



**School Earthquake Safety Initiative
Tsunami Mitigation for Schools Subcommittee**

**Tsunami Awareness, Preparedness and
Education Resources for Schools**

Version 1.0, dated September 19, 2016

CALIFORNIA

CGS TSUNAMI WEBSITE

California Geological Survey Tsunami Program website provides several resources for tsunami preparedness, mitigation and information.

<http://www.tsunami.ca.gov>

(the links below for California can also be found via the above, simplified URL)

TSUNAMI EDUCATION, OUTREACH, AND ONLINE RESOURCES PAGE

Provides outreach materials including educational videos, K-12 tsunami education materials, and general tsunami education/information resources

http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Pages/TsunamiEducation.aspx

ONLINE CALIFORNIA INUNDATION MAPS

Includes interactive maps, inundation maps by county, and spatial data.

http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps/Pages/Index.aspx

HOW TO SURVIVE A TSUNAMI BROCHURE

Tsunami preparedness and survival guide (Also in print)

http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Documents/TsunamiBrochure.pdf

TSUNAMI INFORMATION POSTER

Basic tsunami information and what to do. It also includes a list of notable tsunamis in California. (Also in print)

http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Documents/2010_tsunami_poster.pdf

INFORMATION NOTE CA TSUNAMIS

Tsunami information, warning signs and evacuation and preparedness procedures. (Also in print)

http://www.conservation.ca.gov/cgs/information/publications/cgs_notes/Documents/CGS_Note_55.pdf

VIDEO: KNOW WHAT TO DO!

Animated video that describes a tsunami and how to prepare for one. Good for educational purposes and showing to children. (CD; Spanish subtitles)

<https://www.youtube.com/watch?v=M6n0gsDeUio&feature=youtu.be>

TILLY SMITH VIDEO

Story of 10 year old girl who recognized tsunami warning signs on the coast of Thailand in 2004 and was able to help 100 people evacuate in time.

<https://www.youtube.com/watch?v=E0yrONL1Q3g&eurl>

USGS TSUNAMI PREPAREDNESS VIDEOS

USGS Tsunami Preparedness Videos for California Coastal regions (online and on CD):

[Tsunami Preparedness in Northern California Area](#)

[Tsunami Preparedness in Southern California](#)

[Tsunami Preparedness along the West Coast, USA](#)

[Tsunami Preparedness in Central California and the San Francisco Bay](#)

GUIDANCE FOR LOCAL JURISDICTIONS

This document provides local jurisdictions with guidance for assessing hazards after a large local earthquake that could inhibit safe evacuation from tsunami hazard areas.

http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Documents/Guidelines_for_Tsunami_Evacuation_Plan_Assessment.pdf

LINKS TO K-12 TSUNAMI EDUCATION/CURRICULUM/ACTIVITIES

K-12 tsunami education curriculum list and resources.

http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Pages/TsunamiEducation.aspx#K12ed

STATEWIDE BROCHURE: STAYING SAFE WHERE THE EARTH SHAKES

This booklet includes the "The Seven Steps to Earthquake Safety" - basic guidelines for what to do before, during, and after a damaging earthquake. This booklet is for all of California. Regional editions are available with local hazard information and contacts. Available in English, Spanish and Chinese. (Includes info on tsunamis) (Also in print)

<http://www.earthquakecountry.org/stayingsafe/>

CAL-EMA ONLINE CONTACT INFORMATION

Contact information of California State Emergency Managers.

http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Pages/ContactInformation.aspx

TSUNAMIZONE.ORG

This website provides suggestions and resources for families and organizations to "know their zone" and to learn how to be safe. Content includes drills and other resources.

<http://www.tsunamizone.org/>

MYHAZARDS

MyHazards is a tool for the general public to discover hazards in their area (earthquake, flood, fire, and tsunami) and learn steps to reduce personal risk. Using the MyHazards tool, users may enter an address, city, zip code, or may select a location from a map. The screen then presents information on the risks identified within the search radius, and recommended actions.

<http://myhazards.calema.ca.gov/>

REDWOOD COAST TSUNAMI WORK GROUP (CASCADIA):

LIVING ON SHAKY GROUND

The RCTWG has developed materials to educate North Coast residents about earthquakes and tsunami hazards, including brochures in English and Spanish and Living on Shaky Ground, a preparedness magazine series.

<http://www2.humboldt.edu/rctwg/site/brochures/>

EVACUATION MAPS (HUMBOLDT AND DEL NORTE COUNTY)

The RCTWG and Humboldt State University have developed relative tsunami hazard maps for much of the North Coast. The maps have been the basis for evacuation planning and response plans.

http://www2.humboldt.edu/rctwg/site/download_tsunami_maps/

TEACHER WORKSHOPS:

Tsunamis in California teacher workshops via the California Science Teachers Association (CSTA) annual science education conferences and with the Southern California Earthquake Center (SCEC).

CGS/Cal OES reaches out to hundreds of teachers each year at various venues providing them with the above resources.

HAWAI'I

KAI'E: HAWAI'I TSUNAMI EDUCATION CURRICULUM

Tsunami education curriculum by Pacific Tsunami Museum, a place-based and culturally relevant education program for Hawaiians and Pacific Islanders.

<http://www.discovertsunamis.org/>

THE TSUNAMI AWARENESS PROGRAM (TAP) – HAWAII

TAP – Hawaii, developed in 2012, expands upon a collection of existing tsunami awareness and preparedness resources to include Hawaii-specific examples, resources and templates, and provides instruction for their application.

<http://tap.pdc.org/>

TSUNAMI SAFETY BOOKLET FROM THE STATE OF HAWAI'I

Educational booklet with information, illustrations and activities that educate and prepare children for tsunamis.

http://www.tsunami.noaa.gov/docs/htsb_final_smfile.pdf

HAWAI'I EMERGENCY MANAGEMENT AGENCY

Website of Hawai'i's Emergency Management Agency. Provides information, evacuation zones and other resources.

<http://www.scd.hawaii.gov/index.htm>

HAWAI'I DEPARTMENT OF EDUCATION: EMERGENCY INFORMATION

Provides information on emergency procedures, drills, and guidelines for parents. It also provides a list of schools in the tsunami zone and guidance brochures for parents in 15 languages.

<http://www.hawaiipublicschools.org/BeyondTheClassroom/SafeSchools/Emergencies/Pages/home.aspx>

KAI'E TSUNAMI CURRICULUM: TSUNAMI EVACUATION GUIDELINES FOR SCHOOLS IN HAWAI'I

This document shares lessons learned, often at a painful cost, by schools that have been impacted by tsunamis in 2004, 2006, 2009 and 2011 across the Pacific and Indian Oceans, as well as tsunamis in 1946 and 1960 in Hawai'i.

http://www.discovertsunamis.org/pdf/School_Guidelines_for_Tsunami_Conference_Final.pdf

OREGON

LINCOLN COUNTY, OREGON

In the middle of the recession, four Lincoln County cities passed a \$63 million bond measure to move the last of the district's 11 schools out of the Tsunami zone. They attribute the success of the measure to framing it as a county stimulus package.

Source Documents:

Tsunami threat: Lincoln County schools leading Oregon coast in preparation for disasters
http://www.oregonlive.com/pacific-northwest-news/index.ssf/2013/07/tsunami_threat_lincoln_county.html

News article

Multi-Jurisdictional Natural Hazards Mitigation Plan for Lincoln County and others

http://www.co.lincoln.or.us/sites/default/files/fileattachments/emergency_management/page/3785/nhmp.pdf

Lincoln County Sheriff's Office Emergency Management

<http://www.co.lincoln.or.us/emergencymanagement/page/emergency-management-division>

CAN COASTAL COMMUNITIES SURVIVE A TSUNAMI?

This story is part of a series Oregon Public Broadcasting is doing on how well the Northwest is prepared for the magnitude 9.0 earthquake that scientists say will hit along the Cascadia Subduction Zone just off the Pacific Coast.

<http://www.opb.org/news/series/unprepared/unprepared-towns-along-coast-manage-tsunami-risk-in-different-ways/>

TSUNAMI VERTICAL EVACUATION REFUGE ACTIVITIES IN OREGON (2012)

The goals of the project are: (1) to help increase public awareness of tsunami vertical evacuation mitigation options in Oregon, and (2) to advance the understanding of proposed Cannon Beach Tsunami Vertical Evacuation

Refuge (CB TVER), including using FEMA P646 and FEMA P646A and to document the activities.

<http://ci.cannon-beach.or.us/community/TVER%20report%202-24-2012submitted.pdf>

OREGON TSUNAMI WAYFINDING RESEARCH PROJECT "UP AND OUT" (2014)

This study focuses on evacuation wayfinding before, during and after a severe tsunami event. The PUARL team studied the conditions of a variety of different coastal communities and disaster precedents through research, stakeholder input, and site testing. However, one particular town, Cannon

Beach was used as a case study with the intention to evaluate the specific conditions that could help establish general conclusions useful for other towns along the Oregon coast.

https://www.oregon.gov/OMD/OEM/plans_train/Earthquake/Final%20Up%20and%20Out_for%20print.pdf

OREGON TSUNAMIREADY COMMUNITIES AND HAZARD MAPPING

Oregon's Tsunami Hazard Mitigation Program is a partnership between DOGAMI, the National Tsunami Hazards Mitigation Program (NTHMP), NOAA, among others. DOGAMI requested \$3 million from NTHMP to complete tsunami inundation maps. The program also includes a volunteer driven education and outreach initiative called TsunamiReady, which supports the National Weather Service's program. There are currently 43 TsunamiReady target communities, and 35 have tsunami evacuation maps.

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

Oregon Geology Fact Sheet: Description of TsunamiReady TsunamiPrepared program.

<http://www.oregongeology.org/pubs/fs/TsunamiReady-factsheet-rev11-2011.pdf>

OREGON TSUNAMI CLEARINGHOUSE-OREGON'S TSUNAMI HAZARD MITIGATION PROGRAM (THMP)

Overview of Oregon's Tsunami Hazard Mitigation Plan including descriptions of the various subprojects.

<http://www.oregongeology.org/tsuclearinghouse/thmp.htm>

PREPARING FOR A CASCADIA SUBDUCTION ZONE TSUNAMI: A LAND USE GUIDE FOR OREGON COASTAL COMMUNITIES

A guide prepared by The Dept. of Land Conservation and Development in January 2014 covering land use mitigation strategies such as how to utilize the comprehensive and long range plans, development codes, financing and incentives, and evacuation plans.

<http://www.oregon.gov/lcd/ocmp/docs/publications/tsunamiguide20140108.pdf>

WASHINGTON

PROJECT SAFE HAVEN

Project Safe Haven is a grassroots, community driven, public process currently taking place in Pacific County, WA to identify areas for one of three types of future vertical evacuation structures; towers, buildings, and berms. A steering committee guided assessment of community evacuation location needs is achieved through site visits, community forums and engagement, and considerations for seniors and special needs populations. One of the vertical evacuation sites is located on top of a school in the Ocosta School District and is projected to hold 1500 people. Led by the Ocosta community and superintendent Paula Akerlund, it is the first of the designated projects to be in the implementation phase.

Source Documents:

Project Safe Haven: Tsunami Vertical Evacuation on the Washington Coast

http://mil.wa.gov/uploads/pdf/emergency-management/haz_safehavenreport_pacific.pdf

Report documenting the process and location selection methodologies including public engagement techniques and hand drawn location-specific structure ideas.

Project Safe Haven: Tsunami Vertical Evacuation in Washington State

<http://nws.weather.gov/nthmp/2014annualmeeting/VerticalEvacUpdate.pdf>

PowerPoint slides that characterize the hazards, describe community-based approach, their three evacuation options, and show some of the safe haven building drawings.

Project Safe Haven: Vertical Evacuation on the Washington Coast

<https://catalyst.uw.edu/workspace/wiserjc/19587/116498>

Website with many materials associated with the project including reports, flyers, maps, etc.

Washington County Plans U.S.' First Vertical Evacuation Tsunami Building

<http://www.emergencymgmt.com/disaster/Washington-County-Plans-Vertical-Evacuation-Tsunami-Building.html>

Interview with Deputy Director of Grays Harbor EM Chuck Wallace, this article talks about

Editorial: Smart planning for a tsunami in Grays Harbor

<http://www.seattletimes.com/opinion/editorial-smart-planning-for-a-tsunami-in-grays-harbor/>

WASHINGTON LED SCHOOL CURRICULUM

Information and Resources for Schools & Tsunami Curriculums (Washington, USA)

http://itic.ioc-unesco.org/index.php?option=com_content&view=article&id=1156:information-and-resources-for-schools-a-tsunami-curriculum-washington-usa&catid=1143:about-tsunamis-educationclassroom&Itemid=2018

EARTHQUAKE AND TSUNAMI -SURVIVING GREAT WAVES OF DESTRUCTION

This publication provides fundamental information about Washington's vulnerability to earthquakes and tsunamis. It provides information and resources for schools.

http://mil.wa.gov/uploads/pdf/emergency-management/haz_eq_tsu_sch_res_guide-intro-unit21.pdf

AN IMPACT EVALUATION OF SHAKEOUT, AN EARTHQUAKE AND TSUNAMI DRILL IN TWO WASHINGTON STATE SCHOOL DISTRICTS

The aim of this evaluation is to see how well children from grades 6 through 12 in Washington state school districts understood the objectives and consequences of the ShakeOut drill, which is an annual one-day event that aims to inform public about earthquake and tsunami preparedness.

https://www.massey.ac.nz/massey/fms/Colleges/College%20of%20Humanities%20and%20Social%20Sciences/Psychology/Disasters/pubs/GNS/2013/SR_2013-019.pdf?ECB2CBB195AAE4F46A0B10B803852931

AMERICAN SAMOA TSUNAMI STUDY

At the request of Samoa, the US Army Corps conducted a Tsunami study under USACE's Planning Assistance to States program and provided recommendations and an implementation strategy. Through interviews and document review, the study team wrote 12 working papers creating a comprehensive review of current resilience efforts and challenges, and recommendations categorized into eight topics including improving risk awareness, policy, and emergency protocol.

American Samoa Tsunami Study-Final Report

Source Documents:

Final Report American Samoa Tsunami Study

[ASTS_Final_Report-031312.pdf](#)

This report summarizes a major planning effort by the U.S. Army Corps and the Samoa to increase coastal community resilience to the effects of tsunamis in American Samoa.

JAPAN

EXPLORING THE POSSIBILITIES OF SCHOOL-BASED RECOVERY AND COMMUNITY BUILDING IN TONI DISTRICT, KAMAISHI

Paper by Shohei Matsuura and Rajib Shaw. This paper attempts to discuss on the possibilities of exploring the “school-based recovery” concept, which is being promoted by the Ministry of Education, Culture, Sports, Science and Technology with a specific case study in Toni District, Kamaishi City in Iwate Prefecture. A series of surveys were conducted in which the results show that school–community linkage prior to the East Japan earthquake and tsunami played a critical part for residents to effectively respond to the disaster. Because of this, this linkage must be promptly restored and strengthened to proceed with recovery and to build disaster resilient communities.

<https://www.eeri.org/wp-content/uploads/Matsuura-and-Shaw-2015-1.pdf>

TSUNAMI EVACUATION: LESSONS FROM THE GREAT EAST JAPAN EARTHQUAKE AND TSUNAMI OF MARCH 11TH 2011

Explores effectiveness of preparedness measures such as evacuation maps/signs, formal warning messages and systems, and vertical evacuation. The end contains recommendations for implementation.

[GNS-SR-2012-017- Vertical Evacuation Study.pdf](#)

TSUNAMI DRILLS PAID OFF FOR HUNDREDS OF CHILDREN

Facebook post talking about how the tsunami and earthquake knowledge and evacuation drills in Kamaishi, Japan saved the children’s lives. Of the 3,000 students, only 5 were reported missing or dead.

<https://www.facebook.com/AJW.Asahi/photos/a.157475197639457.39036.157466287640348/162656293788014/?type=3>

MIXED LOCATIONS AND EXISTING GUIDANCE DOCUMENTS

NATIONAL TSUNAMI HAZARD MITIGATION PROGRAM (NTHMP): LINKED RESOURCES

This is a comprehensive list of tsunami resources compiled by the NTHMP which cover the following areas: education and outreach; guidance, plans, and policy; maps; media resources; research and reports.

http://nws.weather.gov/nthmp/NTHMP_Web_Resources.html

INTERNATIONAL TSUNAMI INFORMATION CENTER AWARENESS & EDUCATION RESOURCES

This webpage provides a list of tsunami awareness and education resources prepared in the aftermath of the 2004 Indian Ocean tsunami.

http://itic.ioc-unesco.org/index.php?option=com_content&view=category&id=1075&Itemid=1075

PREPARING YOUR COMMUNITY FOR TSUNAMIS: A GUIDEBOOK FOR LOCAL ADVOCATES

This guidebook is designed to help you prepare your coastal community for tsunamis. This goes beyond preparing yourself and your loved ones. It means taking steps to educate your entire community about when and how to evacuate for tsunamis. It means helping your local government to be prepared to mobilize and coordinate evacuations, and it means working to change your community's development, so that tsunamis will cause less damage. It means becoming a tsunami safety advocate.

<https://www.eeri.org/wp-content/uploads/Samant-Tobin-and-Tucker-2008.pdf>

SCHOOL RECOVERY: LESSONS FROM ASIA

This document compiles 25 case studies from 12 countries in an effort to understand the recovery processes from past damages of school buildings due to disasters. Although the case examples come from different countries and different socioeconomic background, common elements are identified and will be useful for recovery from major disasters.

<https://www.eeri.org/wp-content/uploads/Shaw-Takeuchi-Fernandez-2012.pdf>

TSUNAMI HAZARD MITIGATION AND PREPAREDNESS--A PERSPECTIVE FROM STATE AND TERRITORY TSUNAMI PROGRAMS IN THE HIGH TSUNAMI RISK PACIFIC REGION

A report from The Western States Seismic Policy Council looking at a number of State Partner Tsunami Programs between various US states and the National Tsunami Hazard Mitigation Program.

[WSSPC Tsunami Report 2011-01.pdf](https://www.wsspc.org/wp-content/uploads/2011/01/WSSPC_Tsunami_Report_2011-01.pdf)

Conclusions drawn from this survey of case studies are:

- 1) Community-based tsunami planning requires strong state programs.
- 2) Continuation of the strong relationship of the state programs with Federal agencies through the NTHMP is needed.
- 3) Meeting long-term goals of tsunami mitigation and preparedness requires maintaining partnerships and funding.
- 4) Working towards tsunami resiliency is desirable.

DESIGNING FOR TSUNAMIS - SEVEN PRINCIPLES FOR PLANNING AND DESIGNING FOR TSUNAMI HAZARDS

By the National Tsunami Hazard Mitigation Program, The purpose of these guidelines is to help coastal communities in the five Pacific states—Alaska, California, Hawaii, Oregon, and Washington—understand

their tsunami hazards, exposure, and vulnerability, and to mitigate the resulting risk through land use planning, site planning, and building design.

<http://marinsheriff.org/uploads/documents/DesignForTsunamis.pdf>

DISASTER PREVENTION FOR SCHOOLS: GUIDANCE FOR EDUCATION SECTOR DECISION-MAKERS (SWITZERLAND)

Guidance document for school administrators, teachers, education authorities, school safety committees and similar. Introduces disaster impacts on and prevention for schools; creating and maintaining safe learning environments; teaching and learning disaster prevention and preparedness, educational materials and teacher training, and developing a culture of safety.

<http://www.preventionweb.net/educational/view/7344>

WHAT'S THE PLAN, STAN?

What's the Plan Stan is a New Zealand Ministry of Civil Defense & Emergency Management initiative for primary schools, featuring Stan the dog and five children- Dan, Ana, Frankie, Matt and Beth - who model what to do in an emergency.

http://toolkit.ineesite.org/resources/ineecms/uploads/1057/Whats_the_Plan_Stan.pdf