

Climate-Community Connections

Flooding and Stormwater

Flooding causes problems. It destroys possessions, washes away crops, and causes billions of dollars in damage. And climate change is increasing these problems as rainfall and storm patterns shift.

In the Midwest and the Great Lakes, heavy rainfall events are twice as common as they were a hundred years ago, and we have seen an increase in annual precipitation. We're also seeing more rain than snow in the winter. Because of climate change, rainfall patterns are changing, affecting the location, frequency and duration of extreme weather events. All these patterns are expected to intensify as climate change continues.

Some flooding is a normal in nature: when spring arrives, water from melting snow and spring rains flows into rivers, raising water levels and replenishing rivers, streams, wetlands, and groundwater. Historically, this water was absorbed by wetlands and floodplains—areas along rivers adapted to influxes of water, nutrients, and soil. As cities, towns, and industry have grown, wetlands have been drained and filled, floodplains have become town centers, and soils have been paved. When rain falls on pavement, it can't soak in the way it would if it landed on a prairie or a forest, or even a garden. This makes cities especially vulnerable to flooding, normal or not.

Runoff from a storm can carry many kinds of pollution, including oil and gas that drip onto pavement, soil from exposed fields and empty lots, and fertilizer from lawns, farms, and gardens. When there is a lot of rain, storm sewers can be overburdened. Many midwestern cities have combined sewer systems that carry stormwater from the streets along with wastewater from sinks and toilets. When these systems are overwhelmed, untreated wastewater may be released from sewage treatment plants in "combined sewer overflow" events. In Chicago, these events can occur from as little at 1.5 inches of rainfall. Pollutants then



Residents evacuating their flooded home by boat in Dutchtown, MO, in 2008.

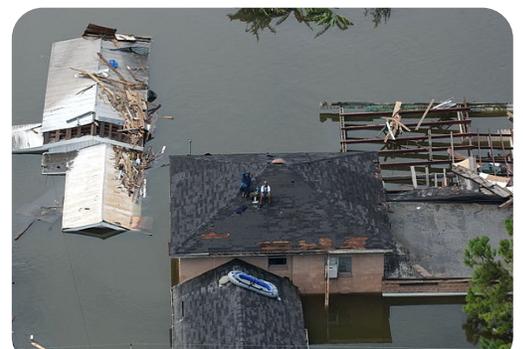
Photo courtesy of John Shea

Objective: Learn about the connection between flooding and stormwater and communities and how to take climate action

Audience: High school and up

Materials: Computer with Internet access (optional)

Time Needed: 15-20 minutes to read closely; additional time to explore linked content

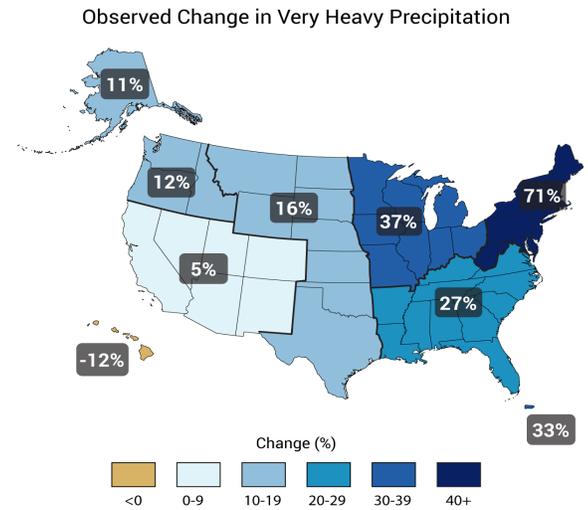


Thousands waited on New Orleans rooftops for rescue following levee failures in 2005.

Photo courtesy of Jocelyn Augustino.

wash into the waterways that provide our drinking water and important recreation areas, jeopardizing public health. For example, a study at Indiana Dunes National Lakeshore found that visitors who had contact with beach water were twice as likely to have gastrointestinal illness than those without contact. Pollution also changes the chemistry of rivers, lakes, and oceans downstream, making them less safe or even completely unfit for life.

Fortunately, communities across the country are taking climate actions that will reduce their vulnerability to flooding. Any action that reduces heat-trapping gases is part of the global effort to deal with climate change. What climate actions will you take in your community? Read on for some examples.



Percent increases in the amount of precipitation in very heavy events from 1958–2012.

Adapted from *Global Climate Change Impacts in the United States*, 2013.

Take Action

Prepare for Flooding

Has your community flooded recently? Or has it flooded in the past? If flood is a risk in your community, get involved in community-wide preparations and planning. Remember that communities and people with limited economic, social, and physical resources may be more at risk of flooding. They may also have fewer resources to help recover after the water recedes.

- **Find out about local flooding history.** Interview people who have dealt with flooding or do some research at the local historical society. This firsthand knowledge can be just as valuable as the data collected by scientists, yet is often overlooked. Use this information to develop tailored community preparedness and response strategies developed through initiatives like those discussed in the next two bullet points below.
- **Get involved in emergency efforts and municipal or regional planning related to flooding.** Be a voice for your community to ensure that community perspectives and knowledge are included in planning discussions. Emergency management agencies operate at the local, regional, and federal level.

Helpful resources:

- [Climate Adaptation Guidebook for Municipalities in the Chicago Region](#) (Chicago Metropolitan Agency for Planning)
- [Find your state's emergency management agency](#)
- [Are You Ready for a Flood?](#)
- [Flooding: Preparedness and Response](#)
- **Connect with social justice groups around flooding and disaster preparedness.** As demonstrated by the mobilization that resulted from Hurricane Katrina, concerns around flooding offer an opportunity for working with social justice groups that may not yet be engaged in climate action work. Initiating or strengthening collaborations with these groups will ensure that your approaches to climate action are addressing the concerns of the most vulnerable populations as well as building on their ideas and assets.

Community Action

2015 marked the ten-year anniversary of one of the most devastating natural disasters in U.S. history: Hurricane Katrina. Katrina has become a key mobilizing event for the national climate justice movement. While we do not know the extent to which it was influenced by climate change, we know that under climate change, extreme weather events will become more frequent—and the worst effects will continue to fall on marginalized communities. Furthermore, Katrina represents threats posed by the devastating combination of climate change and racism not only to communities but entire cultures. Learn more about Katrina, climate change, and local action:

- [The WE ACT for Climate Justice Project](#)
- [A Climate of Change: African Americans, Global Warming, and a Just Climate Policy for the U.S.](#)
- [Everybody's Movement: Environmental Justice and Climate Change](#)

Let the Water Soak In

Have you heard of green infrastructure projects in your area? Green infrastructure includes things like rain gardens, bioswales, permeable pavement, open space, cisterns, rain barrels, green roofs, and more. Many city and regional governments are looking at green infrastructure to help cope with extreme rain events by reducing pavement and making it easier for water to soak into the ground—more like it would in a forest or prairie. Some green infrastructure, like green open space, also helps beautify the neighborhood and provides residents with more outdoor space, too.

- **Plant and maintain a rain garden at your school, place of worship or workplace.** Rain gardens are specially designed to capture rain during downpours. They use plants adapted to wet conditions and provide food and habitat for pollinators and other wildlife. Planting a rain garden is a great project for a youth group or garden club. Just be sure to have a plan and some people to maintain the garden—your garden will need a little extra attention in the first two to three years. Recruit a local gardener or club to teach community members about rain garden maintenance.

Helpful resources:

- [Forest Glen Boy Scout Rain Barrel Installation](#)
- [Rain Gardens: A How-To Manual](#)
- (Wisconsin Department of Natural Resources)
- [Rain Garden Network](#)
- [Earth Partnership for Schools \(UW-Madison Arboretum\)](#)
- **Install rain barrels in a public place where people can see them and get inspired.** Rain barrels catch water during a rainstorm and store it until it's needed. Water from the barrel can be used to water flowers in the garden and potted plants in the house. Offer classes and help people with installation to create a network of barrels to collect rainwater.
- [How to Install and Maintain a Rain Barrel](#) (Animalia Project)

Community Action

Students at Lake Hills Elementary School in Michigan City, IN, planted rain gardens in their schoolyard to help reduce flooding. Students learned about plants, soil, and pollinators as well as how to care for the small habitats they created.



Community members install rain gardens at affordable housing units on Chicago's West Side.

Photo courtesy of the Center for Neighborhood Technology.

A quarter of a million U.S. acres are paved or repaved every year.

Revitalize Your Waterfront

Think about a nearby river or beach that is now dirty, eroded, or inaccessible. Imagine what it would be like if that place were clean and safe so that people could swim or lounge on the beach. Is there a waterway in your community that could become a wonderful place for recreation or contemplation? Enlist your community to become stewards of beaches and riverbanks in your neighborhood. By taking care of the waterways, you can protect your local water supply while getting to know more about the place where you live.

- **Clean up beaches and riverbanks.** Community organizations can adopt a waterway to keep it clean. You don't have to be an expert; partner with another organization to put together a cleanup program in your community.
 - [Adopt-a-Beach](#) (Alliance for the Great Lakes)
 - ["Riverbank Neighbors"](#) of Chicago
- **Restore wetlands.** Wetlands serve as natural water filters and reduce the severity of storms and flooding. Partner with a local conservation organization to restore a wetland in your community.
 - [My Healthy Wetland: A Handbook for Wetland Owners](#) (Wisconsin Wetlands Association)
- **Monitor water quality in a local river or lake.** Frequent monitoring helps identify point-source pollution quickly and provides important baseline data for managing watersheds. Volunteer with a monitoring program in your region; they'll provide the training and equipment.
 - [Illinois River Watch](#) (National Great Rivers Research and Education Center)
 - [Volunteer Lake Monitoring Program](#) (Illinois Environmental Protection Agency)
 - [Wisconsin Citizen Water Monitoring Network](#) (UW-Extension)



A student pours river water into beaker for water quality testing.

Photo courtesy of Steve Hillebrand.

Transform Lawns for Clean Water

Even routine practices, like tending the lawn, can have unintended consequences. Lawns are usually over-fertilized with more nitrogen and phosphorus than the grass can use. In fact, homeowners put more fertilizer on an acre of lawn than farmers put on an acre of crops. Extra fertilizer runs off— especially during big rainstorms— and pollutes rivers and lakes.

- **Work with your school, place of worship or community center to adopt healthy lawn care practices where lawns are maintained.** “Natural” or “organic” lawn-care practices were just normal practice before synthetic fertilizers and pesticides became widespread in the 1950s.
 - [Lawn to Lake](#) (Chicago Metropolitan Agency for Planning)
 - [Lawn and Garden](#) (Environmental Protection Agency)
- **Transform lawns into gardens that enrich the community.** Shrink the lawn and plant a vegetable garden to feed the community, a heritage garden that celebrates the cultures of the people in the neighborhood or a wildlife habitat that features native plants.
 - [Bringing Nature Home](#): How you can sustain wildlife with native plants. Douglas Tallamy (Timber Press, 2007).
 - [Native Plants in the Home Landscape for the Upper Midwest](#). Keith Gerard Nowakowski. (University of Illinois Extension, 2004).
 - [Ample Harvest](#) (Lists local pantries that accept vegetable garden produce)

Community Action

The Village of Lisle, in the western suburbs of Chicago, partnered with the Lisle Park District to install a cooperative lawn-care demonstration project at Village Hall in 2010. The project aimed to create a beautiful lawn without the use of typical lawn-care chemicals to demonstrate the benefits of natural lawn care, such as reduced fossil fuel consumption and protecting local waterways from pollutants.

Homeowners use more fertilizer per acre than farmers do.

Web addresses

Prepare for flooding:

- *Climate Adaptation Guidebook for Municipalities in the Chicago Region* (<http://www.cmap.illinois.gov/livability/sustainability-climate-change/climate-adaptation-toolkit>)
- Find your state's emergency management agency (<http://www.fema.gov/emergency-management-agencies>)
- Are You Ready for a Flood? (<http://www.ready.gov/floods>)
- Flooding: Preparedness and Response (<https://www.osha.gov/dts/weather/flood/>)

Climate action, Hurricane Katrina:

- The WE ACT for Climate Justice Project (<http://www.weact.org/climate-justice-sign>)
- A Climate of Change: African Americans, Global Warming, and a Just Climate Policy for the U.S. (<http://reimaginepe.org/files/climateofchange-2.pdf>)

Let the water soak in:

- Forest Glen Boy Scout Rain Barrel Installation (<https://vimeo.com/35324907>)
- *Rain Gardens: A How-To Manual*, Wisconsin Department of Natural Resources (<http://dnr.wi.gov/topic/Stormwater/raingarden/>)
- Rain Garden Network (<http://www.raingardennetwork.com/>)
- *How to Install and Maintain a Rain Barrel*, Animalia Project (<http://animaliaproject.org/landscapes-rainbarrels/>)
- Earth Partnership for Schools, UW-Madison Arboretum (<https://arboretum.wisc.edu/learn/eps/>)

Revitalize your waterfront:

- Adopt-a-Beach, Alliance for the Great Lakes (<http://www.greatlakes.org/ADOPTABEACH>)
- “Riverbank Neighbors” or Chicago (<http://grist.org/cities/community-thrives-along-a-nearly-forgotten-slice-of-an-urban-river/>)
- *My Healthy Wetland: A Handbook for Wetland Owners*, Wisconsin Wetlands Association (<http://wisconsinwetlands.org/MyHealthyWetlandHandbook.htm>)
- Illinois River Watch, National Great Rivers Research and Education Center (<http://www.ngrrec.org/riverwatch/>)
- Volunteer Lake Monitoring Program, Illinois Environmental Protection Agency (<http://www.epa.illinois.gov/topics/water-quality/monitoring/vlmp/index>)

Transform lawns for clean water:

- Lawn to Lake, Chicago Metropolitan Agency for Planning (<http://www.cmap.illinois.gov/livability/water/resources/lawn-to-lake>)
- Lawn and Garden, Environmental Protection Agency (<http://www2.epa.gov/safepestcontrol/lawn-and-garden>)
- Bringing Nature Home: How You Can Sustain Wildlife with Native Plants. Douglas Tallamy, Timber Press, 2007 (http://www.timberpress.com/books/bringing_nature_home/tallamy/9780881929928)
- Native Plants in the Home Landscape for the Upper Midwest. Keith Gerard Nowakowski, University of Illinois Extension, 2004 (<https://pubsplus.illinois.edu/C1381.html>)
- Ample Harvest (<http://www.ampleharvest.org/find-pantry.php>)