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Questions and Answers on El Niño

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As a principal steward of the California coast, the Coastal Commission must carefully balance conservation of public resources with the needs of coastal landowners to protect their property against natural hazards such as storm waves, erosion, flooding, and landslides. This is intended to advise coastal property owners and public agencies of coastal permitting requirements in connection with winter storm preparedness and response to damage. It also provides some technical information that may be helpful. The Commission staff stands ready to assist in any way possible. At the end of this document, we provide a list of phone numbers and addresses for the [Coastal Commission offices](#).

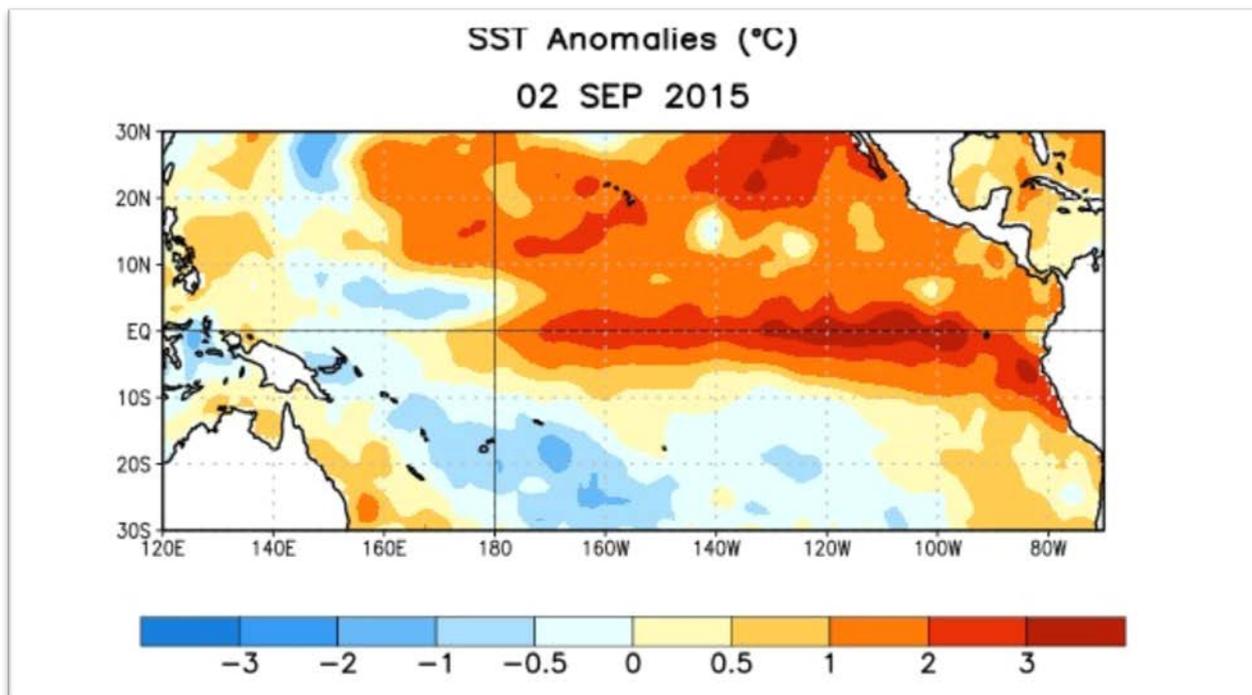


Figure 1. Average sea surface temperature (SST) anomalies (°C) for the week centered on 2 September 2015. Anomalies are computed with respect to the 1981-2010 base period weekly means. *Source:* NOAA Climate Prediction Center.

Q What is El Niño?

El Niño is the popular term for an El Niño-Southern Oscillation (ENSO) event. The most notable aspect of an El Niño is the migration of warm water from the western Pacific to the eastern Pacific, along the coasts of South America, Central America, and California. This warmer water can affect fisheries and cause a persistent elevation of sea level. The Southern Oscillation refers

to a shift in atmospheric pressure, with a pressure increase in the eastern Pacific and pressure decrease (a low pressure system) in the central Pacific. In California, this low pressure system can cause more southern storm tracks that often bring more rainfall. El Niños are not directly connected with climate change; however, there are some studies¹ that suggest that there may be more frequent El Niños as a result of warmer ocean water. Storms during an El Niño event also provide an idea of possible consequences from more routine winter storms after a rise in sea level. For a primer on El Niño and to see updated forecasts, visit the NOAA web site: <http://www.pmel.noaa.gov/tao/elnino/nino-home.html>



Figure 2: Topanga Creek after one of the El Niño storms of 1997-98.
Photo credit: L. Ewing

Q How is El Niño expected to affect weather and rainfall for this year?

According to the September 2015 ENSO forecast by NOAA, there is a 95% chance that there will be El Niño conditions this winter. Ocean warming is one indicator of El Niño strength, and the sea temperatures for June through August were the third highest since such records were started in 1950. Only the temperatures in 1987 and 1997 – both years with damaging storms – were higher. However, there are many ‘flavors’ of El Niños and only time will tell if this winter has above or below average rains and coastal storms.

Often during El Niño conditions, storms take a more southerly track than normal, bringing more precipitation to the southern part of the state where there are few reservoirs to store the water. And, if more precipitation falls as rain, less water will be stored as snow pack for summer use. So, more rain may trigger mudslides and floods, but do little to alleviate the drought. Mudslides and debris flows are of special concern for watersheds that contain areas that have recently had fires and still have unvegetated slopes.

One of the observations from past El Niño events has been that some of the most damaging storms are those that coincide with the highest tides. Storms that peak during high tides are far more likely to cause damage than if the same storm peaked during low tide. Some of the highest

¹ Cai *et al.* 2014. “Increasing frequency of extreme El Niño events due to greenhouse warming”, *Nature Climate Change*, 4, 111–116; doi:10.1038/nclimate2100.

tides for the 2015/16 winter will occur close to holidays (see table below). This highlights the need for early preparation since holidays are times that people tend to travel and go on vacation. Even when people remain at home, the focus is often more on family, than the property.

Dates of Tides Greater than 6 Feet, for the 2015/16 Winter Season

		Locations with Major Tide Stations and Corresponding Dates						
MONTH	Tides	San Diego	Los Angeles	Santa Barbara	Monterey	San Francisco	Humboldt	Crescent City
November	Tides > 6 ft	9 th -14 th 22 nd -29 th	22 nd - 28 th	23 rd -27 th	23 rd -27 th	22 nd -28 th	1 st -2 nd 5 th -17 th 19 th -30 th	1 st -2 nd 5 th -17 th 19 th -30 th
	Tides > 7 ft	24 th -27 th	25 th				10 th -14 th 22 nd -29 th	10 th -14 th 21 st -29 th
	Tides > 8 ft						24 th -27 th	24 th -27 th
December	Tides > 6 ft	8 th -14 th 21 st -27 th	10 th -13 th 21 st -27 th	22 nd - 26 th	21 st -26 th	9 th -13 th 20 th -27 th	1 st -31 st	1 st -31 st
	Tides > 7 ft	23 rd -25 th					8 th -14 th 19 th -28 th	8 th -14 th 9 th -28 th
	Tides > 8 ft						22 nd -26 th	22 nd -26 th
January	Tides > 6 ft	7 th -12 th 19 th -25 th	8 th -11 th 20 th -24 th	10 th 21 st -22 nd	9 th -11 th 20 th -23 rd	6 th -12 th 17 th -25 th	1 st -31 st	1 st -31 st
	Tides > 7 ft						6 th -13 th 16 th -26 th	6 th -13 th 15 th -26 th
February	Tides > 6 ft	6 th -10 th 19 th -22 nd	7 th -9 th		1 st -8 th	5 th -10 th 13 th -21 st	1 st -29 th	1 st -29 th
	Tides > 7 ft						5 th -22 nd	5 th -22 nd
March	Tides > 6 ft	6 th -9 th	8 th			6 th -9 th 11 th -13 th	1 st -29 th	1 st -29 th
	Tides > 7 ft						6 th -14 th	6 th -14 th
April	Tides > 6 ft	6 th -9 th	7 th -9 th			7 th -11 th	3 rd -14 th 18 th -27 th	3 rd -13 th 19 th -27 th
	Tides > 7 ft						7 th -11 th	6 th -11 th

Source: Developed from NOAA Tide Predictions on the Tides & Currents page
https://tidesandcurrents.noaa.gov/tide_predictions.html?gid=235

Q What have been the effects from past El Niño events?

The 1982/83 El Niño and the 1997/98 El Niño brought high rainfall and coastal wave surge in California. There was extensive flooding, landslides, coastal erosion, and damage to coastal structures. These storms were viewed as being extraordinary and have often been used as the "design" event for new development. The year 1977 was also an El Niño year; but 1977, in contrast, had a lower than average rainfall since a high pressure system settled over southern California and diverted storms to the north. Each El Niño is different.

Q What can people do in response to these predictions?

Due to El Niño we may experience elevated sea level and some severe winter storms. Local governments and coastal property owners should undertake common sense inspections of their property to identify prudent maintenance activities to minimize potential storm damage. Even if there are no severe storms this winter, it is almost certain that, in the next few years, some parts of the California coast will be battered by intense storms and that some areas will experience flooding or will have storm induced landslide movement. Property inspections and periodic maintenance are sensible winter preparation, regardless of the current El Niño development.



Figure 3: Cardiff State Beach, San Diego after one of the El Niño storms of 1997-98. *Photo credit:* L. Ewing

Q How is the Coastal Commission responding to El Niño?

Predictions associated with El Niño vary greatly and there is no way to be certain about the severity of this winter's storms. The Coastal Commission is very concerned about the threat to public safety and the potential for shoreline property loss. Prudence and experience dictate that preparedness is a good course of action. The Commission certainly supports efforts to maximize advance readiness planning, and other reasonable actions to protect shoreline properties. At the same time and based on considerable experience, there are legitimate concerns that some emergency projects proposed as protective measures are excessive in scope and impact, inadequately designed such that they may actually create or contribute to a dangerous condition, and result in significant harm to or loss of public resources (*i.e.*, diverting water toward the toe of a landslide or displacing of public beach with rock rip-rap to protect private property). It is also important that emergency shoreline protection projects are designed and constructed under the supervision of a qualified coastal engineer. Commission staff will be as helpful as possible and will be creative and flexible in finding answers and "solutions" to questions about shoreline protective works and how to minimize coastal permitting burdens. It is important for coastal property owners to recognize that in some cases the emergency shoreline protective measures/structures, as proposed, may not be consistent with the Coastal Act or a certified Local Coastal Program. Therefore, it is imperative that project alternatives be carefully considered that minimize impacts to sensitive coastal resources and encroachment onto the beach. Furthermore, some proposed projects may not meet the criteria for an emergency permit or a permit waiver. If

you have questions, call a Commission office as soon as possible and staff will do what it can to help you through the process.

Q What is meant by repair and maintenance; what coastal permits do I need?

Repair and maintenance for storm protection encompasses a broad range of activities. For flood protection, it could involve clearing out debris basins or dredging a flood control channel; for homes and businesses, it may include cleaning out gutters and down drains, inspecting roofs, or planting ground cover on bare areas; for shore protection, it could include patching shotcrete, refacing concrete, cleaning out drains or placing displaced rock back on an existing revetment.

Many repair and maintenance activities can require a coastal permit, especially if there will be grading, landform alteration, or the use of mechanized equipment on the beach or near a coastal stream or bluff. For projects in the coastal zone, property owners should contact both the Commission staff and local government to determine 1) if a coastal permit is necessary, and 2) what information will be needed to file an application for a permit. Many repair and maintenance activities can be reviewed quickly and permits could be waived, but to avoid violations it is important to contact staff before proceeding.

Q What permits are needed to install a new protective structure to address ongoing safety concerns?

There are situations where property owners identify new projects they want to undertake to address pre-existing site conditions that relate to safety concerns — a recently activated or reactivated landslide, slope failure, or an existing structure which is in danger from erosion. These situations usually require permanent solutions — regrading of a landslide, a buttress fill, slope reconstruction, retaining walls, new revetments or seawalls. These actions almost always require a coastal permit. Property owners should contact both the Commission staff and local government to determine 1) if a coastal permit is necessary, and 2) what information will be needed to file an application for a permit. Permits for permanent new structures often require detailed information on site characteristics, design constraints, engineering concerns, *etc.*

If there is an existing imminent threat or if there has been damage that requires action more quickly than the regular permit process will allow, there are provisions in the [Coastal Act](#), and in most local coastal programs, to authorize emergency permits. A perceived threat from potentially extraordinary storms is not generally considered an emergency under the Coastal Act. Rather, the Commission's implementing regulations deem an emergency to be "a sudden unexpected occurrence demanding immediate action to prevent or mitigate loss or damage to life, health, property or essential public services." If an emergency occurs, the emergency permit process is meant to allow for the minimum amount of temporary measures necessary to abate the emergency (for example, easily removable sand bags might be more appropriate in an emergency context than would be a concrete seawall). In that context, the objective is to abate the emergency, and it is not to use the emergency process to install substantial protective works that might not otherwise be allowed under the Coastal Act. In all cases, emergency coastal permits only authorize development temporarily, and anything that is intended to be kept for the longer term requires a follow up regular coastal permit. For these reasons, the emergency coastal permit process is used judiciously, including to avoid significant investments in unapprovable infrastructure. The Commission will evaluate each request on a case-by-case basis.



Figure 4: Oxnard Shores after 1983 El Niño storms.
Photo credit:
R. McCarthy

Q What about new protective work to address safety concerns from potential extraordinary threats, such as this year's El Niño?

Many properties will be safe during "normal" storms, but could be at risk during an extreme event. Because the current El Niño event may cause extreme storm conditions, property owners and communities may hope to take steps to add temporary protection to prevent damage in the winter. These types of preventive actions are generally not considered emergencies, but may need expedited approvals to enable them to be installed prior to the winter storm season. It may be possible to expedite projects that: 1) have little or no environmental impact; 2) have little or no effect on public access and recreation; 3) are temporary; 4) are removable; and 5) pose no risk to coastal resources or public safety. Contact Commission staff for more information.

Temporary shore protection options include beach nourishment, sand berms, sand bags at the toe of a bluff, or articulated concrete matting keyed below scour depth. Temporary slope protection could include revegetation, sand bags or geotubes to redirect drainage to appropriate areas; or slope coverings such as visqueen, jute or light weight concrete matting. There are few temporary options for landslides other than drainage controls and removal of toe debris. Most landslide problems require permanent protection measures. Most of these temporary measures could require some type of permit, so contact Commission staff for more information.

Q How do I get permits for temporary protection options?

Temporary measures for shore protection, slope protection and landslides may not be suitable in every situation. For example, it may be harmful to use slope covering over a slope that contains sensitive resources; or an articulated concrete mat may not be a good option for a shallow bedrock platform area where the matting cannot be keyed without excavation of the platform material. Prior to proceeding with temporary protection, property owners should contact both the Commission staff and local government to determine 1) if a coastal permit is necessary, and 2)

what information will be needed to file an application for a permit. In many situations, early contact with staff can avoid problems and enable you to proceed with your plans in a timely manner and environmentally acceptable fashion.

Q When should I contact Commission staff?

Commission staff is prepared to consider each situation independently and review the conditions and facts of each problem on a case-by-case basis. We encourage local governments and property owners to assess their situations or properties now and contact your local Commission office for consultation and direction. A brief written description, and a drawing and site plan of any proposed project, if time permits, would allow Commission staff to review requests more efficiently.

Here are links to the emergency permit application form should you need one:

- Here is the [form in PDF](#) which you should print out and fill out.
- Here is the [form as a Microsoft Word Template](#) (.dot). Download it and save it to your computer. Open it in Microsoft Word where you may (after entering your information, save as a .doc file and print out to send).

A [list of commission offices](#), addresses and telephone numbers is provided below and on the Commission’s web site at www.coastal.ca.gov. If there is a certified local coastal program, property owners should contact the local government staff directly. If the work involves any shoreline protective work or bluff work, property owners should contact *both* local government staff and Commission staff.

District Office	Address	Phone	Geographic Responsibility
North Coast	1385 8th Street Suite #130 Arcata, CA 95521	(707) 826-8950	Del Norte, Humboldt and Mendocino Counties
North Central Coast	45 Fremont Street, Suite 2000 San Francisco, CA 94105	(415) 904-5200	Sonoma, Marin, San Francisco and San Mateo Counties
Central Coast	725 Front Street, Suite 300 Santa Cruz, CA 95060	(831) 427-4863	Santa Cruz, Monterey and San Luis Obispo Counties
South Central Coast	89 S. California Street, Suite 200 Ventura, CA 93001	(805) 585-1800	Santa Barbara, Ventura and Los Angeles Counties
South Coast	200 Oceangate Long Beach, CA 90802	(562) 590-5071	Los Angeles and Orange Counties
San Diego Coast	7575 Metropolitan Drive, Suite 103 San Diego, CA 92108	(619) 767-2370	San Diego County