

Pollution Prevention Best Practices

Minnesota Water Sustainability Framework January 2011

C. Pollution Prevention

Pollution prevention (P2) is defined as "reducing, reusing, and recycling" to prevent pollution in water through individual action, government policy, and industrial and business action. It is far more cost-efficient and effective to prevent pollution in the first place than to clean up problems after they are created. A number of best management practices (BMPs), resources, technical assistance, and guidelines are available to aid individuals, businesses and industry, and government.

1. Individual action

In many cases, improving practices at the household level to prevent pollution to waterways simply requires sharing common sense solutions with the public. Primary ways for Minnesota residents to prevent pollution include recycling; preventing hazardous or toxic materials from reaching waterways by disposing of them or recycling them properly; reducing use or re-using products rather than buying new; and making informed choices when purchasing goods and services or managing homes and properties. Tools and resources for improved practices at the household level are readily available through the Minnesota Pollution Control Agency.

Recycling

At 42%, Minnesota has the second highest recycling rate in the nation yet, every year Minnesotans throw out over a million tons of material that could be recycled. Recycling best practices include purchasing products made of materials that can be recycled locally, encouraging local businesses and merchants to recycle, and purchasing items made from recycled materials.

Preventing hazardous materials from reaching waterways

Most of the behaviors that can impact water sustainability are easily preventable once old habits are examined in light of pollution prevention and changed to more sustainable practices. For example, burning household garbage in burn barrels, stoves, and fire pits is a long-standing practice, but one that we now know contributes dioxins and other contaminants to the air, water, and soil. It's against the law for most homeowners in Minnesota but is still common in many areas. Eliminating this practice requires a combination of enforcement, recycling, waste reduction, and education.

Consumer electronics can release heavy metals and other chemicals into the environment. Minnesota law requires that televisions and monitors be recycled, and almost anything electronic can and should be recycled. Some retail stores and major computer and electronic manufacturers now provide recycling and reuse services. Cell phones can be donated for reuse, resale, and recycling. Household hazardous wastes are another source of contaminants to our waters. Homeowners are encouraged to identify potentially hazardous substances in their households and use local collection facilities for appropriate reuse or disposal. Chemical residues from pharmaceuticals and personal care products in our lakes and rivers can cause adverse effects on fish, wildlife, and potentially, humans. Proper disposal of unwanted pharmaceuticals is important to protecting water quality. Best practices for household pharmaceutical

disposal are directed toward encouraging citizens to dispose of them through local collection events or package them well, conceal them, and dispose of them in their trash.

Making informed choices to prevent waste and pollution

Purchasing durable goods, repairing rather than replacing, reusing products and packaging, choosing products with minimal waste, as energy-efficient and free of toxics as possible, and sharing durable goods with others help reduce waste. Online services such as the Freecycle Network, Craigslist, or Hennepin County's *Choose to Reuse Directory* are also an excellent way to reduce waste.

Informed choices by consumers not only help save money but also reduce impacts on water resources. Consumer choice and public expectations can influence the market and move it toward more sustainable products and practices and the implementation of corporate social responsibility programs. For example, paying a small additional fee to electrical utilities to support alternative energy sources that reduce coal use has an added water and air quality benefit of decreasing mercury emissions. With surveys indicating over 50% of Americans are concerned about chemicals in household cleaners, several major manufacturers such as Clorox Co., SC Johnson and Proctor & Gamble have begun disclosing the ingredients of their cleaning products on the Internet and through toll-free phone numbers. In 2008, in response to consumer preferences, Walmart outlined a series of steps to build a more environmentally and socially responsible global supply chain.

2. Government action

Under Section 6602 (b) of the Pollution Prevention Act of 1990, Congress established a national policy that:

- pollution should be prevented or reduced at the source whenever feasible;
- pollution that cannot be prevented should be recycled in an environmentally safe manner whenever feasible;
- pollution that cannot be prevented or recycled should be treated in an environmentally safe manner whenever feasible; and
- disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

Pollution prevention can be implemented at the federal, state, or local government level through strategies such as employee education, incentives for more efficient practices, intentional land use planning and preservation, and waste and toxin reduction strategies, such as integrated pest management. A combination of regulations, incentives, education, and perhaps most critically, easy access to effective guidance is required to make P2 strategies effective. For example, the Minnesota Pollution Control Agency in cooperation with other agencies has created excellent online resources to guide citizens, businesses, and local governments toward better pollution prevention choices (c.f. <http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/preventing-waste-and-pollution.html>).

Regulations also play an important role when education and incentives are not effective. The Minnesota Phosphorus Lawn Fertilizer Law, passed statewide in 2005, prohibits use of phosphorus lawn fertilizer under most conditions with the intent of preventing nutrient enrichment of surface waters and requires fertilizer of any type to be cleaned up immediately if spread or spilled on a paved surface. A survey conducted three years after the law took effect found phosphorus-free lawn fertilizer in 97% of stores, use

of lawn fertilizers containing phosphorus had decreased 38%, costs did not rise, and consumers were supportive of the law.

Another state and local government role is to promote P2 practices to the business community through actions such as small business educational workshops and recognition programs to encourage pollution prevention, promotion of water conservation, and use of non-toxic products. The third role local governments play is to encourage their citizens to implement pollution prevention techniques at home through education and incentives, such as sponsoring pharmaceutical collection events.

3. Pollution Prevention in the Industrial and Commercial Sector

Pollution prevention in the industrial and commercial sector is fast becoming an important element of sustainability in the private sector. The growing concern and importance of protecting water resources within the watershed surrounding business facilities in conjunction with the financial savings provided with water conservation and green chemistry design as well as the improved health and safety of employees and the community contribute to a sustainable community. Within the context of water resources, pollution prevention can be discussed as the quantity of water a facility uses and recycles and the quality of water the company treats and discharges into the environment. The general framework approached by leading companies is briefly discussed below.

Pollution Prevention in Relation to Water Quantity

Water footprinting is a methodology that measures the total annual volume of water used to produce the goods and services consumed by any well-defined group of consumers such as families, cities, states and more recently, a business or its products. Water footprints help businesses better understand their relationship with watersheds, make informed management decisions, and spread awareness of water challenges. Corporate water footprints measure the total volume of water use directly and indirectly to run and support a business. This in combination with a life cycle assessment of the environmental impacts of a given product or service caused or necessitated by its existence helps companies identify environmental impacts incurred at different stages in the value chain.

Best Management Practices (BMPs) for pollution prevention in terms of water quantity are designed to consider all of the various commercial and industrial uses of water to maximize conservation. This can mean both maximizing water efficiency and minimizing use within a company infrastructure and product development. Conserving water begins with the development of a water management plan to help understand how a company uses its water from the time the water enters the site or is piped into the facility till when it exits as wastewater or stormwater. The Environmental Protection Agency (EPA) has developed a top ten list of water management techniques that have proven helpful in managing water use at their facilities. These are very similar to what many commercial and industrial facilities include in their techniques. It includes: metering and measuring water use to ensure that equipment is running efficiently and BMPs are effective, optimizing cooling towers, upgrading sanitary fixtures, eliminating single-pass cooling, landscaping for infiltration and stormwater retention and treatment, and reuse or recycling of grey water depending on the use(s).

There are advanced tools available to help companies understand their water needs in relation to local conditions including water availability (current and projected), water quality, water 'stress' (relating to people, environment and agriculture), access to safe drinking water sources and sanitation, as well as population and industrial growth. Examples of these online tools include the Global Water Tool (GWT) and the Global Environmental Management Initiative (GEMI) water sustainability planner and tool.

These tools help companies understand and manage water use from the individual to the whole company in a sustainable fashion. For example, Dow and Caterpillar combined the use of the GWT with the GEMI's 'Collecting the Drops: A Water Sustainability Planner,' while Lafarge and PepsiCo linked it to their testing of the Water Footprint Network's method.

Pollution Prevention in Relation to Water Quality

Competitiveness and productivity are essential for any business. One way to cut costs is to use water resources efficiently and effectively. Preventing waste and pollution before it is generated is economically savvy and sustainable to the community. In addition, encouraging pollution prevention within the company and the community with environmental purchasing and recycling can boost morale, improve worker safety, and reduce liability. There are a wide range of commercial and industrial businesses in Minnesota that manufacture and produce an array of products. There is a great need for pollution prevention technical assistance among Minnesota facilities. This need is met by the Minnesota Pollution Control Agency (MPCA) and the Minnesota Technical Assistance Program (MNTAP), which provide resources for companies to prevent pollution with existing technologies and through new and emergency green chemistry methods. Generally, this is accomplished by recognizing and taking advantage of opportunities to prevent pollution through chemical substitution, material flow, process control, automation, and technology. Much can be done to prevent or reduce pollution just by examining a company's general material flow, process control, and automation. Once these are understood and changes are made within the existing structure, innovative technology, green chemistry, and design can be employed to increase P2 opportunities. Green chemistry and design involve formulating or designing a new product (or reformulating or redesigning an existing one) to reduce environmental, workplace, human health, and energy use impacts over the product's entire life-cycle. A product's life cycle includes design, production of material and energy inputs, product production, end use, end-of-life recovery, and all packaging and transportation between these steps.

For example, General Mills Inc. redesigned one of its food products and optimized the related manufacturing processes on one production line amounting to a savings of \$760,000 and reducing ingredient waste by 640,000 pounds annually. They are now using what they learned to reduce waste and save money across all of their production lines. Another example is Medtronic Inc., which reduced chemical use and wastewater loading early in a product design using a method developed by environmental personnel, resulting in annual savings of \$2.1 million dollars.

Resources Used

Resources: Individual Pollution Prevention

Guidance on what can be recycled in each Minnesota county. www.RecycleMoreMinnesota.org.

Registered collectors of consumer electronics.

<http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/product-stewardship/initiatives-in-minnesota/electronics/minnesota-electronics-recycling-act/registered-stakeholders-py3.html>.

Healthy Home Checklist. <http://www.pca.state.mn.us/index.php/view-document.html?gid=13394>.

Minnesota Pollution Control Agency Pollution Prevention Website.

<http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/preventing-waste-and-pollution.html>.

Minnesota Pollution Control Agency resource page for citizen pollution prevention.

<http://www.pca.state.mn.us/index.php/living-green/citizens.html>.

Household hazardous waste county collection site locator. <http://www.pca.state.mn.us/index.php/living-green/living-green-citizen/household-hazardous-waste/where-to-find-a-household-hazardous-waste-collection-site.html>.

Guidance for disposing of pharmaceutical waste. <http://www.pca.state.mn.us/index.php/living-green/living-green-citizen/household-hazardous-waste/pharmaceutical-waste-disposing-of-unwanted-medications.html?menuid=&redirect=1>.

Resources: Government Pollution Prevention

Frampton, J. Acting Like a Leader: The Art of Sustainable Sustainability.

http://www.sustainablelifemedia.com/content/column/brands/the_art_of_sustainable_sustainability.

National Pollution Prevention Policy. <http://www.epa.gov/p2/pubs/p2policy/definitions.htm>.

Chesapeake Bay Program. 1998. Local Government Pollution Prevention Toolkit.

<http://www.p2pays.org/ref/06/05818.pdf>.

Resources: Pollution Prevention in Relation to Water Quantity

Global Water Tool – World Business Council for Sustainable Development.

<http://www.wbcd.org/Plugins/DocSearch/details.asp?DocTypeId=251&ObjectId=Mzg4NTQ&URLBack=/templates/TemplateWBCSD4/layout.asp%3Ftype%3Dp%26MenuId%3DODQ%26doOpen%3D1%26ClickMenu%3DrightMenu>.

Global Environmental Management Initiative. <http://www.gemi.org/waterplanner/index.htm>.

Corporate Water Accounting - An Analysis of Methods and Tools for Measuring Water Use and Its Impacts.

http://www.unglobalcompact.org/docs/issues_doc/Environment/ceo_water_mandate/Corporate_Water_Accounting.pdf.

The Minnesota Technical Assistance Program (MnTAP) is an outreach program at the University of Minnesota that helps Minnesota businesses develop and implement industry-tailored solutions

that prevent pollution at the source, maximize efficient use of resources, and reduce energy use and cost to improve public health and the environment. <http://mntap.umn.edu/>.

Resources: Pollution Prevention in Relation to Water Quality

Minnesota Pollution Control Agency – Assistance and resources for preventing waste and pollution. <http://www.pca.state.mn.us/index.php/topics/preventing-waste-and-pollution/assistance-and-resources/assistance-and-resources.html>.

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The Water Environment Federation is a not-for-profit association that provides technical education and training for thousands of water quality professionals who clean water and return it safely to the environment. <http://www.wef.org/>.