# HAZARD INFORMATION AND ANALYSIS RESOURCES

Provided below is a listing of publicly-available resources for natural hazards data and information, as well as modeling and analytic tools. Communities can use these resources to identify potential natural threats and hazards in their communities, the community vulnerabilities, and consequences resulting from an event to help them develop and inform their risk assessment.

## Hazard Data and Information Resources

| | Hazard(s) | Source | Description |
|---|---|---|---|
| **Single-Hazard Resources** | **Earthquake** | USGS Hazard Maps and Site-specific Data<br>http://earthquake.usgs.gov/hazards/hazmaps/ | Set of maps displaying earthquake hazard exposure for regions and sites across the United States. |
| | **Flood** | Sea Level Rise and Coastal Flooding Impacts Viewer and Data Development, NOAA<br>https://coast.noaa.gov/slr/ | A mapping tool to visualize community-level impacts from coastal flooding or sea level rise (up to 6 feet above average high tides). Photo simulations of how future flooding might impact local landmarks are also provided, as well as data related to water depth, connectivity, flood frequency, socio-economic vulnerability, wetland loss and migration, and mapping confidence. |
| | **Flood** | Critical Facilities Flood Exposure Tool, NOAA<br>https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html | This online visualization tool supports communities that are assessing their coastal hazard risks and vulnerabilities. The tool creates a collection of user-defined maps that show the people, places, and natural resources exposed to coastal flooding. The maps can be saved, downloaded, or shared to communicate flood exposure and potential impacts. In addition, the tool provides guidance for using these maps to engage community members and stakeholders. *The current geography includes the East Coast and Gulf of Mexico*. |
| | **Hurricane** | Atlantic Hurricane Database Re-analysis Project, NOAA<br>http://www.aoml.noaa.gov/hrd/hurdat/Data_Storm.html | Historical Data and past modeling of Atlantic Tropical Storms and Hurricanes. Data goes back as far as mid-19$^{th}$ century. |

| | Hazard(s) | Source | Description |
|---|---|---|---|
| | **Landslide** | Landslide Hazard Program, USGS http://landslides.usgs.gov/ | Data and information on current landslide reports, warnings and monitoring of major areas of incident. Hazard mapping and forecasts are also available. |
| | **Wildfire** | National Interagency Fire Center https://www.nifc.gov/fireInfo/fireInfo_statistics.html | Current and historical data and situation reports on wildfire reports and damages. Some data goes back as far as the 1960's |
| **Multi-Hazard Resources** | **Drought Flood** | CREAT Climate Resilience Utility https://www.epa.gov/crwu/build-climate-resilience-your-utility | The Climate Resilience Evaluation and Awareness Tool (CREAT) is a climate risk assessment and planning application for water, wastewater and storm water utilities. |
| | **Drought Flood** | Community Based Water Resilience Tool https://19january2017snapshot.epa.gov/communitywaterresilience/community-based-water-resiliency-tool_.html | The Community-Based Water Resiliency (CBWR) Tool is an easy way to find out how prepared your community is to handle emergencies that impact your water systems and learn about tools and resources that can be used to build resilience. |
| | **Flood Hurricane** | Critical Facilities Flood Exposure Tool, NOAA https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html | The Critical Facilities Flood Exposure Tool provides an initial assessment of a community's critical facilities and roads that lie within the 1% annual chance flood zone established by the Federal Emergency Management Agency (FEMA). The tool helps coastal managers quickly learn which facilities may be at risk—providing information that can be used to increase flood risk awareness or to inform a more detailed analysis. |
| | **Flood Hurricane Tsunami** | The Coastal and Inland Flooding Observation and Warning Project (CI-FLOW), NOAA https://ciflow.nssl.noaa.gov/ | CI-FLOW captures the complex interaction between rainfall, river flows, waves, tides and storm surge, and how they will impact ocean and river water levels. CI-FLOW simulates the combined effects of coastal and inland floods. Though this information is specific to the coastal Carolina's, it can be used as background information and best practices for any resilience program. |

| Hazard(s) | Source | Description |
|---|---|---|
| **Drought<br>Flood<br>Winter Storm<br>Wildfire<br>Hurricane** | Billion-Dollar Weather and Climate Disasters: Table of Events, NOAA<br>http://www.ncdc.noaa.gov/billions/events | Flood Damage Data by Year, Cost and Fatalities |
| **Flooding<br>Hurricanes<br>Tornado<br>Wildfire and Other** | Spatial Hazard Events and Losses Database for the United States (SHELDUS), Univ. of South Carolina<br>https://cemhs.asu.edu/SHELDUS/ | County-level hazard loss data set for damages reported larger than $50,000 and/or at least 1 death. Subscription-based aggregated date covers 18 hazards and provides data back to 1960's |
| **Earthquake<br>Tsunami<br>Flood<br>Sea Level Rise<br>Landslide<br>Fire<br>Drought** | Association of Bay Area Governments resilience Program – Open Data<br>http://resilience.abag.ca.gov/open-data/ | Data, mapping and historical trends tools on various hazards, such t earthquake, tsunami, landslide and various other significant hazards. Though this information is San Francisco Bay Area focused, the information and background can be useful to any resiliency building plan. |

## Modeling and Analytic Tools

| | Hazard(s) | Source | Description |
|---|---|---|---|
| Single-Hazard Resources | **Earthquake** | OpenSha Seismic Hazard Analysis Tool<br>http://www.opensha.org/ | Modeling tool that shows the probability that something of concern will occur given one or more earthquakes. More specifically, SHA states the probability that an Intensity Measure Type (IMT) will exceed some Intensity Measure Level (IML). |
| | **Avalanche** | Rapid Mass Movements (RAMMS)<br>http://ramms.slf.ch/ramms/index.php?option=com_content&view=article&id=60&Itemid=77 | Module developed to simulate flowing snow avalanches in complex terrain. The module is widely used in Switzerland for avalanche hazard studies. |
| | **Flood** | National Weather Services FLDWAV Computer Program, FEMA<br>https://www.fema.gov/national-weather-service-fldwav-computer-program | The FLDWAV program, developed by the National Weather Service (NWS), is a generalized flood routing program with the capability to model flows through a single stream or a system of interconnected waterways. |
| Multi-Hazard Resources | **Drought Flood** | Conduct a Drinking Water or Wastewater Utility Risk Assessment<br>https://www.epa.gov/waterriskassessment/conduct-drinking-water-or-wastewater-utility-risk-assessment | Modeling and Analysis Tool that for drinking water that Identifies the highest risks to mission-critical operations and find the most cost-effective measures to reduce those risks |
| | **Hurricane Tsunami** | Getting to Resilience; A Coastal Community Resilience Evaluation Tool, State of NJ<br>http://www.state.nj.us/dep/cmp/docs/gtr-resilience.pdf | Questionnaire tool designed to assist local decision makers in the identification of planning, mitigation, and adaptation opportunities to reduce vulnerability to coastal storms and sea level rise and build capacity for coastal community resilience. The questionnaire highlights the importance of local plan integration and consistency with municipal building codes and ordinances. It also identifies the importance of localized hazard assessments and their necessary link to planning, outreach, mitigation, response, and recovery. The facilitation of the tool is intended to initiate a dialogue among local decision makers and provide information on local actions to improve resilience. |

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| **Volcanic Eruption** | Global Volcano Model and Tephra Hazard Modeling http://globalvolcanomodel.org/hazard-modelling/tephra-hazard-modelling/ | Modeling tool that tracks volcanic eruption and flow. |
| **Volcanic Eruption** | Geophysical Mass Flow Group http://www.gmfg.buffalo.edu/ | An integrated set of information management tools comprising of computer modeling of the physical phenomena, visualization of the models and different levels of fidelity and communications to assist a range of stakeholders -- public safety planners to scientists interested in the physics of such events. |
| **Volcanic Eruption** | Ash3D, Volcano Hazards Program, USGS https://volcanoes.usgs.gov/vhp/ash_info.html | Forecasts of expected ash dispersion (ash clouds) and deposition (ash fall) from volcanic eruptions using a numerical atmospheric transport model. The model can be run for actual or hypothetical eruptions. USGS Volcano Observatories run Ash3D for any US volcano at elevated alert level (excepting effusive Hawaiian volcanoes) assuming a reasonable hypothetical eruption. Should an eruption occur, the responsible volcano observatory updates the forecast with actual observations (eruption start time and duration, plume height) as they become available. |
| **Flood Hurricane Tsunami** | Coastal Resilience Index, NOAA https://toolkit.climate.gov/tool/coastal-resilience-index | The Coastal Resilience Index is a self-assessment tool developed by the Mississippi-Alabama Sea Grant Consortium and NOAA's Coastal Storms Program. To complete the index, community leaders get together and use the tool to guide discussion about their community's resilience to coastal hazards. The Index provides a simple, inexpensive method for community leaders to perform a self-assessment of their community's resilience to coastal hazards, identifying weaknesses a community may want to address prior to the next hazard event and guiding community discussion. The Index is not intended for comparison between communities. |