WEST COAST DIGITAL ELEVATION MODELS

Coastal Models Supporting our Nation's Needs through Science and Technology

Cassidys Pt.
Cassidys Head
Bay
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All of the coastal digital elevation models (DEMs) in this presentation were created by scientists with NOAA's National Geophysical Data Center (NGDC) and the Cooperative Institute for Research in Environmental Sciences (CIRES)— University of Colorado at Boulder. The elevation modeling work, done in collaboration with the National Tsunami Hazard Mitigation Program (NTHMP), is providing near-continous coverage of U.S. coasts in support of NOAA's role in protecting life and property and conserving and protecting natural resources.

Data identified as coming from the NOAA National Geophysical Data Center are provided for public use from many academic, federal, state and other sources. For a complete list of sources see the Technical Reports developed for each DEM, available online.

WEST COAST

The West Coast of the United States contains some of the largest metropolitan cities in the country including Los Angeles, San Francisco, San Diego, Portland, and Seattle. Covering three expansive states—Washington, Oregon, and California—the area is home to almost 50 million people. Famous for its culture and beauty, the region boasts many attractions such as the Puget Sound, the Pacific Coast Highway, the Redwood National Forest, and the Orange County surf.

The people who live on the Pacific coast, especially directly along the shore, are vulnerable to tsunamis, coastal storms, and other inundation events. Active plate boundaries and tectonic zones exist along the coast and stretch across the Pacific Ocean and northward into Alaska. Earthquakes, storms, and landslides in the area can trigger waves that propagate along the coast to highly populated towns.

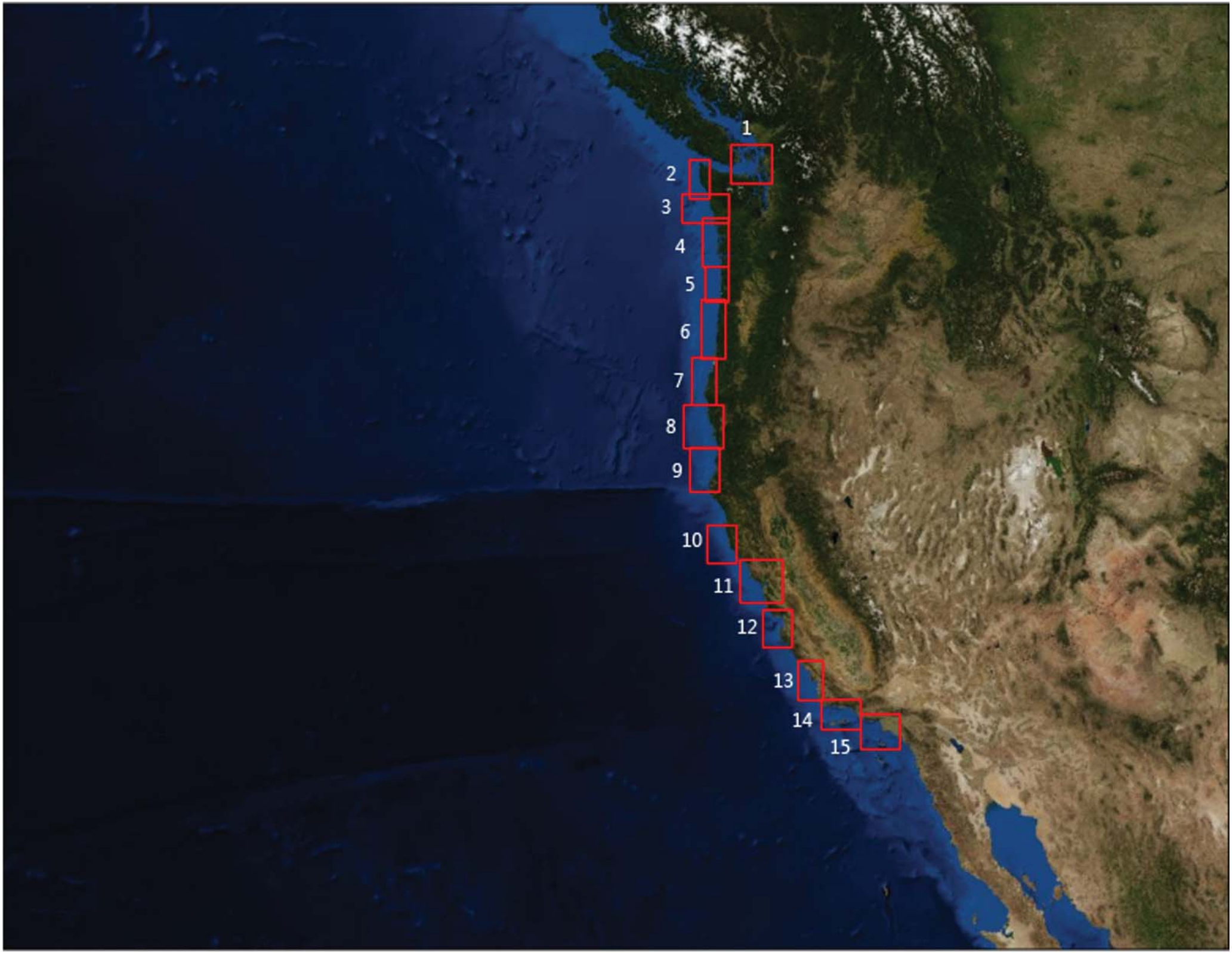
A 1946 tsunami that originated in Alaska caused several fatalities along the West Coast. In 1960, several deaths along the West Coast were caused by another tsunami that propagated from Chile. Property damages due to Pacific tsunamis occur even more frequently. Highly populated coastal communities located on unstable cliffs, eroding shores, and rocky bluffs are at risk during tsunami events that can originate anywhere in the Pacific Ocean.

In collaboration with state partners, NGDC provides detailed, accurate DEMs of U.S. coasts. The DEMs are used by scientists, coastal managers, and policy makers to effectively manage marine ecosystems and coastal resources, coordinate planning and mitigation efforts, and better understand the impacts of natural hazards. The DEMs presented here display data for many coastal cities along the Pacific Ocean, providing near-continuous coverage of the U.S. West Coast.

1. Port Townsend, WA
2. La Push, WA
3. Taholah, WA
4. Astoria, OR
5. Garibaldi, OR
6. Central Oregon Coast
7. Port Orford, OR
8. Crescent City, CA
9. Eureka, CA
10. Arena Cove, CA
11. San Francisco, CA
12. Monterey, CA
13. Port San Luis, CA
14. Santa Barbara, CA
15. Santa Monica, CA



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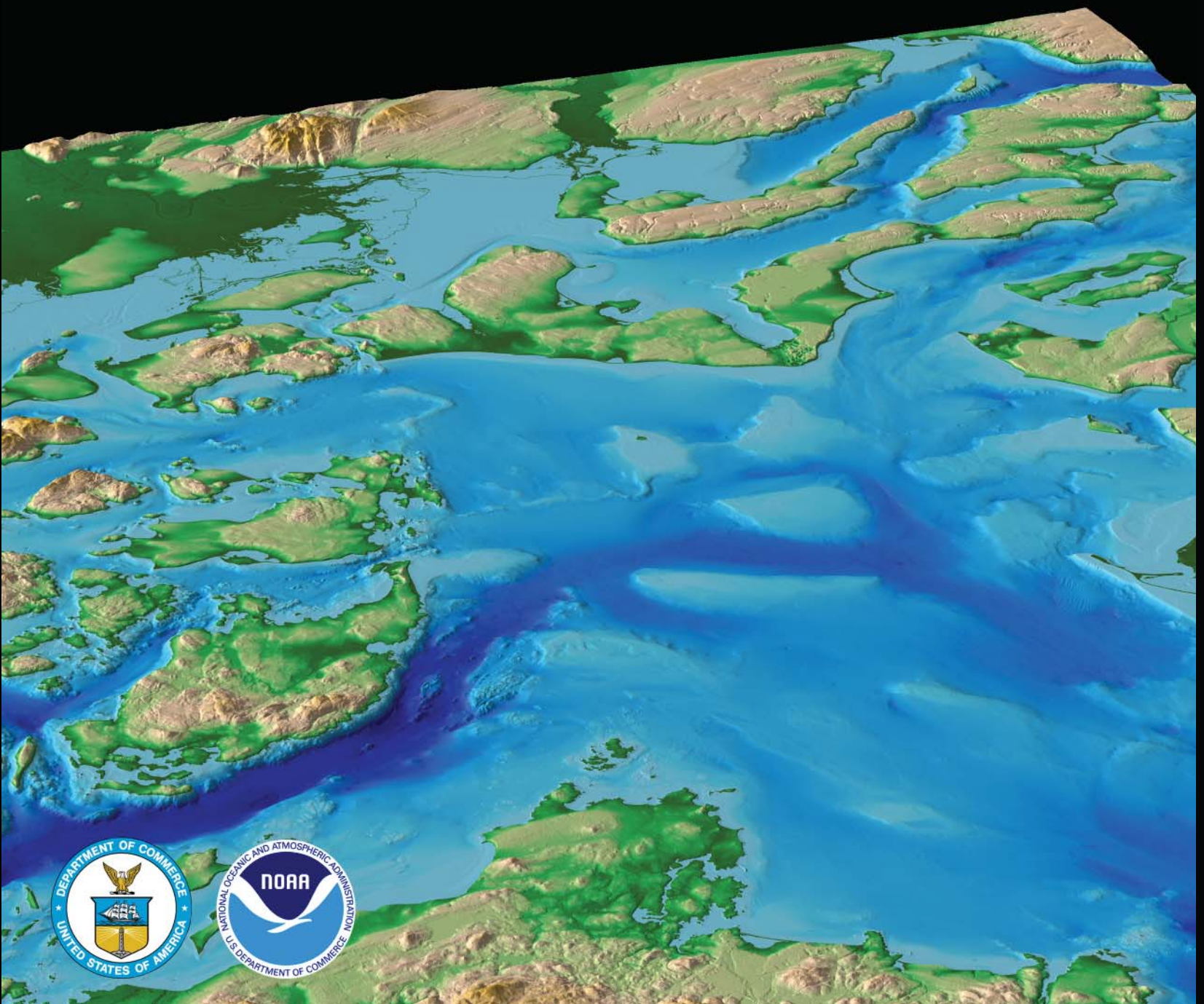
DIGITAL ELEVATION MODEL

Port Townsend, Washington



NOAA Knows...

PORT TOWNSEND, WASHINGTON

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Why Model Port Townsend, Washington?

Port Townsend is located in Jefferson County on the tip of the Olympic Peninsula, 65 kilometers to the northwest of Seattle. The town has approximately 8,400 residents, most of whom are involved with the local marine trades industry. The area is well known for its natural scenery, diverse variety of landscapes, and maritime center. In addition, the town is known for its art galleries, film festivals, music, and well known independent boat builders. The region offers a diverse variety of landscapes, which include mudflats, rocky shores, mountains, tidal-flats, and floodplains. The Port Townsend DEM spans an area of approximately 10,000 square kilometers and covers the De Fuca Strait, the Puget Sound, the San Juan Islands, and Vancouver Island. Areas such as Puget Sound are estuaries composed of a series of underwater basins and sills, which are the result of the Cascadia subduction zone and the Wisconsin Glaciation. The Port Townsend model is an important tool for community planners in respects to hazard mitigation, tsunami inundation, and preparing for other severe storm events.

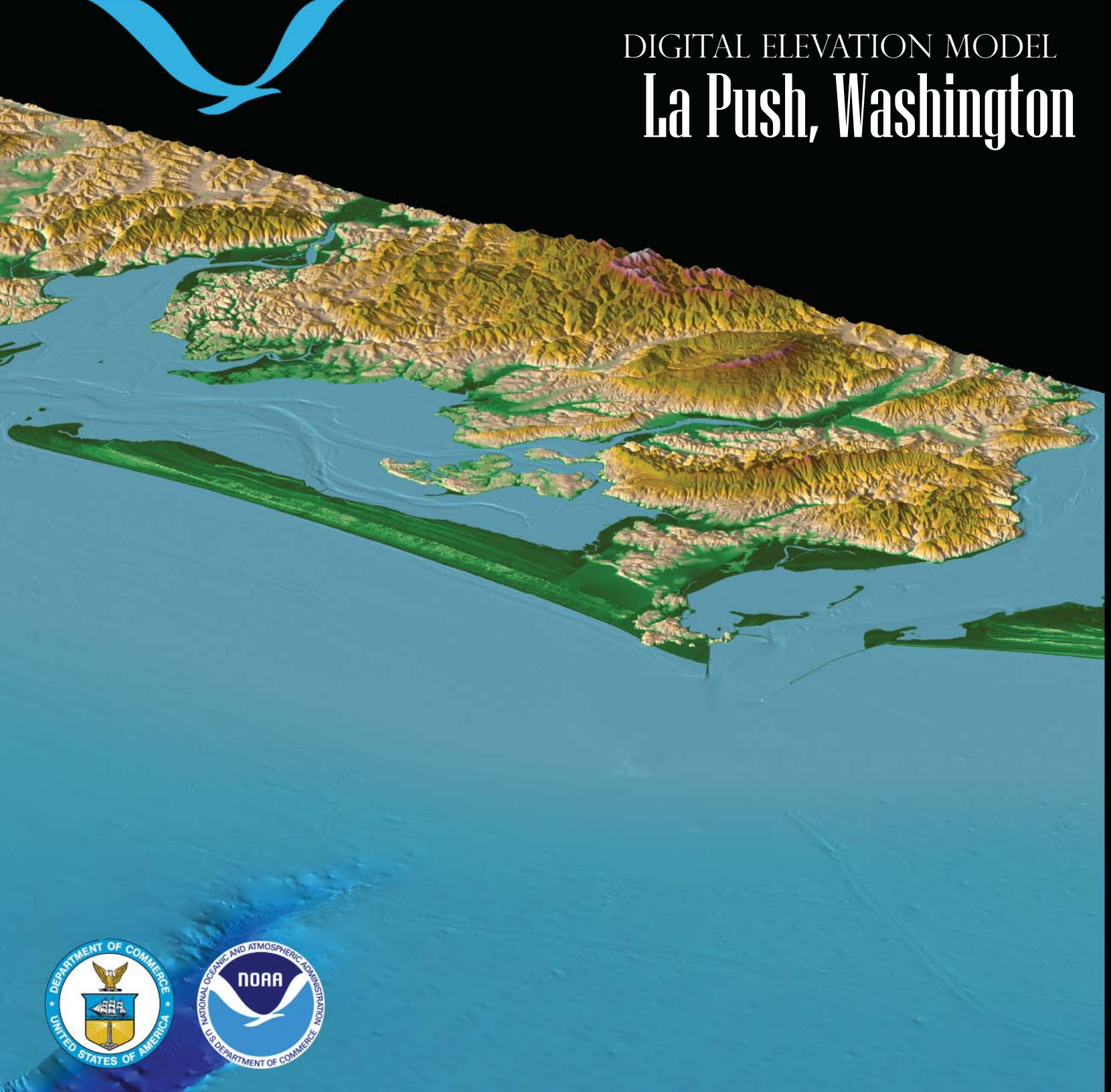
Who Provided the Data?

- NOAA National Geophysical Data Center (NGDC)
- NOAA Coastal Services Center (CSC)
- NOAA Office of Coast Survey (OCS)
- Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX)
- Canadian Hydrographic Service (CHS)
- Canadian Digital Elevation Data (CDED)
- Washington State Department of Ecology (WSDE)
- Puget Sound Lidar Consortium (PSLC)
- U.S. Geological Survey (USGS)

Photo Credit: http://apps.ecy.wa.gov

DIGITAL ELEVATION MODEL

La Push, Washington



NOAA Knows...

LA PUSH, WASHINGTON

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Why Model La Push, Washington?

The La Push DEM provides coverage of the entire coastal region surrounding the town of La Push, Washington. Included within the DEM boundary are the coastal towns of Neah Bay to the north and the Native American communities of the Makah, Quileute, and Ho tribes. Nearly all of the land area covered by the DEM lies within the Olympic Coast National Marine Sanctuary boundary. The name La Push, meaning 'the mouth', was given to the town due to its location at the mouth of the Quillayute River. The near shore river region is subject to sediment deposition and transport, making the sea floor relatively shallow for upwards of 50 kilometers offshore. Farther from the coast, the shelf is cut by deeper submarine canyons that carry sediments to the deep ocean floor. Tectonic activity, such as earthquakes and volcanism, are relatively common in the region as the Juan de Fuca oceanic plate subducts underneath the continental North American plate. Importantly, the La Push DEM provides local community managers with a tool to understand and prepare for future tsunami and extreme storm events that will threaten this coastal area.

Who Provided the Data?

- NOAA National Ocean Service (NOS)
- NOAA National Geophysical Data Center (NGDC)
- NOAA Coastal Services Center (CSC)
- NOAA Office of Coast Survey (OCS)
- U.S. Geological Survey (USGS)
- U.S. Army Corps of Engineers (USACE)
- Joint Airborne LiDAR Bathymetry Technical Center of Expertise (JALBTCX)
- Puget Sound LiDAR Consortium (PSLC)
- Washington State Department of Transportation (WSDOT)

Photo Credit: http://www.wsdot.wa.gov

DIGITAL ELEVATION MODEL

Taholah, Washington

NOAA Knows...

TAHOLAH, WASHINGTON

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Why Model Taholah, Washington?

Taholah is home to the Quinault Indian Reservation. The Quinault Indian Nation is a sovereign nation, made up of roughly 900 people. The community is located on the mouth of the Quinault River, on the southwestern corner of Washington's Olympic Peninsula. The land is rich with wildlife and supports an array of recreational activities. The Taholah DEM provides coverage of the southern to central coastline of Washington, from Grays Harbor to Kalaloch. It overlaps the surrounding DEMs by approximately 11 kilometers, providing complete coastal elevation coverage of Washington's Pacific coastline. The community of Taholah lies in a tsunami hazard zone. The 1964 megathrust Alaska earthquake, which registered 9.2 on the Richter scale, inundated Tahaloh with almost an almost one meter tsunami surge, damaging many boats and docks. There is an even larger threat of tsunamis from the nearby Cascadia subduction zone, located just offshore from the U.S. northern west coast. Biologic and geologic evidence of past Cascadia events indicate the occurrence of a magnitude 9 earthquake in 1700, which caused the coastline to be iundated by an estimated 10 meter wave. DEMs and tsunami modeling projects will help the community of Taholah to be better prepared in the face of future tsunamis, storms, and coastal inundation events.

Who Provided the Data?

- NOAA National Ocean Service (NOS)
- NOAA National Geophysical Data Center (NGDC)
- NOAA Coastal Services Center (CSC)
- NOAA Office of Coast Survey (OCS)
- U.S. Geological Survey (USGS)
- Washington State Department of Transportation (WASDOT)

Photo Credit: http://apps.ecy.wa.gov/shorephotos

DIGITAL ELEVATION MODEL

Astoria, Oregon

NOAA Knows...

ASTORIA, OREGON

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Why Model Astoria, Oregon?

Astoria is located in the Willapa Hills physiographic province, which stretches from Seaside, Oregon north to Ocean Shores, Washington. Astoria was founded in 1810 on the southern bank of the Columbia River as a fur trading port. Tourism and light manufacturing have replaced the once booming fishing and lumber industries. Currently, Astoria has a population of approximately 10,000 people living in a 15 square kilometer area. Formed from the Columbia River Basalt Group and coastal sediments, the region is characterized by weathering, creating topography that is rounded compared to the jagged Olympic Mountains to the north. Encompassing the mouth of the Columbia River, the modeling region also includes two large estuaries, Willapa Bay and Grays Harbor. Willapa Bay is largely a muddy intertidal zone, with much of the water entering and retreating with the tide. Grays Harbor also contains large areas of mud flats. As part of the Cascadia Subduction Zone, the Oregon coast is subject to a variety of geologic hazards including landslides, earthquakes, volcanoes, and tsunamis. In addition to locally generated tsunamis, the area is at risk from tsunamis generated anywhere across the Pacific Ocean "Ring of Fire". The Astoria DEM provides hazard managers and community planners with an important tool to forecast and analyze future hazard events.

Who Provided the Data?

- NOAA Office of Coast Survey (OSC)
- NOAA National Ocean Service (NOS)
- NOAA Coastal Services Center (CSC)
- NOAA National Geophysical Data Center (NGDC)
- U.S. Army Corps of Engineers (USACE)
- Washington Department of Ecology
- Puget Sound LiDAR Consortium (PSLC)
- U.S. Geological Survey (USGS)

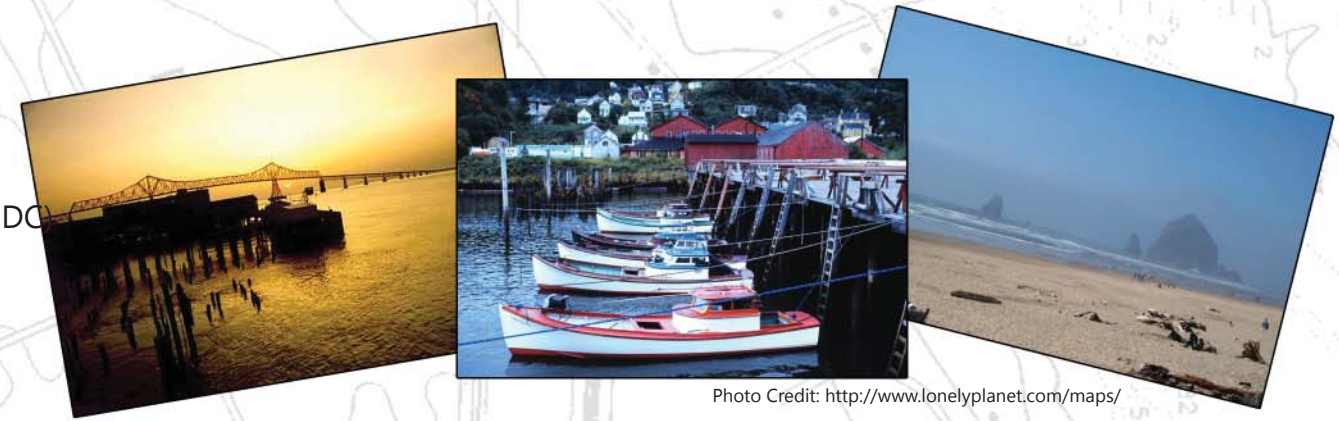


Photo Credit: http://www.lonelyplanet.com/maps/

DIGITAL ELEVATION MODEL

Garibaldi, Oregon

NOAA Knows...

GARIBALDI, OREGON

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Why Model Garibaldi, Oregon?

Garibaldi is located on the northern edge of Tillamook Bay near the Pacific Ocean. Included within the Garabaldi coastal digital elevation model are the neighboring communities of Cannon Beach, Manzanita, and Rockaway Beach to the north, and Oceanside, Netarts, and Pacific City to the south. Garibaldi has a small population of approximately 1,000 people, who work primarily in the agricultural, fisheries, lumber, and recreational industries. Many people visit the area for its renowned fishing opportunities, shellfish beds, and associated charters. Geographically, Garibaldi lies near an active convergent tectonic zone making it vulnerable to seismically generated tsunamis. The state has prepared a community tsunami plan in order to increase public awareness and safety for the threat of tsunamis. The Garibaldi DEM, along with knowledge of past events, such as the 1700 Cascadia rupture that left geologic evidence of a large tsunami, provides hazard managers and community planners with an important tool for forecasting and analyzing possible future events.

Who Provided the Data?

- NOAA Office of Coast Survey (OSC)
- NOAA National Ocean Service (NOS)
- NOAA Coastal Services Center (CSC)
- NOAA National Geophysical Data Center (NGDC)
- U.S. Army Corps of Engineers (USACE)

DIGITAL ELEVATION MODEL

Central Oregon Coast

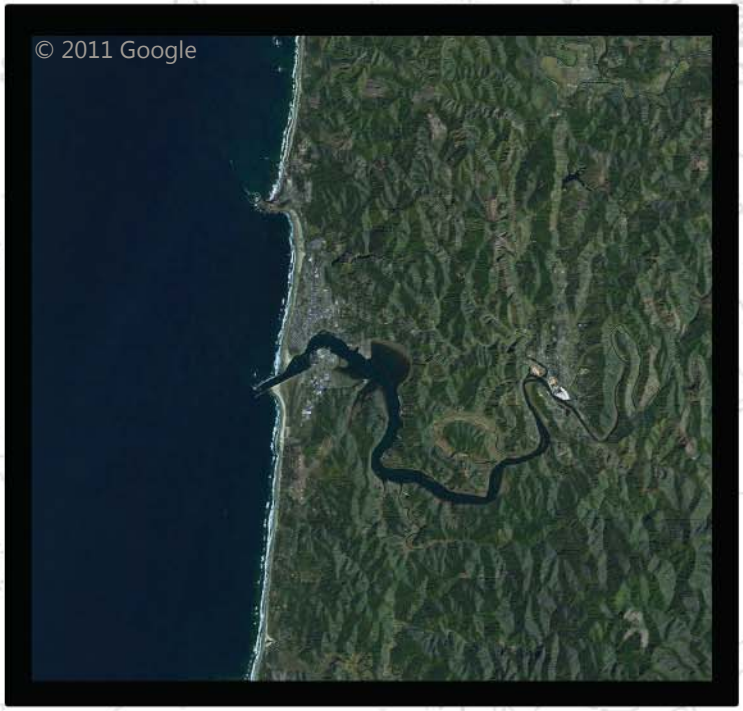
DEPARTMENT OF COMMERCE
UNITED STATES OF AMERICA

NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

NOAA Knows the...

CENTRAL OREGON COAST

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model the Central Oregon Coast?

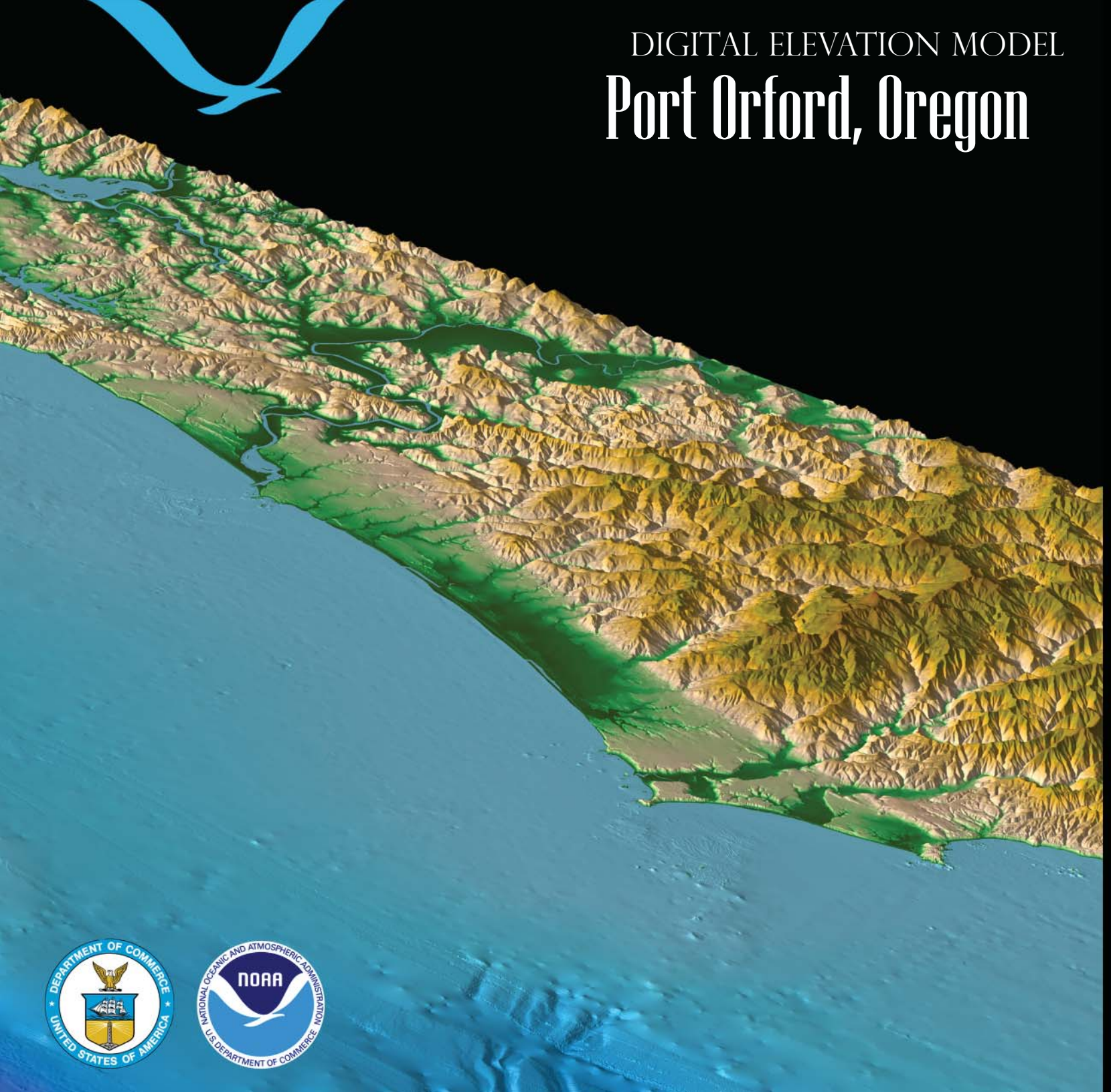
The Central Oregon Coast DEM covers the coastal area of Oregon from Cascade Head south to the Umpqua River. The area includes many popular seaside towns such as Newport, Lincoln City, Waldport, Yachats, and Florence. More than thirty State Parks line this section of the coast, along with countless lighthouses, science centers, heritage centers, and opportunities for recreational activities. The shore is lined with rocky cliffs, scenic shores, and dense evergreen forests. As part of the Cascadia Subduction Zone, the Oregon coast is subject to a variety of geologic hazards including landslides, earthquakes, volcanoes, and tsunamis. The major coastal communities located within the Central Oregon Coast DEM boundary are Lincoln City located north of Siletz Bay, Newport on the north side of Yaquina Bay, Waldport on the south side of Alsea Bay, and Florence at the Siuslaw River. Overall, the Central Oregon Coast DEM is an important tool for community planners in respects to hazard mitigation, tsunami inundation, and preparing for other severe storm events.

Who Provided the Data?

- NOAA National Ocean Service (NOS)
- NOAA Office of Coast Survey (OCS)
- NOAA Coastal Services Center (CSC)
- NOAA Pacific Marine Environmental Laboratory (PMEL)
- U.S. Geological Survey (USGS)
- U.S. Army Corps of Engineers (USACE)
- Oregon Department of Fish and Wildlife (ORDFW)

DIGITAL ELEVATION MODEL

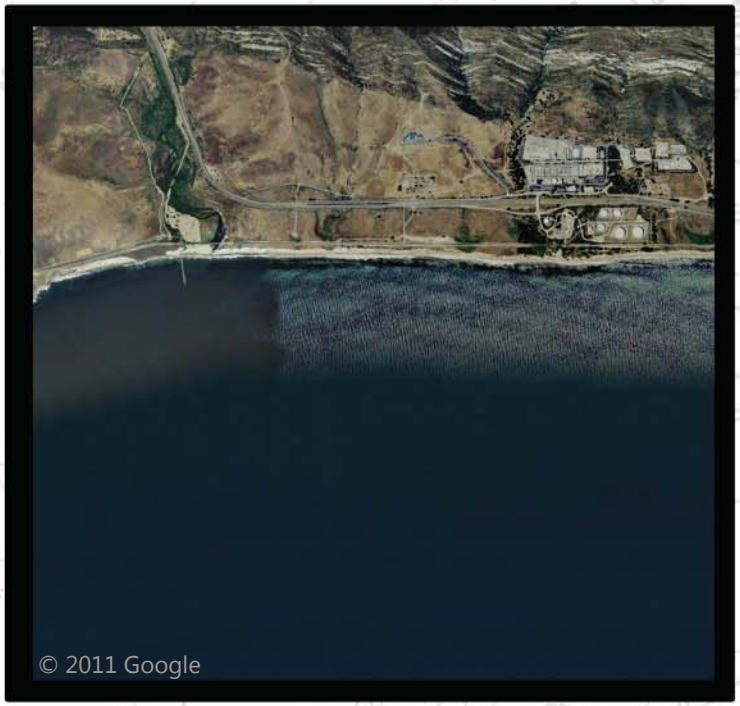
Port Orford, Oregon



NOAA Knows...

PORT ORFORD, OREGON

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model Port Orford, California?

The town of Port Orford is located south of Cape Blanco, along the western-most point of the Oregon coast and has a local population of approximately 1,100 people. The Port Orford DEM covers the coastal region surrounding the town of Port Orford, Oregon from the Umpqua River in the north to the town of Ophir in the south and includes the communities of Port Orford, Langlois, Bandon, Charleston, Coos Bay, North Bend, and Winchester Bay. Encompassing a portion of the Oregon Dunes National Recreation Area and the Oregon Islands National Wildlife Refuge, the DEM includes many offshore rocks, small islands, reefs, and shoreline cliffs. The region is home to many species of coastal birds and animals, which fuel a variety of recreational and educational opportunities. The Port Orford DEM and detailed information about the terrain can help local managers prepare for future storm, flood, and hazard events that are associated with geologic changes.

Who Provided the Data?

- NOAA National Ocean Service (NOS)
- NOAA Office of Coast Survey (OCS)
- NOAA Coastal Services Center (CSC)
- U.S. Geological Survey (USGS)
- U.S. Army Corps of Engineers (USACE)
- Oregon Department of Fish and Wildlife/ Marine Resource Program (ORDFW)

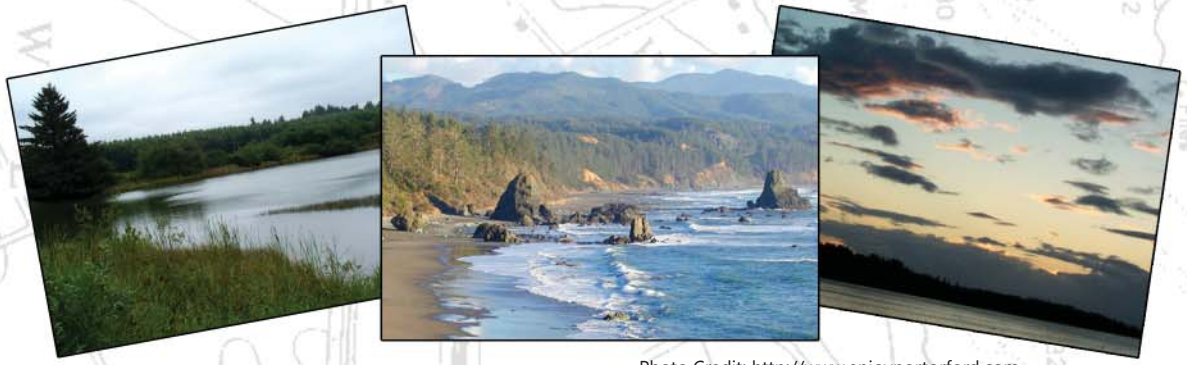
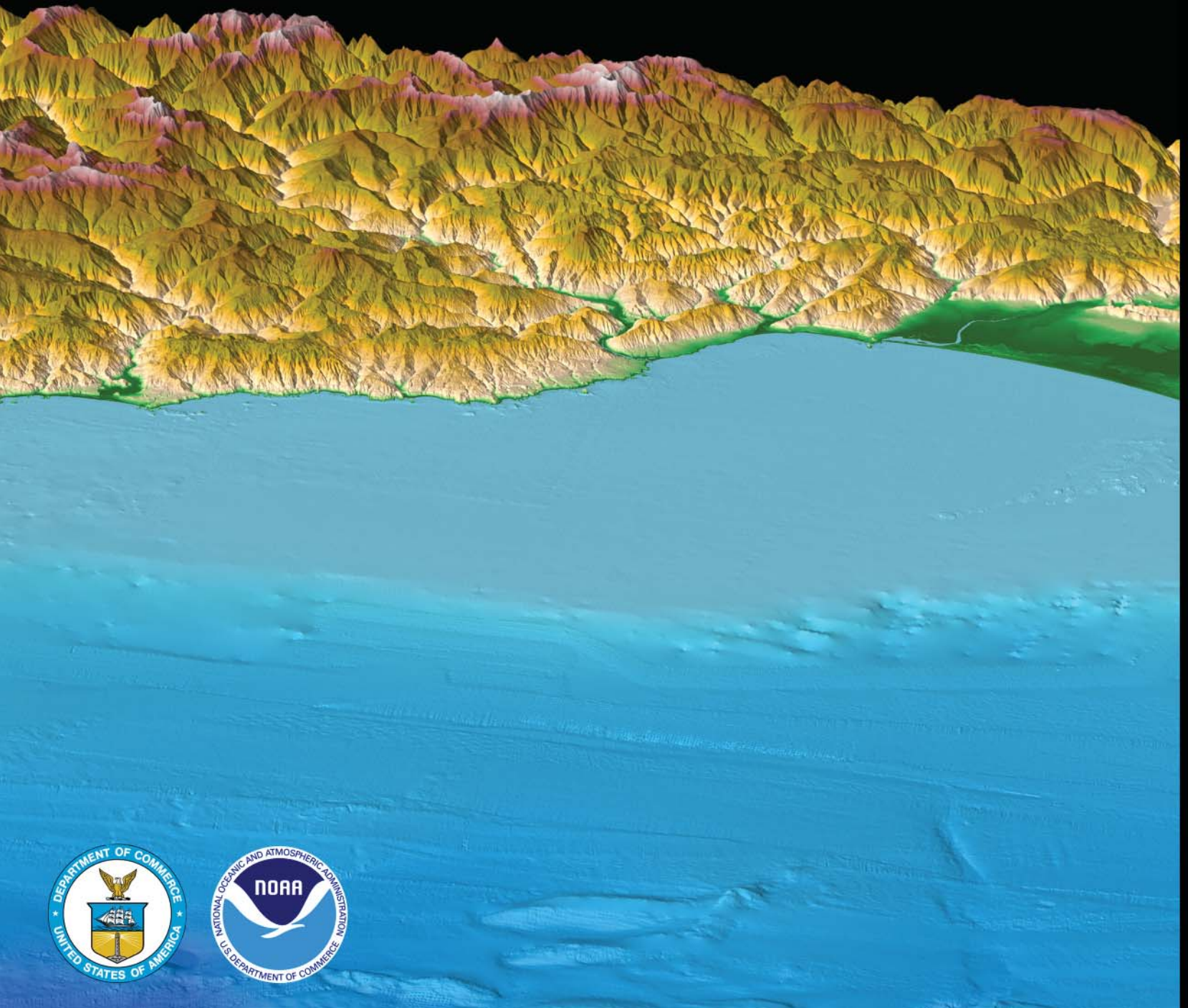


Photo Credit: http://www.enjoyportorford.com

DIGITAL ELEVATION MODEL

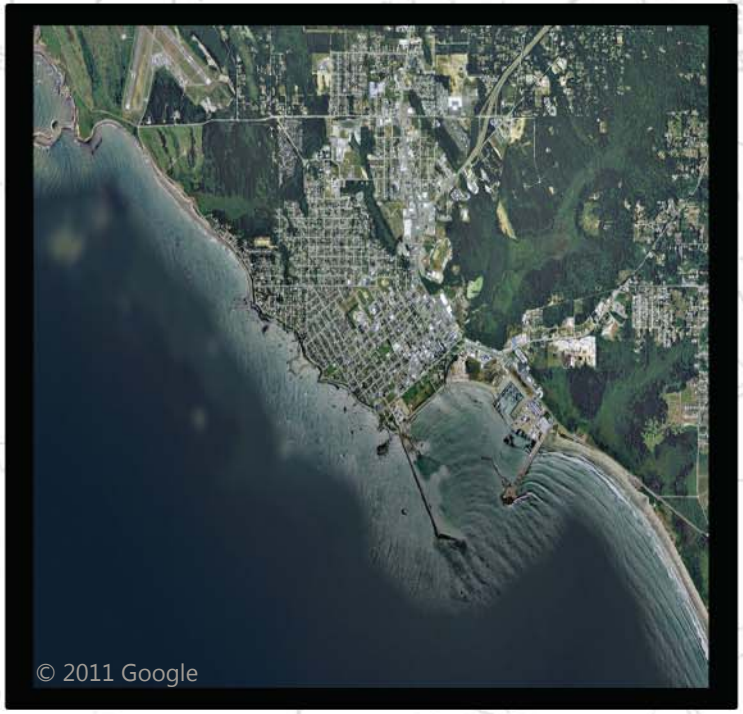
Crescent City, California



NOAA Knows...

CRESCENT CITY, CALIFORNIA

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model Crescent City, California?

The Crescent City DEM extends from north of Gold Beach, Oregon to south of Klamath, California. Crescent City is located in Northern California, 30 kilometers south of the Oregon border. The city covers an area of approximately 4 square kilometers and has a population of 7,500 with a surrounding suburban population of 15,000. Crescent City is considered to be more vulnerable to tsunamis than any other city along the West Coast of the United States. Observed tsunami events date back to the late 1800's and early 1900's. The most devastating tsunami event in the community to date was the 1964 Gulf of Alaska tsunami, which recorded a water height of almost five meters in Crescent City. Eleven people in Crescent City died from the tsunami, and many more suffered severe injuries. Offshore bathymetry may play a role in amplifying tsunami wave heights at Crescent City. The Mendocino Escarpment, an offshore feature, is thought to provide a means of channeling tsunami energy towards the city. For this reason, Crescent City is considered a high priority site for tsunami inundation research and the development of forecasting methods and models.

Who Provided the Data?

- NOAA National Geophysical Data Center (NGDC)
- NOAA National Ocean Service (NOS)
- NOAA Office of Coast Survey (OCS)
- NOAA Coastal Services Center (CSC)
- California Department of Fish and Game (CDFG)
- California State University Monterey (CSUMB)
- U.S. Army Corps of Engineers (USACE)
- U.S. Geological Survey (USGS)

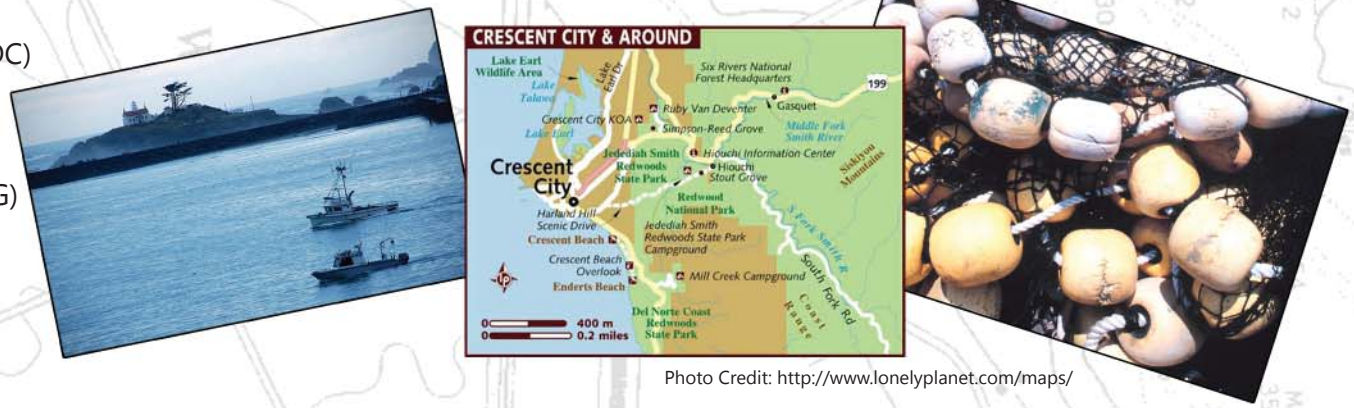
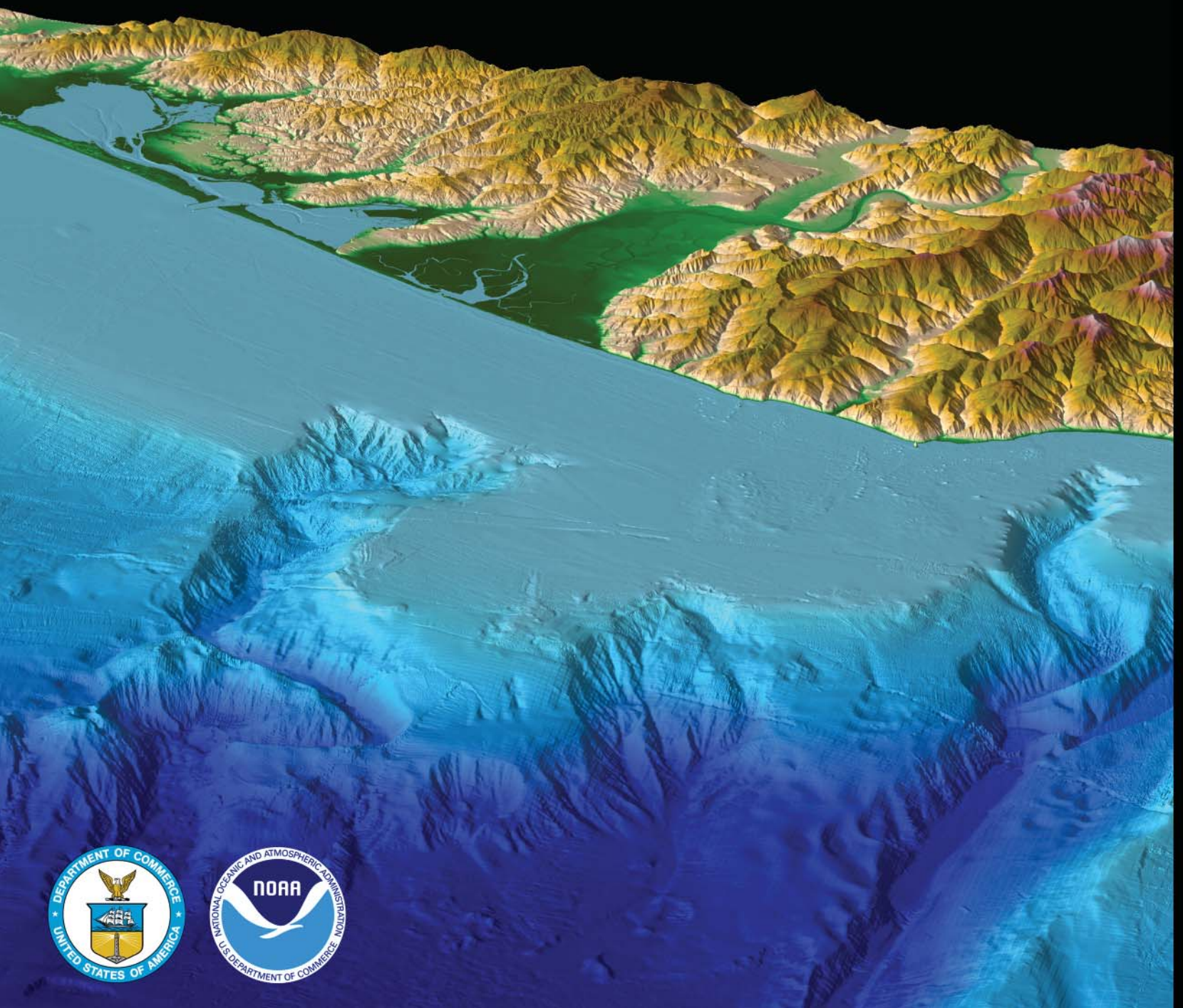


Photo Credit: http://www.lonelyplanet.com/maps/

DIGITAL ELEVATION MODEL

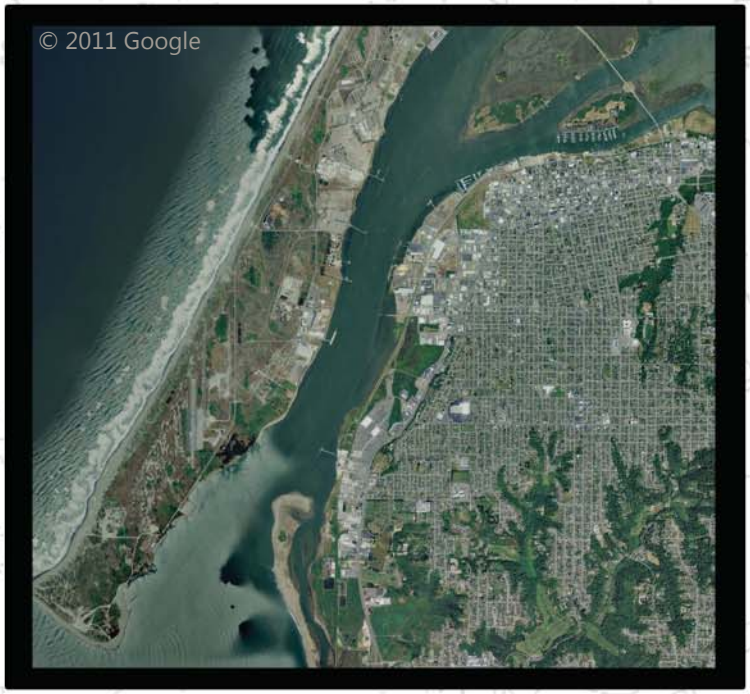
Eureka, California



NOAA Knows...

EUREKA, CALIFORNIA

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model Eureka, California?

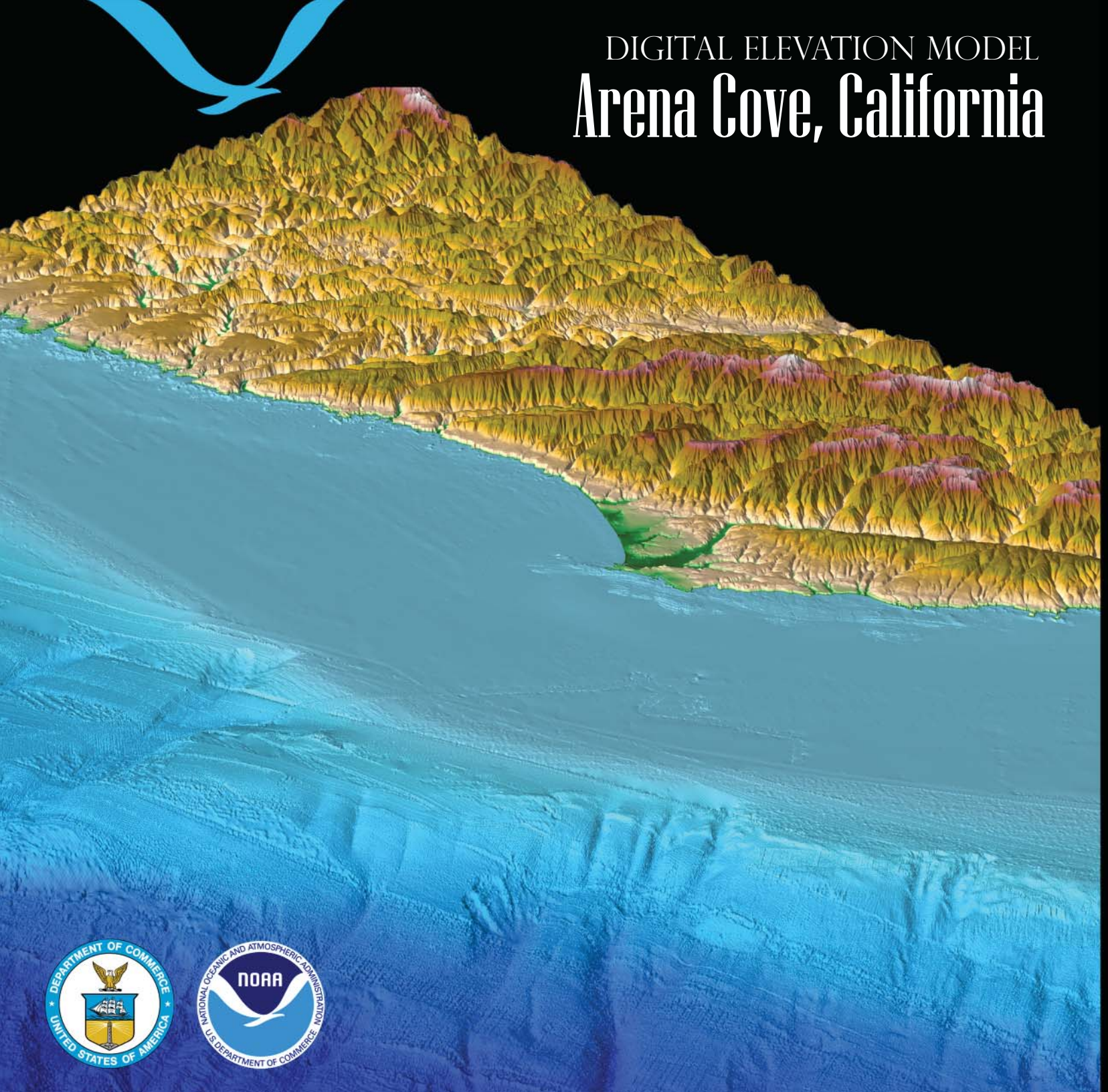
Eureka is located in Humboldt County on the northern coast of California - between Cape Mendocino and the Oregon border. The town has a population of roughly 26,000 people. Eureka was originally established by gold miners in order to ship gold south to Sacramento. After the Gold Rush, Humboldt County's economy relied heavily on the salmon fishing industry and the lumber industry. Most recently, tourism has provided some economic recovery to the region. The Redwood National Park is located 65 kilometers north of Eureka along scenic Pacific Coast Highway 101. The Eureka DEM boundary encompasses the communities of Orick, Trinidad, McKinleyville, Arcata, and Eureka. Located offshore along the western edge of the DEM is the southern end of the Cascadia Subduction Zone (CSZ). This region is where the Juan de Fuca plate to the north is subducted below the North American Plate to the east. Plate movement here creates a highly seismic region, putting the area at risk for not just earthquakes but also for tsunamis and landslides. These geologic factors coupled with coastal community development make the Eureka DEM an important tool for hazard preparedness and planning.

Who Provided the Data?

- NOAA Office of Coast Survey (OSC)
- NOAA National Ocean Service (NOS)
- NOAA Coastal Services Center (CSC)
- NOAA National Geophysical Data Center (NGDC)
- California Department of Fish and Game (CDFG)
- California State University Seafloor Mapping Laboratory (CSUMB)
- Center for Coastal and Ocean Mapping Joint Hydrographic Center (CCOM-JHC)
- California Regional Water Quality Board
- U.S. Geological Survey (USGS)
- The University of New Hampshire (UNH)
- GEON's Open Topography Portal

DIGITAL ELEVATION MODEL

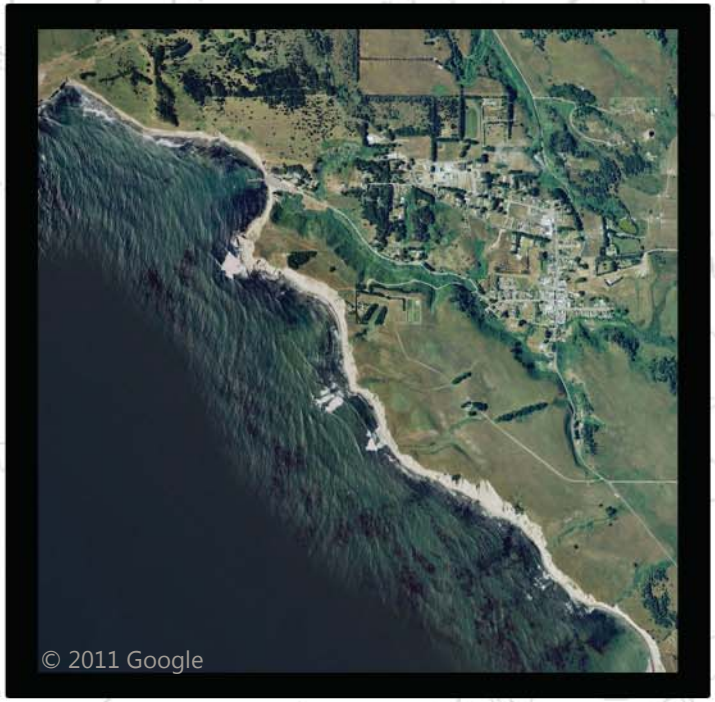
Arena Cove, California



NOAA Knows...

ARENA COVE, CALIFORNIA

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model Arena Cove, California?

Arena Cove is a small sandy cove among rocky cliffs, located about 200 kilometers north of San Francisco, near the small fishing community of Point Arena. The town of Point Arena is home to about 500 people who depend heavily on tourism to support the local economy. Arena Cove and Point Arena are both highly visited locations due to their natural beauty, open spaces, and wildlife. The most notable attraction in the area is the Point Arena lighthouse, which sits atop a cliff near Arena Cove. The sparsely populated Arena Cove area is scientifically important due to its unique physical location atop the San Andreas Fault; the high-risk area was heavily damaged by the 1906 earthquake. The DEM of the Arena Cove area provides detailed information about the complex coastline and fault zone, which is helpful for the study of hurricanes, earthquakes, tsunamis, and sea-level rise. Detailed model information about the terrain can help local managers prepare for future storm and hazard events that are associated with inundation and geologic changes.

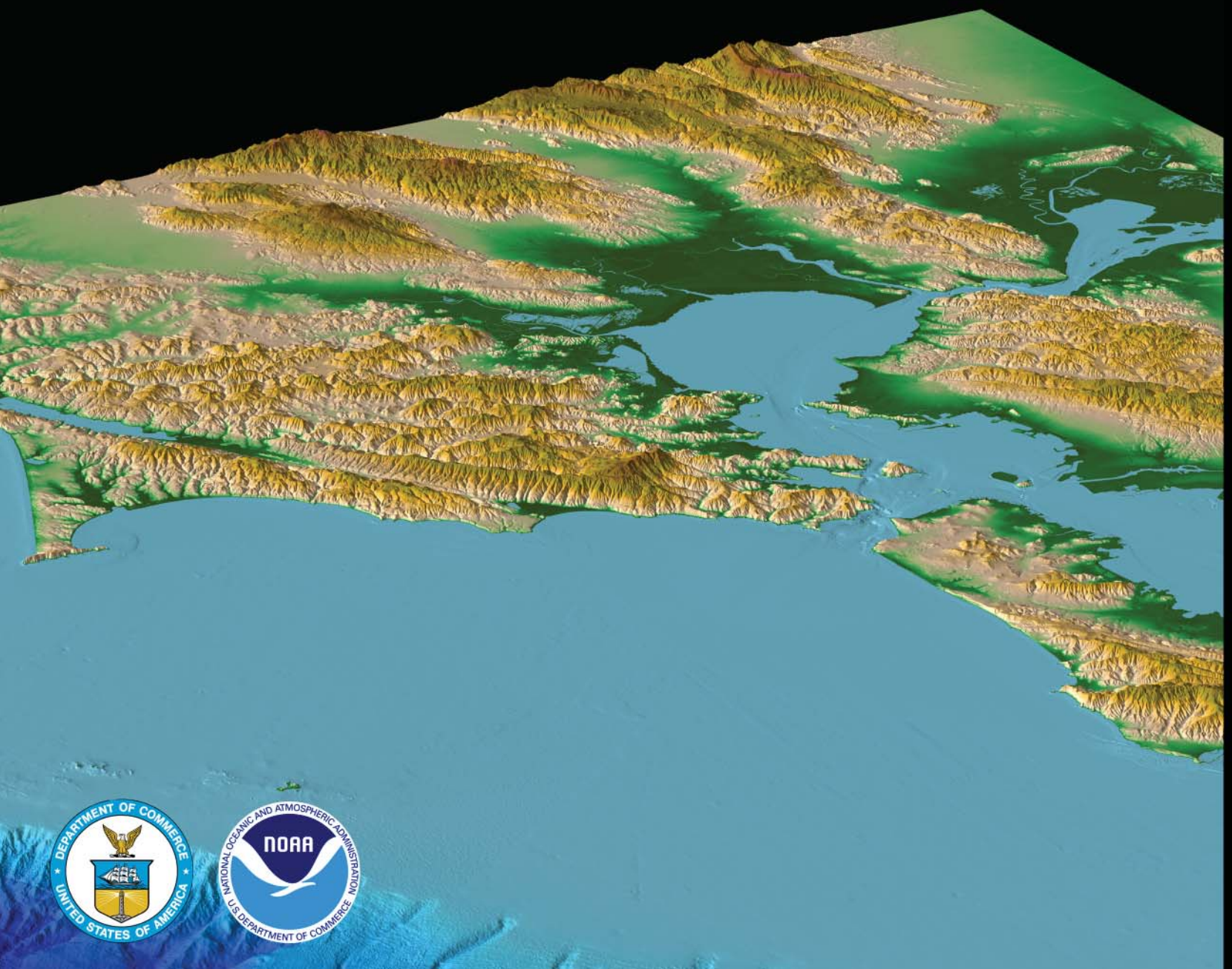
Who Provided the Data?

- NOAA Office of Coast Survey (OSC)
- NOAA Coastal Services Center (CSC)
- NOAA National Geophysical Data Center (NGDC)
- U.S. Fish and Wildlife Service (USFWS)
- The U.S. Geological Survey (USGS)
- California State University at Monterey Bay Seafloor Mapping Laboratory (CSUMB)
- California Department of Fish and Game (CDFG)
- California Spatial Information Library (CASIL)

Photo Credit: ©Scott Simpson, www.westofone.com

DIGITAL ELEVATION MODEL

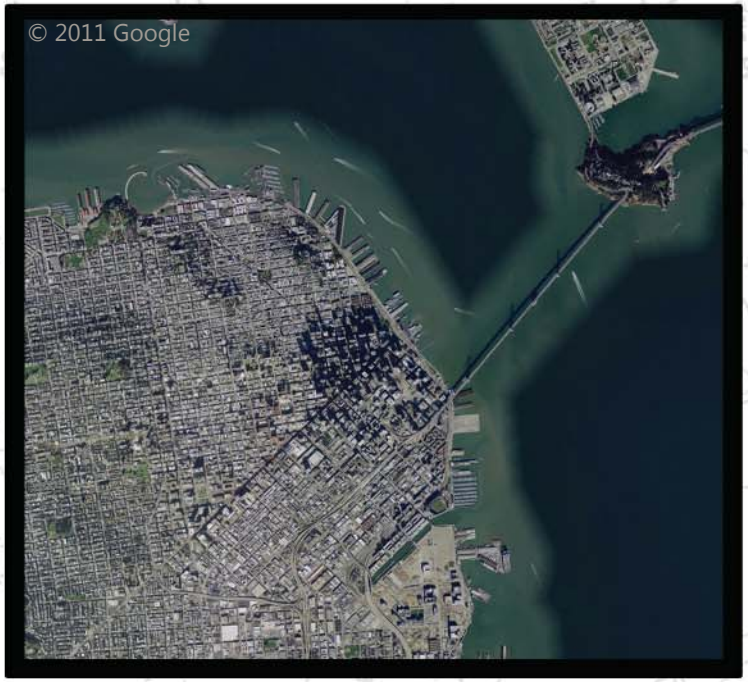
San Francisco, California



NOAA Knows...

SAN FRANCISCO, CALIFORNIA

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model San Francisco, California?

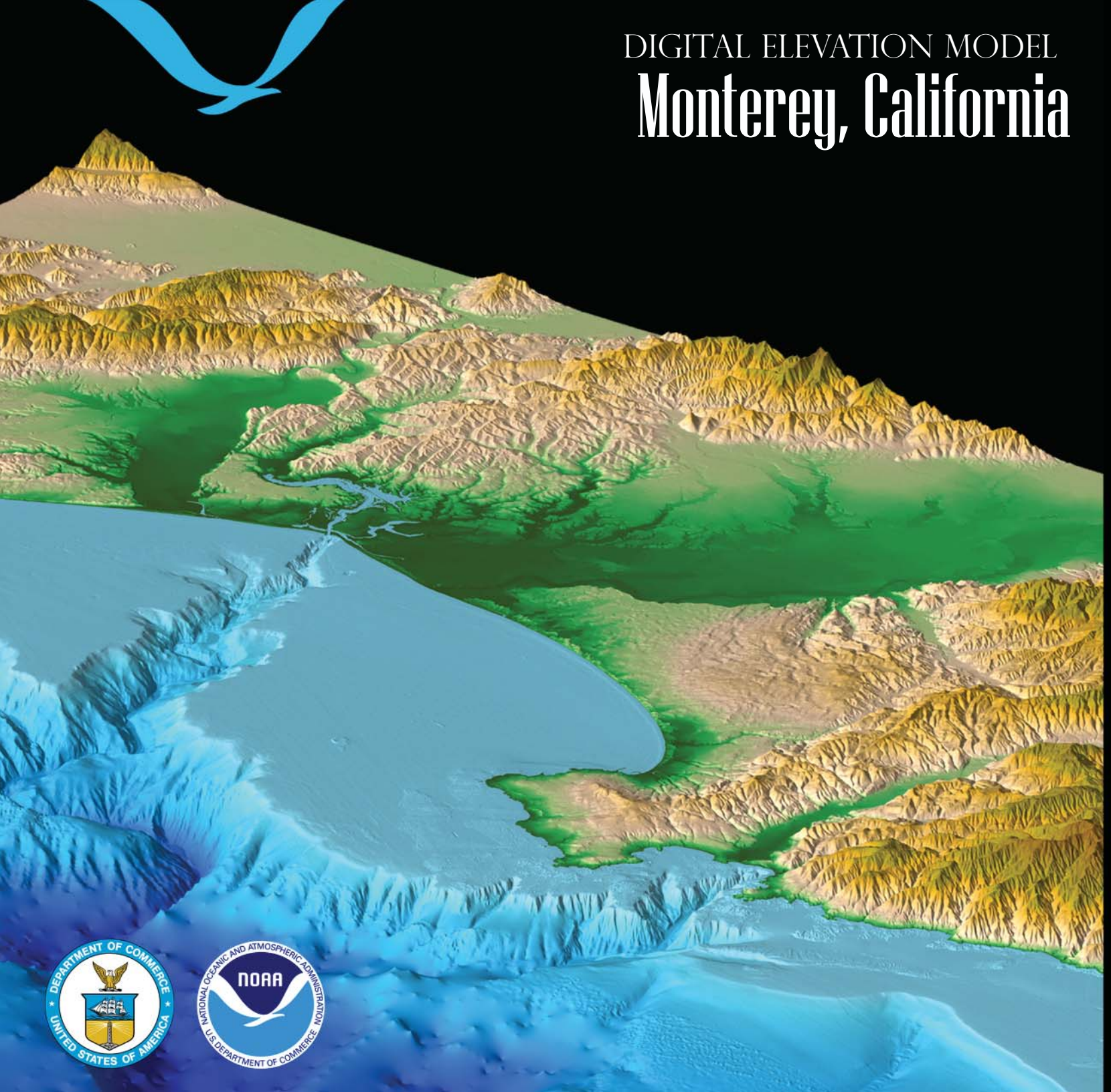
The city of San Francisco is located on a peninsula along the Pacific Ocean and San Francisco Bay. The bustling town has a total population of 815,000 people (7 million including the surrounding areas of San Jose and Oakland), making it the second-most densely populated city in the country. The city's skyline, the Golden Gate Bridge, cable cars, and the harbor seals attract thousands of tourists each year– helping to fuel the local economy. In the past century, the natural shoreline has been dredged, extended, and filled to support growth and developing communities. A number of major faults cross the area, trending from southeast to northwest making this region at high risk for earthquakes. In the face of earthquake and flooding events, man-made structures are at risk for disaster. The 1964 Alaskan earthquake generated a tsunami that resulted in damages within San Francisco Bay and also along the Southern California coast. The San Francisco DEM is an important tool for community planners as they work to prepare for and mitigate the effects of natural geologic hazards, tsunami inundation, and other severe storm events in the popular urban area.

Who Provided the Data?

- NOAA National Geophysical Data Center (NGDC)
- NOAA National Ocean Service (NOS)
- NOAA Office of Coast Survey (OCS)
- California Department of Fish and Game (CDFG)
- California Department of Water Resources (CADWR)
- California State University at Monterey Bay Seafloor Mapping Laboratory (CSUMB)
- National Center of Airborne Laser mapping (NCALM)
- Federal Emergency Management Agency (FEMA)
- City and County of San Francisco
- U.S. Army Corps of Engineers (USACE)
- U.S. Geological Survey (USGS)
- Geosciences Network's (GEON) Open Topography Portal

DIGITAL ELEVATION MODEL

Monterey, California



NOAA Knows...

MONTEREY, CALIFORNIA

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Why Model Monterey, California?

The Monterey DEM covers the coastal region surrounding the town of Monterey, California, and includes the communities of Santa Cruz, Capitola, Moss Landing, Seaside, Monterey, Pacific Grove, and Carmel-by-the-Sea. Encompassing a portion of the Monterey Bay National Marine Sanctuary, the DEM bathymetry depicts large underwater canyons. The region is home to many species of marine life, which provide recreational, educational, and economic benefits to the surrounding communities. The ocean also offers research opportunities for the Monterey Bay Aquarium Research Institute and the University of California Santa Cruz. Overall, the coastline in the area varies from beaches to sea cliffs, and the drive along the coast is considered to be one of the most scenic on the west coast. The actual town of Monterey is located at the southernmost part of Monterey Bay and has a population of approximately 30,000 people. Originally a fishing and whaling community built up in the 1850s, the town developed a large recreational and agricultural based economy in the 1950s. Steep terrain both above and below the water, along with a history of seismic activity, and densely populated areas, increases the likelihood of damages from coastal hazards and the need for DEM modeling and government preparation.

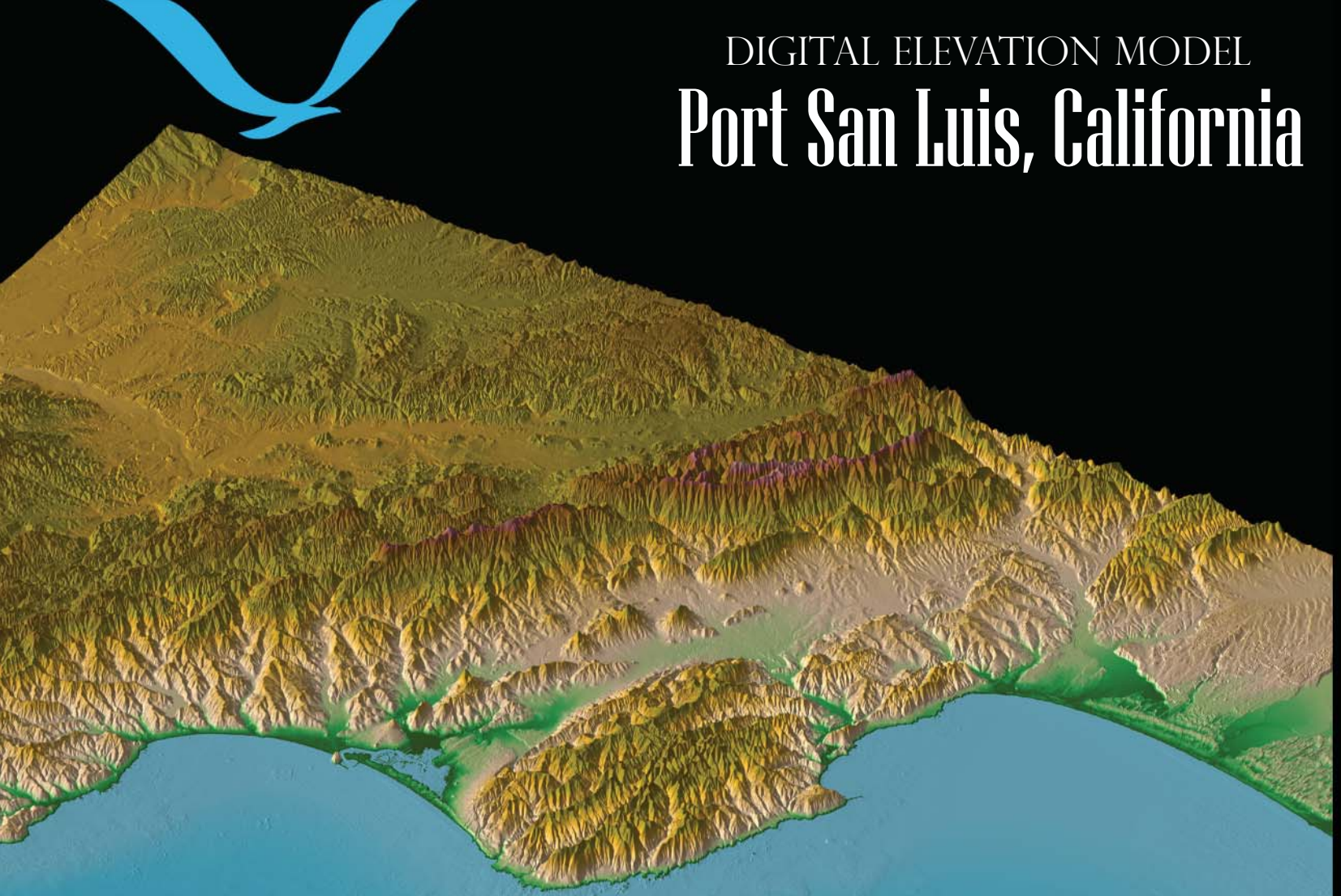
Who Provided the Data?

- NOAA National Ocean Service (NOS)
- NOAA Office of Coast Survey (OCS)
- NOAA Coastal Services Center (CSC)
- California State University at Monterey Bay Seafloor Mapping Laboratory (CSUMB)
- U.S. Geological Survey (USGS)
- California Department of Fish and Game Marine Region GIS Unit (CDFG)

Photo Credit: city-data.com

DIGITAL ELEVATION MODEL

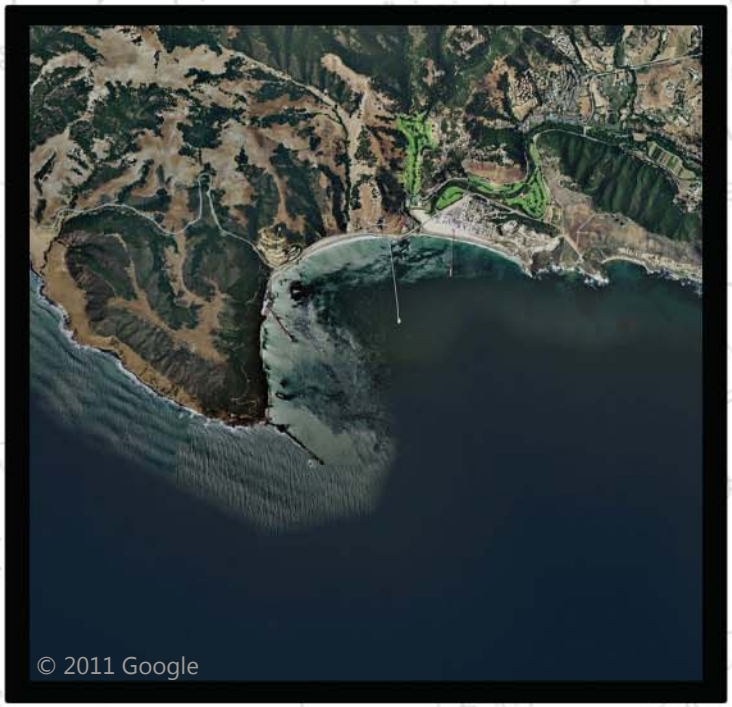
Port San Luis, California



NOAA Knows...

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

PORT SAN LUIS, CALIFORNIA

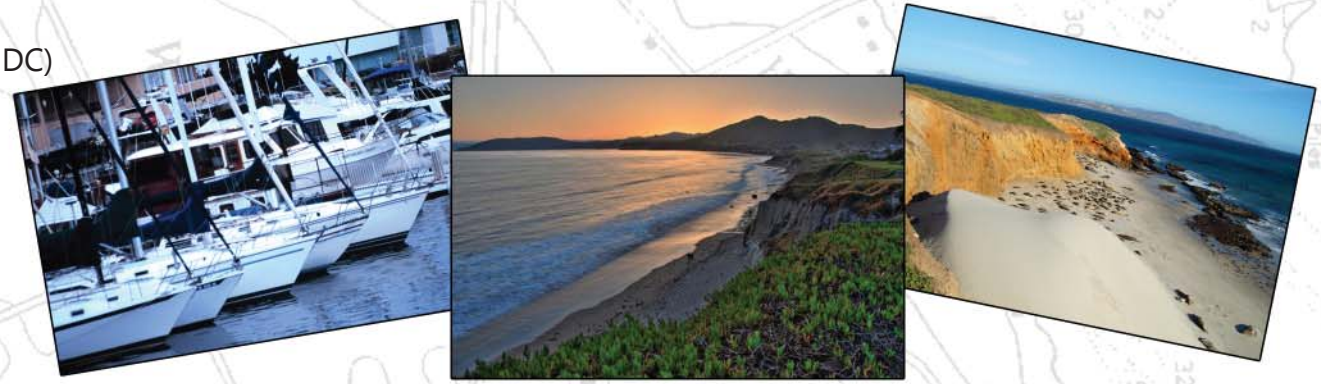


Why Model Port San Luis, California?

Port San Luis is located between Los Angeles and San Francisco, in San Luis Obispo County near the coastal communities of Avila Beach, Pismo Beach, and Morro Bay. The area has a total population of roughly 247,000 people. This "Central Coast" area retains some of the older Californian characteristics that are said to have been lost in the large coastal towns. The towns in the area are more rural and agricultural, supporting fishing industries and outdoor activities. Overall, San Luis Obispo county is the third largest producer of wine in California, which provides a large tourism outlet and economic niche for local residents. In and along the bay, volcanic formations and fault lines increase the risk for tectonic activity, earthquakes, landslides, and tsunamis. Strong earthquakes with epicenters off the coast of Alaska and across the Pacific can threaten this area, potentially causing severe damage to seaside towns and communities. The Port San Luis DEM is an important tool for community planners as they prepare for future hazards and coastal flooding.

Who Provided the Data?

- NOAA National Geophysical Data Center (NGDC)
- NOAA National Ocean Service (NOS)
- NOAA Coastal Services Center (CSC)
- NOAA Office of Coast Survey (OCS)
- U.S. Geological Survey (USGS)
- U.S. Army Corps of Engineers (USACE)
- University of California, San Diego (UCSD)



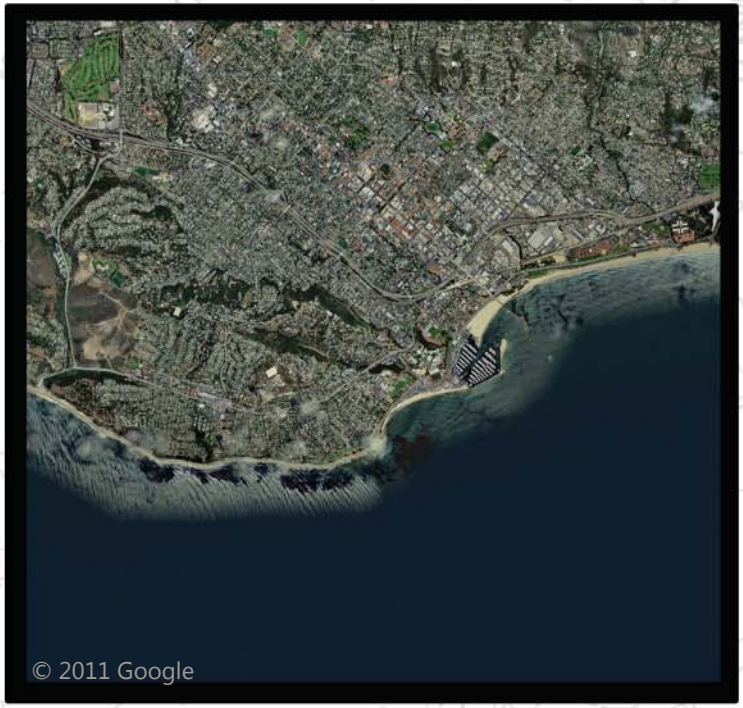
DIGITAL ELEVATION MODEL

Santa Barbara, California

NOAA Knows...

SANTA BARBARA, CALIFORNIA

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model Santa Barbara, California?

The Santa Barbara DEM covers the coastal region from Port Hueneme in the southeast to Point Conception in the northwest, and includes the communities of Port Hueneme, Oxnard, Ventura, Carpinteria, Santa Barbara, Isla Vista, and Goleta. The city is home to almost 100,000 people, with another 100,000 people living in the surrounding suburbs. The Channel Islands National Marine Sanctuary is located south of the city. The Channel Islands are home to many species of marine life, providing recreational, educational, and economic benefits to the surrounding communities and to the many universities in the region, including the University of California, Santa Barbara. The nearby Santa Clara River, the largest river in Southern California, empties into the ocean about 50 kilometers southeast of Santa Barbara. The river flooded in 2005, causing heavy property damages and loss of life. Steep terrain both above and below the coastline, along with a large population and a history of earthquakes and seismic activity, result in a high level of threat from possible coastal hazards in the area. The Santa Barbara DEM is an important tool for community planners when preparing for future severe storm and hazard events.

Who Provided the Data?

- NOAA National Ocean Service (NOS)
- NOAA National Geophysical Data Center (NGDC)
- NOAA Coastal Services Center (CSC)
- NOAA Office of Coast Survey (OCS)
- U.S. Geological Survey (USGS)
- U.S. Army Corps of Engineers (USACE)
- The California State University at Monterey Bay Seafloor Mapping Laboratory (CSUMB)
- California Department of Fish and Game (CDFG)
- Ventura and Santa Barbara Counties

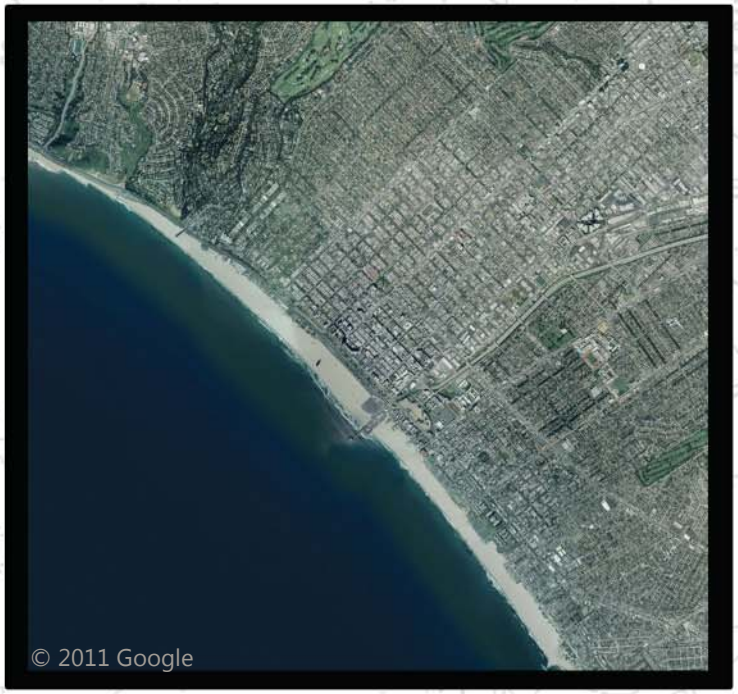
DIGITAL ELEVATION MODEL

Santa Monica, California

NOAA Knows...

SANTA MONICA, CALIFORNIA

National Oceanic and Atmospheric Administration
U.S. Department of Commerce



Why Model Santa Monica, California?

The Santa Monica model provides coverage of the coastal region that includes the communities of Santa Monica, Malibu, Marina del Rey, Redondo Beach, Los Angeles, Long Beach, Newport Beach, and Huntington Beach. The City of Santa Monica is situated on a generally flat slope with high bluffs along the coast in the northern portions of the city. The population estimate for the City of Santa Monica is approximately 87,000 people. The total population within the model boundary, however, exceeds 10 million. Located in a historically active earthquake region, the North and South Branches of the Santa Monica Fault run roughly southwest to northeast across the western half of the city. The communities are at high risk for earthquakes and associated hazards, such as landslides and tsunamis. The region surrounding Santa Monica contains a significant number of other faults, including the San Andreas Fault to the north. The Santa Monica DEM is an important tool for community planners in respect to future tsunamis, earthquakes, storms, and other hazard events.

Who Provided the Data?

- NOAA National Ocean Service (NOS)
- NOAA National Geophysical Data Center (NGDC)
- NOAA Coastal Services Center (CSC)
- NOAA Office of Coast Survey (OCS)
- U.S. Geological Survey (USGS)
- U.S. Army Corps of Engineers (USACE)
- The California State University at Monterey Bay Seafloor Mapping Laboratory (CSUMB)
- California Department of Fish and Game (CDFG)

Photo Credit: http://www.coastal.ca.gov/

Cassidys Pt.
Cassidys Head
Bay
Cold Bath Shoal
FIG
HOWE
HOWE
Cable Ferry
FIR
Cables

This flipbook is part of a "Regional DEM Series" that is based on the work of a team of NOAA and CIRES scientists, led by Dr. Barry Eakins and Lisa Taylor. To learn more about coastal DEMs and DEM development in support of coastal management and research, visit http://www.ngdc.noaa.gov/mgg/coastal/

2011, NOAA NGDC

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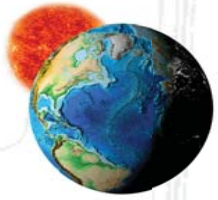

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