



California Project WET Gazette

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Nature Rules

Californians are gearing up to celebrate the end of a winter that has brought our state abundant precipitation and a heavy Sierra Nevada snowpack to help refill drought deleted reservoirs. Yet, while the forces of nature have helped quenched our thirst this year, others have not been so fortunate. Many states east of the Rocky Mountains are bracing for extensive flooding as record snowfalls begin to rapidly melt. We have witnessed the horrible power of tsunami waves that have devastated Japan and damaged our shores, and are still holding our breath as a nuclear crisis unfolds due to an inability to get water to flow in reactor coolant systems. And it should not be forgotten that large areas of our own state are still recovering from December storms that buried neighborhoods under water and mud. As we look around the world and take stock of our situation during this season of Spring celebrations, it is a good time to remember our own water fortunes can just as quickly change and prepare ourselves for likely future hazards in our own future.

Natural hazards are a part of living in California. We are a geologically active state sitting atop the aptly named 'Ring of Fire' with an ocean front view of the Pacific Rim. Tectonic plates collide and destroy each other beneath us in fits and starts that fracture, shove and melt the surrounding rock as they have for millions of years. The Cascadia Subduction Zone is located off our northern coast where tectonic plates are being forced in the hotter depths of the Earth, providing geothermal heat plumes that give rise to our active volcanic areas. Geyser fields are one example of this geothermal activity and students can learn the mechanics of how these features operate in the activity *'Geyser Guts'* (p: 144). Evidence also suggests the Cascadia Subduction Zone was the source of a tsunami that struck Japan in the year 1700. (http://www.pnsn.org/HAZARDS/CASCADIA/cascadia_event.html).

California has predominately a Mediterranean climate, characterized by wet winters and hot, dry summer. The activity *'Wet Vacation'* (206) has students analyzing factors that affect temperature and precipitation patterns in the United States. By having students go one step further to locate and compare graphs of annual precipitation for the listed California cities and those in other US States, our unique climate becomes readily apparent. This additional information can be found on the NOAA website: (<http://www.esrl.noaa.gov/psd/data/usclimate/states.fast.html>). Our unique climate provides the perfect conditions to grow loads of vegetation that quickly turns into a tinder box ready to burn each year. *'Thirsty Plants'* (p: 116) and *'Water Address'* (p: 122) can both be used to study how plants and animals survive in different climates.

California can also experience severe weather events, as evidence by the multitude of flood watches issued throughout the state this winter, sightings of a funnel cloud a few weeks ago- and 3 years of severe drought in the preceding years. Lightning is a major cause of forest fires in California and the concentrated rainfall these storms can deliver is highlighted in the activity *'Thunderstorm'* (p: 196), which also includes how to estimate the distance of a thunderstorm from one's location and set-up a

simple monitoring network to estimate precipitation amounts. *'Just Passing Through'* (p: 166) can be used as a follow-up to help students understand the potential impacts of erosion following fires or severe precipitation events. The activity also has students investigate and evaluate measures taken to reduce the threat of erosion and thus the threat of debris flows.

The activities *'Nature Rules'* (p: 262), *'Dust Bowls & Failed Levees'* (p: 303) and *'AfterMath'* (p: 289) can be used to investigate current and historical natural disasters. *'Nature Rules'* (p: 262) is an activity that focuses student attention on the visual evidence of water-related disasters to help them understand how powerful a force water can be in the natural world. Through literature study, research and writing, the activity *'Dust Bowls & Failed Levees'* (p: 303) focuses student understanding on the effects of drought, flood and other water-related events on people through time. The activity focuses on the dust bowl in the books, but can just as easily be applied to investigating the impact of past versus the current tsunami impacts, flooding or drought events in California. *'AfterMath'* (p: 289) asks students to determine what are the real losses associated with a natural disaster like a flood or tsunami. Students calculate economic losses from a mock flood event and evaluate potential losses that can't be replaced. Students identify and design an emergency preparedness kit for likely natural events closer to home in the Project WET activity *'Take Action'*, providing a natural follow-up for AfterMath. *'Take Action'* is available for free download through the end of March at: www.projectwet.org. Please see the *'Websites of Interest'* for more information related to natural hazards in our state, as well as events to help prepare for or reduce the risk of natural hazards at home and in the community.

WEBSITES OF INTEREST

CA Emergency Management Agency Hazard Mitigation Portal <http://myhazards.calema.ca.gov/>

Natural hazards are part of living in California. Having a preparedness kit will help you weather the days after a disaster, but did you know there are steps you can take that may actually reduce the risks of injuries to you and your neighbors and lessen the damage to your home? Use this website to discover the hazards that exist in your area and learn how to reduce YOUR risk! Remember, the best way to recover from disasters is by reducing the risks before a disaster strikes. CalEMA has created this user-friendly website where you can enter in your address and find out if you live within an area at risk to hazards from earthquakes, flooding, fire, and tsunami inundation.

Magnitude 8.9 Near the East Coast of Japan <http://www.usgs.gov/corecast/details.asp?ep=147>

A magnitude 8.9 earthquake struck the coast of Japan on March 11, 2011. USGS geophysicists and Bill Ellsworth and Eric Geist talk to CoreCast host Kara Capelli about the quake and subsequent tsunami.

USGS: Tsunami and Earthquake Research <http://walrus.wr.usgs.gov/tsunami/>

Here you will find general information on how local tsunamis are generated by earthquakes as well as animations, virtual reality models of tsunamis, and summaries of past research studies. The scope of tsunami research within the USGS, however, is broader than the topics covered here. USGS researchers have also provided critical research toward understanding how sediments are transported during tsunami runup and deciphering the geologic record of prehistoric tsunamis. The USGS collaborates closely with the National Center for Tsunami Research: <http://nctr.pmel.noaa.gov>.

Tsunamis http://www.consrv.ca.gov/cgs/geologic_hazards/Tsunami/Pages/About_Tsunamis.aspx#introduction

A tsunami is a sea wave generated by an earthquake, landslide, volcanic eruption, or even by a large meteor hitting the ocean. (The Japanese word tsu means harbor; nami means wave.) These sea waves can move more than 800-kilometers (500-miles) per hour. Though damaging tsunamis have occurred infrequently in California, they are a possibility that must be considered in coastal, and even deep-lake shoreline, communities.

TsunamiReady

<http://www.tsunamiready.noaa.gov/>

Schools, playgrounds, hospitals, factories and homes are often built in areas vulnerable to tsunamis. The TsunamiReady Program, developed by the National Weather Service, is designed to help cities, towns, counties, universities and other large sites in coastal areas reduce the potential for disastrous tsunami-related consequences. The NWS StormReady and TsunamiReady programs can help you be better prepared to save lives during threatening weather through better planning, education, and awareness.

Flooding Spring 2011

<http://www.usgs.gov/corecast/details.asp?ep=148>

USGS CoreCast. The upper Midwest, the Deep South, the Northern Plains, the Ohio Valley and parts of southern New England are experiencing flooding now or are highly vulnerable to flooding this spring. In this episode of CoreCast USGS National Flood Coordinator Bob Holmes talks to CoreCast host Kara Capelli about why increased flooding is likely this year and how USGS is responding.

Overview of the ARkStorm Scenario

<http://pubs.usgs.gov/of/2010/1312/>

The U.S. Geological Survey, Multi Hazards Demonstration Project (MHDP) uses hazards science to improve resiliency of communities to natural disasters including earthquakes, tsunamis, wildfires, landslides, floods and coastal erosion. The project engages emergency planners, businesses, universities, government agencies, and others in preparing for major natural disasters. This document summarizes the next major public project for MHDP, a winter storm scenario called ARkStorm (for Atmospheric River 1,000). The hypothetical storm depicted here would strike the U.S. West Coast and be similar to the intense California winter storms of 1861 and 1862 that left the central valley of California impassible.

StormReady

<http://www.stormready.noaa.gov/links.htm>

Each year across America there are on average 10,000 thunderstorms, 5,000 floods, 1,000 tornadoes, and 6 named hurricanes. Additionally, about 90 percent of all presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly \$14 billion in damage. The web links provided on this page will help you determine how your own home town can be affected by the ravages of severe weather.

Flood of 1955 Interviews

<http://www.sutterbutteflood.org/podcasts.html>

The destructive power of water is on full display during flood events and one of the worst in recent history was the Christmas Eve flood of 1955. The Sutter Butte Flood Control Agency provides free podcasts of the radio series 'What About the Flood?' - a 1956 radio series in which survivors shared their harrowing accounts of the night Sutter County flooded after a levee broke apart in Yuba City. The 8 interviews of this 38 part series are available at the website above. The Project WET activities '*Dust Bowls and Failed Levees*' (p: 303) or '*Nature Rules*' (p: 262) for ready-made for integrating the podcasts.

Water Facts & Fun

<http://www.water.ca.gov/education/wffcatalog.cfm>

Lots of free materials for California educators, including '*The California Water Works*' that has a colorful comic book character, Professor Goodwater, leading students through the water cycle, showing them how water is delivered through California's built and natural water systems to the end users. Guidelines for water conservation are provided as well.

If you would like more information on Project WET please contact Brian Brown, California Project WET Coordinator at: projectwet@watereducation.org or (916) 444-6240.

Check our website www.watereducation.org and/or contact us for updates.