

You Can Grow a Greener Town



LONGER-LIVED PAVEMENTS

ENERGY SAVINGS

RECREATION & WELLBEING

BETTER WATER QUALITY

LOWER CARBON FOOTPRINT



ADDED PROPERTY VALUES

LOWER RISK OF HEAT STROKE

GREEN JOBS

BETTER AIR QUALITY

POLLINATOR HABITAT

Why Choose Green Infrastructure?

Every community relies on its infrastructure to provide service routes for things like energy, water and transit. Green infrastructure is distinct from traditional gray infrastructure (roads, power lines, water lines, sewers and storm drains, etc.) in that it **works with nature** to meet the daily needs of our communities while protecting our environmental resources.

Green infrastructure is the network of trees, gardens, woodlands, parks and other natural landscape features that **utilizes plants to keep a community healthy** [1].

Green infrastructure allows communities to maintain valuable ecosystem functions that are easily disturbed by human activities. The water cycle—relied upon for **clean drinking water, flood prevention** and groundwater recharge—is one such function that benefits from green infrastructure. Another is the carbon cycle, through which plants make air more breathable by **removing CO₂ and pollutants**. In addition to cleaning water and air, trees and other plants also **shade and**

cool our towns, thereby reducing the urban heat island effect and heat stress-related injury. Moreover, they providing habitat for important birds, insects and other animals that make up the food web.

Green infrastructure comes with social and economic perks in addition to these environmental benefits. Greener towns **encourage physical activity** and improve interaction between neighbors. Trees and gardens reduce noise pollution, **relieve stress and anxiety**, and make places more attractive to visitors.

Furthermore, green infrastructure can **decrease energy use** and lengthen the lifespan of roadways [2], resulting in significant municipal savings.

In this context, public green space is not a luxury; it is a vital part of a thriving community. By planning ahead for **conservation and development to work together**, a town can weave green infrastructure into its long-term vision and start planting to improve quality of life where people live, work and play.

Green infrastructure uses plants to solve problems in towns large and small.

ENERGY
SAVINGS

LONGER-LIVED
PAVEMENTS



New and mature trees grow side by side to shade streets in South Sioux City.

Greener Streets

South Sioux City

Ten years ago South Sioux City's urban forest was in trouble. With maple trees suffering from iron chlorosis and ash trees threatened by emerald ash borer, the community was faced with **losing almost 50% of its trees**, bringing the value of tree to the city's attention. Since then, the Parks & Recreation Department has been working hard to retree its streets by planting new trees in parks and neighborhoods to replace those lost to disease, old age, and construction around town.

They also established a tree replacement plan to provide cost assistance to residents. To increase the urban forest's resilience to future disease and pests, they planted a diversity of trees, emphasizing native species. Over the next 40 years, shade from 350 new trees will **save residents an average of \$3,213 per year** in heating and cooling costs, prevent an average of 26,437 gallons of rain runoff per year and remove an average of 80 pounds of pollution per year from their air and waterways.

GREEN INFRASTRUCTURE...

Greener Schools

Beattie Elementary

Beattie Elementary school in Lincoln has transformed its schoolyard into a series of gardens that provide endless **opportunities for learning and unstructured play**. What began as a pollinator garden championed by a Master Gardener volunteer quickly grew to over 2,000 square feet of gardens across the entire schoolyard. During the school year, students spend time every week helping care for the gardens. They learn how to plant trees, flowers and vegetables and they help keep the garden watered and weeded.

Teachers bring their classes outside to read in a beached row boat under the shade of several trees. Fifth graders work together to plan monthly family garden nights that give students a chance to serve their school and **learn leadership skills**. Family nights keep the garden maintained throughout the summer and give everyone a chance to share in the harvest.

GREEN
JOBS

RECREATION &
WELLBEING



Beattie Elementary takes learning outside to over 2,000 square feet of gardens and shade.



A shift to prairie style gardening gives these home owners a chance to relax.

Greener Yards

Robin and Russ's House

Every spring, the Williams dig up a few more feet of their bluegrass lawn to make way for the landscape of their dreams. The first year it was a vegetable garden to enjoy the summer harvest. The second year it was a ring of berry-laden shrubs around the fire pit to **feed songbirds**. Then there was the pocket of prairie along the back wall to **attract butterflies and bumble bees**. Now the front yard has made room for a rain garden of trees and flowers that get **watered by rainfall** from the roof (by disconnecting the downspouts).

For Robin and Russ, less lawn means less mowing, less watering and less rain going down the sewer drain. More trees and flowers means capturing ecosystem services with more habitat and cleaner air. But they didn't do it all at once. By working on one area at a time, they **kept costs low and stayed ahead of weeds** while having time to enjoy the garden.

WORKS ACROSS NEBRASKA.

Greener Downtowns

City of Scottsbluff

The City of Scottsbluff has been working diligently to give their business district a makeover. They've planted trees and flowers along underused sidewalks and converted a parking lot into a gathering space for concerts and festivals. These projects make the main street more **comfortable and inviting** while showcasing waterwise landscaping.

They've kept the focus on well-adapted plants that require minimal irrigation and capture water running off the pavement. Large shade trees **keep pedestrians cool** and assist with carbon capture. Downtown business owners have taken the lead on many of these projects, knowing that a more attractive shopping district will increase the number and frequency of customer visits [3]. These green infrastructure improvements also **increase commercial property values** and decrease their energy, maintenance and repair costs [4].

ADDED PROPERTY
VALUES

LOWER RISK OF
HEAT STROKE



Downtown Scottsbluff has transformed its main street from shades of gray to a people-friendly oasis.

Biodiversity Where You Live

Outlast Landscape Threats

The variety of life (trees, plants, animals, insects, microorganisms) that inhabits an ecosystem is referred to as biodiversity [5]. Biodiverse landscapes are **healthier, more visually appealing** and more resilient than uniform landscapes planted with overused species. Diversity in trees and other plants protects the landscape from decimation by a single pest or disease, such as emerald ash borer or pine wilt disease.

Landscapes that are planted with native and adaptable species (such as a xeric garden, rain garden, or a buffalograss lawn) are well suited to deal with local pests, climate and soil conditions. They are able to **handle extreme weather** such as drought, flooding, hot summers and cold winters with less watering, fertilizer and pesticides. Greener Towns plant a diversity of trees and plants in order to benefit from landscapes **resilient to pests**, disease, changing climates and human pressure.



This neighborhood landscape in Gering is full of diverse, resilient and beautiful native plants.

Enjoy the Services that Nature Provides

Healthy and diverse ecosystems provide humans with several kinds of eco-services. Supporting services such as **soil formation** and **nutrient cycling** provide the base on which other services are built. Provisioning services provide us with **freshwater, food, fuel** and genetic diversity. Regulating services keep disease and pollution under control and **regulate local climate** to keep our towns livable. Cultural services provide for our **recreation** and aesthetic, spiritual and inspirational needs [6].

Support Pollinators and Other Wildlife

Our towns are home to many wildlife species that we benefit from and that allow us to maintain a sense of connection to the natural environment. To maintain habitat for these species we must provide them with food, water, shelter and space.

Biodiversity in our landscapes is necessary in order to provide food and shelter to the wide variety of **birds, insects and other animals** that live around us. Using green infrastructure to manage rainwater provides **clean water** for our wildlife neighbors as well as ourselves. Maintaining a network of greenspaces in our towns provides wildlife with safe spaces to find **shelter** and raise their young and prevents the negative interactions that can take place when they are forced to seek shelter in our yards or homes [5].



A neighborhood in Omaha enjoys the beauty, quiet and shade their street trees provide.

Solving Water Challenges

Prevent Flooding and Stream Pollution

Traditional gray infrastructure, such as storm drains and sewage systems, overrides the water cycle by moving rainwater quickly out of town. This makes a community vulnerable to flooding, and sends many **pollutants into streams** and rivers. Street flooding creates safety hazards for vehicles, biker and pedestrians. Property is damaged when basements and garages are flooded.

Green infrastructure prevents these problems by combining plants and constructed elements to restore and preserve the natural water cycle. **Slowing and cleaning rainwater** where it falls and giving it a chance to soak into the ground [2].

Large, mature trees play an important role in flood prevention by intercepting rain, holding it in their leaves and branches until it evaporates. A single tree can intercept an average of 450 gallons of rainwater per year over a 40-year period [1].



Rain gardens and bioswales, like this one in Omaha, capture and clean water before it enters a stream.

Save Soil from Washing Away

When rainwater is funneled out of town by gutters and sewers it carries many pollutants into streams, rivers and lakes. The excess water erodes stream banks and exposed soil, picking up sediment.

In contrast, green infrastructure uses bioswales and rain gardens to slow the water down and give it a chance to soak into the ground. Plants are able to **clean pollutants** from water including pathogens, sediment, fertilizers, chemicals and metals. They **prevent erosion** by keeping the soil covered and their roots hold soil in place. Plant roots improve soil's ability to absorb water, allowing rain to recharge groundwater reserves rather than run off into waterways [2].

Thrive During Drought

Bioswales and rain gardens can be used to direct water to areas that would otherwise require irrigation. Plant species chosen for their adaptability to drought conditions **decrease the labor and water required** to maintain landscapes in times of drought [2].

As our climate becomes less predictable, our communities need to be more resilient to drought conditions. Green infrastructure sees **rainwater as a resource** to be captured and valued, rather than a threat to be funneled out of the way.



A buffalograss lawn on Chadron State College campus is well adapted to the rainfall of the area.

Ready, Set, Grow!

The journey to a greener town is taken one step at a time. Here are some ways that you can set up your community for success.

Establish a citizen advisory board. Most communities have groups of citizen volunteers who advise administrators on different topics and shape the policies of their local government. These groups research issues, give testimony and make recommendations to the local government. Citizens who serve on an advisory board advocate for effective environmental policy in their community.

Invest in public-private partnerships. By partnering with private companies, a community can increase the impact of its investment in green infrastructure. For example, a town might contract with a landscape professional to maintain landscapes that require special care and investment of resources.

Create a tree and landscape ordinance. Outdated zoning codes and building standards can prevent a town from utilizing green infrastructure. Review your town's landscape ordinances and visit plantnebraska.org/community-landscapes/start-a-landscape-project for examples of green infrastructure oriented ordinances.

Connect to grants and expertise. Nebraska has a wealth of resources to support green infrastructure in communities. Reach out to these organizations to start planting your town:



The Nebraska Statewide Arboretum offers knowledge and funding to help you with sustainable landscape projects, whether it's a few plants or a few thousand. plantnebraska.org



Natural Resource Districts help with soil conservation, flooding and erosion, conservation planting and education and have grants available for projects. nrdsn.net/nrds/find-your-nrd



Nebraska Extension Educators are in every county to help communities with pests, lawn and landscape, water and food production challenges. extension.unl.edu



Tree Boards get involved with local tree planting and care along parks, roads and utility lines. Get in touch with a city official in your town to find out if you have a Tree Board and how to contact them.



Nebraska Forest Service staff are available to answer tree and forest health questions and can help you through funding programs for tree-related projects. nfs.unl.edu/foresters



Neighborhood volunteers, city staff and designers collaborating on park improvements.

Works Cited

[2] "Benefits of Green Infrastructure." EPA, Environmental Protection Agency, 22 Mar. 2017, epa.gov/green-infrastructure/benefits-green-infrastructure.

[4] Clements, Janet, et al. "The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value." Natural Resources Defense Council, Natural Resources Defense Council, Dec. 2013, nrdc.org/sites/default/files/commercial-value-green-infrastructure-report.pdf.

[5] Lepczyk, Christopher A, et al. "Biodiversity in the City: Fundamental Questions for Understanding the Ecology of Urban Green Spaces for Biodiversity Conservation | BioScience | Oxford Academic." OUP Academic, Oxford University Press, 9 Aug. 2017, <https://academic.oup.com/bioscience/article/67/9/799/4056044>.

[6] "Multiple Benefits of Green Infrastructure and Role of Green Infrastructure in Sustainability and Ecosystem Services." Multiple Benefits of Green Infrastructure and Role of Green Infrastructure in Sustainability and Ecosystem Services- Minnesota Stormwater Manual, Minnesota Pollution Control Agency, 31 May 2018, https://stormwater.pca.state.mn.us/index.php?title=Multiple_benefits_of_green_infrastructure_and_role_of_green_infrastructure_in_sustainability_and_ecosystem_services.

[3] "Project Report- i-Tree Planting Calculator v1.1.3." Project- i-Tree Planting Calculator, USDA Forest Service, 2018, <https://planting.itreetools.org/app/report/>.

[1] USDA National Agroforestry Center. Working Trees for Communities. Working Trees for Communities, USDA National Agroforestry Center, 2012.



This publication is funded by a grant from the Nebraska Environmental Trust, a beneficiary of the Nebraska lottery. environmentaltrust.org

