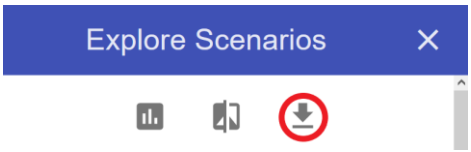
OCOF
OUR COAST OUR FUTURE
ourcoastourfuture.org

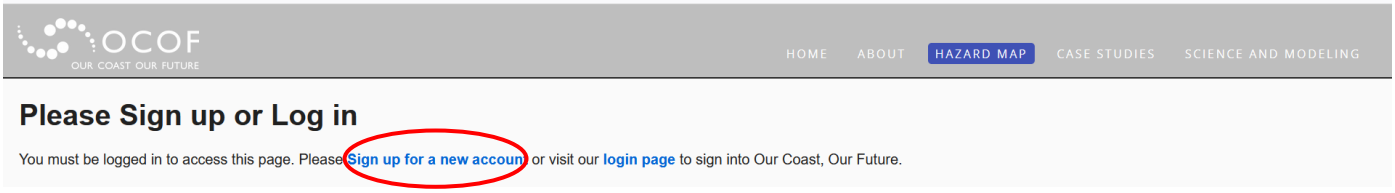
Understand, visualize, and adapt to sea level rise, coastal storms, erosion, and groundwater hazards

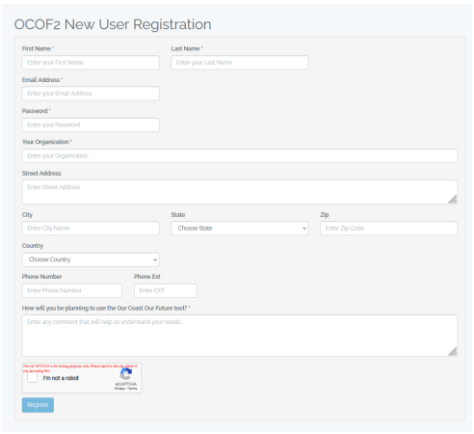
Accessing downloadable GIS data: Flooding

1 To access FLOODING data (including for the SF Bay Area), go to: ourcoastourfuture.org/hazard-map and click the "Data Download" button under the left-side Explore Scenarios menu



2



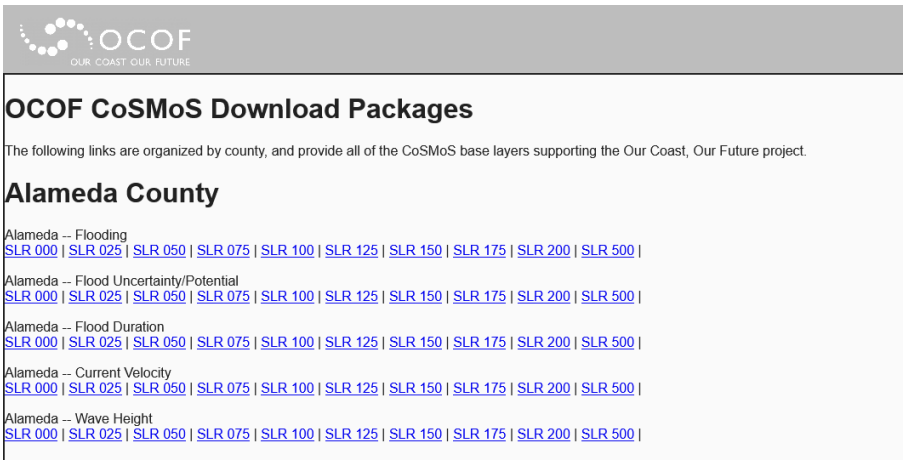


Register as a user to access the download page.

- Please do provide a description of the project and/or purpose of the data, and any contact info to find out more about the project. It really helps us to keep track of user metrics and report on the broader impact of the modeling and web tool!
  - e.g., who are you supporting and how are they planning to use the info from your analysis
  - What is the geography of your analysis
  - Any web links to a project or program are helpful as well.

3 You will receive a welcome email approving your registration, which you can then follow to access the downloads page

4 Download zip files by county, data product, and sea level rise (SLR) scenario



Note: Data are not always clipped precisely to jurisdictional boundaries. Be sure to download the adjacent county if there are data missing near the county border.

Page last updated: 9/26/2025

Point Blue Conservation Science

USGS science for a changing world

Collaborative, Trusted Science to Support Decision Making

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Accessing Erosion Data: Cliff Retreat and Shoreline Position

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To access CLIFF RETREAT data go to USGS ScienceBase here:

- Northern California (California-Oregon border to Golden Gate Bridge): https://doi.org/10.5066/P9048D1S
- Central California (Golden Gate Bridge to Pt. Conception): https://doi.org/10.5066/P9NU062B
- Southern California (South of Pt. Conception): https://doi.org/10.5066/F7T151Q4
- Shapefiles (shp) and KMZs are available
- Data displayed on OCOF are the "uncertainty" bands for 10 sea level rise scenarios and 2 management options, explained further here: https://ourcoastourfuture.org/science-and-modeling/#cliff

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To access statewide SHORELINE POSITION data go to USGS ScienceBase here: https://doi.org/10.5066/P9CJMB2H

- Data displayed on OCOF are "..._model_uncertainty_..." (shp) or "modeled shoreline uncertainty"(kmz) bands for 12 sea level rise scenarios and 4 management options, explained further here: https://ourcoastourfuture.org/science-and-modeling/#shoreline
- Case 1 – Yes Hold the Line / No Beach Nourishment – (1) a "Landward Model Boundary" for the future shoreline position is imposed, assuming that existing infrastructure or other features (e.g., cliff, dune toe) will limit the extent of future erosion, and (2) the model assumes recent historical accretion rates DO NOT continue into the future.
- Case 2 – Yes Hold the Line / Yes Beach Nourishment – (1) a "Landward Model Boundary" for the future shoreline position is imposed, assuming that existing infrastructure or other features (e.g., cliff, dune toe) will limit the extent of future erosion, and (2) the model assumes recent historical accretion rates CONTINUE into the future.
- Case 3 – No Hold the Line / No Beach Nourishment – (1) shoreline positions along each transect are allowed to move landward WITHOUT LIMITATION. Infrastructure or other features (e.g., cliff, dune toe) are NOT included in this model case, and no assumptions about these features are made; and (2) the model assumes recent historical accretion rates DO NOT continue into the future.
- Case 4 – No Hold the Line / Yes Beach Nourishment – (1) shoreline positions along each transect are allowed to move landward WITHOUT LIMITATION. Infrastructure or other features (e.g., cliff, dune toe) are NOT included in this model case, and no assumptions about these features are made; and (2) the model assumes recent historical accretion rates CONTINUE into the future.

Contact ocof@pointblue.org for additional questions.

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Accessing Groundwater/Coastal Water Table Data

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To access GROUNDWATER data (available statewide) go to USGS ScienceBase. To download the data that is currently visualized in the OCOF tool, select "Projected groundwater emergence and shoaling…" and the MHHW (Mean Higher High Water) scenario.

- These data are in shapefile format
- Data displayed on OCOF are depth to the water table for the MHHW (Mean Higher High Water) boundary condition, for 12 sea level rise scenarios and 3 hydraulic conductivities, explained further here: https://ourcoastourfuture.org/science-and-modeling/#groundwater
- Each zip file contains 6 folders. The 3 "Kh…" folders contain the data visualized in the OCOF tool. These data correspond to the full MODFLOW model runs that simulate drainage, run across a range of hydraulic conductivities described in the table below:

Folder Name	Hydraulic Conductivity (Kh)	Corresponding OCOF "Groundwater Geology"
Kh0p1mday	Kh (hydraulic conductivity) = 0.1 meters/day	Less permeable/Shallower water table
Kh1p0mday	Kh (hydraulic conductivity) = 1.0 meters/day	Moderate
Kh10p0mday	Kh (hydraulic conductivity) = 10.0 meters/day	More permeable/Deeper water table

- Each "Kh…" folder contains 12 shapefiles corresponding to the 12 different SLR scenarios
- File naming convention example:

  - County = San Francisco
  - MHHW marine boundary condition (ocean water surface elevation is set at MHHW)
  - noghb = a MODFLOW boundary condition; ignore as it is the same for every scenario
  - slr0p25m = SLR scenario of 0.25m (25cm)
  - Kh0p1mday = K equal to 0.1 m/day (Less permeable/Shallower water table)
  - wtbins = water table depth binned into depth classes with the following data coding in the "fbin_m" attribute field:
    - 1 = marine inundation (below marine boundary condition (MHHW) sea level)
    - 0 = water table at or above ground surface (emergent groundwater)
    - 1 = water table between 0-1 m depth (very shallow)
    - 2 = 1-2 m depth (shallow)
    - 5 = 2-5 m depth (moderate)
    - 6 = > 5 m depth (deep)

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How to Cite

- Suggested citations: ourcoastourfuture.org/about/#cite

Metadata

- Metadata for all CoSMoS products (flooding v3.x, cliff retreat, shoreline position, groundwater) can be found here: https://www.sciencebase.gov/catalog/item/5633fea2e4b048076347f1cf
- Information for CoSMoS flood models v2.x (inner San Francisco Bay Area, and outer coast from Golden Gate north to Point Arena) is available on the following page.

What CoSMoS versions of data are currently packaged for download
(as of September 26, 2025)

- For a map showing CoSMoS versions: ourcoastourfuture.org/about
- SLR 250cm and 300cm scenarios are only available for v3.1 geography (outer coast from the Golden Gate south to Pt Conception)
- San Mateo County and San Francisco County: data are v2.1 for the inner bay, and the latest v3.1 for the outer coast. One implication is that any of the SLR 125cm and 175cm scenarios will only have data for inner SF Bay (from v2.1), as they have been dropped from v3.1 models in order to provide 250cm and 300cm scenarios.
- Marin County: CoSMoS v2.1 for inner bay, and v2.0 for outer coast
- Sonoma County: v2.1 (inner bay) and v2.0 and v2.2 for different stretches of the outer coast
- Santa Barbara County: CoSMoS v3.0 for south of Pt. Conception, and v3.1 for the area north of Pt. Conception; these two regions are packaged separately based on UTM zone
- Note for inner San Francisco Bay: flood extent shapefiles for the entire inner SF Bay are provided with each county download, but raster data (e.g., flood depth) cover only the county geography

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San Francisco Bay Area (CoSMoS v2.x) metadata

Last updated Sept 2025

USGS CoSMoS v2.x data are only available on Our Coast Our Future (ourcoastourfuture.org) and not on USGS's digital repository. As such, we do not have any official metadata, but we hope the information and references below provide some basic information. The information provided below is for the flood extent layers and associated vector (shapefile) data. If you used flood depth or any other raster product, please contact Maya Hayden (mkhayden@usgs.gov) or Andy O'Neill (aoneill@usgs.gov) and we can put similar information together for those data.

- Who created this and who is it for -- Coastal Storm Modeling System (CoSMoS) v2.0, v2.1, and v2.2 were created by the CoSMoS project team at the USGS Pacific Coastal and Marine Science Center. Technical questions should be directed to Andy O'Neill (aoneill@usgs.gov, 831-460-7586). These data are intended for policy makers, resource managers, science researchers, students, and the general public. These data can be used with geographic information systems or other software to identify and assess possible areas of vulnerability. These data are not intended to be used for navigation.
- What is being depicted and measured -- For the flood extent layers and associated data: Attribute values are extents of flood projections, low-lying vulnerable areas, and maximum/minimum flood potential (flood uncertainty) due to plausible sea-level rise and future storm conditions and therefore cannot be validated against observations. The projections were generated using the latest downscaled climate projections and calibrated hydrodynamic models.
- When was it done -- Completion dates -- CoSMoS v2.0: December 2012. CoSMoS v2.1: June 2014. CoSMoS v2.2 (Pt. Arena expansion): 2015.
- Where -- CoSMoS v2.0 for the Central California outer coast from the Golden Gate to Bodega Head (not including SF Bay). CoSMoS v2.1 covers inside San Francisco Bay. CoSMoS v2.2 covers from Bodega Head north to the Sonoma/Mendocino county border.
- Datums -- Data is referenced to UTM 10 (2 m resolution), and vertical datum NAVD88 (in m).
- Why was it done -- CoSMoS was developed for hindcast studies, operational applications and future climate scenarios to provide emergency responders and coastal planners with critical storm-hazards information that can be used to increase public safety, mitigate physical damages, and more effectively manage and allocate resources within complex coastal settings.

Additional references for purpose and methods:

- Barnard, P.L., van Ormondt, M., Erikson, L.H. et al. Nat Hazards (2014) 74: 1095. https://doi.org/10.1007/s11069-014-1236-y
- Li H. Erikson, Andrea C. O'Neill and Patrick L. Barnard "Estimating Fluvial Discharges coincident with 21st Century Coastal Storms Modeled with CoSMoS," Journal of Coastal Research (JCR) 85(sp1), (1 May 2018). https://doi.org/10.2112/SI85-159.1
- O'Neill, A. C., L. H. Erikson, and P. L. Barnard (2017), Downscaling wind and wavefields for 21st century coastal flood hazard projections in a region of complex terrain, Earth and Space Science, 4, 314–334, doi:10.1002/2016EA000193.
- Hummel, M.A., Wood, N.J., Schweikert, A. et al. Reg Environ Change (2018) 18: 1343. https://doi.org/10.1007/s10113-017-1267-5