to evacuate too far, or at all to the south of the city, due to increased vulnerability as one heads south or southeast out of the city.

SPECIAL CONSIDERATIONS

Visitors

Depending on the time of day and year, there may very well be many visitors at the beach and mission in Carmel at the time of the tsunami warning and evacuation. Visitors need know explicitly where to go, and not heading south to the Lagoon area needs to be reinforced. On foot evacuation uphill and inland may be best for visitors told to seek higher ground.

Pebble Beach / Del Monte Forest

In the event of a tsunami warning, Pebble Beach Community Service District will close the points of entry into the Forest and will limit access to emergency and official personnel. This may need to be communicated to those told to evacuate to avoid potential confusion.

Special Needs Citizens

Carmel has a higher percentage of elderly people than most other areas in Monterey County. This has to be taken into consideration when conducting evacuations. Elderly people may be less willing to evacuate their homes and/or may require assistance in doing so. Some people in the evacuation zone may need assistance in getting out of harm's way. Pre-determination of special needs citizens, including those that would need assistance in evacuation and those that require medical equipment to be moved with them, would be very beneficial to the evacuation. This is useful not only for tsunami, but for any potential disaster in the area.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

City of Carmel Police Department
Chief George Rawson
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City of Carmel Fire Department
Chief Andrew Miller
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City of Carmel Administration
Richard Guillen, City Manager
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CDF / Cypress Fire Protection District (*for coordination of evacuation*)
Chief George Haines
Phone: (831) 647-6222
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MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex I: CARMEL RIVER LAGOON AREA

RESPONSE AGENCIES:

Monterey County Sheriff's Office, CDF / Cypress Fire Protection District, California State Parks, Westmed, Carmel Regional Fire Ambulance

OVERVIEW:

The Carmel River Lagoon area is an area already known to have significant flooding issues, and a tsunami event would further exacerbate potential flooding problems in the area. For the purposes of this annex, the Carmel River Lagoon response area is defined as the areas immediately south and east of the City of Carmel, including the Carmel River.

The major area of concern is certainly the Carmel River Lagoon and the adjacent neighborhoods to the north and east. Also of concern is the Carmel River itself. The area along the river extends the tsunami evacuation zone approximately 2 miles inland. In this response area, the size of the tsunami will greatly affect the response effort, as a 10 meter tsunami (worst-case scenario situation) results in an evacuation zone three times the size of the one for a <5 meter tsunami.

The neighborhood directly to the north of the Lagoon (please refer to the Carmel 2 Evacuation Map for detail) includes beachfront and other low-lying properties that would need to be evacuated in the event of a tsunami warning. Also in this area is Carmel River Elementary School, which would need to be evacuated if the observed wave is greater than 5 meters (approximately 17 feet), along with several nearby homes. The Mission Fields area would also have to be evacuated should the observed wave be greater than 5 meters. Finally, in the event of a tsunami greater than 5 meters, the floodplain floor of the Carmel Valley would be endangered. As examples, the Crossroads Shopping Center, Rancho Canada Golf Course, Carmel Rancho Center, the Barnyard Shopping Center, and the Cypress Fire Station would also have to be evacuated. This would likely cause logistical problems with the station having to be evacuated, along with the increased area needed to be cleared.

If an evacuation is ordered, the Sheriff's Office will lead the evacuation of the targeted areas. Evacuation will include clearing the beachfront / Carmel Lagoon Natural Preserve of all people. Depending on the amount of time and personnel available to conduct the evacuation, either door-to-door notification or vehicle-equipped public address systems will be used.

Incident Command will be established at the Pebble Beach Community Services District's EOC.

Areas in Evacuation Zone

For a tsunami less than 5 meters (approximately 17 feet):

Carmel River Lagoon
Carmel River Lagoon & Wetlands Natural Preserve
Carmel River State Beach
Homes along Scenic Drive
Mission Fields residences / Mission Ranch
Carmel Sanitary Disposal District plant

For a tsunami greater than 5 meters:

All areas previous listed to evacuate for a tsunami <5 meters PLUS:
Neighborhood immediately north of Carmel River Lagoon (see map for detail)
The Crossroads Shopping Center
Cypress Fire Protection District Rio Rd. station
Residences along Rio Rd.
Carmel Post Office
Rancho Canada Golf Course
Carmel Rancho Center

Evacuation Routes / Routes to Avoid

These routes lead to more inland areas and/or areas higher in elevation

Rio Rd. east to Highway 1 north
Highway 1 north to Carmel High School

These routes may be completely inundated with water and/or lead to other areas that may be inundated and therefore should be avoided.

Scenic Rd.
Highway 1 south of Point Lobos State Reserve
Highway 1 north of Carpenter St.
Carmel Valley Rd. (parallels river, should be avoided)

It is important that people told to evacuate know that they don't need to travel great distances to reach safety. In fact, increasing distance traveled may actually increase the risk associated with the tsunami.

Safe Areas

Carmel High School will be used as a staging / collection site for the Carmel Lagoon area as well as the City of Carmel. Response personnel will be staged there to provide information to evacuees as it becomes available. This will not be a full Red Cross shelter operation at the onset, due to the limited response time associated with tsunami evacuation. Should the tsunami come ashore and displace evacuees for an extended period of time, full-scale shelter operations will be considered as appropriate. Red Cross personnel will be present at the evacuation center to provide information and updates, snacks and water, and will be prepared to open up a full-scale shelter operation if need be.

Routes where traffic should be controlled by Sheriff's Office or CHP

These routes should be blocked to keep people from entering the evacuation zone or entering another jurisdiction with high tsunami risk.

Highway 1 north of Carpenter St (access to Highway 1 should be restricted as vulnerability increases as one travels north along the highway).

Highway 1 south of Point Lobos State Reserve (access to Highway 1 should be restricted as traveling south along the highway is unnecessary and can lead to increased risk).

SPECIAL CONSIDERATIONS

City of Carmel

Due to the fact that the City of Carmel will be in response mode as well, coordination of evacuations with Carmel will be imperative. Preferably, evacuees would move inland or uphill within the same jurisdiction, but due to possible panic, confusion, and the fact that many people may be visitors, 100% compliance with same-jurisdiction evacuation is unlikely. Coordination is also important due to the fact that Carmel High School will be used as a staging site for both the Carmel River Lagoon area and the City of Carmel.

The Crossroads Shopping Center

The Crossroads is a large shopping center with 70 stores and 12 restaurants. Depending on the time of day that an evacuation is ordered, and if the evacuation of the >5 meter evacuation zone is ordered, this could pose a serious challenge to the evacuation effort.

Carmel River State Beach and Point Lobos State Reserve

California State Parks has jurisdiction at Carmel River State Beach and Point Lobos State Reserve. However, due to the number of State Parks along the coast, the limited State Parks personnel, and the short timeframe associated with a tsunami evacuation, it may not be possible for State Parks to address all of the coastal parks. Carmel State Beach and Point Lobos State Reserve are located in this area and will need to be evacuated. Coordinate with State Parks to ensure that these areas are addressed.

Special Needs Citizens

Some people in the evacuation zone may need assistance in getting out of harm's way. Pre-determination of special needs citizens, including those that would need assistance in evacuation and those that require medical equipment to be moved with them, would be very beneficial to the evacuation. This is useful not only for tsunami, but for any potential disaster in the area.

Carmel Valley Fire District

Although most of the Carmel Valley Fire District is located outside of the tsunami evacuation zone, due to personnel constraints and the scope of the task of evacuating the targeted areas, a nearby outside agency such as Carmel Valley Fire may be able to aid in the response effort. Also for Carmel Valley Fire, the Carmel River will likely experience rising water levels during a tsunami, and therefore extra attention will need to be given to the river and those nearby.

Carmel Highlands Fire Protection District

Similarly to Carmel Valley Fire, Carmel Highlands Fire may be able to assist in the response effort. Other than the beaches, there should be no need for evacuations in the Carmel Highlands area. Should first responders in the Cypress area be overwhelmed, coordination with Carmel Highlands Fire may be very beneficial.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This

is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

CONTACTS:

Monterey County Sheriff's Office – Monterey Watch Command
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CDF Emergency Command Center
Chief George Haines
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Alt. Phone: (831) 333-2000

City of Carmel Police Department (*for coordination of evacuation*)
Chief George Rawson
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Carmel Valley Fire District
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California State Parks / Carmel River State Park
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MONTEREY COUNTY TSUNAMI INCIDENT RESPONSE PLAN

Annex J: BIG SUR COAST / COASTAL AREAS SOUTH OF CARMEL LAGOON AREA

RESPONSE AGENCIES:

Monterey County Sheriff's Office, Mid Coast Fire Brigade, Big Sur Volunteer Fire Brigade, Carmel Highlands Fire Protection District / CDF, California State Parks, United States Forest Service, Westmed, Cambria Ambulance

OVERVIEW:

The coastline of Monterey County south of the Carmel River Lagoon area is quite different than the coastline from the Lagoon north. In this portion of the county, very steep cliffs, often nearly vertical, define the shoreline. Because the cliffs and bluffs are so high, tsunami inundation is not possible, with the exception of at creek mouths and along stretches of beach. Because the population of this area is so small, and because the vast majority of development is well above the tsunami evacuation zone, no evacuations will need to be conducted in this portion of the county, with the exception of the aforementioned beaches. However, there are still several concerns relating to tsunami warning response that will need to be addressed for this area. For the purposes of this annex, the response area is defined as the coastline from Point Lobos State Reserve south to the San Luis Obispo County line, to include Highway 1 which parallels the coast.

If a tsunami warning is issued and evacuations are ordered for the zones targeted for such, the coastal areas south of Point Lobos State Reserve will be in response mode although no formal evacuations will need to be ordered. The areas of concern for the portion of the coastline are the beach access points along Highway 1, creek / river mouths along the ocean, and the several State Parks in the region.

There are approximately 15 beach access points along Highway 1 from Point Lobos to the SLO county line, which includes approximately 75 miles of coastline. In the event of a tsunami warning, these areas will need to be cleared. Due to the large area needing to be responded to, the time needed to clear all beaches in the area, and the short amount of time usually associated with tsunami evacuation, this could pose a significant challenge. The Sheriff's Office will lead the effort of clearing the beaches of County jurisdiction, while California State Parks will be the lead agency for State Parks' beaches.

Incident Command will be established at the Multi-Agency Facility, Highway 1, Big Sur.

Beach Access Points along Highway 1

These are County jurisdiction beach access points that may need to be evacuated in the event of a tsunami (with responsible fire agency in parentheses)

Pfeiffer Beach (USFS)
Surfer beach (Big Sur Fire Brigade)
Big Creek (Big Sur Fire Brigade)
Kirk Creek (USFS)
Mill Creek (USFS)
Sand Dollar Beach (USFS)
Jade Cove (USFS)
Willow Creek (USFS)

California State Parks that have beachfront

These parks have beachfront areas that will need to be cleared / evacuated.

Point Lobos State Reserve
Garrapata State Beach
Andrew Molera State Park
Julia Pfeiffer Burns State Park – Partington Cove area
Limekiln State Park
Pt. Sur Naval Facility
Pt. Sur Lighthouse

Creek / River Mouths along shoreline

Inundation of water can occur at creek and river mouths, and extra attention should be made to these areas in the event of a tsunami. Large inland inundation is not expected, although greater volumes of water are likely to be present in the creeks / rivers, especially nearer to the beach. The larger the creek or river, the larger the carved valley / canyon will be, and thus the larger the potential for increased water in the creek or river. Special attention should be made to picnic areas along or near creek / river mouths and beaches located at creek / river mouths.

Highway 1

From Point Lobos State Reserve south, Highway 1 is above the tsunami evacuation zone and out of harm's way from incoming water. Highway 1 will be the primary route used by emergency officials responding to an incident. Therefore, people in the area need to be advised to stay off of Highway 1 during the tsunami warning window. For traffic and safety reasons, Highway 1 should be closed to non-emergency northbound and southbound traffic south of Point Lobos State Reserve. This is to ensure that people are

not entering the tsunami evacuation zone along Highway 1 north of the Reserve. This is also to prevent people from entering the Big Sur Coast area attempting to catch a glimpse of the tsunami approaching the shore.

Safe Areas

This portion of the Monterey County coastline is well-protected from tsunamis, but people in the area may not be aware. Therefore, people told to leave the beach or State Park need to know to move inland or to higher ground, but that they do not need to travel farther inland than Highway 1. People should be told to not drive along Highway 1, rather stay put in a safe area along the highway. Persons traveling through the Big Sur area will be directed to stage in turnouts along the east side of Highway 1. Staging areas can also be set up as needed at Julia Pfeiffer Burns State Park (east side parking) and Pfeiffer Big Sur State Park (day use area).

SPECIAL CONSIDERATIONS

Cut-off areas

In the event of a tsunami warning and subsequent restricted access to Highway 1 north of Carmel Highlands, the Big Sur Coast will become effectively cut off from the rest of the county. Although this would be a situation encountered before for this region, it must be noted that it is likely to occur again if evacuations are ordered for a tsunami. Because much of the area north of Point Lobos State Reserve along Highway 1 will need to be evacuated, it is imperative that people not be allowed to enter that evacuation zone.

Observers

Due to the curious nature of people, many choose to actually go to the beach to see the tsunami. Because of the high cliffs overlooking the ocean, people may come to this area seeking to get a “good view” of the incoming tsunami. Although technically these people would be out of an evacuation zone, traffic moving southbound along Highway 1 attempting to get to an overlook may impede first responders’ abilities to respond to what will certainly be a confusing and possibly chaotic situation. Therefore, access to Highway 1 should not only be restricted for northbound traffic entering an evacuation zone, but also southbound traffic attempting to view the tsunami. Highway 1 will not be used as an evacuation route for those told to evacuate from the Carmel River Lagoon area.

All Clear / Tsunami Warning Cancellation

As stated before, a tsunami is a *series* of waves, not a single wave. Therefore, the event may not be over once a wave has reached shore. Once the last wave has been observed, the EOC will issue a warning cancellation message. Until the cancellation message is issued, it is not advised that first responders return to the evacuation zone. Any subsequent wave may reach shore in as little as 5 – 30 minutes. This will likely not be sufficient time to return to the area, respond to an incident, and re-evacuate the zone. This is very similar to people returning to the scene of a hurricane when the eye is passing over, only to be hit with the backside of the storm.

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MONTEREY COUNTY **TSUNAMI INCIDENT RESPONSE PLAN**

Annex K: FEDERAL / DEFENSE INTERESTS IN MONTEREY COUNTY

RESPONSE AGENCIES: Naval Postgraduate School, Presidio of Monterey, United States Coast Guard

OVERVIEW:

Monterey County has long been associated with the United States Armed Forces and Federal Government, including the Army at the Former Fort Ord, the Presidio of Monterey, and Defense Language Institute (DLI), the Naval Postgraduate School (NPS), the Coast Guard Station, and the National Oceanic and Atmospheric Administration (NOAA). Many of these facilities are located at or near the coast and in areas targeted for evacuation from a tsunami. The military and marine research presence in Monterey County also provides unique and specialized capabilities and expertise.

The areas of greatest concern in terms of tsunami evacuation zones for these Federal agencies are portions of NPS, the Coast Guard Station in Monterey, and NOAA's National Undersea Research Program (NURP), located in Moss Landing. These three facilities would each require some type of evacuation, and due to geography, response to each will not be the same.

Naval Postgraduate School (NPS) / United States Navy

NPS is located right along the coast, adjacent to a large area targeted for evacuation within the City of Monterey. Although the majority of the campus is above the elevations that should be evacuated, the northernmost and westernmost portions of campus (near Del Monte Lake) are low-lying and would need to be evacuated. A suitable evacuation plan for this small area would be to move people to above ground floor in any of the multi-story buildings on campus. Several of the campus buildings, especially those nearest to Highway 1, are completely out of the evacuation zone (even ground floor). NPS Police has the authority to evacuate those in harm's way to higher elevations; however it is recommended that those told to evacuate low-lying portions of NPS stay within the confines of the campus, above ground floor. This would be to lessen the amount of traffic and possible panic on the streets of Monterey. It should also be noted that as one leaves the campus to the west or north into Downtown Monterey, the vulnerability increases. If one must leave the campus, it should be to the South.

As a side note, the U.S. Naval Research Facility, co-located with the Fleet Numerical Center and the National Weather Service on Grace Hopper Ave. near the Monterey Peninsula Airport, lies completely out of the evacuation zone and could potentially be

used for whatever response needs are deemed necessary by the Navy (staging, sheltering Navy personnel, etc.).

United States Coast Guard

For obvious reasons, the Coast Guard constantly monitors sea conditions, and as a result may very well receive a tsunami watch or warning before the EOC, Sheriff's Office, or any other agency. Due to its location, the Coast Guard will need to respond quickly. Should there be a teletsunami observed (a wave that allows at least an hour or more response time before arriving), the Coast Guard will send its vessels out to open ocean (to approximately the 100-fathom curve / 2 miles out to sea). A near-shore event would likely not allow for vessels to be sent out to sea. The USCG Station is located where a total evacuation would be necessary. Should the station need to be evacuated, USCG will move its operations / command post to the Presidio of Monterey Defense Language Institute, which is located more inland and at higher elevation.

United States Army / Presidio of Monterey / Defense Language Institute

Long after the closing of Fort Ord, the U.S. Army maintains a strong presence along the Monterey County coast. Fortunately for tsunami response, very little of the Army's property would be affected by a tsunami. The Former Fort Ord area (now belonging to the Cities of Marina, Seaside, and Del Rey Oaks, CSU Monterey Bay, and California State Parks) is located along the coast, but benefits from high bluffs along the coast that would impede inundation of water from a tsunami. There are no areas targeted for evacuation within the Former Fort Ord area, with the exception of the immediate beach, which is now State Parks' jurisdiction. Because of this, Presidio of Monterey Police and Fort Ord Fire personnel may be able to assist in the response effort.

The Presidio of Monterey is also located completely out of the evacuation zone, and therefore would require no evacuations. However, the U.S. Coast Guard will shift operations / command post to the Presidio's Defense Language Institute (DLI) due to the necessity of evacuating the Coast Guard Station.

The Presidio also has the capability to make available its roads to possibly assist in the evacuation. However, since most of the city lies in areas where on foot and vertical evacuation is preferred, this may not be necessary. Should it become inevitable that the evacuation effort is stalling due to clogged roads, people not heeding the on-foot and vertical evacuation recommendations, or for whatever other reason, the Presidio can make its normally restricted roads available to aid in the evacuation. It should also be noted that in the event the Lighthouse Ave. tunnel needs to be closed due to flooding or fear of flooding, the roads through the Presidio offer the best means for traffic ingress and egress between the City of Monterey and points north and west.

National Oceanographic and Atmospheric Administration (NOAA)

NOAA operates several facilities within Monterey County, including two right along the coast, one of which would need to be completely evacuated. The facility of largest concern is the National Undersea Research Program (NURP), located in Moss Landing. Due to its topography, virtually all of Moss Landing will need to be evacuated in the event of a tsunami warning. Moss Landing falls into an area that the Monterey County Sheriff's Office is tasked with evacuating. The center will need to be evacuated and those told to leave will need to move inland and to higher elevation. North County High School will be used the staging area for North County / Moss Landing evacuees.

Although the Pacific Fisheries Environmental Lab is located very near the coast at Asilomar, it lies completely above the evacuation zone. Therefore, no evacuations would be necessary for this facility.

The National Weather Service Office, co-located with the Naval Research Laboratory and Fleet Numerical Center on Grace Hopper Ave in North Monterey also lies completely out of the evacuation zone. Therefore, the Federal government and/or the U.S. Navy may use this facility for the response effort if need be.