



CHICAGO COMMUNITY
CLIMATE ACTION
TOOLKIT



CHICAGO WILDERNESS
CLIMATE ACTION PLAN
FOR NATURE (CAPN)

COMMUNITY ACTION STRATEGIES



A CLIMATE ACTION TOOL
THAT ADDRESSES THE
NATURAL ENVIRONMENT

COMMUNITY ACTION STRATEGIES

Climate change is affecting both people and nature in the Chicago Region. Chicago Wilderness, a regional alliance of more than 250 organizations, created a plan called the Chicago Wilderness Climate Action Plan for Nature (CAPN)¹ to address the impacts of climate change on local nature and identify strategies to help natural areas respond and adapt to changes in our climate. This document outlines how every Chicagoan can help implement the goals of the Chicago Wilderness CAPN in their own community through the following ways:

1 CLIMATE-FRIENDLY GARDENS AND LAWNS

2 WATER CONSERVATION

3 MONITORING

4 STEWARDSHIP

5 CLIMATE CHANGE EDUCATION

These community action strategies are designed to assist individuals and communities to:

1. **mitigate**, or lessen the future impacts, of climate change by reducing **greenhouse gas emissions**,
2. help native plants and animals **adapt** to climate change, or
3. both.

For example, converting underutilized areas of lawn grass into native gardens is an action that can help human and natural communities both mitigate and adapt to climate change. Since native plants do not require regular mowing like lawn grass, lawn mower greenhouse gas emissions are eliminated, thereby mitigating these emissions and reducing climate change impacts. Native plants also provide habitat for birds, butterflies, and other insects, creating islands of habitat in urban areas that can be beneficial as species adapt to a changing climate.

Each strategy is described in detail in the sections below, including specific examples of action items and links to more resources. Technical terms are included in *italics* and defined in the attached glossary. Information about climate science and more strategies for mitigating climate change can be found in other sections of the Chicago Community Climate Action Toolkit.

¹"Chicago Wilderness Action Plan for Nature." Chicago Wilderness. June 2010. http://www.chicagowilderness.org/pdf/CAPN_Brochure-FINAL_singlepages_WEB_6.21.10.pdf

1 CLIMATE-FRIENDLY GARDENS AND LAWNS

Gardening is a rewarding way to get in touch with nature in your own backyard or community. Some gardeners are already noticing changes in the types of plants they can grow in their gardens and how plants are responding to our changing climate. Fortunately, gardeners can make their gardens more **resilient** to climate change. There are some garden practices that not only help mitigate climate change impacts, but also create habitat for native plants and animals, which in turn help native species adapt to climate change.

Vegetation and soil are integral parts of the carbon cycle²; therefore every gardener plays a part in the global carbon cycle and has the power to make their garden “climate-friendly.” The Union of Concerned Scientists defines a “climate-friendly garden” as one that “stores, or prevents the release of, more heat-trapping gases than it generates.”³ The sections below outline actions a landowner or gardener can take to create a living, beautiful, climate-friendly garden or landscape. (Please note that many of the sections below overlap and should not be thought of as mutually exclusive.)

PLANT SELECTION AND ARRANGEMENT

Use native plants

Planting native vegetation in a garden can provide a myriad of environmental benefits. Native plants are species that have lived in the Chicago region for thousands of years and are well-adapted to local growing conditions. Some native plants have characteristics, such as the ability to withstand periods of drought in the summer, that make them climate-smart garden choices.



Once established, native plants do not require mowing, intensive watering, or fertilization, making them less resource-intensive, more sustainable options for the climate-friendly garden.

Native plants are good options for maximizing a garden’s **carbon sequestration** (ability to remove carbon from the atmosphere and store it in the garden’s vegetation and soils) and **stormwater infiltration** capacity (amount of rainwater it can absorb). All plants take in carbon dioxide from the atmosphere and, through photosynthesis, convert it into carbon compounds used to produce energy and build plant tissues. Much of this carbon is returned to the atmosphere through **respiration** and **decomposition** processes, but some carbon remains captured or bound in the plant tissues and soil. This carbon will remain stored in this form unless otherwise distributed.

Many native plants are long-lived and have long, complex root systems that are able to store more carbon than short-rooted plants like lawn grass and annuals. Since these plants are continually growing and shedding old plant parts, they are helping add organic matter, or carbon, to the soil. Additionally, the long, complex root systems of native plants create pathways in the soil that help rainwater to soak directly into the ground instead of flowing into a nearby sewer or waterway.

²“The Carbon Cycle.” Landscapes For Life. 2011. http://www.landscapeliforlife.org/give_back/3a.php.

³“The Climate-Friendly Gardener: A Guide to Combating Global Warming from the Ground Up.” Union of Concerned Scientists. April 2010. http://www.ucsusa.org/assets/documents/food_and_agriculture/climate-friendly-gardener.pdf.

RESOURCES

The **US EPA** has a clearinghouse of information on native landscaping.

<http://www.epa.gov/greenacres/index.html>

Wild Ones is a non-profit organization that promotes environmentally sound landscaping practices.

<http://www.for-wild.org>

Use climate-smart plants

Climate change scientists predict that the Chicago region's climate will become hotter and drier, with more precipitation occurring in large storm events resulting in more frequent floods. When planting gardens, select plant species that are able to withstand periods of drought and a wide range of moisture requirements; they will be better able to adapt to climate change.

Create bird and wildlife habitat

Any backyard or vacant lot can be transformed into a sanctuary for local wildlife. Creating a backyard habitat is a wonderful way to invite nature into your community while providing critical places for birds, insects, and mammals to feed, rest, and raise their young.

Plants and insects have evolved complex relationships over thousands of years. Often a butterfly or insect species may require a specific native (or "host") plant in order to complete its life cycle. By planting specific host plants, a garden can provide essential habitat for our native pollinators that may be stressed by climate change. Creating a network of native gardens can create migratory corridors through our urban areas.

Plant arrangement and diversity may also influence the habitat quality of a garden: multi-layered gardens that incorporate mature trees, small trees, berry or fruit-bearing shrubs, grasses, and flowers are more attractive to birds and groups of colorful flowering native plants are attractive to butterflies. Providing a water source in the garden can benefit both birds and butterflies. Consider leaving seed heads on plants in the winter to provide a natural food source for winter birds.

Planting a variety of native plants will help create balance in your garden. A complex garden will support a diverse assemblage of insect predators, birds, and bats, who naturally keep harmful insect populations in check.

RESOURCES

National Wildlife Federation has a website and series of YouTube videos on how to create certified wildlife habitats in your yard.

www.nwf.org/gardenforwildlife

<http://www.youtube.com/NationalWildlife#g/c/66088158FF933E91>

Bringing Nature Home is a website by Doug Tallamy, University of Delaware professor, who has been studying insects and their role in the environment for over 20 years.

<http://bringingnaturehome.net/native-gardening>

Grow your own food

Locally, sustainably grown foods demand less processing, packaging and transportation – and therefore less energy. To grow a climate-friendly edible garden, take steps to maximize carbon storage and minimize use of chemical fertilizers and pesticides, which require large amounts of energy to produce.

Try companion planting

For example, fragrant herbs can keep many harmful insects away from nearby fruits and vegetables. In large vegetable gardens, rotating the location of crops each year can also make pests and diseases easier to manage without chemicals. To minimize fertilizer use, consider planting cover crops like cereal grains in the fall. Cover crops are not harvested; their purpose is to store carbon and nourish soil over the winter, making soil more productive and drought-resistant in the spring.

Many popular fruits grow on woody trees and bushes that have a high capacity for carbon storage. Consider planting these and other perennial edibles: because they return each year, they are generally less resource-intensive than annual crops, which die each year and then must be re-planted. Heirloom varieties of fruits and vegetables are worth exploring too, as they often are less dependent on fertilizer.

RESOURCE

The Union of Concerned Scientists' guide

"The Climate-Friendly Gardener: A Guide to Combating Global Warming from the Ground Up" includes details on cover crops and crop rotation.

http://www.ucsusa.org/assets/documents/food_and_agriculture/climate-friendly-gardener.pdf

CARE & MAINTENANCE

Minimize mowing and watering

Mow high in order to encourage longer roots or consider replacing turf grass with more drought-tolerant grasses or low-maintenance native species that do not require mowing. Consider using a low-impact push or electric mower for areas that must be mowed, and reduce or eliminate lawn equipment that produces carbon dioxide such as leaf blowers and lawn mowers.

In Chicago, up to 40% of our summertime water use is attributed to watering our gardens and lawns. Water your lawns during the coolest part of the day to reduce water loss to evaporation. Use mulch around planting beds to retain moisture and reduce the need for watering.

RESOURCE

National Wildlife Federation's Green Landscaping Tips:

<http://www.nwf.org/Global-Warming/Personal-Solutions/Green-Landscaping.aspx>

Nurture plants naturally

Lawn maintenance can be resource-intensive. In order to minimize the environmental impact of lawn maintenance, avoid chemical fertilizers and pesticides, choose non-synthetic products, know the garden's fertilizer needs and use fertilizer only as necessary.

Avoid planting mixtures and soils that contain peat, a slow-forming type of organic matter that is harvested from northern peat bogs or wetlands. Peat harvesting can destroy the wetland and release carbon that was previously locked up in the soil.

Compost

Composting is a simple way to reduce the amount of waste added to the municipal waste stream. Up to 30% of our household waste is food scraps that can be composted. Yard and landscape trimmings contribute approximately 32 million tons to the municipal waste stream, representing more than 13% of total municipal waste in the United States (U.S. EPA, 2006). Composting food scraps and landscape waste on-site means fewer garbage trucks, fewer landfills, and fewer greenhouse gas emissions. Composting produces organic, nutrient-rich soil that can be used to help improve a garden's soil quality and reduce the need to purchase energy-intensive chemical fertilizers.

LOCATION

Create a green roof

Rooftop gardens help mitigate the urban “*heat island*” effect and lower a building’s cooling costs in the summer – and lower heating bills in the winter. They can also absorb stormwater and reduce runoff, decreasing the demand on our city’s water treatment system

RESOURCE

City of Chicago’s Guide to Rooftop Gardening:

http://www.artic.edu/webspaces/greeninitiatives/greenroofs/images/GuidetoRooftopGardening_v2.pdf

More information on the heat island effect from the US EPA:

<http://www.epa.gov/heatisland>

Transform underutilized space

There are many unused spaces in our neighborhoods that can be transformed into a garden. Chicago has a strong and growing community of gardeners who are creating gardens in vacant lots, parkways, parks, at sidewalk corners and along railroad corridors. Gardens can provide neighborhoods with shade and cooler temperatures in summer, and a place to socialize.

RESOURCES

GreenNet Chicago is a coalition of nonprofit organizations and public agencies committed to sharing information and resources. It serves as a clearinghouse for information about green space in Chicago.

<http://www.greennetchicago.org>

NeighborSpace is a non-profit organization that works with many private and public partners to preserve and expand community managed open space in Chicago.

<http://neighbor-space.org/>

CLIMATE-FRIENDLY GARDEN RESOURCES

Landscape for Life Website and Workbook | <http://landscapeforlife.org/>, http://www.landscapeforlife.org/publications/LFL_Workbooks_Print_downloadable.pdf

Union of Concerned Scientists. “The Climate-Friendly Gardener: A Guide to Combating Global Warming from the Ground Up.” | http://www.ucsusa.org/assets/documents/food_and_agriculture/climate-friendly-gardener.pdf

City of Chicago: Sustainable Backyard Program | http://www.cityofchicago.org/city/en/depts/doi/provdrs/nat_res/svcs/how_can_i_get_a_rainbarrelorcompostbinrebateform.html

2 WATER CONSERVATION

The Chicago region is expected to become warmer and drier in the coming decades. Even though Chicago sits on the shores of Lake Michigan, one of the world's largest freshwater bodies, this does not mean that we have an unlimited amount of water. Although intense storms and flooding are expected to become more common, much of the precipitation will end up leaving the region in the form of **stormwater runoff**. This is because we have greatly altered the natural **hydrology** of our landscape by replacing pervious spaces (allowing water to pass through) such as natural areas and green spaces with impervious surfaces like concrete and pavement. Unfortunately, the status quo for decades has been to design systems that send stormwater off-site as quickly as possible and into sewer and drainage systems. These drainage systems carry water away from the site, and eventually our region, resulting in less precipitation soaking into the ground where it falls to replenish **groundwater** levels. Instead our water washes downstream in the form of runoff.

This shift in water availability will affect not only our own demand for water, but also which plants and animals are able to thrive. Practicing water conservation and increasing the permeability of our landscape can greatly help reduce the magnitude of this impact on our region.

Improve stormwater infiltration

One way to help retain groundwater is to create pathways for water to infiltrate, or soak, into the ground where it falls in order to recharge water levels. This can also help



reduce the risk of basement flooding. Stormwater can be managed on-site through a variety of site-specific options, including creating **rain gardens** and **bioswales** and reducing impervious surfaces such as concrete.

Practice efficient watering

Water the lawn or garden during the coolest part of the day (early morning/late evening is best) and only water the lawn when necessary: once a week, if rainfall isn't sufficient. Avoid watering on windy and hot days and put down no more than one inch (set out a empty cans to determine how long it takes to water one inch) each week. This watering pattern will encourage healthier, deeper grass roots.

Capture rainwater

Capturing rainwater to use in the garden or yard is an excellent water conservation strategy. It also decreases stress on the sewer system during heavy storm events. Consider disconnecting your downspout, and/or installing a rain barrel or cistern to capture rainwater. (Note: Do consider the materials in your rain barrel and rain water when irrigating an edible garden. If you are concerned or unsure about the contents of the water collected, water your edibles around the roots and/or consider another water source, at least near harvest time.)

WATER CONSERVATION RESOURCES

What Our Water's Worth | <http://www.chicagolandh2o.org>

"Water: from Trouble to Treasure", a publication of the Center for Neighborhood Technology (CNT) | http://www.cnt.org/repository/Water_booklet_final.pdf

3 MONITORING

Detecting and understanding the changes that are occurring in our natural world is paramount to adapting to climate change. There are several community-based monitoring programs that encourage individuals and organizations to become citizen scientists by collecting data in their neighborhoods.

Develop or participate in a community-monitoring program

For example, *Project Budburst* invites volunteers to share observations of the timing of plants' first leaf, flower, and fruit. This data helps scientists monitor plant responses to a changing climate. Chicago Wilderness Habitat Project also has regional monitoring programs for plants, birds, frogs, butterflies, and dragonflies. These programs provide training and resources to individuals or groups who are able to commit to monitoring a specific site for a season.



MONITORING RESOURCES

Project Budburst | <http://neoninc.org/budburst/index.php>

Chicago Wilderness Habitat Project | <http://www.habitatproject.org/opportunity/monitor.html>

Illinois Butterfly Monitoring Network | www.bfly.org

Illinois RiverWatch Network | www.ngrrec.org/index.php/riverwatch

Bird Conservation Network Survey | www.bcnbirds.org/census.html

4 STEWARDSHIP

Just as your backyard garden provides environmental benefits and **ecosystem services** (such as shade, clean air, butterfly habitat, etc.) to your community, parks, forest preserves, and community gardens provide important benefits to our neighborhoods and cities on a larger scale. Green spaces and natural areas clean the air and water, reduce pollution, decrease flooding, and provide habitat for native plants and animals. These areas also retain carbon that otherwise would be released into the atmosphere as carbon dioxide, a major contributor to climate change. While all green space is valuable, healthy natural areas are able to provide more ecosystem services per acre than parks and lawns. Healthy, diverse natural areas are more resilient to climate change than degraded natural areas.

Restore and manage healthy urban natural areas

Join a volunteer stewardship group to enhance or maintain healthy, diverse natural areas in your community.

Create and/or install wildlife habitat structures

Help create wildlife corridors in urban areas by installing artificial wildlife structures, such as nest boxes for owls or bats, when creating or improving natural habitat is not an option.



Increase the quantity and quality of green space in your community

Create a community garden or convert an under utilized area of turf into a native garden or prairie planting. Remove unnecessary concrete such as unused patios, parking lots, or medians and use the space for a garden instead.

Plant resilient species

Select plant species that are able to withstand periods of drought and a wide range of moisture requirements (i.e., resilient species); they will be better able to adapt to climate change.

STEWARDSHIP RESOURCES

Field Museum Stewardship | <http://fieldmuseum.org/explore/department/ecco/getinvolvedinstewardship>.

Bat Conservation International guidelines for installing a bat house | <http://www.batcon.org/index.php/get-involved/install-a-bat-house.html>.

Neighbor-Space a resource for community managed open space | <http://neighbor-space.org/main.htm>

5 CLIMATE CHANGE EDUCATION

With each passing day, there is an ever-growing body of evidence indicating climate change will have serious impacts on our planet, making it the defining challenge we face in the 21st Century. In order to inspire action, it is necessary to engage communities and public officials in meaningful ways on this issue and to effectively communicate how climate change will impact communities, individuals, and natural habitats.

Educate your community and elected officials about climate change impacts to plants and animals

As the impacts of climate change are not always immediately visible, it can be difficult for people to connect climate change and their daily lives. Schedule a tour or nature walk and use the assets in your community, such as a local natural area or park, to talk to community members about how climate change is predicted to impact this resource.

Educate neighbors, community, businesses, and the horticulture industry about how to be climate-friendly

Constructive action is often hampered by lack of information and access to resources. Be the force that advocates for local stores to carry products and materials such as native plants, rain barrels, composting bins, etc. Two-way communication and education between individuals and businesses is important to encourage local stores to carry these products. Educate nurseries and community members about the potential for invasive species to have more of a competitive advantage as



climate changes. To limit the potential pathways for invasive species, it is important that local gardening centers do not sell plants known to be invasive (e.g., purple loosestrife, Japanese barberry).

CLIMATE CHANGE EDUCATION RESOURCES

Understanding and Responding to Climate Change: Explore some of the ecological impacts of climate change that have already been observed—right in your own backyard | <http://dels-old.nas.edu/climatechange/ecological-impacts.shtml>

EPA's student's guide to global climate change and its effects on plants and animals | <http://www.epa.gov/climatechange/kids/impacts/effects/ecosystems.html>

COMMUNITY ACTION STRATEGIES GLOSSARY

Adaptation

Modifying the built environment (roads, buildings, sewage pipes) or natural systems (gardens, forests, wetlands,) to help them become better suited to changes in the environment.

Bioswales

Landscape elements designed to remove silt and pollution from surface runoff water. They consist of a swaled drainage course with gently sloped sides and filled with vegetation, compost and/or large stones.

Carbon sequestration

The uptake and storage of carbon. Trees and plants, for example, take in carbon dioxide from the atmosphere, release the oxygen and store the carbon in their leaves and roots. Fossil fuels are ancient stores of decomposed and compressed organic matter that continue to store the carbon until burned.

Decomposition

The process of rotting and decay which causes the complex organic materials in plants and animals to break down into simple inorganic elements which can be returned to the atmosphere and soil.

Ecosystem services

The processes by which the environment produces resources such as clean water, timber, habitat for fisheries, and pollination of native and agricultural plants.

Greenhouse Gas Emissions

Heat-trapping gases, such as carbon dioxide and methane, which result from the burning of fossil fuels (e.g., oil, coal, natural gas). These gases absorb long-wave radiation and heat, contributing to an increase in the earth's average temperature (i.e., global warming) when present in the atmosphere.

Groundwater

That portion of the water beneath the ground surface stored in soil pores and in the fractures of rock formations. Groundwater is recharged from precipitation that collects on the surface and permeates into the ground. Natural discharge of groundwater often occurs at springs and seeps and can form wetlands.

Heat island

Urban area where the built environment results in higher temperatures than rural areas, especially at night.

Hydrology

The study of the occurrence, movement, distribution, and quality of water.

Mitigation

Measures taken to reduce the severity of future climate change impacts on people and the environment using natural systems, technology, or strategies to decrease the amount of greenhouse gases released into the atmosphere.

Rain gardens

A planted depression that allows rainwater runoff from impervious urban areas like roofs, driveways, walkways, parking lots, and compacted lawn areas the opportunity to be absorbed. This reduces rain runoff by allowing stormwater to soak into the ground.

Resilient

Able to withstand or recover quickly from difficult conditions; an ecosystem or community that is able to remain healthy despite a changing climate and ecosystem pressures.

Respiration

The process of metabolizing (burning) sugars to yield energy for growth, reproduction, and other

life processes, and involves transporting oxygen from the outside air to the cells within plant tissues, and the transport of carbon dioxide in the opposite direction. Both plants and animals (including microorganisms) need oxygen for respiration. This is why overly wet or saturated soils are detrimental to root growth and function, as well as the decomposition processes carried out by microorganisms in the soil.

Stormwater infiltration

The penetration of water through the ground surface into sub-surface soil.

Stormwater runoff

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater runoff from naturally soaking into the ground.