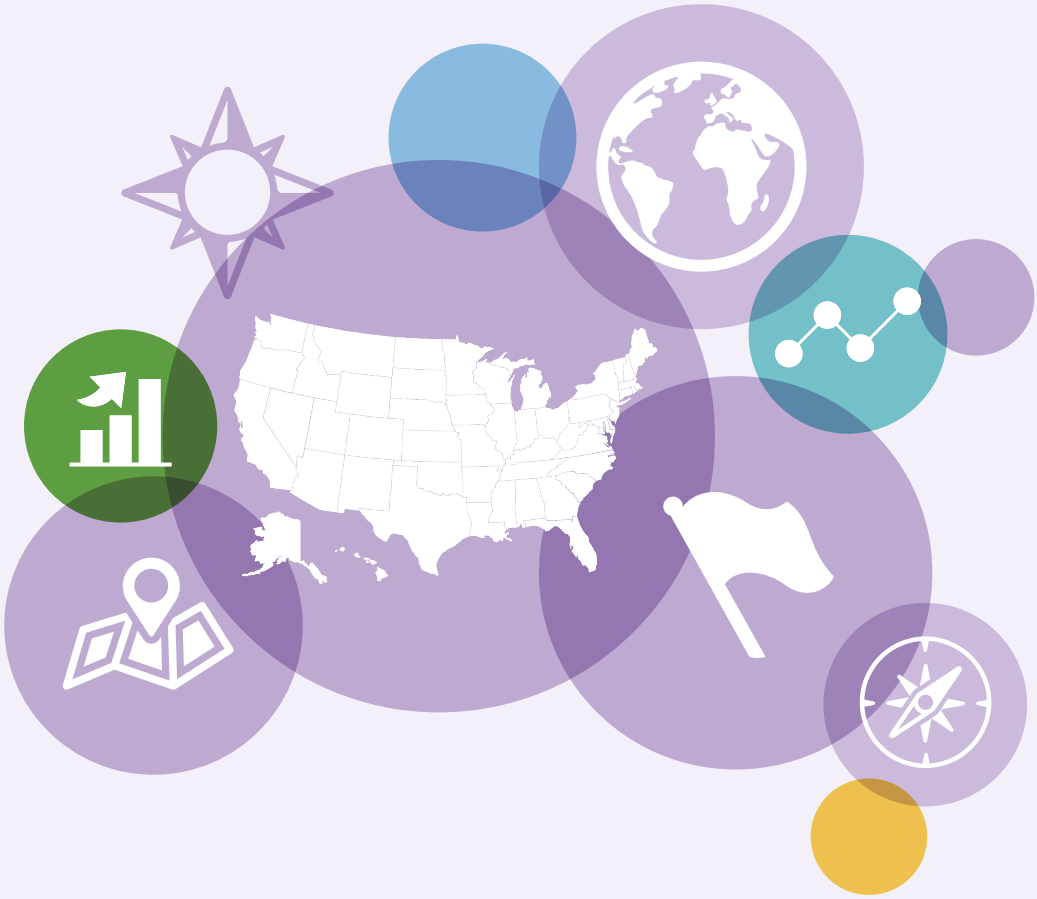


PLAY IT SAFE!

TEACHER VERSION

Subject Level:
Elementary School Geography

Grade Level:
5

Approx. Time Required:
90 minutes

Learning Objectives:

- Students will be able to describe and analyze the effects of environmental hazards on people.
- Students will be able to describe how people change their behaviors in response to environmental hazards.
- Students will be able to use census data to explain how prepared U.S. residents are for natural disasters.
- Students will be able to create a sample disaster preparedness kit, determining the necessity of items for specific disasters in their community.

Activity Description

Students will learn how the U.S. Census Bureau helps emergency responders provide support during natural disasters. Then, the teacher will set up various stations around the room to encourage peer-to-peer learning in small groups. Students will rotate from station to station, completing tasks such as creating an emergency preparedness kit, determining the states with the highest risk for hurricanes, and reviewing a series of photos of houses to determine which are most likely to survive a natural disaster.

Suggested Grade Level
5

Approximate Time Required:
90 minutes

Learning Objectives:

- Students will be able to describe and analyze the effects of environmental hazards on people.
- Students will be able to describe how people change their behaviors in response to environmental hazards.
- Students will be able to use census data to explain how prepared U.S. residents are for natural disasters.
- Students will be able to create a sample disaster preparedness kit, determining the necessity of items for specific disasters in their community.

Topics:

- Emergency preparedness
- Environmental hazards
- Infographics
- Natural disasters

Skills Taught:

- Analyzing data
- Drawing conclusions
- Making predictions
- Peer-to-peer learning

Materials Required

- The student version of this activity, 18 pages
- Large sheets of paper, such as those on a self-stick easel pad
- Markers
- Supplies for an emergency preparedness kit (see more information in the "Before the Activity" section)

Activity Items

The following items are part of this activity. The items and their sources appear at the end of this teacher version.

- Item 1: How Ready Are We?
- Item 2: Coastal Areas
- Item 3: Coastline Population Trends in the United States: 1960 to 2008

For more information to help you introduce your students to the Census Bureau, read "*Census Bureau 101 for Students*." This information sheet can be printed and passed out to your students as well.

Standards Addressed

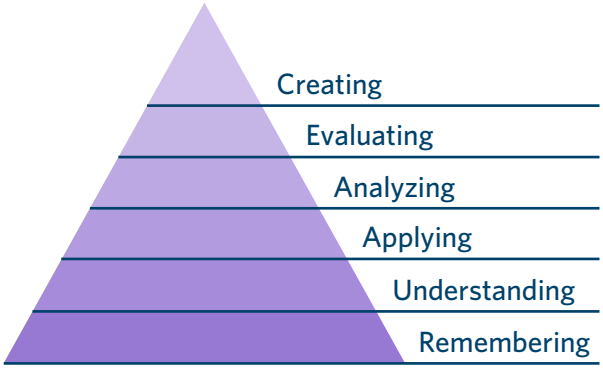
See chart below. For more information, read "*Education Standards and Guidelines Addressed by Statistics in Schools.*"

National Geography Standards

Standard	Grade	The student knows and understands:
15 – How physical systems affect human systems	4	Environmental Hazards 2. Environmental hazards affect human activities *Therefore, the student is able to:* b. Describe and analyze the effects of environmental hazards on human activities, as exemplified by being able to: • Describe how people change their behaviors in response to environmental hazards (e.g., knowing evacuation routes, building a storm shelter, conducting earthquake or tornado drills). • Describe how people might build their houses differently on a coast or beach as compared to another location (e.g., elevated footings for storm surge, shutters over windows, metal reinforced roof trusses for wind). • Construct a disaster preparedness manual for your community or school that includes a list of actions people should take in an emergency situation due to a local environmental hazard event.

Bloom's Taxonomy

Students will ***analyze*** the effects of environmental hazards on people.



Teacher Notes

Before the Activity

Students must understand the following key terms:

- **Coast** – the part of land that is right next to the sea
- **Emergency preparedness** – being ready for an unplanned and dangerous situation
- **Evacuate** – to move from a place of danger to a safe place
- **Generator** – a fairly small device (usually powered by gas) that is plugged into appliances, such as refrigerators, to make them work when the power (electricity) is out
- **Infographic** – a visual tool, such as a chart, picture, or timeline, used to show numbers and/or words, including data
- **Population** – the number of people in an area
- **Natural disaster** – a sudden event, caused by environmental factors, that can lead to serious damage (e.g., hurricane, earthquake, avalanche, tornado, flood, blizzard, monsoon, tsunami, wildfire, cyclone, landslide, storm/lightning, heat wave, volcanic eruption)

This activity is intended to foster peer-to-peer learning rather than rely on teacher-led instruction. Therefore, teachers should encourage students to turn to each other for help. While each student should complete an activity packet, students should work together and engage in discussions at each station. The classroom should be loud and lively! The activity is designed with stations to get students moving around so they stay engaged and energized.

Since this activity requires rotations, suggested timing cues are included to help guide teachers and ensure that students stay on track.

Teachers should divide the room into five stations, labeling each area with a number (1–5). Stations could be clusters of desks or sections of the classroom, such as a reading nook or carpeted area (if it exists). Below are instructions for setting up the stations.

- **Station 1:** No special setup needed.
- **Station 2:** Set out markers and a large sheet of paper. Use either a self-stick easel pad on the wall next to the station or an oversized piece of paper in the center of a cluster of desks, depending on the setup. Prepare one piece of paper for each group with a T-Chart that has the left side titled "Potential Dangers" and the right side titled "Ways to Prepare for Disaster."
- **Station 3:** No special setup needed.
- **Station 4:** No special setup needed.

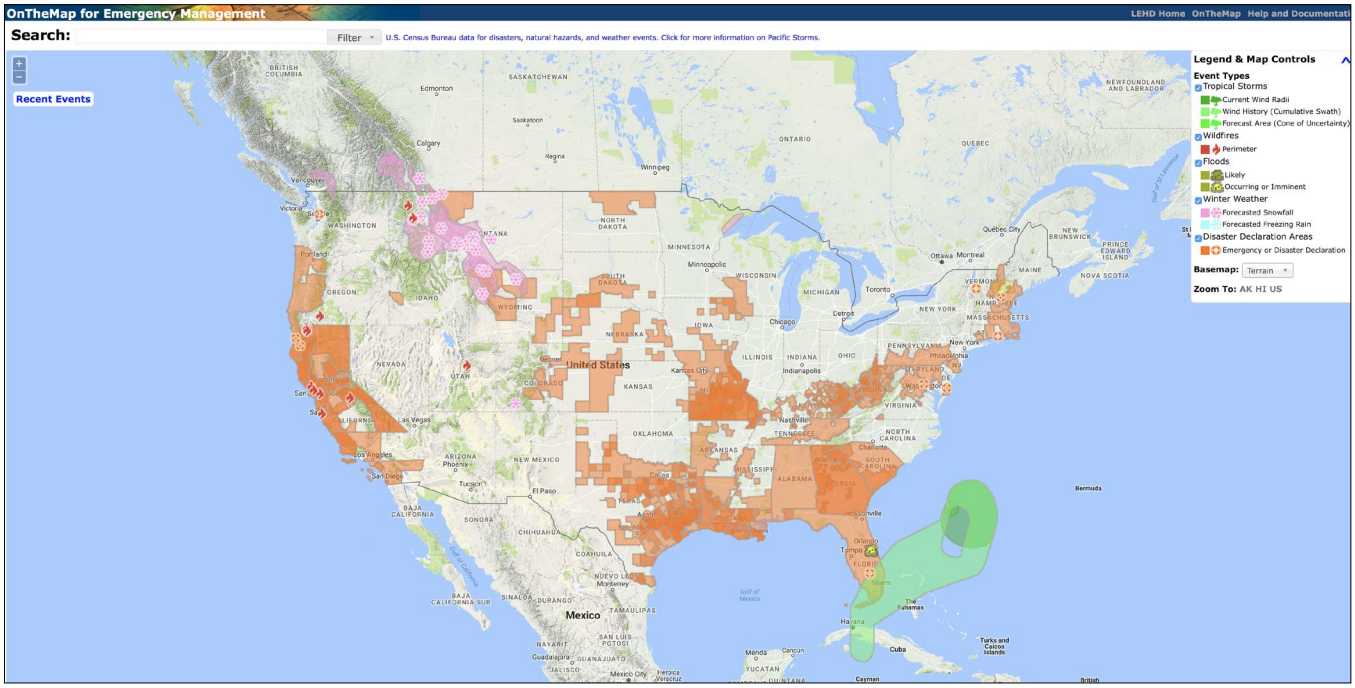
- **Station 5:** Provide supplies for an emergency preparedness kit as well as one small to medium box with a lid for student groups to put those items in. Supply more items than students can fit in the box to encourage them to make smart decisions about which items are most important. (Teachers may also want to provide some items that are not important to test students; for example, teachers could provide movies, but students should recognize that they may not have power and therefore probably shouldn't pack those.) Ideas for supplies include:
  - Cans of nonperishable food
  - Can opener
  - Towels
  - Hand sanitizer
  - Bottled water
  - First-aid kit
  - Blankets
  - Matches
  - Batteries
  - Flashlight
  - Cellphone
  - Whistle to signal for help
  - Maps
  - Cash (Monopoly money)
  - Paper and pencils
  - Fun items, like books or puzzles
  - Candy
  - Handkerchiefs or bandanas

Teachers should note that student groups will be asked to dissemble their box when they rotate to the next station, so teachers may want to take a photo of the box when students are done. Teachers could post those photos around the room following the activity.

5 minutes

Teachers should ask students to come up with examples of natural disasters (hurricane, tornado, etc.). Teachers should write those on the board as students say them, helping students by adding other natural disasters to the list that they may not be aware of. Teachers should ask students which natural disasters are possible in the state/territory where they live and which are not (for example, hurricanes are common in Florida, but not so common in Kansas; and floods and fires can happen anywhere). Teachers could consider asking students to share their personal experiences with a natural disaster.

If desired, teachers can use the Census Bureau's OnTheMap tool to help guide this discussion: *onthemap.ces.census.gov/em*. OnTheMap for Emergency Management provides real-time access to a range of detailed Census Bureau data about the people living and working in areas being affected by hurricanes, floods, wildfires, and winter storms, and in federal disaster declaration areas. While teachers don't need to use the tool to complete the activity, it may be helpful to show the map to students to indicate different natural disasters across the country.



5 minutes

Teachers should let students know that they will be looking at some information from the U.S. Census Bureau in this activity. Teachers should explain that one thing the Census Bureau does is ask U.S. residents questions to learn more about them, and that a couple things the Census Bureau asks about are where people live and how many people live there. The Census Bureau knows how many people live in each town, city, state, and U.S. territory. So when a natural disaster happens, emergency responders can look at these numbers from the Census Bureau to get a good sense of how many people they need to help. The Census Bureau also collects information about natural disasters after they happen, including when they occurred, where they occurred, and how many people were affected.

3 minutes

Teachers should divide students into five groups and assign each group to a station, explaining that they will be at each station for about 10 minutes before rotating to the next one. (It is up to the teacher to determine the exact timing based on how quickly students are grasping the concepts.)

During the Activity

50–60 minutes

Teachers should move around the room, checking on students at each station.

At Station 3, students need only use the tables in **Item 2** to answer the questions, but students may review the narrative portion of the item and find it difficult to understand. Teachers should be ready to assist them.

After the Activity

10 minutes

Teachers should bring the class back together and discuss what students learned at each station. If time permits, teachers may want to review the prompts and questions posed at each station, calling on volunteers to share their responses.

7 minutes

Teachers may want to have students fill out a short exit slip to gauge their understanding. The exit slip could ask students all or some of the following questions:

- What is the most important thing you learned today?
- What is the most surprising thing you learned today?
- What questions do you still have?
- What was difficult about today's activity?
- What are some examples of how people change their behaviors in response to environmental hazards? Explain. (Students could provide examples like stocking up on nonperishable food.)

Extension Ideas

To extend this activity, teachers could:

- Ask students to read this "2017 Hurricane Season Begins" document from the Census Bureau: *www.census.gov/content/dam/Census/newsroom/facts-for-features/2017/cb17-ff13.pdf*
- Share with students resources from the Federal Emergency Management Agency on emergency preparedness for kids: *www.fema.gov/media-library/assets/documents/34411*

Student Activity

Click ***here*** to download a printable version for students.

Activity Items

The following items are part of this activity and appear at the end of this student version.

- Item 1: How Ready Are We?
- Item 2: Coastal Areas
- Item 3: Coastline Population Trends in the United States: 1960 to 2008

Student Learning Objectives

- I will be able to describe and analyze the effects of environmental hazards on people.
- I will be able to describe how people change their behaviors in response to environmental hazards.
- I will be able to use census data to explain how prepared U.S. residents are for natural disasters.
- I will be able to create a sample disaster preparedness kit for a potential disaster in my community.

Today, you will be going to different stations set up around the classroom. At each station, you will learn something about natural disasters and emergency preparedness. Your teacher will put you in groups, tell you which station to start at, and let you know when you need to move to the next station. Most of you will not start at Station 1, so you may be completing this activity out of order (and that's OK!).

Station 1: Are U.S. Residents Ready for an Emergency?

Review **Item 1: How Ready Are We?** This is an infographic that the U.S. Census Bureau created to show how prepared U.S. residents are for natural disasters. The items along the left side are different things you need to be prepared for a natural disaster—like an emergency water supply (the first item). According to the infographic, it is recommended that households have "at least three gallons or 24 bottles of water for each person in the household," and 54.3 percent of U.S. residents said they have this in their house in case of an emergency.

Discuss the following questions with your group, and then record your answers.

1. Nonperishable emergency food means food that is not fresh, takes a long time to go bad, and does not necessarily need to be cooked, such as canned food. A total of 82 percent of U.S. residents have enough nonperishable food to feed everyone in their house for up to 3 days. What are some other examples of nonperishable food (aside from canned food) that you would recommend having in the house?

   Student answers will vary, but students should mention foods that will not easily spoil and that do not require cooking, like granola bars, cereal, and crackers.

2. According to the infographic, which emergency preparedness items are U.S. residents least likely to have? Explain how you know the answer, and why you think this is.

   Most U.S. residents do not have a generator present. Students may explain that only 18.3 percent have one and that this is the lowest percentage of all the items, or that the dark blue bar for "no" is the largest for having a generator present. Students may say this is the case because generators are expensive.

3. After studying this infographic, is there anything that you want to do differently in your own life? If you were in charge of your household, is there something in particular you would like to do to be prepared for natural disasters?

   Student answers will vary, but students might say they would create an emergency meeting location and have a supply of emergency water and food. They might also say that they are going to ask their parents which emergency preparedness items they already have.

Station 2: How Does a Natural Disaster Impact a Community?

At this station, you will find a large sheet of paper with one side that says "Potential Dangers" and another that says "Ways to Prepare for Disaster."

With your group, brainstorm potential dangers related to a natural disaster that could happen where you live. (Think about various natural disasters that could occur in your area and the specific problems that could occur as a result.) Write your ideas on the left side of the paper—you can assign one person to be the recorder, or everyone can take turns writing different examples.

Then, on the right side of the paper, write an idea for how you could prepare for each situation.

See this example:

Potential Dangers	Ways to Prepare for Disaster
If you live in Florida, a potential danger is ***hurricane winds blowing in the windows*** of buildings.	To potentially lessen a hurricane's damage to buildings, you could ***board up the windows with wooden panels***.

Student answers will vary, but on the left students should write the danger related to a potential natural disaster, and on the right they should write the preventive action. A sample answer appears below.

Potential Dangers	Ways to Prepare for Disaster
Tornadoes knocking things over	**Build a secure tornado shelter in the basement to protect people from things that could fall on them.**

Station 3: Hurricane Risks

Look at the tables in **Item 2: Coastal Areas**, which discusses the population living along the coast of the United States. The Census Bureau collects specific information about the people who live in coastal counties, which are right next to the sea.

1. How does the number of people living on the coast in 1960 compare with the number of people living there in 2008?

   The population almost doubled, growing by 40 million people (an 84.3 percent increase).

2. Which county was hit with the most hurricanes between 1960 and 2008? And how many hurricanes did it get?

   Monroe County, Florida – 15 hurricanes

Now take a look at **Item 3: Coastline Population Trends in the United States: 1960 to 2008**. Review the map in Figure 1 and complete the rest of the table:

States With Coastline Counties That Could Be Hit by a Hurricane	Body of Water
California	Pacific
Oregon	**Pacific**
Washington	**Pacific**
Alaska	**Pacific**
Hawaii	**Pacific**
Texas	**Gulf of Mexico**
Louisiana	**Gulf of Mexico**
Mississippi	**Gulf of Mexico**
Alabama	**Gulf of Mexico**
Florida	**Gulf of Mexico and Atlantic**
Georgia	**Atlantic**
South Carolina	**Atlantic**
North Carolina	**Atlantic**
Virginia	**Atlantic**
Maryland	**Atlantic**
Delaware	**Atlantic**
New Jersey	**Atlantic**
New York	**Atlantic**
Massachusetts	**Atlantic**
Connecticut	**Atlantic**
Rhode Island	**Atlantic**
New Hampshire	**Atlantic**
Maine	**Atlantic**

3. How many states with coastline counties are at risk for hurricanes?

   23

Station 4: Which Houses Will Survive?

Some (but not all) of the houses pictured on the following pages were built with natural disasters in mind. Which houses do you believe would survive—or not survive—a natural disaster and why? You can talk about the house itself and the environment surrounding it. Write your answers in the table on Page 10. **(Note: In the teacher version, the table appears on Page 18.)** (The first row—for the first photo—has been completed for you as an example.)

Photo 1:

Photo 2:

Photo 3:

Photo 4:

Photo 5:

Photo 6:

Student answers will vary, as there are multiple possible answers. Some houses would survive some natural disasters but not other natural disasters, so students' explanations are important. Sample answers appear below.

Photo #	Which natural disaster would it survive or not survive? (You can write about either surviving or not surviving for any of these houses. You can also write "none," mention just one natural disaster, or mention multiple natural disasters for each.)	Why?
1	It would likely survive a heavy snowstorm.	The roof allows for snow to fall off and not pile up, which means there is less of a chance that the roof will fall in from the weight of snow.
2	**It would likely not survive a tornado.**	**The trees around the house could be blown over (and onto the house) by strong winds from a tornado.**
3	**It would likely survive a flood.**	**The house is raised off the ground, so it would take longer for the rising water during a flood to reach the house and damage it.**
4	**It would likely survive a hurricane or tornado.**	**This house appears to be made of concrete, which is very strong and can stay put even in strong winds from a hurricane or tornado.**
5	**None**	**This looks like a standard house without special qualities. The windows would most likely get blown in during a hurricane, and it would probably get damaged during a flood because it is right on the ground.**
6	**These would likely survive a flood.**	**The houses are all up high, which would probably limit the effects of a flood.**

Station 5: Create an Emergency Preparedness Kit

At your station, you will find a box and several items. Work with your group to decide which items you want to put in the box to make an emergency preparedness kit for a natural disaster. Think about one specific type of natural disaster that could occur in your area and what you would need if it happened.

All of the items must fit comfortably in your box so that you can close it. That means you will have to make some smart decisions as a team about what is most important to put in your kit because you will likely not be able to include everything.

Once you are done putting together your emergency preparedness kit, complete the following prompts.

1. In the table below, write down the items you included and why you picked them. Be sure to mention somewhere in your table which natural disaster you were preparing for.

   Student answers will vary depending on where students live, but students should identify something like a flood, tornado, etc.

Our emergency preparedness kit includes:	We chose this item because:
Student answers will vary.	**Student answers will vary.**

2. Look at some of the items you decided not to include. Explain why they were not a priority.

   Student answers will vary, but students should clearly explain why they did not prioritize certain items.

3. Save and clean up! Wait for your teacher to come by to see what you included in your emergency preparedness kit, then take all of the items out of the box, leaving everything as you found it.

Item 1: How Ready Are We?

www.census.gov/library/visualizations/2015/comm/how_ready_are_we.html

Item 2: Coastal Areas

Coastal Areas

Tweet Share

The growth in population of coastal areas illustrates the importance of emergency planning and preparedness for areas that are susceptible to inclement tropical conditions. The U.S. Census Bureau's official population estimates, along with annually updated socioeconomic data from the American Community Survey, provide a detailed look at the nation's growing coastal population. Emergency planners and community leaders can better assess the needs of coastal populations using census data.

This historical report uses a combination of decennial census data and population estimates to examine population trends along the country's saltwater edges — the nation's coastline counties.

Between 1960 and 2008, the population in coastline counties along the Gulf of Mexico soared by 150 percent, more than double the rate of increase of the nation's population as a whole. This area is now home to nearly 14 million residents.

Eighty-seven million people, or 29 percent of the U.S. population, live in coastline counties, including more than 41 million in Atlantic and 32 million in Pacific counties. In 1960, only 47 million lived in coastline counties, an increase of 40 million.

Additional Information on Coastal Areas

Coastline counties along the Atlantic and Gulf of Mexico coasts as well as the Hawaiian Islands account for nearly two-thirds of the nation's coastline population and are home to four of the nation's 10 most populous counties. These counties are also vulnerable to one of nature's biggest threats: hurricanes.

What is a coastal county?

As defined by the US Census Bureau: a coastal county has to be adjacent to water classified as either coastal water or territorial sea. There are 254 coastline counties, stretching across parts of 23 states and covering 561,435 square miles. Coastline counties are located in three coastline regions: the Atlantic (129 counties), Gulf of Mexico (56 counties), and Pacific (69 counties).

Population Growth in Coast Counties

The coastal population grew by 40 million people between 1960 and 2008, an 84.3% increase.

Year	Coastal Population
1960	47.4 million
1970	56.7 million
1980	63.6 million
1990	73.0 million
2000	82.1 million
2008	87.4 million

Item 2: Coastal Areas (Continued)

Percentage Increases in Coast and Non-coastal Population by Time Period

Time Period	Coastal	Non-coastal
1960 to 1970	19.5	11.1
1970 to 1980	12.1	11.2
1980 to 1990	14.9	7.8
1990 to 2000	12.4	13.5
2000 to 2008	6.5	8.7

The overall population increased between 1960 and 2008 was 84.3% for coastal areas and 64.3% for non-coastal areas.

Demographic Components of Population Change: 2000 to 2008

The 5.3 million coastal population increase was due entirely to natural increase (births minus deaths) and international migration.

International migration	+3.9 million
Domestic migration	-3.5 million
Natural increase	+4.5 million

Housing Units in Coastal

The number of housing units along the coastline increased in recent decades, from 16.1 million in 1960 to 36.3 million in 2008. During this period, the Atlantic coastline region gained the largest number of housing units (8.8 million), followed by the Pacific (6.8 million) and the Gulf of Mexico (4.5 million).

Between 1960 and 2008, the percentage increase in housing units along the coastline (126 percent) was greater than that of the United States (121 percent) or for non coastline counties (120 percent). Among the coastline regions, the total percentage increases in the Gulf of Mexico (246 percent) and the Pacific (130 percent) far outpaced the gains for the Atlantic region (98 percent).

Source: U.S. Census Bureau, Decennial Census of Population and Housing: 1960 to 2000; Population Estimates Program: 2008.

Coastline Counties Most Frequently Hit by Hurricanes: 1960 to 2008

Rank	County	State	Numbers of Hurricanes	Percent Change 1960 to 2008	Percent Change 2000 to 2008
1	Monroe County	FL	15	50.8	-9.2
2	Lafourche Parish	LA	14	67.2	2.9
2	Carteret County	NC	14	104.3	6.4
4	Dare County	NC	13	465.9	12.1
4	Hyde County	NC	13	-10.1	-11.1
6	Jefferson Parish	LA	12	108.9	-4.2
6	Palm Beach County	FL	12	454.7	11.9
8	Miami-Dade County	FL	11	156.5	6.4
8	St. Bernard Parish	LA	11	17.2	-43.9
8	Cameron Parish	LA	11	4.8	-27.6
8	Terrebonne Parish	LA	11	78.7	3.9

The 10 most intense hurricanes since 1960 affected nearly 51 million people living in coastline counties. If those same 10 hurricanes had struck in 2008, the coastline population affected would have been closer to 70 million. Coastline counties affected by Hurricane Katrina (2005) had an overall decrease in population (nearly 2 percent loss). The populations in coastline counties affected by Hurricanes Andrew (1992) had grown by more than 20 percent.

www.census.gov/topics/preparedness/about/coastal-areas.html

Item 3: Coastline Population Trends in the United States: 1960 to 2008

Coastline Population Trends in the United States: 1960 to 2008

May 2010

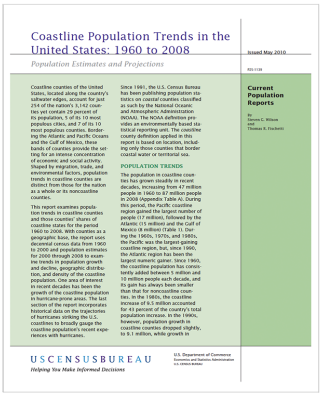
Report Number: P25-1139

Steven G. Wilson and Thomas R. Fischetti

Tweet Share

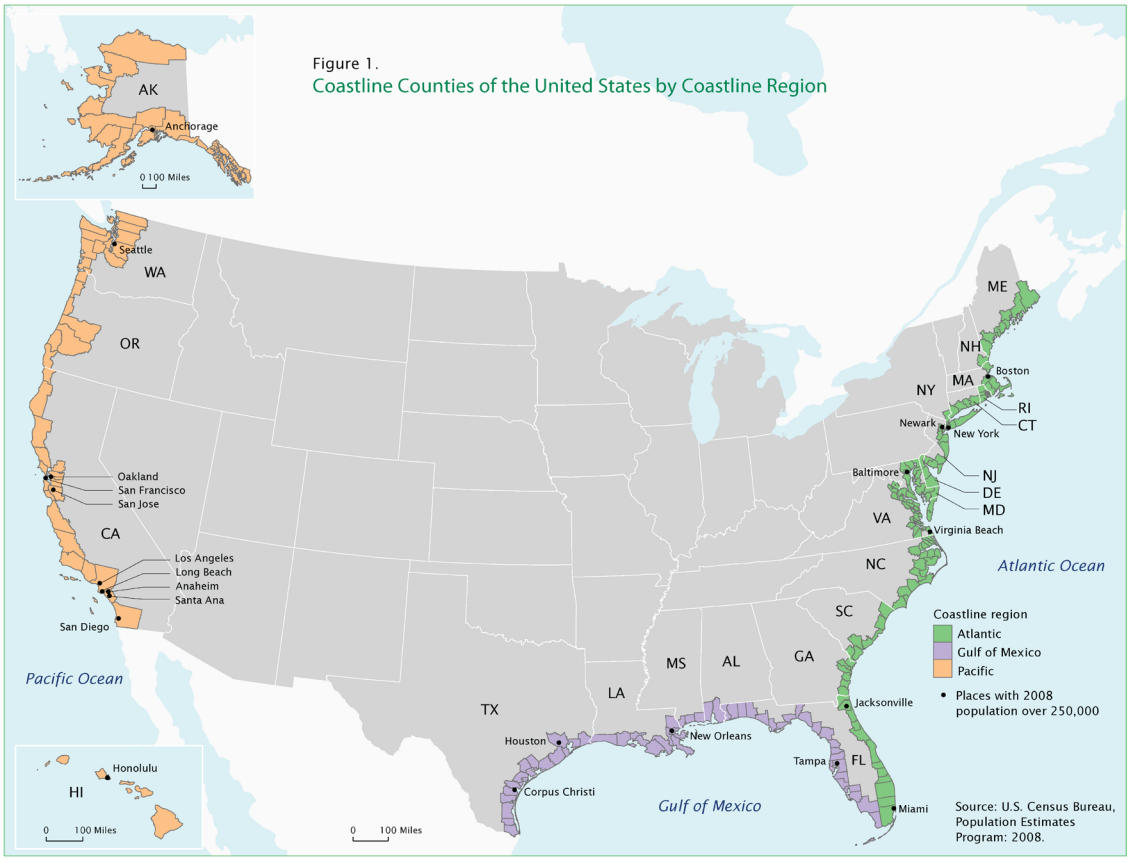
Coastline counties of the United States, located along the country's saltwater edges, account for just 254 of the nation's 3,142 counties yet contain 29 percent of its population, 5 of its 10 most populous cities, and 7 of its 10 most populous counties. Bordering the Atlantic and Pacific Oceans and the Gulf of Mexico, these bands of counties provide the setting for an intense concentration of economic and social activity. Shaped by migration, trade, and environmental factors, population trends in coastline counties are distinct from those for the nation as a whole or its noncoastline counties.

- P25-1139 - Supplementary Table 1 - Population, Housing Units, and Land Area for Counties: 1960 to 2008 [CSV file] [File layout]
- P25-1139 - Supplementary Table 2 - Estimated Demographic Components of Change for Counties: April 1, 2000 to July 1, 2008 [CSV file] [File layout]



Download Coastline Population Trends in the United States: 1960 to 2008 [PDF - 14.6 MB]

Item 3: Coastline Population Trends in the United States: 1960 to 2008 (Continued)



U.S. Census Bureau

www.census.gov/library/publications/2010/demo/p25-1139.html