

Toward a **Sustainable** Community:

A Toolkit for
Local Government

Volume 2
University of Wisconsin-Extension



**"The future is literally in our hands to mold as we like. But we cannot wait until tomorrow. Tomorrow is now."
Eleanor Roosevelt**



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Introduction

Why This Toolkit

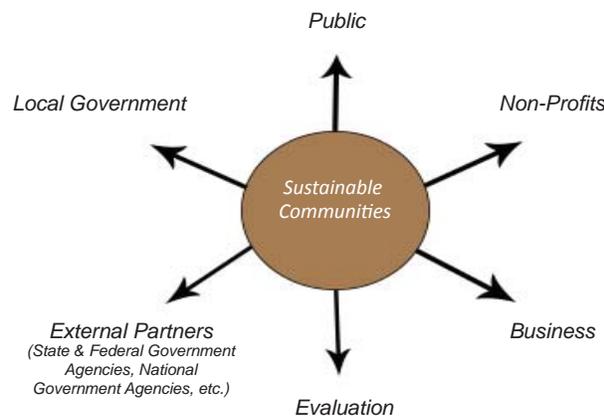
Since the publication of Volume 1 of this toolkit in 2006, about 30 local governments in Wisconsin became eco-municipalities, over 100 local governments are involved in the Energy Independent Communities; several are involved in the DNR's Green Tier Legacy Community program.

“Just suppose, for a minute, that all the departments, boards, and agencies of a city or town, and all the sectors of the larger community have a common vision about a sustainable community future and a shared understanding of a new set of playing rules for how to get there.”

The Natural Step for Communities: How Cities and Towns Can Change to Sustainable Practices, by Sarah James and Torbjörn Lahti

Like Volume 1, this guide is intended to give practical tools for making each function of local government more cost-effective and more supportive of human and environmental health and well-being. This volume has largely kept the Introduction section the same. What has changed are the sections focused on government functions. Volume 1 focused on internal government functions, such as procurement, buildings, investments, and human resources. Volume 2 focuses on government functions that directly affect community. This volume's chapters are organized in large part around a local government's functions: air quality management, land use, water, land and water conservation, parks and recreation, cemeteries, economic development, local food systems, and solid waste. A chapter on climate change is included because these effects will impact local government functions in potentially profound ways.

This guide provides strategies that can be implemented through traditional means of policy development, fiscal administration, programs, and education. The various government functions and strategies listed in this guide are intended to be viewed and implemented as a whole system.



What is Sustainable Development?

The “Brundtland Report” definition of sustainable development – shown at left – has been the most commonly used or cited definition since 1987 when the world community gathered to address this critical issue. Sustainability acknowledges the biophysical or environmental limits that the natural world imposes on economic activity and social and political institutions.

Recently, emphasis has shifted to the science of sustainability and a focus on the core principles of ecological limits. Regardless of the definition or approach, there is a shared sense that sustainable development explicitly recognizes the interconnections and relationships between the economy, society, and the environment. These are often seen as three types of capital – economic, social, and natural.

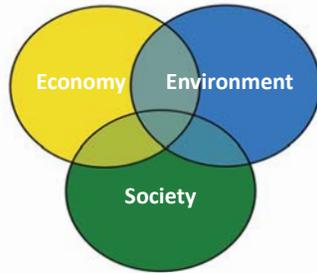
When sustainable development has been represented as three interconnected types of capital, the emphasis is on the linkages between the economy, society, and the environment. But when a systems view is used, the emphasis shifts specifically to the ecological limits imposed on the economy and society.

In this case, a concentric circles diagram is used to model sustainability and sustainable development. Here, the economy and society function within a larger environmental

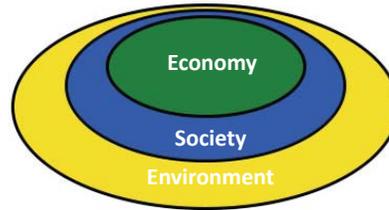
“Sustainable development is... development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

World Commission on Environment and Development, Our Common Future, 1987

The Linkages View of Sustainable Development



The Systems View of Sustainable Development



system, or biosphere, and are limited by the carrying capacity of the natural environment. This concept of sustainability speaks to the need for consideration of all forms of capital in community decision making but places prime importance on the services of natural capital that are essential to all life on this planet.

The Natural Step Approach

This toolkit presents the principles of “The Natural Step” as a sustainability framework, both because it works and because it has been adopted by a growing number of Wisconsin local governments. It provides a shared framework around which they and other communities are developing and implementing sustainable practices. But which framework a local government adopts – and there are others available – is less important than the act of adopting one. Such a step is a key part of the process of moving toward sustainability.

The Natural Step (TNS) sustainability framework and process originated in Sweden in 1983.¹ The first Swedish eco-municipality, Övertorneå, was a pilot project that used this framework in a northern rural town of 5,000. Success in Övertorneå sparked what today is a network of 70 eco-municipalities across Sweden. These eco-municipalities represent over a quarter of the country’s municipalities, ranging from villages of 300-400 residents to the capital city of Stockholm with a population of over 700,000. Many communities around the world are now exploring and implementing this model and a number of Wisconsin’s communities are among the first in the United States to do so.

Five local governments in northern Wisconsin – the cities of Washburn and Ashland in 2005 and the city of Bayfield, town of Bayfield, and Douglas County in 2006 – adopted resolutions stating their intention to become eco-municipalities based on this model. The city of Madison launched a sustainable city program in 2004 and passed a resolution adopting The Natural Step as its guiding sustainability principle in 2005. Madison city staff from all 25 departments were then formally trained in The Natural Step framework in 2006. Also in 2006, the Village of Johnson Creek in Jefferson County passed a resolution adopting the The Natural Step sustainability principles. As of Spring 2013, there are 29 eco-municipalities in Wisconsin. See Appendix 1 for examples of sustainability resolutions.

What is an eco-municipality? It is a city, town, or region that aspires to develop an ecologically, economically, and socially healthy community for the long term, using The Natural Step or other framework for sustainability² as a guide, and a democratic, highly participative development and decision-making process as the method.



L. MacKinnon photo

1 James, Sarah and Torbjörn Lahti. 2004. *The Natural Step for Communities: How Cities and Towns Can Change to Sustainable Practices*. New Society Publishers, British Columbia, Canada.

2 For more about the Natural Step, go to www.naturalstep.org.

The Natural Step's Four System Conditions for a Sustainable Society

In the sustainable society, nature is not subject to systematically increasing

- concentrations of substances extracted from the Earth's crust;
- concentrations of substances produced by society;
- degradation by physical means;

and, in that society,

- people are not subject to conditions that systematically undermine their capacity to meet their needs.

Source: *The Natural Step*

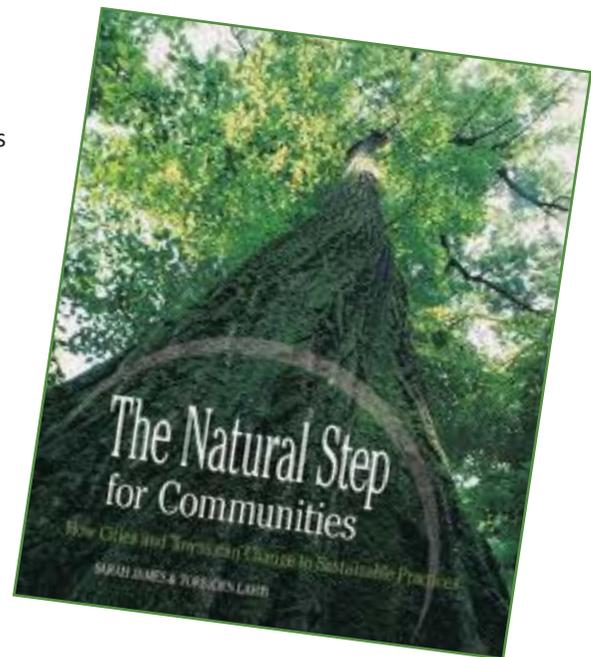
The Natural Step takes a “systems approach” to creating sustainability. It is based, in large part, on laws of nature. Embedding the non-negotiable laws of nature in business, government, institutions, and the way we operate as a society is an identified route toward sustainability. In order to be sustainable over the long term, laws and policies developed by humans must cooperate with, mimic, or be consistent with the laws of nature. The Natural Step is a key international example of a science-based sustainability initiative.

According to the authors of *The Natural Step for Communities: How Cities and Towns Can Change to Sustainable Practices*,

Sarah James and Torbjörn Lahti, “Many communities in the United States and around the world have initiated and are carrying out sustainable development projects. Green building programs, affordable housing, open space preservation, recycling, climate change initiatives, smart growth initiatives, are just a few of these. While these initiatives have made progress toward sustainable goals, they largely are occurring on a project-by-project or issue-oriented basis. Frequently these efforts, as laudable as they are, are unconnected and not integrated throughout municipal governments and the larger communities.” They go on to say, “In contrast to this ‘silo approach’ to sustainable development, the eco-municipality model uses a *systems approach*. Key ingredients of this systems approach are widespread community awareness-raising and integrated municipal involvement, using a common “sustainability language” based upon The National Step framework. Using this common language brings about a shared understanding of what sustainability means and how to achieve it throughout all sectors of municipal government and the wider community. The likelihood of conflict and competition among resulting actions is therefore minimized, since all sectors are using the same ‘sustainability playing rules.’”³



There are 29 communities in Wisconsin that have adopted eco-municipality resolutions.



3 James, Sarah and Torbjörn Lahti. 2005. “The Eco-Municipality Model for Sustainable Community Change: A Systems Approach to Creating Sustainable Communities.”

How to Move toward Sustainability

There are a number of fundamental steps a municipality can take to initiate a sustainable community program although there is no single route. Local governments can provide leadership to organize the process through municipal channels; or, this can occur through community involvement and grassroots efforts; or, it can evolve through both top-down and bottom-up approaches. Ten basic steps to consider are outlined below.

1. Convene a task force/committee/study group/green team.

- Purpose: Develop recommendations with regard to sustainable community development for consideration by elected officials.
- Group make-up: Include wide representation of various businesses, utilities, architecture, engineering, energy experts, watershed experts, farmers, local environmental non-profits, city departments, local officials, local residents, community social agencies, schools, faith-based groups, university, two-year campus or technical colleges.
- Process: Assess the current situation – identify existing green initiatives; identify key areas and opportunities; identify gaps and barriers; develop a vision statement and key goals; recommend actions based on goals.

2. Commit to becoming a sustainable community through a formal resolution (see Appendix 1).

3. Adopt a guiding principle or framework for sustainability. This guide presents the principles of The Natural Step as a sustainability framework because it works as both a process and as a measure of what constitutes sustainability based on the fundamental laws of science. It has been adopted by a number of Wisconsin local governments, the American Planning Association (APA), and communities around the world, including many Canadian cities.⁴ But there are other examples, as well, and communities across the country have developed their own frameworks and have excellent web sites where it is possible to review their work. The applicability of The Natural Step to local planning and sustainable development efforts has been recognized by the APA. In its Policy Guide on Planning for Sustainability, the guiding objectives for policies and practices are based on The Natural Step's "four system conditions for a sustainable society".⁵

4. Establish a standing committee or advisory board to oversee implementation of the sustainable community program and to further develop a strategic sustainable community plan. Consider a committee of 12-15 members with varying length terms and strengths that complement the implementation plan.

5. Establish a department, reconfigure existing departments, or appoint or hire a director of sustainable development. The purpose of this "office of sustainable development" is to implement the strategic sustainability plan, leverage investments wisely, and coordinate the program across departments. Include a staff representative from each department to be the green liaison or point person. Note: Sustainability is necessarily a holistic approach and therefore negates the traditional silo approach of government.

6. Educate and train staff and officials across departments about sustainability. This is important for creating organizational capacity to lead by example and move toward sustainability. Education is also key to integrating sustainability effectively into the government culture.

- The city of Madison has undertaken this step. Madison trained personnel across 25 departments in The Natural Step to develop a common language and integrated approach to sustainability citywide. As a result of the training and continuing application of lessons learned by interdepartmental teams, staff will be able to make decisions based on sustainability impacts, evaluate existing programs, policies, and practices as to whether they meet the systems conditions for sustainability, develop short- and long-term action plans to achieve sustainability, and prioritize and initiate new projects and policies based on the city's sustainability goals.

⁴ The Natural Step Canada website includes resources and a list of municipalities with which they work. Accessed at www.naturalstep.ca.

⁵ APA. 2000. Policy Guide on Planning for Sustainability. Accessed at www.planning.org/policy/guides/adopted/sustainability.htm.

Objectives of APA's Strategy for Planning for Sustainability

Planning for sustainability requires a systematic, integrated approach that brings together environmental, economic, and social goals and actions directed toward the following four objectives:

- Reduce dependence upon fossil fuels, extracted underground metals and minerals.
- Reduce dependence on chemicals and other manufactured substances that can accumulate in Nature.
- Reduce dependence on activities that harm life-sustaining ecosystems.
- Meet the hierarchy of present and future human needs fairly and efficiently

Source: APA's Policy Guide on Planning for Sustainability

Goal/Indicator Matrix

Santa Monica, California developed a Goal/Indicator Matrix that not only measures progress for each goal but demonstrates linkages between the areas. As a result, on the ten-year anniversary of their sustainable city program, Santa Monica was able to report their successes to the public. This included

- 95% reduction in dry weather pollution to the Bay
- first U.S. city to buy 100% renewable electricity and cut greenhouse gas emissions by 6%
- toxic-free parks and public buildings
- water savings of over 328,500,000 gallons per year
- establishment of a Blue Line, voted best bus line in the country and a leader in clean air technology
- a growing group of sustainable business leaders helping the local economy, environment, and quality of life.

Source: City of Santa Monica, <http://santa-monica.org/epd/>

7. Establish demonstrations. Either make various existing initiatives into examples of sustainability or initiate new projects that showcase sustainability principles. This provides staff with experience using sustainable planning, decision making, and green practices; allows leadership to show progress and success; and provides the private and public sector local models and successes to learn from and emulate.

8. Adopt Full Cost Accounting. Full Cost Accounting (FCA) is the analysis of all the costs, as well as the advantages, of all proposed alternatives, and the presentation of those findings to decision makers. In FCA, “cost” is not just the monetary cost to the organization making decisions. It also includes the social and environmental costs to anyone else affected by the decision. This process can be especially useful for government agencies that represent a variety of interests when deciding how to allocate public funds and/or other resources. Organizations that use FCA have experienced budget savings.

Performing an FCA helps avoid “externalizing” a cost. In economics an externality is a cost “side-effect”. In the context of local government decision making, a decision that may not create a direct cost for the decision maker or her department or program can often create negative costs for somebody else’s department or program, and that will ultimately cost the community as a whole.

FCA can be applied across the broad range of decisions made every day by local governments. For example, in purchasing fleet vehicles a local government can use FCA to help choose between different options. One of the vehicle options might have the lowest “purchase price” but, from a lifecycle perspective, the local government will need to determine whether it’s really the “less expensive vehicle” if it uses more fuel and releases more toxins and carbon dioxide. The public health and quality-of-life costs affected by that decision are not truly external to local government. FCA will help you determine the costs of those “cheaper” vehicles’ “side effects” to the community, residents, and others affected by the decision.

Another example would be using FCA on a community’s solid waste operations. In this case, the community would need to go beyond a simple analysis of the capital and operating costs of a facility. FCA would include:

- Front-end costs of engineering and site planning
- Direct and indirect daily operating costs:
 - Direct cost – costs of specific services, salaries, parts, interest on debt
 - Indirect cost – costs of support from general government services such as purchasing, administration, legal, fleet maintenance
- Back-end costs such as closing a facility at the end of its useful life, post-closure care, and monitoring

9. Measure, track, record, and report progress and results. What gets measured gets accomplished. Local governments can demonstrate leadership by assessing and continuously improving their contribution to a sustainable community. Sustainability indicators typically are tied to the sustainable community goals and measure progress toward meeting each of the goals. There are many examples of community sustainability indicators.⁶ Minneapolis, Minnesota, for example, created a sustainable city plan in 2003 with 24 indicators ranging from water quality to public health. The indicators were updated in 2012.⁷ The process of developing indicators can bring different sectors of the community together. “Indicators reveal the common goals and shared values that foster alliances across traditional boundaries, provide citizens with a better compass for understanding community problems and maximizing regional assets, and compel change toward progress,” according to Redefining Progress in the *Community Indicators Handbook*, 2nd Edition, a best practices resource.⁸

6 Sustainable Measures: Indicators of Sustainability. Accessed at www.sustainablemeasures.com/indicators.

7 City of Minneapolis. Sustainability Indicators. Accessed at www.minneapolismn.gov/sustainability/indicators/index.htm.

8 *Community Indicators Handbook*, 2nd Edition, 2006. Accessed at www.redefiningprogress.org/cihb/index.shtml.

10. Publicize. Communicate the efforts and results to staff, local officials, and to the private, public, and non-profit sectors. The goal of this toolkit is to provide towns, cities, villages, counties, and regions with specific actions to take to preserve options for future generations and for enhancing quality of life and securing the health of people, the economy, and the environment now and for the future. As local governments move forward with a process, whether using the ten steps outlined above or some others, consider working with county University of Wisconsin-Extension educators to help move toward a sustainable community.

The next sections of this guide discuss the purpose, strategy, and actions of specific areas within local government. Within each section are case studies as well as a list of specific resources.

Resources

Sustainable Communities Capacity Center

This site includes numerous resources for sustainable community development.

www3.uwsuper.edu/sustainability/

Green Tier Communities

<http://greentiercommunities.org>

League of Wisconsin Municipalities

See Green Tier Legacy Communities resources in the left-hand column.

www.lwm-info.org

National League of Cities' Sustainable Cities Institute

This site provides resources and case studies about sustainability in practice.

www.sustainablecitiesinstitute.org

Climate Communities

This site provides information about federal climate policy that impacts local government.

www.climatecommunities.us

National Association of Counties Environment and Infrastructure Resources

www.naco.org/newsroom/pubs/Pages/Environment%20and%20InfrastructurePubs.aspx



Wisconsin Dept. of Tourism photo



www.sxc.hu/profile/jucarino photo



UW-Extension photo

Our future generation

Climate Change

Purpose



Peter C. Gorman photo

Groundwater flooding in Spring Green, Wisconsin, on July 12, 2008. More frequent large-precipitation events may result in localized areas of groundwater flooding.

Earth's climate has been changing for billions of years so climate change is nothing new. What is new is the rate of that change.^{9,10} It appears that temperature has increased by a couple of degrees on average and more in the Arctic polar region over the last 120 years or so. That is why we call it rapid climate change. Dealing with that change is a new challenge for local governments and communities. According to scientists, rapid climate change is the result of human activity, primarily related to the combustion of fossil fuels.^{11,12}

Many people already notice changes from increased temperature change, fewer sub-zero days, or changes in precipitation, particularly snow and ice. Sometimes it's hard to see or feel because some winters seem as cold and snowy as they always have, but long-term monitoring shows steady change. Other changes include increased variability in the weather and increased intensity in weather events (e.g., long lasting droughts, stronger tornadoes, or many inches of rain).

Rapid climate change impacts many things in a community and consequently in the operation of local government. The challenge is learning to apply concepts and tools to a new situation. This will include using processes that

local government already takes part in, such as learning, planning, and risk management. Most steps will save tax dollars in the long run (such as comprehensive planning or renewable energy). Some will have an expensive "front end" with a long payoff (such as retrofitting the waste water treatment plant with an electric generator to burn the methane produced in the waste process, thus saving money by producing its own energy and possibly selling electricity to the utility).

This change in the climate is just starting and will continue for centuries. Each local government will do its part to help the community work through the challenges they will face. The goal is to develop a resilient government serving a resilient community.

Local government's overall strategy should be iterative: it should generate solutions for problems that can show improvement over time. Thus, as our knowledge increases, the quality of our solutions can improve and the impacts can be more profound.

See the supplement at the end of the chapter for definitions of climate change terms.

Strategy

Many communities, governments, and organizations have been using a variety of strategies to plan for rapid climate change.

- Educate local government staff, elected and appointed officials, and the community. The more everyone is informed, the better prepared the community will be. This involves learning about basic climate change science, the impacts on the region, relevant impacts elsewhere, impact on different government departments (such as water resources versus county forest), and new skills and methods.
- Create a local "climate team". Large local governments in Wisconsin already have appointed sustainability directors and staff. They are the logical choice for shepherding this process. Some large local governments opt to create a climate change position, to coordinate this and do the heavy lifting. Smaller local governments without the financial capacity to create a new position can create a team to lead the process. When it comes to public representatives, consider including the business community and the head of your local

9 NASA. 2011. Carbon and Climate Change in 90 Seconds (video). Accessed at http://climate.nasa.gov/climate_reel/CarbonCrisis/.

10 NASA. 2012. Climate Time Machine. Accessed at http://climate.nasa.gov/interactives/climate_time_machine.

11 Corkery, Robert and Vesta Animation. 2010. Time-lapse History of Human Global CO2 Emissions (video). Accessed at www.youtube.com/watch?v=MEMse22h8c8.

12 National Academy of Sciences and the Board on Atmospheric Sciences and Climate. 2013. Climate Change: Lines of Evidence videos. Accessed at <http://nas-sites.org/americasclimatechoices/videos-multimedia/climate-change-lines-of-evidence-videos/>.

economic development corporation. A local business may have a sustainability director, or even a climate change strategy position. If the local government has one or more municipal utilities, include its director(s).

- Create staff and elected leader buy-in. Climate change will require local governments to tweak what they do. The leaders, community, and staff need to understand why the changes need to be made and get on board.
- Assess the climate change situation. It's important for local governments to understand the possible impacts that climate change could have on their communities. Conducting an analysis of needs, vulnerabilities, and risk analysis, through an emergency management plan, is a good step (see the Resources section on the next page).
- Manage risk. The risk management method most appropriate regarding climate change is Iterative Risk Management. This is a method to use when there is a serious risk, known trends, and uncertainty in the threat details. Iterative Risk Management marries risk management with a cycle of monitoring, learning, and improving response to the threat. This method is recommended by the Intergovernmental Panel on Climate Change (IPCC), and is being used by many in and outside of the public sector, including the U.S. Armed Forces.
- Plan for adaptation. From the administrator to the zoning department, everyone will be involved in adaptation planning. This is where what you learned is applied to the everyday work of each department.
- Plan for mitigation. This includes what government will do to reduce the release of greenhouse gases from its property and operations. Much of this will have to do with energy conservation and efficiency, and the substitution to renewable technologies from fossil technologies.
- Implement, measure outcomes, make corrections. The adaptation process to climate change is a long-term commitment, and it is important to have an implementation plan and goals that can be used to measure progress toward outcomes. It must become part of the ongoing operation of local government.

Climate Team

A climate team for your local government could include the following people:

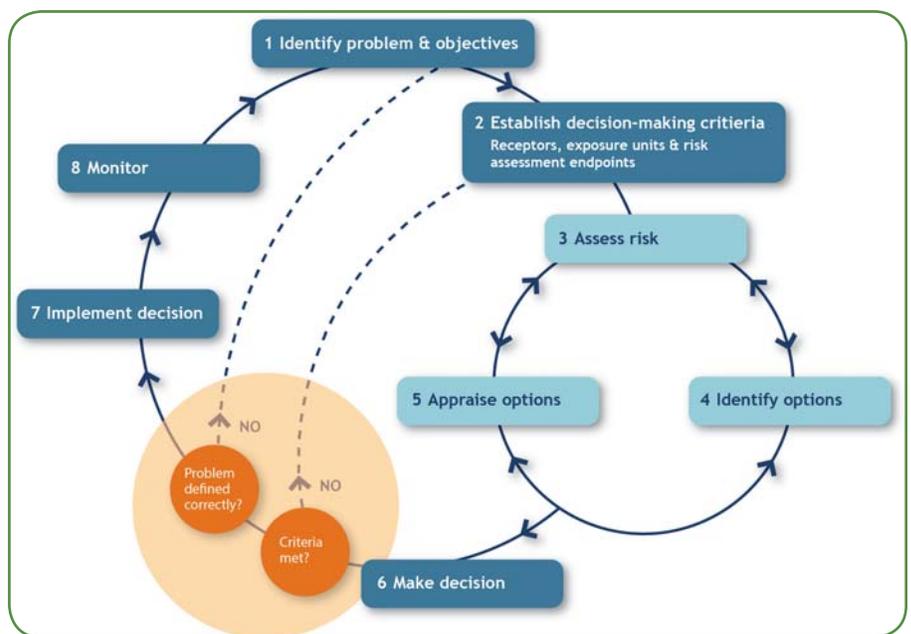
- An interested council/board member
- An interested UW-Extension educator in your county office
- A planner
- A public health director
- The emergency management director
- Key department heads (highways, buildings, land use, etc.)
- Public representatives

A local government may experience short-term cost savings from implementing a strategy, but more importantly, planning and implementation must help build the long-term economic, social, and environmental progress of community residents and businesses. The outcomes should ultimately be about the resiliency of local government and its people.

Actions

The actions that local governments take are based on their local situation and planning. Those actions may involve the following:

- Involve residents and the private sector in the climate change planning process.
- Continuously educate staff, elected officials, and residents.
- Consider training staff on systems thinking and systems dynamics.
- Prepare for handling new invasive species and diseases.
- Prepare for changing threats with emergency management and public safety personnel.



A framework to support good decision making in the face of climate change risk.
Source: UK Climate Impacts Programme et al. Climate adaptation: Risk, uncertainty and decision-making, UKCIP Technical Report, May 2003, p. 7.

- Determine which actions will eventually require new capital financing.
- Identify which infrastructure elements can be improved now to reduce future expenses and dangers from climate change impacts, such as with highway and road construction, waste water, and other infrastructure.
- Implement the use of Full Cost Accounting within local government to see the big picture of community outcomes (see page 8).
- Explore and implement new ideas in land use and comprehensive planning.
- Explore and implement new types or elements of zoning laws.
- Understand the changes in the flora and fauna that will occur in local parks.
- Determine how to meet heat challenges for the elderly and low income in your jurisdiction.

Case Studies

La Crosse, Wisconsin Collaboration with Wisconsin Initiative on Climate Change Impacts

The Wisconsin Initiative on Climate Change Impacts (WICCI) was created in 2007 to “generate and share information that can limit vulnerability to climate change in Wisconsin and the Upper Midwest.” WICCI partnered with the city and county of La Crosse in 2012 to complete a four-month pilot program to increase coordination and communication among programs that address the public health consequences of climate change. In February 2012, WICCI and other partners toured the area and held a workshop on climate change adaptation for La Crosse officials, staff, community leaders, and others. This include a presentation on climate change science as well as a facilitated discussion about local experiences and next steps. Next WICCI worked with local community partners to complete a La Crosse Area Climate Change Adaptation Study. The study assessed community and technical assistance options, including suggesting adaptation measures that could be included in future planning efforts. The study notes that the city and county of La Crosse should “include climate change in relevant future plans and community decisions” and “implement one or more climate change adaptation projects to address the community’s top priorities”. This case is an example of relationship building to address climate change, and WICCI hopes to use a similar model in other communities. View the full report at www.astho.org/Programs/Environmental-Health/Natural-Environment/Climate-Change/Climate-Change-Grantees/Materials/WI-Department-of-Natural-Resources--Climate-Adaptation-Study/.

Grand Rapids, Michigan Sustainability Plan

Grand Rapids, Michigan created a sustainability plan for 2011-2015. The city included an energy and climate protection section that includes several outcomes, including reducing greenhouse gases and impact on climate change and reducing energy demand and fossil fuel consumption. The city used a plan-do-check-act approach with annual progress reports that track progress toward measurable targets for each outcome. The year two progress report for 2012 notes that the city is now creating a sustainable energy plan to reduce risk on overall energy demand. The Grand Rapids’ mayor received a Mayors’ Climate Protection Award in 2012. Learn more at <http://grcity.us/enterprise-services/officeofenergyandsustainability/Pages/default.aspx>.

Resources

Sustainable Communities Capacity Center, Climate Change Tool Box

www3.uwsuper.edu/sustainability/Climate_Change_Strategy.htm

American Planning Association Policy Guide on Planning and Climate Change

www.planning.org/policy/guides/pdf/climatechange.pdf

National Climate Assessment: Midwest Technical Input Report

Includes reports on climate, water, forestry, biodiversity, transportation, energy, agriculture, etc.

http://glisa.msu.edu/great_lakes_climate/nca.php

Wisconsin Initiative on Climate Change Impact

www.wicci.wisc.edu/climate-change.php

Georgetown Climate Center State and Local Adaptation Plans

www.georgetownclimate.org/adaptation/state-and-local-plans

ICLEI Local Governments for Sustainability USA: Small Communities Toolkit

www.icleiusa.org/action-center/learn-from-others/small-communities-toolkit

Wisconsin Land Use Megatrends on Climate Change

www.uwsp.edu/cnr-ap/clue/documents/megatrends/Megatrends__print_lettersize.pdf

Supplement: Climate Change Terms

Climate: “Climate in a narrow sense is usually defined as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization.”¹³

Weather: “The state of the atmosphere with respect to wind, temperature, cloudiness, moisture, pressure, etc. Weather refers to these conditions at a given point in time (e.g., today’s high temperature), whereas Climate refers to the “average” weather conditions for an area over a long period of time (e.g., the average high temperature for today’s date).”¹⁴

Resilience: “The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change.”¹⁵

Mitigation: “Technological change and substitution that reduce resource inputs and emissions per unit of output. Although several social, economic, and technological policies would produce an emission reduction, with respect to Climate Change, mitigation means implementing policies to reduce greenhouse gas emissions and enhance sinks.”¹⁶ Mitigation is a political issue in the United States because it means emitting fewer greenhouse gases into the atmosphere and changing from a fossil fuel economy to a renewable economy. This impacts people and businesses in different ways, hence the politics. Not all governments can “safely” address mitigation.

Adaptation: “Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects. Various types of adaptation exist, e.g., anticipatory and reactive, private and public, and autonomous and planned. Examples are raising river or coastal dikes, the substitution of more temperature-shock resistant plants for sensitive ones, etc.”¹⁷

13 Intergovernmental Panel on Climate Change (IPCC). Glossary. Accessed at www.ipcc.ch.

14 NOAA’s National Weather Service (NWS). Glossary. Accessed at <http://w1.weather.gov/glossary/>.

15 IPCC. Glossary.

16 IPCC. Glossary.

17 IPCC. Glossary.

Health Consequences of Air Pollution

Air pollution affects everyone, especially people with lung and heart conditions, seniors, and children most profoundly. According to the American Lung Association 2013 State of the Air Report,

- 13 percent of Wisconsin residents suffer from the lung conditions of adult and pediatric asthma and chronic obstructive pulmonary disease
- almost one in four (24 percent) state residents has cardiovascular disease
- young children inhale more pollution relative to their size than adults and are generally more active, which makes them more vulnerable

Air pollution can cause

- immediate symptoms (wheezing, coughing, shortness of breath)
- long-term problems (cancer, emphysema, chronic bronchitis) in even healthy individuals who are active during high air pollution days

Source: American Lung Association, www.lung.org

Purpose

Our atmosphere has never been completely free of chemical gases and particulates. Natural occurrences such as wildfires and volcanic eruptions send smoke and particulates into the atmosphere. However, the rapid development of industry and technology over the last two centuries, along with a growing global population, has both increased the amount and changed the nature of air pollutants. Today air pollution from human activities is by far the more serious and persistent cause of environmental degradation and health problems than natural occurrences. Driving our vehicles, heating our buildings, manufacturing our products, and growing our crops all contribute to outdoor air pollution.

Studies by the National Institute of Environmental Health Sciences indicate that long-term exposure to air pollutants increases the risk of allergies, asthma, heart disease, and lung cancer. Improving air quality through government operations and residents' actions is of vital concern to municipalities for both health and economic reasons.

With the Clean Air Act (1970), Congress provided the regulatory authority to improve the nation's air quality. As a result, the U.S. Environmental Protection Agency (EPA) sets a health standard or a maximum acceptable level of a pollutant and regulates ozone, fine particles, nitrogen oxides (NO_x), and Volatile Organic Compounds (VOCs). Major air pollutants are described at the end of the section.

Although air pollutants are usually more prevalent in cities and industrial areas, pollution can and does occur everywhere. In addition, wind may carry pollution released in one place to many other locations.

Strategy

Local governments can reduce the amount of air pollution created by government operations and encourage residents to do the same in their households and businesses. Often, reductions in air pollution occur simultaneously with other actions to offset environmental cost, and they typically save money from less fuel use. Key components in an air quality reduction strategy are as follows:

- Identify the largest sources of air pollution in the municipality and region by working with the Wisconsin Department of Natural Resources (DNR) and UW-Extension specialists.
- Engage governmental and private sector leaders with influence over the largest sources of vehicle emissions and fleets – highway departments, public works departments, sheriff's departments, construction companies, etc., and private sector leaders with influence over emissions from manufacturing, advanced metals, canning, quarries, agriculture, etc. – to make voluntary reductions in emissions, especially on days when the DNR predicts ozone or fine particle levels will be high.
- Research fuel options and available technology for fleets to see if it is feasible to use less polluting ones like ethanol, E-85, flex-fuel, compressed natural gas, or electricity.
- Implement a no-idle policy for vehicles.
- Educate employees about the health risks from air pollution, especially for people with asthma and lung and heart conditions, children, and older adults.
- Implement policies to reward actions that reduce air pollution while at work. Inexpensive rewards or recognition for employees who bike, carpool, or use mass transit can be motivational and improve health and air quality.
- Increase employee health and productivity by investigating potential sources of indoor air pollution (radon, off-gassing from new carpets or furniture, paints and other maintenance chemicals, perfumes, etc.) and taking steps to reduce them.
- Consider ordinances or resolutions to regulate the use of Outdoor Wood Boilers (OWBs), burn barrels, and other sources of smoke.
- Consider air quality when creating community land use plans. Make the community safer for

biking or walking by adding designated lanes, signage, and bike racks. Reduce the incentive to drive by improving public transit and limiting automobile parking and increasing bike parking.

Actions

There are many ways that individual actions lead to cleaner air. Here are some that a local government could encourage among employees, vendors, and residents:

- Stay informed about the air quality (AQ) forecast and take actions to improve AQ for your health and the health of others. Register to receive AQ alerts from the DNR via email or text message, from EPA, from local news outlets, or through a tablet or smartphone app, from “AIRNow” or from American Lung Association’s “State of the Air”.
- When air quality is forecast to be poor, reduce or eliminate non-essential activities that create more air pollution:
 - Limit activities such as painting, lawn mowing, driving, and refueling to reduce ground-level ozone especially on days when air quality is forecast to be poor. When these activities are necessary, do them at cooler times of the day or in the dark if possible.
 - Drive less by combining and coordinating trips, carpooling, biking, walking, or using public transportation.
 - Don’t idle engines. Turn the car off when stopped. Modern car engines do not need to be warmed up, even in cold weather.
 - Drive more gently and maintain vehicles for better fuel efficiency.
- Use low- or no-VOC (volatile organic compounds) building materials and paints or natural cleaning agents. Pour chemicals carefully to avoid spilling and releasing more chemicals into the air.
- Test single-family houses and multi-family apartment buildings for radon. Fix the building if the radon level is high. When building new, install a radon mitigation system.
- Use less electricity. Seventy percent of Wisconsin electricity, and much of our air pollution, comes from coal-fired power plants. Consider an electricity plan for your home or business that has lower rates for electricity used in the evening and night (“off-peak”) which can be more affordable and reduce air pollution.

Air Quality Regulation

In Wisconsin, the DNR administers and enforces air pollution rules. All commercial activity that contributes to air pollution is subject to DNR regulation, including:

- emissions of combustion byproducts from coal or natural gas used for heating or electrical generation
- emissions of hazardous chemicals from chemical manufacturing, petroleum refining, and other industrial activities
- sources of VOCs such as paints and coatings, adhesives, and maintenance products

Case Studies

Fond du Lac County, Wisconsin: The Northeast Wisconsin (NEW) Air Coalition organized in 2004 in response to high ozone levels and an increased potential for receiving a “nonattainment” designation from the EPA. Spearheaded by the Fond du Lac County Economic Development



Fond du Lac Area Transit Station

D. Tscheschlak photo

The Definition and Implication of Nonattainment Status

Counties that exceed the federal standard for a specific pollutant are designated with nonattainment status and mandated to have stricter permitting and environmental controls on industrial facilities until emissions are within the acceptable range.

Currently Sheboygan and Kenosha Counties are in nonattainment status for ozone. Milwaukee, Waukesha, and Racine Counties are in nonattainment status for fine particles.

Stricter permitting and environmental controls are required on industrial facilities in nonattainment counties until pollutant levels are reduced. This can be an expensive hurdle for existing businesses and can inhibit economic development if relocating companies choose to move to a county where air pollution standards have not been exceeded. Generally, private activities of homeowners and others are not subject to these rules.

Corporation, supporting resolutions were passed by both the Fond du Lac County Board and the city of Fond du Lac Common Council. Group members included environmental engineers from local manufacturers, education, health and economic development professionals, and representatives of local government. Participating entities such as Mercury Marine and the Fond du Lac County Sheriff's Department reduced non-essential emissions on days when ozone was forecast to be high and educated their employees on actions they could take individually to improve air quality. Fond du Lac County UW-Extension provided locally specific air quality alerts through a specially-designed website (Healthy Air Healthy Us), which included both indoor and outdoor air quality resources. Educational efforts today emphasize energy conservation as a key tool for improving air quality and the financial bottom line.



Dane County Wood Smoke Reduction: Citing EPA Region V data indicating that the county contributed more than 500 tons-per-year of fine particle (PM_{2.5}) emissions through the use of non EPA-certified wood stoves and fireplace inserts, and that Dane County was one of only eight counties across six states in EPA's Region V (MN, WI, IL, IN, MI, OH) that reached this level of PM_{2.5} emissions from non-EPA certified wood stoves and fireplace inserts, the Dane County Clean Air Coalition initiated the BurnWise program.

The program used \$45,000 in federal funds to encourage residents to replace an old, inefficient stove with an EPA-certified wood stove or fireplace insert. EPA-certified wood stoves emit 70 percent less particle pollution and are approximately 50 percent more energy efficient than wood stoves manufactured before 1990. The Coalition developed a general educational outreach package of educational materials and used it in all outreach communications to the public and project partners, including: North Central Hearth, Patio and Barbecue Association and their retailer members; UW-Extension Solid and Hazardous Waste Education Center; Dane County Cooperative Extension; Wisconsin DNR -- Air Management Division; Public Health of Madison and Dane County; Wisconsin Department of Health Services; city of Fitchburg; city of Madison; city of Madison Fire Department; Dane County Fire Chief's Association; Unity Health; and Dane County Asthma Coalition.

As a result of the outreach education and consumer rebates, a total of 59 highly polluting wood stoves and fireplace inserts were changed out, salvaged, or decommissioned and replaced with EPA-certified wood stoves or gas inserts. This effort eliminated the emissions of 2.22 tons of PM_{2.5}, 16.12 tons of carbon monoxide (CO), 0.17 tons of nitrogen oxides (NO_x), 4.52 tons of Methane and 4.08 tons of VOCs. The city of Madison also created an ordinance banning the installation of Outdoor Wood Fired Boilers (OWBs) to reduce health risks from wood smoke pollution and prevent nuisance complaints by neighbors.

Resources

Dane County Clean Air Coalition

www.healthyairdane.org

Wisconsin Department of Natural Resources Air Quality & Health

<http://dnr.wi.gov/topic/AirQuality/>

Wisconsin Partners for Clean Air

www.cleanairwisconsin.org/index.php

U.S. Environmental Protection Agency Burn Wise

www.epa.gov/burnwise/

Supplement: Description of Major Air Pollutants

Major air pollutants include:

Volatile Organic Compounds (VOCs): VOCs are chemical vapors emitted, for example, from paint, paint strippers, solvents, gasoline, cleaning supplies, adhesives, office supplies, and building materials. In the home or office, high levels of VOCs in the air can last much longer than the actual use of the product. VOCs blend with nitrogen oxides to form ground-level ozone. VOCs can cause eye/nose/throat irritation, headaches, dizziness, nausea, cancer, and central nervous system damage. They are of most concern indoors where there is poor ventilation.

Nitrogen Oxides (NOx): NOx is a contributor to the formation of ozone. It results from the burning of fossil fuel at high temperatures and is composed of nitrogen and oxygen.

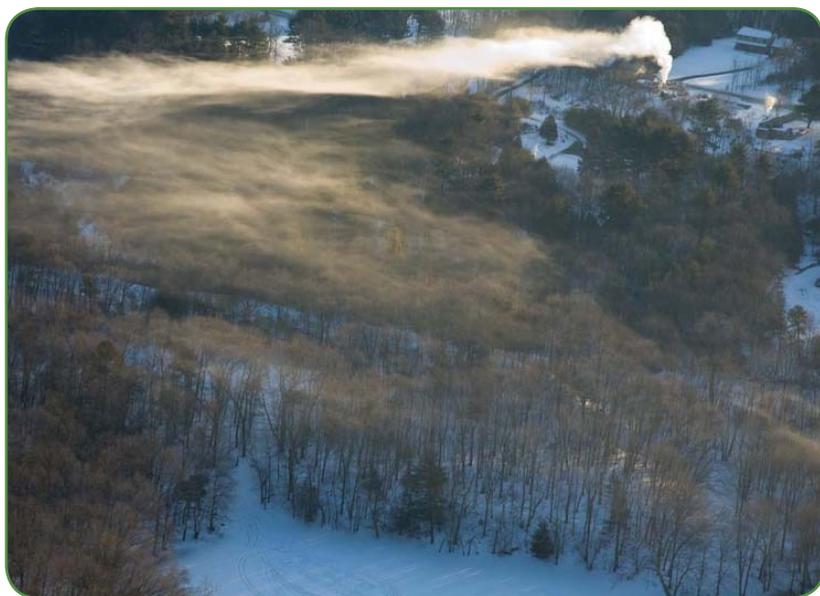
Sulfur Oxides (SOx): SOx contains sulfur and oxygen and is a contributor to the formation of ozone.

Ozone: Ozone is a gas that is created when NOx from vehicle emissions and VOCs react with sunlight and heat. Ground-level ozone is of most concern in the summer when there is more sunlight and the temperatures are higher. According to the American Lung Association immediate effects of inhaling ground-level ozone include difficulty breathing, asthma attacks, coughing, and an increased likelihood to need medical treatment for existing lung and heart conditions. Over time, repeated exposure can lead to an increased likelihood of premature death or strokes. Recent research indicates that ozone damage from even short-term contact in healthy individuals can mimic that of heart disease.¹⁸

Fine Particles: Also called particulate matter (PM), fine particles are tiny bits of solids or liquids suspended in the air. They are usually referred to according to their size, with PM2.5 designating a particle size of less than 2.5 microns. The smaller the particle, the deeper it can penetrate into the lungs. Breathing in these particles can aggravate heart diseases, asthma, emphysema, and bronchitis, and cause chest pain, palpitations, shortness of breath, fatigue, cardiac arrhythmia, and heart attacks. Combustion of coal, oil, diesel, or wood fuels sends particulate matter into the air. The DNR began statewide air monitoring for levels of fine particles in 2002.

Wood Smoke: Burning wood releases significant amounts of fine particles, VOCs, carbon monoxide, and other toxic substances into the air. Smoke from outdoor wood-fired boilers (OWBs) is of particular concern. This type of boiler is a natural or forced-draft wood stove surrounded with a water jacket. It is typically mounted some distance from the home and connected to a home heating or hot water system through underground piping. The New York Attorney General's Report on Air Quality states that because these boilers can burn over long periods with restricted combustion air, or use green or partially dried wood, they can produce 10 times the smoke of other wood-burning heat sources. When OWBs are used near other houses, wood smoke pollution can create serious health concerns for neighbors.

Radon: Radon is an invisible, radioactive gas that occurs naturally when uranium in soil and rock decays. It is a carcinogen and can seep into homes and other buildings, where it poses significant health risks to occupants if breathed at high levels over time. Radon is the second leading cause of lung cancer and causes an estimated 21,000 deaths per year in the United States. It is the leading cause of lung cancer among non-smokers.



Plumes of smoke from OWBs can remain at ground level, affecting distant neighbors. In the photo above, smoke drifts across a valley.

G. Leslie Sweetnam photo

¹⁸ American Heart Association. June 2012. New evidence links ozone exposure to heart attacks. Accessed at <http://newsroom.heart.org/news/new-evidence-links-ozone-exposure-235515>.

Purpose

Land use planning and regulations, and subsequent decisions by local governments and private landowners, directly affect the shape and functioning of communities. A community's pattern of development is set in place for decades, establishing where people live, work, shop, and play among many other activities, and how those activities are connected to each other through a transportation network. Patterns of development in turn influence energy use, land consumption, the function of ecological services, available land to access local food production, and public health including the level of safety for, and access to, walking and biking.

Land use relates to many aspects of a community. One important linkage is the relationship between land use and transportation. The way in which we plan for and build a transportation network in a community can affect the land use, and vice versa, land use affects the transportation network. The efficiency and compactness of communities greatly affects how much gasoline is used, but also how much physical activity occurs by community residents including children. Larger cities can consider various forms of public transportation in compact areas.

Another land use linkage is with housing. In particular the density of housing, often measured by housing units per acre, can affect the number of automobiles owned and the amount of mileage per car. Also, mixes of different size and types of housing can create more compact areas but also more social cohesion across income groups. When housing, transportation, and commercial areas are designed not for cars, but for people, more compact development forms are often the result.

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect."

Aldo Leopold

Strategy

An appropriate strategy is essential for sustainable land use to be implemented. Strategies for improving sustainable land use include:

- Educate local government staff, boards, and commissions in addition to landowners, business owners, other organizations, and the public on the importance of sustainability in land use decisions.
- Create a comprehensive plan that integrates sustainability concepts.
- Assess land use and transportation, and housing linkages.
- Integrate green infrastructure into the community, such as natural areas, wetlands, natural bike paths and trails, and parks.
- Evaluate current zoning ordinances and subdivision regulations, and amend or rewrite them to include sustainability concepts.
- Consider using tools like transfer of development rights (TDR) or purchase of development rights (PDR). TDR can help create more compact and mixed use areas and food production areas. PDR can create conservation areas for either agriculture or ecosystem services.

Actions

It is important for local governments to take the lead in the sustainability of their communities through various tools at their disposal. Each of the following land use actions holds its own advantages and disadvantages for the preservation of land and resources.

- Weigh the advantages and disadvantages of including a separate element or chapter focused on sustainability into the comprehensive plan or infusing sustainability concepts into each existing element.
- Review ordinances and consider including:
 - Permit solar rooftop installations.
 - Create a solar access ordinance.

- Permit community and/or neighborhood gardens in residential districts.
- Permit accessory dwelling units with appropriate standards.
- Permit farmer’s markets and mobile vending with appropriate standards in residential, mixed use, and commercial districts.
- Permit chickens and beekeeping in residential backyards with appropriate standards.
- Create mixed use districts that mix housing types, commercial uses, and agricultural uses, such as community gardens. Create standards for commercial/retail areas that include a mix of private and public outdoor spaces, including for example, outdoor eating areas, street furniture, playground, a water feature, etc.
- Identify current or potential mixed use districts and the ordinance and plan changes needed.
- Integrate uses, such as libraries, schools, child care, senior centers, and community or small market or truck gardens or orchards into residential areas.
- Assess walking and biking safety and distances and determine safe routes for both recreation and for commuting to work places, schools, and shopping.



City of Madison photo

Case Studies

Comprehensive Plan, City of Eau Claire, Wisconsin

The city of Eau Claire adopted its Comprehensive Plan in 2005. In September of 2008 the City Council decided to add a sustainability chapter to the comprehensive plan. The 30-page chapter was adopted in April 2009 and includes a set of key issues for which each one lists objectives, policies, and an implementation program. The city worked to make the sustainability chapter consistent with its comprehensive plan and an additional document lists the goals, objectives, and policies that move the city toward its overall sustainability goal.

Key Issues

1. Energy: What should the city do to foster local energy production, conservation, and efficiency, while increasing the use of renewable power?
2. Local Food: What should the city do to promote area food production, sales, and consumption while reducing food-related waste?
3. Environmental Conservation: What should the city do to safeguard our ecosystems, trees, soil, and water resources?
4. Atmosphere: What should the city do to reduce our contribution to global warming and minimize air pollution?
5. Managing Waste: What should the city do to promote consumer product awareness, increase recycling rates, and reduce the amount of substances entering into landfills?
6. Strong and Healthy Community: How should the city continue to protect its citizens from disease, promote healthy living, civic engagement, cultural and ethnic diversity, while partnering with others to provide these activities?
7. Sustainable Development: How should the city guide and promote development so that buildings and neighborhoods incorporate sustainable features?
8. Balanced Transportation: How should the city increase mobility choices by enhancing other forms of transportation besides that for automobiles? How can transportation infrastructure

Town of Dunn Goals for Purchase of Development Rights Program

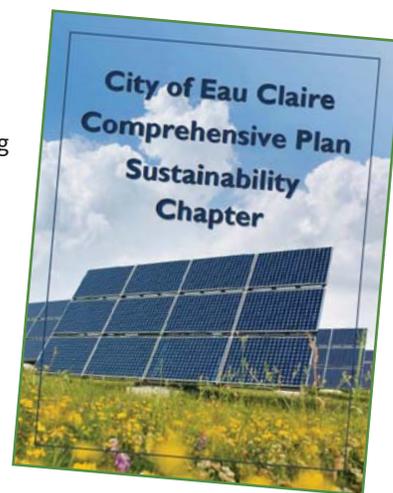
1. Preserve viable farm operations and farmland to maintain the rural character of the town of Dunn, with agriculture as the major economic activity.
2. Permanently preserve scenic vistas and environmentally significant areas (wetlands, lakes, streams, woodlots, etc.).
3. Protect the town from the encroachment of neighboring cities and villages.
4. Preserve “buffer zones” around significant environmental and/or agricultural areas.

Source: Town of Dunn

be designed efficiently, safely, with the environment in mind, and be connected to other local and regional networks?

9. Greener Economy: How should the city bolster the local economy by attracting Green-collar jobs and encouraging businesses to become more sustainable?
10. Sustainable Government: What should the city do to provide good government and cost-effective services, meet the needs of our citizens, protect the environment, and cooperate with other governments?

The full plan is available at www.eauclairewi.gov (under the following tabs: departments, community development, planning, comprehensive plan).



Critical Area Overlay Zoning, Town of Empire, Fond du Lac, Wisconsin

The town of Empire, in Fond du Lac, Wisconsin, developed a “Critical Areas Overlay” placing further protection on sensitive areas including steep slopes and areas prone to contamination. The ordinance also provides protection for valuable cultural resources including woodlands and the Niagara Escarpment. The ordinance enhances road grading restrictions, vegetative screening of buildings, and limits the amount of impervious surfaces in the zone. The ordinance implemented by the town of Empire can be found at www.empire-town.org/zoning.html.

Purchase of Development Rights, Town of Dunn, Wisconsin

The town of Dunn has seen great success with the implementation of their purchase of development rights program. From 1997-2009, the town preserved 2,873 acres of land in perpetual agricultural easements. Since its implementation, Dunn County has also seen great increases in other land preservation initiatives from both public and private entities. Through various government funding sources, and a close partnership with a local land trust, the program continues to prosper.

Information on the implementation of this program can be found at <http://town.dunn.wi.us/townofdunn/land+use/purchase+of+development+rights/default.asp>.



Town of Dunn photo

The first property that the town of Dunn purchased was in 1997 from the Sinaiko Family. This was also the first PDR transaction in the state of Wisconsin.

Transfer of Development Rights, City of Mequon, Wisconsin

The city of Mequon used the transfer of development rights to help protect the area surrounding a local nature preserve. Developers have the ability to purchase the development rights in areas surrounding the reserve, in exchange for increased development rights to the north. See Section 58-332 of the Mequon zoning ordinance for details at www.ci.mequon.wi.us.

Density Zoning, Waupaca County, Wisconsin

Waupaca County implemented an ordinance which included density zoning in designated areas. This ordinance limits the amount of development per acre in certain areas to prevent sprawling

of homes and habitat fragmentation. Furthermore, the ordinance requires all lots to be clustered, requires buildings to be hidden from view if at all possible, does not allow building on ridgelines and hills, and cannot interfere with normal agricultural practices. Depending on the zone, more stringent density policies may be implemented. The ordinance implemented by Waupaca County can be found at www.co.waupaca.wi.us/zoning within the Waupaca County Zoning (Chap. 34).

Incentive Zoning, Waukesha County, Wisconsin

Waukesha County makes use of a type of cluster zoning in their “rural residential” zones. In these zones, they allow for only 20 percent of the total land to be converted to residential use. The ordinance provides increased development rights in one area in exchange for the protection of agricultural and environmentally sensitive lands in another. The ordinance implemented by Waukesha County can be found at www.waukeshacounty.gov/uploadedFiles/Media/PDF/County_Ordinance/Appendix_A_11_07.pdf.

Subdivision Regulations, Village of Caledonia, Wisconsin

The village of Caledonia adopted a conservation subdivision ordinance requiring the preservation of approximately 50 percent of the total green space within new developments. The primary goal of this was to preserve the rural character of the area. Furthermore it lists open space, archeological sites, stormwater management, and recreational opportunities as priorities in protection and use of the land. As of 2005, the village had 14 conservation subdivisions approved. Information regarding conservation subdivisions in Caledonia can be found at www.caledoniawi.com/ConservationSubDivisions.aspx.

Resources

Center for Land Use Education (CLUE)

www.uwsp.edu/cnr-ap/clue/Pages/default.aspx

CLUE Plan Commission and Zoning Board Handbooks

www.uwsp.edu/cnr-ap/clue/Pages/publications-resources/PlanCommissions.aspx

www.uwsp.edu/cnr-ap/clue/Pages/publications-resources/Zoning.aspx

CLUE Plan Implementation Tools

www.uwsp.edu/cnr-ap/clue/Pages/publications-resources/PlanImplementation.aspx

Sustainable Community Development Code Framework

<http://law.du.edu/index.php/rmlui/rmlui-practice/code-framework>



Green Circle photo

The Green Circle Trail is a 26-mile trail that winds through natural areas, forests, parks, and neighborhoods in the Stevens Point area. The trail opened in 1996 and includes donations and easements of both public and private land.

Purpose

A sustainable water supply provides safe, clean drinking water to residents at an affordable rate. This is accomplished without compromising the environment's ability to serve its natural functions or provide for future generations. Although surface water is a defining feature for Wisconsin, the water we don't see is perhaps our greatest asset. Approximately 70 percent of residents and 97 percent of communities rely on groundwater for drinking water.¹⁹ This underground water source is of special concern, as increased water use, agricultural practices, and land use decisions can negatively impact our drinking water quality and quantity as well as the overall sustainability of the drinking water system.

Essential to a sustainable water supply is protection from water quality degradation. Put simply, an ounce of protection is worth a pound of remediation. Water quality threats are difficult and costly to correct, as is the case with nitrate contamination, a major concern for infants less than 6 months of age or pregnant women. Nitrate contamination can be triggered by agricultural fertilization, manure or other bio-solid spreading, septic systems and lawn fertilizers. Pesticides used for agriculture also tend to persist in the environment and can be harmful to human health. Their metabolites (breakdown products) are frequently detected in groundwater in areas of high use. Drinking water standards are administered by the U.S. Environmental Protection Agency (EPA), but the Wisconsin DNR has established more stringent drinking water requirements than EPA requirements.²⁰

Groundwater pumping has historically caused significant declines in groundwater levels in Dane County, the Fox River Valley, and southeast Wisconsin. Water quantity is also an issue in Central Wisconsin, where concentrated pumping of groundwater threatens the health of nearby streams, springs and lakes. In other areas, communities have had to locate alternative sources of water because of contamination in existing groundwater aquifers. And some communities have trouble extracting ample groundwater because of the local geologic conditions. As human demand for water during dry periods increases, so do groundwater withdrawals which simply add to any existing problems caused by low water levels and can also stress any local water supply infrastructure.

Proactively addressing potential water management issues through issues of quality and quantity is necessary to maintain the rich water resources humans and wildlife depend upon. The benefits of planning for sustainable water systems include:

- Maintenance of healthy drinking water sources that prevent the need for expensive water treatment
- Decreased mitigation costs should quality or quantity issues arise
- Preservation of fish, water fowl, and wildlife habitat as well as other ecologically sensitive areas
- Preservation of recreational areas dependent upon clean, clear lakes, rivers, streams, and wetlands
- Water conservation, which reduces the volume of waste water requiring treatment and prolongs the life of existing infrastructure
- Access to clean water, which increases the quality of life for people and economic opportunities for the community

Strategy

Local governments can promote a sustainable supply of water through public policies and enforcement of standards, but ultimately the responsibilities fall on local communities. Therefore,

¹⁹ Wisconsin Department of Natural Resources (WDNR). 1997. Status of Groundwater Quantity in Wisconsin. Publication no. DG-043-97. Accessed at <http://dnr.wi.gov/topic/Groundwater/documents/pubs/quantity.pdf>.

²⁰ WDNR, US Geological Survey, and University of Wisconsin System. 2007. Protecting Wisconsin's Groundwater through Comprehensive Planning. Accessed at <http://wi.water.usgs.gov/gwcomp/>.

"In every glass of water we drink, some of the water has already passed through fishes, trees, bacteria, worms in the soil, and many other organisms, including people [...] Living systems cleanse water and make it fit, among other things, for human consumption."

Elliot A. Norse

a two-pronged approach of policy formation and a focused public education and incentive program is necessary to promote a truly sustainable water system. The following outlines basic strategies public officials can use to ensure quality water for all residents:

- Engage in regional water quality discussions. Strive to address water quality issues from multiple scales, realizing that jurisdictional boundaries are usually not the best contexts for managing sustainable water systems.
- Reduce land use impacts. Carefully consider land use decisions and associated impacts on water quality.
- Provide education about water quality within the government and among residents. Strive for active involvement and education concerning water quality and quantity issues for water users. Encourage stakeholder input early in the water management decision-making process.
- Create conservation incentives. Create incentive programs for farmers, businesses, and private residents regarding water conservation and water quality protection.



Keith Weller (USDA Agricultural Research) photo

Testing agricultural impacts on water quality

Actions

Local government can take steps to ensure the sustainability of water resources for its residents. Potential actions can include, but are not limited to the following:

- Develop a water budget for communities that consider the connection of groundwater and surface waters and determine how to stay within this limit.
- Incorporate adaptive management plans which assess how human populations, land use trends, and climate may influence water management plans over time.
- Identify and continually monitor current water use and quality trends.
- Create short and long-term goals for water quality and quantity which recognize the limits for a sustainable system.
- Adopt sustainable water use plans for publicly owned facilities while incorporating employee education programs.
- Assess current zoning ordinances in regards to their potential impact on water sustainability. Direct land uses which may result in contamination away from sensitive recharge areas or away from surface water sources. Implement overlay wellhead protection zoning ordinances which limit the proximity and type of land uses within close proximity to municipal wells (if present in county).
- Develop educational programs or campaigns focused on water sustainability.
- Limit impervious surfaces through mitigation techniques for new development, including rain barrels, rain gardens, infiltration basins, swales, and grading.
- Provide funding to support future water monitoring endeavors and determine which agency(ies) will be responsible for conducting ongoing tests.
- Implement conservation-oriented rate structures (inverted or seasonal).
- Ensure that local officials and the public have easy access to water quality data for planning purposes.
- Provide incentives and guidelines for the private sector to implement rainwater harvesting and water reuse/reclamation to reduce water demand. For example, this water can be used for irrigation.
- Properly abandon and cap unused wells to ensure protection of groundwater.
- Develop a regional groundwater model that can be used to predict impacts of current and future water withdrawal proposals.

Case Studies

Wellhead Protection Plans, Waupaca County, Wisconsin

Wellhead protection (WHP) plans are developed to achieve groundwater pollution prevention measures within public water supply wellhead areas. In some areas of the state, sophisticated groundwater flow modeling techniques were used to delineate source water areas for municipal wells. A WHP plan uses public involvement to delineate the wellhead protection area, inventory potential groundwater contamination sources, and manage the wellhead protection area. All new municipal wells are required to have a WHP plan. A WHP ordinance is a zoning ordinance that implements the WHP plan by controlling land uses in the wellhead protection area.²¹

Of those municipal water systems that have WHP plans, some have a WHP plan for all of their wells, while others only have a plan for one or some of their wells. Similarly, of those municipal water systems that have WHP ordinances, some ordinances apply to all of their wells and others just one or some of their wells.

Volunteer Monitoring, Waukesha County, Wisconsin

In southeastern Wisconsin, Waukesha County's stream water health monitoring relies, in part, on citizens willing to get their feet wet. In Waukesha County, teams of citizen volunteers collect stream water data from 30 sites for the county's stream water monitoring program. Each team includes at least two volunteers trained to collect data on water temperature, dissolved oxygen, biotic index, turbidity, and stream flow. Monitoring program volunteers help the county stretch resources for ensuring the quality and health of local stream waters.

Each volunteer team is assigned to a stream monitoring site where they spend approximately two hours collecting data once per month. In addition to providing the county with valuable monitoring data, the program also serves as an educational tool, teaching volunteers about water quality issues and aquatic habitats.

In the approximately six years since the program began, the program expanded to include the entire county. The Rock River Coalition, the Fox River Partnership, and the Pewaukee River Partnership support this effort. The county provides volunteer training and coordination, and testing chemicals as needed.

Initial start-up costs for the program were somewhat expensive. Every team required a monitoring kit, each of which cost more than \$200. In addition to costs for supplies, the program also requires an extensive commitment in staff time once monitoring season begins. County staff must hold volunteer training sessions and accompany each team on its first site visit to make sure volunteers know how to apply what they have learned to their site location. After training has been completed, county staff maintain contact with volunteers and check their data for accuracy.

The county has found that newspaper coverage boosts volunteer recruitment tremendously. In 2009, a newspaper article about Waukesha's stream monitoring program and volunteers inundated the program with requests to participate. So many volunteers asked to participate in the program that a waiting list was created.

For more information, see <http://waterstarwisconsin.org/story.cfm?sid=47415>.

St. Cloud, St. Paul, Minneapolis Local Surface Water Intake Protection Collaboration, Minnesota

These three metropolitan communities in east-central Minnesota draw drinking water almost entirely from surface water sources. St. Paul receives most of its drinking water from a series of reservoir lakes while Minneapolis and St. Cloud draw from the Mississippi River. The Minnesota Department of Health (MDH) proactively conducted assessments on each drinking water source, which revealed realistic threats of nonpoint contamination that would be difficult to address in a reactive manner. These findings fueled the creation of a Surface Water Intake Protection Plan based upon MDH standards.

²¹ WDNR, US Geological Survey, and University of Wisconsin System. 2007. Waupaca County Case Study. Accessed at http://wi.water.usgs.gov/gwcomp/find/waupaca/index_full.html.

The plan seeks to accomplish the following objectives (not inclusive): delineated source water protection areas, inventory of potential contaminant sources and corresponding management measures and strategies, a formal process for local, state, and federal government recognition of delineated Source Water Protection Areas and Source Water Protection Plan, and extensive education and outreach activities.

For more information, see http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/casestudies/upload/Source-Water-Case-Study-MN-St-Cloud_St-Paul.pdf.

Resources

Water Star Wisconsin

www.waterstarwisconsin.org

Protecting Wisconsin's Groundwater Through Comprehensive Planning

<http://wi.water.usgs.gov/gwcomp/>

On-Site Water Reuse Systems: Using Water to Its Full Potential

<http://learningstore.uwex.edu/On-Site-Water-Reuse-Systems-Using-Water-to-Its-Full-Potential-P1362.aspx>

WI Statewide Water Conservation and Water Use Efficiency Goals

http://dnr.wi.gov/topic/WaterUse/documents/WDNR_Statewide_WCE_Objectives_2011.pdf

MN Managing for Water Sustainability

www.eqb.state.mn.us/documents/Managing_for_Water_Sustainability_12-08.pdf

Wisconsin Water Use: 2010 Reported Withdrawals

<http://dnr.wi.gov/topic/WaterUse/documents/WaterUseReport2010TwoPage.pdf>

Sustainable Water Resources Management, Volume 3: Case Studies on New Water Paradigm

www.decentralizedwater.org/documents/DEC6SG06a/Case%20Studies%20on%20New%20Water%20Paradigm.pdf

EPA Source Water Protection Case Studies

<http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/casestudies/index.cfm>



J. Bedofra photo

Community members participate in stream monitoring training in 2008.

Purpose

Sustainable landscapes depend upon healthy relationships between land and water resources. Land use practices define the health of lakes, rivers, streams, and groundwater. Alternately, the health of our lakes and streams often defines the practical use of the land. In addition, how land and water is managed directly affects animal and plant communities. Sustainable land and water systems depend upon proper planning, which starts with a locally inspired Land and Water Resource Management Plan (LWRMP).

Chapter 92.10 (6) of Wisconsin Statutes requires that all counties develop a land and water conservation plan. LWRMP's outline how each county will utilize existing local, state, and federal programs and partnerships to leverage the conservation of land and water resources within the county. At minimum, plans must address the following eight items of county-wide importance:

1. Complete a county-wide assessment of water quality and erosion.
2. Define water quality objectives by water basin, priority watershed, and priority lake.
3. Identify Best Management Practices (BMPs) to achieve #2's objectives.
4. Identify performance standards and prohibitions for nonpoint pollution and erosion control.
5. Include descriptions for county activities pertaining to land and water resources.
6. Identify a monitoring system for plan activities.
7. Develop a strategy for information dissemination and education relating to soil and water.
8. Outline methods to coordinate plan activities with local, state, and federal programs/agencies.

These minimum standards offer mandatory guidelines for plan development; however, some counties have done excellent jobs fleshing-out creative land and water conservation strategies. Many of these strategies go above and beyond the requirements mentioned above.

Strategy

The following steps can be taken by local officials in order to improve the strength of their management plan and its overall effectiveness at ensuring county-wide sustainable management of land and water resources:

- Include stakeholder involvement whenever possible in order to establish and strengthen community support for land and water conservation strategies.
- Dedicate sufficient funding for detailed natural resource inventories and re-evaluation: in order to protect land and water, it's imperative to know what features should be protected.
- Ensure sufficient funding for staff members to work in the field with landowners in support of conservation strategy implementation as well as for promoting local, state, and federal programs which provide financial assistance to landowners.
- Allocate sufficient funding to assist landowners in the implementation of a cost-shared, property specific Land and Water Resource Management Plan.
- Prevent, to the extent possible, damage from conflicting land uses on the natural environment.
- Establish working relationships and coordinate efforts with non-profit agencies striving for conservation or improvement of environmental health.
- Develop priority areas for cost-sharing practice implementation based on those areas which are most prone to water quality degradation from nutrient loading, erosion, habitat loss, etc.
- Manage the storage, disposal, and spreading of animal manure/waste to protect nutrient loading to nearby bodies of water.



Photo courtesy of USDA NRCS

Grazing cattle



P. Wood, DNR photo

Constructed wetland



R. Korih, UWEX Lakes photo

Sandhill cranes

Actions

- Coordinate goals and objectives of the LWRMP with local communities' comprehensive plans and align with county forest policies.
- Through public survey, create a ranked list of significant resource concerns and use this list to guide implementation work schedules and prioritization. Imperative to the successful implementation of conservation practices is a thorough understanding of the public's concern over what resources need the greatest attention.
- Incorporate a removal and monitoring system for invasive species, both aquatic and terrestrial. The monitoring system should include GPS coordinates and maps of known infestation areas. A plan for removal should be established with its own goals and realistic work schedule.
- Hold educational sessions and disseminate materials concerning invasive species to those that work with the land, including foresters, land managers, land trusts, landscapers, private landowners, and recreationists.
- Incorporate a lakes classification system if such a study has not been conducted yet. This will give insight into the best method for protecting bodies of water within the county as well as help guide surrounding development.
- Actively seek state and federal funding for property owners with runoff, erosion, or nutrient management issues.
- Work with agricultural landowners to promote programs such as rotational/managed grazing, no-till, strip-till, or conservation tillage practices, etc.
- Acquire no-till agricultural planting equipment which can be made available to farmers at low or no cost through a rental agreement in order to promote no-till agriculture.
- Hold well-advertised farm visits which promote practices such as no-till agriculture, managed grazing, or other conservation practices to serve as an educational opportunity for neighboring farmers.
- Protect prime farmland from conversion to other uses due to development through use of purchase of development right (PDR) or transfer of development rights (TDR) programs and zoning practices in conjunction with the planning and zoning staff.

Case Studies

Managed Intensive Grazing Project, Marathon and Lincoln County, Wisconsin: Grass-based farmers and agricultural professionals formed the Central Wisconsin River Graziers Network in 1994 to promote grazing-based farming. In 1998, Lincoln and Marathon County embarked on a cooperative project with the USDA's Natural Resource Conservation Service (NRCS) and the Wisconsin Department of Agriculture, Trade, and Consumer Protection (DATCP) to promote the Managed Intensive Grazing (MIG) program, which was created to work with the network and the landowners

as well as educate others about the benefits of grazing.²²

Grazing involves systematically moving cows or other grazing animals to fresh pasture, allowing previously grazed areas to recover. Managed grazing allows farmers to earn similar profits as Confined Animal Feeding Operations (CAFOs) while managing a much smaller herd of cows and reducing fuel costs, labor costs, and the amount of agricultural chemicals used. Wisconsin dairy farmers who use grazing report less debt and more satisfaction with their quality of life than other types of farmers.²³

“Managed grazing is a low cost practice that is unmatched in soil and water conservation benefits.”

Marathon County Land Conservation and Zoning Committee report

The results of this program’s implementation are summarized below:

1. As of 2012, this practice was implemented on 17,904 acres of beef and dairy farms in Lincoln and Marathon County, including 125 new farm start-ups
2. Reduced barnyard nutrient loading from runoff by approximately 70 percent
3. Estimated 159,872 lbs./year reduction in phosphorus loading to surface waters
4. Prevented an estimated 36,438 tons/year of sediment from being transported to surface waters

Wisconsin Cost-Share Project Ranking System, Vilas County, Wisconsin

Due to increased local interest in cost-share programs, Vilas County needed to find a way to better prioritize which areas should be considered for participation. The county’s Land and Water Conservation Department determined that properties particularly susceptible to erosion and subsequent nutrient loading should be considered the most critical areas, and a ranking system needed to be developed to rate properties both qualitatively and quantitatively. The department visits the properties of interested landowners to assess characteristics like slope, area of lake over which wind usually blows, and soil types to establish a preliminary soil erosion severity potential. The Land and Water Conservation Committee then assigns a second set of scores to each property based upon factors like the difficulty of the project, expense, etc. to achieve an average score. This list is updated each year and the ranking order is used to prioritize projects according to staffing and funding circumstances.

Land and Water Resource Management Plan, Douglas County, Wisconsin

Douglas County includes the St. Croix National Scenic Riverway, Bois Brule River State Forest, Lake Superior shoreline, and many other water resources. The Douglas County Land and Water Conservation Program created a Land and Water Resource Management Plan for the county in 2009 to identify local needs and engage local leadership in protecting these resources. During the planning process, the committee garnered public input through surveys, information sessions, two open meetings, and a public hearing. The plan covers a 10-year period. Some notable portions of the plan are as follows:

- Habitat typing classifications
- Strategies for managing recreation to avoid major damage to natural resources
- Stormwater and erosion control plans for sites over one acre in size
- Ranking systems for priority agricultural, shorelands, wildlife corridors/habitat, and other lands
- Parcel evaluation that includes a records and map inventory for baselines and monitoring
- Promotion of cost-sharing programs (Federal or State) for BMPs
- Natural resources management strategies with local/regional economics in mind

²² Marathon County Land Conservation and Zoning Committee. 2013. Managed Grazing in Marathon and Lincoln Counties: Fifteen Years of Progress. Accessed at www.co.marathon.wi.us/Portals/0/Departments/CPZ/Documents/grazing_booklet_2012_updated.pdf.

²³ Lloyd, S., Bell, M., Kriegl, T., and S. Stevenson. August 2007. Milking more than profits: Life satisfaction on Wisconsin dairy farms. Report for the University of Wisconsin—Center for Dairy Integrated Agricultural Systems, cited in Marathon County Land Conservation and Zoning Committee 2013.

- Emphasis on education of landowners, farms, and the general public
- Emphasis on protecting waterbodies/wetlands from development impacts

Review the full plan at <http://wi-douglascounty.civicplus.com/DocumentCenter/Home/View/357>.

Resources

DATCP's Guide for Land and Water Conservation Committees

http://datcp.wi.gov/Environment/Land_and_Water_Conservation/Resources_for_County_Land_Conservation_Committees/index.aspx

UW-Extension: Nutrient Management Considerations

<http://learningstore.uwex.edu/assets/pdfs/A2809.pdf>

Wisconsin Land and Water Conservation Association, Inc.

www.wlwca.org



Photo courtesy of USDA NRCS

Grass back terrace on a Lafayette County farm in the Upper Mississippi Watershed

Purpose

Parks are an important part of Wisconsin communities for recreation and enjoyment. In addition, they contribute to the protection, restoration, and enhancement of local government natural resources. A healthy, connected park system can provide local governments with an opportunity to create a more livable and environmentally sustainable community for people of all ages. Parks also provide green infrastructure that naturally provides environmental services, such as storm water management and retention and improved air quality.

Strategy

Through management strategies, local parks can become leaders in sustainability. The following strategies can help drive innovation in park systems and make for more sustainable communities:

- Use language identifying sustainable parks management within the local comprehensive plan. The local government comprehensive plan is the backbone for management decisions for a local park system, and it highlights the desires of the local government for the management of its park resources. By laying out goals, objectives, and policies oriented to sustainable practices, future management strategies will be easier to implement.
- Create a parks management plan. A park management plan provides opportunity to plan for recreation, historical sites, and environmental needs of a park system. Much like a comprehensive plan, a park plan lays out the goals, objectives, and policies for the park system, but it's more specific than the comprehensive plan.
- Implement a conservation park program. Conservation parks are set aside specifically to restore and preserve them as a connection to nature for communities and also as vital resources to maintain a healthy environment. While these areas may not have all of the traditional amenities of parks, such as mowed grassland areas and pavilions, they provide hiking and biking opportunities in a more natural environment that many people desire. These programs often rely on volunteers to help remove invasive species, restore areas, and maintain trails.
- Create park environmental and sustainable education programs. These programs can provide lessons from recycling to water quality and quantity issues. Each local government or city can cater programs to the specific needs of their area.
- Implement stormwater practices within parks. Parks are natural areas within a community that can soak up lots of rainwater, especially if managed using best practices. A demonstration rain garden next to a parking lot can show how to capture rain from impervious surfaces and look aesthetically pleasing. Other parts of the park if not already natural, e.g., all grass, can be naturalized so less mowing is occurring, but also those areas can absorb more water due to less disturbance from compaction of the soil, for example.
- Promote community gardens and community orchards on public lands. Local food is an excellent way to promote sustainability and allows for residents to become a part of their local community. Cities have been known to charge a fee for garden plots which allows for improvement to the program along with providing useful amenities that can go to costs for fencing, water, tools, and other gardening needs.
- Create pedestrian and bike connections between parks. This is one way of promoting alternative forms of transportation (e.g., greenways, bike trails, safe routes to schools). Connecting parks throughout a city not only provides important recreational corridors, but also provides a means of transportation to other areas of the city in between park resources.
- Implement recycling and composting programs on park properties.
- Minimize environmental impacts from the onset through sensitive siting of a park within the landscape and careful consideration of the various uses within the park boundaries.
- Educate the public about the value of natural resource stewardship.
- Involve the public as partners, customers, volunteers, participants, stakeholders, etc.
- Create partnerships with various organizations.

Actions

Local government can take multiple actions to improve the management and sustainability of their park resources. The following actions have been used successfully by local governments in the past and may be appropriate for others.²⁴

Education and Outreach

- Provide sustainability training for public park employees.
- Provide opportunities for the public to learn about park sustainability and natural resource protection.
- Create volunteer opportunities for the public to be directly involved in the protection, maintenance, and enhancement of natural and open space areas.
- Provide public access to parks, recreational facilities, and open space areas for all members of the community.

Public Health

- Provide community gardens, including orchards, and edible landscape and native planting demonstration gardens for local residents to grow edible food products and interact with other local residents.
- Provide facilities and programs to encourage physical fitness and reduce the obesity rate.
- Increase bike trail access for communities and provide safe routes to schools and parks.
- Provide transportation alternatives to motor vehicles.
- Increase plantings of trees within appropriate areas to improve air quality.

Habitat Enhancement and Restoration

- Reduce vulnerability to damage from flooding, wildfire, and drought by reducing development of hazard prone areas.
- Develop a program to eliminate the use of chemicals and ensure proper use/disposal of chemicals as they are reduced.
- Develop a program to remove non-native invasive vegetation.
- Develop an urban tree and forest management program if applicable.
- Design parks to provide stormwater retention.
- Develop bioswales within and adjacent to parks.
- Use pervious surfaces, where appropriate, for parking areas, walkways, and other public spaces.
- Use recycled water for landscape irrigation where feasible.
- Reduce turf within developed parks.

Energy, Utilities, and Recycling

- Conduct on-site green waste/composting of park materials.
- Provide public recycling containers at all developed park and recreation facilities.
- Replace or renovate obsolete energy or resource-inefficient infrastructure within park and recreation facilities.
- Utilize solar roof top collecting panels and wind generating equipment when and where appropriate.
- Track water, electricity, and natural gas use within buildings and other facilities, and for equipment and vehicles.

“...Parklands have a major role in providing superlative opportunities for outdoor recreation, but they have other “people serving” values. They can provide an experience in conservation education for the young people of the country; they can enrich our literary and artistic consciousness; they can help create social values; contribute to our civic consciousness; remind us of our debt to the land of our fathers.”

Stewart Udall



Rain garden and sign at Waukesha County's Naga-Waukee Maintenance Building

Waukesha County Park System staff photo

²⁴ This section was largely taken from Developing Sustainable Park Systems in Oregon. Accessed at www.oregon.gov/oprd/PLANS/docs/scorp/2013-2018_SCORP/Developing_Sustainable_Park_Systems.pdf.

- Track water use and use treated water for irrigation of developed landscapes where appropriate.
- Expand use of LED lighting.

Design, Land Use, Green Building, and Construction

- Incorporate sustainable practices into the design of new or renovated projects to limit resource use and reduce on-going maintenance and operation costs.
- Locate new parks at in-fill locations within communities.
- Construct all new and renovated buildings using a rating system such as LEED.
- Incorporate sustainable design principles in renovated and new construction, such as groundwater recharge, solar power sources, composting or low-flow restrooms, low-water vegetation, sustainable and recycled products, energy efficient materials and processes, and local products.
- Prevent damage from erosion and siltation through stormwater management and well-designed trails and park roads.

Case Studies

Minneapolis Park and Recreation Board (MPRB), Minnesota

The MPRB has sustainability as one of its core values and strives to incorporate sustainable practices in all it does. The MPRB uses the 3E's as a way to manage parks.

1. Environment – Sustain and enhance parklands, waters, and urban forests.
2. Economic – Develop short-term and long-term financial stability of the park system.
3. Equity – Provide residents with the opportunity to improve their quality of life and well-being through outstanding parks and recreation services that are suited to their respective needs.

Its goal with “3E sustainability” is to ensure lasting benefits for the community by:

1. Reducing MPRB's impact on the environment.
2. Being more money smart with public dollars.
3. Providing opportunities for everyone to experience the benefits of Minneapolis parks and programs today and into the future.

Sustainability was identified in MPRB's 2007-2020 Comprehensive Plan as one of five core values upon which the Park Board bases its everyday work. In 2009, a sustainability plan prepared by GreenMark was approved by the Board of Commissioners. The plan includes a strategic outline, Sustainability 2013, for implementing and enhancing sustainable practices throughout the MPRB. Implemented in concert, these efforts will help the MPRB become the park and recreation system of the future. In 2011, five work teams were created to implement action plans and which continue today around the Board's priorities for the following strategies:

- Make buildings energy efficient and reduce carbon emissions.
- Broaden the strategic application of the Urban Forest to include multiple benefits.
- Re-organize waste management strategies.
- Events go green!
- Educate residents and staff on current sustainability practices.

Find out more at www.minneapolisparcs.org/default.asp?PageID=1160.

City of Rice Lake Comprehensive Plan, Wisconsin

Rice Lake makes excellent use of its comprehensive plan by laying the groundwork for future parks management. It establishes specific goals and objectives for its park system, which

paves the way for sustainable management of their park system. The plan accounts for conservation and connectivity of park resources for recreation and the environment.

The comprehensive plan for the city of Rice Lake can be found at www.cityofricelake.com under Community Development.

Conservation Parks Program and Community Gardens, Madison, Wisconsin

Since the 1960s, the city of Madison has purchased land, especially in the area known as the Cherokee Marsh, to improve environmental help and especially water quality. Beginning in 1971, the city began a specific Conservation Park program and now has over 1,600 acres of parkland preserving unique plant communities, critical ecological areas, water quality, and outstanding aesthetic qualities. For more information on Madison's conservation parks program visit www.cityofmadison.com/parks/parks/conservation/.

Madison also has numerous community gardens, many of which are run in partnership with the Community Action Coalition of South Central Wisconsin. The community gardens, which have minimal plot fees, currently serve approximately 2,200 residents at 43 different garden locations. Some are located in municipal parks such as Quann Park on Madison's near south side. For more information about the community gardens, visit www.cacscw.org/gardens.php.



Veterans Memorial Park in Rice Lake

City of Rice Lake photo

St. Croix County Environmental Education Programs

The St. Croix County Land and Water Conservation Department puts on various programs including conservation field days, stream clean ups, garden planting, and educational events on many other sustainability and environmental issues. The department works with schools, scouts, 4-H groups, and other organizations to promote the environment and sustainability in the community. The county provides these programs free of charge, and currently reaches at least 2,500 students each year. For a list of some of their programs visit www.co.saint-croix.wi.us/vertical/Sites/%7BBBC2127FC-9D61-44F6-A557-17F280990A45%7D/uploads/EE_pamphlet.pdf.

Resources

APA City Parks Forum

www.planning.org/cityparks/

Green Infrastructure, The Conservation Fund

www.conservationfund.org/our-conservation-strategy/focus-areas/green-infrastructure/

Defining, Measuring, Monitoring, and Managing the Sustainability of Parks for Outdoor Recreation, Journal of Park and Recreation Administration

<http://js.sagamorepub.com/jpra/article/view/2253>

Rain Gardens: A How-To Manual for Homeowners

learningstore.uwex.edu/pdf/GWQ037.pdf

Community Orchards, National Sustainable Agriculture Information Service

www.attra.ncat.org/horticultural.html

Sustainable Sites Initiative™ (SITES™)

www.sustainablesites.org

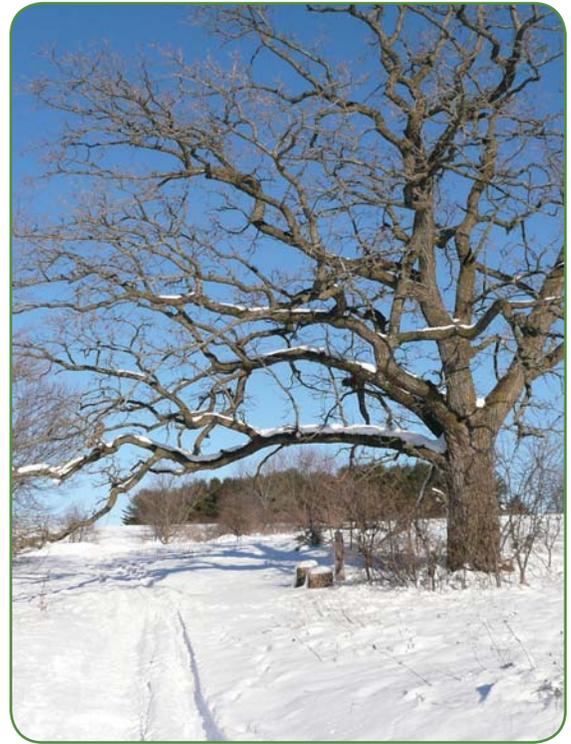
Purpose

An often overlooked consideration when planning for the sustainable growth of communities is planning for cemeteries. General guidance for cemetery placement is rarely discussed in most communities' comprehensive plans, largely due to the fact that planning for the disposal of human remains is an unpleasant thought.²⁵ Instead, cemeteries are listed as a conditional use in many plans. This trend of insufficient planning deserves to be reversed since few land uses are as permanent and publicly contested as cemeteries.

Planning for the interment, or burial, of the deceased is of growing concern for several reasons. As the "baby boomer" generation of the post-World War II era nears their life expectancy around 2020, there is an expected increase in the need for burial space.²⁶ To put things into perspective, approximately 2.5 million people died in the U.S. in 2010.²⁷ Additionally, the expansion of previously existing cemeteries proves difficult because of community resistance, usually resulting in the creation of new cemeteries elsewhere in the community. Also, in many cases, public knowledge of the actual capacity of existing cemeteries may be unknown, as cemeteries are usually privately owned operations.²⁸

Predicting the anticipated "demand" for cemetery plots has proven to be a difficult task. People move into and out of areas at different stages in their lives. Some choose to be buried in their hometown while most city dwellers must be buried outside of city limits due to high costs of land and land use regulation limiting the number of cemeteries nearby large cities. How bodies are prepared for burial also varies, as an increasing percentage of deceased are cremated, which reduces the amount of land needed for interment. In fact, the percentage of those cremated versus buried traditionally was around 34 percent in 2007, compared to only around 15 percent in 1985.²⁹ In 2011, the percent of cremations (47 percent) surpassed the number of traditional burials (46 percent) for the first time, which has an impact on land use.³⁰

The truth of the matter is that cemeteries deserve proper planning because of how their use, placement, and management can contribute to the overall sustainability of a community. Cemeteries represent unforeseen opportunities for wildlife habitat, recreation, and even land conservation. However, significant changes in the public perception of cemeteries and the communication between local governments and private cemetery owners are crucial steps to achieve these benefits.



Natural Path Sanctuary photo

Natural Path Sanctuary in Dane County, Wisconsin

"We bury enough embalming fluid to fill eight Olympic-size swimming pools, enough metal to build the Golden Gate Bridge, and so much reinforced concrete in burial vaults that we could build a two-lane highway from New York to Detroit."

Joe Sehee, Executive Director of the Green Burial Council, interview with National Public Radio, December 16, 2007

25 Basmajian, Carlton, and Christopher Coutts. 2010. Planning for the disposal of the dead. *Journal of the American Planning Association*. 76(3):305-317. The average plot is 4 feet by 12 feet (907 plots per acre). If 76 million baby boomers reach life expectancy between 2024-2024, this will take up 130 square miles (after taking into consideration cremation rates and including cemetery road space of 80 square miles).

26 Coutts, Christopher, Carlton Basmajian, and Timothy Chapin. 2011. Projecting landscapes of death. *Landscape and Urban Planning*. 102(2011):254-261.

27 Centers for Disease Control and Prevention. January 2012. *National Vital Statistics Reports*. Volume 60, No. 4. Accessed at www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_04.pdf.

28 Coutts et al., 2011.

29 Cremation Association of North America. Accessed at www.cremationassociation.org.

30 Wisconsin Department of Health Services. *Wisconsin Deaths, 2011*. Accessed at www.dhs.wisconsin.gov/deaths/index.htm.

Strategy

The following strategies can be used by local officials as they consider the development and management of municipally owned cemeteries:

- Include considerations for future cemetery capacity requirements within the comprehensive planning process.
- Allow stakeholders the opportunity to influence the placement of cemeteries as much as possible.
- Create an outreach program which seeks to promote the use of cemeteries for multiple uses, such as running or biking.
- Incorporate cemeteries into a community instead of putting them in the outskirts of town for development to leapfrog over.
- Work within the regional context to assure adequate interment space is available.
- Create a method or funding source for the care and maintenance of cemeteries once they have reached capacity, to avoid them falling into disrepair.

Actions

There are several behavioral changes local officials can promote or initiate in order to increase the sustainability of public or private cemeteries. Examples include:

- Obtain Green Burial certification of local cemeteries. The term “Green Burial” is defined by the Green Burial Council (GBC) as a means of “caring for the dead with minimal environmental impact that furthers legitimate ecological aims [...]” The GBC’s hopes to accomplish the following things through green burials: the protection of ecological landscapes, the minimization of gravestones which pollute a viewshed, the minimization of man-made materials and chemicals being buried, and the preservation and restoration of wildlife habitat. GBC offers three certification levels for cemeteries (a one to three leaf rating) based upon the level and permanency of land conservation offered.
- Educate existing cemeteries about how to offer green burial options. Whether or not a cemetery obtains GBC certification, a cemetery can begin to adopt some of these guidelines.
- Establish and maintain a working relationship between government officials and cemetery owners to determine the capacity of current cemetery locations and future needs.
- Allow green cremation and spreading of ashes for land conservation. It seems to be commonplace for the spreading of human cremated remains to be unlawful on most public lands. Consider adopting ordinances that allow the spreading of ashes in areas managed specifically for this use. This will help preserve land elsewhere in the community which may otherwise be consumed for use as a burial location.
- Consider prohibiting carcinogenic chemicals and promote the use of non-carcinogenic chemicals for embalming. Embalming, or chemical preservation, of human remains is not required under most circumstances and is not common outside of the United States and Canada. Formaldehyde and other chemicals used in the embalming process can be harmful to the environment and human health. Under most circumstances, if formaldehyde leaches to the soil it is broken down by natural process, but this is not always the case. Natural embalming chemicals or preservation without chemicals is an alternative, and poses less of a risk for groundwater contamination.
- Create cremation gardens, columbaria, and mausoleums, which offer a space-conscious way to preserve human remains. A columbaria is a structure with individual compartments for the storage of urns containing ashes. A cremation garden usually involves the burial of urns with appealing landscaping and pathways. Mausoleums are aboveground structures with compartments for storing embalmed human remains. All of these alternatives minimize the land area necessary for burial, and are a less expensive alternative in many cases.³¹

Green Burial Certification

The Green Burial Council offers three certification levels:

- One leaf: The one leaf rating is for hybrid burial grounds, which are conventional cemeteries that offer green burial options.
- Two leaf: The two leaf rating is for natural burial grounds.
- Three leaf: The three leaf rating is for conservation burial grounds that work toward land conservation in addition to natural burial, sometimes in collaboration with a community land trust.

Source: Green Burial Council, www.greenburialcouncil.org

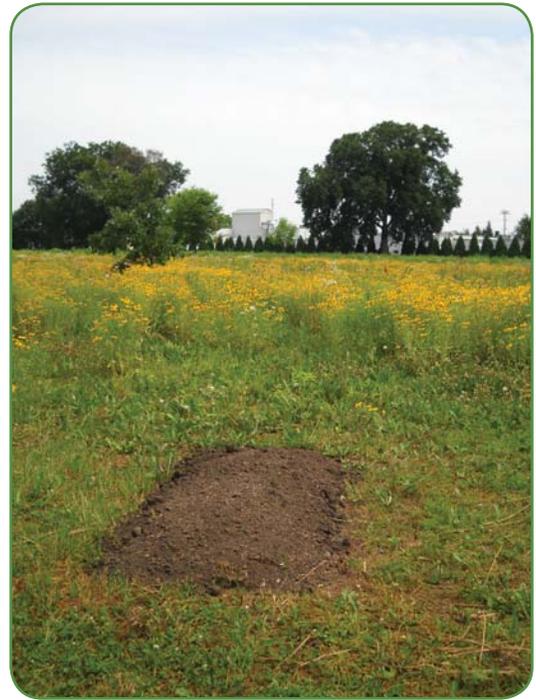
31 Basmajian and Coutts, 2010.

Case Studies

Prairie Home Cemetery, City of Waukesha, Wisconsin: The city of Waukesha operates the Prairie Home Cemetery, a historic cemetery on a 69-acre site surrounded by residential and light industrial uses.

After thoroughly assessing the site and conducting water and soil analyses with CPRA Studio cemetery planning firm, Prairie Home Cemetery was able to get approval from the City of Waukesha cemetery commission, plan commission, and common council to develop the site for green burials.³² The cemetery began offering natural burial options throughout the traditional areas of the cemetery as well as in a newly restored four-acre natural prairie setting in 2010.

The cemetery worked with Midwest Prairie LLC to install the prairie. Once established, prairies require little maintenance and no mowing or herbicides. In 2013, the cemetery will conduct the first prescribed burn of the area and invite local schools to learn about the process. Parks and Recreation staff are observing the site and determining whether prairies may be an attractive and low-cost option for other city land. Learn more about Prairie Home Cemetery at www.prairiehomecemetery.com.



Prairie Home Cemetery photo

A portion of the prairie is cleared for a burial at Prairie Home Cemetery, Waukesha, WI. The prairie reheels itself after a period of time.

Natural Path Sanctuary, Town of Springdale, Wisconsin: The Linda & Gene Farley Center for Peace, Justice, and Sustainability created the Natural Path Sanctuary as a nature preserve burial ground and green cemetery in 2011. Obtaining conditional use permits from the Town of Springdale and Dane County took approximately 10 months, and included a review by the Dane County Public Health Department.³³

The sanctuary is located on 25 acres of woods and meadows in rural Dane County, which are managed with a minimalist land management approach, including burials and the maintenance of unpaved paths. University of Wisconsin-Madison has partnered with the site to create learning opportunities for soil science, landscape architecture, and service learning students.

Proceeds from the cemetery help support additional programming at the Farley Center, including an organic farm incubator program for ethnically diverse farmers. Learn more at www.farleycenter.org.

Texas Parks and Wildlife Department Partners with the Green Burial Council, Texas: The GBC and the Texas Parks and Wildlife Department (TPWD) teamed up to designate several parks within the state as areas where scattering of human cremated remains is legal. Each offers a scenic, natural setting for remains scattering for a fee. The revenues attained from this program will go toward purchasing new land for conservation and maintaining those lands already under TPWD protection. All new land acquisitions must be approved by a recognized conservation organization such as the Trust for Public Land or the Nature Conservancy to ensure that quality natural lands are selected. More information is available at <http://fcaambis.org/wp-content/uploads/2008/07/SPRING-2010-AMBIS-NWSLTR.pdf>.

³² Telephone interview with David Brenner, Prairie Home Cemetery Manager, April 18, 2013.

³³ Telephone interview with Kevin Cerrado, Nature Preserve Facilitator at Natural Path Sanctuary, March 6, 2013.

Evergreen Cemetery Jogging Path, Boyle Heights, California: The community of Boyle Heights in Los Angeles, California was severely lacking in green space before the Evergreen Cemetery Jogging Path (ECJP) was created. Evergreen Cemetery, centrally located within Boyle Heights, represented one of the only places where residents could jog, walk, or run, but the sidewalks were in such disrepair it was a dangerous place for these activities. City officials cooperated with the Evergreen Jogging Path Coalition to bring life back to this area by installing a recycled rubberized asphalt path which ensured pedestrian safety. The city's Parks and Recreation Department offered \$800,000 to create the only public sidewalk in the country which earned the designation of a recreational area. The ECJP example shows how cemeteries can be incorporated into the fabric of a city as a public gathering place rather than an area to be avoided. More details can be found at www.preventioninstitute.org/component/sbxmapper/article/301.html.

Resources

Planning for the Deceased

Available for purchase from the American Planning Association
www.planning.org/apastore/

Wisconsin State Law Library: Funerals, Burials, Cemeteries

<http://wilawlibrary.gov/topics/estate/funerals.php>

Green Burial Council

www.greenburialcouncil.org

National Funeral Directors Association Green Resources

<http://nfda.org/tools-for-your-business/green-resources.html>

Wisconsin Geological and Natural History Survey - Hydrogeology Program

<http://wisconsingeologicalsurvey.org>

Memorial Ecosystems, Inc. Consulting Services

www.memorialecosystems.com/ConsultingServices/tabid/111/Default.aspx

EDA Land Planning Cemetery Planning and Design

www.edalandplanning.com/gallery4.htm

Cremation Association of North America

<https://cremationassociation.site-ym.com>

References

Barrett, Gary W., and Terry L. Barrett. 2001. Cemeteries as repositories of natural and cultural diversity. *Conservation Biology*. 15(6): pages 1820-1824.

Capels, Valerie and Wayne Senville. Planning for Cemeteries. *Planners Web*. October 15, 2006. Article #230.

Economic localization

“Economic localization occurs when a region, county, city—even a neighborhood—frees itself from overdependence on the global economy and invests in local resources to produce a significant portion of the goods, services, food, and energy it consumes [...] a strategy that brings production of vital goods and services close to home is more environmentally, economically, and socially sustainable than a strategy based on economic globalization.”

Redefining Progress,
<http://rprogress.org>

Purpose

A local economy is impacted by state, regional, national, and global decisions, but there are many aspects of a local economy that can be affected by local decisions. This section discusses ways in which local governments can work to localize the economy. Localization does not imply self-sufficiency, but it does mean looking for ways to localize economic relationships to the greatest extent possible and practicable. Michael Shuman defined a local economy as LOIS, which stands for Locally Owned, Import Substitution. The ability of a community to weather external economic shocks, or its resiliency, can be enhanced via localization.

A simple way to think of a community’s economy is as a bucket with money, goods, and services flowing in from the top as well as spilling and leaking out of the bucket.³⁴ Using the bucket analogy:

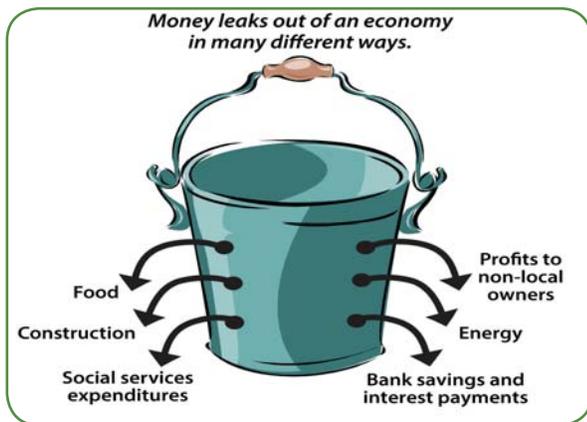
- The community is linked with the rest of the world by the inflow and outflow of resources, income, and goods/services.
- The community uses resources to produce goods and services and these can come from within the community or from the outside.
- The fullness of the bucket—or the size of the local economy—is determined by the inflow of outside resources and income, the lack of leakage of local income and resources, and the amount of resources used to produce the community’s output.

Economic localization focuses, in particular, on minimizing the following: (1) the amount of local income leaking out of the community to purchase resources, goods, services, and manufactured goods, and (2) the loss of resources due to unemployment, the degradation of natural resources, and/or local capital being invested outside of the community. Any avoided leakages increase the size of the local economy, which translates into the potential for additional localized growth and development. These kinds of efforts can also lead to additional purchases of locally produced goods and services by people from outside the community, which similarly increases economic activity.

Another economic consideration is the role of multipliers. While such measures are often overstated and can be subject to debate, localization can enhance the multiplier relationship.³⁵

The income multiplier increases when people spend a larger proportion of their income locally and when a larger percentage of what they spend becomes local income—through local wages, salaries, profits, and interest. Local profits imply local ownership, and local interest payments imply returns on capital that is invested locally.

Local governments can and often do play key roles in the economic development arena. These include investment, the provision of public goods and services, infrastructure development, capacity building, and the enactment of supportive policies and regulations. Government agencies and entities are significant purchasers of goods and services. All of these activities can be viewed and pursued within an economic localization context.



Strategy

Communities can pursue a number of broad strategies that support economic localization: local ownership, import substitution, and mobilizing local capital.

- Local ownership offers a variety of advantages: higher standards, greater wealth, greater stability, better community planning, stronger identity, greater creativity, greater social well-

³⁴ This “leaky bucket” model description is adapted from *Community Economic Analysis: A How To Manual* (1994) by Ron Hustedde, Ron Shaffer, and Glen Pulver.

³⁵ See Hustedde et al.

being, and greater political participation.³⁶

- Import substitution is an economic development strategy that promotes the local production and consumption of goods and services, limiting the necessity to import products for local consumption.
- Mobilizing local capital seeks to tap financial assets held by community residents to support community-based projects and investments.

Localization has traditionally included “buy local” campaigns that focus on retail purchases, local procurement policies for businesses and government agencies, local ownership of businesses and financial institutions, and local sourcing of inputs for area manufacturers. Another localization example is small business development and economic gardening, or a “grow from within” strategy.³⁷

Strategies that local policymakers can pursue to support LOIS businesses include:³⁸

- Make publicly supported incubators off-limits to distantly owned businesses, while using public money for educating local entrepreneurs.
- Make a higher priority of those public infrastructure investments that serve LOIS businesses.
- Revise zoning rules to allow mixed-uses and traditional neighborhood design, which are more likely to create conditions conducive to neighborhood-scale, LOIS businesses.
- Emphasize the commercial potential of existing buildings, not just the value of new industrial parks and buildings.
- Give local business a fair shot at landing local government contracts and investments.

Three rules that local economies can use to allow them to prosper are:³⁹

- Maximize local ownership. Maximize the percentage of jobs in your local economy that exist in businesses that are locally owned.
- Maximize cost effective resilience. Maximize the diversity of your businesses so that your economy is as self-reliant and resilient as possible.
- Spread high standards. Prioritize spending and replicating local business models with outstanding labor and environmental standards.

Actions

Community policymakers have a range of actions they can take to support economic localization. Five areas identified by Michael Shuman and specific options within each are as follows:⁴⁰

- Conduct local studies. These analyze leakages, provide decision-making data for community members, and help point to localization opportunities. Examples include: indicators development (select and quantify relevant measures), assets analysis (gather data on community assets, especially unused and underused assets), imports analysis (to determine local demand), subsidy inventory (to see which ones went to locally owned businesses), State of the Region Report, Community Reinvestment Report, pension fund analysis (to determine potential for local reinvestment), and good community-keeping seals (based on local ownership and performance).
- Conduct local training. Build the capacity of entrepreneurs interesting in establishing or expanding local businesses. Examples include entrepreneurship programs, mentorship programs, place-based scholarships (to train and retain local graduates), and incubators (for locally owned businesses).

36 Shuman, Michael. 2012. *Local Dollars, Local Sense. A Community Resilience Guide.*

37 See <http://edwardlowe.org/tools-programs/economic-gardening/>.

38 Shuman, Michael. 2006. *The Small-Mart Revolution: How Local Businesses Are Beating the Global Competition.* San Francisco, CA: Berrett-Koehler Publishers.

39 Shuman 2012.

40 Shuman 2006. For an abbreviated overview, see the Small-Mart Revolution Checklist at small-mart.org/files/SMChecklist-Policymakers.pdf.

- Support local purchasing. Provide the means for, and support of, purchasing local goods and resources. Examples include creating a homegrown or regional directory, developing selective public contracting (for local businesses), small business bidding assistance, broker business-to-business (B2B) deals (for buying inputs from local suppliers), Buy Local Campaigns, and local currency (support or create a local scrip).
- Support local investing. Mobilize local capital. Examples include banking locally (with local government funds), investing locally (with community funds including surplus revenues and pension funds), bond finance (limit use of industrial revenue bonds to projects involving locally owned businesses), and subsidies (remove as many as possible and sunset the rest).
- Develop local public policy. Use local policy tools to support localization efforts. Examples include Smart Growth, Smart Zoning (with respect to chain-store clusters), Smart Schools (refurbish smaller schools and make it easy/safe for children to walk/bike to school), Smart Taxes, Smart Wages (including a living wage ordinance), and Smart Politics (lobby and press for relevant reforms).

Case Studies

Benton, Wisconsin

Benton is a village of 1,007 located in rural, picturesque Lafayette County. Benton village government has collaborated closely with the Benton Community Development Corporation (BCDC) since its inception by then-village-president Keith Farrey in 1992. BCDC and the village government work together on a variety of economic localization programs:

- Benton Business Incubator. The largest project undertaken to date is the building and management of the Benton Business Incubator. In 2009, it was awarded Revolving Loan and Technical Assistance funds through USDA Rural Development.
- Benton website. The village recently launched its new website (www.bentonwi.us), which is funded by an Alliant Energy grant written by the BCDC and supported by the village.
- Welcome signs. Benton has two impressive welcome signs that bookend the village. BCDC and the village provided funds for sign purchase and installation.
- Marketing to past Benton High School graduates. The BCDC created a directory of all Benton High School graduates, from 1900 to 2007. As a “come home” marketing project, it sends them the Benton Community Voice, a community newsletter published three times a year.

Kickapoo Culinary Center, Gays Mills, Wisconsin

The Kickapoo Culinary Center, although run independently of local government, provides important shared benefits. It is a not-for-profit food business incubator that provides start-up and early-stage food processing businesses with affordable access to a fully-equipped, 2,400-square foot, shared-use kitchen. It also offers coaching and counseling directly to developing businesses, plus coordinates on-site training events with outside educational partners. The Center is co-located in the federally-funded “Community Commerce Center”, which also includes village



Kickapoo Culinary Center photo

government offices, the public library, a large meeting hall, and the flood recovery / economic development coordinator’s office. Village of Gays Mills cooperation with the Culinary Center takes the form of the following:⁴¹

- Both were signatory to the Economic Development Administration grant that funded the creative concept of a community commerce center, conceived during long-range recovery planning after the 2007-08 floods.

Community Commerce Center

41 Telephone interview with Brad Niemcek, Director, Kickapoo Culinary Center, May 31, 2013.

- The village of Gays Mills owns the shared-use kitchen space and contracts with the Gays Mills Economic Development Association, Inc., a local non-profit, for its operation.
- Meeting hall rental revenues supplement operating costs of the Culinary Center.
- The Center, its manager, and its kitchen in turn support community events and related community marketing, as afforded by the public meeting hall.

Advance Microloan Program, Northeast Wisconsin

The Advance Microloan Program, run by the Economic Development Arm of the Green Bay Area Chamber of Commerce (a public-private partnership organization), was created to assist “start-up, newly established, and emerging businesses”. The program began as a way to help new businesses obtain capital during a particularly trying economic period. Initially, only businesses located within Brown County were eligible. Recently the program has expanded eligibility to for-profit businesses located in Brown, Manitowoc, Shawano, Oconto, Outagamie, Calumet, Kewaunee, Door, Florence, Forest, Marinette, and Menominee Counties. Perhaps one of the most unique aspects of this program is the low point of entry: the minimum loan is \$5,000, particularly important for microenterprises and those that lack a “proven track record”. Though the program is run by a public-private organization with private financial partners, this same concept has been implemented by communities across the nation.

Resources

Business Alliance for Local Living Economies (BALLE)

<http://bealocalist.org>

Wisconsin Business Incubation Association

www.wbiastate.org/?110280

UW-Extension Center for Community Economic Development

www.uwex.edu/ces/cced/

Institute for Local Self-Reliance

www.ilsr.org

Slow Money Wisconsin

www.slowmoneywisconsin.org

Sample Resolution for “Buy Local Day”

www.sustainablecitiesinstitute.org/view/page.basic/legislation/feature.legislation/Model_Ord_Buy_Local_Day

Sample Local Preference Purchasing Policy

www.cedar-rapids.org/government/departments/purchasing/Pages/BuyLocal.aspx



Green Bay Area Chamber of Commerce photo

Dennis Wieber, owner of Wieber Machine, received a loan through the Advance Microloan Program.

Purpose

The production, processing, distribution, consumption, and disposal of food have significant implications for community sustainability. The broad scope of individuals, businesses, organizations, resources, and policies involved in moving food from the farm to the dinner table comprise a community's "food system".

"A sustainable food system as one that provides healthy food to meet current food needs while maintaining healthy ecosystems that can also provide food for generations to come with minimal negative impact to the environment. A sustainable food system also encourages local production and distribution infrastructures and makes nutritious food available, accessible, and affordable to all. Further, it is humane and just, protecting farmers and other workers, consumers, and communities."

American Public Health Association

A community food system can be defined in terms of any level of geography and from a variety of perspectives including economic development, family and public health, environmental sustainability, or land use. In 2010, the American Public Health Association, the American Planning Association (APA), the American Dietetic Association, and the American Nurses Association developed principles of a healthy and sustainable food system, including health-promoting; sustainable; resilient; diverse in size and scale, geography, culture, and choice; fair; economically balanced; and transparent.⁴²

Most local governments already make decisions that affect the health of the community food system. Local governments provide oversight of food sourced by publicly funded institutions like schools, jails, and hospitals; disseminate public health and nutrition information and food stamps or coupon programs; and engage in planning and zoning and land use decisions that affect local agricultural production, processing, and resident access to food (e.g., location of grocery stores and farmer's markets). Food systems issues are often large, complex problems with influences outside of local government control. However, local governments can develop effective approaches to these complex problems by creating collaborative strategies with community partners already addressing food systems issues.

Strategy

An overall food systems strategy that can be implemented by public officials and local governments is to:

- Create a food systems plan and/or incorporate food systems components into other planning processes, such as municipal, comprehensive, master, or sustainability plans; emergency action plans; transportation plans; neighborhood plans; or economic development plans. A recent report from the APA found that about 12 percent of communities in a national survey explicitly addressed food systems in their comprehensive or sustainability plans. The most common topics addressed in the plans were rural agriculture, food access and availability, urban agriculture, food retail, and food waste.⁴³ The goals of food systems can vary widely and it is important for a community to use community food system goals developed through these planning processes to guide their actions.
- Address regional food issues. Collaborate with other municipalities and organizations to better understand the regional implications of food systems issues, urban-rural connections, and scope of entities addressing these issues.
- Provide food education about prevention and reduction of diet-related disease, sourcing, growing and using foods, or technical assistance for food-related businesses.
- Support food-related business and industrial development. Create or develop financial incentives for food-related business development including food production, neighborhood grocery stores, or food processing or innovative programs that increase partnerships between institutions involved in the food system.
- Collaborate with agencies and other organizations in the implementation of public outreach and education campaigns to inform the community about food-related emergency preparedness.

⁴² APA. 2010. Principles of a Healthy, Sustainable Food System. Accessed at www.planning.org/nationalcenters/health/foodprinciples.htm.

⁴³ Hodgeson, Kimberley (American Planning Association). 2012. Planning for Food Access and Community-Based Food Systems: A National Scan and Evaluation of Local Comprehensive and Sustainability Plans. p. 7. Accessed at www.planning.org/research/foodaccess/pdf/foodaccessreport.pdf.



E. Peot photo



E. Peot photo



Sunny Sky Farm photo

- Recognize and value the cultural aspects of food. When appropriate, support efforts by Native Americans and ethnic communities to identify and document community and ecological assets and cultural traditions tied to food production, preparation, and consumption.

Actions

While each community must evaluate the appropriateness of an action in their community context, below are some sample actions that local governments can take to impact food systems in a variety of ways and support the strategies discussed above:

- Collect data through studies and assessments that better inform decision making about the regional food system. There are many different categories of food system assessments, including community food security assessments, community food asset mapping, local food economy assessments, and food industry assessments.⁴⁴
- Set food system goals. While local governments can be involved in food systems change at a range of levels from passing zoning policies to conducting broad regional food assessments, the community's comprehensive, strategic, master, or sustainability plan is an important tool for articulating food systems goals. Food systems goals are generally developed through a comprehensive planning process that includes an assessment of the current assets and challenges as well as input from residents. Examples of community goals related to food systems might be to maintain rural character or the agricultural lifestyle of a community, increasing access to healthy foods for low income families, or reducing the food waste stream.
- Integrate food systems policies that build on and celebrate diverse cultural, agricultural, and dietary traditions present in the region into existing comprehensive plan chapters.
- Develop and enact policies to protect agricultural land such as agricultural land preservation zoning, purchase of development rights, and transfer of development rights.
- Develop and enact land use policies, environmental monitoring, and ecological mitigation that prevents potential contamination of agriculture and food products through water runoffs from animal operations, provides sanitary living and working conditions for farm and food workers, and otherwise promotes food safety.
- Enact policies to support healthy food systems and public health such as land use, transportation, and design policies that encourage physical activity, protect food and water sources from contamination, and encourage conservation of prime agricultural land for food production, or purchasing policies that prioritize purchasing from regional farms and support fair trade.
- Amend permitted use standards in the zoning ordinance to include mixed-use neighborhood design and redevelopment such as small and mid-size grocery stores (e.g., 3,000 to 20,000

⁴⁴ Freedgood, Julia, Pierce-Quiñonez, Marisol, and Kenneth A. Meter. December 2011. "Emerging assessment tools to inform food system planning." *Journal of Agriculture, Food Systems, and Community Development*. p. 86-88.

square feet), farmer’s markets, and community gardens in residential and commercial districts.

- Develop regional policies that strengthen markets for the region’s food producers and reduce long-distance transportation of agricultural products and processed foods.
- Assess the impact of food waste disposal on area landfills and explore ways to reduce food waste at each step of the supply chain, from production to retail and consumer loss.⁴⁵ This might include conducting food waste audits, public awareness campaigns, developing secondary markets for imperfect products, composting, and biofuel development.
- Develop and financially support programs that encourage healthy food systems such as transit programs to encourage resident food access, urban agriculture projects, and farmer’s markets at or near government offices, or farm to school programs that increase institutional purchasing of foods from local farms.
- Support health and nutrition educators to provide education for county residents about prevention and reduction of obesity and diet-related diseases such as heart disease, certain cancers, and diabetes.
- Create financial incentives to assist public institutions such as schools, hospitals, colleges, government agencies, and private food outlets such as grocery stores and restaurant to source foods produced in the region.
- Collaborate with other municipalities and support economic development organizations that focus on industry clusters related to agricultural and food systems development.
- Support transit programs that provide safe and convenient connections between low-mobility neighborhoods and grocery stores, community gardens, food assistance programs such as food pantries, and health and social service providers.

Case Studies

Oneida Community Integrated Food System (OCIFS), Oneida Tribe of Indians of Wisconsin

Tribal sovereign nations have been restoring their land and water, addressing diet-related diseases, and ensuring self-sustainability and food security by re-establishing place-based food systems and shifting away from federal food assistance. The Oneida Tribe of Indians of Wisconsin has been exemplary in reclaiming their local food system. The tribe developed a collaborative group consisting of the Oneida Nation Farm, Apple Orchard, tsyunhe’hkw[^] (loosely translated as “Life Sustenance”), Food Distribution, and the Oneida Comprehensive Health Division. The group implements several integrated local agricultural programs, provides nutrition education that incorporates tribal traditions, works to increase food security, develops employment opportunities and engages young people in sustaining their community. More information can be found at: www.oneidanation.org/ocifs/ and <http://falcon.aihec.org/Lists/WhatsNew/Attachments/3/Food%20Sovereignty%20Assessment%20Tool.pdf>.

City of Racine Comprehensive Plan, Racine, Wisconsin

The Agricultural, Natural and Cultural Resources Chapter of the city of Racine’s Comprehensive Plan outlines several objectives, policies, and programs that support food systems initiatives in the city including: expand community gardening opportunities on publicly owned land or other vacant land in the city where feasible, maintain the existing farmer’s market, and consider opportunities to establish new farmer’s markets in other areas of the city. Such markets provide city residents convenient access to fresh farm products and support the county’s agricultural sector. New markets also support agritourism efforts and direct marketing of farm products. More information can be found at www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-305-comprehensive-plan-for-the-city-of-racine.pdf.

⁴⁵ National Resources Defense Council. 2012. Wasted: How America is Losing Up to 40 Percent of Its Food from Farm to Fork to Landfill. Accessed at www.nrdc.org/food/files/wasted-food-ip.pdf.

Chicken Ordinance, City of Oshkosh, Wisconsin

Keeping small livestock used to be commonplace in cities, and was even encouraged by the U.S. government during World War II as part of the Victory Garden campaign. However, it became less commonplace after the war ended and food became less expensive.⁴⁶ Currently it's becoming popular for families to raise small livestock as a hobby and to meet some of their food needs, and many communities have passed or began considering urban livestock ordinances.

A group of residents in Oshkosh (population 66,000) were interested in raising chickens but found that it was not allowed under the current city ordinances. Residents petitioned the city council to approval a backyard chicken ordinance. After securing recommendations from the board of health and the sustainability advisory board, the city council approved an ordinance in 2011 that allows residential households to keep up to four hens in R-1 Single Family or R-2 Two Family Zoning Districts. The council approved a controversial amendment to the ordinance that also required written consent from all abutting neighbors. Opponents felt this requirement was excessive, given that residents are not required to request permission for a dog or other animal. More information can be found at www.ci.oshkosh.wi.us/weblink8/0/doc/620486/Page1.aspx.

In 2012 the city of Oshkosh passed a sustainability plan that included a section on local food with the objective to “promote local food production, sales, and consumption.” The plan calls for further municipal code revisions addressing “non-slaughter food production in residential and other districts.” The City of Oshkosh Sustainability Plan (May 2012) is available at www.ci.oshkosh.wi.us/SustainableOshkosh/assets/pdf/Sustainability_Plan_Draft_5-16-12.pdf.



Whitefeather Organics LLC photo

Resources

Wisconsin Food Security Project

<http://foodsecurity.wisc.edu/>

North Central Region County Food Systems Profiles Portal, University of Wisconsin-Extension

County based food systems profiles, maps, and topical resource links created in 2012.

<http://foodsystems.wisc.edu/>

Policy Guide on Community and Regional Food Planning

www.planning.org/policy/guides/adopted/food.htm

Counties and Local Food Systems, National Association of Counties

www.farmtoschool.org/files/publications_133.pdf

Planning to Eat? Innovative Local Government Plans and Policies to Build Healthy Food Systems in the United States

http://cccfoodpolicy.org/sites/default/files/resources/planning_to_eat_sunybuffalo.pdf

UW-Extension Economic Impact of Agriculture Reports

www.uwex.edu/ces/ag/wisag/

Community Orchards

<https://attra.ncat.org/horticultural.html>

⁴⁶ Bouvier, Jaime. April 2013. “Practicing Urban Livestock.” Zoning Practice, American Planning Association, Issue Number 4, p. 4-13.

Solid Waste Management

Purpose

The use and flow of resources or materials through communities is one of the central themes to sustainability. The policies and practices adopted by businesses and local units of government can impact whether these materials are disposed of as wastes, returned to use through recycling, or returned to the earth through composting.

In a traditional view of solid waste management, local governments take on the challenge of managing the solid waste generated by residents of their community. Local units of government have developed a variety of systems for the collection of solid waste and recyclables. The services range from municipal employees performing the collections to requiring residents to contract for services on their own. In addition to determining who will perform collection, a community also needs to determine how and what materials will be collected as well as how it will be managed after it has been collected.

In some cases state mandates dictate which materials are recycled; however, some communities have decided to expand their list of what is collected. The solid waste hierarchy, which prioritizes approaches to managing materials both prior to and after disposal, is a useful guide in the decision making process when setting priorities and gauging one practice versus another.⁴⁷



Another important component of these systems is education. Residents rely upon their local programs to provide them with information regarding what is or is not recyclable as well as instructions for setting materials out for collection.

Strategy

The following strategies can be used to address waste management:

- Reduce waste. This strategy entails taking steps that eliminate the production of waste at the source. The elimination of mercury use in products such as thermometers and thermostats is an example of that approach.
- Reuse waste (e.g., through Habitat Restores, Choose to Re-Use events, or Freecycle websites). This strategy would put mechanisms in place that would encourage residents or businesses to seek out others who may be able to use an item or material they no longer have a need or use. For example, the town of Grand Rapids holds two Choose to Re-Use events each year.⁴⁸
- Recycle waste. This is the diversion of materials recovered from the solid waste stream (such as paper, plastic containers, etc.) to be returned to productive use as a material.
- Collect source separated organics. This strategy focuses upon the fraction of the waste

⁴⁷ EPA. Solid Waste Management Hierarchy. Accessed at www.epa.gov/osw/nonhaz/municipal/hierarchy.htm.

⁴⁸ Choose to Re-Use Grand Rapids brochure. Accessed at www.townofgrandrapids.org/uploads/documents/Choose%20to%20Reuse%20in%20Your%20Community.pdf.

stream that can be composted or anaerobically digested. In both cases the resulting product can be used as a soil amendment to build soil health. Anaerobic digestion has as an additional benefit the production of methane gas, which can be used to generate electricity, vehicle fuel, or heat.

- Reduce waste to zero. Many communities have adopted zero waste as a goal for their waste management system. In this case, aggressive steps are taken to both minimize waste generation and maximize resource recovery. Many communities have gotten to a 75 percent recycling rate through the combination of traditional recycling and source separated organics recovery. Zero waste aims to find a way to recover that final quarter of the waste stream.
- Reduce toxic materials. Household hazardous wastes (HHW) are waste materials generated by homeowners that may be considered hazardous. While homeowners may be exempt from state and federal hazardous waste handling requirements, a municipality may choose to offer collection services for these materials. This service is commonly referred to as a “Clean Sweep.” Initially these events were one-day events held on a sporadic basis. Due to the increased demand for Clean Sweep services, some communities have established seasonal or permanent collection sites to provide residents with more opportunities to properly dispose of or recycle the HHW that has been generated in their home. Another initiative is a community-wide collection of prescription drugs. These drugs get into our water sources and by collecting them, they can be disposed of in a safe manner.

Actions

Local governments have implemented a number of actions to support resource management strategies. These include:

- Educate residents about reducing and recycling waste. An education program is one of the components of maintaining an effective recycling program. Educational materials should clearly inform residents about the requirements for recycling in your community, and the information should be shared through schools, community groups, and media outlets. Residents need periodic reminders regarding which materials can be recycled, how to prepare materials for collection, and when these materials will be collected.
- Implement policies that maximize the recovery of recyclable materials. In addition to educational programs, many communities have increased recycling rates through the use and enforcement of local recycling ordinances.
- Institute a pay-as-you-throw system. These systems provide a monetary incentive for residents to reduce waste disposal volumes. Rather than paying for collection services as part of annual tax bills, residents are assessed a fee based upon the size of waste cart they use or a “per-bag” charge for each garbage bag set out for collection or brought to a drop-off site.
- Encourage cooperation among local businesses and manufacturers. Larger volumes of materials are typically easier to recycle. Additionally some communities have facilitated discussions between manufacturers regarding waste generation. A waste generated by one company may be a suitable feedstock for another manufacturer and exchanges of these materials are facilitated by use of an online waste exchange.
- Develop cooperative agreements. Typically, increasing the economies of scale affecting materials improves the cost effectiveness and efficiency of programs. Local governments have joined forces to implement cooperative strategies to manage materials, including shared HHW facilities and recycling processing facilities.



Recycling containers at the University of Wisconsin-Stevens Point

CLUE photo

Case Studies

Toward Zero Waste, City of Madison, Wisconsin

The city of Madison has set a long-term goal of achieving zero waste. In order to achieve this goal, a variety of steps were taken including:

- The city added construction and demolition debris and plastic bags in 2010. As a result, they now divert 73 percent of their waste resources from landfill.
- Organics represents one of the largest fractions (nearly half) of the remaining materials in the waste stream. In 2012, a pilot organics collection program was launched for 550 households. Items collected included food scraps, soiled paper, pet waste, diapers, and yard waste.
- Nearly 14 pounds per week per household was collected using a special organics cart (35 gallon) and taken to a compost site.

As a result of this organics diversion effort, the city of Madison significantly reduced odor-producing putrescibles in the regular trash, allowing for future diversion of the remaining solid waste materials. In 2013, the pilot program was expanded to grocery stores and restaurants, while negotiations were begun with Dane County for taking organics to their proposed anaerobic digester to generate renewable energy. The goal will be to phase in expanded curbside organics collection citywide beginning in 2015.

Economies of Scale, Regional Cooperation in the Fox River Valley, Wisconsin

Faced with the increasing cost of operating an integrated solid waste program, Brown, Outagamie, and Winnebago Counties (BOW) formed the Tri-County Solid Waste Consortium in 2002. Prior to that, the three counties operated their own disposal, recycling, and household hazardous waste facilities. Now, the three counties coordinate their waste disposal using each county-run landfill in sequence thereby sharing administration and operational costs. In addition, BOW operates a regional single stream Materials Recovery Facility (MRF) in Appleton that is one of the largest municipal MRFs in the country. The shared MRF processes and markets comingled residential and commercial recyclable containers and paper from the partner counties, as well as other northeastern Wisconsin counties.

In order to retain maximum participation and convenience, each county operates their own HHW facility, since household hazardous waste is dropped off by consumers. This cooperative recycling and solid waste effort is slated to save the three counties \$35 million in disposal costs over 25 years as well as \$8 million in recycling costs over 12 years.

Resources

US Environmental Protection Agency – Office of Solid Waste

Various publications and programs for solid waste management programs.

www.epa.gov/osw

UW-Extension Solid and Hazardous Waste Education Center (SHWEC)

Provides publications, resources and technical assistance to business and communities in the area of solid waste, recycling, and composting.

www.uwex.edu/shwec

Wisconsin Recycling Markets Directory

Faced with an increasing need to expand both the types of recyclables and locations for processing, the SHWEC established the Wisconsin Recycling Markets Directory (WRMD) in 2007. The WRMD provides information about outlets for recycling various materials in Wisconsin.

Users can search a list of recyclers for various materials, view information about the recyclers and



J. Van Rossum photo

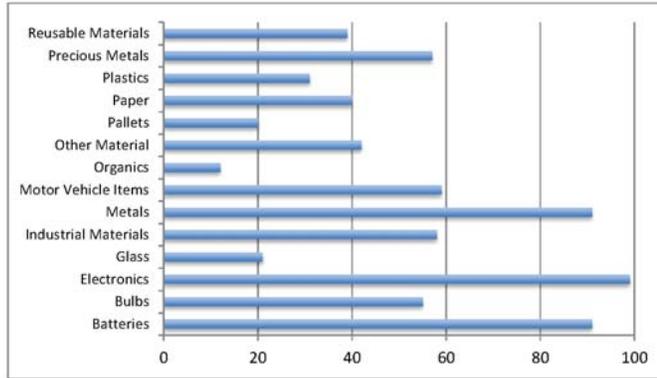
Food waste in Madison is collected through compost bins.

suggest additional recyclers to include in the listing.

Since the recyclers in this directory generally work with large volumes of material, contact information is provided to allow for discussion of recycling options and to make arrangements for drop-off or pick up. Currently, there are over 250 business listings in 15 different categories in the database.

www4.uwm.edu/shwec/wrmd

Wisconsin Recycling Markets Directory: # of Firms



Curbside Value Partnership

An organization working with communities to improve recycling educational programs and recycling efficiency.

www.recyclecurbside.org

By-Product Synergy Hub

An effort by the United States Business Council for Sustainable Development to connect waste generators with potential end-users.

<http://bps-hub.org>

Sample Resolutions for Becoming an Eco-Municipality

City of Ashland

RESOLUTION # _____

City of Ashland, Wisconsin

Eco-Municipality Designation Resolution

Adoption of Sustainable Community Development Policy

WHEREAS, the City of Ashland has adopted a Comprehensive Plan (2004 - 2024) that calls for “The Making of an Exceptional City”, and includes dozens of references to sustainable practices; and

WHEREAS, the adoption of the four system conditions of The Natural Step can provide a framework that will assist city employees and elected officials in moving in a more sustainable direction; and

WHEREAS, the willingness of the city to move in the direction of becoming an eco-municipality can serve as a model for others and encourage economic development along similar lines in our city and region; and

WHEREAS, the City of Ashland has a pledge of support through mentorship and consulting from The National Association of Swedish Eco-Municipalities; and

WHEREAS, the following four guidelines were developed by the American Planning Association to help communities implement sustainable practices:

1. Reduce dependence upon fossil fuels, and extracted underground metals and minerals.
2. Reduce dependence on chemicals and other manufactured substances that can accumulate in Nature.
3. Reduce dependence on activities that harm life-sustaining ecosystems.
4. Meet the hierarchy of present and future human needs fairly and efficiently.

NOW THEREFORE BE IT RESOLVED that The City of Ashland hereby endorses the principles of sustainable community development described herein, and agrees to apply these principles whenever possible in its planning, policy making, and municipal practices.

Adopted by the City Council of Ashland, Wisconsin this 13th day of September, 2005

_____	_____
Fred Schnook, Mayor	Date

_____	_____	_____	_____
Attorney	Date	City Clerk	Date

City of Bayfield
Bayfield County - Wisconsin

A Resolution: A Commitment to Sustainability in the City of Bayfield

WHEREAS, the City of Bayfield acknowledges that the people of Bayfield, Wisconsin desire to create a stable, sustainable future and acknowledge that such a future is not certain.

We recognize that it will take the goodwill and determined work of individuals and communities around the world to achieve this goal. We wish be part of this international network and declare sustainability to be a goal of this City.

We wish to integrate our economy, environment, society, and governance in ways that foster vibrant social and economic conditions, and a healthy ecosystem. To that end, we commit ourselves to creating the conditions necessary for a sustainable future. By seeking innovative and flexible solutions to the challenges that confront us, by sharing our knowledge, and by coordinating our actions, we strive to:

- Reduce and eventually eliminate our contribution to the progressive buildup of materials (and their associated wastes) that are extracted from the Earth’s crust.
- Reduce and eventually eliminate our contribution to the progressive buildup of synthetic materials produced by human society.
- Reduce and eventually eliminate our contribution to the ongoing physical degradation of the Earth.
- Reduce and eventually eliminate our contribution to conditions that undermine people’s ability to meet their basic needs.

THEREFORE, BE IT RESOLVED that the City of Bayfield declares its commitment to sustainability as outlined above.

Adopted this 13th day of December in the year 2006 and signed.

THIS IS TO CERTIFY THAT the foregoing is a true and correct copy of a resolution duly and legally adopted by the CITY OF BAYFIELD at a regular meeting held on the 13th day of December in the year 2006.

Billie Hoopman, Clerk

Town of Bayfield
Bayfield County - Wisconsin
RESOLUTION 2006-18

A Resolution
Supporting Sustainability in the Town of Bayfield

WHEREAS, the Town of Bayfield Board of Supervisors does hereby acknowledge societies desire to create a stable, sustainable future. We further acknowledge that such a future is not certain, and that it will take the goodwill and determined work of many individuals, organizations, and communities around the world to achieve our goal.

And WHEREAS, we are proud to be part of a community as rich in natural amenities, economic opportunities, and social responsibilities as the town of Bayfield, and to be working on behalf of a future in which our economy, environment, society and governance are integrated in ways that foster vibrant communities, strong economies, and healthy ecosystems. To that end, we commit ourselves to creating the conditions necessary for a sustainable future. By seeking innovative and flexible solutions to the challenges that confront us, by sharing our knowledge, and by coordinating our actions, we strive to:

1. Reduce and eventually eliminate our contribution to the progressive buildup of materials (and their associated wastes) that are extracted from the Earth's crust.
2. Reduce and eventually eliminate our contribution to the progressive buildup of synthetic materials produced by society.
3. Reduce and eventually eliminate our contribution to the ongoing physical degradation of Nature.
4. Reduce and eventually eliminate our contribution to conditions that undermine people's ability to meet their basic needs.

NOW, THEREFORE, BE IT RESOLVED that the Town of Bayfield Board of Supervisors declares its commitment to sustainability as outlined above.

Adopted this 16th day of October in the year 2006 and signed.

Tom Gordon, Chair

Gerald L. Carlson, Supervisor

Richard L. Carver, Supervisor

Richard C. Compton, Supervisor

William Ferraro, Supervisor

THIS IS TO CERTIFY THAT the foregoing is a true and correct copy of a resolution duly and legally adopted by the TOWN OF BAYFIELD at a regular meeting held on the 16th day of October 2006.

David L. Good, Clerk

Toward a **Sustainable** Community:

A Toolkit for Local Government

Authors:

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Available electronically at www.uwsp.edu/cnr-ap/clue/Pages/publications-resources/EcoSustainability.aspx.

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